Pathways to kindergarten readiness.

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PATHWAYS TO KINDERGARTEN READINESS

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A Capstone Project
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Doctor of Education in Educational Leadership and Organizational Development

Department of Educational Leadership, Evaluation & Organizational Development
University of Louisville
Louisville, Kentucky

August 2016
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A Capstone Project Approved on June 22, 2016

by the following Capstone Project Committee

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Dr. Bradley Carpenter, Chair

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Dr. W. Kyle Ingle

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Dr. Jason Immekus

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Dr. John Gasko
DEDICATION

This dissertation is dedicated to preschool students in EDS. We hope our research positively impacts your academic success.
ACKNOWLEDGEMENTS

We would like to thank our dissertation chair, Dr. Bradley Carpenter and our committee members, Dr. Kyle Ingle, Dr. Jason Immekus, and Dr. John Gasko, for their support and guidance throughout this prodigious journey.

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Finally, to my capstone crew, I don’t even know where to begin. This journey has been crazy from start to finish, but we made it through. I am a stronger educator, more refined writer, and better listener because of the countless hours we have spent together. I will always remember the synonym key, not to sing in front of a true musician, that Deb always has snacks when you need them, and that Cardinal Café is just around the corner when you need a place to sit and debrief. I will always return your calls and text, maybe.

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ABSTRACT
PATHWAYS TO KINDERGARTEN READINESS
Stephanie Nutter
&
Deborah Rivera
&
Ashley T. Forrest
June 22, 2016

The purpose of this capstone was to explore pathways for increased kindergarten readiness by examining the relationship between kindergarten readiness as measured by the Brigance Kindergarten Screener (BKS) domains of cognitive/general knowledge and language/communication and each of the following variables: school funding, school location, school classification, teacher credentials, teacher years of experiences, music inclusion, and time allotted to music instruction. Participants included 174 preschool students from 17 classrooms in an urban school district. This capstone used preexisting data from the school district including demographic variables of race, socioeconomic status (SES), prior setting, attendance, and the school-level variable of climate. A Hierarchical Linear Multiple Regression found that SES had a significant relationship with all dependent variables. The variable of school classification was reported as having a significant relationship to the cognitive/general knowledge domain of the BKS. Our study as a whole provides research-based information on which policy decisions concerning preschool programs can be made.
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EXECUTIVE INTRODUCTION

The importance of impactful and structured early childhood experiences cannot be understated. Perez-Johnson and Maynard (2007) suggest “experiences in early childhood help shape the ‘architecture’ of the brain supporting the significance of addressing early childhood curriculum, staffing, and funding decisions” (pp. 589-590). The relationship between kindergarten readiness and variables contributing to student success, such as school funding source, school location, school classification, teacher credentials, years of experience, and the inclusion of and the time allotted to cross-curricular instructional materials (such as music education) must be examined to determine successful pathways to kindergarten readiness. We argue that determining successful pathways allows access to the skills needed for all students across socioeconomic statuses to be kindergarten ready.

In order to increase kindergarten readiness, achievement gaps among children demand the attention of educational leaders, policy makers, and researchers. In an attempt to reduce the development of achievement gaps, increased attention has been placed on early childhood programs due to the foundation that these programs provide in establishing an infrastructure for future learning experiences, including the ultimate goal of high school graduation.Highlighting the challenges of traditionally marginalized students, Hernandez (2012) found that “35 percent of children who were poor, lived in neighborhoods of concentrated poverty, and not reading proficiently failed to
graduate high school on time” (p. 11). Duncan and Magnuson (2011) used probit regressions to investigate the relationship between high school completion and preschool cognitive skills, attitude, and background for students ages 5 to 14. When reading and math measures were combined to create the cognitive measure, it was a significant predictor of high school completion (Duncan & Magnuson, 2011). Traditionally marginalized populations must be afforded equitable access to preschool programs, thus allowing their children to attend, and benefit from, quality schools, qualified teachers, and access to a variety of curricular experiences including music.

The purpose of our study was to identify research-based pathways for all students to reach kindergarten readiness. According to the State Department of Education\(^1\) (2015), 51% of kindergarten students in the state are not ready to enter school. The most recent census data for Elementary District Schools\(^2\) (EDS) shows there are 40,863 children below the age of five living in the district (United States Census Bureau, 2010). More than 20,000 students will enter school not ready for the academic rigor of kindergarten if current trends of kindergarten readiness continue. Age of Learning, Inc. (2011) conducted a National Kindergarten Preparedness Survey and reported that 65.6% of kindergarten students from more than 500 classrooms throughout the United States were not fully prepared to meet academic standards.

The importance of teacher quality in early childhood programs cannot be understated. Teacher certification, college education, and years of experience for teachers provide access to highly qualified teachers for all students, regardless of socioeconomic status when qualifications established by states often vary for preschool teachers.

---

1 A pseudonym was used in order to protect the identity of the State Department of Education.
2 A pseudonym was used in order to protect the identity of the cooperating school district.
(Abbate-Vaughn, Paugh, & Douglass, 2011). Critical examination of preschool programs is essential to minimizing achievement gaps that are already present before students enter kindergarten. Questions concerning funding sources, school location, school classification, teacher credentials, teacher years of experience, and the inclusion of, and time allotted to, non-assessed curriculum such as music should be addressed to maximize preschool student achievement. All students must be afforded equal opportunity for success through the creation of quality preschool programs that provide productive educational experiences towards the goal of kindergarten readiness.

**Accountability**

In the age of school accountability, there is a heightened awareness of preschool programs (Williams, Landry, Anthony, Swank, & Crawford, 2012) and the imperative for students to enter kindergarten ready to learn has been recognized (Konold & Pianta, 2005), especially with many students not being prepared to learn (Pianta & Stuhlman, 2004). The U. S. Department of Education (2015) acknowledged state and federal governments, in addition to philanthropic agencies, are funding preschool programs at an increasing rate. Tax dollars are largely invested in preschool to ensure increased levels of proficiency for students as indicated by state accountability assessments. According to the Prichard Committee for Academic Excellence (2012), the state in which EDS resides spent $71.3 million for the 2013-2014 school year in efforts to prepare preschool children for success on the state-mandated Brigance Kindergarten Screener (BKS). Walters (2014) discusses *President Obama’s Fiscal Year 2016 Budget* and its efforts to improve Head Start services through funding. These improvements would include more access for all children to full-day, full-year programs. Walters continues by stating quality, full-day
preschool programs improve cognitive skills more than other preschool programs and improvement in cognitive skills could have a positive impact on students’ kindergarten readiness.

Lawmakers must provide fiscal resources and reauthorizations of legislation for state and federally funded preschool programs due to mandates of the *No Child Left Behind Act of 2001* (NCLB) and the updated *Elementary and Secondary Education Act of 2015* (ESEA). Pressure from NCLB legislation has forced preschools to focus on developing academic skills that increase achievement of standards mandated in elementary schools (Stipek, 2006). Since significant amounts of funding have been allocated to these programs, lawmakers must ensure that they are fiscally responsible with these allocations (Early et al., 2007). Structural components of preschools, such as funding sources, school location, school classification, teacher credential requirements, teacher years of experience, and curricular decisions (such as music education inclusion) were examined in our study to determine the most productive and effective pathway for kindergarten readiness and student success. Examining the aforementioned components of preschool education yielded critical insights to effective kindergarten readiness services for all students.

**Kindergarten Readiness**

The State Department of Education (2015) defined kindergarten readiness as follows: “[Kindergarten] readiness means each child enters school ready to engage in and benefit from early learning experiences that best promote the child’s success” (para.1). The level of kindergarten readiness each student reaches is determined through the administration and scoring of the BKS. The outcomes from this assessment are used to
determine the effectiveness of programs at preparing students for kindergarten. The BKS is a state required test of students’ kindergarten readiness in the areas of physical readiness, socio-emotional readiness, and cognitive readiness.

The focus on academics as a sole indicator of school success has led to approaches in early childhood education that leave out social-emotional and linguistic education (Stipek, 2006). Garner, Mahatmya, Brown, and Vesely (2014), as well as Lasi, Nadeem, and Fatima (2007) support the need for a holistic approach to preschool education to ensure kindergarten readiness and support the need for creating educational experiences in addition to assessed subjects. The addition of music to preschool classrooms as a supplemental instructional resource, or as a separate curriculum, supports the student in “exploring the world in musical ways” (Niland, 2009, p. 18). Preschools that focus only on cognitive skills might not equip students to be kindergarten ready, as measured by the BKS.

**Purpose**

Children need quality instruction and a firm foundation of multiple skill sets in order to be successful in elementary school. Yoshikawa et al. (2013) discussed how advances in neuroscience research have assisted in the recognition of the benefits of quality early education. These advances reinforce the idea that the early years are a critical period in children’s developmental learning and provide the foundation for more advanced skills. Without these early learning opportunities, students may be at an academic disadvantage before they begin their elementary school years. Preschool programs are critical to fostering a solid foundation upon which students can begin their formal academic journey. Future studies must provide answers as to the relationship
between variables and the readiness of kindergarten students in order to provide support for curricular and structural decisions for preschool programs.

**Research Questions**

Our capstone study addressed the following research questions:

**S. Nutter study, Research question 1.** What is the relationship between school funding source and preschool students’ kindergarten readiness?

**S. Nutter study, Research question 2.** What is the relationship between preschool location and students’ kindergarten readiness?

**S. Nutter study, Research question 3.** What is the relationship between school classification and kindergarten readiness?

**D. Rivera study, Research question 1.** What is the relationship between preschool teacher credentials and kindergarten student readiness?

**D. Rivera study, Research question 2.** What is the relationship between preschool teacher years of experience and kindergarten student readiness?

**A. Forrest study, Research question 1.** What is the relationship between the inclusion of music curriculum in the preschool setting and kindergarten readiness?

**A. Forrest study, Research question 2.** What is the relationship between the amount of time allotted to inclusion of music curriculum in the preschool setting and kindergarten readiness?

**Hypotheses**

The following are the null and alternative hypotheses of our guiding research questions:

**S. Nutter study, Research question 1.**
• Null (H₀): There will be no difference in kindergarten readiness rates for students attending preschool in a federally funded preschool program and students attending a tuition funded preschool program.

• Alternative (H₁): There will be a difference in kindergarten readiness rates for students attending preschool in a federally funded preschool program and students attending a tuition funded preschool program.

S. Nutter study, Research question 2.

• Null (H): There will be no difference in kindergarten readiness rates for students based on the location of the preschool they attended.

• Alternative (H₁): There will be a difference in kindergarten readiness rates for students based on the location of the preschool they attended.

S. Nutter study, Research question 3.

• Null (H₀): There will be no difference in kindergarten readiness rates for students based on the school classification for the school where their preschool is housed.

• Alternative (H₁): There will be a difference in kindergarten readiness rates for students based on the school classification for the school where their preschool is housed.

D. Rivera study, Research question 1.

• Null (H₀): There will be no difference in kindergarten readiness between students assigned to teachers with teacher credentials and students assigned to teachers without teacher credentials.

• Alternative (H₁): There will be a difference in kindergarten readiness between students with preschool teachers holding teaching credentials and students with
preschool teachers who do not hold teaching credentials. Students from preschools that have credentialed teachers will score higher on the BKS.

D. Rivera study, Research question 2.

- Null (H₀): There will be no difference in kindergarten readiness between students based on preschool teacher years of experience.

- Alternative (H₁) – There will be a difference in kindergarten readiness between students based on preschool teacher years of experience. Students from preschools that have teachers with experience will score higher on the BKS.

A. Forrest study, Research question 1.

- Null (H₀): There will be no difference in kindergarten readiness between students from preschools that include music in their curriculum and students from preschools that do not include music in their curriculum.

- Alternative (H₁): There will be a difference in kindergarten readiness between students from preschools that included music in their curriculum and students from preschools that did not include music curriculum. Students from preschools that include music education in their curriculum will score higher on the BKS for kindergarten readiness.

A. Forrest study, Research question 2.

- Null (H₀): There will be no difference in kindergarten readiness in relation to the amount of time allotted to music instruction.

- Alternative (H₁): There will be a difference in kindergarten readiness in relation to the amount of time allotted to music instruction.
Sources of Data

Data for the capstone study were collected from five tuition-based and 12 federally funded preschool programs. The Elementary District Schools (EDS) Data Management and Research Department provided existing panel data. The student-level data included federally funded preschools and tuition-based preschools. Enrollment in each of the included classrooms ranged from 18-20 students. The enrollment levels are mandated by requirements of the state in which the EDS district resides. Enrollment in federally funded preschool programs requires adherence to Public Law 110-134, *Improving Head Start for Readiness Act 2007*. This legislation requires families to meet any of the following criteria: a) income below the poverty line; b) homeless guidelines; c) qualify for special needs services; or d) if a class is below the projected enrollment numbers families at 130% of the poverty line may be accepted. Families who chose to enroll in tuition-based programs are required to pay a set fee for the school year. All of the preschools in EDS follow a set curriculum that includes music instruction. For the purposes of studying music inclusion, students were classified as having music instruction or not having music instruction. The amount of time allotted to music instruction was also analyzed in actual minutes.

Sample

The sample includes 174 preschool students combined from EDS federally funded preschool and tuition-based programs housed in A1 schools. Schools that are under the control of a principal and can establish a Site Based Decision Making (SBDM) Council are known as A1 schools, according to the State Department of Education (2014). A total of 17 classrooms from federally funded preschool programs and 17 classrooms from
tuition funded preschool program were selected, thus providing comparable comparison groups from a district that has a limited number of tuition-based preschool programs.

Key Terms

The follow key terms were used in all three studies:

A1 Schools: “A school under administrative control of a principal or head teacher and eligible to establish a school-based decision making council. The school is not a program operated by another school” as defined by the State Department of Education (para. 1).

Attendance: For the purpose of our study, attendance will be defined as actual number of days absent.

Brigance Kindergarten Screener (BKS): This assessment tool was adopted by the State Department of Education and contains five kindergarten entry screeners, including a) cognitive/general knowledge; b) language/communication development; c) physical development; d) self-help; and e) social/emotional development. Our study used cognitive/general knowledge and language/communication scores as measurements of kindergarten readiness (Breidenbach & French, 2012).

Classroom Level: At the classroom level, our study included a classroom’s music inclusion and the time allotted to music instruction per day.

Kindergarten Readiness: Kindergarten readiness is defined by the State Department of Education (2015) as follows: “[Kindergarten] readiness means each child enters school ready to engage in and benefit from early learning experiences that best promote the child’s success.”

Kindergarten Screener: A procedure that assists in gaining valid and reliable assessment information that is used to place students into appropriate educational settings.
(Emmons & Alfonso, 2005).

**Preschool:** For the purposes of this study, preschool is defined as schooling before the kindergarten year for three- and four-year-olds.

**Prior Setting:** According to the State Department of Education (2015), prior setting is where a student received early care services for the 12 months prior to coming to kindergarten.

**Race:** For the purpose of our study, we define race as the concept of dividing people into populations or groups on the basis of physical characteristics. Race is reported by the parent/guardian of the student.

**School Climate:** As defined by the National School Climate Center (2016), school climate is based on patterns of students’, parents’ and school personnel’s experience of school life, which is reflective of their goals, values, and relationships.

**School Level:** At the school level, our study included a school’s funding source, preschool location, school classification, and climate.

**Socioeconomic Status (SES):** Our study used a student’s free/reduced lunch status as a proxy for SES. Students who qualify for free/reduced lunch status were considered as living near, or below, the federal poverty line. Students who did not qualify for free/reduced lunch status were considered as living above the poverty line.

**Student Level:** At the student level, our study included a student’s race, attendance, prior setting, and socioeconomic status.

**Teacher Level:** At the teacher level, our study included a teacher’s years of experience and teacher credentials (that is, the teacher’s highest achieved academic degree).

Key terms that are unique to each study will be defined in each individual introductions.
Organization of the Studies

The remainder of this capstone is divided by the individual research studies that are outlined by the previously mentioned research questions. Each individual study in the capstone includes the following study-specific chapters: Introduction, Literature Review, Methodology, Results, and Discussion. The S. Nutter study is presented in Chapters I through V. The D. Rivera study is presented in Chapters VI through X. The A. Forrest study is presented in Chapters XI through XV. The capstone will close with an Executive Summary that summarizes the findings of our Hierarchical Linear Multiple Regressions (HLMR). The HLMR found a significant relationship between SES and the dependent variables of the language/communication domain and the cognitive/general knowledge domain as assessed from the BKS. A significant relationship between the variable of school classification and the cognitive/general knowledge domain of the BKS was reported. The third Block containing teacher-level variables of teacher credentials and teacher years of experience was significant for the cognitive/general knowledge domain of the BKS. A significant relationship was not found between both variables of the BKS and music, and student performance scores were slightly higher in each. Our capstone study provided research-based information for policy makers to consider when making decisions concerning preschool programs.
CHAPTER I

INTRODUCTION

Two babies born on the same day, in the same hospital, with identical birth weights and positive health test results are expected to grow and learn at similar rates throughout their lives. Yet, one baby was born to a middle class family and the other was born to a family living in poverty. This may be just one alteration, but it is one that can determine a child’s level of success in school. Researchers found that poverty has an increasingly negative and cumulative effect on children’s mental health and social-emotional development (Bornstein & Bradley, 2014; Brooks-Gunn & Duncan, 1997; Jensen, 2009; Shore, 1997; Sirin, 2005). Shore (1997) noted that when babies living in poverty are compared to babies not living in poverty, they are 70% more likely to struggle with relationships between their peers and caregivers. One of the means by which communities and governments have sought to reverse the negative effects of poverty and prepare children for kindergarten is through the use of preschool programs (Yoshikawa et al., 2013; Cascio & Schanzenbach, 2013; Kuhl, 2011). Research reveals that students who participate in preschool have better health and academic outcomes than students who do not (Shonkoff & Phillips, 2000). Bushouse (2009) Magnuson, Ruhm, and Waldfogel (2007), as well as the U.S. Department of Education (2015) have revealed wide variation in the quality of preschool programs. Age of Learning, Inc. (2011)
conducted a National Kindergarten Preparedness Survey with 518 kindergarten classrooms from across the United States. The results showed 65.6% of kindergarteners entering school for the first time are not fully prepared, including 8.5% reported as not being prepared at all for the academic expectations.

Magnuson et al. (2007) found that preschools that were housed in public schools have higher positive outcomes for children when compared to preschools located in a private setting. The outcomes included higher achievement levels and less behavior problems when students transition into a kindergarten class. The findings of my research allow schools and districts around the country to examine support for children under the age of five based on funding source, preschool location, and school classification. The control variables of my study were race, socioeconomic status, prior setting, attendance, and school climate. One goal of my study was to provide research-based information to decision-making bodies on how current funding sources, preschool location, and school classifications impact student outcomes. While the results are not generalizable beyond the district that was involved in the study, they showed examples of positive relationships between funding, location, classification, and student outcomes that can be researched in other districts.

Researchers conducted a number of recent empirical studies and found that preschool matters for students living below the poverty line, particularly in the performance areas of reading, math, and self-control skills (Bushouse, 2009; Magnuson et al., 2007; Mashburn et al., 2008). These researchers focused on state funding and funding patterns to support preschool for all students (Bushouse, 2009; Magnuson et al., 2007; Mashburn et al., 2008). My current research expanded the body of work to include
federal funding and tuition-based programs. The existing body of research largely used state- and district-level data to measure the rate of kindergarten readiness (Johnson & Schoeni, 2007; Karoly, Kilburn, & Cannon, 2006; U.S. Department of Education, 2015). LoCasale-Crouch et al. (2007) stated, “This provides an opportunity for future work to explore factors that conspire to hold quality down, like high concentrations of risk, and influences that could potentially push quality up” (p. 15) LoCasale-Crouch et al. (2007) further suggested that research should be conducted in ways other than cluster analysis, thus allowing for more individual data analysis.

In response to the LoCasale-Crouch et al. (2007) call for more research, the focus of my study was to determine the relationship between two types of pre-kindergarten programs, school location, school classification, and the academic growth of children attending the sites. Preschools are categorized into two types based on funding source. One type of preschool is a federally funded program and the other is supported by tuition paid by the parents of preschool-aged students. Both program types are housed within various school settings inside and outside of public schools. I used data from the Elementary District Schools (EDS) school district. The data represented 174 preschool students within the district. I analyzed the 2014-2015 and 2015-2016 data sets in my study. I utilized student-level data rather than aggregate school, district, and state-level data.

**Research Questions**

In this study, I sought to answer the following research questions:

**Research question 1.** What is the relationship between school funding source and preschool students’ kindergarten readiness?
Research question 2. What is the relationship between school location and preschool students’ kindergarten readiness?

Research question 3. What is the relationship between school classification and kindergarten readiness?

Hypotheses

The following were the null and alternative hypotheses for my guiding research questions:

Hypotheses for research question 1 (funding source).
- Null (H₀): There will be no difference in kindergarten readiness rates for students attending preschool in a federally funded preschool program and students attending tuition-based preschool program.
- Alternative (H₁): There will be a difference in kindergarten readiness rates for students attending preschool in a federally funded preschool program and students attending a tuition-based preschool program.

Hypotheses for research question 2 (preschool location).
- Null (H₀): There will be no difference in kindergarten readiness rates for students based on the location of the preschool they attended.
- Alternative (H₁): There will be a difference in kindergarten readiness rates for students based on the location of the preschool they attended.

Hypotheses for research question 3 (school classification).
- Null (H₀): There will be no difference in kindergarten readiness rates for students based on the school classification for the school where their preschool is housed.
- Alternative (H₁): There will be a difference in kindergarten readiness rates for
students based on the school classification for the school where their preschool is housed.

**Scope of the Study**

In my research, I analyzed data from Elementary District Schools (EDS). The State Department of Education (2015) reported that 51% of all kindergarten students are not ready for school when they arrive in kindergarten. The most recent census data for EDS showed that there are 41,000 children below the age of five living in the district (United States Census Bureau, 2015). If current trends of kindergarten readiness continue, 20,432 students will arrive in kindergarten not ready for school within the next five years. In this study, I used student-level data from 174 preschool students within EDS. The data were retrieved from the 2014-2015 and 2015-2016 school years.

**Limitations**

In this study, I proposed to use a hierarchical linear multiple regression to determine the relationship between school funding source, school location, school classification, and preschool students’ kindergarten readiness as assessed by Brigance Kindergarten Screener (BKS), as well as identifying other variables associated with BKS scores. As such, a discussion of limitations and assumptions of this analytical approach was necessary. The study is not generalizable to broad programs, districts, or schools. The findings are only generalizable to EDS district, district programs, and the time period of 2015. My study is not able to report cause and effect due to the use of a correlational research design.

**Definition of Terms**

The following terms will be used in my study:
**Funding Source:** Leachman and Mai (2014) stated that funding source is the place where money allocated to education through a formula originates.

**Homeless:** According to the McKinney-Vento Homeless Education Assistance Improvements Act (2001), homeless children are children who do not have regular nighttime housing, have lost housing, are sharing someone else’s housing, are living in a place not normally used as housing, or migratory children. The BKS results for homeless students will be reported with the students living below the poverty line.

**Low-Income:** The United States Department of Education identifies families with a taxable income less than 150% of the poverty line as low income. Students living in low-income households qualify to attend a federally funded preschool at no cost to the family. The level of kindergarten readiness each student reaches will be determined by the administration of the BKS. The outcomes will be used to determine the effectiveness of programs at preparing students for kindergarten.

**Poverty:** Citro and Michael (1995) defined poverty as an economic deficit where a family’s resources do not allow them to acquire a sufficient standard of living in the United States of America. The poverty line set by the United States Government will be used as the determination for students living below the poverty line. Students living below the federal poverty line qualify to attend a federally funded preschool at no cost to the family.

**Preschool Location:** For the purpose of my study preschool location will be the place where the classroom was housed. Locations include housed within a public A1 school and not housed in a public A1 school.

**School Classification:** The State Department of Education (2015) classifies schools
based on the state test score for the current school year. The classifications were distinguished, proficient, needs improvement, and progressing.

**Summary Review of Findings and Potential Implications for Policy and Practice**

My study added to existing scholarly literature by highlighting implications for future practices and policies. All research aims to add to existing research in a relevant and innovative way. The significance of my research on scholarly literature, practices, and policies are discussed in this section.

The literature reviewed for this study focused on district or state-level data. My research added to the literature by including student-level data. I identified student data that directly connected to a specific preschool student, allowing for the identification of preschool sites that produce high numbers of students who meet kindergarten readiness benchmarks. Additionally, the analysis included preschool sites that produced high readiness results for students living in poverty.

Improving the practice of preschool programs is a focus of the United States public education system, as the pressure to make benchmarks on state and national standardized tests continue to increase. Through the identification of preschool programs producing kindergarten ready students, my study set the stage for future research on the practices within the successful preschools leading to kindergarten readiness. My research also identified the funding source of each preschool allowing for funds to be shifted to best practice sites.

According to *Fiscal Year 2014 Budget of the United States of America* (Office of Management and Budget, 2013), $75 billion will be spent to fund preschool opportunities for four-year-old students across the United States over the next 10 years. In this study, I
identified the variance of kindergarten readiness rates explained for preschool programs according to funding source, school location, and school classification, providing current research on which to base future preschool funding. My research influences policies addressing where federally funded preschools are housed. It has been hypothesized that preschools housed within a public elementary school have higher positive effects on student learning than preschools housed outside of public elementary schools. Structural decisions at the district level may need to be examined in order to maximize facilities and personnel for the benefit of student achievement and personnel.

I found that the independent variable of funding source was not significant in the domains of language/communication or cognitive general knowledge when the independent variable was included in the HLMR. However, my findings show that students who attended a preschool that was not federally funded scored on average 2.71 points higher than students who attended a federally funded preschool. The independent variable of school location was not included in the final Block 3 of the HLMR due to the descriptives of the data set provided by EDS. All of the students who were included in the sample attended preschool within an A1 (public elementary school). The independent variable of school classification was my only study variable to be identified as having a statistically significant impact in the domain of cognitive/general knowledge when the variable was included in Block 3 of the HLMR. Students who attended a school that was classified as distinguished scored on average 9.41 points higher than other student groups that were included in my study.
CHAPTER II
REVIEW OF LITERATURE

Overview

The existing research literature on preschools was reviewed to determine needed research, specifically on education financing of preschools in order to determine which types of school funding sources impact kindergarten readiness as assessed by the Brigance Kindergarten Screener (BKS) for preschool students attending a program within the public school setting. The research questions for my study were: a) What relationship does school funding source have with kindergarten readiness?; b) What relationship does the location of the preschool classroom have with kindergarten readiness?; and c) What relationship does school classification have with kindergarten readiness? The review is segmented into eight sections, framing the need for this study while explaining the current reality of kindergarten readiness in the United States.

The first section, Poverty and its Deleterious Impacts on American Children, outlines the number of families in the United States living below the poverty line. This section also introduces a number of the consequences living below the poverty line has on child rearing and a child’s health, which impacts kindergarten readiness. Many of the students living below the poverty line attended preschool within a public school setting, making the quality of the programs important for their success.

Poverty and Educational Outcomes is the second section of the literature
review. This literature was included to inform the reader of the adverse consequences poverty has on the educational attainment of students. The second section also supports the need for further research to determine the best programs for educating students before kindergarten to lessen the negative outcomes poverty has on student academic attainment.

The third section, Poverty and Kindergarten Readiness, identifies the need for quality programs before the age of five for students living in poverty. The third section also includes research about the lasting outcomes of quality programs for students. My study sought to identify the programs that provide quality instruction in a public school setting before kindergarten.

Kindergarten Readiness Characteristics, the fourth section, outlines the definition of kindergarten readiness and examines the Brigance Kindergarten Screener (BKS) as it relates to my study. The section also explores several additional kindergarten screens and why they were not chosen to be included in my study.

The next two sections identify the variables that were used in my study to determine the relationship between the variables and kindergarten readiness. The fifth section, Kindergarten Readiness Demographic Independent Variables, describes the research that supports the use of the variables of race and socioeconomic status. The sixth section, Other Independent Variables Related to Kindergarten Readiness, describes the research that supports the inclusion of the variables prior setting, attendance, and climate. The variables included in the fifth and sixth sections will be common variables for my capstone group.

Study Specific Independent Variables Related to Kindergarten Readiness, the seventh section, includes the variables of school funding, preschool location, and school
classification. The variables included in this section were only used in my study.

The eighth section, *Summary*, is the final section. The summary section brings the literature review to a close with a brief review of the information covered within each of the previous sections.

**Poverty and its Deleterious Impacts on American Children**

Johnson and Schoeni (2007), as well as Spencer, Thanh, and Louis (2012) found that children living in poverty have a high risk of unfortunate results in life, including chronic health problems, criminal victimization, lower academic achievement, and they are more likely to leave school with inadequate literacy and numeracy skills. Additionally, Braveman (2011) found that people living in poverty have worse health than people living above the poverty line or people who had attended some form of college. Furthermore, Vernon-Feagans and Cox (2013) stated the following in their epidemiological study of 1,292 children:

> We have long known that poverty is associated with poor outcomes for children on many dimensions of development that are important to us as a society, including the quality of children’s learning/achievement in school and the development of behavior problems/psychopathology, as well as the completion of high school and employment as an adult. (p. 1)

In the *Current Population Survey*, the United States Census Bureau (2015) reported 14.5%, or 45.3 million people, were living in poverty in the United States. The report also stated that 19.9% of all children under the age of 18 in the U.S. were living in poverty. With almost 20% of the nation’s children living below the poverty line, which predisposes them to negative results in life, it is important to include research findings of the negative outcomes to which poverty may contribute.

**Chronic health problems.** Children living with adversity have been found to
endure lifelong educational, economic, and health issues (Shonkoff & Gardner, 2012). Shonkoff and Gardner found that prolonged exposure to anxiety connected to living in poverty could lead to impairments in memory and mood controls. The researchers listed the consequences as mental health issues, low education achievement, poor decision-making abilities, low memory functions, difficulties with self-regulation and impulse control—all of which can be attributed to circumstances related to living in poverty at an early age (Shonkoff & Gardner, 2012).

Chronic physical health issues occurred at higher rates for children living in poverty. Braveman and Barclay (2009) compiled a list of health outcomes linked to the socioeconomic status of a child, including stomach cancer, heart disease, obesity, diabetes, and substance abuse. Kitsantas, Kornides, Cantiello, and Wu (2013) found that 16.9% of children living in poverty were diagnosed with asthma compared to 11.6% of children living above the poverty line. Further research shows that many physical health issues for children living in poverty were directly related to the lack of basic needs being met and limited access to health resources (Lee, Wickrama, & Simons, 2012).

Finally, brain research has shown that health influences of poverty are evident in the way the brain functions. McEwen and Gianaros (2010) found that socioeconomic status could be related to the changing of brain systems. The researchers noted that emotional regulation, as well as reactions to stress, aging, and coping skills are all brain systems that can be affected by low socioeconomic status at a young age. McEwen and Gianaros (2010) acknowledged that socioeconomic status alone cannot explain the influences on health related issues, but it can help to explain the stressful situations that children experience, which is another factor in the health issues.
Chronic health issues impact the ability of students to attend school and maintain focus in class. Mental and physical health and brain function were noted as important factors in a child’s success in school. Living in poverty had a negative impact on both health aspects and brain function. Identifying preschool pathways that are successful in helping students to be kindergarten ready, despite the chronic health issues facing students living in poverty, is a key to finding learning strategies beneficial for these students.

Criminal victimization. Subjection to crime could have devastating results for children. Brooks-Gunn and Duncan (1997) reported that 5.4% of children living in poverty had experienced violent criminal victimization compared to 2.6% of children not living in poverty. In addition, Brooks-Gunn and Duncan (1997) found that 0.8% of children living above the poverty line experienced child abuse or neglect compared to 5.4% of children living below the poverty line. Finkelhor, Turner, Ormrod, and Hamby (2012) found that 60.6% of the children in their study experienced victimization in the year prior to the study. Finkelhor et al. (2012) further noted that 46.3% of children experienced an assault as part of the victimization within the year.

Exposure to violence and crime has multiple negative life outcomes for children. Sharkey, Tirado-Strayer, Papachristos, and Raver (2012) and Turner, Finhelhor, Shattuck, and Hamby (2012) found that victimization had deleterious relationships with mental health and behavioral outcomes of children. Poverty also had a negative impact on the probability that children will become the perpetrators in the victimization of others. Jarjoura, Triplett, and Brinker (2002) stated that the more time children live below the poverty line, the greater the chance they will commit a crime. Jarjoura et al. (2002) also
found that a child experiencing poverty during the first five years of life was at a greater risk for committing a crime than a child who experiences poverty later in life.

Peer victimization is a subcategory of victimization that occurs between peers who are not related. The acts may not be criminal by law; however, they may impact a student’s education in similar ways to criminal victimization. Leadbeater, Hoglund, and Woods (2003) found that high levels of peer victimization in classrooms were connected to high levels of poverty within the classroom setting. Pouwels and Cillessen (2013) stated that early peer victimizations were related to negative behavior outcomes in later school years. Unnever and Cornell (2003) noted that students not only living in poverty were exposed to higher levels of peer victimization, but they also identified with a bullying culture.

**Lower academic achievement.** Research has found that poverty affects the cognitive abilities of children. Brooks-Gunn and Duncan’s (1997) analysis of national longitudinal data sets found that 3.8% of children living above the poverty line were identified as developmentally delayed, but 5% of children living in poverty were identified as developmentally delayed. The research had strong, reliable national data sets that represent analyses of data across time and presents a continuous look over time of the relationships between poverty and outcomes for children living in poverty. The use of the data sets avoided a one-time look at data and allows the findings to be more generalizable than smaller studies. This research supports the need for strong, high-quality preschool programs that provide all children, especially those living in poverty, the opportunity to enter kindergarten at the same level as their peers living above the poverty line. Brooks-Gunn and Duncan (1997) also found that 6.1% of children not living
in poverty were identified as learning disabled, while 8.3% of children living in poverty were identified as learning disabled. This finding continued to support the need for high-quality preschools for students living in poverty, which would aid them in overcoming the 13.3% chance they have of being identified as developmentally delayed or learning disabled. Hart, Soden, Johnson, Schatschneider, and Taylor’s (2013) quantitative study of existing state-level data sets found that “Poverty suppresses the expression of genetic potential for higher achievement” (p. 1052). The Hart et al. (2013) study used the G x E continuous univariate model to look at the relationship between socioeconomic status (SES) and reading comprehension. The findings of Hart et al. (2013) noted that students living in poverty were less likely to reach their full potential because of environmental factors associated with poverty, while students in schools with high SES were more likely to reach their full potential. The results were reported with a .95 confidence interval, identifying that the findings represent with 95% certainty the population mean. These findings support the need for future research to examine the relationship between variables and kindergarten readiness in order to identify pathways to kindergarten readiness for all students in an effort to close the achievement gaps between student groups. Turkheimer, Haley, Waldron, D’Onofrio, and Gottesman (2003) reported that among low-SES students, heritability of IQ was 10%, whereas among high-SES students, heritability of IQ was 72%. This research showed that the environment that low-SES students experience has a 90% effect on their IQ compared to a 28% environmental effect for students living in high-SES. These results support the need to identify variables that affect quality funded programs for low-SES students. In addition, the study was particularly strong due to its design. Turkheimer et al. (2003) divided IQ scores into
groups, genotype, shared environment, and non-shared environment, which were interacted with SES during the study. The results were found using a biometric analysis of pre-existing data sets from the National Collaborative Perinatal Project (Turkheimer et al., 2003). Reardon’s (2013) comprehensive quantitative analysis of relationships between overall school achievement and income suggested that school districts must devote more of their resources and time to students living in poverty in order to combat the achievement gap between students with varying levels of socioeconomic status. Reardon used 12 national studies to compile his findings of research that includes 50 years’ worth of data, allowing the results to show consistency throughout time.

Finally, the socioeconomic status of the school as a whole had a relationship with the educational achievement for students. Sirin (2005) found in his meta-analysis of data from 101,157 students and 6,871 schools that the socioeconomic status impact on achievement was higher at the school level than at the student level. The student information that was included in the analysis was student grade level, ethnicity, and school location. Each student characteristic was assessed to see how it influenced the relationship between socioeconomic status and cognitive success in school (Sirin, 2005). Sirin’s study was the first of its kind to gather all major studies with in a 10-year period and analyze findings to identify trends in the data. He concluded that “researchers must continue to assess student’s SES as part of their understanding of family effects on academic performance” (p. 443). Hiatt’s (2012) research using T-tests that compare schools with high numbers of free and reduced lunch students and schools with low numbers of free and reduced lunch students concluded the following:

Middle schools with the highest level of free or reduced lunch participants had significantly lower scores on their Communication Arts and Math portions of
their MAP test. The four middle schools with significantly lower free and reduced lunch participants all had significantly higher scores on their MAP test. (p. 17)

This finding supported the need for high-quality preschools that serve students who live below the poverty line in order to close the gap before students arrive in middle school. A multiple regression highlights the relationships between kindergarten readiness and the independent variables. Future research can then be conducted at the sites to find the strategies that are working to help students become kindergarten ready.

Identifying pathways to kindergarten readiness and ensuring that the pathways are accessed by students living in poverty will help children to express higher achievement and meet their potential. Students living in poverty, as aforementioned studies have shown, are at a higher risk for being diagnosed with a learning disability combined with having a lower IQ score due to environmental factors. Several studies, including Turkheimer et al. (2003), Reardon (2013), and Sirin (2005), examined the outcomes related to poverty but neglected the examination of funding source. My study aimed to identify high-quality pathways to kindergarten that affect educational outcomes through the analysis of student-level BKS scores for students attending federally funded and tuition-based programs within a public school setting.

**Poverty and Other Educational Outcomes**

Poverty affects every aspect of education for students living below the poverty line. Reardon (2011) examined 19 national studies that included math scores, reading, scores, and income data and found that the achievement gap between high- and low-income middle school students can be as large as 40 percentage points and is twice as large as the gap between black and white middle school students. Duncan and Magnuson (2011) found in their analysis of the Early Childhood Longitudinal Study and the
Kindergarten Cohort Study that the large gap associated with income does not grow or narrow once students enter kindergarten. In fact, there is more than one standard deviation between the kindergarten readiness score of students in the lowest income range and the highest income range.

**Graduation rates.** The achievement gap between students of high and low incomes is linked to high school graduation. The Brook-Gunn and Duncan (1997) analysis of national longitudinal data reported that 21% of students living in poverty drop out of high school between the ages of 16 and 24, while only 9.6% of same-age students who do not come from low socioeconomic backgrounds drop out. Statistics found that while only 11.4% of high-income students in the United States drop out of high school, 30.2% of low-income students in the United States drop out of high school (Chapman, Laird, Ifill, & Kewal, 2011). The research was conducted with a national random sample, including diverse variables that represent race, age, and SES. Graduation rate research supports the need for closing the gap between high-SES and low-SES students. As previously mentioned, research has shown that the gap between high-SES and low-SES does not narrow after kindergarten. If society aims to lower the graduation dropout rate of low-SES students, then the work must begin in preschools. Graduating high school has a positive social and economic outcome for students. Brooks-Gunn, Guo, and Furstenberg (1993) found in their 20-year follow regression analysis of 230 babies born to black teenage mothers that 37% of the black males living in an urban setting did not graduate high school. A common predictor among the 37% was low cognitive scores entering elementary school. The researchers also found that, of the 46% that completed high school, they shared the predictor of being cognitively ready for elementary by attending
preschool (Brooks-Gunn, Guo, & Furstenberg, 1993). The findings were reaffirmed in 2011, when Duncan and Murnane asserted that improving school readiness is an effective strategy for stopping issues in the later years of school (Reardon, 2011). Reeves and Grannis (2014) additionally found that children born to mothers with a high school diploma were more likely to stay on grade level and graduate high school. Krueger & Lindahl (2000) conducted a national summary of micro-econometric and empirical macro research and found that each year of education adds 10% annual income later in life. Crimmins and Saito (2001) use of the Sullivan method for estimating life expectancy found that the change in life expectancy for a male high school graduate is 44 years, while the change for high school dropouts is only 33 years. On average, high school graduates live 10.5 years longer than those who drop out. Keeping students in school can help them to live longer, healthier lives.

**Attendance rates.** Absenteeism is also affected by poverty rates. Rappaport, Daskalakis, and Andre’s (2010) analysis of 291,040 records for 165,056 students found students who qualify for free/reduced lunch on average miss one out of every 10 days of school during a 180 day school year. Further examination of absentee rates in urban high schools found that the rate of absenteeism is 15% for all students and 20% for students living in poverty (Arthurs, Patterson, & Bentley, 2014). Attendance rates impacted the level of success that students will achieve in school (Arthurs, Patterson, & Bentley, 2014). In a retrospective quasi-experimental cross-sectional study, Brown and Lee (2014) noted that students living in poverty, who participated in effective preschool programs, had higher attendance rates in grades three, five, and seven. The researchers stated that higher attendance rates were a factor in student success. Roby’s (2004) use of the
Pearson’s R correlation with publicly available data on the Ohio Department of Education’s website found the top academic 10% of Ohio students had an average attendance of 95.92%, while the bottom 10% had an average of 92.05% attendance. The difference in attendance rates was 3% while the difference in academic success was 80%. The study shows that attendance clearly matters for all students. Effective preschools, as Brown and Lee (2014) found, impact attendance for years after preschool. When attendance increased, student success increased—for all students.

**Suspensions and expulsions.** Researchers Brooks-Gunn and Duncan (1997) reported that 11.9% of students from low SES backgrounds have been suspended or expelled in comparison to 6.1% of children who do not come from low SES backgrounds. Darney, Reinke, Herman, Stormont, and Ialongo (2013), as well as Reinke, Herman, Petras, and Ialongo (2008) found in their latent class analysis of longitudinal research that students who experience both academic and behavior problems are more likely to be suspended from school and have negative outcomes. Research from previous sections show students living in poverty had greater health, behavior, and academic problems than students living above the poverty line. Students living in poverty were at greater risk of suspension and poor academic outcomes.

The aforementioned studies of Reardon (2011) and Duncan and Magnuson (2011) supported the need for closing the gap between high poverty students and low poverty students. Since the gap was not found to widen or narrow after kindergarten begins, it was important for my study to identify the relationship between funding and kindergarten readiness in preschool. This allowed me to identify, at the student level, pathways that are closing the gap by producing kindergarten ready students before the gap becomes
permanent. Unfortunately, the aforementioned research of The National Center for Education Statistics (2012), along with Chapman, Laird, Ifill, and Kewal (2011), showed that students living in poverty have less of a chance of receiving the benefits of graduating high school, and this further supports the need to focus current research on preschool to help close the gap before elementary school begins. The Arthurs, Patterson, and Bentley (2014) research, along with the Brown and Lee (2014) research supported the need to identify effective preschools through their kindergarten readiness rates in order to ensure that districts and schools are funding effective preschools to have the greatest impact on student achievement for all students.

**Poverty and Kindergarten Readiness**

With the existing research indicating a consistent trend of poverty’s negative impact on numerous educational outcomes, it should come as no surprise that poverty is negatively associated with kindergarten readiness. The impact of family income levels on the educational achievement of students of all grade levels has been discussed thus far. It has been noted that the place where we can make our greatest impact is before formal school begins. In their comparison of the Early Childhood Longitudinal Study and the Kindergarten Cohort study, Duncan and Magnuson (2011) stated the following:

> By fifth grade, non-Hispanic Black children and children from low SES families have closed none of their achievement gap with children from White and more advantaged families, and have fallen further behind in terms of their attention skills and problem behaviors. (p. 13)

The years before kindergarten are critical in the development of student’s academic skills, which will impact them for their entire school career. The focus of this section is to identify a need for quality preschool programs with the ability to affect future academic outcomes. Magnuson et al.’s (2007) regression analysis of the Early
Childhood Longitudinal Study data found that students living below the poverty line had higher levels of anger and lower achievement levels than students of higher income families. Magnuson et al. (2007) also noted that academic gains are larger and last longer for students living in poverty who attend preschool than for students not living in poverty and who attend preschool. This finding highlights the importance of preschool for children of low-income families.

Winsler et al. (2008) supported these findings with their repeated measure MANOVA research of 3,838 four-year-olds, who are ethnically diverse and living in poverty. The students attended either a community-based or public school-based subsidized preschool, which was free for them to attend. Winsler et al. (2008) found that children living in poverty begin the preschool year below the national average for cognitive percentile, but end the year at the national average. The researchers also state that public school-based sites have a slightly higher impact than private centers on student outcomes (Winsler et al., 2008). This supports the need to identify high-quality preschools and their connection to kindergarten readiness for students living in poverty.

**Relationship between kindergarten readiness and future school outcomes.**

Children who are prepared for kindergarten often show greater gains throughout their school career. Barnett (1995) conducted a meta-analysis of kindergarten readiness research and found that students who were ready for kindergarten showed an IQ score gain of 4-11 points, which was retained throughout their school years. Barnett (1995) also found that achievement scores for students who were identified as kindergarten ready continued to improve in later years—and in five large studies, kindergarten readiness was linked to improved rates of high school graduation. Another study conducted by
Reynolds, Temple, Robertson, and Mann (2001) found that students who participated in preschool programs were more likely to complete high school, complete more years of school, and were less likely to be arrested before the age of 18. Reynolds et al. (2011) also found the results were more favorable for students living in poverty. While the Heckman, Pinto, and Savelyev (2013) factor analysis of the Perry Preschool Program showed long-term outcomes into adulthood, the conclusions of the Perry Preschool Program included greater educational attainment, earnings benefits, and higher rates of employment.

Each of these studies highlights that waiting until after preschool to intervene for students living in poverty is not the most effective way to close the achievement gap. Preschool is the foundation for which educational and life success rest for students living below the poverty line. Future academic success for students living below the poverty line may depend on success in preschool.

**Quality preschools.** The quality of the preschool program matters in relation to student outcomes. Mashburn et al. (2008) analyzed data from the National Center for Early Development and Learning, the Multi-State Study of Pre-Kindergarten, and the NCEDL-NIER State Wide Early Education Program Study. Mashburn et al. (2008) noted that high-quality instruction was related to increased student outcomes. Along with instruction, Mashburn et al. (2008) found that positive teacher-child interaction impacts student academic and language outcomes. Karoly et al. (2005) also found that at-risk students in quality programs exhibit achievement gains in academic areas. None of the aforementioned studies examine the relationship that school funding had with kindergarten readiness, however, which was one of the main independent variables in my
Kindergarten readiness has a lasting impact beyond the kindergarten year. As the aforementioned research shows, educational attainment levels are higher for students who attend a preschool program. My study aimed to identify programs of quality within the public school setting based on funding to maximize the benefits of being kindergarten ready. In order to conduct the study, I must first provide a general understanding of preschool funding.

**Kindergarten Readiness Characteristics**

This section of the literature review discusses findings on kindergarten readiness and kindergarten screeners. Kindergarten screeners are used to assess students in order to place them in appropriate educational settings. Included is research describing readiness and the importance of using a screener. The section also explains why the BKS is the screener that I chose to be included in my study.

**Kindergarten readiness.** Best practice for determining which kindergarten screener to use demanded adherence to standards for professional test development. Pyle (2002) noted that no test should be used to make decisions about students other than referral for additional evaluation. Screening programs must be used for identification purposes, but not to classify students into categories of need or achievement level. Pyle (2002) offered four suggestions for best practices in screening assessments: a) defining the purpose of the assessment tool; b) using an instrument with multiple raters, as well as follow-up procedures; c) creating a process for administering the assessment; and d) careful analyses and interpretation of results (Pyle, 2002). Screeners must use multiple measures in multiple settings to gather more holistic information on students to determine
how educators should precede providing equitable and appropriate instruction for students.

A milestone in preschool accountability and assessment took place in 2005 with the release of the five-year, 17-state study titled *National School Readiness Indicators Initiative: A 17 State Partnership* (Rhode Island KIDS COUNT, 2005). The aim of the study was to create a complete set of readiness benchmarks for preschool students to meet before entering kindergarten (Rhode Island KIDS COUNT, 2005). According to the Rhode Island KIDS COUNT, the three objectives of the 2005 study were: 1) develop indicators for school readiness that could be assessed and tracked over the course of a student’s school year; 2) have states and government use the indicators to track data and report it to the public; and 3) increase the rate of children reading on level by stimulating policy and program improvements. Each state included in the research used the information learned to adopt school readiness standards. The state in which Elementary District Schools (EDS) resides chose 41 indicators to track the growth of children from birth to age five (Rhode Island KIDS COUNT, 2005). The summary of the study also identified a readiness equation that the committees from all 17 states agreed upon as the path to school readiness (Rhode Island KIDS COUNT, 2005). The equation components were “ready families + ready communities + ready services + ready schools = children ready for school” (Rhode Island KIDS COUNT, 2005, p. 6).

The perception of preschool programs as an important aspect of early childhood learning has not changed, however debate continued about how to use resources in ways that best prepare students for future success. Unprecedented interest in exploring connections between elementary education and programs prior to entrance into first grade
emerged around 2005 with an increased focus on how to connect the two levels (Pianta, 2007). Pianta (2007) summarized this shift in focus:

The central challenges and concerns of the field are now not only how to provide safe, organized preschool programs to selected groups of children and how to better connect families and schools but also how to offer all preschool children appropriate and effective early educational experiences that are aligned and included with state K-12 standards and reform efforts and that, for some children, provide opportunities for accelerated progress. (p. 5)

This new focus on connecting previously independent educational programs created new challenges since these preschool programs would now be charged with better preparing students for previously established accountability systems. Rather than preschool programs being regarded as a separate, unaccountable program, they would be included as a central part of the child’s academic experience and special attention made to its ability to transition the student into the K-12 education system. The new argument is not whether students should be exposed to early childhood learning experiences, but rather how best to use those opportunities to best contribute to the child’s academic development and to society (Pianta, 2007).

In 2009, the U.S. Department of Education announced Race to the Top as part of the American Recovery and Reinvestment Act (ARRA) signed into law by President Obama. This was a $4.35 billion investment earmarked to prepare America’s students to graduate college, be career ready, and compete in the global economy (U.S. Department of Education, 2009). Race to the Top challenged states to compete for these funds as part of an application process. The process assigned points for states based on reform in the following areas: rigorous standards, high quality assessments, attracting and keeping quality teachers and principals, supporting data systems to improve instruction, and sustaining educational reform (U.S. Department of Education, 2009). The effect of
preschool education has positive effects on the cognitive and social development of children (Pianta, Barnett, Burchind, & Thornburg, 2009). These effects are especially lasting in large-scale public programs. According to Pianta et al. (2009), research findings and policies such as Race to the Top, it is clear that variables such as curriculum, staffing, funding, and level of education impact the effects of preschool.

**Kindergarten readiness screener.** The *Individuals with Disabilities Education Improvement Act (IDEA) of 2004* (Public Law 108-446, 2004) requires all federally funded early childhood programs to complete performance-based assessments of children in order to evaluate their potential need for intervention and to assess their academic growth. In 2005, the National School Readiness Indicators Initiative (NSRII) concluded a three-year study in which 17 states developed a set of indicators to track the progress of students from birth to age eight (Rhode Island KIDS COUNT, 2005).

The goal of the NSRII was to assist states in using research-based school readiness indicators to inform public policy decisions and track progress in meeting key goals for young children. A key task of this initiative was for each of the states involved to develop a list of readiness indicators that could provide valuable feedback on student progress and be tracked at the state and local level. The five domains agreed upon through this initiative included a) physical well-being and motor development; b) social and emotional development; c) approaches to learning; d) language development; and e) cognition and general knowledge. The state in which EDS resides was a part of this 17-state initiative and chose to use the BKS as its assessment for kindergarten readiness. Its five components are based off of this initiative and are labeled academic/cognitive, language, development, physical development, self-help, and social-emotional.
According to the Center on Enhancing Early Learning Outcomes (2014), in the 2011-2012 school year, 28 states required assessments of students during their kindergarten year. Most assessments were developed by the locality (12 states), followed by state-developed assessments (7 states). Five states used the Dynamic Indicators of Basic Learning (DIBELS); two used the Phonological Awareness Literacy Screening (PALS); and two used the BKS.

The DIBELS assessment is administered in the fall of the student’s kindergarten year and is used to assess the risk status for students in their future academic abilities (Stormont, Herman, Reinke, King, & Owens, 2015). Curriculum-based measures are used to administer one-minute, individual probes of key skills in the areas of reading, math, and writing competence. This assessment measure only covers academics and does not address external factors, such as physical well-being or self-help measures in relation to a student’s ability to be holistically ready for kindergarten.

The PALS assessment’s main purpose is to measure literacy-based knowledge that includes phonological awareness, alphabet knowledge, knowledge of letter sounds, spelling, concept of words, word recognition in isolation, and oral passage reading. The primary purpose of PALS is to identify those students who are not performing at grade-level expectations and may need additional reading interventions (Invernizzi, Juel, Swank, & Meier, 2013). This form of kindergarten assessment only focuses on reading as an indicator of readiness, ignoring other academic and non-academic areas in other screeners. Therefore, this assessment was not chosen for this study due to its lack of assessment in other academic areas other than reading-based indicators. Like many
assessment tools, PALS covers just one aspect in assessing a student’s overall literacy competence. Other important information includes additional early literacy assessment data, parent information, the child’s interest in books, and teacher judgment. Although PALS provides reliable screening for development in literacy acquisition, only using one measure of literacy performance is not sufficient when making decisions about a student’s academic future (Invernizzi et al., 2013).

The purpose of the BKS is “to identify potential developmental delays and giftedness, to inform instruction, and to monitor child progress” (French, 2013, p. 2). The state in which EDS resides mandates the BKS as the measurement tool to assess kindergarten readiness according to the state mandates. State legislation requires alignment with the state’s definition of school readiness as well as state standards established for preschool. It must assess students in the domains of adaptive, cognitive, communication, motor, and social emotional readiness. BKS is designed to monitor a student’s progress rather than label him or her for intervention or remediation. Because of its availability through state-mandated testing requirements, as well as its focus on multiple aspects of a student’s learning environment, I chose this assessment tool for this study.

In order to focus on academic indicators, my study will use the cognitive/general knowledge and language/communication domains of the BKS for data analysis. Although the broad definition of readiness can be characterized in both cognitive and social areas, Konold and Pianta (2005) found that high cognitive functioning served as a better predictor of academic test performance at the kindergarten and first grade levels than the student’s social skill development. In a meta-analysis of 70 studies, Paro and Pianta
(2001) examined indicators that predict performance in the early grades of school. They found that the average correlation of a student’s academic-cognitive area from preschool to elementary school was .43, while the average correlation for social-behavioral area was .32. Although both can be considered predictors for kindergarten readiness, the higher correlation that was associated with cognitive development was used for the current study.

**Kindergarten Readiness Demographic Independent Variables**

The inclusion of demographic variables (race and socioeconomic status) is common in studies concerning kindergarten readiness and serves as the starting point for this section of the literature review. Race was a common demographic variable used in education research. Researchers use race as one of the student-level variables to distinguish between outcomes for children included in the study sample (Brooks-Gunn, Duncan, & Maritato, 1997; Duncan & Aber, 1997; McLloyd, 1998; Raver, Gershoff, & Aber, 2007; Davoudzadeh, McTernan, & Grimm, 2015). Current research has also found that race plays a role in determining school readiness levels. For example, African American students living below the poverty line are at a higher risk of not being kindergarten ready than white students (Connell & Prinz, 2002; Davoudzadeh, McTernan, & Grimm, 2015; Duncan, Kalil, Magnuson, & Murane, 2014). Koury and Votruba-Drzal (2014) determined through their regression study that Indian Asian and East Asian students outscored their white counterparts on school readiness exams while Mexican and Spanish Caribbean students scored below their white counterparts.

Race was used as a demographic variable to determine its relationship to the dependent variable, Brigance cognitive readiness. The categorical data for each student
were obtained from student preschool enrollment records. Student enrollment records included race information that was provided by the student’s parent/educational guardian.

Socioeconomic status (SES) was another common school readiness demographic variable that was used in school readiness research over time. Herman, Reinke, King, and Owens (2015) affirmed the findings of previous research when they concluded that “Children who are living in poverty are at higher risk for struggling in their transition to kindergarten and are more likely to have academic and behavior deficits that likely interfere with their success” (p. 225). SES was found to be a reliable predictor of early student outcomes (Janus & Duku, 2007; White, 1982; Fitzpatrick, Mckinnon, Blair, & Willoughby, 2014).

Use of SES as a demographic variable allowed for the relationships between differing student economic status and kindergarten readiness to be explored using the results of the BKS. For the purposes of my study, I used free and reduced lunch status as a proxy for socioeconomic status. Students who qualified for free and reduced lunch were considered living near or below the poverty line. Students who did not qualify for free and reduced lunch were not considered to be living in poverty. I obtained data through the EDS database. The categorical data consisted of preschool year information as completed by the educational guardian. The provided information was verified by the State Department of Education.

**Other Independent Variables Related to Kindergarten Readiness**

Of interest were the student-level variables of prior setting and attendance rate, along with the school-level variable of climate. Additionally, the research literature has examined the relationship between prior setting, attendance rates and school climate, and
kindergarten readiness.

**Prior setting.** A less common variable used to study kindergarten readiness was prior setting. Prior setting, for the purpose of this study, identified the educational or care setting in which students were enrolled the year before they began kindergarten.

Magnuson et al. (2004) found in their analysis of the Early Childhood Longitudinal Study that children with a quality prior preschool setting had higher math and reading scores than children who did not attend preschool. Magnuson et al. (2004) used ordinary least squares regressions to find the relationship between math and reading skills of kindergarten students and their prior year setting. The study findings were reaffirmed by later research that concluded that vocabulary, literacy, and math skills of kindergarten students who attended quality programs were higher when compared to students who did not attend the quality programs (Bierman et al., 2008; Claessens & Garrett, 2014; Lee, Zhai, Brooks-Gunn, Han, & Waldfogel, 2014).

It should be noted that use of prior setting as a demographic variable has not been well documented in previous literature. For the purposes of my study, prior setting was identified as Head Start and tuition-based preschool. The categorical data were collected within the first 30 days of the students’ kindergarten year. The information was requested from educational guardians at the same time as BKS administration.

**Attendance.** One characteristic of readiness was student attendance. Attendance was often overlooked, yet it may have more of an impact on school-wide academic achievement than historically thought (Johnston, 2000). King (2000) cited attendance as one of the academic performance variables, along with student grade point average, that was considered important for functioning in relation to cognitive and behavioral
dimensions. Roby (2006) conducted a correlational study for each grade level, taking the Ohio Proficiency Test to analyze school-wide attendance and its relationship to student achievement. The results of this study provided a broad overview of the relationship between attendance and achievement for students in fourth, sixth, ninth, and twelfth grades. Further studies should expand on the role of attendance in relation to cognitive and behavioral dimensions at the preschool level to determine if this correlation exists for younger students.

An article by Magnuson, Lahaie, and Waldfogel (2006) used data from the Early Childhood Longitudinal Survey of a Kindergarten cohort to analyze the links between preschool attendance and the school readiness of children of immigrants. Multivariate regression models were used to analyze the effects of preschool on school readiness for these children. Magnuson, Lahaie, and Waldfogel (2006) found that children whose mothers were not native to the United States were less likely to be enrolled in preschool programs than other children. The researchers also determined that preschool attendance raises reading and math scores for all students, regardless of their demographics.

Gottfried (2010) utilized a fixed effects design and instrumental variables strategy seeking to provide evidence estimating the causal impact of attendance on several measures of achievement, including grade point average and standardized test results. The results of this study indicated a strong, positive relationship between student attendance and student achievement at both the elementary and middle school levels. Stakeholders, including parents, staff, and community members, have assumed a positive relationship between school attendance and academic success. A vast research base has examined how these factors relate to academic outcomes for students, however few
studies have examined the relationship between individual attendance and student achievement at the preschool level.

Use of attendance as a demographic variable has been widely used in education research. For the purposes of my study, attendance was identified as the number of days a student was absent from school. The teacher of record collected the continuous data from the student’s preschool year.

Climate. School climate was also considered a school readiness variable. Leadbeater, Sukhawathanakul, Smith, and Bowen (2015) conducted an examination of the predictive association between child reports of peer victimization and internalization/externalization of school problems as reported by parents and teachers. Influences of school climate and reports of peer victimization were investigated in path models both across third and fourth grades and within the two grade levels. Both reports from parents and students showed stability of school climate dimensions. Parents’ perceptions of the school environment were not found to be significant to peer victimization. Leadbeater et al. (2015) found that children’s negative thoughts and their world view, coupled with peer victimization, may interfere with their connection to school and their perception of the school climate. This study compared parent and student perceptions of climate and found possible pathways for reducing peer victimization through positive social climate within schools.

Hoy, Hannum, and Tschannen-Moran (1998) conducted a longitudinal study of 86 middle schools and used health and openness metaphors to develop measures of organizational climate. School climate was found to significantly influence student achievement in basic skills, along with SES. Although this study was conducted in 1998,
it was the first one to consider the relationship of school climate and SES on student achievement.

For my research study, I used a proxy for climate, with the continuous data from the Comprehensive School Survey that was conducted in all of the K-12 grade schools in EDS. The data management department of EDS developed and validated this instrument. Each preschool was assigned the climate data for the K-12 school in which it was housed. This proxy was chosen due to the lack of climate data for preschools, since this information was not collected independently of the school in which it was located.

**Study Specific Independent Variables Related to Kindergarten Readiness**

The inclusion of school-level variables (school funding, preschool location and school classification) was uncommon in studies of relationships to kindergarten readiness. Some important previous research of these school-level variables is included in this section of my literature review.

**Funding source.** The preschool movement began in 1964 when President Lyndon B. Johnson took a stand against poverty in his State of the Union address. Funding during the early years of the program included a combination of federal dollars, local investments and donations (Office of Head Start, 2015). It was not until 1995, according to the Office of Head Start, that the first grants for programming were awarded. Then in 1998, the program was updated to include full-day services. The federal government began regulating the program and its services with the adoption of the *Improving Head Start for School Readiness Act of 2007* (Public Law 110-134, 2007).

Today America spends $71.3 billion on preschool education per year at the state level, according to the Prichard Committee for Academic Excellence (2012). My study
used funding sources, combined with student-level data, to identify preschool pathways that are preparing high percentages of students for kindergarten as assessed by the BKS.

Identifying effective federally funded preschool pathways within a public school allows districts to then study the strategies that the school is using to reach high level of kindergarten readiness with the hope of sharing the effective strategies district-wide. My research added to the current body of research by examining the relationship between preschool funding sources and kindergarten readiness outcomes allowing for research to show if funds were being spent on programs producing kindergarten ready students.

**Preschool location and its relation to kindergarten readiness.** A school-level factor that my study incorporated was preschool location and its relationship with kindergarten readiness. I was able to access the preschool location for each student included in the data set. While there are not many studies that use preschool location as an independent variable, there have been some key studies in preschool research. Several researchers found preschool location was associated with the level of individualized instruction students received (Pong & Hoe, 2007; Rous, Hallam, McCormick, & Cox, 2009; Winsler et al., 2008). Another prominent finding in location research is that students attending a preschool located within a public school setting score higher on readiness assessments (Magnuson et al., 2007; Reynolds et al., 2014). My study expanded the current research through hierarchical linear multiple regression analysis including school location and readiness scores.

**School classification for schools that house preschools and kindergarten readiness.** With the age of high stakes accountability came the passage of the *No Child Left Behind Act* (NCLB). One component of NCLB was the beginning of labeling schools
according to outcomes on state testing. NCLB labeled schools as “distinguished,” “proficient,” and “in need of improvement,” according to the school’s ability to meet their Annual Yearly Progress (AYP) (Public Law 107-110, 2002). Karen (2005) found that when labels are placed on schools based on student outcomes, the students are negatively affected.

There was a gap in the research regarding the relationship between school classifications and student outcomes. My study expanded current research by examining the relationship between student outcomes and the classification of the school in which their classroom is housed. The schools with kindergarten through twelfth grade received their classification according to their state accountability results.

**Summary**

The first section, *Poverty and its Deleterious Impacts on American Children*, highlighted research about the negative impact of poverty on health, victimization, and academic achievement. The second section, *Poverty and Educational Outcomes*, reported research that found graduation rates were lower, attendance rates were lower, and suspension rates were higher for students growing up in poverty. The third section, *Poverty and Kindergarten Readiness*, discussed the importance of students being ready for kindergarten in order to have positive outcome throughout the students’ educational career.

An analysis of the literature has shown a need for preschool students to attend a quality preschool within a public school setting. The purpose of this research was to expand the research base focused around preschool classes located in public schools. Magnuson et al. (2007) and Winsler et al. (2008) concluded that preschools that were...
located in public schools have higher positive outcomes for children. The outcomes included achievement levels and fewer behavioral problems when students move into kindergarten. My research examined the outcomes of two types of preschools that were located in a public school district and determined if there were significant differences between the variance explained by adding federally funded programs or tuition-based programs with both programs being housed within a public school to the regression. A gap in current research was the comparison between preschools based on how they are funded. Studies looked at student income levels, but they did not investigate funding levels of the school and they did not expand to include funding sources or include research about the enrollment levels of disadvantaged students. My study expanded the base of knowledge to the federal funding level and report the percentage of students in federally funded programs that are reaching the kindergarten readiness benchmark thus identifying programs who are successfully preparing students for their kindergarten through fifth grade education.

Mashburn, et al. (2008) determined that quality state funded preschools matter for students living below the poverty line. The study did not expand to the federal funding level for students living below the poverty line. My study also expands the research base to include student-level data on both federally funded and tuition-based preschools.
CHAPTER III
METHODOLOGY

Introduction

This study examined potential predictors of kindergarten readiness, including funding source (federally funded, tuition-based), preschool location (housed in a public A1 school, not housed in a public A1 school), and school classification. The sample of this study included preschool classrooms located in Elementary District Schools (EDS). A correlational research design was used to address the research questions, as seen in Figure 1, based on the use of existing school district data. In particular, hierarchical linear multiple regression (HLMR) was used to examine the extent of predictive utility of the aforementioned variables to predict kindergarten-readiness. This statistical method allows for combining several common educational variables to determine their predictive ability for kindergarten readiness. Regression models were used to determine correlations between the predictor variables and the dependent variables of kindergarten readiness using the domains of language/communication and cognitive/general knowledge from the Brigance Kindergarten Screener (BKS). This chapter is divided into the following sections: Research Design, Measurement of Variables, Participants, Procedures, and Data Analysis. This chapter provides the research design procedures and participant inclusion for the capstone study. Key components of the measurement instruments, the BKS and the Comprehensive School Survey (CSS), are addressed. The validity,
reliability, and reasoning of their inclusion are discussed. Figure 1 shows the three groupings that the capstone research analyzed in order to determine their relationships between the dependent variable of kindergarten readiness and the independent variables.

![Concept map for kindergarten readiness study](image)

**Figure 1.** Concept map for kindergarten readiness study

My research provides data-based outcomes that describe the effectiveness of preschool programs according to existing panel data of kindergarten readiness scores.

**Research questions.** My study addressed the following research questions:

**Research question 1: Funding source.** What is the relationship between school funding source and preschool students’ kindergarten readiness?

**Research question 2: Preschool location.** What is the relationship between preschool location and students’ kindergarten readiness?

**Research question 3: School classification.** What is the relationship between school classification and kindergarten readiness?
Research Design

The purpose of my study was to reveal relationships among variables using this data to determine possible contributing factors to increased kindergarten readiness. Although Kerlinger (1986) noted limitations of correlational research, such as the inability to manipulate independent variables, assign participants to groups, and explain a relationship between the independent variables and the dependent variables, a correlational research design is appropriate for conducting educational research when it is not possible or acceptable to manipulate the characteristics of human participants. My study looked at naturally occurring relationships between study variables based on the data set provided by EDS. According to Kerlinger and Rint (1986), correlational research design seeks to determine possible relationships through the observation of preexisting evidence in order to search for plausible contributing factors. Cohen, Manion, and Morison (2000) discussed the correlational design as an appropriate means to retrospectively examine existing groups for factors that contribute to their differences.

Measurement of Variables

**Measurement of funding source independent variables.** Table 1 reports the independent variables used within the study. The school-level independent variables of funding source (Categorical: federally funded = 0; other = 1), preschool location (Categorical: housed in a public A1 school = 0; not housed in a public A1 school = 1), school classification (Categorical: distinguished = 0; not distinguished = 1) were reported from different sources within the EDS data systems. Funding source and preschool location were reported in the EDS data books available on the EDS website. School classification was reported by the state in the school’s report card that is published each
year on the State Department of Education website.

**Table 1**

Research Questions for Funding Source, School Location, and School Classification

<table>
<thead>
<tr>
<th>Study</th>
<th>School-level variables</th>
<th>Definition of variable</th>
<th>Measurement of variable</th>
<th>Level of measurement</th>
<th>Variable levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the relationship between school funding source and preschool student kindergarten readiness?</td>
<td>Funding source</td>
<td>Where the money allocated through a formula to support education is received from</td>
<td>Reported by EDS data books for the 2014-2015 school year</td>
<td>Categorical</td>
<td>(0) Federally funded (1) Other</td>
</tr>
<tr>
<td>What is the relationship between preschool location and students’ kindergarten readiness?</td>
<td>School location</td>
<td>Where the preschool classroom is housed</td>
<td>Reported by EDS data books for the 2014-2015 school year</td>
<td>Categorical</td>
<td>(0) Housed in a public A1 school (1) Not housed in a public A1 school</td>
</tr>
<tr>
<td>What is the relationship between school classification and kindergarten readiness?</td>
<td>School classification</td>
<td>School rating based on state test scores</td>
<td>Reported by the State. Will be a proxy used from the school where the preschool was housed during the 14-15 school year</td>
<td>Categorical</td>
<td>(0) Distinguished (1) Not distinguished</td>
</tr>
</tbody>
</table>

**Measurement of common capstone control independent variables.** Table 2 reports the independent variables that were used for the entire capstone study. The school-level common independent variable of climate (Interval) was reported via proxy from the score on the CSS. The student-level common independent variables were race (Categorical: African American = 0; Non-African American = 1), socioeconomic status
(Categorical: qualifies for free/reduced lunch = 0; does not qualify for free/reduced lunch = 1), prior setting (Categorical: Head Start = 0; tuition-based = 1), and attendance (Interval, reported as days absent out of total enrollment days).

**Table 2**

Independent Variables Included in Capstone Study

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition of variable</th>
<th>Measurement of variable</th>
<th>Level of measurement</th>
<th>Variable levels</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race</td>
<td>The concept of dividing people into populations or groups on the basis of physical characteristics</td>
<td>Preschool year; Educational guardian identified</td>
<td>Categorical</td>
<td>(0) African American (1) Non-African American</td>
<td>Brooks-Gunn, Duncan, &amp; Maritato (1997); Davoudzadeh, McTernan, &amp; Grimm (2015); Duncan et al. (2014)</td>
</tr>
<tr>
<td>Socio-economic Status (SES)</td>
<td>A proxy for SES is a student qualifying or not qualifying for free/reduced lunch status</td>
<td>Preschool year; Form completed by educational guardian and verified by the state</td>
<td>Categorical</td>
<td>(0) Qualifies for free/reduced lunch (1) Does not qualify for free/reduced lunch</td>
<td>Fitzpatrick et al. (2014); Herman et al. (2015); Janus &amp; Duku (2007)</td>
</tr>
<tr>
<td>Prior Setting</td>
<td>Where a student received early care services for the 12 months prior to coming to kindergarten</td>
<td>Kindergarten year; Educational guardian identified</td>
<td>Categorical</td>
<td>(0) Head Start (1) Tuition-based</td>
<td>Bierman et al. (2008); Claessens &amp; Garrett (2014); Lee et al. (2014); Magnuson et al. (2004)</td>
</tr>
<tr>
<td>Attendance</td>
<td>Attendance is actual numbers if days present</td>
<td>Preschool year; Teacher collected daily CSS data; Student, Parent, staff identified; experience of school life</td>
<td>Interval</td>
<td>Actual number of days absent</td>
<td>Johnston (2000); King (2000); Roby (2006)</td>
</tr>
<tr>
<td>School Climate</td>
<td>Patterns of students personnel's experience of school life</td>
<td></td>
<td>Interval</td>
<td>Student survey data from the CSS</td>
<td>Hoy et al. (1998); Leadbeater et al. (2015)</td>
</tr>
</tbody>
</table>
Comprehensive School Survey. According to the Evaluation Manual, the purpose of the CSS is to put the emphasis of academic programs on educating the entire child. This survey captures data beyond academics and allows all stakeholders to have input on student learning (Muñoz & Lewis, 2009). It was designed and created as a unique survey instrument for use by EDS.

Background. According to the CSS Evaluation Manual, EDS constructed the instrument as a way to include student, parent, and teacher feedback on the services schools provide outside of the academic realm (Muñoz & Lewis, 2009). The CSS is EDS’s way of monitoring school systems and processes through the input of stakeholders. The collected data are used to inform practitioners’ decisions about how to educate the whole child and teach students ways to become productive members of the community.

Administration requirements. EDS uses two options to administer the CSS to students, parents, and staff: an email link to an internal data collection platform and paper surveys (Muñoz & Lewis, 2009). Student surveys are conducted using a paper format and then scanned into an internal data collection system. Staff surveys are conducted using an email link to an internal data collection system. Parents are offered two options, including a paper format or an online format, depending on their comfort level and access to technology. The online method allows for survey responses to be recorded efficiently and accurately into the EDS data analysis system.

Score types and subscales. The CSS survey includes score types for elementary, middle, and high school students, EDS staff, and parents of EDS students (Muñoz & Lewis, 2009). Question categories for EDS students include the following: a) school (i.e.,
school engagement, school belonging, school climate, school support, safety, and overall satisfaction); b) home/community (i.e., political discussion); c) personal development (i.e., conflict resolution and positive character); and d) school operation (i.e., teaching, curriculum, school resources, and school services). Question categories for EDS staff include the following: a) students (i.e., school support); b) school operation (i.e., administration, teaching, curriculum, student assessment, school resources, and school services); and c) employee (i.e., school belonging, safety, job satisfaction, overall satisfaction, positive character and educational satisfaction).

CSS scores are reported on a four-point Likert scale, ranging from strongly disagree to strongly agree. A score of 1 represents strongly disagree and a score of 4 represents strongly agree. The scores for all completed surveys are averaged for a school composite score (Muñoz & Lewis, 2009). For the purposes of my study, I used student survey data. Only questions relating to school climate were then averaged for a school climate score. I used questions from the following categories: school belonging, school discussion climate, caring environment, safety, overall satisfaction, and personalization. Table 3 reports the questions from the CSS that were asked of students in regards to school climate.
Table 3

Student CSS Climate Questions

<table>
<thead>
<tr>
<th>Category</th>
<th>ID #</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>School belonging</td>
<td>B4</td>
<td>I really like other students in my school.</td>
</tr>
<tr>
<td>School belonging</td>
<td>B5</td>
<td>I feel that I belong in my school.</td>
</tr>
<tr>
<td>School belonging</td>
<td>B6</td>
<td>I feel like I am part of my school community.</td>
</tr>
<tr>
<td>School discussion climate</td>
<td>B7</td>
<td>I can give opinions in class that disagree with the opinions of other students.</td>
</tr>
<tr>
<td>School discussion climate</td>
<td>B8</td>
<td>My teachers respect my opinion in class even if it disagrees with their opinions.</td>
</tr>
<tr>
<td>School discussion climate</td>
<td>B9</td>
<td>I feel I can disagree openly with my teachers about events in the news.</td>
</tr>
<tr>
<td>Caring Environment</td>
<td>B10</td>
<td>I feel my teachers really care about me.</td>
</tr>
<tr>
<td>Caring Environment</td>
<td>B11</td>
<td>I believe I can talk with my counselor.</td>
</tr>
<tr>
<td>Category</td>
<td>ID #</td>
<td>Question</td>
</tr>
<tr>
<td>Caring Environment</td>
<td>B12</td>
<td>My school has a caring and supportive environment for students.</td>
</tr>
<tr>
<td>Personal safety</td>
<td>B13</td>
<td>I feel safe walking to and from school.</td>
</tr>
<tr>
<td>Personal safety</td>
<td>B14</td>
<td>I feel safe outside the building before and after school.</td>
</tr>
<tr>
<td>Personal safety</td>
<td>B15</td>
<td>I feel safe at school.</td>
</tr>
<tr>
<td>Overall satisfaction</td>
<td>B18</td>
<td>I am very satisfied with my school.</td>
</tr>
<tr>
<td>Overall satisfaction</td>
<td>B19</td>
<td>I would rather go to this school than any other school.</td>
</tr>
<tr>
<td>Overall satisfaction</td>
<td>B20</td>
<td>I am very satisfied with JCPS.</td>
</tr>
<tr>
<td>Personalization</td>
<td>B21</td>
<td>There is at least one adult at my school whom I feel I can trust.</td>
</tr>
<tr>
<td>Personalization</td>
<td>B22</td>
<td>When I have a problem there is at least one adult at my school whom I can talk about my problem.</td>
</tr>
<tr>
<td>Personalization</td>
<td>B23</td>
<td>There is at least one adult at my school who says positive things to me often.</td>
</tr>
<tr>
<td>Site safety</td>
<td>E22</td>
<td>At my school, I feel bullying is not a problem.</td>
</tr>
<tr>
<td>Site safety</td>
<td>E23</td>
<td>At my school, I feel Internet bullying is not a problem.</td>
</tr>
<tr>
<td>Site safety</td>
<td>E24</td>
<td>The adults in my school take care of safety problems quickly.</td>
</tr>
<tr>
<td>Site safety</td>
<td>E25</td>
<td>I believe the adults in my school will take care of any unsafe situation.</td>
</tr>
</tbody>
</table>

*Psychometric properties.* The Survey Tailored Design Method (Dillman, Christian, & Smith 2014) is a procedure for conducting multiple self-administered surveys that produce both high-quality (i.e., valid and reliable) information and acceptable response rates. A validity study (Rudasill, 2008), in coordination with the
local university’s College of Education, examined the structure of the instruments using exploratory factor analysis, identifying the principle components through inter-item correlations (Stevens, 2001). Seven populations were examined, including elementary school students, middle school students, high school students, parents, classified staff, and certified staff for the 2007-2008 CSS. Revisions were made for the 2008-2009 CSS by adding and deleting questions, as well as rewording questions in order to reflect current trends in the district.

In 2008, Muñoz conducted a reliability study for the survey, each domain within the surveys, and the construct within each domain. Correlations with Cronbach’s alphas were conducted with item-by-item correlations using the Statistical Package for the Social Sciences (SPSS). The psychometric properties of the surveys were deemed adequate since the coefficients alphas greatly exceeded the minimum (.60) recommended for use of composite scales in statistical analyses (Nunally & Bernstein, 1994).

**Brigance Kindergarten Screener (BKS).** Each of the dependent variables was interval in measurement and reported the actual score for each student included in my study. Table 4 reports the domains of the BKS used for the purposes of my study.

**Table 4**

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Measurement</th>
<th>Definition of variable</th>
<th>Level of measurement</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brigance Kindergarten Screener</td>
<td>Cognitive/General Knowledge; Language Communication</td>
<td>Combination of the literacy and math scores and language/ Communication; Receptive and expressive language</td>
<td>Interval</td>
<td>French (2013)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Konold &amp; Pianta (2005)</td>
</tr>
</tbody>
</table>
Purpose. French (2013) noted that “the purpose of the BKS is to identify potential developmental delays and giftedness, to inform instruction, and to monitor child progress” (p. 2). The state in which EDS resides mandates the BKS as the measurement tool to assess kindergarten readiness according to the state legislation 704 KAR 5:070, Section 2 in accordance with KRS Chapter 45A. This legislation mandates that the screener aligns with the state’s definition of school readiness and the state’s standards that are established for preschool, and assesses the domains of adaptive, cognitive, communication, motor, and social emotional readiness. The screener must be reliable and valid for target populations, including subgroups such as English Language Learners and students with disabilities, as well as provide student-level data that assesses school readiness in each of the five aforementioned domains.

Theoretical background. The theory behind the BKS is confirmatory factor analysis, which is an analysis driven by theory that requires deductive specification of the correlation of underlying traits and indicators (French, 2013). This type of analysis supported the creation of the domain structure for the BKS.

Length. According to the Brigance Screener Training Manual, the approximate time for assessment of each student included in this study is 15 minutes per domain (French, 2013). There are 101 cognitive/general knowledge items that account for a total of 65.5 points. The language/communication domain consists of eight items, accounting for a total of 16 points. The total score for BKS ranges from 0 to 100 and is compiled from the weighted scores of each domain.

Administration requirements. Although the administration of the BKS does not require specific qualifications, each of the examiners must be familiar with the
procedures for administration and scoring, and they must have practiced administering
the exam several times. Additionally, the examiners must be able to adhere to the
directions that accompany each domain of the assessment. The state in which EDS
resides requires all new test administrators to attend a three-hour face-to-face training,
and all experienced test administrators must attend a one- to two-hour refresher training
annually. The training of each test administrator must be verified by the district and kept
on file for state records. The BKS must be administered between 15 calendar days from
the start of the school year to the thirtieth instructional day (State Common Kindergarten

*Score types and subscales.* The five domains of the BKS include: a) cognitive/general knowledge; b) language/communication; c) physical well-being; d) self-help skills; and e) social emotional skills. For the purposes of the capstone study, I examined the BKS scores related to academic readiness, which were collected by trained school personnel. Those measures are cognitive/general knowledge and language/communication. Cognitive/general knowledge is defined as a combination of the literacy and math scores and language/communication is defined as receptive and expressive language (French, 2013). Each domain assessed within the BKS produces normative scores that can be assessed individually to address the readiness of the student, and they can be used for age-level comparisons (French, 2013). Table 5 reports the questions used to gather the data for my study.
### Table 5

**Student BKS Questions for Domains Use in Study**

<table>
<thead>
<tr>
<th>Brigance domain</th>
<th>Questions asked of student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive/general knowledge</td>
<td>Knows personal information; Recites alphabet; Sorts objects (by size, color, shape); Counts by rote; Matches quantities with numerals; Determines total of two sets; Reads uppercase or lowercase letters; Experience with books and text</td>
</tr>
<tr>
<td>Language/communication</td>
<td>Names parts of the body; Verbal fluency and articulation</td>
</tr>
</tbody>
</table>

The composite score for each student is reflected along a normative scale through the conversion of raw scores from each domain. The composite scores consist of normative scores from each domain. The normative scores of each domain have a mean of 100, with this score indicating the child’s performance is reflected along a normative scale through the mean or average within a normal distribution. The standard deviation for the composite score is 15, reflecting a score of 115 as one standard deviation above the mean and a score of 85 as one standard deviation below the mean. The scores that were used in this assessment are based on an equal interval scale, allowing for arithmetical manipulation and examination (French, 2013). Each of the domains uses the same scoring guide to interpret a student’s score in relation to his or her kindergarten readiness. Table 6 can be found in the Brigance Technical Manual (French, 2013, p. 107).
Table 6

Brigance Performance Ratings

<table>
<thead>
<tr>
<th>Brigance score</th>
<th>Performance ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;70</td>
<td>Very weak</td>
</tr>
<tr>
<td>70-79</td>
<td>Weak</td>
</tr>
<tr>
<td>80-89</td>
<td>Below average</td>
</tr>
<tr>
<td>90-110</td>
<td>Average</td>
</tr>
<tr>
<td>111-120</td>
<td>Above average</td>
</tr>
<tr>
<td>121-130</td>
<td>Strong</td>
</tr>
<tr>
<td>&gt;130</td>
<td>Very strong</td>
</tr>
</tbody>
</table>

*Psychometric properties.* The reliability of the BKS was first established in 1991, and then again in 2012 with the release of the BKS III (French, 2013). The reliability was tested in two ways. Curriculum Associates, the publishers of the BKS, gathered estimates through the use of a test-retest study and an inter-rater study (French, 2013). For the first measure of reliability, the test-retest study included 338 children of all ages up to 7 years and 11 months from 25 sites. The same test administrator was used for each of the two test sessions; the second test was given within three weeks of the first test. French (2013) reported that the correlation for the total score on the BKS was .92. According to Hinkle, Wiersma, and Jurs (2003), a correlation of .70 or higher is considered strong and a correlation of .90 or higher is considered very strong. The test-retest study has a very high positive reliability correlation according to the Hinkle et al. (2003) scale of correlations.

The second measure of reliability that was used was an inter-rater study. French (2013) noted that the inter-rater study was conducted with 330 children with ages up to 7 years 11 months. According to French (2013), the two examiners assigned to each student conducted the test in the most similar settings as possible. The correlation for the total test score was .93. According to Hinkle et al. (2003), .93 is a very strong correlation.
French noted that both the test-retest and inter-rater studies showed high correlations of reliability.

The validity of the BKS was established through a study of test content, internal structure, fairness, and associations with other variables (French, 2013). Breidenbach and French (2012) found that the BKS is valid for “monitoring half-year to yearly student progress and identifying areas of strength and weakness” (p. 486). French (2013) found that the BKS was valid in the areas of test content and internal structure.

BKS test content was determined to be valid by several researchers, including Helfeldt (1984), Brennan (1985), and Scheerer (1986). The BKS is a criterion-referenced assessment that is well organized (Helfeldt, 1984). Brennan (1985) compared the BKS to other well-known assessments and Scheerer (1986) added that the BKS is as valid as the Developmental Indicators for the Assessment of Learning (DIAL) test that was widely used in the New York Public School system. Additionally, internal structure validity was tested using confirmatory factor analysis and maximum likelihood estimation (French, 2013). The BKS structure was found to be valid, according to French (2013), because it is comprised of three-factor, first-order models and a one-factor, second-order model that were the only combination of models found to meet the validity standards.

**Participants**

Initial data received from EDS consisted of 304 student participants. After analyzing the data set, 115 students were removed because they were not enrolled in their preschool locations for the entire 2014-2015 school year. Students in a tuition-based preschool were enrolled for 175 days and students in federally funded preschool were enrolled for 160 days. Fifteen additional students were removed from the data set due to
the absence of their BKS scores. The final data set consisted of 174 students with complete data.

Table 7 reports the numbers and percentages of study participants. The frequency column reports the actual number of participants for each category of the variable and the percent column reports the percentage of the total number of participants. Similarities between students’ SES and their prior setting are a result of the funding source for the prior setting. Students who qualify for free/reduced lunch status are eligible for Head Start programs. Students who do not qualify for free/reduced lunch cannot attend Head Start and must attend tuition-based preschools therefore SES and prior setting report the same values. Due to the similarities, prior setting was removed from the variable list for reporting frequencies.

Table 7
Frequencies for Independent Variables

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>102</td>
<td>58.6</td>
</tr>
<tr>
<td>Non-African American</td>
<td>72</td>
<td>41.4</td>
</tr>
<tr>
<td>Qualifies for free/reduced Lunch</td>
<td>128</td>
<td>73.6</td>
</tr>
<tr>
<td>Does not qualify for free/reduced lunch</td>
<td>46</td>
<td>26.4</td>
</tr>
<tr>
<td>Head Start (Federally Funded)</td>
<td>123</td>
<td>70.7</td>
</tr>
<tr>
<td>Tuition-based</td>
<td>51</td>
<td>29.3</td>
</tr>
</tbody>
</table>

(Note: N = 174)

According to the State Department of Education (2014) A1 schools are under the control of a principal and can establish a Site-Based Decision Making Council (SBDM). The number of tuition-based programs that are available in the district limits the sample because there are only five tuition-based preschools in EDS. In order to keep the sample balanced, data from a total of 17 classrooms were used from classrooms housed in one of
the nine schools included in the study. Demographic data for each of the schools in the study are reported below in Table 8. The demographics table shows that the average attendance rates range from 94.5% to 97.3%, with all included schools above the district average of 94.3%. Free/reduced lunch rates range from 12.9% to 95.6% of students qualifying for this service, with a district average of 66.8%. African American students comprise 11.6% to 71.3% of students in the school population with a district average of 35.1%.

Table 8

2014-2015 Demographics of Schools Included in this Research Study

<table>
<thead>
<tr>
<th></th>
<th>Enrollment</th>
<th>F/R Lunch</th>
<th>White</th>
<th>African American</th>
<th>Hispanic</th>
<th>Other</th>
<th>Mobility</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>529</td>
<td>33.3</td>
<td>34.8</td>
<td>39.3</td>
<td>3.0</td>
<td>22.9</td>
<td>1.1</td>
<td>97.3</td>
</tr>
<tr>
<td>2</td>
<td>709</td>
<td>36.4</td>
<td>66.6</td>
<td>13.3</td>
<td>10.4</td>
<td>9.7</td>
<td>2.7</td>
<td>96.8</td>
</tr>
<tr>
<td>3</td>
<td>709</td>
<td>19.6</td>
<td>69.7</td>
<td>12.7</td>
<td>4.1</td>
<td>13.5</td>
<td>7.3</td>
<td>96.2</td>
</tr>
<tr>
<td>4</td>
<td>753</td>
<td>12.9</td>
<td>68.5</td>
<td>11.6</td>
<td>4.5</td>
<td>15.4</td>
<td>1.4</td>
<td>97.3</td>
</tr>
<tr>
<td>5</td>
<td>689</td>
<td>39.0</td>
<td>72.4</td>
<td>15.1</td>
<td>5.2</td>
<td>7.3</td>
<td>4.5</td>
<td>95.9</td>
</tr>
<tr>
<td>6</td>
<td>388</td>
<td>95.6</td>
<td>45.4</td>
<td>50.5</td>
<td>1.0</td>
<td>3.1</td>
<td>7.6</td>
<td>94.6</td>
</tr>
<tr>
<td>7</td>
<td>480</td>
<td>28.3</td>
<td>72.7</td>
<td>13.3</td>
<td>5.2</td>
<td>8.8</td>
<td>6.9</td>
<td>96.5</td>
</tr>
<tr>
<td>8</td>
<td>743</td>
<td>85.1</td>
<td>13.3</td>
<td>71.3</td>
<td>11.2</td>
<td>4.2</td>
<td>8.0</td>
<td>96.0</td>
</tr>
<tr>
<td>9</td>
<td>497</td>
<td>75.5</td>
<td>61.8</td>
<td>27.0</td>
<td>4.8</td>
<td>6.4</td>
<td>12.8</td>
<td>94.5</td>
</tr>
<tr>
<td>DA*</td>
<td>498.6</td>
<td>66.8</td>
<td>46.2</td>
<td>35.1</td>
<td>10.3</td>
<td>8.4</td>
<td>9.0</td>
<td>94.3</td>
</tr>
</tbody>
</table>

(Note. Enrollment data are actual numbers of students; all other data are reported as percentages.)

(Note. School 1 houses classes of both federally funded and tuition-based preschool programs. Although located in the same facility, different classrooms will be used for each category.)

(Note. The EDS Profile Website 2014-2015 identifies the following definitions [updated 11/7/15]: Mobility index—A comparison of reentries to total enrollments expressed as an annual percentage; Free/reduced lunch—percent of students at school who receive either a free or reduced priced lunch; Ethnicity—percentage of white, African American and all other students enrolled.)

* DA represents the District Average for EDS.

Figure 2 reports demographic data comparing the study participants’ average to the district average. When comparing my sample to the district, I used the school-level
variables of SES, race, mobility, and attendance. Schools included in the study have a demographically similar average to the district average for EDS. The sample population for the study is representative of EDS district demographics.

Achievement data for each of the schools in the study are reported in Table 9. The achievement table shows that average kindergarten readiness rates range from 28.4% to 89.7%, with seven of nine schools achieving above the district average of 51.9%. Cognitive/general knowledge readiness rates range from 21.6% to 80.4%, with seven of nine schools achieving above the district average of 39.2%. Language/communication readiness rates range from 69.2% to 91.8%, with all schools included in the study above the district average of 66.7%.

Figure 2. Comparison of average school demographics included in the study to average district demographics for EDS

(Note. All data are percentages.)
Table 9

2014-2015 Achievement of Schools Included in this Research Study

<table>
<thead>
<tr>
<th>School</th>
<th>Met AMO?</th>
<th>KPREP score %</th>
<th>Kindergarten ready %</th>
<th>Cognitive ready %</th>
<th>Language ready %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No</td>
<td>75.7</td>
<td>89.7</td>
<td>80.4</td>
<td>91.8</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>71.4</td>
<td>66.7</td>
<td>55.0</td>
<td>75.8</td>
</tr>
<tr>
<td>3</td>
<td>Yes</td>
<td>79.9</td>
<td>65.9</td>
<td>56.9</td>
<td>76.4</td>
</tr>
<tr>
<td>4</td>
<td>Yes</td>
<td>81.4</td>
<td>89.4</td>
<td>83.3</td>
<td>86.4</td>
</tr>
<tr>
<td>5</td>
<td>Yes</td>
<td>76.7</td>
<td>76.5</td>
<td>63.5</td>
<td>77.4</td>
</tr>
<tr>
<td>6</td>
<td>No</td>
<td>56.9</td>
<td>28.4</td>
<td>21.6</td>
<td>73.0</td>
</tr>
<tr>
<td>7</td>
<td>No</td>
<td>78.1</td>
<td>72.2</td>
<td>66.7</td>
<td>90.3</td>
</tr>
<tr>
<td>8</td>
<td>No</td>
<td>61.2</td>
<td>53.1</td>
<td>41.5</td>
<td>69.2</td>
</tr>
<tr>
<td>9</td>
<td>Yes</td>
<td>65.4</td>
<td>37.5</td>
<td>26.4</td>
<td>79.2</td>
</tr>
<tr>
<td>DA*</td>
<td>N/A</td>
<td>56.1</td>
<td>51.9</td>
<td>39.2</td>
<td>66.7</td>
</tr>
</tbody>
</table>

(Note: AMO—Annual Measurable Objective as set by the state department of education; KPREP—Kentucky Performance Rating for Educational Progress as required by Senate Bill One passed in 2009 by the State General Assembly; Brigance uses the Anastasi and Urbina [2008] definition of School/Kindergarten Readiness: “School readiness means that a child possesses a set of prerequisite skills and abilities that will allow that child to benefit from instruction at the kindergarten level”.)

* D represents the District Average for EDS.

Figure 3 reports achievement data comparing the study participants average to the district averages for EDS. When comparing my sample to the district, I used the school-level variables of KPREP scores, as well as the percentages of kindergarten readiness, cognitive readiness, and language readiness. The average of all indicators for the sample is 67.57% as compared to the district average of 53.47%. The sample population for the study includes both high performing and low performing schools, which is a representation of the achievement in EDS.
Figure 3. Comparison of averages of schools included in the study to district averages for EDS for achievement

Procedures

Pre-existing data were used for the purposes of this study. Specifically, the data management department of EDS collected and analyzed data in the 2014-2015 and 2015-2016 school years to determine the relationship effects of each variable and kindergarten readiness. I used student-level data retrieved from the EDS district. The data are collected annually within the first 30 days of the school year through the administration of the BKS. Trained educators administer the screener and enter the data into the Brigance Online Management System. The EDS data management department imported this data into the EDS student records management system to which district staff have access. Student-level data (i.e., race, SES, prior setting, attendance, and school climate), as well as school-level data (i.e., funding source, preschool location, and school classification), were not publicly available and were requested through the EDS online data request
A committee of data management specialists reviewed the request and granted approval for the release of data for this capstone study. The EDS data management department coded the data to protect the confidentiality of the participants prior to releasing the file to the capstone group.

Through the review of publicly available EDS data notebooks, the capstone group selected the schools and classrooms from which the existing panel data were requested. The data notebooks reflected demographic characteristics and funding sources of all schools within the district. I used the EDS informational website to obtain a list of schools that have tuition-based and federally funded preschool programs. This data set was assessed to determine the classrooms included in the capstone. All of the schools were selected using a random sample based on the following characteristics: a) where the preschool was housed; b) whether the school where they were housed has a student body of at least 350 students; and c) whether the school has a full-day preschool program. Schools with 350 or more students were selected due to the use of the Comprehensive School Survey to determine school climate ratings. In addition, the average size for elementary schools in EDS is 350 students.

The requested BKS data included student-level results in the domains of cognitive/general knowledge and language/communication. These results were analyzed according to the raw score reported by EDS. The BKS scores range from 0 to 125 for a composite score on all five domains. Below average scores range from 0-89; average scores range from 90-109; and above average scores range from 110-125.

Data Analysis

Descriptive statistics, correlations, and multiple regressions were used to address
the study research questions. Descriptive statistics were used to report the data collected on key variables (e.g., race, SES, prior setting, attendance, and climate). Correlations were used to examine the relationship among study variables. Lastly, regressions were used to examine the variance explained by the addition of my study variables (e.g., school funding, school location, and school classification). Each procedure is subsequently described in detail as related to addressing the study research questions.

Descriptive statistics are used to categorize, describe, and summarize numerical data (Cronk, 2012; Hinkle et al., 2003). Descriptive statistics permit researchers to dichotomize the sample into subgroups, allowing the researcher to determine if the study sample is representative of the population of the district as a whole. The characterization of the study sample provided by the descriptive statistics provides an intensive understanding of the population being studied.

Descriptive statistics were run on all variables to describe the data set that was used to answer the research questions. The descriptive statistics expressed the characterizations of the sample as a whole and included cross tabulations for each dichotomous independent variable in relation to each dependent variable. This allowed me to report the performance of study participants in relation to their demographic groups of race, SES, and prior setting. Percentages of students from each group who scored average or above or below average are reported in the following chapter.

Correlations establish the relationship between two variables (Cronk, 2012). Correlations enhance my understanding of the relationships between study independent and dependent variables and they were used to examine the relationship among the variables, including race, SES, language/communication, and cognitive/general
knowledge. Subsequently, correlations were used to examine the relationship among the continuous independent variables of attendance and climate and the dependent variables of Brigance scores. The mean BKS score for language/communication and cognitive/general knowledge was determined for each level or value represented within the independent variables. This allowed for scoring comparisons between variables and each of the subgroups within the variables. The Pearson correlation outlines the linear relationship between my study specific independent variables (e.g., school funding, school locations, and school classification) and the capstone study dependent variables of language/communication and cognitive/general knowledge. This statistical analysis allowed me to determine whether a positive or negative correlation existed among variables as well as the strength of the relationship between variables. According to Hinkle et al. (2003), a correlation value can be reported from .00 to .100, with .00 showing no relationship and 1.00 showing a very high relationship. Hinkle et al. (2003) reported guidelines for determining the strength of the relationship between variables. A correlation can be reported as a little positive (.00 to .30) or negative (.00 to -.30) correlation, low positive (.30 to .50) or negative (-.30 to -.50) correlation, moderate positive (.50 to .70) or negative (-.50 to -.70) correlation, high positive (.70 to .90) or negative (-.70 to -.90) correlation, or very high positive (.90 to 1.00) or negative (-.90 to -1.00) correlation. The significance of the relationship was determined at p < .05. Cronk (2012) noted that a reliable relationship exists between variables that are found to have a significant correlation. For the significance of the Pearson correlation to be reliable, both independent and dependent variable should be normally distributed (Cronk, 2012).

An HLMR allows the researcher to identify the entry order of the independent
variables into the regression equation (Ho, 2013). Due to the flexibility of this regression, an HLMR was used to address the study research questions. The common independent variables of race, SES, prior setting, attendance, and school climate, as well as funding source, preschool location, and school classification, were entered into SPSS using HLMR. This HLMR is an explanatory statistical procedure. Osborne (2000) suggested using this procedure when the researcher is trying to understand a phenomenon through group-level variables. I analyzed data from the HLMR outputs that included funding source, preschool location, and school classification. The dependent variable was kindergarten readiness in the domains of cognitive/general knowledge and language/communication.

The use of HLMR analysis allowed for the creation of variable blocks, which, when included in the analysis, produced the variance explained among the blocks within the same sample to understand the relationship between funding source, preschool location, and school classification and kindergarten readiness. This method was selected because the research questions sought to explain the variance among groups of variables after accounting for the variances attributed to covariates (Tabachnick & Fidell, 2013). My study included three variable blocks: a) student-level variables of SES (qualifies for free/reduced lunch = 0), race (African American = 0), attendance (number of days absent); b) school-level variable of climate (average student climate CSS scores); c) school-level variables of funding source (Categorical: federally funded = 0), preschool location (housed in a public A1 school = 0); and d) school classification (Categorical: distinguished = 0). The Block 1 served to control for the student-level demographic variables prior to the addition of school and classroom-level variables. I expected to find
a significant outcome with the addition of each block explaining the variance. I looked for a significant increase in $R^2$. I also examined the change in the $R^2$ value to determine the significance of adding variables into the analysis at different stages (Petrocelli, 2003). This allowed me to determine the amount of change in variance by adding more variable blocks to the analysis.

The variables entered/removed table shows the order in which the variables were added to the study while the model summary table reports the variance accounted for after each variable was added to the regression (Ho, 2013). In order to determine the variance explained, I used the $R^2$ value, which reports “the degree in which a phenomenon exists” (Cohen, 1965, p. 9). Analyzing the differences in $R^2$ values after each block is added allowed me to determine the variance explained by the combination of variables included with the addition of each block. The $f$ change value was used to determine the effect size of variance explained by each block. According to Cohen (1988), a small effect size is .0196; a medium effect size is .1300; and a large effect size is .2600. Ho (2013) noted that the coefficients table helps to examine how the variables were entered into the regression equation and the significance attributed to each variable as it relates to the dependent variable.

An issue in correlational research is the nature of the relationship among variables. In particular, for multiple regression, multicollinearity occur when two or more variables are too strongly correlated. To gauge the multicollinearity of variables, the variance inflation factor (VIF) was used to determine if a strong linear relationship existed between any predictor variables (Stevens, 2009). Ho (2013) and Stevens (2009) asserted that VFI levels below 10 indicate multicollinearity are not an issue. The
collinearity diagnostics output table measures how interrelated the variables are (Becker & Wu, 2007).

Significance of each predictor Block was determined through the use of regression equation $f(\text{df}1, \text{df}2) = f \text{ change, } p < .05$ (Ho, 2013). After the significance of the Block was determined, Beta weights were analyzed to determine the significance of each predictor included within the Block. Predictors were found to be significant at the $p < .05$ level. According to Ho (2013), Beta weights less than $p < .05$ level show a significant contribution to the Block. After the significance of the predictors within the significant Block was determined at the $p < .05$ level, I was able to reject or accept the null hypothesis (Hinkle et al., 2003). When the predictor was significant, I was able to reject the null hypothesis. When the predictor was not significant, I was able to accept the null hypothesis. When the null hypothesis was rejected, I examined the $t$-statistic to evaluate the difference between the population mean and the observed sample mean (Hinkle et al., 2003). The $t$-statistic critical value is significant at or above 1.960 when $p < .05$ (Hinkle et al., 2003).

The use of HLMR analysis allowed the capstone group to enter the independent variables in the order that was dictated by logical considerations (Ho, 2013). Initial analysis of the research about each independent variable dictated that the order of input into the regression was: 1) funding; 2) school location; 3) school classification; 4) teacher credentials; 5) teacher’s years of experience; 6) music inclusion; and 7) amount of time allotted to music instruction. The capstone group anticipated funding would have the strongest relationship to the dependent variable with the independent variable of teacher credentials in the second priority position and the relationship between music inclusion
and the dependent variable in the third priority position. The order of entry allowed me to see the importance of each independent variable Block and the variance provided by each Block in relation to the dependent variable of kindergarten readiness (Ho, 2013).

The variable Blocks’ (e.g., Block 1, Block 2, and Block 3) null hypothesis can be rejected at the $p < .05$ level (Hinkle et al., 2003), or when the parameter is statistically different from zero, allowing me to determine if there was a statistical significance of the variable Blocks in the HLMR analysis. This also informed me when the variables in the Block collectively accounted for the variance in the dependent variables.

Rejecting the null hypothesis allowed me to determine if the addition of the independent variables within Block 3 enhanced the prediction funding source, preschool location, and school classification had a positive relationship on kindergarten readiness. This change was reflected in the $R^2$ value through the addition of Block 3 to the model.

**Assumptions.** Statistical procedures have assumptions that must be tested before the outputs can be considered reliable. The HLMR has assumptions that were tested during the data analysis. According to Snijders (2012), the assumptions include the following:

- Are the right variables included in the fixed section of the regression?
- Are the right variables included in the random section of the regression?
- Are the residuals normally distributed, is the variance of the residuals constant?
- Are the coefficients distributed normally?
- And do the coefficients have a construct co-variance matrix?

I addressed these assumptions in the data analysis section. Assumptions were addressed by assigning variables to Blocks according to their school level, classroom level, and student level. Additional assumptions were addressed by examining residual
plots for clustering of data, as described by Stevens (2009).
CHAPTER IV

RESULTS

Chapter IV is divided into two sections that report study findings: Descriptive Statistics and Hierarchical Multiple Linear Regression (HLMR). The first section, Descriptive Statistics, reports the descriptive statistics of the collected data collected on the key variables (e.g., race, SES, prior setting, attendance, and climate). The second section, Hierarchical Linear Multiple Regression Results (HMLR), reports the results of the HLMR. Results are reported from the three HLMR blocks and from not only the aforementioned independent variables, but also from the addition of school funding, school location, and school climate.

Descriptive Statistics

Tables 10 and Table 11 report the cross tabulations for the independent variables of race, SES, and prior setting, and the dependent variables of each of the included domains of the Brigance Kindergarten Screener (BKS). Specifically, Table 10 reports descriptive statistics for each of the student-level independent variables for the language/communication domain, whereas Table 11 reports descriptive statistics for the cognitive/general knowledge domain.

As shown in Table 10, 27.4% of African American students scored below average in the domain of language/communication, while 26.3% non-African American
students scored below average. Therefore, African American students were 1.1% more likely than non-African American students to score below average in the language/communication domain of the BKS. A Chi-Square statistic was used to examine whether African American students who scored below average were significantly different than the non-African American group, and there was no significant difference between the groups, $X^2 (1) = .02, p = .88$.

For students who qualified for free/reduced lunch, 29.6% scored below average, while 70.3% scored above average in the domain of language/communication. Of the students who did not qualify for free/reduced lunch status, 19.5% scored below average and 80.4% scored above average. Students who qualified for free/reduced lunch were therefore 10.1% more likely to score below average on the language/communication domain of the BKS compared to those who did not qualify. A Chi-Square statistic was used to examine whether or not students who qualify for free/reduced lunch scoring below average were significantly different than students who did not qualify for the free/reduced lunch group, and there was no significant difference between the groups, $X^2 (1) = 1.76, p = .19$.

Table 10 also reports that 30.8% of Head Start students scored below average, and 69.1% scored on or above average. Of the tuition-based students, 17.6% scored below average and 82.3% scored average or above on the language/communication domain of the BKS. Students who were enrolled in Head Start programs in their prior setting were 13.2% more likely to score below average on this domain. A Chi-Square statistic showed that Head Start students who scored below average were significantly different than the students in the tuition-based group, and there was not a significant difference between the
groups, $X^2 (1) = 3.21, p = .07$.

**Table 10**

**Language/Communication Readiness**

<table>
<thead>
<tr>
<th></th>
<th>Average or above</th>
<th>Below average</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>74</td>
<td>28</td>
</tr>
<tr>
<td>Non-African American</td>
<td>53</td>
<td>19</td>
</tr>
<tr>
<td><strong>SES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualifies for Free/Reduced Lunch</td>
<td>90</td>
<td>38</td>
</tr>
<tr>
<td>Does Not Qualify for Free/Reduced Lunch</td>
<td>37</td>
<td>9</td>
</tr>
<tr>
<td><strong>Prior setting</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head Start</td>
<td>85</td>
<td>38</td>
</tr>
<tr>
<td>Tuition-based</td>
<td>42</td>
<td>9</td>
</tr>
</tbody>
</table>

*(Note. N = 174)*

As reported in Table 11, 61.7% of the African American students scored below average in the domain of cognitive/general knowledge, while 36.1% non-African American students scored below average. Therefore, African American students were 25.6% more likely than non-African American students to score below average in the cognitive/general knowledge domain of the BKS. A Chi-Square statistic was used to examine whether African American students who scored below average were significantly different than the non-African American group, and there was significant difference between the groups, $X^2 (1) = 10.28, p < .01$.

For students who qualified for free/reduced lunch, 60.1% scored below average, while 39.8% scored above average in the domain of cognitive/general knowledge. Of the students who did not qualify for free/reduced lunch status, 26.0% scored below average and 73.9% scored above average. Students who qualified for free/reduced lunch were 33.3% more likely to score below average on the cognitive/general knowledge domain of the BKS. A Chi-Square statistic was used to examine whether students who qualified for free/reduced lunch scoring below average were significantly different than the students
who did not qualify for the free/reduced lunch group, and there was a significant
difference between the groups, $X^2 (1) = 15, p < .00$.

Table 11 also reports that 59.3% of Head Start students scored below average and
40.6% scored on or above average. Of the tuition-based students, 31.3% scored below
average and 68.6% scored average or above on the cognitive/general knowledge domain
of the BKS. Students who were enrolled in Head Start programs in their prior setting
were 27.2% more likely to score below average on this domain. A Chi-Square statistic
was used to examine whether Head Start students who scored below average were
significantly different than the students in the tuition-based group and there was a
significant difference between the groups, $X^2 (1) = 10.64, p < .00$.

**Table 11**

*Cognitive/General Knowledge Readiness*

<table>
<thead>
<tr>
<th></th>
<th>Average or above</th>
<th>Below average</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>39</td>
<td>63</td>
</tr>
<tr>
<td>Non-African American</td>
<td>46</td>
<td>26</td>
</tr>
<tr>
<td><strong>SES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualifies for</td>
<td>51</td>
<td>77</td>
</tr>
<tr>
<td>Free/Reduced Lunch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does Not Qualify for</td>
<td>34</td>
<td>12</td>
</tr>
<tr>
<td>Free/Reduced Lunch</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Prior setting</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head Start</td>
<td>50</td>
<td>73</td>
</tr>
<tr>
<td>Tuition-based</td>
<td>35</td>
<td>16</td>
</tr>
</tbody>
</table>

*(Note: N = 174)*

Table 12 reports the Pearson correlations between study independent variables and
study dependent variables of language/communication and cognitive/general knowledge.
All of the relationships between the independent variables and language/communication
were found to have little to no relationship with values ranging from -.108 to .083, and no
value was reported for school location. There is little to no relationship between
cognitive/general knowledge and attendance (-.154) or climate (.148).
Table 12

Pearson Correlations for Dependent Variables, Attendance, and Climate

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Attendance—days absent</th>
<th>Climate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language/communication</td>
<td>-.108</td>
<td>.052</td>
</tr>
<tr>
<td>Cognitive/ general knowledge</td>
<td>-.154*</td>
<td>.148*</td>
</tr>
</tbody>
</table>

(Note. * represents p < .05)

Table 13 reports the mean number of sample participants included in the level of each independent variable included in Block 3 (N), and standard deviation of dependent variable scores for students in the sample. The mean score for language/communication and cognitive/general knowledge are reported for each level of Block 3 variables (i.e., school funding, school location, and school classification). The mean score for the independent variable of school funding is reported for students who attended a federally funded program and students who did not attend a federally funded program for each of the dependent variables. Students who received federally funded instruction averaged 2.47 points lower in language/communication than students who did not receive federally funded instruction. Students who received federally funded instruction scored on average 9.26 points lower in cognitive/general knowledge than students who did not receive federally funded instruction.

The mean score for the independent variable of school location is reported for students who received instruction in preschools that were housed in an A1 public school. Students who received instruction in preschools that were housed in an A1 public school had an average score of 96.01 in language communication and an average score of 89.14 points in cognitive/general knowledge.

The mean score for the independent variable of school classification is reported for
students who attended a preschool within a school that was classified as distinguished, and for students who did not attend a preschool within a school that was classified as distinguished for each of the dependent variables. Students who received instruction in a preschool within a school that was classified as distinguished averaged 2.08 points higher in language/communication than students who did not attend a preschool within a school that was classified as distinguished. Students who received instruction in a preschool within a school that was classified as distinguished scored on average 9.41 points higher in cognitive/general knowledge than students who did not attend a preschool within a school that was classified as distinguished.
Table 13

Mean Scores for School Funding, School Location, and School Classification and Dependent Variables Included in Study

<table>
<thead>
<tr>
<th>Block 3 variable</th>
<th>Variable levels</th>
<th>LangCom</th>
<th>CogGenK</th>
</tr>
</thead>
<tbody>
<tr>
<td>School funding Federally funded</td>
<td>Mean</td>
<td>95.28</td>
<td>86.43</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>123</td>
<td>123</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>14.055</td>
<td>14.605</td>
</tr>
<tr>
<td>Not federally funded</td>
<td>Mean</td>
<td>97.75</td>
<td>95.69</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>51</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>12.283</td>
<td>14.473</td>
</tr>
<tr>
<td>Total</td>
<td>Mean</td>
<td>96.01</td>
<td>89.14</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>174</td>
<td>174</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>13.571</td>
<td>15.126</td>
</tr>
<tr>
<td>School location Located in an A1 p.s.</td>
<td>Mean</td>
<td>96.01</td>
<td>89.14</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>174</td>
<td>174</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>13.571</td>
<td>15.126</td>
</tr>
<tr>
<td>School classification Distinguished</td>
<td>Mean</td>
<td>97.20</td>
<td>94.55</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>74</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>13.879</td>
<td>14.526</td>
</tr>
<tr>
<td>Not distinguished</td>
<td>Mean</td>
<td>95.12</td>
<td>85.14</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>13.879</td>
<td>14.358</td>
</tr>
<tr>
<td>Total</td>
<td>Mean</td>
<td>96.01</td>
<td>89.14</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>174</td>
<td>174</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>13.571</td>
<td>15.126</td>
</tr>
</tbody>
</table>

(Note. LangCom represents Language/Communication; CogGenK represents Cognitive/General Knowledge; SD represents Standard Deviation.)

(Note. N = 174 for each Block 3 variable.)

**Multicollinearity explained.** The test outputs for multicollinearity of the independent variables included in my study were reported in Block 3 results in the coefficients table that was produced by the HLMR. The results showed that multicollinearity is not an issue when Block 3 is inserted into the HLMR for either dependent variable, language/communication or cognitive/general knowledge. After examining the Beta weights, it can be noted that even though multicollinearity does not pose an issue, only the independent variables of SES and school classification were found to be significant ($p < .05$) in the HLMR for the dependent variable of cognitive/general knowledge.
knowledge. No independent variables were found to be significant for the dependent variable of language/communication.

**Hierarchical Linear Multiple Regression (HLMR) Results**

My research questions for this study are as follows:

**Research question 1.** What is the relationship between school funding source and preschool students’ kindergarten readiness?

**Research question 2.** What is the relationship between school location and preschool students’ kindergarten readiness?

**Research question 3.** What is the relationship between school classification and kindergarten readiness?

Each of these questions was answered using the HLMR statistical procedure using three blocks of variables. Block 1 was comprised of student-level variables (e.g., race, SES, prior setting, and attendance); Block 2 was comprised of the school-level variable of climate; lastly, Block 3 contained the school-level variables of school funding, school location, and school classification.

**Reports for HLMR blocks.** Table 14 reports the amount of variance explained by each Block, the Beta coefficients, and the standard error statistics for the predictor variables included in each Block of the HLMR for the dependent variables of language/communication and cognitive/general knowledge. Block 1 included the demographic variables of race, SES, and attendance, and accounted for 1.9% of the variance in language/communication, which was not statistically significant $F(3,170) = 1.084, p > .05$. The addition of Block 2, which included the school-level variable (school climate), explained 2.2% of the variance in language/communication, which resulted in
an increase of .3% of the variance explained and was not statistically significant, 
\[ F(1,169) = .505, p > .05. \] The inclusion of Block 3 provided a test of whether the variables of school funding, school location, and school classification contributed to explaining the variance in language/communication. As reported, the variable blocks accounted for 3.0% of the variance in language/communication, which was an increase of .8% and was not statistically significant, \[ F(2,167) = .707, p > .05. \] As such, the independent variables were not strong predictors of kindergarten readiness in the BKS domain of language/communication.

Block 1 included the demographic variables of race, SES, and attendance and accounted for 11.3% of the variance in cognitive/general knowledge, which is statistically significant, \[ F(3,170) = 7.226, p < .05. \] The variable of SES was found to be significant at the \( p < .05 \) with a \( t \)-statistic of 3.217 showing the cognitive/general knowledge mean score of the study population was more than three standard deviations away from the hypothesized mean score of the population. The addition of Block 2 that included the school-level variable (school climate) explained 11.4% of the variance in cognitive/general knowledge, which resulted in an increase of .1% of the variance explained and was not statistically significant, \[ F(1,169) = .179, p > .05. \] The inclusion of Block 3 provided a test of whether the variables of school funding, school location, and school classification contributed to explaining the variance in cognitive/general knowledge. As reported, the variable blocks accounted for 14.7% of the variance in cognitive/general knowledge, which was an increase of 3.3% and was statistically significant, \[ F(2,167) = 3.273, p < .05. \] As such, the independent variables of SES and school classification were strong predictors of kindergarten readiness in the BKS domain.
of cognitive/general knowledge. The predictor variable of SES had a \( t \)-statistic of 2.298 showing that the cognitive/general knowledge score of the study population was more than two standard deviations away from the hypothesized mean score of the population.

The predictor variable of school classification was significant at the \( p < .05 \) with a \( t \)-statistic of -2.298. I was able to reject the null hypothesis that states there will be no difference in kindergarten readiness rates for students based on the school classification for the school where their preschool is housed.

**Table 14**

**HMLR Analyses of the Relationship of Kindergarten Readiness to Student Demographics, School Climate, School Funding, and School Classification**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Block 1</th>
<th>R²</th>
<th>ΔR²</th>
<th>( \beta )</th>
<th>SE</th>
<th>Block 2</th>
<th>R²</th>
<th>ΔR²</th>
<th>( \beta )</th>
<th>SE</th>
<th>Block 3</th>
<th>R²</th>
<th>ΔR²</th>
<th>( \beta )</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race</td>
<td></td>
<td>.019</td>
<td>.113</td>
<td>-.087</td>
<td>2.312</td>
<td>.079</td>
<td>2.450</td>
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<td></td>
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</tr>
<tr>
<td>SES</td>
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<td>2.719</td>
<td>.271</td>
<td>2.882</td>
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<td></td>
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<tr>
<td>Attendance</td>
<td></td>
<td></td>
<td></td>
<td>-.091</td>
<td>.103</td>
<td>-.063</td>
<td>.109</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Block 2</td>
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<td>-.101</td>
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<td>.071</td>
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<tr>
<td>Race</td>
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<td>-.056</td>
<td>2.789</td>
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<tr>
<td>Block 3</td>
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<td>.103</td>
<td>-.047</td>
<td>.180</td>
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<td>13.073</td>
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<tr>
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<td>.214</td>
<td>6.482</td>
<td>-.300</td>
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<tr>
<td>Classification</td>
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<td>-.204</td>
<td>2.714</td>
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</tr>
</tbody>
</table>

(Note. LangCom represents Language/Communication; CogGenK represents Cognitive/General Knowledge; SES represents socioeconomic status; Climate represents school climate; Funding represents school funding; Classification represents school classification.)
Conclusion

For each of the research questions for my study, I determined the significance of the independent variables as they were added to Block 3 of the HLMR. The inclusion of Block 3 was determined to be significant. The independent variables of SES and school classification were found to be significant with in Block 3. Based on these findings, I was able to reject the Null hypothesis for research question 3. School funding was not found to be significant and I accepted the null hypothesis for research question 1. Additionally, the independent variable of school location was not included in the HLMR. After my analysis of the descriptive statistics, I found that the sample did not provide comparison groups within in the variable. Chapter V will provide discussion and implications of my findings.
CHAPTER V

DISCUSSION

Introduction

Chapter V of my study is a summary of the methods, major findings, and limitations. I conducted this research for the purpose of identifying research-based pathways for preschool students in order to reach kindergarten readiness before the students enter elementary school. The findings can be used to support funding and classroom placement for preschool classrooms.

Summary of Method

The data received from Elementary District Schools (EDS) included student-level data for 174 students from the 2014-2015 and the 2015-2016 school year. The coded data set was entered into the Statistical Package for the Social Sciences (SSPS) and analyzed using a hierarchical linear multiple regression (HLMR). The HLMR was used for the purpose of explaining relationships between the variables that were included in a sample (Osborne, 2000). My study analyzed data from HLMR outputs that included student-level independent variables of race, socioeconomic status (SES), prior setting, and attendance. The school-level variables of school climate, school funding, school location, and school classification were also analyzed using the HLMR statistical procedure. The dependent variable was kindergarten readiness in the areas of language/communication and
cognitive/general knowledge, as assessed by the Brigance Kindergarten Screener (BKS). The independent variables were grouped into three variable blocks according to student demographics, school level variables, and my individual study variables. Block 1 included student-level variables of race, SES, prior setting, and attendance. Block 2 added the school-level variable of school climate, and Block 3 added the school-level variables of school funding, school location, and school classification. Student scores for each of the dependent variables were entered into SPSS and correlated with the independent variable blocks.

Outputs for descriptive statistics, correlations, and multiple regressions were analyzed to summarize the sample, examine the relationship between the independent and dependent variables, and to examine the variance explained by the addition of variable blocks.

Summary of Findings for Research Questions

Research question 1. What is the relationship between school funding source and preschool students’ kindergarten readiness?

Arthurs, Patterson, and Bentley (2014) and Brown and Lee (2014) identified a need to research effective preschools by examining kindergarten readiness rates to ensure the funding of effective programs and to have the greatest impact on student achievement for all students. According to the Prichard Committee for Academic Excellence (2012) the state where EDS resides spends $71.3 million on preschool education per year. The aim of my study was to identify preschool pathways that are preparing high percentages of students for kindergarten as assessed by the BKS. I was able to explore if the source of funding had a significant relationship with student academic outcomes. I found that when
school funding was added to the HLMR Block 3, it was not a significant predictor variable of kindergarten readiness for the BKS domains of language/communication or cognitive/general knowledge, thereby showing that researchers may be able to eliminate funding source as a focus when researching kindergarten readiness.

While school funding was not significant when included in Block 3 of the HLMR, the descriptive statistics showed that students who attended a program that was not federally funded had an average score that was 2.71 points higher than the average score for students who attended a federally funded program. The descriptive statistics showed that future research using different statistical methods could provide stronger information about the role that school funding plays in kindergarten readiness.

Further research using methods that individually examine the relationship of independent variable of school funding and the dependent variable of kindergarten readiness would allow for a deeper analysis of the relationship that school funding has with kindergarten readiness. These future studies should include all domains of the BKS and should use an experimental or quasi-experimental design. District leaders of EDS would benefit from future research in the area of school funding and educational leaders could make research-based decisions regarding budget decisions and requests for tax increases to support preschool education.

**Research question 3.** What is the relationship between school classification and kindergarten readiness?

The *No Child Left Behind Act (NCLB)* labeled schools as distinguished, proficient, and in need of improvement based on the school’s scores on their state assessment (Public Law 107-110, 2002). The ability of the school to meet the Annual
Yearly Progress (AYP) goal, which was part of Public Law 107-110 (2002), determined the school’s classification. Karen (2005) found that students were negatively affected when labels were placed on schools based on student outcomes. The gap in the research regarding the relationship between school classification and student outcomes is that very few studies exist using this variable. My study supports the current research with the finding that school classification was one of two significant variables in Block 3 of the HLMR. School classification had a significantly negative impact on kindergarten readiness scores in the area of cognitive/general knowledge. When schools have classifications other than distinguished, the average student outcome of kindergarten readiness is lower.

This finding highlights the need for school districts and state boards of education to reexamine the classifications of schools based on test scores alone, as well as the placement of preschool classrooms into schools that are not labeled as distinguished. Students who attended a preschool within a school that was classified as distinguished scored an average of 9.41 points higher in the cognitive/general knowledge domain than students who attended preschool within a school that was not classified as distinguished. This finding shows that further research needs to be completed to examine the specific reasons why students in preschool classrooms that are located in distinguished schools are outperforming other student groups. This future research should include the examination of instructional strategies, types of curriculum used, and the rates of preschool readiness for students who attend preschool sites within a school that is classified as distinguished. While it is not logistically feasible at the current time to place all of the preschool sites into distinguished schools, future research into strategies,
curriculum, or preschool readiness may provide a framework for all preschool classrooms to implement. The implementation of this framework could produce higher kindergarten readiness rates in all preschools, thereby enabling more schools to reach the distinguished category as the students identified as ready progress through the school system.

**Limitations of Research Design**

My study is not generalizable to broad programs, districts, or schools. The findings are only generalizable to the EDS district, district programs, and the time period of 2015. The analyzed data were from one district, during one time frame, using one kindergarten screener. It is possible that different kindergarten screeners may produce differing kindergarten readiness rates.

My study was not able to report cause and effect due to the use of a correlational research design. My research was also limited because all of the participants attended preschool within an A1 public school. This did not allow the regression to report the ability of school location to predict kindergarten readiness.

While each domain of the BKS has been found to be valid and reliable, only two of the five domains were included in my study: language/communication and cognitive/general knowledge. Additionally, the data were collected in August of the students’ kindergarten year, which was eight weeks after the end of the students’ preschool year. The time away from a school setting could have impacted the students’ retention of the knowledge that they had gained during preschool.

**Summary**

The use of the HLMR model allowed the data set to be analyzed using variable blocks. The variable blocks explained 3.0% of the variance for the dependent variable of
language/communication and 14.7% of the variance for the dependent variable of cognitive/general knowledge. My independent variables of school funding and school location were not significant when added to Block 3, and could not be compared to prior research. My independent variable of school classification was significant and my findings did support current research.
CHAPTER VI

INTRODUCTION

Preschools in the United States were first funded with public tax dollars when Head Start was introduced by President Lyndon Johnson in 1965 as part of his campaign against poverty. States began to develop their own preschool programs because there were more student applications than federal funding. Enrollment in preschool has steadily increased since 1965 and currently 66% of the nation’s four-year-olds are participating (Institute of Education Sciences, n.d.). This rapid increase in student participation created an increased need for preschool teachers. Many early childhood education advocates believe there should be increasing state requirements that mandate bachelor’s degrees as the minimum required credential to teach preschool age children (Barnett, 2003; Clarke-Stewart, Vandell, Burchinal, O’Brien, & McCartney, 2002; Whitebook, 2003). Further, Clotfelder, Ladd, and Vigdor (2007) found that teacher credentials, along with teacher years of experience, have positive effects on student academic outcomes.

**Contextualizing the Proposed Study**

States vary in employment requirements for preschool teachers. While some states require preschool teachers to earn a four-year college degree in specified areas such as early childhood or child development, other states have no such requirements (Kim, Chang, & Kim, 2011). Therefore, research in this field is needed in order to assist states in determining which teacher credentials should be required to teach preschool.
A large group of studies has shown positive effects between preschool teacher college attainment and student outcomes (Barnett, 2003; Clarke-Stewart et al., 2002; Whitebook, 2003). Further studies have found that high levels of education, including early childhood curriculum, result in high levels of preschool quality (Burchinal, Cryer, Clifford & Howes, 2002; Howes 1997). In relation to specific content areas, studies have concluded that teacher-level variables, including years of experience and licensure, had positive effects, particularly in the area of mathematics (Clotfelter, Ladd, & Vigdor, 2007, Kim et al., 2011; Spodek, 1982). While these studies all have shown the positive effects of teacher credentials, it is clear that several variables within this context may determine if teacher education matters for student outcomes.

In contrast, another group of studies have shown little correlation between the two (Burchinal, Hyson, & Zaslow, 2008; Early et al., 2007). There have been several reviews of the literature that summarize the relationship between teacher-level characteristics and student academic outcomes (Rice, 2003; Wayne & Younsg, 2003; Wilson & Floden, 2003; Wilson, Floden, & Ferrini-Mundy, 2001). While these studies highlight the importance of teacher characteristics to student outcomes, the combination of these characteristics is unclear.

A deficiency exists in the literature examining teacher years of experience and kindergarten readiness. While research has looked at this relationship for elementary students (Clotfelter, Ladd, & Vogdor, 2007), a gap for the examination for younger students exists. Clotfelter, Ladd, and Victor (2007) noted that even though research has been extensive, “the debate still rages about whether measurable teacher credentials can reliably predict either teacher quality or student achievement” (p. 674). This debate has
been a topic of research for many decades.

Clarke-Stewart et al. (2002) found a small negative correlation between caregivers’ experience and positive caregiving but noted the effect of experience would be found when other factors that predict high quality care were controlled. Finally, Pianta et al. (2005) observed teacher attributes in several classrooms and found an association between experience and quality. Studies demonstrate teacher-level variables affect student outcomes (Rice, 2003; Wayne & Youngs, 2003; Wilson & Floden, 2003; Wilson, Floden, & Ferrini-Mundy, 2001). However, many of the studies differ on the context of the association, noting inconsistencies with structure, center location, gender, and global quality. While all of the studies uncovered a correlation between teacher credentials and quality, it was clear that other factors affect the degree of correlation.

**Purpose of the Study.** My study seeks to determine the extent to which the teacher-level variables of teacher credentials and years of experience impact kindergarten readiness as measured by the Brigance Kindergarten Screener (BKS).

**Research Questions**

**Research question 1.** Teacher Credentials. What is the relationship between preschool teacher credentials and kindergarten readiness?

**Research question 2.** Teacher Years of Experience. What is the relationship between preschool teacher years of experience and kindergarten readiness?

**Hypothesis**

The following are the null and alternative hypotheses of my guiding research questions:

**Teacher credentials.** Null (H₀) - There will be no difference in kindergarten readiness between students assigned to teachers with teacher credentials and students
assigned to teachers without teacher credentials. Alternative (H₁) - There will be a
difference in kindergarten readiness between students with preschool teachers holding
teaching credentials and students with preschool teachers who do not hold teaching
credentials.

**Teacher years of experience.** Null (Hₒ) - There will be no difference in
kindergarten readiness between students based on preschool teacher years of experience.
Alternative (H₁) – There will be a difference in kindergarten readiness between students
based on preschool teacher years of experience.

**Key Terms**

For the purpose of this study the following definitions will apply:

**Bachelor’s Degree:** A bachelor’s degree is defined as teacher possession of a four-year
degree from a postsecondary institution.

**Early Childhood Certificate:** An Early Childhood Certificate is defined as teacher
possession of a certificate in early childhood development

**Teacher Certification:** Teacher certification is defined as teacher possession of a state
teaching license.

**Teacher Credentials:** For the purpose of my study, teacher credentials are defined as
teachers who possess a bachelor’s degree or higher.

**Teacher Years of Experience:** Teacher years of experience are defined as the number of
years a teacher is employed by the district.

**Significance of Study**

Due to the importance of developing quality preschool education programs, the
effect of teacher credentials on student outcomes must be determined. Federal and state
funded preschool programs are important due to the government mandated accountability of the *No Child Left Behind Act (NCLB)* of 2007, known as the nation’s general education law. This law requires that children must be assessed for proficiency in reading and math in grades 3-8 to determine if students are making Adequate Yearly Progress (AYP). Therefore, kindergarten readiness must be studied to ensure that students are prepared in their preschool years to reach proficiency on state mandated tests in elementary school. It is not enough to require teacher certification and college education for teachers beginning with those that teach kindergarten. It is critical to require high levels of qualifications for preschool teachers as well as to recruit new teachers through teacher preparation programs (Lobman, Ryan, & McLaughlin, 2005). Preschool students must be taught by teachers who can prepare them cognitively, socially, and linguistically to succeed.

**Limitations and Design Controls**

The study is not generalizable broadly to other districts or schools and only to the district being studied. The use of Hierarchical Linear Multiple Regression (HLMR) allowed me to establish relationships between multiple variables within the same sample to understand the relationship between teacher credentials, years of experience, and kindergarten readiness. A discussion of limitations and assumptions of this analytical approach is necessary. The use of HLMR analysis allowed the capstone group to input the independent variables in the order dictated by logical considerations (Ho, 2013).

**Organization of the Research Study**

Chapter VI includes the research question, hypothesis, key terms, overview of the existing research, deficiencies of the past research, and significance of the study. Chapter VII reviews the literature of the teacher-level variables of credentials and years of
experience. Chapter VIII is an explanation of the methodology that was used in my study. Chapter IX discusses the gathered data. Chapter X summarizes the findings of the research and policy implications for the relationship between the teacher levels of credentials and years of experience for both my individual study and the capstone study.

**Summary Review of Findings and Potential Implications for Policy and Practice**

I found higher Brigance Kindergarten Screener (BKS) scores for students included in the sample on the cognitive/general knowledge domain when teacher-level variables (i.e., credentials and years of experience) were added as a block. This supported my hypothesis that the teacher-level variables of teacher credentials and teacher years of experience impact outcomes for preschool students \( p = .043 \). The results were significant only when the teacher-level variables were added as a block. The results of my study further found the significance of the teacher-level variables were high \( p = .001 \) for students from low socioeconomic (SES) backgrounds and thus supports a positive correlation between those variables. The results of my study support the importance of teacher-level variables and examination of teacher-level requirements at the national and local levels.
CHAPTER VII
LITERATURE REVIEW

States have inconsistent preschool teacher credential requirements, varying from holding a bachelor’s degree to no requirements (Kim, Chang, & Kim, 2011). One cornerstone study by Clotfelter, Ladd, and Vigdor (2007) demonstrated teacher-level variables, including years of experience and licensure, had positive effects in the area of mathematics. For the purpose of my study, literature was reviewed to highlight inquiry around the variables of preschool teacher credentials, including college attainment and teacher years of experience.

Previous studies that measured student outcomes through preschool teacher college attainment provided mixed results and there is limited research that studies preschool teacher certification as it relates to kindergarten readiness as measured by a common kindergarten screener. In my study, I sought to address the deficiency in literature relating to the teacher-level variables of teacher credentials and teacher years of experience as assessed by a common kindergarten screener.

Several study findings around the effects of college attainment on student outcomes are mixed. One group of studies supports a positive effect of preschool teacher college attainment on student outcomes (Barnett, 2003; Clarke-Stewart et al., 2002; Whitebook, 2003). Yet another group of studies has shown little correlation between the two (Burchinal, Hyson, & Zaslow, 2008; Early et al., 2007). An additional group of
studies found that teacher degree attainment, that includes early childhood curriculum, resulted in high levels of preschool quality (Burchinal, Cryer, Clifford, & Howes, 2002; Howes 1997). Additional research delves into support for teacher certification and/or college attainment for underserved student populations (Darling-Hammond, 2010; Goldhaber & Brewer, 1997). The research around the topic of teacher education is unclear.

In my study, I also sought to address a gap in the literature between the teacher-level variable of teacher years of experience and kindergarten readiness. Research has looked at this relationship for elementary students (Clotfelter, Ladd, & Vogdor, 2007), but further studies should explore this relationship for younger students. Recent findings show teacher-level variables must not be examined as stand-alone factors (Gates Foundation, 2013). In a study of 10 early childhood caregivers, Clarke-Stewart (2002) found a small negative correlation between caregivers’ experience and positive caregiving, but noted that the effect of experience would be noted when other factors that predict high-quality care were controlled. Finally, Pianta et al. (2005) observed teacher attributes in several classrooms and discovered an association between experience and quality. The literature examined on teacher years of experience noted that experience matters but utilized various modes of measurement. Research measuring teachers’ years of experience should be examined utilizing a common kindergarten screener to study the relationship of kindergarten readiness at the teacher level.

My literature review is divided into six sections, framing the need for my study while explaining the current reality of preschool credential requirements in the United States. The first section of the literature review first provides a Brief History of Preschool
Programs in the United States, establishing the relevance of the topic in order to demonstrate the current context of preschool. The second section discusses Teacher Characteristics Related to Kindergarten Readiness as outlined in the current research. This section includes a discussion of the inconsistency of states in establishing a universal set of preschool credentialing requirements. I analyzed the literature describing various methods of preschool teacher credentialing and years of experience in order to build a case for my study and its specific relevance to the current age of accountability for elementary schools. The third section discusses Preschool in the Current Age of Accountability to build the case for assessing preschool programs. The fourth section reviews common kindergarten screeners, including Brigance Kindergarten Screener (BKS). Assessment of preschool programs will also be discussed as it relates to equity for all subpopulations. This section establishes relevance to the importance of assessment for each of these groups. The fifth section includes a Discussion of Kindergarten Readiness Demographic Independent Level Variables of SES, race, attendance, and prior setting. In addition, the school-level variable of climate will also be reviewed. The literature review will conclude with a sixth section, a Summary of the Themes Discussed Throughout the Review.

Brief History of Preschool Programs in the United States

In 1965, President Lyndon B. Johnson started a campaign to eradicate poverty that supported economic, education, and community programs. As part of this campaign, a half-day program named Head Start was developed for students from low SES backgrounds (Beatty, 1995). There were more applications than seats available for Head Start, so states began to develop their own preschool programs. Preschool enrollment has
seen a steady increase since the inception of Head Start enrollment, and currently 66% of the nation’s four-year-olds are participating in a preschool program (Institute of Education Sciences, n.d.). Due to the current enrollment numbers, preschool quality must be monitored.

Additionally, preschool is currently the focus of national legislation. In 2007, Public Law 110-134 the Improving Head Start for School Readiness Act of 2007 was signed, reauthorizing the Head Start program. This new legislation contained several improvements, including alignment to school readiness criteria and state early learning standards (Office of Head Start Administration for Children and Families, 2016). Other revisions to the law include providing states with flexibility over implementation of their accountability systems and criteria requiring states to create comprehensive systems of teacher development and evaluation.

With the recent increase of national attention on preschool programs, availability of preschool programs has become a countrywide focus. Under the Obama administration, the American Reinvestment and Recovery Act added more than 60,000 seats for Early Head Start and Head Start programs (Office of Head Start Administration for Children and Families, 2009). States currently have several preschool options for families. These programs include the federally funded Head Start Program, state funded programs, and private preschool. Efforts to make preschool education a part of the public school system have often been rejected despite clear evidence that preschools are beneficial for all young children (Beatty, 1995). Research must continue to examine the effectiveness of preschool programs in order to provide support for their continuation as well as possible inclusion into public schools.
Teacher Characteristics Related to Kindergarten Readiness

This section discusses findings on the relationship between teacher characteristics and kindergarten readiness. Teacher characteristics include college attainment, teacher certification, early childhood certification, and teacher experience. Due to the importance of developing quality preschool education programs at the preschool level, quality teachers must be properly trained. Credentialed teacher-level variables (i.e., teacher experience and certification) and their relationship to student outcomes have been explored in many studies (Rice, 2003; Wayne & Youngs, 2003; Wilson & Floden, 2003; Wilson, Floden, & Ferrini-Mundy, 2001). In recent decades, there has been increased recognition of high-quality education, specifically for lower income children (Barnett, 2003). In his chapter on early childhood education, Barnett (2003) recommends that preschool teachers be highly qualified, have at least a bachelor’s degree with early childhood training, and be highly paid. Studies that explore teacher-level variables are varied.

Preschool teacher training programs offer inconsistent curriculum that may negatively affect student outcomes. Preschool teachers are often trained in multiple types of early childhood education courses as indicated in a study of 343 national programs in the United States (Spodek, 1982). Although this research is more than 30 years old, it was the first to analyze preschool teacher quality. This study’s results identified characteristics of teacher education program trends. A questionnaire relating to program characteristics was sent to 343 colleges with early childhood programs, with 172 programs responding. The results of the study indicated concerns over the quality of programs. Preparation of personnel varied relating to teaching certificate attainment, level
Varieties of programs included field experience training, a range of college credits, two-year college degrees, four-year college degrees, and early childhood certificate credentials. Spodek (1982) noted that “while all of these programs may be considered teacher preparatory, they do not lead to standard teaching credentials” (p. 7). While Spodek’s study was an early attempt to identify characteristics of programs across the United States utilizing only survey data, it did identify trends and characteristics of these programs and has become a cornerstone study to highlight the preparation of preschool teachers in college institutions.

**College attainment.** One of the strategies that policymakers use to increase the quality of preschool education is requiring more college education. The minimum requirements of preschool teacher education were considered during the reauthorization of Head Start (H.R. 1429, 2007). According to Clarke-Stewart et al. (2002), the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care data were used to assess how various features of childcare settings affected child development. Homes included in the study that were selected had at least two children and received payment for childcare services. This study observed the quality of caregiver behavior and measures of both the social and physical environment. Information about child caregiver training was gathered through semi-structured interviews. Additionally, levels of education were coded in a six-level variable including the following: a) less than high school; b) high school graduate; c) some college; d) college degree; e) some graduate work; and f) advanced degree. Of the six factors tested in the study, three were related to the education of the caregiver with the others related to structural components.
This study collected data at 10 research sites in a total of nine states, and therefore is generalizable to a larger sample. The results of this study suggested higher levels of teacher education and higher levels of training lead to better quality childcare. The use of data in this qualitative study provided an opportunity to examine questions related to both regulable and non-regulable features of a large sample. Although there are many types of preparation programs, not all may be high quality.

Teachers with a bachelor’s degree specific to early childhood education or a related field to education tend to have higher quality classrooms (Barnett, 2003; Burchinal, Cryer, Clifford, & Howes, 2002). Burchinal, Cryer, Clifford, and Howes (2002) examined a sample of 553 infant-through-preschool classrooms, focusing on the association between classroom quality and preschool teacher education, combined with attendance at workshops focused on early childhood topics. The results indicated that teachers with formal early childhood training were rated as providing higher quality care to students. Further, children in these classrooms had more advanced language skills than their same-age peers. While the findings of Burchinal, Cryer, Clifford, and Howes (2002) contributed to the research base, the findings may lack validity, as they are based completely on preschool caregiver self-reports.

It can be difficult to prove the effect of college attainment on teachers as it relates to student achievement. The research that correlates the ideal level of preschool teacher education varies. Many child advocates believe there should be an increase of requirements by states mandating bachelor’s degrees, specifically in early childhood, to teach preschool age children (Barnett, 2003). Barnett’s (2003) commentary, including recommendations for better quality preschools, states that “industrialized countries do in
fact have rigorous standards and requirements for preschool teachers paralleling the requirements for kindergarten teachers” (p. 3). It is clear that the Unites States must re-evaluate its education requirements for preschool teachers.

Whitebook (2003) presented a meta-analysis that focused on early education quality. She reviewed literature on the relationship between teacher preparation and preschool quality. In particular, the review focused on whether teacher attainment of a bachelor’s degree provided better quality preschool. The review utilized peer-reviewed articles and studies of classrooms that serviced students between three and five years old, with a concentration on diverse regulatory locations and multivariate analysis exploring the relationship between teacher training and quality programs. The studies considered in Whitebook’s (2003) literature review were limited in both sample and analysis measures; however, they highlighted the role of the importance of a bachelor’s degree for preschool teachers and quality classrooms.

Through an analysis of seven major studies on early childcare and education, Early et al. (2007) found no association between teacher education and student outcomes, although the quality of those preparation programs was not examined in the study. The researchers discussed the lack of investigation of college programs as a limitation to this particular finding, and that education is simply one component of evaluating teacher quality and effectiveness. Teacher education is linked to high-quality student outcomes as measured by the Early Childhood Environmental Rating Scale (Early et al., 2007). Early et al. (2007) stated that this has led to a push in more states requiring a bachelor’s degree to teach preschool. Researchers examined 237 preschool classrooms and more than 800 children randomly selected from six states. The study included observation, kindergarten
academic assessments, and questionnaires from teachers about educational attainment. No significant differences in quality were found when comparing teachers with a bachelor’s degree to those without one, however teachers with more than a bachelor’s degree had higher teaching and interaction scores when compared to teachers with an associate degree ($d = 0.58$). While the study by Early et al. (2007) established that a bachelor’s degree alone is not sufficient to ensure a high-quality preschool program, the constraints on sample size prevented the researcher from stratifying other variables such as a teachers’ college major and other credentials as part of the study. While a bachelor’s degree may be the entry credential that should be required for preschool teachers, other variables must also be considered.

A review by Burchinal, Hyson, and Zaslow (2008) considered reasons for the differences in study findings on the relationship between teacher education and classroom quality. Burchinal et al. (2008) noted that there may be other factors, such as quality of degree granting institutions, that studies on preschool teacher college attainment may not consider. Early et al. (2008) asserted, “Policymakers want to know what sets of policies regarding teachers’ education level and major are most likely to lead to high-quality classrooms” (p. 558). The political aspect of public education forces policymakers to determine minimum requirements of educational attainment at all levels in order to shift the focus of teacher quality away from government and toward teacher preparation programs and individual programs.

**Certification.** Teaching certification is mandatory for all teachers of grades kindergarten through 12, yet this is not the case for preschool. A policy commentary by Barnett (2002) states that other industrialized countries do in fact have rigorous standards
and requirements for preschool teachers paralleling the requirements for kindergarten teachers. A bachelor’s degree alone may not suffice in ensuring high levels of student achievement (Bogard, Traylor, & Takanishi, 2007; Burchinal, Howes, & Kontos, 2002; Howes, 1997; Miles & Stipek, 2006).

Miles and Stipek (2006) discuss the importance of developing physical, social, and emotional skills in preschool students in their study analysis. Although learning outcomes on pre-literacy and math skills are often the focus of preschool programs, as examined by Early et al. (2006; 2007), developmental skills should not be overlooked. Predictors for future achievement are not solely limited to academic skills. Preschool teachers who are trained in both cognitive and child development may be better equipped to meet the needs of their students, and thus better able to prepare children for success in kindergarten. However, more research is needed in relation to classroom variables and their correlation on preschool student outcomes.

Bogard, Traylor, and Takanishi (2007) looked at the results of a study of seven preschool programs as described in the previous preschool credential section and did not find consistent relationships between degree, major, and certification with preschool outcomes. The researchers proposed a bachelor’s degree be the starting credential requirement for pre-kindergarten teachers followed by professional education and classroom experiences. While this study does not specify what is meant by professional education, teacher certification requirements would meet this criterion. Bogard, Traylor and Takanishi (2007) further found that the quality of curriculum being delivered in preschool teacher certification programs is a variable in the proficiency equation. It is important to align curriculum in preschool preparation programs to national standards in
order to ensure proficiency; and schools that train preschool teachers must offer programs that have very clear standards (Bogard, Traylor, & Takanishi, 2007).

**Early childhood certificate.** A Child Development Associate (CDA) is a nationally recognized entry-level credential in the field of Early Childhood Education that is issued by the Council for Professional Recognition (CPR). The CDA certification is designed for those individuals who are working with young children in all settings. Obtainment of the CDA certificate focuses on meeting the needs of young children in the areas of emotional and intellectual growth through the lens of child development. A paper by Hinitz (1998) provides a comprehensive history of the CDA credential. The original purpose of the CDA program was to combine work experience, training under supervision, and completion of five college courses (Hinitz, 1998). While the purpose of the work of Hinitz (1998) was to provide a comprehensive look at the history of the CDA credential, the age of the work does not contextualize this credential today. Early et al. (2006), as previously discussed, found that the CDA credential is linked to student gains in basic skills; however, it is not linked to gains in mathematics skills or other measures of classroom quality across the preschool year. While the CDA credential may be linked to children’s attainment of basic skills, it might not be the best credential to improve overall preschool classroom quality.

**Costs associated with certification.** Finances are an important function of all entities, and education is no exception to this. It is significantly less expensive to pay the salary of a non-certified preschool teacher, or one who does not hold a college degree, than a certified teacher. Policymakers are interested in the student outcome effects of certification and degree attainment because of the public expense (Cost, Quality, & Child...
The goals for policymakers can be difficult because they must ensure both preschool program quality and student outcomes while also balancing the public budget. Barnett (2003) noted that this leads to overspending on state and federally funded preschool programs when teachers in those classrooms are not prepared by preparation programs aligned to standards or when they are not college educated. Furthermore, it is difficult to hire quality preschool teachers if they receive poor compensation.

A review by Ackerman (2006) provides a summary of the history of childcare worker wages, discussing issues that policymakers must address as they consider solutions to the low wages of childcare workers. Ackerman (2006) considered the hourly wages of child care workers in 14 states, describing how low wages incapacitate teachers’ abilities to upgrade their teaching credentials. Ackerman (2006) recommended increased public funding for childcare programs as a possible solution to increasing salaries for preschool teachers. Results of a discriminative analysis by the Head Start Family and Services (FACES) survey by Whitebook (2003), previously discussed, indicates that highly trained teachers are more likely to leave their jobs for higher paying positions. Increasing the pay for preschool teachers may lead to increased retention in the field.

**Years of experience.** Clotfelter, Ladd, and Vigdor (2007) used administrative data of fifth grade students in North Carolina to examine the relationship between teacher characteristics (i.e., credentials and experience) and student achievement as measured by the results of North Carolina standardized test scores. The data included standardized test scores for students in third, fourth, and fifth grades, from 1995 to 2004. The results build on previous research of teacher credentials and characteristics, such as years of
experience, but included longitudinal data for a 10-year span. Clotfelter, Ladd, and Vigdor (2007) concluded that teacher-level variables, including years of experience and licensure, had positive effects, particularly in the area of mathematics. Teacher-level variables may positively affect student outcomes, but it is unclear if this is true for younger students.

Findings from research related to teacher experience are not always straightforward. While some research has shown that home caregivers provide a more responsive environment for children (Howes, 1983), other studies have discovered that caregivers that are more experienced have lower warmth scores (that is, they are less attentive and responsive), as noted on the Family Day Care Rating scale. Clarke-Stewart et al. (2002) observed a small negative correlation between a caregiver’s experience and positive caregiving in 10 childcare sites within nine states. Clarke-Stewart et al. (2002) further asserted that although this small negative correlation was found, they expected that an effect in experience would be noted when other factors were controlled and would then predict high-quality care for students.

Pianta et al. (2005) utilized the observation of both classroom and teacher attributes, specifically including teacher experience to predict their effect on classroom quality. A sample of 238 classrooms was tested using the Classroom Assessment Scoring System (CLASS) and Early Childhood Rating Scale (ECERS). Global quality, which was assessed by the ECERS, was higher when teachers had more experience. This study indeed found a relationship between experience and quality, as the researchers found that teacher attributes, such as credentialing and years of experience, improve teaching quality in classrooms.
Cracking the code of teacher quality. My literature review has described the educational research of teacher credentials and years of experience and their relationship to teacher quality indicators. There are some studies that connect teacher quality to the attainment of an advanced degree (Burchinal, 2002; Clarke-Stewart et al., 2002; Whitebook, 2003) or teacher experience (Clotfelder et al., 2007; Pianta, 2005). However, these studies differ in relation to the context of the association, noting inconsistencies with structure, center location, gender, and global quality.

While several studies uncovered a correlation between degree and quality, it was unclear what other factors affected the degree of correlation until a three-year study by the Gates Foundation (2013) examined multiple measures of quality and sought to uncover ideal weights for the predictability of the measures tested. This three-year study investigated how several measures could reliably predict teacher effectiveness. Paired with academic scores, 3,000 teacher volunteers participated in the Measures of Effective Teaching (MET) project to answer fundamental questions regarding the identification of effective teachers, trustworthiness observation results, and the amount of weight that should be placed on various measures of effective teaching. The MET study (Bill & Melinda Gates Foundation, 2013) utilized “combined measures of observation results of multiple raters, student perception surveys and student achievement gains to measure effective teaching” and controlled for student characteristics including demographics (p. 6). The researchers concluded that teachers who had previously been identified as effective continued their effectiveness even when students were randomly assigned to their classrooms the following year. The findings of the study recommend that school districts consider prior test scores of students and other multiple measures to identify
effective teaching. The results reported that student achievement gains should ideally account for 65% of teacher effectiveness measures along with other multiple measures of quality. Additionally, researchers from the MET study (Bill & Melinda Gates Foundation, 2013) found that student perception surveys, classroom observations by trained observers, feedback on classroom practices, assigning balanced weights to effectiveness measures, and the use of video for teacher feedback can identify effective teaching.

One indicator in the improvement of early education focuses on teacher quality. This indicator was explored through an instrumental case study of Massachusetts’ early childhood system (Abbate-Vaughn, Paugh, & Douglass, 2011). This study sought to illustrate the inconsistency of early childhood credentialing policies through its examination of statewide studies, archival records, and policy implementation in state agencies. Further, the study observed 30 public and private facilities in and around Boston, Massachusetts, where informal interviews were also conducted. All three researchers triangulated their data to ensure differing prospective to the analysis. The researchers determined that policy must include requirements for advanced degrees, quality control of teachers’ education programs, parity of preschool teachers’ salaries, and access to high-quality teachers across all preschool settings. The establishment of policy governing preschool certification is a step towards creating more consistent definitions of teacher qualifications and therefore teacher quality.

Teacher certification and a college education may ensure that all students receive instruction from highly qualified teachers when preschool teacher qualifications vary by state (Abbate-Vaughn et al., 2011). Abbate-Vaughn et al. (2011) utilized an in-depth case
study to outline the disparity of preschool teacher requirements across states. While it was not generalizable to a larger sample population, the study further highlighted that quality instruction appeared more prevalent in public preschools, especially for those serving lower-income families. Even within states requiring certification, there are differences within the quality of the teacher preparation programs.

Another group of studies defines preschool teacher quality in terms of teacher certification that may or may not depend on a degree (Barnett, 2003; Lobman, Ryan, & McLaughlin, 2005). The study by Lobman et al. (2005) utilized a representative sample in one state to analyze that state’s preschool preparation curriculum in comparison to national standards for content, which included foundational coursework, domain-specific coursework, and student diversity. While participant self-reporting limited this study, the findings demonstrated the short period of time in which a state preschool teacher credentialing requirements could be enacted and determined the ability of one state to meet this demand. Barnett (2003) examined the relationship between teacher qualifications and program quality, summarizing the qualifications that teachers need and the research between quality programs and teacher qualifications. Barnett (2003) noted that, “both general and specific preparation in early childhood education have been found to predict teacher quality” (p. 5). Two major areas of research focus when examining teacher quality are college attainment combined with education certification credentials.

Multiple components of a classroom experience have an impact on student achievement. High quality preschool programs may include the variables of teacher college education, early childhood teacher certification, and teacher classroom observation. While these variables may be taught as part of preschool teacher preparation
programs, they are not comprehensive for all programs. High-quality programs will affect student outcomes, not only academically, but also socially (Barnett, 1998; Campbell, Pungello, Miller-Johnson, Burchinal, & Ramey, 2001).

Through his critical analysis of 38 studies focused on the long-term effects of early childhood programs serving students living in poverty, Barnett (1998) notes positive effects in the area of academic achievement.

Campbell et al. (2001) studied 104 students from the age of 3 to age 31. Cognitive test scores, as well as academic test scores, were analyzed using a hierarchical linear model. The treatment group was assigned to a full-time early childhood program while the control group was not. Specifically, students enrolled in the preschool program achieved higher reading scores \( (F(1,187) = 8.34, p = .004) \) and higher math scores \( (F(1,187) = 6.02, p = .015) \). These researchers concluded that intensive early childhood education can provide long-lasting effects on cognitive and academic development for all students, especially for students from low socioeconomic status.

*Training in reading instruction and interventions.* Hoffman et al. (2005) focused on the preparation of elementary pre-service teachers to teach reading and their experiences through their first three years of service. This mixed-methods approach used qualitative data from the first year in the form participating teacher interviews. Data collected during the second year also included interview data but expanded to analyze quantitative data from classroom environment and teaching practices. The third year included more frequent classroom observation. The analysis of both qualitative and quantitative data in this study, over the course of three years, strengthens the finding of participation in a high-quality teacher preparation program, has an intentional focus on
reading strategies, and has a positive influence on new teachers and the quality of student engagement with respect to literacy instruction. The study by Hoffman et al., (2005) reported teaching practices in specific academic areas may indicate classroom quality.

Mashburn, Justice, McGinty, and Slocum (2016) examined the impacts of the Read It Again (RIA) intervention on the outcomes of prekindergarten students measured through family demographics, including race and SES; teacher demographics including years of experience and credentials; student language outcomes utilizing four measurement instruments; students print concepts utilizing three areas of print knowledge; and student language development utilizing individual assessments. This randomized trial drew on the scores of students in 104 preschool classrooms and found that the use of the RIA intervention led to positive effects in print concepts, but no impacts on language development. While Mashburn et al. (2016) found that student-level and teacher-level variables have an effect on student outcomes in reading, multiple student outcomes should be utilized to reduce the likelihood of a type-I error (Mashburn et al., 2016). Teacher practice may be an indicator of classroom quality and affect student outcomes.

Program quality. Quality teacher education depends on the quality of the program (Hyson, Tomlinson, & Morris, 2009). Hyson et al. (2009) utilized an exploratory study through an online survey of 231 early childhood administrators to determine program factors that would improve the quality of their programs. The findings indicated that strengthening student competencies such as curriculum implementation, building capacity of instructors, and accreditation were the highest priority. One limitation of this study is that it had a 43% response rate. Although this study was limited in participants, it
does indicate the importance of teacher capacity and accreditation to building leaders.

A study of 8,000 children from 1,255 preschool classrooms was conducted over one year and sought to determine quality indicators of preschools based on a Texas school readiness certification system (Williams, Landry, Anthony, Swank, & Crawford, 2012). These researchers noted that 67.3% of the classrooms labeled as high quality by the state were also high quality based on student outcomes as measured by a variety of approved kindergarten reading screeners as well as a teacher reported behavior rating scale. While Williams et al. (2012) found that the Texas certification program provides a scientific approach to informing stakeholders about the quality of preschool through certification, teacher self-reporting of student social readiness would be more valid through measurement by a state mandated social screener. Furthermore, the study recommended future research be conducted to classify classrooms within the same school that may or may not be certified. In addition, the study recommended further exploration of practices within classrooms to explain differences within these schools. Kindergarten readiness may be a reliable predictor of classroom quality.

**Funding.** Government funding is allotted to state funded preschool such as Head Start and therefore these programs are subject to scrutiny of their effectiveness on students. With substantial funding assigned to these programs, it is possible to put state-wide systems in place to upgrade the credential requirements of early childhood teachers (Lobman et al., 2005). Lobman et al. (2005) provided a comprehensive document reporting on New Jersey’s efforts to create a system of preschool teacher certification requirements to update the credentials of the workforce. Lobman et al. (2005) argued that teacher preparation programs do not teach current child development practices. The
researchers interviewed 12 representative samples from the total population of 14 institutions in New Jersey to determine the possibility of a state’s ability to upgrade its workforce in a defined period of time. All participants were interviewed by telephone for approximately 30-60 minutes using a semi-structured protocol by members of the research team or a trained research assistant. All interview responses were recorded and entered into a statistical software package (SPSS) to create qualified results. The researchers found that many of the preparation programs in New Jersey do not offer all of the content necessary to effectively teach young children. While this study provides insight by participants that were selected based on their overall knowledge of early childhood preparation programs, self-report data can be unreliable. This key study highlighted the central idea of the foundations of child development as knowledge of pedagogy, teaching diverse populations, and inclusion of field experience. Particularly, it included a shift for preschool teachers to obtain their credentials in an institution including these foundational courses.

Hamre and Pianta (2005) examined teacher support of instructional and emotional needs for students for at risk of failure. Their national prospective study of 910 at risk five- and six-year-old children examined the impact of the classroom experience on student success. Data were collected through classroom observation during the child’s second year of school as well as the demographics of participants. Although this study does not directly correlate teacher certification to achievement, its examination of instructional and emotional support for students in relation to teacher support emphasizes the need for quality training in these areas. This training is often a part of quality teacher programs and may be critical for academic success with at-risk populations. Further, the
Hamre and Pianta (2005) study also found student outcomes cannot be validated by teacher college education but rather by classroom observations on application. These findings emphasize a need to recommend and consistently implement common standards including teacher application of both instruction and socio-emotional dimensions in classroom observations.

Program alignment to national early childhood program standards and accreditation criteria standards. National standards determine what should be present in a preschool teacher preparation program. The National Association for the Education of Young Children (NAEYC) is an organization that promotes excellence and quality in early childhood education. Accreditation systems are a major part of NAEYC's efforts to improve early childhood education; however, privately run daycares are not required to seek accreditation. The NAEYC has developed a set of national standards for early childhood education. This set of standards may align curriculum to ensure preschool quality.

High-quality preschool programs must be taught by educators who hold a bachelor’s degree and preschool certification in a program aligned to the NAEYC National Standards. Preschool students who are educated by teachers with a set of National Standards are more likely to achieve both at high levels cognitively as well as develop high levels of linguistic proficiency and social skills (Bowman, Donovan, & Burnes, 2001; Howes, 1997). Bowman, Donovan, and Burnes (2001) discuss children’s early childhood experiences as foundational for social and emotional development and literacy. Their work describes outdated theories and part of the uneven quality of preschool programs. Alignment of all preschool programs to NAEYC standard may
provide organization of curriculum and teacher preparation to improve the quality of preschool programs.

**Other variables.** Multiple factors including context, school culture, resources, student attitude, and community influences may negate the positive effects of teacher college education and teacher application of skills in the classroom (Cochran-Smith, 2005). Cochran-Smith’s (2005) review of over 60 documents focused on teacher reform from 1998-2005, as well as other teacher education documents and critiques of new teacher preparation programs. While the study supported the universal call for better teachers, there is a void of a consensus about what quality teaching is. Cochran-Smith (2005) also discussed the need for less of a focus on outcomes as a measure of teacher quality, stressing the need to examine teacher behavior in the classroom. This discussion raises questions for teacher preparation programs as well as the accreditation processes.

**Equity for student subpopulations.** Equity for students from racial subpopulations and socioeconomic background comes through high quality teachers. According to a commentary published by Barnett (2003), the Head Start program has lower educational requirements for teaching than the majority of state funded preschools. Head Start teachers serve students from economically disadvantaged backgrounds, yet less than 40% of Head Start teachers hold a four-year degree (Kim, Chang, & Kim, 2011). Kim et al. (2011) utilized hierarchical linear modeling of a national and longitudinal data set, the Head Start Family and Child Experiences Survey, to address the performance gap between children born in the United States and those who are not. The results of this study showed a significant positive effect when immigrant children had teachers with high levels of education and experience. The researchers used both
longitudinal data as well as a large national data set to conduct their study. Students from immigrant families may benefit more from teachers who have a degree.

Immigrant students often enter preschool cognitively and linguistically below their peers and benefit from highly qualified teachers who will promote their cognitive, social, and physical areas (Mistry, Biesanz, Chien, Howes, & Benner, 2008). Mistry et al. (2008) examined the effects of socioeconomic status (SES) on both cognitive and behavioral outcomes by examining longitudinal data for a student sample of 1,459 low-income families and 1,202 immigrant families. The large sample size of this study is significant; however, their national origin was studied through a common SES background. The results indicate that these students are in greater need for language and literacy supplementation.

Preschool teachers not certified may not be prepared to teach students from diverse cultures and languages. Early and Winston (2001) indicated that less than 45% of teachers had coursework in diversity and best practices for English Language Learners. Early and Winston (2001) presented a paper on the findings of 438 participants in a national survey administered to directors of early childhood preparation programs. Some of the challenges that the respondents noted included a lack of preparation to teach students with either limited English or children that come from culturally diverse backgrounds. While this study was limited by self-report it provides insight into the lack of preparation graduates of early childhood teaching programs feel. Teacher preparation including diversity training may lead to higher outcomes for immigrant students.

**Preschool in the Current Age of Accountability**

The passage of the *No Child Left Behind Act* (NCLB) of 2001 standards-based
educational reform requires setting high standards and establishing measurable goals to improve individual outcomes in education. This act mandates all students must receive rigorous and standards-based instruction to measure student growth (Stipek, 2006).

Schools are increasingly being pressured to begin teaching children the basic academic skills assessed under NCLB prior to entering kindergarten, which was previously considered the start of formal education for children.

In his analysis, Stipek (2006) examined policy related to early childhood education that can be traced to NCLB legislation or development of mandated assessments. Stipek (2006) noted the pressure that is now on preschool teachers and believes that this pressure may promote a greater emphasis on academics at the sake of creative, physical, and emotional goals. Furthermore, Stipek (2006) noted the importance of student achievement:

Mastery of standards requires that students learn at high levels and the effects of legislation are beginning to be felt in preschools because policy makers believe that an early start on developing academic skills will help children reach the standards they are expected to achieve in elementary. (p. 455)

This examination of preschool policy exposes the pressure to make preschool more academic and thus may require that preschool teachers be trained in both early childhood development and pedagogy. As all public schools are required to administer a state test to assess students’ mastery of standards starting in third grade, preschool teacher preparation must shift to ensure classroom teachers are prepared to meet the challenges of teaching these students to meet the high levels of proficiency now required by law.

**Kindergarten Readiness Characteristics**

This section of my literature review discusses findings on kindergarten readiness and kindergarten screeners. Kindergarten screeners are used to assess students in order to
place them in appropriate educational settings. Included is research describing readiness and the importance of using a screener. The section also explains why the Brigance Kindergarten Screener (BKS) is the screener chosen to be included in my study.

**Kindergarten readiness.** Best practice for determining which kindergarten screener to use demanded adherence to standards for professional test development. Pyle (2002) stated that no test should be used to make decisions about students other than referral for additional evaluation. Screening programs must be used for identification purposes but not to classify students into categories of need or achievement level. Pyle (2002) offered four suggestions for best practices in screening assessments: defining the purpose of the assessment tool, using an instrument with multiple raters as well as follow-up procedures, creating a process for administering the assessment, and careful analyses and interpretation of results (Pyle, 2002). Screeners must use multiple measures in multiple settings to gather more holistic information on students to determine how educators should precede providing equitable and appropriate instruction for students.

A milestone in preschool accountability and assessment took place in 2005 with the release of the five-year, 17-state study titled *National School Readiness Indicators Initiative: A 17 State Partnership* (Rhode Island KIDS COUNT, 2005). The aim of the study was to create a complete set of readiness benchmarks for preschool students to meet before entering kindergarten (Rhode Island KIDS COUNT, 2005). According to the Rhode Island KIDS COUNT, the three objectives of the 2005 study were to do the following: 1) develop indicators for school readiness that could be assessed and tracked over the course of a student’s school year; 2) have states and government to use the indicators to track data and report it to the public; and 3) increase the rate of children
reading on level by stimulating policy and program improvements. Each state included in
the research used the information learned to adopt school readiness standards. The state
in which Elementary District Schools (EDS) resides chose 41 indicators to track the
growth of children from birth to age five (Rhode Island KIDS COUNT, 2005). The
summary of the study also identifies a readiness equation that the committees from all 17
states agreed upon as the path to school readiness (Rhode Island KIDS COUNT, 2005).
The equation components are, “ready families + ready communities + ready services +
ready schools = children ready for school” (Rhode Island KIDS COUNT, 2005, p. 6).

The perception of preschool programs as an important aspect of early childhood
learning has not changed, however debate continued about how to use resources in ways
that best prepare students for future success. Unprecedented interest in exploring
connections between elementary education and programs prior to entrance into first grade
emerged around 2005 with an increased focus on how to connect the two levels (Pianta,
2007). Pianta (2007) summarized this shift in focus as follows:

The central challenges and concerns of the field are now not only how to provide
safe, organized preschool programs to selected groups of children and how to
better connect families and schools but also how to offer all preschool children
appropriate and effective early educational experiences that are aligned and
included with state K-12 standards and reform efforts and that, for some children,
provide opportunities for accelerated progress. (p. 5)

This new focus on connecting previously independent educational programs
created new challenges since these preschool programs would now be charged with better
preparing students for previously established accountability systems. Rather than
preschool programs being regarded as a separate, unaccountable program, they would be
included as a central part of the child’s academic experience and special attention made
to its ability to transition the student into the K-12 education system. The new argument
is not whether students should be exposed to early childhood learning experiences, but rather how best to use those opportunities to best contribute to the child’s academic development and to society (Pianta, 2007).

In 2009, the U.S. Department of Education announced Race to the Top as part of the American Recovery and Reinvestment Act (ARRA) signed into law by President Obama. This was a $4.35 billion investment earmarked to prepare America’s students to graduate college, be career ready, and to compete in the global economy (U.S. Department of Education, 2009). Race to the Top challenged states to compete for these funds as part of an application process. The process assigned points for states based on reform in the following areas: rigorous standards, high quality assessments, attracting and keeping quality teachers and principals, supporting data systems to improve instruction, and sustaining educational reform (U.S. Department of Education). The effect of preschool education has positive effects on the cognitive and social development of children (Pianta, Barnett, Burchinal, & Thornburg, 2009). These effects are especially lasting in large scale public programs. According to Pianta et al.’s (2009) research findings and policies, such as Race to the Top, it is clear that variables such as curriculum, staffing, funding, and level of education impact the effects of preschool.

**Kindergarten readiness screener.** The Individuals with Disabilities Education Improvement Act (IDEA) of 2004 (Public Law 108-446, 2004) requires that all federally funded early childhood programs complete performance-based assessments of children in order to evaluate their potential need for intervention and to assess their academic growth. In 2005, the National School Readiness Indicators Initiative (NSRII) concluded a three-year study that included 17 states in order to develop a set of indicators to track
progress of students from birth to age eight (Rhode Island KIDS COUNT, 2005).

The goal of the NSRII was to assist states in using research-based school readiness indicators to inform public policy decisions and track progress in meeting key goals for young children. A key task of this initiative was for each of the states involved to develop a list of readiness indicators that could provide valuable feedback on student progress and be tracked at the state and local level. The five domains agreed upon through this initiative were a) physical well-being and motor development; b) social and emotional development; c) approaches to learning; d) language development; and e) cognition and general knowledge. The state in which EDS resides was a part of this 17-state initiative and chose to use the Brigance Kindergarten Screener (BKS) as its assessment for kindergarten readiness. Its five components are based off of this initiative and are labeled academic/cognitive, language, development, physical development, self-help and social-emotional development.

According to the Center on Enhancing Early Learning Outcomes (2014), in the 2011-2012 school year, 28 states required assessments of students during their kindergarten year. Most assessments (12 states) were developed by the locality, followed by state-developed assessments (seven states). Five states used the Dynamic Indicators of Basic Learning (DIBELS); two used the Phonological Awareness Literacy Screening (PALS); and two used the BKS.

The DIBELS assessment is administered in the fall of the student’s kindergarten year and is used to assess the risk status for students in their future academic abilities (Stormont, Herman, Reinke, King, & Owens, 2015). Curriculum-based measures are used to administer one-minute individual probes of key skills in the areas of reading, math, and
writing competence. This assessment measure only covers academics and does not address external factors such as physical well-being or self-help measures in relation to a student’s ability to be holistically ready for kindergarten.

The PALS assessment’s main purpose is to measure literacy-based knowledge that includes phonological awareness, alphabet knowledge, knowledge of letter sounds, spelling, concept of word, word recognition in isolation, and oral passage reading. The primary purpose of PALS is to identify students who are not performing at grade-level expectations and those who may need additional reading interventions (Invernizzi, Juel, Swank, & Meier, 2013). This form of kindergarten assessment only focuses on reading as an indicator of readiness, ignoring other academic and non-academic areas in other screeners. Therefore, the PALS assessment was not chosen for this study due to its lack of assessment in other academic areas other than reading-based indicators. Like many assessment tools, PALS covers just one aspect in assessing a student’s overall literacy competence. Other important information includes additional early literacy assessment data, parent information, the child’s interest in books, and teacher judgment. Although PALS provides reliable screening for development in literacy acquisition, only using one measure of literacy performance is not sufficient when making decisions about a student’s academic future (Invernizzi et al., 2013).

The purpose of the BKS is “to identify potential developmental delays and giftedness, to inform instruction, and to monitor child progress” (French, 2013, p. 2). The state in which EDS resides mandates the BKS as the measurement tool to assess kindergarten readiness according to the state mandates. State legislation requires alignment with the state’s definition of school readiness as well as state standards
established for preschool. It must assess students in the domains of adaptive, cognitive, communication, motor, and social emotional readiness. BKS is designed to monitor a student’s progress rather than label him or her for intervention or remediation. Because of its availability through state-mandated testing requirements as well as its focus on multiple aspects of a student’s learning environment, I chose this assessment tool for this study.

In order to focus on academic indicators, my study used the cognitive/general knowledge and language/communication domains of the BKS for data analysis. Although the broad definition of readiness can be characterized in both cognitive and social areas, Konold and Pianta (2005) found that high cognitive functioning served as a better predictor of academic test performance at the kindergarten and first grade levels than the student’s social skill development. In a meta-analysis of 70 studies, Paro and Pianta (2001) examined indicators that predict performance in the early grades of school. They found that the average correlation of a student’s academic-cognitive area from preschool to elementary school was .43, while the average correlation for social-behavioral area was .32. Although both can be considered predictors for kindergarten readiness, the higher correlation associated with cognitive development was used for the current study.

**Discussion of Kindergarten Readiness Demographic Independent Level Variables**

The inclusion of demographic variables (race and socioeconomic status) is common in studies concerning kindergarten readiness and serves as the starting point for this section of the literature review.

**Race.** Historically, race has been a common demographic variable used in education research. Researchers use race as one of the student-level variables to
distinguish between outcomes for children included in the study sample (Brooks-Gunn, Duncan, & Maritato, 1997; Duncan & Aber, 1997; McLloyd, 1998; Raver, Gershoff, & Aber, 2007; Davoudzadeh, McTernan, & Grimm, 2015). Current research has also found that race plays a role in determining school readiness levels. African American students living below the poverty line, for example, are at a higher risk of not being kindergarten ready than white students (Connell & Prinz, 2002; Davoudzadeh, McTernan, & Grimm, 2015; Duncan, Kalil, Magnuson, & Murane, 2014). Additionally, Koury and Votruba-Drzal (2014) determined through their regression study that Indian Asian and East Asian students outscored their white counterparts on school readiness exams while Mexican and Spanish Caribbean students scored below their white counterparts.

Race was used as a demographic variable to determine its relationship to the dependent variable, Brigance cognitive readiness. The categorical data for each student were obtained from student preschool enrollment records. Student enrollment records included race information that was provided by the student’s parent/educational guardian. My study also examined relationships between race and my study specific independent variables.

**Socioeconomic status (SES).** SES was another common school readiness demographic variable traditionally used in school readiness research over time. Herman, Reinke, King, and Owens (2015) affirmed the findings of previous research when they concluded that, “Children who are living in poverty are at higher risk for struggling in their transition to kindergarten and are more likely to have academic and behavior deficits that likely interfere with their success” (p. 225). SES was found to be a reliable predictor of early student outcomes (Janus & Duku, 2007; White, 1982; Fitzpatrick,
Use of SES as a demographic variable allowed for the relationships between student economic status and kindergarten readiness to be explored using the results of the BKS. For the purposes of my study, I used free and reduced lunch status as a proxy for SES. Students qualifying for free and reduced lunch were considered living near or below the poverty line. Students who do not qualify for free and reduced lunch were considered not living in poverty. I obtained categorical data through the EDS database, which consisted of preschool year information as completed by the educational guardian. The information provided was verified by the State Department of Education. My study also examined relationships between SES and my study-specific independent variables.

**Other Independent Variables Related to Kindergarten Readiness**

Of interest were the student-level variables of prior setting and attendance rate along with the school-level variable of climate. Additionally, the research literature has examined the relationship between prior setting, attendance rates and school climate and kindergarten readiness.

**Prior setting.** A less common variable used to study kindergarten readiness was prior setting. Prior setting, for the purpose of this study, identified the educational or care setting in which students were enrolled in the year before they began kindergarten. Magnuson, Meyers, Ruhm, and Waldfogel (2004) found in their analysis of the Early Childhood Longitudinal Study that children with a quality prior preschool setting had higher math and reading scores than children who did not attend preschool. Magnuson et al. (2004) used ordinary least squares regressions to find the relationship between math and reading skills of kindergarten students and their prior year setting. The study findings
were reaffirmed by later research that determined that vocabulary, literacy, and math skills of kindergarten students who attended quality programs were higher when compared to students who did not attend the quality programs (Bierman et al., 2008; Claessens & Garrett, 2014; Lee, Zhai, Brooks-Gunn, Han, & Waldfogel, 2014).

It should be noted that use of prior setting as a demographic variable has not been well documented in previous literature. For the purposes of my study, prior setting was identified as Head Start and tuition-based preschool. The categorical data were collected within the first 30 days of the student’s kindergarten year. The information was requested from educational guardians at the same time as BKS administration.

**Attendance.** One characteristic of readiness was student attendance. Attendance was often overlooked, yet it may have more of an impact on schoolwide academic achievement than historically thought (Johnston, 2000). King (2000) cited attendance as one of the academic performance variables, along with student grade point average, that was considered important for functioning in relation to cognitive and behavioral dimensions. Roby (2006) conducted a correlational study for each grade level taking the Ohio Proficiency Test to analyze schoolwide attendance and its relationship to student achievement. The results of this study provided a broad overview of the relationship between attendance and achievement for students in fourth, sixth, ninth, and twelfth grades. Further studies should expand on the role of attendance in relation to cognitive and behavioral dimensions at the preschool level to determine if this correlation exists for younger students.

Magnuson, Lahaie, and Waldfogel (2006) used data from the Early Childhood Longitudinal Survey of a Kindergarten cohort to analyze the links between preschool
attendance and the school readiness of children of immigrants. Multivariate regression models were used to analyze the effects of preschool on school readiness for these children. Magnuson, Lahaie, and Waldfogel (2006) determined that children whose mothers were not native to the United States were less likely to be enrolled in preschool programs than other children. The researchers also found that preschool attendance raises reading and math scores for all students, regardless of their demographics.

Gottfried (2010) used a fixed effects design and instrumental variables strategy seeking to provide evidence that estimates the causal impact of attendance on several measures of achievement, including grade point average and standardized test results. The results of this study indicated a strong, positive relationship between student attendance and student achievement at both the elementary and middle school levels. Stakeholders, including parents, staff, and community members have assumed a positive relationship between school attendance and academic success. A vast research base has examined how these factors relate to academic outcomes for students however few studies have examined the relationship between individual attendance and student achievement at the preschool level.

Use of attendance as a demographic variable has been widely used in education research. For the purposes of my study, attendance was identified as the number of days a student was absent from school. The teacher of record collected the continuous data from the student’s preschool year.

**Climate.** School climate was also considered to be a school readiness variable. Leadbeater, Sukhawathanakul, Smith, and Bowen (2015) conducted an examination of the predictive association between child reports of peer victimization and
internalization/externalization of school problems, as reported by parents and teachers. Influences of school climate and reports of peer victimization were investigated in path models both across third and fourth grades and within the two grade levels. Both reports from parents and students showed stability of school climate dimensions. Parents’ perceptions of the school environment were not found to be significant to peer victimization. Leadbeater et al. (2015) found that children’s negative thoughts and their world view, coupled with peer victimization, may interfere with their connection to school and their perception of the school climate. This study compared parent and student perceptions of climate and found possible pathways for reducing peer victimization through positive social climate within schools.

Hoy, Hannum, and Tschannen-Moran (1998) conducted a longitudinal study of 86 middle schools and used health and openness metaphors to develop measures of organizational climate. School climate was found to significantly influence student achievement in basic skills along with SES. Although this study was conducted in 1998, it was the first one to consider the relationship of school climate and SES on student achievement.

For my research study, I used a proxy for climate, with the continuous data from the Comprehensive School Survey that was conducted in all of the K-12 grade schools in EDS. The data management department of EDS developed and validated this instrument. Each preschool was assigned the climate data for the K-12 school in which it was housed. This proxy was chosen due to the lack of climate data for preschools since this information was not collected independently of the school in which it was located.
Summary of the Themes Discussed Throughout the Review

Further research is needed to determine the relationships between the variables of teacher certification and teacher years of experience. More preschool teachers should receive dual certification in early childhood development and elementary certification at the minimum level of a bachelor’s degree. Furthermore, teacher years of experience should be considered as an additional layer to their credentialing, as research has demonstrated its relationship to student outcomes.

Federally and state funded preschool programs are continuing to grow. Accountability is at the forefront of education today and it will become increasingly important to prepare students at a young age to reach proficiency. It is not enough to require teacher certification and college education for only those teachers of kindergarten and beyond. It is critical to require high levels of qualifications for preschool teachers as well as to recruit new teachers via teacher preparation programs who will remain in the profession. Students in preschool must be taught by teachers who can prepare them cognitively, socially, and linguistically to succeed. Student populations are becoming increasingly diverse. Preschool preparation programs must also include education in the areas of cultural diversity and learning differences.

When there is a significant cost associated with education, programs will be assessed with scrutiny. It is important to determine if the variables of teacher credentials and years of experience credentials impact kindergarten readiness. Early et al. (2006) sought to look at the levels and forms of prekindergarten teacher’s education and how they are operationalized through a multi-state study of involving 237 classrooms and more than 800 children. Early et al. (2006) found few associations between teacher
credentials and children’s outcomes as measured by multiple assessments. However, this study fell short in its generalization of preschool student outcomes, which may vary, depending on their family’s SES. In the current age of NCLB, accountability education dollars are being invested in preschool programs in order to ensure proficient outcomes for students (U.S. Department of Education, 2002). States vary from NCLB guidelines for teacher certification to requirements of an Early Childhood certificate and thus equitable preschool education is not standardized. As dollars are being earmarked for preschool, it remains unclear as to which teacher credentials correlate to student outcomes prior to entering kindergarten for various student subgroups.
CHAPTER VIII
METHODOLOGY

Introduction

This study examined potential predictors of kindergarten readiness including the
teacher-level variables of years of experience and credentials. The sample of this study
included preschool classrooms located in Elementary District Schools (EDS). Based on
the use of pre-existing school district data, a correlational research design was used to
address the research questions following Figure 4. In particular, hierarchical linear
multiple regression (HLMR) was used to examine the extent of predictive utility of the
aforementioned variables to predict kindergarten readiness. This statistical method allows
for combining several common educational variables to determine their predictive ability
for kindergarten readiness. Regression models were used to determine correlations
between the predictive variables and the dependent variables of kindergarten readiness
using the domains of language/communication and cognitive/general knowledge from the
Brigance Kindergarten Screener (BKS).

This chapter is divided into the following sections: Research Design,
Measurement of Variables, Participants, Procedures, and Data Analysis. This chapter
provides the research design procedures and participant inclusion for the capstone study.
Key components of the measurement instruments, the BKS and the Comprehensive
School Survey (CSS), are addressed. The validity, reliability, and reasoning of their
inclusion are also discussed. Figure 4 shows the three groupings the capstone research analyzed to determine the relationships between the dependent variable of kindergarten readiness and the independent variables.

Figure 4. Concept map for kindergarten readiness study

My research provides data-based outcomes describing the effectiveness of preschool programs according to existing panel data of kindergarten readiness scores.

**Research questions.** My study addressed the following research questions:

**Research question 1, teacher credentials.** What is the relationship between preschool teacher credentials and kindergarten readiness?

**Research question 2, teacher years of experience.** What is the relationship between preschool teacher years of experience and kindergarten readiness?

**Research Design**

A correlational research design is ideal for conducting educational research when it is not possible or acceptable to manipulate the characteristics of human participants.
My study looked at the naturally occurring relationships between study variables based on the data set provided by EDS. The purpose of my study was to reveal relationships among variables using this data in order to determine possible contributing factors to increased kindergarten readiness. According to Kerlinger and Rint (1986), correlational research design seeks to determine possible relationships through the observation of preexisting evidence in order to search for plausible contributing factors. Cohen, Manion, and Morison (2000) discussed the correlational design as an appropriate means to retrospectively examine existing groups for factors that contribute to their differences. Kerlinger and Rint (1986) noted limitations of this design such as the inability to manipulate the independent variables, inability to assign participants to groups, and the possibility of not being able to explain a relationship between the independent variables and the dependent variables. My study did not require the manipulation of variables or student groups. As with any research or research design, the chance of finding no additional insight to the subject being studied existed and could not be avoided. I believe this design was appropriate for my study.

**Measurement of Variables**

**Measurement of teacher credentials and years of experience independent variables.** Table 15 reports the independent variables that were used within the study. The teacher-level independent variable of teacher credentials (Categorical: 0 = bachelor’s degree or higher; 1: lower than bachelor’s degree or no degree) was reported from the credential information submitted to the State Department of Education by the preschool teachers included in my sample. The teacher-level independent variable of years of experience (continuous) was reported from EDS as determined from their start date and
end date if applicable, which are recorded in the Infinite Campus data recording system.

**Table 15**

**Research Questions for Teacher Credentials and Years of Experience Study**

<table>
<thead>
<tr>
<th>Research question</th>
<th>Teacher-level variables</th>
<th>Definition of variable</th>
<th>Measurement of variable</th>
<th>Level of measurement</th>
<th>Variable levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the relationship between preschool teacher credentials and kindergarten student readiness?</td>
<td>Teacher credentials</td>
<td>Bachelor’s degree is a four year degree from a post-secondary institution.</td>
<td>Credential information is submitted to EDS by the teacher.</td>
<td>Categorical</td>
<td>(0)Bachelor’s degree or higher (1)Lower than bachelor’s degree or no degree</td>
</tr>
<tr>
<td>What is the relationship between preschool teacher years of experience and kindergarten student readiness?</td>
<td>Teacher years of experience</td>
<td>The number of years used by the state to determine a teacher’s salary (Clotfelter, Ladd, &amp; Vigdor, 2007).</td>
<td>EDS reported as years of experience in the district.</td>
<td>Continuous</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

**Measurement of common capstone control independent variables.** Table 16 reports the independent variables that were used for the entire capstone study. The school-level common independent variable of climate (Interval) was reported via proxy from the CSS. The student-level common independent variables were race (Categorical: African American = 0; non-African American = 1), socioeconomic status (Categorical: qualifies for free/reduced lunch = 0; does not qualify for free/reduced lunch = 1), prior setting (Head Start = 0; tuition-based = 1), and attendance (Interval, reported as days absent out of total enrollment days).
Table 16

Independent Variables Included in Capstone Study

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition of variable</th>
<th>Measurement of variable</th>
<th>Level of measurement</th>
<th>Variable levels</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race</td>
<td>The concept of dividing people into populations or groups on the basis of physical characteristics</td>
<td>Preschool year; Educational guardian identified</td>
<td>Categorical</td>
<td>(0) African American (1) Non-African American</td>
<td>Brooks-Gunn, Duncan, &amp; Maritato (1997) Davoudzadeh, McTernan, &amp; Grimm (2015)</td>
</tr>
<tr>
<td>Socio-economic Status (SES)</td>
<td>A proxy for SES is a student qualifying or not qualifying for free/reduced lunch status</td>
<td>Preschool year; Form completed by educational guardian and verified by the state</td>
<td>Categorical</td>
<td>(0) Qualifies for free/reduced lunch (1) Does not qualify for free/reduced lunch</td>
<td>Duncan et al. (2014) Herman et al. (2015) Janus &amp; Duku (2007) Bierman et al. (2008)</td>
</tr>
<tr>
<td>Prior Setting</td>
<td>Where a student received early care services for the 12 months prior to coming to kindergarten</td>
<td>Kindergarten year; Educational guardian identified</td>
<td>Categorical</td>
<td>(0) Head Start (1) Tuition-based</td>
<td>Claessens &amp; Garrett (2014) Lee et al. (2014)</td>
</tr>
<tr>
<td>Attendance</td>
<td>Attendance is actual numbers if days present</td>
<td>Preschool year; Teacher collected daily</td>
<td>Interval</td>
<td>Actual number of days absent</td>
<td>Johnston (2000) King (2000)</td>
</tr>
<tr>
<td>School Climate</td>
<td>Patterns of students personnel's experience of school life</td>
<td>CSS data; Student, Parent, staff identified experience of school life</td>
<td>Interval</td>
<td>Student survey data from the CSS</td>
<td>Leadbeater et al. (2015)</td>
</tr>
</tbody>
</table>
student learning (Muñoz & Lewis, 2009). It was designed and created as a unique survey instrument for use by EDS.

**Background.** According to the CSS Evaluation Manual, EDS constructed the instrument as a way to include student, parent, and teacher feedback on the services schools provide outside of the academic realm (Muñoz & Lewis, 2009). The CSS is EDS’s way of monitoring the schools systems and processes through the input of stakeholders. The data collected are used to inform practitioners’ decisions on how to educate the whole child and teach students ways to become productive members of the community.

**Administration requirements.** EDS uses two options to administer the CSS to students, parents, and staff: an email link to an internal data collection platform and paper surveys (Muñoz & Lewis, 2009). Student surveys are conducted using a paper format and then scanned into an internal data collection system. Staff surveys are conducted using an email link to an internal data collection system. Parents are offered two options, including a paper format or an online format, depending on their comfort level and access to technology. The online method allows for survey responses to be recorded efficiently and accurately into the EDS data analysis system.

**Score types and subscales.** The CSS survey includes score types for elementary school students, middle school students, high school students, EDS staff, and parents of EDS students (Muñoz & Lewis, 2009). The following question categories for EDS students include: a) school (i.e., school engagement, school belonging, school climate, school support, safety and overall satisfaction); b) home/community (i.e., political discussion); c) personal development (i.e., conflict resolution and positive character); and
d) school operation (i.e., teaching, curriculum, school resources, and school services).

The following question categories for EDS staff include: a) students (i.e., school support); b) school operation (i.e., administration, teaching, curriculum, student assessment, school resources, and school services); and c) employee (i.e., school belonging, safety, job satisfaction, overall satisfaction, positive character and educational satisfaction).

CSS scores are reported on a four-point Likert scale, ranging from strongly disagree to strongly agree. A score of 1 represents strongly disagree and a score of 4 represents strongly agree. The scores for all completed surveys are then averaged for a school composite score (Muñoz & Lewis, 2009). For the purposes of my study, I used student survey data. Only questions relating to school climate were averaged for a school climate score. I used questions from the following categories: school belonging, school discussion climate, caring environment, safety, overall satisfaction and personalization. Table 17 reports the questions from the CSS that were asked of students in regards to school climate.
Table 17

School CSS Climate Questions

<table>
<thead>
<tr>
<th>Category</th>
<th>ID#</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>School belonging</td>
<td>B4</td>
<td>I really like other students in my school.</td>
</tr>
<tr>
<td>School belonging</td>
<td>B5</td>
<td>I feel that I belong in my school.</td>
</tr>
<tr>
<td>School belonging</td>
<td>B6</td>
<td>I feel like I am part of my school community.</td>
</tr>
<tr>
<td>School discussion climate</td>
<td>B7</td>
<td>I can give opinions in class that disagree with the opinions of other students.</td>
</tr>
<tr>
<td>School discussion climate</td>
<td>B8</td>
<td>My teachers respect my opinion in class even if it disagrees with their opinions.</td>
</tr>
<tr>
<td>School discussion climate</td>
<td>B9</td>
<td>I feel I can disagree openly with my teachers about events in the news.</td>
</tr>
<tr>
<td>Caring Environment</td>
<td>B10</td>
<td>I feel my teachers really care about me.</td>
</tr>
<tr>
<td>Caring Environment</td>
<td>B11</td>
<td>I believe I can talk with my counselor.</td>
</tr>
<tr>
<td>Caring Environment</td>
<td>B12</td>
<td>My school has a caring and supportive environment for students.</td>
</tr>
<tr>
<td>Personal safety</td>
<td>B13</td>
<td>I feel safe walking to and from school.</td>
</tr>
<tr>
<td>Personal safety</td>
<td>B14</td>
<td>I feel safe outside the building before and after school.</td>
</tr>
<tr>
<td>Personal safety</td>
<td>B15</td>
<td>I feel safe at school.</td>
</tr>
<tr>
<td>Overall satisfaction</td>
<td>B18</td>
<td>I am very satisfied with my school.</td>
</tr>
<tr>
<td>Overall satisfaction</td>
<td>B19</td>
<td>I would rather go to this school than any other school.</td>
</tr>
<tr>
<td>Overall satisfaction</td>
<td>B20</td>
<td>I am very satisfied with EDS.</td>
</tr>
<tr>
<td>Personalization</td>
<td>B21</td>
<td>There is at least one adult at my school whom I feel I can trust.</td>
</tr>
<tr>
<td>Personalization</td>
<td>B22</td>
<td>When I have a problem there is at least one adult at my school whom I can talk about my problem.</td>
</tr>
<tr>
<td>Personalization</td>
<td>B23</td>
<td>There is at least one adult at my school who says positive things to me often.</td>
</tr>
<tr>
<td>Site safety</td>
<td>E22</td>
<td>At my school, I feel bullying is not a problem.</td>
</tr>
<tr>
<td>Site safety</td>
<td>E23</td>
<td>At my school, I feel Internet bullying is not a problem.</td>
</tr>
<tr>
<td>Site safety</td>
<td>E24</td>
<td>The adults in my school take care of safety problems quickly.</td>
</tr>
<tr>
<td>Site safety</td>
<td>E25</td>
<td>I believe the adults in my school will take care of any unsafe situation.</td>
</tr>
</tbody>
</table>

_Psychometric properties._ The Survey Tailored Design Method (Dillman, Christian, & Smythe, 2014) is a procedure for conducting multiple self-administered surveys that produce both high-quality (i.e., valid and reliable) information and acceptable response rates. A validity study by Rudasill (2008), in coordination with the local university’s College of Education, examined the structure of the instruments using
exploratory factor analysis, identifying the principle components through inter-item correlations (Stevens, 2001). Seven populations were examined including elementary school students, middle school students, high school students, parents, classified staff, and certified staff for the 2007-2008 CSS. Revisions were made for the 2008-2009 CSS by adding and deleting questions, as well as rewording questions in order to reflect current trends in the district.

In 2008, Muñoz conducted a reliability study for the survey as a whole, each domain within the surveys, and the constructs within each domain. Correlations with Cronbach’s alphas were conducted with item-by-item correlations using the Statistical Package for the Social Sciences (SPSS). The psychometric properties of the surveys were deemed adequate since the coefficients alphas greatly exceeded the minimum (.60) recommended for use of composite scales in statistical analyses (Nunally & Bernstein, 1994).

**Brigance Kindergarten Screener (BKS).** Each dependent variable was interval in measurement and reported the actual score for each student included in my study.

Table 18 reports the domains of the BKS, used for the purposes of my study.

**Table 18**

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Measurement of variable</th>
<th>Definition of variable</th>
<th>Level of measurement</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brigance Kindergarten Screener (BKS)</td>
<td>Cognitive/General Knowledge</td>
<td>Combination of the literacy and math scores and language/communication</td>
<td>Interval</td>
<td>French (2013)</td>
</tr>
<tr>
<td></td>
<td>Language/ Communication</td>
<td>Receptive and expressive language</td>
<td></td>
<td>Konold &amp; Pianta (2005)</td>
</tr>
</tbody>
</table>
**Purpose.** French (2013) noted that “the purpose of the BKS is to identify potential developmental delays and giftedness, to inform instruction, and to monitor child progress” (p. 2). The state in which EDS resides mandates the BKS as the measurement tool to assess kindergarten readiness according to the state legislation 704 KAR 5:070, Section 2 in accordance with KRS Chapter 45A. This legislation mandates that the screener aligns with the state’s definition of school readiness and the state’s standards that are established for preschool and assesses the domains of adaptive, cognitive, communication, motor, and social emotional readiness. The screener must be reliable and valid for target populations, including subgroups such as English Language Learners and students with disabilities, as well as provide student-level data that assesses school readiness in each of the five aforementioned domains.

**Theoretical background.** The theory behind the BKS is confirmatory factor analysis, which is an analysis driven by theory that requires deductive specification regarding the correlation of underlying traits and indicators (French, 2013). This type of analysis supported the creation of the domain structure for the BKS.

**Length.** According to the Brigance Screener Training Manual, the approximate time for assessment of each student included in this study is 15 minutes per domain (French, 2013). There are 101 cognitive/general knowledge items that account for a total of 65.5 points. The language/communication domain consists of eight items accounting for a total of 16 points. The total score for BKS ranges from 0 to 100 and is compiled from the weighted scores of each domain.

**Administration requirements.** Although the administration of the BKS does not require specific qualifications, each of the examiners must be familiar with the
procedures for administration and scoring, and they must have practiced administering the exam several times. Additionally, the examiners must be able to adhere to the directions that accompany each domain of the assessment. The state in which EDS resides requires all new test administrators to attend a three-hour face-to-face training, and all experienced test administrators must attend a one- to two-hour refresher training annually. The training of each test administrator must be verified by the district and kept on file for state records. The BKS must be administered between 15 calendar days from the start of the school year to the thirtieth instructional day (State Common Kindergarten Implementation Guide, 2015).

Score types and subscales. The five domains of the BKS include: a) cognitive/general knowledge; b) language/communication; c) physical well-being; d) self-help skills; and e) social emotional skills. For the purposes of the capstone study, I examined the BKS scores related to academic readiness, which were collected by trained school personnel. Those measures are cognitive/general knowledge and language/communication. Cognitive/general knowledge is defined as a combination of the literacy and math scores and language/communication is defined as receptive and expressive language (French, 2013). Each domain assessed within the BKS produces normative scores that can be assessed individually to address the readiness of the student, and they can be used for age-level comparisons (French). Table 19 reports the questions used to gather data for my study. The questions are written as found in the BKS testing materials.
Table 19

Student BKS Questions for Domains Used in Study

<table>
<thead>
<tr>
<th>Brigance domain</th>
<th>Questions asked of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive/general knowledge</td>
<td>Knows personal information</td>
</tr>
<tr>
<td></td>
<td>Recites alphabet</td>
</tr>
<tr>
<td></td>
<td>Sorts objects (by size, color, shape)</td>
</tr>
<tr>
<td></td>
<td>Counts by rote</td>
</tr>
<tr>
<td></td>
<td>Matches quantities with numerals</td>
</tr>
<tr>
<td></td>
<td>Determines total of two sets</td>
</tr>
<tr>
<td></td>
<td>Reads uppercase or lowercase letters</td>
</tr>
<tr>
<td></td>
<td>Experience with books and text</td>
</tr>
<tr>
<td>Language/Communication</td>
<td>Names parts of the body</td>
</tr>
<tr>
<td></td>
<td>Verbal fluency and articulation</td>
</tr>
</tbody>
</table>

The composite score for each student is reflected along a normative scale through the conversion of raw scores from each domain. The composite scores consist of normative scores from each domain of the BKS. The normative scores from each domain have a mean of 100 with this score indicating the child’s performance on the assessed skill to be at the mean or average within a normal distribution. The standard deviation for the composite score is 15, reflecting a score of 115 being one standard deviation above the mean and a score of 85 being one standard deviation below the mean. The scores that were used in this assessment are based on an equal interval scale, allowing for arithmetical manipulation and examination (French, 2013). Each of the domains uses the same scoring guide to interpret a student’s score in relation to his or her kindergarten readiness. Table 20 can be found in the Brigance Technical Manual (French, p. 107).
Table 20

Brigance Performance Ratings

<table>
<thead>
<tr>
<th>Brigance score</th>
<th>Performance rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;70</td>
<td>Very weak</td>
</tr>
<tr>
<td>70-79</td>
<td>Weak</td>
</tr>
<tr>
<td>80-89</td>
<td>Below average</td>
</tr>
<tr>
<td>90-110</td>
<td>Average</td>
</tr>
<tr>
<td>111-120</td>
<td>Above average</td>
</tr>
<tr>
<td>121-130</td>
<td>Strong</td>
</tr>
<tr>
<td>&gt;130</td>
<td>Very strong</td>
</tr>
</tbody>
</table>

*Psychometric properties.* The reliability of the BKS was first established in 1991, and then again in 2012 with the release of the BKS III (French, 2013). The reliability was tested in two ways. Curriculum Associates, the publishers of the BKS, gathered estimates through the use of a test-retest study and an inter-rater study (French, 2013). For the first measure of reliability, the test-retest study included 338 children of all ages up to 7 years and 11 months from 25 sites. The same test administrator was used for each of the two test sessions; the second test was given within three weeks of the first test. French (2013) reported that the correlation for the total score on the BKS was .92. According to Hinkle, Wiersma, and Jurs (2003), a correlation of .70 or higher is considered strong and a correlation of .90 or higher is considered very strong. The test-retest study has a very high positive reliability correlation according to the Hinkle et al., (2003) scale of correlations.

The second measure of reliability that was used was an inter-rater study. French (2013) noted that the inter-rater study was conducted with 330 children with ages up to 7 years 11 months. According to French (2013), the two examiners assigned to each student conducted the test in the most similar settings as possible. The correlation for the total test score was .93. According to Hinkle et al. (2003), .93 is a very strong correlation.
French noted that both the test-retest and inter-rater studies showed high correlations of reliability.

The validity of the BKS was established through a study of test content, internal structure, fairness, and associations with other variables (French, 2013). Breidenbach and French (2012) found that the BKS is valid for “monitoring half-year to yearly student progress and identifying areas of strength and weakness” (p. 486). French (2012) found that the BKS was valid in the areas of test content and internal structure.

BKS test content was determined to be valid by several researchers, including Helfeldt (1984), Brennan (1985), and Schearer (1986). The BKS is a criterion-referenced assessment that is well organized (Helfeldt, 1984). Brennan (1985) compared the BKS to other well-known assessments and Schearer (1986) added that the BKS is as valid as the Developmental Indicators for the Assessment of Learning (DIAL) test that was widely used in the New York Public School system. Additionally, internal structure validity was tested using confirmatory factor analysis and maximum likelihood estimation (French, 2013). The BKS structure was found to be valid, according to French (2013), because it is comprised of three-factor, first-order models and a one-factor, second-order model that were the only combination of models found to meet the validity standards.

Participants

Initial data received from EDS consisted of 304 student participants. After analyzing the data set, 115 students were removed because they were not enrolled in their preschool locations for the entire 2014-2015 school year. Students in a tuition-based preschool were enrolled for 175 days and students in a federally funded preschool were enrolled for 160 days. Fifteen additional students were removed from the data set due to
the absence of their BKS scores. The final data set consisted of 174 students with complete data.

Table 21 reports the numbers and percentages of study participants. The frequency column reports the actual number of participants for each category of the variable and the percent column reports the percentage of the total number of participants. Similarities between students’ SES and their prior setting are a result of the funding source for the prior setting. Students who qualify for free/reduced lunch status are eligible for Head Start programs. Students who do not qualify for free/reduced lunch cannot attend Head Start and must attend tuition-based preschools. Therefore, SES and prior setting report the same values. Due to the similarities, prior setting was removed from the variable list for reporting frequencies.

**Table 21**

Frequencies for Independent Variables

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>102</td>
<td>58.6</td>
</tr>
<tr>
<td>Non-African American</td>
<td>72</td>
<td>41.4</td>
</tr>
<tr>
<td>Qualifies for free/reduced lunch</td>
<td>128</td>
<td>73.6</td>
</tr>
<tr>
<td>Does not qualify for free/reduced lunch</td>
<td>46</td>
<td>26.4</td>
</tr>
<tr>
<td>Head Start (federally funded)</td>
<td>123</td>
<td>70.7</td>
</tr>
<tr>
<td>Tuition-based</td>
<td>51</td>
<td>29.3</td>
</tr>
</tbody>
</table>

(Notice: N = 174)

According to the State Department of Education (2014) A1 schools are under the control of a principal and can establish a Site-Based Decision Making Council (SBDM). The number of tuition-based programs that are available in the district limits the sample because there are only five tuition-based preschools in EDS. In order to keep the sample balanced, data from a total of 17 classrooms were used from classrooms housed in one of the nine schools included in the study. Demographic data for each of the schools in the
study are reported below in Table 22. The demographics table shows that the average attendance rates range from 94.5% to 97.3%, with all included schools above the district average of 94.3%. Free/reduced lunch rates range from 12.9% to 95.6% of students qualifying for this service, with a district average of 66.8%. African American students comprise 11.6% to 71.3% of students in the school population, with a district average of 35.1%.

**Table 22**

<table>
<thead>
<tr>
<th></th>
<th>Enrollment</th>
<th>F/R Lunch</th>
<th>White</th>
<th>African American</th>
<th>Hispanic</th>
<th>Other</th>
<th>Mobility</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>529</td>
<td>33.3</td>
<td>34.8</td>
<td>39.3</td>
<td>3.0</td>
<td>22.9</td>
<td>1.1</td>
<td>97.3</td>
</tr>
<tr>
<td>2</td>
<td>709</td>
<td>36.4</td>
<td>66.6</td>
<td>13.3</td>
<td>10.4</td>
<td>9.7</td>
<td>2.7</td>
<td>96.8</td>
</tr>
<tr>
<td>3</td>
<td>709</td>
<td>19.6</td>
<td>69.7</td>
<td>12.7</td>
<td>4.1</td>
<td>13.5</td>
<td>7.3</td>
<td>96.2</td>
</tr>
<tr>
<td>4</td>
<td>753</td>
<td>12.9</td>
<td>68.5</td>
<td>11.6</td>
<td>4.5</td>
<td>15.4</td>
<td>4.1</td>
<td>97.3</td>
</tr>
<tr>
<td>5</td>
<td>689</td>
<td>39.0</td>
<td>72.4</td>
<td>15.1</td>
<td>5.2</td>
<td>7.3</td>
<td>4.5</td>
<td>95.9</td>
</tr>
<tr>
<td>6</td>
<td>388</td>
<td>95.6</td>
<td>45.4</td>
<td>50.5</td>
<td>1.0</td>
<td>3.1</td>
<td>7.6</td>
<td>94.6</td>
</tr>
<tr>
<td>7</td>
<td>480</td>
<td>28.3</td>
<td>72.7</td>
<td>13.3</td>
<td>5.2</td>
<td>8.8</td>
<td>6.9</td>
<td>96.5</td>
</tr>
<tr>
<td>8</td>
<td>743</td>
<td>85.1</td>
<td>13.3</td>
<td>71.3</td>
<td>11.2</td>
<td>4.2</td>
<td>8.0</td>
<td>96.0</td>
</tr>
<tr>
<td>9</td>
<td>497</td>
<td>75.5</td>
<td>61.8</td>
<td>27.0</td>
<td>4.8</td>
<td>6.4</td>
<td>12.8</td>
<td>94.5</td>
</tr>
<tr>
<td>DA*</td>
<td>498.6</td>
<td>66.8</td>
<td>46.2</td>
<td>35.1</td>
<td>10.3</td>
<td>8.4</td>
<td>9.0</td>
<td>94.3</td>
</tr>
</tbody>
</table>

(Notes: Enrollment data are actual numbers of students; all other data are percentages.)

(Notes: School 1 houses classes of both federally funded and tuition-based preschool programs. Although located in the same facility, different classrooms will be used for each category.)

(Notes: The EDS Profile Website 2014-2015 identifies the following definitions [updated 11/7/15]: Mobility index—comparison of reentries to total enrollments expressed as an annual percentage; Free/reduced lunch—percentage of students at school who receive either a free or reduced priced lunch; Ethnicity—percentage of white, African American, and all other students enrolled.)

*DA represents the District Average for EDS.

Figure 5 shows demographic data that compares the study participants’ average to district averages for EDS. When comparing my sample to the district, I used the school-level variables of SES, race, mobility, and attendance. Schools included in this study
have a demographically similar average to the district average for EDS. The sample population for this study is representative of EDS district demographics.

**Figure 5.** Comparison of average school demographics included in the study to average district demographics for EDS

(Note. All data are percentages.)

Achievement data for each of the schools in the study are reported in Table 23. The achievement table reports the average kindergarten readiness rates range from 28.4% to 89.7%, with seven of nine schools achieving above the district average of 51.9%. Cognitive/general knowledge readiness rates range from 21.6% to 80.4%, with seven of nine schools achieving above the district average of 39.2%. Language/communication readiness rates range from 69.2% to 91.8%, with all schools included in the study above the district average of 66.7%.
Table 23

2014-2015 Achievement of Schools Included in this Research Study

<table>
<thead>
<tr>
<th>School</th>
<th>Met AMO?</th>
<th>KPREP score %</th>
<th>Kindergarten ready %</th>
<th>Cognitive ready %</th>
<th>Language ready %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No</td>
<td>75.7</td>
<td>89.7</td>
<td>80.4</td>
<td>91.8</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>71.4</td>
<td>66.7</td>
<td>55.0</td>
<td>75.8</td>
</tr>
<tr>
<td>3</td>
<td>Yes</td>
<td>79.9</td>
<td>65.9</td>
<td>56.9</td>
<td>76.4</td>
</tr>
<tr>
<td>4</td>
<td>Yes</td>
<td>81.4</td>
<td>89.4</td>
<td>83.3</td>
<td>86.4</td>
</tr>
<tr>
<td>5</td>
<td>Yes</td>
<td>76.7</td>
<td>76.5</td>
<td>63.5</td>
<td>77.4</td>
</tr>
<tr>
<td>6</td>
<td>No</td>
<td>56.9</td>
<td>28.4</td>
<td>21.6</td>
<td>73.0</td>
</tr>
<tr>
<td>7</td>
<td>No</td>
<td>78.1</td>
<td>72.2</td>
<td>66.7</td>
<td>90.3</td>
</tr>
<tr>
<td>8</td>
<td>No</td>
<td>61.2</td>
<td>53.1</td>
<td>41.5</td>
<td>69.2</td>
</tr>
<tr>
<td>9</td>
<td>Yes</td>
<td>65.4</td>
<td>37.5</td>
<td>26.4</td>
<td>79.2</td>
</tr>
<tr>
<td>DA*</td>
<td>N/A</td>
<td>56.1</td>
<td>51.9</td>
<td>39.2</td>
<td>66.7</td>
</tr>
</tbody>
</table>

(Note: AMO—Annual Measurable Objective as set by the state department of education; KPREP—Kentucky Performance Rating for Educational Progress as required by Senate Bill One passed in 2009 by the State General Assembly; Brigance uses the Anastasi and Urbina [2008] definition of School/Kindergarten Readiness. “School readiness means that a child possesses a set of prerequisite skills and abilities that will allow that child to benefit from instruction at the kindergarten level” [p. 84]).

* DA represents the District Average for EDS.

Figure 6 shows achievement data comparing averages of study participants to district averages for EDS. When comparing my sample to the district, I used the school-level variables of KPREP scores as well as the percentages of kindergarten readiness, cognitive readiness and language readiness. The average of all indicators for the sample is 67.57% as compared to the district average of 53.47%. The sample population for this study includes both high performing and low performing schools, which is a representation of the achievement in EDS.
Figure 6. Comparison of averages of schools included in the study to district averages for EDS for achievement

**Procedures**

Pre-existing data were used for the purposes of this study. Specifically, the data management department of EDS collected and analyzed data in the 2014-2015 and 2015-2016 school years to determine the relationship effects of each variable and kindergarten readiness. I used student-level data retrieved from the EDS district. The data are collected annually within the first 30 days of the school year through the administration of the BKS. Trained educators administer the screener and enter the data into the Brigance online management system. The EDS data management department imported this data into the EDS student records management system to which district staff have access. Student-level data (i.e., race, SES, attendance, prior setting, and school climate), as well as teacher-level data (i.e., teacher credentials and years of experience), were not publicly available and were requested through the EDS online data request system. A committee
of data management specialists reviewed the request and granted approval for the release of data for this capstone study. The EDS data management department coded the data to protect the confidentiality of the participants prior to releasing the file to the capstone group.

Through the review of publicly available EDS data notebooks, the capstone group selected the schools and classrooms from which the existing panel data were requested. The data notebooks reflected demographic characteristics and funding sources of all schools within the district. I used the EDS informational website to obtain a list of schools that have tuition-based and federally funded preschool programs. This data set was assessed to determine the classrooms included in the capstone. All of the schools were selected using a random sample based on the following characteristics: a) where the preschool was housed; b) whether the school where they were housed has a student body of at least 350 students; and c) whether the school has a full-day preschool program. Schools with 350 or more students were selected due to the use of the Comprehensive School Survey to determine school climate ratings. In addition, the average size for elementary schools in EDS is 350 students.

The requested BKS data included student-level results in the domains of cognitive/general knowledge and language/communication. These results were analyzed according to the raw score reported by EDS. The BKS scores range from 0 to 125 for a composite score of all five domains. Below average scores range from 0-89; average scores range from 90-109; and above average scores range from 110-125.

Data Analysis

Descriptive statistics, correlations, and multiple regressions were used to address
the study research questions. Descriptive statistics were used to report the data collected on the key variables (e.g., race, SES, prior setting, attendance, and climate). Correlations were used to examine the relationship among study variables. Lastly, regressions were used to examine the variance explained by the addition of my study variables (e.g., teacher credentials and teacher years of experience). Each procedure is subsequently described in detail as related to addressing the study research questions.

Descriptive statistics are used to categorize, describe and summarize numerical data (Cronk, 2012; Hinkle et al., 2003). Descriptive statistics permit researchers to dichotomize the sample into subgroups allowing the researcher to determine if the study sample is representative of the population of the district as a whole. The characterization of the study sample provided by the descriptive statistics provides an intensive understanding of the population being studied.

Descriptive statistics were run on all variables to describe the data set that was used to answer the research questions. The descriptive statistics expressed the characterization of the sample as a whole and included cross tabulations for each dichotomous independent variable in relation to each dependent variable. This allowed me to report the performance of study participants in relation to their demographic groups of race, SES, and prior setting. Percentages of students from each group scoring average or above or below average are reported in the following chapter.

Correlations establish the relationships between two variables (Cronk, 2012). Correlations enhance my understanding of the relationships between study independent and dependent variables and they were used to examine the relationships among the variables, including: race, language/communication and cognitive/general knowledge.
Subsequently, correlations were used to examine the relationship among the continuous independent variables of attendance and climate and the dependent variables of the Brigance scores. The mean BKS score for language/communication and cognitive/general knowledge was determined for each level or value represented within the independent variables. This allowed for scoring comparisons between variables and each of the subgroups within the variables. The Pearson Correlation outlines the linear relationship between my study specific independent variables (e.g., teacher credentials and teacher years of experience) and the capstone study dependent variables of language/communication and cognitive/general knowledge. This statistical analysis allowed me to determine whether a positive or negative correlation existed among variables as well as the strength of the relationship between variables. According to Hinkle et al. (2003), a correlation value can be reported from .00 to 1.00 with .00 showing no relationship and 1.00 showing a very high relationship. Hinkle et al. (2003) reported guidelines for determining the strength of the relationship between variables. A correlation value can be reported as a little positive (.00 to .30) or negative (.00 to -.30) correlation, low positive (.30 to .50) or negative (-.30 to -.50) correlation, moderate positive (.50 to .70) or negative (-.50 to -.70) correlation, high positive (.70 to .90) or negative (-.70 to -.90) correlation, or very high positive (.90 to 1.00) or negative (-.90 to 1.00) correlation. The significance of the relationship was determined at $p < .05$. Cronk (2012) noted that a reliable relationship exists between variables that are found to have a significant correlation. For the significance of the Pearson Correlation to be meaningful and reliable, both dependent and independent variables should be evenly distributed (Cronk, 2012).
An HLMR allows the researcher to identify the entry order of the independent variables into the regression equation (Ho, 2013). Due to the flexibility of this regression, an HLMR was used to address the study research questions. The common independent variables of race, SES, prior setting, attendance, and school climate, as well as teacher credentials and teacher years of experience were entered into SPSS Statistical package using HLMR. This HLMR is an explanatory statistical procedure. Osborne (2000) suggested using this procedure when the researcher is trying to understand a phenomenon through group-level variables. I analyzed data from the HLMR outputs that included teacher credentials and teacher years of experience. The dependent variable was kindergarten readiness in the BKS domains of cognitive/general knowledge and language/communication.

The use of HLMR allowed for the creation of variable blocks which when included in the analysis produced the variance explained among the blocks within the same sample to understand the relationship between teacher credentials, teacher years of experience and kindergarten readiness. This method was selected because the research questions sought to explain the variance among groups of variables after accounting for the variances attributed to covariates (Tabachnick & Fidell, 2013). My study included three variable blocks: a) student-level variables of SES (Qualifies for free/reduced lunch = 0); race (African American = 0), attendance (number of days absent); b) school-level variable of climate (average student climate CSS scores); c) teacher level of credentials (bachelor’s degree or higher = 0); and d) teacher years of experience. Block 1 served to control for the student level demographic variables prior to the addition of school and classroom level variables. I expected to find a significant outcome with the addition of
each block explaining the variance. I looked for a significant increase in $R^2$. I also examined the change in the $R^2$ value to determine the significance of adding variables into the analysis at different stages (Petrocelli, 2003). This allowed me to determine the amount of change in variance by adding more variable blocks to the analysis.

The variables entered/removed table shows the order in which the variables were added to the study while the model summary table reports the variance accounted for after each variable was added to the regression (Ho, 2013). In order to determine the variance explained, I used the $R^2$ value, which reports “the degree to which a phenomenon exists” (Cohen, 1965, p. 9). Analyzing the differences in $R^2$ values after each block is added, allowed me to determine the variance explained by the combination of variables included in the block. The $f$ change value was used to determine the effect size of variance explained by each block. According to Cohen (1988), a small effect size is .0196, a medium effect size is .1300, and a large effect size is .2600. Ho (2013) stated that the coefficients table helps to examine how the variables were entered into the regression equation and the significance attributed to each variable as it relates to the dependent variable.

An issue in correlational research is the nature of the relationship among variables. In particular for multiple regression, multicollinearity occurs when two or more variables are too strongly correlated. To gauge the multicollinearity of variables, the variance inflation factor (VIF) was used to determine if a strong linear relationship existed between any predictor variables (Stevens, 2009). Ho (2013) and Stevens (2009) asserted that VIF levels below 10 indicate multicollinearity are not an issue. The collinearity diagnostics output table measures how interrelated the variables are (Becker
The significance of each predictor Block was determined through the use of the regression equation $f_{i} (df1, df2) = f_{\text{change}}, p < .05$ (Ho, 2013). After a significance of the Block was determined, Beta weights were analyzed to determine the significance of each predictor included within the Block. Predictors were found to be significant at the $p < .05$ level. According to Ho, Beta weights at less than $p < .05$ level show a significant contribution to the Block. After a significance of the predictors within the significant Block was determined at the $p < .05$ level, I was able to reject or accept the null hypothesis (Hinkle et al., 2003). When the predictor was significant, I was able to reject the null hypothesis. When the predictor was not significant, I was able to accept the null hypothesis. When the null hypothesis was rejected, I examined the $t$-statistic to evaluate the difference between the population mean and the observed sample mean (Hinkle et al., 2003). The $t$-statistic critical value is significant at or above 1.960 when $p < .05$ (Hinkle, et al., 2003).

The use of HLMR analysis allowed the capstone group to input the independent variables in the order that was dictated by logical considerations (Ho, 2013). Initial analysis of the research on each independent variable dictated that the order of input into the regression was as follows: 1) funding; 2) school location; 3) school classification; 4) teacher credentials; 5) teacher years of experience; 6) music inclusion; and 7) amount of time allotted to music instruction. The capstone group anticipated that funding would have the strongest relationship to the dependent variable, with the independent variable of teacher credentials in the second priority position, and the relationship between music inclusion and the dependent variable in the third priority position. The order of entry
allowed me to see the importance of each independent variable Block and the variance provided by each Block in relation to the dependent variable of kindergarten readiness (Ho, 2013).

The variable Blocks’ null hypothesis (e.g., Block 1, Block 2, and Block 3) can be rejected at the $p < .05$ level (Hinkle et al., 2003), or when the parameter is statistically different from zero. This allowed me to determine if there was a statistical significance of the variable Blocks in the HLMR analysis. This informed me when the variables in the Block collectively accounted for the variance in the dependent variables.

Rejecting the null hypothesis allowed me to determine if the addition in the independent variables within Block 3 enhanced the prediction teacher credentials and teacher years of experience had a positive relationship on kindergarten readiness. This change was reflected in the $R^2$ value through the addition of Block 3 to the model.

**Assumptions.** Statistical procedures have assumptions that must be tested before the outputs can be considered reliable. The HLMR tests assumptions during the data analysis. According to Snijders (2012), the assumptions include:

- Are the right variables included in the fixed section of the regression?
- Are the right variables included in the random section of the regression?
- Are the residuals normally distributed?
- Is the variance of the residuals constant?
- Are the coefficients distributed normally?
- Do the coefficients have a construct co-variance matrix?

I addressed these assumptions in the data analysis section. Assumptions were addressed by assigning variables to Blocks according to school level, teacher level, and student
level. Additional assumptions were addressed by examining residual plots for clustering of data as described by Stevens (2009).
CHAPTER IX
RESULTS

Chapter IV is divided into two sections reporting study findings: *Descriptive Statistics* and *Hierarchical Linear Multiple Regression (HLMR)*. The first section, *Descriptive Statistics*, reports the descriptive statistics on the collected data on the key variables (e.g., race, SES, prior setting, attendance, and climate). The second section, *Hierarchical Linear Multiple Regression Results*, reports the results of the HLMR. Results are reported from the three HLMR blocks (aforementioned independent variables) and the addition of the teacher-level variables of teacher credentials and teacher years of experience.

**Descriptive Statistics**

Tables 24 and Table 25 report cross tabulations with the independent variables being race, SES, and prior setting, and the dependent variables of each of the included domains of the Brigance Kindergarten Screener (BKS). Specifically, Table 24 reports descriptive statistics for each of the student level independent variables for the cognitive/general knowledge domain, whereas Table 25 reports descriptive statistics for the domain of language/communication.

As shown in Table 25, 26.3% of non-African American students scored below average. African American students were 1.1% more likely than non-African American students to score below average in the language/communication domain of the BKS.
A Chi-Square statistic was used to examine whether African American students who scored below average were significantly different than the non-African American group, and there was no significant difference between the groups, $X^2 (1) = .02, p = .88$.

For students who qualified for free/reduced lunch, 29.6% scored below average while 70.3% scored above average in the domain of language/communication. Of the students who did not qualify for free/reduced lunch status, 19.5% scored below average and 80.4% scored above average. Students who qualified for free/reduced lunch were therefore 10.1% more likely to score below average on the language/communication domain of the BKS compared to those who did not qualify. A Chi-Square statistic was used to examine whether students who qualified for free/reduced lunch scoring below average were significantly different than students who did not qualify for the free/reduced lunch group, and there was no significant difference between the groups, $X^2 (1) = 1.76, p = .19$.

Table 24 also reports that 30.8% of Head Start students scored below average, and 69.1% scored on or above average. Of the tuition-based students, 17.6% scored below average and 82.3% scored average or above on the language/communication domain of the BKS. Students who were enrolled in Head Start programs in their prior setting were 13.2% more likely to score below average on this domain. A Chi-Square statistic showed that Head Start students who scored below average were significantly different than students in the tuition-based group and there was not a significant difference between the groups, $X^2 (1) = 3.21, p = .07$. 

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Table 24

Language/Communication Readiness

<table>
<thead>
<tr>
<th></th>
<th>Average or above</th>
<th>Below average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>74</td>
<td>28</td>
</tr>
<tr>
<td>Non-African American</td>
<td>53</td>
<td>19</td>
</tr>
<tr>
<td>SES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualifies for Free/Reduced Lunch</td>
<td>90</td>
<td>38</td>
</tr>
<tr>
<td>Does Not Qualify for Free/Reduced Lunch</td>
<td>37</td>
<td>9</td>
</tr>
<tr>
<td>Prior Setting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head Start</td>
<td>85</td>
<td>38</td>
</tr>
<tr>
<td>Tuition-based</td>
<td>42</td>
<td>9</td>
</tr>
</tbody>
</table>

(Note. N = 174)

As reported in Table 25, 61.7% of African American students scored below average in the domain of cognitive/general knowledge while 36.1% of the non-African American students scored below average. Therefore, African American students were 25.6% more likely than non-African American students to score below average in the cognitive/general knowledge domain of the BKS. A Chi-Square statistic was used to examine whether African American students who scored below average were significantly different than the non-African American group and there was a significant difference between the groups, $X^2 (1) = 10.28, p < .01$.

For students who qualified for free/reduced lunch, 60.1% scored below average, while 39.8% scored above average in the domain of cognitive/general knowledge. Of the students who did not qualify for free/reduced lunch status, 26.0% scored below average and 73.9% scored above average. Students who qualified for free/reduced lunch were 33.3% more likely to score below average on the cognitive/general knowledge domain of the BKS. A Chi-Square statistic was used to examine whether students who qualified for free/reduced lunch scoring below average were significantly different than the students who did not qualify for the free/reduced lunch group and there was a significant
difference between the groups, $X^2 (1) = 15, p < .00$.

Table 25 also reports that 59.3% of the Head Start students scored below average and 40.6% scored on or above average. Of the tuition-based students, 31.3% scored below average and 68.6% scored average or above on the cognitive/general knowledge domain of the BKS. Students who were enrolled in Head Start programs in their prior setting were 27.2% more likely to score below average on this domain. A Chi-Square statistic was used to examine whether Head Start students who scored below average were significantly different than the students in the tuition based group and there was a significant difference between the groups, $X^2 (1) = 10.64, p < .00$.

**Table 25**

**Cognitive/General Knowledge Readiness**

<table>
<thead>
<tr>
<th></th>
<th>Average or above</th>
<th>Below average</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>39</td>
<td>63</td>
</tr>
<tr>
<td>Non-African American</td>
<td>46</td>
<td>26</td>
</tr>
<tr>
<td><strong>SES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualifies for Free/Reduced Lunch</td>
<td>51</td>
<td>77</td>
</tr>
<tr>
<td>Does Not Qualify for Free/Reduced Lunch</td>
<td>34</td>
<td>12</td>
</tr>
<tr>
<td><strong>Prior Setting</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head Start</td>
<td>50</td>
<td>73</td>
</tr>
<tr>
<td>Tuition-based</td>
<td>35</td>
<td>16</td>
</tr>
</tbody>
</table>

*(Note. N = 174)*

Table 26 reports the Pearson correlations between study independent variables and study dependent variables of language/communication and cognitive/general knowledge. All of the relationships between the independent variables and language/communication were found to have little to no relationship with values ranging from -.108 to .062. There is little to no relationship between cognitive/general knowledge and attendance (-.154), climate (.148), and years of experience (-.062).
Table 26

Pearson Correlations for Dependent Variables for Attendance, Climate, and Years of Experience

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Attendance-days absent</th>
<th>Climate</th>
<th>Years of Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language/communication</td>
<td>-.108</td>
<td>.052</td>
<td>.007</td>
</tr>
<tr>
<td>Cognitive/ general knowledge</td>
<td>-.154*</td>
<td>.148*</td>
<td>-.062</td>
</tr>
</tbody>
</table>

(Note. *represents p<.05)

Table 27 reports the mean number of sample participants that were included in the level of each independent variable included in Block 3 (N) and standard deviation of dependent variable scores for students in the sample. The mean score for language/communication and cognitive/general knowledge are reported for each level of Block 3 variables (i.e., teacher credentials and teacher years of experience). The mean score for the independent variable of teacher credentials is reported for students who had a preschool teacher who held a bachelor’s degree or higher, or students who had a preschool teacher who held no degree for each of the dependent variables. Students with preschool teachers that held a bachelor’s degree or higher averaged 1.5 points higher in language communication domain than students who had teachers with less than a four-year degree. Students with preschool teachers who held a degree scored on average 1.79 points higher in cognitive/general knowledge than students with preschool teachers who did not hold a bachelor’s degree or above. Teacher years of experience stretched from one to 25 years. Language/communication scores ranged from 88.64 (teachers with 22 years of experience) to 102.18 (teachers with 25 years of experience), with the average scores combining years of experience to be 96.01. Cognitive/general knowledge scores ranged from 80.94 (teachers with 13 years of experience) to 94.09 (teachers with 25 years of experience).
of experience), with the average score combining all years of experience to be 89.4. In both the areas of language/communication and cognitive/general knowledge, teachers with 25 years of experience had higher average scores than the average scores of all teachers in the sample.
Table 27

Mean Scores for Years of Experience, Credentials, and BKS Domains Included

<table>
<thead>
<tr>
<th>Block 3 variables</th>
<th>Variable levels</th>
<th>LangCom</th>
<th>CogGenK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher Credentials</td>
<td>Bachelor’s</td>
<td>Mean</td>
<td>96.56</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>111</td>
<td>111</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>13.478</td>
<td>15.737</td>
</tr>
<tr>
<td></td>
<td>No Degree</td>
<td>Mean</td>
<td>95.03</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>13.788</td>
<td>14.035</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>Mean</td>
<td>96.01</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>174</td>
<td>174</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>13.571</td>
<td>15.126</td>
</tr>
<tr>
<td>Years of Experience</td>
<td>1 Year</td>
<td>Mean</td>
<td>97.79</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>15.462</td>
<td>14.829</td>
</tr>
<tr>
<td></td>
<td>4 Years</td>
<td>Mean</td>
<td>94.23</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>13.770</td>
<td>15.053</td>
</tr>
<tr>
<td></td>
<td>5 Years</td>
<td>Mean</td>
<td>95.38</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>11.666</td>
<td>20.083</td>
</tr>
<tr>
<td></td>
<td>7 Years</td>
<td>Mean</td>
<td>97.38</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>8.975</td>
<td>13.081</td>
</tr>
<tr>
<td></td>
<td>11 Years</td>
<td>Mean</td>
<td>98.39</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>11.272</td>
<td>15.806</td>
</tr>
<tr>
<td></td>
<td>12 Years</td>
<td>Mean</td>
<td>90.67</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>12.971</td>
<td>13.398</td>
</tr>
<tr>
<td></td>
<td>13 Years</td>
<td>Mean</td>
<td>96.24</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>17.718</td>
<td>11.222</td>
</tr>
<tr>
<td></td>
<td>21 Years</td>
<td>Mean</td>
<td>97.46</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>214.247</td>
<td>12.112</td>
</tr>
<tr>
<td></td>
<td>22 Years</td>
<td>Mean</td>
<td>88.64</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>12.251</td>
<td>15.765</td>
</tr>
<tr>
<td></td>
<td>25 Years</td>
<td>Mean</td>
<td>102.18</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>11.805</td>
<td>14.652</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>Mean</td>
<td>96.01</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>174</td>
<td>174</td>
</tr>
</tbody>
</table>

(Note. LangCom represents Language/Communication; CogGenK represents Cognitive/General Knowledge; SD represents Standard Deviation.)

(Note. N = 174 for each Block 3 variable)

**Multicollinearity explained.** The test outputs for multicollinearity of the
independent variables included in my study were reported in Block 3 results in the coefficients table that was produced by the HLMR. The results showed that multicollinearity is not an issue when Block 3 is inserted into the HLMR for either dependent variable, language/communication or cognitive/general knowledge. After examining the Beta weights it can be noted that even though multicollinearity does not pose an issue only the independent variable of SES was found to be significant ($p < .05$) in the HLMR for the dependent variable of cognitive/general knowledge. No independent variables were found to be significant for the dependent variable of language/communication.

**Hierarchical Linear Multiple Regression (HLMR) Results**

My research questions for this study are as follows:

**Research question 1.** What is the relationship between preschool teacher credentials and kindergarten readiness?

**Research question 2.** What is the relationship between preschool teacher years of experience and kindergarten readiness?

Each of these questions was answered using the HLMR statistical procedure using three blocks of variables. Block 1 was comprised of student-level variables (e.g., race, SES, prior setting, and attendance); Block 2 was comprised of the school-level variable of climate lastly, Block 3 contained the school level variables of teacher credentials and teacher years of experience.

**Report on HLMR blocks.** Table 28 reports the amount of variance explained by each Block, the Beta coefficients, and the standard error statistics for each of the predictor variables included in each Block of the HLMR for the dependent variables.
Block 1 included the demographic variables of race, SES, and attendance, and accounted for 1.9% of the variance in language/communication, which was not statistically significant $F(3,170) = 1.084, p > .05$. The addition of Block 2, which included the school-level variable (school climate), explained 2.2% of the variance in language/communication, which resulted in an increase of .3% of the variance explained and was not statistically significant, $F(1,169) = .505, p > .05$. The inclusion of Block 3 provided a test of whether the teacher-level variables of teacher credentials and teacher years of experience contributed to explaining the variance in language/communication. As reported, the variable blocks accounted for 3.2% of the variance, which was an increase of 1.0% and was not statistically significant, $F(2,167) = .926, p > .05$. As such the teacher-level independent variables were not strong predictors of kindergarten readiness in the BKS domains of language/communication.

Block 1 included the demographic variables of race, SES and attendance and accounted for 11.3% of the variance in cognitive/general knowledge, which is statistically significant, $F(3,170) = 7.226, p < .05$. The variable of SES was found to be significant at the $p < .05$ with a t-statistic of 3.217, showing the cognitive/general knowledge mean score of the study population was more than three standard deviations from the hypothesized mean score of the population. The addition of Block 2 that included the school-level variable (school climate) explained 11.4% of the variance in cognitive/general knowledge, which resulted in an increase of .1% of the variance explained and was not statistically significant, $F(1,169) = .179, p > .05$.

The inclusion of Block 3 provided a test of whether the teacher-level variables of teacher credentials and teacher years of experience contributed to explaining the variance
in cognitive/general knowledge. As reported, the variable blocks accounted for 12.6% of the variance in cognitive/general knowledge and was an increase of 1.3% and was found to be statistically significant $F(2,167) = 1.125, p > .05$. The addition of teacher credentials and teacher years of experience as a Block was a strong predictor in the domain of cognitive/general knowledge. The Block was found to be significant at the $p > .05$ with a $t$-statistic of 2.036 showing the cognitive/general knowledge population was more than two standard deviations from the hypothesized mean score of the population. However, my individual predictor variables separately were not significant, and therefore I was able to reject the null hypothesis.

**Table 28**

HMLR Analysis of the Relationship of Kindergarten Readiness to the Teacher Level

Demographics of Teacher Credentials and Teacher Years of Experience in Preschools

<table>
<thead>
<tr>
<th>Variable</th>
<th>LangCom estimates</th>
<th>CogGenK estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$R^2$</td>
<td>$ΔR^2$</td>
</tr>
<tr>
<td>Block 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td>.019</td>
<td>.113</td>
</tr>
<tr>
<td>SES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attendance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block 2</td>
<td>.022</td>
<td>.003</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attendance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block 3</td>
<td>.032</td>
<td>.011</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attendance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YrsExp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credentials</td>
<td>.249</td>
<td>5.213</td>
</tr>
</tbody>
</table>

*(Note. LangCom represents language/communication; CogGenK represents cognitive/general knowledge; SES represents socioeconomic status; Climate represents school climate; YrsExp represents teacher years of experience)*
Conclusion

For my research question relating teacher years of experience to student performance on the BKS, I was able to accept the null hypothesis. For both the language/communication and cognitive/general knowledge domains, teacher years of experience was not significant. For my research question relating teacher credentials to student performance on the BKS, I was able to reject the null hypothesis. Teacher credentials were significant to the cognitive/general knowledge domain and were not significant to the language/communication domain. Chapter X will provide discussion and implications of my study’s findings.
CHAPTER X
DISCUSSION

Purpose

In order for schools to ensure kindergarten readiness for preschool students, variables that were related to school quality were studied. With an eye towards preparing students to meet proficiency and growth benchmarks as mandated by the No Child Left Behind Act of 2001, as well as the Elementary and Secondary School Act of 2015, districts earmark preschool funding at the school level, teacher level, and classroom level. Working in the context of this national legislation, mandated state screeners monitor kindergarten readiness. The Brigance Kindergarten Screener (BKS) is one such monitoring tool, and is utilized by EDS. The BKS uses the Anastasi and Urbina (2008) definition of school readiness, which is defined as a measurement of whether a student has the prerequisite skills and abilities that are required to be successful in kindergarten. As such, there is a need to determine the level of school variable (i.e., district, school, teacher classroom) that might lead to the highest level of student outcomes. The purpose of my study was to determine if the teacher-level dependent variables of teacher credentials and teacher years of experience predicted kindergarten readiness as determined by the language/communication and cognitive/general knowledge domains of the BKS, when tested in a Hierarchical Linear Multiple Regression (HLMR) block.
Summary of Methods

For my study, a correlational design was used to examine the relationship between teacher-level variables (teacher credentials and teacher years of experience) with kindergarten readiness. Using HLMR, I sought to answer the following research questions: Research question 1. What is the relationship between preschool teacher credentials and kindergarten readiness? Research question 2. What is the relationship between preschool teacher years of experience and kindergarten readiness?

This statistical procedure was used because it seeks to examine possible relationships through the observation of preexisting data in order to search for contributing factors (Kerlinger & Rint, 1986). In addition, this correlational design is appropriate to examine pre-existing data among groups in order to determine the factors that contribute to their differences (Cohen, Manion & Morison, 2000).

The use of HLMR allowed me to establish relationships between multiple variables within the same sample in order to understand the relationship between the independent variables of teacher credentials and years of experience and the independent variable of kindergarten readiness. The variables were included in the analysis in order to produce variance explained among these blocks within the same sample. Block 1 of the HLMR served to report the common demographic student-level independent variables of race, socioeconomic status, prior setting, and attendance prior to the addition of school and teacher level variables. Block 2 tested the school-level variable of climate. Block 3 tested the teacher-level variables of years of experience and credentials.

Summary of Findings

Several studies have used race as a variable to study academic outcomes for
children (Brooks-Gunn, Duncan, & Maritato, 1997; Duncan & Aber, 1997; McLloyd, 1990; Raver, Gershoff, & Aber, 2007; Davoudzadeh, McTernan, & Grimm, 2015). The African American students who were included in my study were only 1.1% more likely to score below average on the language/communication domain of the BKS than non-African American students. Several studies have confirmed that African American students who live in poverty are at a higher risk than other races of not being ready to start kindergarten (Connell & Prinz, 2002; Davoudzadeh et al., 2015; Duncan, Kalil, Magnuson, & Murane, 2014). My study did not support trends in research when the student-level variable of race was tested in the area of language/communication, along with the student-level variables of SES and attendance.

SES is a demographic variable that has been studied in large bodies of research and has been found to be a reliable predictor of student outcomes prior to kindergarten (Janus & Duku, 2007; White, 1982; Fitzpatrick, Mckinnon, Blair, & Willoughby, 2014). Of the students who were included in my sample, students who qualified for free/reduced lunch were 33.3% more likely to score below average on the cognitive/general knowledge domain of the BKS than those who did not qualify. A study by Stormont et al. (2014) confirmed the findings of previous research when they established that children who live in poverty are more likely to struggle academically and behaviorally as they transition to starting kindergarten than those who do not live in poverty. My study did support trends in research when the student-level variable of SES in the area of cognitive/general knowledge on the BKS was tested along with the student-level variables of race and attendance.

The addition of Block 2 added the school-level variable of climate to determine
the variance when added to Block 1. In my study, the EDS Comprehensive School Survey was used as a proxy for school climate. The addition of Block 2, which included the school-level variable of climate, was not found to be significant in either language/communication or cognitive/general knowledge. These results suggested that the addition of the school-level variable of climate is not a powerful predictor in relation to the dependent variables of either language/communication or the cognitive/general knowledge domain of the BKS.

Studies conducted by Leadbeater, Sukhawathanakul, Smith, and Bowen (2015) and Hoy, Hannum, and Tschanne-Moran (1998) found that school climate significantly influenced student achievement in basic skills when students also lived in poverty. While past research has found that school climate influences student achievement, it was not found to explain a large variance in my study and therefore my study did not support this research.

The inclusion of Block 3 provided a test of whether the teacher level variables of teacher credentials and teacher years of experience contributed to explaining the variance in the BKS domains of language/communication and cognitive/general knowledge. In the area of language/communication, the addition of Block 3 was not statistically significant. In the area of cognitive/general knowledge, the teacher-level variables were found to be significant and accounted for 12.6% of the variance explained. These results suggested that the addition of the teacher-level variables of years of experience and teacher credentials were powerful predictors in relation to the dependent variable of cognitive/general knowledge. When considered individually, the teacher-level variables of credentials and years of experience were not significant at the p<.05 level. While this
block was determined to be significant, SES appears to explain the significance within
the block.

Several past studies have demonstrated that teacher-level variables affect student
outcomes (Rice, 2003; Wayne & Youngs, 2003; Wilson & Floden, 2003; Wilson, Floden,
& Ferrini-Mundy, 2001). Further studies have concluded that teacher-level variables,
including years of experience and licensure, had positive effects, particularly in the area
of mathematics (Clotfelter, Ladd, & Vigdor, 2007, Kim, Chang, & Kim, 2011; Spodek,
1982). This debate has been a topic of research for many decades. The findings of my
study suggested that when the teacher-level variables of years of experience and
credentials are added in a block, they indeed appear to be significant to the variable of
SES and supports the research that teacher credentials are an unreliable predictor of
student achievement for all students. My findings supported the research that stated that
multiple dimensions, including both teacher variables of practice and structure, may
affect student outcomes (Abbate-Vaughn et al., (2011); Bill & Melinda Gates
Foundation, (2013); Miles & Stipek, 2006).

My data set only reported teacher years of experience as the number of years
employed by EDS. Future studies should consider a teacher’s full range of experience
prior to working with the current district, which may have an impact on their
effectiveness. Exclusively studying the full range of teacher experience and the
relationship with kindergarten readiness would allow researchers to find combinations of
teacher experience, which produce higher levels of prepared kindergarteners. Future
research should include teachers’ professional and personal experiences. Professional
experiences may include degrees received, quality of the institution attended, course
selection, years of experience in educational service (i.e., daycare provider, tutor, teacher, administrator), and participation in professional organizations. Personal experiences may include SES background, past and present family structure, and childhood perceptions. This research will provide insight for the EDS human resource (HR) department in creating selection criteria for hiring preschool teachers. EDS would be able to use the criteria to slate quality candidates according to the needs of the school’s demographics. EDS leaders may also be able to use the findings of the future research to develop incentive programs that are aimed at retaining current staff who meet the selection criteria developed by the HR department.

Limitations

While my study sought to determine if teacher-level variables (i.e., credentials and years of experience), when added to a regression as a block, would significantly predict kindergarten readiness outcomes, there are two limitations for my study. First, my data set was small due to the removal of student scores without one full year of program attendance or missing BKS scores. As a result, several student scores were dropped from my study. Future studies should attempt to replicate my research with a larger sample to gain better insight between the relationships of student-, school-, and teacher-level variables. Second, the variable of teacher years of experience was based on years of experience in the district that was studied. Teachers may have teaching experience prior to their work in the district that was studied, either at another district or in the private sector.

Conclusion

Kindergarten readiness must be studied to ensure that students are prepared in
their preschool years to reach proficiency on state mandated tests in elementary school. It is not enough to require teacher certification and college education for teachers beginning with those that teach kindergarten. It is critical to require high levels of qualifications for preschool teachers, as well as to recruit new teachers through teacher preparation programs (Lobman, Ryan, & McLaughlin, 2005). Due to the importance of developing quality education programs at the preschool level, quality teachers must be properly trained and credentialed, as demonstrated by the significance of the addition of my variable block. My study sought to address the deficiency in literature that relates preschool teacher credentials and preschool teacher years of experience to learning outcomes assessed by a common kindergarten screener when these teacher level variables were tested as a block. I found that the teacher-level variables (i.e., years of experience and credentials) explained a significant variance when added as a block for students from low SES backgrounds. It can be difficult to prove the effect of college attainment on teachers as it relates to student achievement. The most recent research suggests that these teacher-level variables may not have a large effect (Early et al., 2007). Furthermore, findings from research that is related to teacher experience are not always straightforward. There are studies that relate teacher quality to the attainment of an advanced degree (Clarke-Stewart, Vandell, & Burchinal, 2002; Whitebook 2003), but these studies differ on the context of variables such as structure, center location, gender, and global quality. Future research should seek to “crack the code” of teacher quality in order to ensure that preschool funding is allocated in areas that will have high effects on student academic outcomes.
CHAPTER XI
INTRODUCTION

Pressures wrought by No Child Left Behind legislation and resulting state accountability systems force educational leaders to examine the impact of curricular programs within elementary and secondary public education. School leaders must scrutinize their budgets to maximize student achievement when examining curricular decisions, especially concerning the inclusion of non-assessed subjects. School accountability scores are published in newspapers and often become the sole measure by which student and school success are judged. Although secondary and elementary schools often receive the majority of negative press over not meeting accountability measures for proficiency, preschool programs are struggling under increased scrutiny as well. Mead (2008) stated that, “As school districts work to improve student learning and narrow achievement gaps, it’s abundantly clear that starting in kindergarten is too late” (p. 25). Instructional leaders in all schools, regardless of grade levels served, must utilize their limited resources to maximize student achievement. In addition, increased attention to early childhood programs’ ability to prepare students for success in elementary school must be addressed.

Spears (2014) stated that only 50% of kindergarten students in the state\textsuperscript{3} in

\textsuperscript{3} A pseudonym is being used to protect the identity of the district in the research study.
which my research is conducted were identified as ready for kindergarten in 2015. Assessed by the Brigance Kindergarten Screener (BKS), this accountability measure often goes unreported by the media and parents. It is not currently reported on school accountability reports or school report cards. The focus on school failures in academic achievement from elementary school through high school has created a lack of focus on whether preschools are adequately preparing young children for success in kindergarten, subsequent grades, college, and for careers. The importance of structured and productive early childhood experiences cannot be understated and assessing school readiness has become a dominant part of early childhood education (Konold & Pianta, 2005; Williams, Landry, Anthony, Swank, & Crawford, 2012). Stormont, Herman, Reinke, King, and Owens (2015) discussed how early academic problems can be easily identifiable in the preschool setting, as well as how it can be a reliable indicator for the risk of future academic failure. Additionally, Shore (1997) summed up the need for increased focus on early childhood programs:

New insights into early brain development suggest that as we care for children in the first years of life and as we institute policies or practices that affect their day-to-day experience, the stakes are very high. The research tells us that the “quiet” crisis of America’s youngest children may have even more serious, lasting consequences for children and families, and for the nation as a whole, than we previously expected. (p. 69)

Although this report is nearly 10 years old, its message remains timely, given the current failure of students to be kindergarten ready.

The effectiveness of curricular programs at all levels of education is constantly examined, as is the incorporation of instructional methods or explorations of other subjects. Music is often added to assist the instruction of core subject areas such as language development, reading, and memorization of material (Cole, 2011; Southgate &
School leaders routinely attempt to maximize the effectiveness of instruction and the inclusion of supplementary materials in order to positively affect academic achievement and readiness for advancement into higher grade levels. Although the Early Childhood Environment Rating Scale (ECERS) instrument provides a basis for preschool instruction, implementation of all instructional techniques at the preschool level must be examined to determine their ability to prepare early childhood students for future academic success.

The inclusion of music-based strategies, as well as basic music instruction, offers preschool teachers an opportunity to foster non-traditional paths to learning academic and social skills needed in early childhood education (Greenberg, 1972; Marin, 2009; Neville et al., 2008; Standley, 2008). Preschool exposure to music may improve movement and music skills, and may have a positive effect on a child’s linguistic and non-linguistic skills (Jorgan-DeCarbo & Galliford, 2011). As with all curricular programs and instructional strategies, the inclusion of music instruction at the preschool level should be examined to determine its effectiveness and influence on kindergarten readiness.

**Contextualizing the Proposed Study**

Research into the connection of music education at the secondary level to achievement is well documented. In order to provide support for the inclusion of music classes in schools, music educators and advocates cite positive correlations between music and reading (Butzlaff, 2000; Marin, 2009; Wong, Skoe, Russo, Dees, & Kraus, 2007), math (Catterall, Chapleau, & Iwanaga, 1999; Goeghegan & Mitchelmore, 1996), and overall performance on standardized tests (Johnson & Memmott, 2006; Wilkins et al., 2003). Music education research studies for secondary students focus on the impact of
music instruction on enrollment in performance classes such as band, orchestra, or choir (Catterall, Chapleau, & Iwanaga, 1999; Gouzouasis, Guhn, & Kishor, 2007; Kinney, 2008; Vaughn & Winner, 2000). The focus of music education research at the secondary level may be a direct result of the aforementioned accountability and media focus on secondary schools’ accountability scores. The need to secure student involvement in music ensemble courses, thereby protecting their inclusion in school master schedules, may drive this focus on music education research.

Although not a primary focus of music education research, early childhood students benefit from music instruction (Greenberg, 1972; Marin, 2009; Neville et al., 2008; Standley, 2008). Standley (2008) conducted a meta-analysis of 30 studies that use music interventions to influence reading skills and found that elementary and preschool students benefit more from music interventions than students do at the secondary level. This analysis was the first to collectively examine the limited research on music and preschool achievement. Emerging medical research combined with arts-based achievement fostered the development of the 2004 Dana Consortium (Neville et al., 2008), combining the expertise of cognitive neuroscientists to examine the association of arts training with high academic achievement. A study conducted by Neville et al. (2008) through the support of the Dana Consortium suggested that students in federally funded Head Start preschools benefit from classes with increased adult attention and music interventions. This brain-based research offers new strategies to examine the effects of arts-based curricular programs on brain development using MRI imaging and other medical tests.

Greenberg’s (1972) study of disadvantaged preschool children in Hawaii is still
relevant today with its association of music and movement and with the development of language skills. His focus on students who did not have early exposure to arts instruction demonstrated a need to provide these experiences to all students. Finally, Marin’s (2009) study associating linguistic abilities and early musical training creates links to language development and music. Language development is a key component in facilitating a young student’s ability to move forward in his or her academic journey.

Previous music education studies about the positive correlation of music education to student-level assessment scores have been limited to secondary school levels through the examination of state-mandated assessments or IQ tests (Johnson & Memmott, 2006; Kinney, 2008; Kinney & Forsythe, 2005; Schellenberg, 2004; Vaughn & Winner, 2000). Research that was conducted at the preschool level has been limited by the presence of Type II errors, as in the Levinowitz (2001) study of students’ BKS scores in comparison to inclusion of music education into their preschool curriculum. Although similar to the current study, the inclusion of student-level data expanded the examination of music education inclusion into the preschool setting.

According to Fox (2000), research efforts focused on music and its influence on the young child’s brain are very limited. Focus on music education research has been limited to secondary levels due to the need to advocate for the inclusion of music courses in school curriculums. With increasing numbers of preschool students labeled as not kindergarten ready, music education research must begin to examine the impact of music inclusion in preschool programs as a means to increase achievement for early childhood students.
**Research Questions**

Specifically, I seek to answer two research questions:

**Research question 1.** What is the relationship between the inclusion of music curriculum in the preschool setting and kindergarten readiness?

**Research question 2.** What is the relationship between the amount of time allotted on inclusion of music curriculum in the preschool setting and kindergarten readiness?

**Hypothesis: Kindergarten Readiness and Inclusion of Music Curriculum**

- Null (H₀)—There will be no difference in kindergarten readiness between students from preschools that included music in their curriculum and students from preschools that did not include music curriculum, controlling for other variables in the model.

- Alternative (H₁)—There will be a difference in kindergarten readiness between students from preschools that included music in their curriculum and students from preschools that did not include music curriculum. Students from preschools that include music education in their curriculum will score higher on the Brigance Assessment for kindergarten readiness, controlling for other variables in the model.

**Hypothesis: Kindergarten Readiness and Time Allotted on Music Curriculum**

**Inclusion**

- Null (H₀)—There will be no difference in kindergarten readiness in relation to the amount of time allotted on music instruction.

- Alternative (H₁)—There will be a difference in kindergarten readiness in relation to the amount of time allotted on music instruction.
Key Terms

Key terms used in the context of my study are defined as follows:

**ECERS Curriculum:** The Early Childhood Environment Rating Scale (ECERS) consists of 43 items organized into seven subscales: 1) space and furnishings; 2) personal care routines; 3) language-reasoning activities; 4) interactions; 5) program structure; 6) parents; and 7) staff.

**Length of Music Instruction:** For the purposes of my study, the length of music instruction is quantified in minutes per day. Any instruction using music is included.

**Disenfranchised Student Groups:** This term will be defined using Marshall and Olivia’s (2006) definition of marginalized groups: “students that are the most often underserved and underrepresented” (p. 19).

**Music Inclusion:** Any music included into other curriculum or as an independent activity will be classified as music inclusion.

**Music Insertion into Other Curriculums:** Any implementation of music concepts into curriculum will be considered music insertion. These music concepts may be used to supplement instructional techniques in other subjects or may be the central focus of instruction.

**Significance of Study**

Early childhood education is critical for young students’ future academic success. Achievement gaps among young children can develop through environmental circumstances and only increase the need for quality educational programs at the preschool level. Preschool education advocates believe early childhood education to be the most influential factor to close these achievement gaps (Heckman & Masterov, 2007;
Perez, Johnson, & Maynard, 2007). Addressing achievement gaps as early as possible increases the ability of young students to realize success in future academic endeavors.

Instructional leaders must make difficult decisions when staffing and supervising curriculum implementation at all levels. Instructional time is limited and must be maximized to ensure that students receive quality educational experiences to best prepare them for future success. The impact of all instructional techniques must be evaluated to fully take advantage of the limited time in schools. Preschool teachers must be provided with a curriculum that will improve kindergarten readiness while at the same time educate the child in a holistic method in order to address all learning styles of students. In addition, education leaders must establish expectations for the improvement of kindergarten readiness for all students.

As previously stated, this study expanded the field of research into kindergarten readiness as well as early childhood music education. Deficiencies in previous research that connect these two areas of concern demand further examination of the connection between music inclusion and other curriculums. Numerous studies related to the impact of music education on the academic success of students at the secondary level have been conducted and support the need for inclusion of music into school curriculums. Enhanced scrutiny of early childhood programs resulting from increasingly high numbers of unprepared kindergarten students should encourage educational leaders to examine all curricular programs in preschools.

My study will assist instructional leaders in the implementation and creation of appropriate arts-based preschool curriculum to best prepare preschool students for kindergarten. I investigated the relationship between individual student achievement and
the influence of music education strategies at the critical preschool age. Results provide support for policymakers to determine which instructional strategies create more successful preschool programs for students. Research into the inclusion of music curriculum into preschools will assist instructional leaders in determining which strategies benefit their students.

**Limitations and Design Controls**

My study used a quantitative, quasi-experimental approach using data collected from select schools in Elementary District Schools (EDS) during the 2014-2015 and 2015-2016 school years. A hierarchical linear multiple regression (HLMR) was used to examine the effects of the student-level independent variables of race, socioeconomic status (SES), prior setting, and attendance, as well as the classroom-level independent variables of music inclusion and time allotted to music instruction. The dependent variable was kindergarten readiness as assessed by the Brigance Kindergarten Screener (BKS) limiting the scope to the domains of cognitive/general knowledge and language/communication. I analyzed the data to determine the effects of the music curriculum construct on kindergarten readiness. A potential limitation to my research is the small sample size due to a limited number of tuition-based preschools in EDS. Additionally, even though the amount of time devoted to musical instruction was quantified, the quality of music education experiences was not addressed in the present study due to the lack of music education training for preschool teachers.

**Organization of Research Study**

Chapter XI includes the introduction, research question, hypotheses, key terms, an overview of existing research, deficiencies of past research, and the significance of the
study. Chapter XII reviews the literature on the impact of music education on other curricular areas as well as on brain development. It also address instructional techniques utilized in early childhood settings. Chapter XIII is an explanation of the research methodology used, data collection, and procedures for my study and the capstone study. Chapter XIV is an analysis of data as well as a description of the results and data. Chapter XV summarizes my research study’s major findings, including recommendations for future research and policy implications for preschool programs and music education.

Summary Review of Findings and Potential Implications for Policy and Practice

I found that the average scores for the cognitive/general knowledge domain of the BKS supported the inclusion of music curriculum with a difference of 4.13 points in mean scores. I found a smaller difference between mean scores for the language/communication domain, which reported a difference of 1.50 points. Although neither difference is considered statistically significant, each score supports a positive correlation between music inclusion and performance on each of the domains. Students who had music instruction as an independent activity for 10 minutes a day scored the highest on the language/communication domain. Although none of the correlations in my study were reported as statistically significant, my research supports the inclusion of music curriculum and examination of curriculum policies at the preschool level.
CHAPTER XII
LITERATURE REVIEW

Introduction

In an era of high-stakes accountability and shrinking budgets in public education, school leaders are closely examining all instructional programs to determine their positive impact on student achievement. Educating the whole child by including non-assessed subject areas can come secondary to meeting the literacy and math goals that are mandated by the No Child Left Behind (NCLB) Act and its successor, the Every Student Succeeds Act (ESSA). The “back to basics” approach suggested by Mittler and Stinespring (1991) has led to concerns about the survival of non-core subjects in schools pressured by a standards-based movement (Wilkins et al., 2003). Pressured by sanctions, possible dismissal, and negative press, school leaders must make difficult decisions when choosing which instructional programs to implement in their schools. Demands to increase achievement in core subjects force educational leaders to make challenging choices concerning non-assessed curriculum, placing arts, physical education, drama, and music programs at risk. These challenging decisions often result in the elimination of non-assessed curriculum in order to emphasize reading and math instruction focused on by NCLB accountability measures (Beveridge, 2010).

Educational theorist John Dewey (1938) advocated that educators must provide an environment that is rich with experiences that will “prepare the young for future
responsibilities and for success in life, by means of acquisition of the organized bodies of information and prepared forms of skill which comprehend the material of instruction” (p. 18). If schools hold true to this belief, all students, especially those who are traditionally disenfranchised, must be exposed to various subjects and experiences to enrich their knowledge base. This type of rich instruction is necessary for children to become better, more equipped adults as it provides students with the ability to juggle multiple concepts and to focus on particular tasks over long periods of time (Jensen, 2009). Although vitally important, reading and math curriculum alone do not fully educate students in key skills and processes to support their continued success as productive adults. The inclusion of arts subjects such as music are key to support holistic learning opportunities that develop the social, intellectual, and personal development of children (Hallam, 2010).

According to the 2012 Presidential report *Investing in Our Future: Teachers to the Classroom*, school budget reductions are forcing cities across the United States to lay off teachers, including music teachers, in a number of cities (Council, 2012). Music courses are often the first removed from school curriculums when budgets are constrained or test scores decline (Beveridge, 2010). For example, EDS\(^4\) has seen a reduction in elementary itinerant music teachers from 55 in 2002 to 31 in 2015, and no music specialists for preschools. To support the retention of these programs in schools, music education advocates and organizations such as the National Association for Music Education (NAfME) work to support their inclusion through research centering on the correlation between the inclusion of music curriculum and student achievement in other

\(^4\) A pseudonym is being used to protect the identity of the district in the research study.
areas such as reading and math. Growing bodies of research focus on the positive impact of music classes on reading (Butzlaff, 2000; Wong, Skoe, Russo, Dees, & Kraus, 2007; Marin, 2009), math (Catterall, Chapleau, & Iwanaga, 1999; Goeghegan & Mitchelmore, 1996), as well as overall performance on standardized tests (Johnson & Memmott, 2006; Wilkins et al., 2003).

The impact of music instruction on neurological structures is also a growing field of study in brain research and has provided a new lens to examine the impact of music instruction on achievement. Neurologists compare how the brain processes musical content with the processing of linguistic material and found many similarities (Anvari, Trainor, Woodside, & Levy, 2002; Bolduc, 2009; Marin, 2009). This area of research provides empirical evidence using brain scans and Magnetic Resonance Imaging (MRI) to confirm similarities in brain stimulations during the instruction of particular subject areas. Scientists are discovering similarities in neurological processes with music and other core subject areas providing more physical evidence connecting educational contents and how the brain processes music instruction (Gazzaniga, 2008).

Many current music education research studies focus on the impact of music instruction on older students, especially those enrolled in performance classes such as band, orchestra, or choir (Catterall, Chapleau, & Iwanaga, 1999; Gouzouasis, Guhn, & Kishor, 2007; Kinney, 2008; Vaughn & Winner, 2000). These studies are often used to support student participation in performance programs, especially at the secondary level. Research at the elementary level tends to focus on relating music to other content areas where exposure to cross-curricular learning is encouraged (Legette, 2003). Gaps in this type of music education research exist when examining younger students, especially
those in preschool programs and other early childhood educational experiences (Fox, 2000; Levinowitz, 2011). With growing concerns over ensuring that children are ready for elementary school, a close examination of preschool curricular programs is essential.

In 2015, only 50% of kindergarten students in the state 5 in which this research was conducted were considered kindergarten ready as measured by the BKS (Spears, 2014). This statistic demands that researchers examine which curricular programs positively benefit preschool students in order to increase their readiness for kindergarten. Few preschool programs provide certified music teachers or mandate arts-based instruction, and gaps in kindergarten readiness research challenge scholars to address whether music instruction positively impacts preschool students in a similar way to older students.

**Research Questions for the Present Study**

Specifically, I seek to answer the following research questions:

**Research question 1.** What is the relationship between the inclusion of music curriculum in the preschool setting and kindergarten readiness?

**Research question 2.** What is the relationship between the amount of time allotted on inclusion of music curriculum in the preschool setting and kindergarten readiness?

**Overview of Literature Review**

The review of literature begins with an overview of research that examines the relationship between music education and student achievement as well as its influence on IQ test scores. This is a key aspect of music education research due to its scrutiny from being omitted from accountability systems. Many of these studies focus on older student

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5 A pseudonym is being used to protect the identity of the district in the research study.
populations relating participation in music classes to academic achievement in other subject areas. The impact of music education on disenfranchised student groups will be addressed in the next section. Diversity in these research studies’ demands closer examination of this populations group. Specific research regarding cross-curricular connections to music will be discussed next with subsections in the following areas: reading, linguistic studies phonological processing, and mathematics. Connecting music to other contents provides additional support for its inclusion into school curriculums. Early childhood music education research will address the specific age demographic included in the study followed by explanations of early childhood music education strategies, including Dalcroze, Kodály, and Orff. Concluding the literature review will be a summary, need for the present study, and restatement of the research questions.

**Impact of Music Education on Student Achievement**

Music education advocates use research on the holistic impact from their classes in order to continue to support their inclusion in school (Fitzpatrick, 2006; Johnson & Memmott, 2006; Kinney, 2008; Kinney & Forsythe, 2005; Vaughn & Winner, 2000). High-stakes accountability partnered with school budget reductions necessitate this type of advocacy for non-assessed courses. Although most music teachers and administrators may view the teaching of music as critical for the creation of the whole child, schools’ leadership teams are forced to make tough decisions in staffing. Music education must be proven as an important component of a school’s overall curriculum. Due to the absence of music education in *No Child Left Behind* (NCLB), the current reauthorization of the *Elementary and Secondary Education Act* (ESEA), and most state accountability systems, research that relates to the impact of music on tested subjects and student achievement is
necessary for the survival of music in public schools. Fitzpatrick (2006), for example, referred to music and other arts courses as having “an uneasy relationship within the standardized testing culture” due to many aspects of music education being difficult to quantify (p. 74). Researchers must attempt to quantify music education’s effects on tested subject areas to advocate for its inclusion in schools. As a non-standardized tested subject area, music education’s influence on other subject areas and assessment results is a critical aspect of music education research.

Research studies used standardized test scores from state-administered accountability exams to determine if students who receive music instruction have more significant gains in other core subjects than students not enrolled in music classes (Fitzpatrick, 2006; Johnson & Memmott, 2006; Wilkins et al., 2003). Although the results from these studies cannot be generalized for student populations in all states due to the individualized nature of state assessments, they do provide support for music education. Fitzpatrick (2006) examined the effects of music participation on the Ohio Proficiency Tests at the fourth, sixth, and ninth grade levels for low and high SES levels. Although she admits that her study was limited due to its non-use of more in-depth statistical analyses, her finding that low SES students benefit equally from music instruction as high SES students provides support for music inclusion for all students. Johnson and Memmott (2006) examined elementary and middle school students in music programs, finding that students in both music programs outscored their non-musical counterparts on standardized tests. This quantitative analysis examined middle school students’ academic achievement and their participation in music programs, concluding that participation in both exceptional and deficient music programs correlated with higher
achievement in both English and math when compared to students not enrolled in music programs (Johnson & Memmott, 2006). These researchers also found a wide variation in the quality of education programs that had an impact on student achievement data. Although the effect size of this study was not large (e.g., 3% for the elementary school students and 6% for the middle school students), it is a unique examination into academic achievement relating not only to the inclusion of music programs but also their quality. Wilkins et al. (2003) surveyed 547 Virginia elementary school principals about the time spent on arts and physical education classes, finding no connection between reducing time on these classes and high test scores. A null relationship was found between time in these courses and achievement.

Schellenberg (2004) employed a study in which students in experimental groups received either voice or Kodály lessons while the control groups either received drama lessons or no additional lessons for the term of one year. Schellenberg (2004) found an increase of 7.0 points (SD = 8.6) in IQ test scores for 144 six-year-old students who were involved in musical activities compared to an increase of 4.3 points (SD = 7.3) from students in the control groups. A limitation of this study was the absence of details about the length of music lessons for the students in the experimental group. Research about whether music courses positively impact student achievement on state accountability measures support the need to continue student participation in this content.

Several studies examined academic achievement of groups of students who were offered a specific music program versus similar students not participating in the program (Cogo-Moreira, De Avila, Ploubidis, & Mari, 2013; Ho, Cheung, & Chan 2003; Piro & Ortiz, 2009). These studies focused on particular music instructional techniques in order
to determine if specific types of music education had an impact on student achievement. Piro and Ortiz (2009) conducted a quasi-experimental design to study 103 primary age students in a middle-class area of New York City. The treatment group received piano instruction whereas the control group, located in another school, did not. Detailed descriptions about the length of time for music instruction were not given in this study. The researcher used quantitative analyses to determine that the primary students who participated in piano lessons outperformed students who were not enrolled in piano lessons on literacy tests that targeted vocabulary and verbal sequencing. Cogo-Moreira et al. (2013) conducted a similar study comparing 235 impoverished Brazilian students with reading difficulties, ranging from 8-10 years old, who were given five months of music classes and compared them with similar populations not given music. These researchers found a small effect on real words read per minute \( [\beta = 13.98, \ p < .001] \). Although this study shows the promise of the music instruction, it only provides a foundation for future studies.

A study conducted by Ho, Cheung, and Chan (2003) was performed in Hong Kong and examined 90 males ages 6 to 15 (45 with musical training and 45 without) to discover if better verbal memory could be observed in students who receive musical training, as it had been observed in a similar study involving adults. Each of the students who studied music participated in the band or orchestra program at the school for at least one hour per week. A strength of this study is the administration of the Hong Kong Weschler Intelligence Scale for Children (HK WISC) prior to the study to account for any pre-existing intelligence differences among the participants. A similar result was found to be true in these students. Ho, Cheung, and Chan (2003) found a positive
correlation between the duration of music instruction and the verbal learning score from the HK WISC test \( r = .54, p < .001 \) even after controlling for the effects of education level and age. This finding provides more evidence that music instruction positively impacted the verbal learning of the students.

Additionally, Gouzouasis, Guhn, and Kishor, (2007) conducted a study in British Columbia, Canada, and found a positive relationship between high achievement in music classes and in academic achievement in core classes, particularly in mathematics and biology coursework for eleventh and twelfth grade students. This study used student-level data and national Canadian assessments to determine average correlations between music course achievement and math and biology \( r = .22 \) and \( r = .26 \), respectively, which are equal to medium effect sizes. This type of research represents the need to continue examining student-level impacts of music education on other academic courses not only in high school students, but at all levels of public education.

Music education advocates often cite studies that compare students who are enrolled in music programs to students who are not. Although most of these studies attempt to equate the environments between the two groups, few examine other essential data that may influence a student’s achievement. The student-level variables of race, gender, and SES are often controlled within these studies; however, researchers rarely examine student-level data and characteristics to more accurately assess the impact of multiple variables on student learning (Bradley & Corwyn, 2002). Closer examinations of these variables, such as the ones to be examined in the present study, will be critical to determine if music education has a significant effect on student achievement, especially with younger populations in order to ensure its inclusion in all levels of education.
Although researchers in this type of correlational research often use state and federal assessments, universal assessments, such as IQ testing, provide results that can be generalized across populations.

**Impact of Music Education on IQ Scores**

The impact of music lessons on students’ IQ has also been the focus of several research studies (Catterall & Rauscher, 2008; Kaviani, Mirbaha, & Mehrangiz, 2014; Schellenberg, 2004). Catterall and Rauscher (2008) compared the Verbal IQ and Performance IQ scores of six-year-old students receiving music instruction (e.g., keyboard and voice lessons) to those who did not over the course of 36 weeks. When the two music groups were consolidated, music participation improved the Performance IQ test with an effect size of .55 while the Verbal IQ was increased at an effect size of .45. Schellenberg (2004) examined 144 six-year-old students receiving either Kodály voice lessons or standard keyboard lessons in comparison to students receiving drama lessons or no additional lessons. He found that students who received music lessons experienced small increases in IQ. However, students in similar, nonmusical activities did not experience the same results. This effect size \(d = 0.35\) lies in between effects considered small (0.2) and medium (0.5), according to Cohen (1988). The musical experiences appear to involve more diverse experiences that may contribute to the increased IQ scores over other similar arts experiences such as drama lessons.

Orff lessons are an instructional technique used primarily with preschool and elementary students based on the teachings of music educator Carl Orff. In a study of 60 five- and six-year-old Iranian children, Kaviani, Mirbaha, and Mehrangiz (2014) used the Stanford-Binet Intelligence Scale to measure IQ changes in students who were or were
not randomly assigned music instruction. An important aspect of this study was the lack of significant differences among the students in terms of age, gender, and mother’s education level. This use of a similar population allowed for more accurate comparisons among subjects. The analyses found a significant main effect for assessment portion of the IQ test \(F(1, 58) = 19.54, p < .001\) with a significant difference in the music group \((p < .001)\). The pre- and post-assessments in the non-musical group did not produce a statistical difference \((p = .53)\). This finding suggests that children who participated in the Orff lessons experienced a significant increase in their IQ scores when compared to the students who did not receive this instruction. Additional findings in this study suggest that students who participate in music lessons benefit from enhanced intellectual functioning and improved abilities in verbal and non-verbal skills in addition to increased memory capacity and performance. Although this study had its limitations, including the lack of detail with respect to time allotted to music instruction, it provides important insight to the power of early childhood music instructional techniques such as Orff lessons and their influence on IQ.

The influence of music education strategies appears to positively affect IQ scores in a number of ways. Non-musical skills are developed through music instruction that increase students’ performance on standardized assessments such as the IQ test. These skills can be developed at an early age to provide a larger impact on students as they progress. Although IQ tests are not frequently used in school assessment measures, it is important to note the effect of music instruction appears to be present in multiple types of assessment measures as well as for students at different age levels and differing backgrounds.
Impact on Disenfranchised Student Groups

For the purposes of this study, disenfranchised student groups are defined using Marshall and Olivia’s (2006) definition of marginalized groups: “students that are the most often underserved and underrepresented” (p. 19). It can be assumed the unique experiences offered by music classes may enhance improvement in a wide range of abilities in students (Hallam, 2010). The skills that are taught in arts classes create a learning experience that “provide[s] transfers better than the explicit ‘textbook’ learning of many other subjects” (Jensen, 2009, p. 119). This is especially true with low-income students who often need more support in building their academic success in school. The impact for these students may be greater due to lack of exposure outside of the school environment (Jensen, 2009). Kenney and Forsythe (2005) found that students who receive comprehensive arts instruction from a low-income urban school scored significantly better on the Ohio 4th-Grade Proficiency Test than students from conventional schools that employ more traditional curriculum. Students from underprivileged backgrounds should be afforded exposure to music instruction and may actually benefit more from its non-music affects.

Students living in poverty may not be afforded quality arts experiences outside the school due to the high cost of participation (Bradley & Corwyn, 2002; Catterall, 2009). Catterall (2009) found substantial differences in access to arts experiences when examining family income and education levels. In his 12-year national study of education in the visual and performing arts using the National Educational Longitudinal Survey (1988), Catterall (2009) examined developments of students between eighth and twelfth grades. The first part of his work examined involvement in the arts in general, across
disciplines whereas the second portion of his research focused on instrumental music and theater since established research had found a connection between these two art disciplines and cognitive development. Catterall (2009) found that students from economically disadvantaged families are twice as likely to have low involvement in the arts when compared to students from economically advantaged families. The impact of arts classes may be greater with students from low-income backgrounds, who may have never had the opportunity to have arts experiences due to high costs or difficulty of access. Through their review of research literature concerning the impact of socioeconomic status and its impact on child development, Bradley and Corwyn (2002) determined that students from lower socioeconomic statuses are less likely to attend museums, plays, concerts, or be offered arts-based lessons in order to enhance skills. Within this survey of research, Bradley and Corwyn (2002) discussed various environmental factors that impact the cognitive development of children from low socioeconomic backgrounds. In an analysis of existing literature that describes environmental factors that impact the person and environment paradigm, Saegert and Winkel (1990) claimed that arts experiences provide the opportunity for learning experiences as well as create a motivational base for the continuation of learning. In addition, Bracey (2006) highlighted the ways in which arts and athletic activities teach non-academic skills, such as following rules, how to sequence, fine motor skills, self-confidence, and additional vocabulary. Comprehensive arts instruction in schools may be the only access to any exposure to the arts for disenfranchised students.

Unfortunately, many low performing urban schools cannot afford to staff music teachers. According to a National Center for Educational Statistics (2012) report on arts
inclusion in public schools, music instruction was offered in 89% of schools with the highest levels of poverty students (e.g., free or reduced lunch status) compared to 97% of schools in the lowest two poverty classifications. This lack of music instruction in high poverty schools can be the result of needing additional staff to supplement reading and math due to traditionally lower performing student populations in high poverty schools. Walker (2012) stated, “Deep budget cuts—which haven’t reached their bottom—and the decade-long focus on reading and math have clearly taken their toll on the availability of arts instruction” (para. 4). Mandates of reading and math student achievement often force principals to direct funding to these subject areas in order to maximize performance on state assessment tests. Other problems arise when music programs experience a lack of funding for equipment, especially when musical instruments and other equipment can be expensive to purchase and maintain. In addition, many music programs require additional instructors, caregivers to purchase equipment, and transportation to events.

Students who have difficulty with a given subject or task may be less likely to put forth their best effort within that subject in the future. In addition, younger students indicate ability and effort as the primary causal designation for success and failure in music (Leggette, 2003). Early difficulties may contribute to students with less exposure to music at an early age becoming disenfranchised with music courses or participation. Students from lower socioeconomic backgrounds may have less exposure to music instruction thereby reducing their musical aptitude upon entering school. This deficiency of exposure could result in students from less privileged backgrounds becoming less likely to participate or excel in music classes. Catterall (2009) found that “participation favors high-income versus low-income students by 23% to 16% in band and orchestra
[and] 25 to 20% in chorus” (p. 13). These students are disadvantaged early in their education due to lack of exposure to music programs, resulting in fewer students in performance ensembles in secondary schools.

Research indicates that students with disabilities may benefit from music instruction or the use of musical elements to enhance instruction of other contents (Diamantes, Young, & McBee, 2002; Overy, 2000; Overy, Nicholson, Fawcett, & Clarke, 2003; Standley, 2008). Diamantes, Young, & McBee (2002) asserted that successful teachers who work with students with learning differences use music and rhythm to reinforce other curriculums such as math, grammar, science facts, geography, and spelling. Standley (2008), in her meta-analysis of research that connected reading and music instruction, found that music activities paired with specific reading skills matched to the needs of students with special needs improve reading instruction. Students experiencing difficulty in core subject areas often find success through the use of rhythmic undertones that aid with memorization or retention of important information.

Additionally, research focused in assisting students with dyslexia has found promising connections to music instruction. It is suggested that music training focused on timing and rhythm could be an effective remediation tool to improve language and literacy skills in dyslexic students who often struggle with the rhythmic aspects of reading (Overy, 2000; Overy, Nicolson, Fawcett, & Clarke, 2003). Overy (2000) examined timing difficulties with music for dyslexic students and then sought to determine if a period of musical training focusing on timing skills could help these students with their language and literacy skills. Six students identified as “at risk for dyslexia” and 16 students who were identified as “at no risk for dyslexia” were compared
using music aptitude tests as well as reading and spelling tests. Using a number of repeated measures ANOVAS, Overy (2000) found significant improvements in phonological skills ($p < .0001$) after receiving musical training for one year with the largest gains made by the students labeled at a high risk for dyslexia.

Overy et al. (2003) compared different types of music instruction among dyslexic students and control children to determine the most effective form of music remediation. The study consisted of 15 dyslexic boys and 18 control boys, all aged 7-11 years old. The researchers found a correlation between spelling and song rhythm ($r = 0.54$, $p < 0.005$), indicating a positive relationship between the two tasks. In addition, dyslexic students struggled with tests involving rapid auditory skills ($p < 0.05$), especially in the area of note number detection. These findings suggest a relationship between language and rhythm and may encourage the inclusion of musical strategies into language curriculum to support the specific difficulties experienced by dyslexic students.

If gaps in academic achievement are to be addressed especially in preschool, students who are traditionally disenfranchised must be afforded every opportunity to succeed. In order to address their academic deficiencies, teachers must be willing to incorporate non-traditional approaches, such as connections to music, to teach the skills that these students need to improve their achievement. Connections between music and other contents may offer these students the connection they need to learn reading, mathematics, and other traditionally valued curriculums.

**Cross-Curricular Connections**

In an effort to keep music in schools, music instruction has been inserted into curricula to assist in or connect concepts to other subjects or connections. Comparing
how students learn core subjects such as language, reading, and math in relation to the acquisition of musical skills could provide new insights to possible cross-curricula connections (Southgate & Roscigno, 2009), as well as how the brain processes new information (Cole, 2011). This area of research links neurology, education, and music advocacy researchers in a common goal of investigating learning commonalities among different subject areas. The need for differentiated instruction to support all students demands that researchers examine the possibility of using additional strategies and support systems to increase achievement. The connection of music to other curricula is a promising field of study for early childhood students as they begin to acquire some basic skills associated with these core subjects. The following subsections will review research literature relating music instruction to other curriculums such as reading, linguistic studies, phonological processing, and mathematics.

Reading. Much of the research that examines the relationship of music instruction to reading achievement is divided between linguistic and phonological studies. Students who studied music were found to be associated with significantly higher scores on standardized reading tests (Butzlaff, 2000; Kinney, 2008; Southgate & Roscigno, 2009), but the reason behind these general studies has been a source of debate. Multiple fields of study are researching this phenomenon, seeking to determine the precise cause of increased reading ability for many students who study music.

Music can be used as a method to teach basic reading skills. Langfit (1994) stated that “along with the usual semantic, syntactic, graphophonic, or pictures cues that we emphasize, a simple melody is another cue that is useful for young students,” offering a creative alternative to traditional reading approaches (p. 430). The use of music can also
instill a love for reading by creating a more meaningful and emotional connection to the text, and the addition of music components such as rhythm and melody to texts can create a more interactive and meaningful experience for young readers in particular (Kolb, 1996). The predictability of lyrics within songs can also help to train reading skills, allowing students to become more comfortable with new texts according to Butzlaff’s (2000) meta-analysis of correlational studies where reading outcomes were analyzed. In his meta-analysis, he only included studies that used a standardized measure of reading ability as a dependent variable, used a reading test that followed music instruction, and included statistical information that allowed for the calculation of an effect size. Butzlaff (2000) found that the inclusion of music in reading programs may offer statistical benefits for the students as well. In a study utilizing second graders in five separate sub-studies, music/reading curriculum was substituted for a standard reading program and the results showed somewhat higher scores for those receiving the music/reading curriculum, although the scores were not significant (Darrow et al., 2009). This particular study’s combination of five separate sites using the same music inclusion strategy into a core curriculum offers insight to possible findings to the present study.

**Linguistic studies.** Music has often been characterized as its own language, and it relies on structured sound sequences (Patel & Iverson, 2007), much like language, and is taught similarly to methods used in reading instruction. Longer passages within both subject areas are systematically learned in small parts in order to facilitate more complete, extended ideas or phrases. The combining of smaller ideas to create larger thoughts can also be seen when combining the use of rhythm and reading, especially in developing readers. As a part of a five-year longitudinal study, David, Wade-Woolley,
Kirby, and Smithrim (2007) studied 53 children with a mean age of 76.1 months who were tested using the Woodcock Reading Mastery Tests in the fall of grades 1-5 and found that rhythm and reading are related in learning styles when they examined this sample of developing readers. This finding is particularly striking because David et al. (2007) found that the reading-rhythm relationship did not diminish substantially over time, with the correlations ranging from .28 to .40. This study suggests that increased difficulty of reading levels with more polysyllabic words may account for the sustained impact of rhythm with these readers.

Hansen, Bernstorf, and Stuber (2004) compared linguistics and music and discovered that similar code-breaking strategies are used in the reading of music and texts. Music uses “left to right progression in reading and writing, phrase reading, rhythmic eye movement, and concrete understanding of terms such as high, low, loud, soft, short, long” (Diamantes et al., 2002, p. 116). Research in the fields of music education and linguistics has established a link between how the brain processes linguistic and musical information (Bolduc, 2009; Gazzaniga, 2008; Kaviani, Mirbaha, Pournaseh, & Sagan, 2014). This link could provide increased opportunities for the development of linguistic information through cross-curricular connections with subjects such as music.

**Phonological processing.** Comparisons have been made to speech development through phonological awareness and music perception and production (Anvari, Trainor, Woodside, & Levy, 2002; Bolduc & Montésinos-Gelet, 2005; Bolduc, 2009). Anvari et al. (2002) studied 50 four-year-olds and 50 five-year-olds to examine the relationship between phonological awareness, music perception skills, and early reading skills. Using
a hierarchical regression analysis, the researchers found that music ability adds to the prediction of reading skill, accounting for phonological awareness establishing a relationship between music perception and reading skill in this age group. In his study of 104 kindergarteners, Bolduc (2009) found that students in the experimental group who received music instruction scored higher on the Phonological Awareness Test than those in the control group ($F = 0.063, p < 0.01$). Bolduc’s 2005 study also found a significant correlation between processing of pitch awareness performance and phonological awareness skills tests ($r = .975, p < 0.001$) in his study of 13 preschool students. Although this sample size was small, it provides evidence of this link for preschool students.

Speech and singing utilize the same vocal apparatus to combine small amounts of elements (e.g., phonemes, notes), abiding by rules that allow for unlimited numbers of utterance and phrases that construct meaning (Lerdahl & Jackendoff, 1983). Singing can be a method for teaching proper patterns and flow in speech, as well. A relationship between phonological awareness, timbre identification, and language development with music suggests that each of these linguistic elements may share some of the same auditory mechanisms (Anvari et al., 2002; Bolduc, 2009; Marin, 2009).

Studies involving the development of a second language and the effect of musical ability provide interesting brain-based research into a possible relationship. Wong et al. (2007) measured the Frequency Following Responses (FFR) of musicians and non-musicians with no previous experience to Mandarin Chinese. The language of Mandarin Chinese was chosen because it is a tone language that uses more linguistic pitch patterns than English. A significant positive correlation ($r = .456$) was found between musical
experience measured in years of musical training and pitch tracking \((p < .03)\). This finding suggests that musical skill predicts the ability to produce and receive sound structures of a second language and musicians have an enriched ability to acquire verbal tones. This brainstem study also found that cortical electrophysiology (e.g., electrical properties of biological cells and tissues) confirms musical training and facilitates language processing in adults. This particular study is the first to show the effect in brainstem responses suggesting the neural encoding of musicians from non-music stimuli proves that “corticofugal modulation is not entirely context specific” (Wong et al., p. 421). Research in this area is shows that music learning and language learning are processed in the same areas of the brain.

**Mathematics.** Although most educators do not immediately connect mathematical concepts to music, the two disciplines are related (Bahna-James, 1991; Catterall et al., 1999). More specifically, basic math concepts and music theory (e.g., the study of the structure of music) are interconnected (Bahna-James, 1991; Catterall et al., 1999; Goeghegan & Mitchelmore, 1996). Music learning and mathematical concepts have been connected through rhythm concepts. Rhythmic notation (e.g., note and rest values) requires musicians to use basic math skills to interpret musical notation. For example, each of the rhythmic symbols is twice the duration of the next shorter symbol (Kostka & Payne, 1995). Patterns of beats grouped together in different quantities as well as the breaking apart of the beat into micro beats using fractions force students to utilize basic arithmetic skills (Gordon, 2013). Pitch is another component of music that relates to mathematical concepts. An interval is the distance between two notes (Kostka & Payne, 1995) and uses ratios to define distances between pitches and these same ratios are used
when discussing harmony. Musicians must use these numeric relationships to define, name, and create different harmonies as well as analyze even the simplest of melodies.

Some educators observe an association to math as a cross-curricular connection, although minimal research supports this assumption. Goeghegan and Mitchelmore (1996) studied mathematical achievement of early childhood students with and without music lessons. Although initial findings suggested a difference in the experimental and control groups, post-hoc analysis revealed that home musical experiences coupled with a structured school program may contribute more to mathematical achievement. The school music program is less likely to impact math achievement alone. When further analyzed through the post-hoc student data analysis, differences in mathematical achievement connected to home experiences were observed. Students with no home music experiences achieved a mean score of 17.3 while the students with home music experience scored a mean score of 22.2, which is significantly higher at the .01 level. Traditional assumptions that who achieve in math will also achieve in music are difficult to support in research.

Differentiation of instruction is key in order to reach the needs of all students. This is not only true for secondary students; younger students need instructional leaders to be open to incorporating multiple strategies in order to meet the needs of all children. The inclusion of music as a strategy to teach other contents is well documented and should be utilized by teachers at all levels, including preschool.

**Early Childhood and Music**

Exposure to educational experiences, including music and language, are critical to a young child’s development, especially during the preschool age of three to four years old. Edwin Gordon (2013), a leading authority on early childhood music education,
discussed the need for musical experiences early in a child’s life. In the 2013 edition of his book, *Music Learning Theory for Newborn and Young Children*, he reflected on the impact of early childhood experiences in music and other languages. Gordon discussed how scientists from different research areas, including neurology, biology, and psychology, agree that an abundance of neurological connections (also referred to as synapses) take place prenatally through 18 months of age. This critical time offers an optimum environment for quality exposure to many academic experiences, especially music. The basis of Gordon’s (2013) research is supported by the need to utilize brain cells early in the child’s life before they are lost. Gordon (2013) noted, “Although a brain keeps growing and reaches approximately 90% of adult size by age five, unless cells from complex neural networks and negative blocking is avoided, unused cells are pruned and not recaptured” (p. 2). Early intervention is key for maximum growth in brain cells.

Although Greenberg’s (1972) study of the effectiveness of preschool music programs is over 40 years old, many of his findings are still relevant to current practice. Greenberg (1972) examined 100 disadvantaged children in Hawaii and found that the use of music and movement is a “valuable means of helping essentially nonverbal preschoolers develop language skills” (p. 15). The teachers involved in the study also advocated for a structured curriculum for teaching music at this level, citing the need to support teachers who are trained and untrained to teach music.

Standley (2008) found that younger children appear to benefit more from music instruction. Her meta-analysis of 30 studies using music interventions to impact reading skills found that preschool and elementary school children benefited the most from music instruction’s effect on reading with a higher effect size when compared with other grade
levels (PreK \(d = .62\), elementary \(d = .25\) and junior high \(d = .00\)). This analysis of literature reinforces the need for structured music lessons in early childhood classes where the impact is the strongest.

In 2004, the Dana Consortium united cognitive neuroscientists from seven universities across the United States to examine why training in the arts is associated with higher achievement. Among the nine research reports is *Effects of Music Training on Brain and Cognitive Development in Under-Privileged 3- to 5-Year-Old Children* (Neville et al., 2008). Neville et al. (2008) studied 88 children participating in federally-funded Head Start preschools, dividing them into four groups: a music intervention class and three other control classes with different student/teacher ratios and instructional emphases including instruction in focusing and being aware of details. Similar results were reported among the music intervention students and those in attention training small groups. The findings from this study suggested that increased adult attention may be an underlying key component in improving students’ cognitive skills. This increased level of focus demanded by the students can be found in classes that use music as a means to teach this skill as well as in classes that use basic instruction in attention skills.

Furthermore, a study of 31 German-speaking preschool children (mean age of 4 years, 11 months) examined the effect of early musical training on linguistic abilities. Marin (2009) found that early musical training and experiences enrich auditory cortical development and that these children also performed better on language development tests than students who had not received training. His study isolated morphologic rule formation, speech and language structure \((t(28) = 2.94, p < .01)\), and memory for words \((t(28) = 3.23, p < .01)\) in subtests.
Although gaps in research exist when addressing younger students and the inclusion of music into their educational experience, existing studies show a positive influence. Researchers must continue to examine the impact of quality musical experiences for younger students as well as the connection of music to critical skills such as reading. The impact of the inclusion of music may have a greater influence in younger students (Standley, 2008) and it could provide a strategy for preschool teachers to differentiate instruction to meet the needs of all children and reduce the potential achievement of gaps developing.

**Early Childhood and Music Education Strategies**

A number of early childhood music education research studies refer to specific instructional strategies used in the instruction of music. Music teachers use several instructional methods to teach music to young children. All of these techniques employ student performance, movement, and the development of skills to enhance future musicianship. The three early childhood music education instructional methods used primarily with young children are Dalcroze, Kodály, and Orff. Each of these music instruction methods receives its name from its primary developer who created the curriculum strategies and instructional techniques associated with each method. Although these three methods differ in structure, they share the fundamental goal of quality music experiences and active participation in learning for young students. Each of the strategies is briefly summarized below.

**Dalcroze.** Music instruction rooted in the approach created by Emile Jaques Dalcroze can be described as “movement with a mission,” allowing teachers to create movement-based activities with a musical purpose (Campbell & Scott-Kassner, 2013, p.
Although Dalcroze instruction includes movement, it is often inaccurately described as dance. This teaching method utilizes a three-pronged approach, including Eurhythmics (i.e., a unique form of rhythmic movement), ear training using solfege, and improvisation. The three components of Dalcroze are linked by using the child’s imagination, listening skills, and immediacy of response to musical stimuli. Although this method of instruction is not usually implemented in isolation of other curricular tools, it can provide supplemental concepts to other instructional techniques.

**Kodály.** Zoltán Kodály was an advocate for music education to be taught at an early age for all students. Kodály believed that the use of good music in instruction was essential. Curriculum grounded in his theories progresses from rhythm training to singing, and then to instrumental lessons. The essential principles of the Kodály method include the use of high-quality music, early childhood music for all students, the inclusion of folk music, a foundation in *a cappella* vocal performance, literacy as a primary means of musical independence, relative solfege, experiences before notation, and a child-centered learning sequence (Sinor, 1997). Kodály also developed a system of hand signals for singing in solfege that is still used today in many choir classrooms. Rhythmically, the Kodály rhythmic syllables of “ta ti-ti” is still used for younger children when learning rhythmic values in relationships in rhythmic patterns (Campbell & Scott-Kassner, 2013). The Kodály teaching method has become an integral component of early childhood music education through its use of phonetic syllables and active hand movements. This type of active phonetic learning can be seen as a basis of language learning early childhood programs.

**Orff.** The curriculum model developed by German composer Carl Orff is the
most popular in North America for music instruction of younger students. His focus on
the natural behaviors of young children, including singing, playing, and dancing, coupled
with improvisation and creative movement, provides a framework that offered an
engaged pedagogical approach to teaching young students musical elements. Although
this method was developed in Europe where it is a more comprehensive program,
American teachers tend to focus on a teaching process of four stages: 1) imitation; 2)
exploration; 3) literacy; and 4) improvisation. Students move through the stages as they
imitate the teacher (i.e., imitation), reapply previous knowledge to new concepts (i.e.,
exploration), transfer and compare new ideas (i.e., literacy), and alter previously learned
material into new forms (i.e., improvisation) (Steen, 1992). The Orff teaching approach
supports improvisation to be a “culminating experience that demonstrates extensive
musical knowledge and creative expression” (Campbell & Scott-Kassner, 2013, p. 56).
The most important aspect of this model is student-created music though improvisation.

Orff believed children to be naturally musical and uninhibited, allowing them to
become highly receptive to properly sequenced and creative music instruction. The four
stages of instruction allow the students to participate in musical experiences before
notational literacy in order to preserve their desire for creation and performance. His
intention for musical involvement to be immediate, and for everyone, created a focus on
improvisation and musical imagination with notation skills and instrumental instruction
that follows in a subordinate role (Swanwick, 1997). The most familiar aspect of Orff
instruction is the use of Orff instruments—that is, when students sing and play small
keyboard instruments, usually seated on the floor. Other auxiliary percussive instruments
are often included as well when students perform as a group or ensemble. These
instruments and method of instruction are an integral part of early childhood and elementary music classes in the United States.

The three aforementioned instructional strategies offer preschool teachers options for teaching the elements of music in their classroom. Common themes of active student participation and student performance allow students to explore music in structured activities. Although training is needed for accurate implementation of these strategies, the Dalcroze, Kodály, and Orff music education methods offer young students and teachers a way to create authentic music experiences.

Summary

Children need quality instruction and a firm foundation of multiple skill sets in order to be successful in elementary school. Without these proficiencies, students may be at an academic disadvantage before they begin their primary school years. Preschool programs are critical to fostering a solid foundation on which students can begin their formal academic journey. Extensive research into cross-curricular connections to music and the inclusion of music education has found a relationship between music education inclusion and higher achievement among students from kindergarten to twelfth grade. Future research, such as the current study, will provide insight into early childhood programs. This research could provide alternatives to traditional curriculum and instructional techniques that permeate current teaching practices at this level. Drawing on previous research, future studies must provide answers as to which factors impact the readiness of kindergarten students and provide support for curricular and structural decisions for early preschool programs.

The trend toward quantitative research on the broad topic of the influence of
music education on student achievement must be continued in order to provide measurable data to support its impact. With current trends in education focusing on student data and quantitative sources to determine academic success, researchers must continue to use student-level achievement data to analyze contributing factors to student success. Although many of the studies in this literature review focused on older student populations, replication with preschool students will provide insight on music education’s effect on student learning at all ages. Correlations to core subject areas such as reading, language development, and mathematics found in older students must be investigated in younger populations to determine the most successful pathway for kindergarten readiness.

Need for Study

Extensive research provides evidence to support the positive impact of music education on students in elementary and secondary school settings. I have highlighted how the inclusion of music correlates with higher achievement in other subject areas such as reading, language development, and mathematics. Although many studies have focused on these correlations in older student populations, a gap in the research exists for preschool students. My research addressed one of these gaps by examining the impact of music education inclusion in preschool curriculums. Further examination of the power of music inclusion in preschool curriculums could provide similar findings and support the inclusion of music instruction at this early age. Additional research is warranted, examining multiple developmental mechanisms in relation to SES and other developmental courses (Bradley & Corwyn, 2002). The need to improve kindergarten readiness of students necessitates scrutiny of preschool curriculums to determine which
aspects provide student academic gains. Could the inclusion of music into preschool programs positively impact students’ ability to be kindergarten ready?

**Kindergarten Readiness Characteristics**

This section of my literature review discusses findings on kindergarten readiness and kindergarten screeners. Kindergarten screeners are used to assess students in order to place them in appropriate educational settings. Included is research describing readiness and the importance of using a screener. The section also explains why the Brigance Kindergarten Screener (BKS) is the screener I chose to be included in my study.

**Kindergarten readiness.** The best practice for determining which kindergarten screener to use demanded adherence to standards for professional test development. Pyle (2002) stated that no test should be used to make decisions about students other than referral for additional evaluation. Screening programs must be used for identification purposes, but not to classify students into categories of need or achievement level. Pyle (2002) offered four suggestions for best practices in screening assessments: 1) defining the purpose of the assessment tool; 2) using an instrument with multiple raters as well as follow-up procedures; 3) creating a process for administering the assessment; and 4) careful analyses and interpretation of results (Pyle, 2002). Screeners must use multiple measures in multiple settings to gather more holistic information on students to determine how educators should precede providing equitable and appropriate instruction for students.

A milestone in preschool accountability and assessment took place in 2005 with the release of the five-year, 17-state study titled *National School Readiness Indicators Initiative: A 17 State Partnership* (Rhode Island KIDS COUNT, 2005). The aim of the
study was to create a complete set of readiness benchmarks for preschool students to meet before entering kindergarten (Rhode Island KIDS COUNT, 2005). According to the Rhode Island KIDS COUNT, the three objectives of the 2005 study were as follows: 1) develop indicators for school readiness that could be assessed and tracked over the course of a student’s school year; 2) have states and government to use the indicators to track data and report it to the public; and 3) increase the rate of children reading on level by stimulating policy and program improvements. Each state that was included in the research used the information learned to adopt school readiness standards. The state in which EDS resides chose 41 indicators to track the growth of children from birth to age five (Rhode Island KIDS COUNT, 2005). The summary of the study also identified a readiness equation that the committees from all 17 states agreed on as the path to school readiness (Rhode Island KIDS COUNT, 2005). The equation components are “ready families + ready communities + ready services + ready schools = children ready for school” (Rhode Island KIDS COUNT, 2005, p. 6).

The perception of preschool programs as an important aspect of early childhood learning has not changed, however debate continued about how to use resources in ways that best prepare students for future success. An unprecedented interest in exploring connections between elementary education and programs prior to entrance into first grade emerged around 2005 with an increased focus on how to connect the two levels (Pianta, 2007). Pianta (2007) summarized this shift in focus:

\[ \text{The central challenges and concerns of the field are now not only how to provide safe, organized preschool programs to selected groups of children and how to better connect families and schools but also how to offer all preschool children appropriate and effective early educational experiences that are aligned and included with state K-12 standards and reform efforts and that, for some children, provide opportunities for accelerated progress. (p. 5)} \]
This new focus on connecting previously independent educational programs created new challenges since these preschool programs would now be charged with better preparing students for previously established accountability systems. Rather than preschool programs being regarded as a separate, unaccountable programs, they would be included as a central part of the child’s academic experience and special attention made to its ability to transition the student into the K-12 education system. The new argument is not whether students should be exposed to early childhood learning experiences, but rather how best to use those opportunities to best contribute to the child’s academic development and to society (Pianta, 2007).

In 2009, the U.S. Department of Education announced *Race to the Top* as part of the American Recovery and Reinvestment Act (ARRA) signed into law by President Obama. This was a $4.35 billion investment earmarked to prepare America’s students to graduate college, be career ready, and to compete in the global economy (U.S. Department of Education, 2009). *Race to the Top* challenged states to compete for these funds as part of an application process. The process assigned points for states based on reform in the following areas: a) rigorous standards; b) high-quality assessments; c) attracting and keeping quality teachers and principals; d) supporting data systems to improve instruction; and e) sustaining educational reform (U.S. Department of Education, 2009). The effect of preschool education has positive effects on the cognitive and social development of children (Pianta, Barnett, Burchind, & Thornburg, 2009). These effects are especially lasting in large scale public programs. According to Pianta et al. (2009) research findings and policies such as *Race to the Top*, it is clear that variables such as curriculum, staffing, funding, and level of education impact the effects of preschool.
Kindergarten readiness screener. The *Individuals with Disabilities Education Improvement Act* (IDEA) of 2004 (Public Law 108-446, 2004) requires all federally funded early childhood programs to complete performance-based assessments of children in order to evaluate their potential need for intervention and to assess their academic growth. In 2005, the National School Readiness Indicators Initiative (NSRII) concluded a three-year study including 17 states in order to develop a set of indicators to track progress of students from birth to age eight (Rhode Island KIDS COUNT, 2005).

The goal of the NSRII was to assist states in using research-based school readiness indicators to inform public policy decisions and track progress in meeting key goals for young children. A key task of this initiative was for each of the states that were involved to develop a list of readiness indicators that could provide valuable feedback on student progress and be tracked at the state and local level. The five domains agreed upon through this initiative were as follows: 1) physical well-being and motor development; 2) social and emotional development; 3) approaches to learning; 4) language development; and 5) cognition and general knowledge. The state in which EDS resides was a part of this 17-state initiative and chose to use the BKS as its assessment for kindergarten readiness. Its five components are based off of this initiative and are labeled academic/cognitive, language, development, physical development, self-help, and social-emotional development.

According to the Center on Enhancing Early Learning Outcomes (2014), in the 2011-2012 school year, 28 states required assessments of students during their kindergarten year. Most assessments were developed by the locality (12 states), followed by state-developed assessments (7 states). Five states used the Dynamic Indicators of
Basic Learning (DIBELS), two used the Phonological Awareness Literacy Screening (PALS), and two used the BKS.

The DIBELS assessment is administered in the fall of the student’s kindergarten year and it assesses the risk status for students in their future academic abilities (Stormont, Herman, Reinke, King, & Owens, 2015). Curriculum-based measures are used to administer one-minute, individual probes of key skills in the areas of reading, math, and writing competence. This assessment measure only covers academics and does not address external factors such as physical well-being or self-help measures in relation to a student’s ability to be holistically ready for kindergarten.

The PALS assessment’s main purpose is to measure literacy-based knowledge that includes phonological awareness, alphabet knowledge, knowledge of letter sounds, spelling, concept of word, word recognition in isolation, and oral passage reading. The primary purpose of PALS is to identify those students who are not performing at grade-level expectations and may need additional reading interventions (Invernizzi, Juel, Swank, & Meier, 2013). This form of kindergarten assessment only focuses on reading as an indicator of readiness, ignoring other academic and non-academic areas in other screeners. Therefore, this assessment was not chosen for this study due to its lack of assessment in other academic areas other than reading-based indicators. Like many assessment tools, PALS covers just one aspect in assessing a student’s overall literacy competence. Other important information includes additional early literacy assessment data, parent information, the child’s interest in books, and teacher judgment. Although PALS provides reliable screening for development in literacy acquisition, only using one measure of literacy performance is not sufficient when making decisions about a
student’s academic future (Invernizzi et al., 2013).

The purpose of the BKS is “to identify potential developmental delays and giftedness, to inform instruction, and to monitor child progress” (French, 2013, p. 2). The state in which EDS resides mandates the BKS as the measurement tool to assess kindergarten readiness according to the state mandates. State legislation requires alignment with the state’s definition of school readiness as well as state standards established for preschool. It must assess students in the domains of adaptive, cognitive, communication, motor, and social emotional readiness. BKS is designed to monitor a student’s progress rather than label him or her for intervention or remediation. Because of its availability through state-mandated testing requirements as well as its focus on multiple aspects of a student’s learning environment, I chose this assessment tool for this study.

In order to focus on academic indicators, my study used the cognitive/general knowledge and language/communication domains of the BKS for data analysis. Although the broad definition of readiness can be characterized in both cognitive and social areas, Konold and Pianta (2005) found that high cognitive functioning served as a better predictor of academic test performance at the kindergarten and first grade levels than the student’s social skill development. In a meta-analysis of 70 studies, Paro and Pianta (2001) examined indicators that predict performance in the early grades of school. They found that the average correlation of a student’s academic-cognitive area from preschool to elementary school was .43, while the average correlation for social-behavioral area was .32. Although both can be considered predictors for kindergarten readiness, the higher correlation associated with cognitive development was used for the current study.
The inclusion of demographic variables (race and socioeconomic status) is common in studies concerning kindergarten readiness and serves as the starting point for this section of the literature review.

**Race.** Race was a common demographic variable used in education research. Researchers use race as one of the student-level variables to distinguish between outcomes for children included in the study sample (Brooks-Gunn, Duncan, & Maritato, 1997; Duncan & Aber, 1997; McLloyd, 1998; Raver, Gershoff, & Aber, 2007; Davoudzadeh, McTernan, & Grimm, 2015). Current research has also found that race plays a role in determining school readiness levels. For example, African American students living below the poverty line are at a higher risk of not being kindergarten ready than white students (Connell & Prinz, 2002; Davoudzadeh, McTernan, & Grimm, 2015; Duncan, Kalil, Magnuson, & Murane, 2014). Koury and Votruba-Drzal (2014) determined through their regression study that Indian Asian and East Asian students outscored their white counterparts on school readiness exams while Mexican and Spanish Caribbean students scored below their white counterparts.

Race was used as a demographic variable to determine its relationship to the dependent variable, Brigance cognitive readiness. The categorical data for each student were obtained from student preschool enrollment records. Student enrollment records included race information that was provided by the student’s parent/educational guardian. My study also examined relationships between race and specific independent variables.

**Socioeconomic status.** Socioeconomic status (SES) was another common school readiness demographic variable that was used in school readiness research over time.
Herman, Reinke, King, and Owens (2015) affirmed the findings of previous research when they concluded that, “Children who are living in poverty are at higher risk for struggling in their transition to kindergarten and are more likely to have academic and behavior deficits that likely interfere with their success” (p. 225). SES was found to be a reliable predictor of early student outcomes (Janus & Duku, 2007; White, 1982; Fitzpatrick, Mckinnon, Blair, & Willoughby, 2014).

Use of SES as a demographic variable allowed for the relationships between differing student economic status and kindergarten readiness to be explored using the results of the BKS. For the purposes of my study, I used free and reduced lunch status as a proxy for socioeconomic status. Students who qualified for free and reduced lunch were considered living near or below the poverty line. Students who did not qualify for free and reduced lunch were not considered to be living in poverty. I obtained data through the EDS database. The categorical data consisted of preschool year information as completed by the educational guardian. The provided information was verified by the State Department of Education. My study also examined relationships between SES and specific independent variables.

Other Independent Variables Related to Kindergarten Readiness

Of interest were the student-level variables of prior setting and attendance rate along with the school-level variable of climate. Additionally, the research literature has examined the relationship between prior setting, attendance rates and school climate and kindergarten readiness.

Prior setting. A less common variable used to study kindergarten readiness was prior setting. Prior setting, for the purpose of this study, identified the educational or care
setting in which students were enrolled in the year before they began kindergarten. Magnuson, Meyers, Ruhm, and Waldfogel (2004) found in their analysis of the Early Childhood Longitudinal Study children with a quality prior preschool setting had higher math and reading scores than children who did not attend preschool. Magnuson et al. (2004) used ordinary least squares regressions to find the relationship between math and reading skills of kindergarten students and their prior year setting. The study findings were reaffirmed by later research that concluded that vocabulary, literacy, and math skills of kindergarten students who attended quality programs were higher when compared to students who did not attend the quality programs (Bierman et al., 2008; Claessens & Garrett, 2014; Lee et al., 2014).

It should be noted that use of prior setting as a demographic variable has not been well documented in previous literature. For the purposes of my study prior setting was identified as Head Start and tuition-based preschool. The categorical data were collected within the first 30 days of the student’s kindergarten year. The information was requested from educational guardians at the same time as BKS administration.

**Attendance.** One characteristic of readiness was student attendance. Attendance was often overlooked, yet it may have more of an impact on school wide academic achievement than historically thought (Johnston, 2000). King (2000) cited attendance as one of the academic performance variables, along with student grade point average, that was considered important for functioning in relation to cognitive and behavioral dimensions. Roby (2006) conducted a correlational study for each grade level taking the Ohio Proficiency Test to analyze school wide attendance and its relationship to student achievement. The results of this study provided a broad overview of the relationship
between attendance and achievement for students in fourth, sixth, ninth, and twelfth grades. Further studies should expand on the role of attendance in relation to cognitive and behavioral dimensions at the preschool level to determine if this correlation exists for younger students.

Magnuson, Lahaie, and Waldfogel (2006) used data from the Early Childhood Longitudinal Survey of a Kindergarten cohort to analyze the links between preschool attendance and the school readiness of children of immigrants. Multivariate regression models were used to analyze the effects of preschool on school readiness for these children. Magnuson, Lahaie, and Waldfogel (2006) determined that children whose mothers were not native to the United States were less likely to be enrolled in preschool programs than other children. The researchers also found that preschool attendance raises reading and math scores for all students, regardless of their demographics.

Gottfried (2010) utilized a fixed effects design and instrumental variables strategy seeking to provide evidence estimating the causal impact of attendance on several measures of achievement, including grade point average and standardized test results. The results of this study indicated a strong, positive relationship between student attendance and student achievement at both the elementary and middle school levels. Stakeholders, including parents, staff, and community members have assumed a positive relationship between school attendance and academic success. A vast research base has examined how these factors relate to academic outcomes for students however few studies have examined the relationship between individual attendance and student achievement at the preschool level.

Use of attendance as a demographic variable has been widely used in education
research. For the purposes of my study, attendance was identified as the number of days a student was absent from school. The teacher of record collected the continuous data from the student’s preschool year.

**Climate.** School climate was also considered as a school readiness variable. Leadbeater, Sukhawathanakul, Smith and Bowen (2015) conducted an examination of predictive association between child reports of peer victimization and internalization/externalization of school problems as reported by parents and teachers. Influences of school climate and reports of peer victimization were investigated in path models both across third and fourth grades and within the two grade levels. Both reports from parents and students showed stability of school climate dimensions. Parents’ perceptions of the school environment were not found to be significant to peer victimization. Leadbeater et al. (2015) found that children’s negative thoughts and their world view coupled with peer victimization may interfere with their connection to school and their perception of the school climate. This study compared parent and student perceptions of climate and found possible pathways for reducing peer victimization through positive social climate within schools.

Hoy, Hannum and Tschannen-Moran (1998) conducted a longitudinal study of 86 middle schools and used health and openness metaphors to develop measures of organizational climate. School climate was found to significantly influence student achievement in basic skills along with socio-economic status. Although this study was conducted in 1998, it was the first one to consider the relationship of school climate and socio-economic status on student achievement.

For my research study, I used a proxy for climate, with the continuous data from
the Comprehensive School Survey that was conducted in all of the K-12 grade schools in EDS. The data management department of EDS developed and validated this instrument. Each preschool was assigned the climate data for the K-12 school in which it was housed. This proxy was chosen due to the lack of climate data for preschools since this information was not collected independently of the school in which it was located.

Variables Specific to My Study

**Music inclusion.** Research that compares the achievement of students who are exposed to music education strategies and those who are not is well documented, especially in elementary schools and secondary schools (Catterall et al., 1999; Catterall & Rauscher, 2008; Gouzouasis, Guhn, & Kishor, 2007; Kaviani, Mirbaha, Pournaseh, & Sagan, 2013; Kinney, 2008; Piro & Ortiz, 2009; Schellenberg, 2004; Vaughn & Winner, 2000). Conclusive and consistent results in preschool settings are not as prevalent (Mehr, Schachner, Katz, & Spelke, 2013). The foundation of this study is to determine the relationship between music education inclusion in the preschool setting and achievement on the BKS.

**Length of music instruction.** Many of the aforementioned studies did not provide specific details about the amount of time that was devoted to music instruction. Most studies described the length of the study, but did not provide specific details about the length of music lessons, or their frequency, for that matter. For example, Catterall and Rauscher (2008); Kaviani et al. (2013); Piro and Ortiz (2009); and Schellenberg (2004), did not address details concerning the actual instructional time of music. Although these studies explained curricular inclusions, such as music education strategy, assessing the impact of various lengths of music instruction could provide insight for teachers at any
level to help them plan instruction. I chose to use curriculum and teaching schedules of
the preschool programs in the present study to examine the amount of music instruction
within the school day in order to determine if the time spent on music strategies impacted
students’ kindergarten readiness scores.

**Research Questions for My Study**

In this study, I seek to answer the following research questions:

**Research question 1.** What is the relationship between the inclusion of music curriculum
in the preschool setting and kindergarten readiness? **Research question 2.** What is the
relationship between the amount of time allotted on inclusion of music curriculum in the
preschool setting and kindergarten readiness?

These research questions will be addressed through the use of a hierarchical linear
multiple regression (HLMR) detailed in Chapter XIII. Results will be reported in Chapter
XIV, followed by the discussion in Chapter XV.
CHAPTER XIII

METHODOLOGY

Introduction

This study examined the potential predictors of kindergarten readiness, including music inclusion and time allotted to music instruction. The sample of this study included preschool classrooms located in Elementary District Schools (EDS). A correlational research design was used to address the research questions, based on the use of existing school district data. In particular, hierarchical linear multiple regression (HLMR) was used to examine the extent of predictive utility of the aforementioned variables to predict kindergarten readiness. This statistical method allows for combining several common educational variables to determine their predictive ability for kindergarten readiness. Regression models were used to determine the correlations between the predictor variables and the dependent variables of kindergarten readiness using the domains of language/communication and cognitive/general knowledge from the Brigance Kindergarten Screener (BKS). This chapter is divided into the following sections: Research Design, Measurement of Variable, Participants, Procedures, and Data Analysis. This chapter provides the research design procedures and participant inclusion for the capstone study. Key components of the measurement instruments, the BKS and the Comprehensive School Survey (CSS), are addressed. The validity, reliability, and reasoning of their inclusion are discussed. Figure 7 shows the
three groupings the capstone research analyzed to determine the relationships between
the dependent variable of kindergarten readiness and the independent variables.

![Concept map for kindergarten readiness study](image)

My research provides data-based outcomes describing the effectiveness of preschool
programs according to existing panel data of kindergarten readiness scores.

**Research questions.** My study addressed the following research questions:

**Research question 1, music inclusion.** What is the relationship between the inclusion of
music curriculum in the preschool setting and kindergarten readiness?

**Research question 2, amount of time allotted to music inclusion.** What is the
relationship between the amount of time allotted to inclusion of music curriculum in the
preschool setting and kindergarten readiness?

**Research Design**

A correlational research design is ideal for conducting educational research when
it is not possible or acceptable to manipulate the characteristics of human participants.
My study looked at the naturally occurring relationships between study variables based on the data set provided by EDS. The purpose of my study was to reveal relationships among variables using this data to determine possible contributing factors to increased kindergarten readiness. According to Kerlinger and Rint (1986), correlational research design seeks to determine possible relationships through the observation of pre-existing evidence in order to search for plausible contributing factors. Cohen, Manion, and Morison (2000) discussed the correlational design as an appropriate means to retrospectively examine existing groups for factors that contribute to their differences. Kerlinger (1986) noted limitations of this design, such as the inability to manipulate the independent variables, inability to assign participants to groups, and the possibility of not being able to explain a relationship between the independent variables and the dependent variables. However, my study did not require the manipulation of variables or student groups. As with any research or research design, the chance of finding no additional insight to the subject that is being studied existed and could be avoided.

**Measurement of Variables**

**Measurement of music inclusion independent variables.** Table 29 reports the independent variables that were used in the study. The classroom-level independent variable of music inclusion (Categorical: music = 0; no music = 1) was reported from the teacher schedules of each preschool classroom included in my sample. The classroom-level independent variable of amount of time spent on music instruction (Ratio) was also reported from the teacher’s schedule of each preschool classroom included in my sample.
Table 29

Research Questions for Music Inclusion Study

<table>
<thead>
<tr>
<th>Research question</th>
<th>Classroom-level variables</th>
<th>Definition of variable</th>
<th>Measurement of variable</th>
<th>Level of measurement</th>
<th>Variable levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the relationship between the inclusion of music curriculum in the preschool setting and kindergarten readiness?</td>
<td>Music Inclusion</td>
<td>Any music included into other curriculum or as an independent activity will be classified as music inclusion.</td>
<td>Reported by preschool teacher schedules</td>
<td>Categorical</td>
<td>(0) Music (1) No music</td>
</tr>
<tr>
<td>What is the relationship between the amount of time allotted to music instruction on inclusion of music curriculum in the preschool setting and kindergarten readiness?</td>
<td>Amount of time allotted to music instruction</td>
<td>Measured in minutes, any inclusion of music into curriculum</td>
<td>Reported by preschool teacher schedules</td>
<td>Ratio</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

Measurement of common capstone control independent variables. Table 30 reports the independent variables that were used for the entire capstone study. The school-level common independent variable of climate (Interval) was reported through proxy from the CSS. The student-level common independent variables were race (Categorical: African American = 0; non-African American = 1), socioeconomic status (SES) (Categorical: qualifies for free/reduced lunch = 0; does not qualify for free/reduced lunch = 1), prior setting (Head Start = 0; tuition-based = 1), and attendance (Interval, reported as days absent out of total enrollment days).
<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition of variable</th>
<th>Measurement of variable</th>
<th>Level of measurement</th>
<th>Variable levels</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race</td>
<td>The concept of dividing people into populations or groups on the basis of physical characteristics</td>
<td>Preschool year; Educational guardian identified</td>
<td>Categorical</td>
<td>(0) African American</td>
<td>Brooks-Gunn, Duncan, &amp; Maritato (1997)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>(1) Non-African American</td>
<td>Davoudzadeh, McTernan, &amp; Grimm (2015)</td>
</tr>
<tr>
<td>SES</td>
<td>A proxy for SES is a student qualifying or not qualifying for free and reduced lunch status</td>
<td>Preschool year; Form completed by educational guardian and verified by the state</td>
<td>Categorical</td>
<td>(0) Qualifies for free/reduced lunch</td>
<td>Duncan et al. (2014)</td>
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<td></td>
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<td></td>
<td></td>
<td>(1) Does not qualify for free/reduce lunch</td>
<td>Fitzpatrick et al. (2014)</td>
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<tr>
<td>Prior Setting</td>
<td>Where a student received early care services for the 12 months prior to coming to kindergarten</td>
<td>Kindergarten Year; Educational guardian identified</td>
<td>Categorical</td>
<td>(0) Head Start</td>
<td>Herman et al. (2015)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>(1) Tuition-based</td>
<td>Janus &amp; Duku (2007)</td>
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<tr>
<td>Attendance</td>
<td>Actual number of days absent</td>
<td>Preschool year; Teacher collected daily</td>
<td>Interval</td>
<td>Actual number of days absent</td>
<td>Bierman et al. (2008)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Magnuson et al. (2004)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Johnston (2000)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>King (2000)</td>
</tr>
<tr>
<td>School Climate</td>
<td>Patterns of students' experience of school life</td>
<td>CSS Data; Student identified</td>
<td>Interval</td>
<td>Student survey data from the CSS</td>
<td>Roby (2006)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hoy et al. (1998)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Leadbeater et al. (2015)</td>
</tr>
</tbody>
</table>
**Comprehensive School Survey.** According to the Evaluation Manual, the purpose of the CSS is to put the emphasis of academic programs on educating the entire child. This survey captures data beyond academics and allows all stakeholders to have input on student learning (Muñoz & Lewis, 2009). The survey was designed and created as a unique survey instrument for use by EDS.

**Background.** According to the CSS Evaluation Manual, EDS constructed the instrument as a way to include student, parent, and teacher feedback on the services that schools provide outside of the academic realm (Muñoz & Lewis, 2009). The CSS is EDS’s way of monitoring the schools’ systems and processes through the input of stakeholders. The data collected are used to inform practitioners’ decisions on how to educate the whole child and teach students ways to become productive members of the community.

**Administration requirements.** EDS uses two options for administering the CSS to students, staff, and parents: an email link to an internal data collection platform and paper surveys (Muñoz & Lewis, 2009). Student surveys are conducted using a paper format and then scanned into an internal data collection system. Staff surveys are conducted using an email link to an internal data collection system. Parents are offered two options, including a paper format or an online format, depending on their comfort level and access to technology. The online method allows for survey responses to be recorded efficiently and accurately into the EDS data analysis system.

**Score types and subscales.** The CSS survey includes score types for elementary school students, middle school students, high school students, EDS staff, and parents of EDS students (Muñoz & Lewis, 2009). The following question categories for EDS
students include: a) school (i.e., school engagement, school belonging, school climate, school support, safety and overall satisfaction); b) home/community (i.e., political discussion); c) personal development (i.e., conflict resolution and positive character); and d) school operation (i.e., teaching, curriculum, school resources, and school services). The following question categories for EDS staff include: a) students (i.e., school support); b) school operation (i.e., administration, teaching, curriculum, student assessment, school resources, and school services); and c) employee (i.e., school belonging, safety, job satisfaction, overall satisfaction, positive character and educational satisfaction).

CSS scores are reported on a four-point Likert scale ranging from strongly disagree to strongly agree. A score of 1 represents strongly disagree and a score of 4 represents strongly agree. The scores for all completed surveys are averaged for a school composite score (Muñoz & Lewis, 2009). For the purposes of my study, I used student survey data. Only questions relating to school climate were then averaged for a school climate score. I used questions from the following categories: school belonging, school discussion climate, caring environment, safety, overall satisfaction, and personalization. Table 31 reports the questions from the CSS that were asked of students in regards to school climate.
### Table 31

**School CSS Climate Questions**

<table>
<thead>
<tr>
<th>Category</th>
<th>ID#</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>School belonging</td>
<td>B4</td>
<td>I really like other students in my school.</td>
</tr>
<tr>
<td>School belonging</td>
<td>B5</td>
<td>I feel that I belong in my school.</td>
</tr>
<tr>
<td>School belonging</td>
<td>B6</td>
<td>I feel like I am part of my school community.</td>
</tr>
<tr>
<td>School discussion climate</td>
<td>B7</td>
<td>I can give opinions in class that disagree with the opinions of other students.</td>
</tr>
<tr>
<td>School discussion climate</td>
<td>B8</td>
<td>My teachers respect my opinion in class even if it disagrees with their opinions.</td>
</tr>
<tr>
<td>School discussion climate</td>
<td>B9</td>
<td>I feel I can disagree openly with my teachers about events in the news.</td>
</tr>
<tr>
<td>Caring Environment</td>
<td>B10</td>
<td>I feel my teachers really care about me.</td>
</tr>
<tr>
<td>Caring Environment</td>
<td>B11</td>
<td>I believe I can talk with my counselor.</td>
</tr>
<tr>
<td>Caring Environment</td>
<td>B12</td>
<td>My school has a caring and supportive environment for students.</td>
</tr>
<tr>
<td>Personal safety</td>
<td>B13</td>
<td>I feel safe walking to and from school.</td>
</tr>
<tr>
<td>Personal safety</td>
<td>B14</td>
<td>I feel safe outside the building before and after school.</td>
</tr>
<tr>
<td>Personal safety</td>
<td>B15</td>
<td>I feel safe at school.</td>
</tr>
<tr>
<td>Overall satisfaction</td>
<td>B18</td>
<td>I am very satisfied with my school.</td>
</tr>
<tr>
<td>Overall satisfaction</td>
<td>B19</td>
<td>I would rather go to this school than any other school.</td>
</tr>
<tr>
<td>Personalization</td>
<td>B20</td>
<td>I am very satisfied with EDS.</td>
</tr>
<tr>
<td>Personalization</td>
<td>B21</td>
<td>There is at least one adult at my school whom I feel I can trust.</td>
</tr>
<tr>
<td>Personalization</td>
<td>B22</td>
<td>When I have a problem there is at least one adult at my school whom I can talk about my problem.</td>
</tr>
<tr>
<td>Personalization</td>
<td>B23</td>
<td>There is at least one adult at my school who says positive things to me often.</td>
</tr>
<tr>
<td>Site safety</td>
<td>E22</td>
<td>At my school, I feel bullying is not a problem.</td>
</tr>
<tr>
<td>Site safety</td>
<td>E23</td>
<td>At my school, I feel Internet bullying is not a problem.</td>
</tr>
<tr>
<td>Site safety</td>
<td>E24</td>
<td>The adults in my school take care of safety problems quickly.</td>
</tr>
<tr>
<td>Site safety</td>
<td>E25</td>
<td>I believe the adults in my school will take care of any unsafe situation.</td>
</tr>
</tbody>
</table>

**Psychometric properties.** The Survey Tailored Design Method (Dillman, Christian, & Smith 2014) is a procedure for conducting multiple self-administered surveys that produce both high-quality (i.e., valid and reliable) information and acceptable response rates. A validity study (Rudasill, 2008), in coordination with the local university’s College of Education, examined the structure of the instruments using...
exploratory factor analysis, identifying the principle components through inter-item correlations (Stevens, 2001). Seven populations were examined, including elementary school students, middle school students, high school students, parents, classified staff, and certified staff for the 2007-2008 CSS. Revisions were made for the 2008-2009 CSS by adding and deleting questions, as well as rewording questions in order to reflect current trends in the district.

In 2008, Muñoz conducted a reliability study for the survey as a whole, each domain within the surveys, and the constructs within each domain. Correlations with Cronbach’s alphas were conducted with item-by-item correlations using the Statistical Package for the Social Sciences (SPSS). The psychometric properties of the surveys were deemed adequate since the coefficients alphas greatly exceeded the minimum (.60) recommended for use of composite scales in statistical analyses (Nunally & Bernstein, 1994).

**Brigance Kindergarten Screener.** Each dependent variable was interval in measurement and reported the actual score for each student included in my study. Table 32 reports the domains of the BKS used for the purposes of my study.

**Table 32**

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Measurement of variable</th>
<th>Definition of variable</th>
<th>Level of measurement</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brigance Kindergarten Screener</td>
<td>Cognitive/general knowledge</td>
<td>Combination of the literacy and math scores and language/communication</td>
<td>Interval</td>
<td>French (2013)</td>
</tr>
<tr>
<td></td>
<td>Language communication</td>
<td>Receptive and expressive language</td>
<td></td>
<td>Konold &amp; Pianta (2005)</td>
</tr>
</tbody>
</table>
Purpose. French (2013) noted that “the purpose of the BKS is to identify potential developmental delays and giftedness, to inform instruction, and to monitor child progress” (p. 2). The state in which EDS resides mandates the BKS as the measurement tool to assess kindergarten readiness according to the state legislation 704 KAR 5:070, Section 2 in accordance with KRS Chapter 45A. This legislation mandates that the screener aligns with the state’s definition of school readiness and the state’s standards that are established for preschool, and assesses the domains of adaptive, cognitive, communication, motor, and social emotional readiness. The screener must be reliable and valid for target populations, including subgroups such as English Language Learners and students with disabilities, as well as provide student-level data that assesses school readiness in each of the five aforementioned domains.

Theoretical background. The theory behind the BKS is confirmatory factor analysis which is an analysis driven by theory that requires deductive specification of the correlation of underlying traits and indicators (French, 2013). This type of analysis supported the creation of the domain structure for the BKS.

Length. According to the Brigance Screener Training Manual the approximate time for assessment of each student included in this study is 15 minutes per domain (French, 2013). There are 101 cognitive/general knowledge items that account for a total of 65.5 points. The language/communication domain consists of eight items accounting for a total of 16 points. The total score for BKS ranges from 0 to 100 and is compiled from the weighted scores of each domain.

Administration requirements. Although the administration of the BKS does not require specific qualifications, each of the examiners must be familiar with the
procedures for administration and scoring, and they must have practiced administering the exam several times. Additionally, the examiners must be able to adhere to the directions that accompany each domain of the assessment. The state in which EDS resides requires all new test administrators to attend a three-hour face-to-face training, and all experienced test administrators must attend a one- to two-hour refresher training annually. The training of each test administrator must be verified by the district and kept on file for state records. The BKS must be administered between 15 calendar days from the start of the school year to the thirtieth instructional day (State Common Kindergarten Implementation Guide, 2015).

**Score types and subscales.** The five domains of the BKS include: a) cognitive/general knowledge; b) language/communication; c) physical well-being; d) self-help skills; and e) social emotional skills. For the purposes of the capstone study, I examined the BKS scores related to academic readiness, which were collected by trained school personnel. Those measures are cognitive/general knowledge and language/communication. Cognitive/general knowledge is defined as a combination of the literacy and math scores and language/communication is defined as receptive and expressive language (French, 2013). Each domain assessed within the BKS produces normative scores that can be assessed individually to address the readiness of the student, and they can be used for age level comparisons (French, 2013). Table 33 reports the questions used to gather data for my study. The questions are written as found in the BKS testing materials.
Table 33

Student BKS Questions for Domains Used in Study

<table>
<thead>
<tr>
<th>Brigance domain</th>
<th>Questions asked of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive/general knowledge</td>
<td>Knows personal information</td>
</tr>
<tr>
<td></td>
<td>Recites alphabet</td>
</tr>
<tr>
<td></td>
<td>Sorts objects (by size, color, shape)</td>
</tr>
<tr>
<td></td>
<td>Counts by rote</td>
</tr>
<tr>
<td></td>
<td>Matches quantities with numerals</td>
</tr>
<tr>
<td></td>
<td>Determines total of two sets</td>
</tr>
<tr>
<td></td>
<td>Reads uppercase or lowercase letters</td>
</tr>
<tr>
<td></td>
<td>Experience with books and text</td>
</tr>
<tr>
<td>Language/communication</td>
<td>Names parts of the body</td>
</tr>
<tr>
<td></td>
<td>Verbal fluency and articulation</td>
</tr>
</tbody>
</table>

The composite score for each student is reflected along a normative scale through the conversion of raw scores from each domain. The composite scores consist of normative scores from each domain. The normative scores of each domain have a mean of 100 with this score indicating the child’s performance on the assessed skill to be at the mean or average within a normal distribution. The standard deviation for the composite score is 15, reflecting a score of 115 as one standard deviation above the mean and a score of 85 being one standard deviation below the mean. The scores that were used in this assessment are based on an equal interval scale allowing for arithmetical manipulation and examination (French, 2013). Each of the domains uses the same scoring guide to interpret a student’s score in relation to his or her kindergarten readiness. Table 34 can be found in the Brigance Technical Manual (French, p. 107).
Table 34

Brigance Performance Ratings

<table>
<thead>
<tr>
<th>Brigance score</th>
<th>Performance rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;70</td>
<td>Very weak</td>
</tr>
<tr>
<td>70-79</td>
<td>Weak</td>
</tr>
<tr>
<td>80-89</td>
<td>Below average</td>
</tr>
<tr>
<td>90-110</td>
<td>Average</td>
</tr>
<tr>
<td>111-120</td>
<td>Above average</td>
</tr>
<tr>
<td>121-130</td>
<td>Strong</td>
</tr>
<tr>
<td>&gt;130</td>
<td>Very strong</td>
</tr>
</tbody>
</table>

Psychometric properties. The reliability of the BKS was first established in 1991, and then again in 2012 with the release of the BKS III (French, 2013). The reliability was tested in two ways. Curriculum Associates, the publishers of the BKS, gathered estimates through the use of a test-retest study and an inter-rater study (French, 2013). For the first measure of reliability, the test-retest study included 338 children of all ages up to 7 years and 11 months from 25 sites. The same test administrator was used for each of the two test sessions; the second test was given within three weeks of the first test. French (2013) reported that the correlation for the total score on the BKS was .92. According to Hinkle, Wiersma, and Jurs (2003), a correlation of .70 or higher is considered strong and a correlation of .90 or higher is considered very strong. The test-retest study has a very high positive reliability correlation according to the Hinkle et al. (2003) scale of correlations.

The second measure of reliability that was used was an inter-rater study. French (2013) noted that the inter-rater study was conducted with 330 children with ages up to 7 years 11 months. According to French (2013), the two examiners assigned to each student conducted the test in the most similar settings as possible. The correlation for the total test score was .93. According to Hinkle et al. (2003), .93 is a very strong correlation.
French noted that both the test-retest and inter-rater studies showed high correlations of reliability.

The validity of the BKS was established through a study of test content, internal structure, fairness, and associations with other variables (French, 2013). Breidenbach and French (2012) found that the BKS is valid for “monitoring half-year to yearly student progress and identifying areas of strength and weakness” (p. 486). French (2012) found that the BKS was valid in the areas of test content and internal structure.

BKS test content was determined to be valid by several researchers, including Helfeldt (1984), Brennan (1985), and Schearer (1986). The BKS is a criterion-referenced assessment that is well organized (Helfeldt, 1984). Brennan (1985) compared the BKS to other well-known assessments and Schearer (1986) added that the BKS is as valid as the Developmental Indicators for the Assessment of Learning (DIAL) test that was widely used in the New York Public School system. Additionally, internal structure validity was tested using confirmatory factor analysis and maximum likelihood estimation (French, 2013). The BKS structure was found to be valid, according to French (2013), because it is comprised of three-factor, first-order models and a one-factor, second-order model that were the only combination of models found to meet the validity standards.

**Participants**

Initial data received from EDS consisted of 304 student participants. After analyzing the data set, 115 students were removed because they were not enrolled in their preschool locations for the entire 2014-2015 school year. Students in a tuition-based preschool were enrolled for 175 days and students in a federally funded preschool were enrolled for 160 days. Fifteen additional students were removed from the data set due to
the absence of their BKS scores. The final data set consisted of 174 students with complete data.

Table 35 reports the numbers and percentages of study participants. The frequency column reports the actual number of participants for each category of the variable and the percent column reports the percentage of the total number of participants. Similarities between students’ SES and their prior setting are a result of the funding source for the prior setting. Students who qualify for free/reduced lunch status are eligible for Head Start programs. Students who do not qualify for free/reduced lunch cannot attend Head Start and must attend tuition-based preschools therefore SES and prior setting report the same values. Due to the similarity, prior setting was removed from the variable list for reporting frequencies.

**Table 35**

**Frequencies for Independent Variables**

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>102</td>
<td>58.6</td>
</tr>
<tr>
<td>Non-African American</td>
<td>72</td>
<td>41.4</td>
</tr>
<tr>
<td>Qualifies for free/reduced lunch</td>
<td>128</td>
<td>73.6</td>
</tr>
<tr>
<td>Does Not qualify for free/reduced lunch</td>
<td>46</td>
<td>26.4</td>
</tr>
<tr>
<td>Head Start (federally funded)</td>
<td>123</td>
<td>70.7</td>
</tr>
<tr>
<td>Tuition-based</td>
<td>51</td>
<td>29.3</td>
</tr>
</tbody>
</table>

*(Note: N = 174)*

According to the State Department of Education (2014) A1 schools are under the control of a principal and can establish a Site-Based Decision Making Council (SBDM). The number of tuition-based programs that are available in the district limits the sample because there are only five tuition-based preschools in EDS. In order to keep the sample balanced, data from a total of 17 classrooms was used from classrooms housed in one of the nine schools included in the study. Demographic data for each of the schools in the
study are reported below in Table 36. The demographics table shows that the average attendance rates range from 94.5% to 97.3%, with all included schools above the district average of 94.3%. Free/reduced lunch rates range from 12.9% to 95.6% of students qualifying for this service, with a district average of 66.8%. African American students comprise 11.6% to 71.3% of students in the school population with the district average being 35.1%.

### Table 36

2014-2015 Demographics of Schools Included in this Research Study

<table>
<thead>
<tr>
<th>Enrollment</th>
<th>F/r lunch</th>
<th>White</th>
<th>African American</th>
<th>Hispanic</th>
<th>Other</th>
<th>Mobility</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>529</td>
<td>33.3</td>
<td>34.8</td>
<td>39.3</td>
<td>3.0</td>
<td>22.9</td>
<td>1.1</td>
</tr>
<tr>
<td>2</td>
<td>709</td>
<td>36.4</td>
<td>66.6</td>
<td>13.3</td>
<td>10.4</td>
<td>9.7</td>
<td>2.7</td>
</tr>
<tr>
<td>3</td>
<td>709</td>
<td>19.6</td>
<td>69.7</td>
<td>12.7</td>
<td>4.1</td>
<td>13.5</td>
<td>7.3</td>
</tr>
<tr>
<td>4</td>
<td>753</td>
<td>12.9</td>
<td>68.5</td>
<td>11.6</td>
<td>4.5</td>
<td>15.4</td>
<td>1.4</td>
</tr>
<tr>
<td>5</td>
<td>689</td>
<td>39.0</td>
<td>72.4</td>
<td>15.1</td>
<td>5.2</td>
<td>7.3</td>
<td>4.5</td>
</tr>
<tr>
<td>6</td>
<td>388</td>
<td>95.6</td>
<td>45.4</td>
<td>50.5</td>
<td>1.0</td>
<td>3.1</td>
<td>7.6</td>
</tr>
<tr>
<td>7</td>
<td>480</td>
<td>28.3</td>
<td>72.7</td>
<td>13.3</td>
<td>5.2</td>
<td>8.8</td>
<td>6.9</td>
</tr>
<tr>
<td>8</td>
<td>743</td>
<td>85.1</td>
<td>13.3</td>
<td>71.3</td>
<td>11.2</td>
<td>4.2</td>
<td>8.0</td>
</tr>
<tr>
<td>9</td>
<td>497</td>
<td>75.5</td>
<td>61.8</td>
<td>27.0</td>
<td>4.8</td>
<td>6.4</td>
<td>12.8</td>
</tr>
<tr>
<td>DA*</td>
<td>498.6</td>
<td>66.8</td>
<td>46.2</td>
<td>35.1</td>
<td>10.3</td>
<td>8.4</td>
<td>9.0</td>
</tr>
</tbody>
</table>

(Note. Enrollment data are actual numbers of students; all other data are percentages.)

(Note. School 1 houses classes of both federally funded and tuition-based preschool programs. Although located in the same facility, different classrooms will be used for each category.)

(Note. The EDS Profile Website 2014-2015 identifies the following definitions [updated 11/7/15]: Mobility index—a comparison of reentries to total enrollments expressed as an annual percentage; Free/reduced lunch—percentage of students at school who receive either a free or reduced priced lunch; Ethnicity—percentage of white, African American, and all other students enrolled.)

* DA represents the District Average for EDS.

Figure 8 reports demographic data comparing the study participants’ average to district averages for EDS. When comparing my sample to the district, I used the school-level variables of SES, race, mobility, and attendance. Schools included in this study
have a demographically similar average to the district averages for EDS. The sample population for this study is representative of EDS district demographics.

![Figure 8. Comparison of average school demographics included in the study to average district demographics for EDS](image)

(Notes: All data are percentages.)

Achievement data for each of the schools in the study are reported below in Table 37. The achievement table shows that the average kindergarten readiness rates range from 28.4% to 89.7% with seven of nine schools achieving above the district average of 51.9%. Cognitive/general knowledge readiness rates range from 21.6% to 80.4% with seven of nine schools achieving above the district average of 39.2%. Language/communication readiness rates range from 69.2% to 91.8% with all schools included in the study above the district average of 66.7%.
Table 37

2014-2015 Achievement of Schools Included in this Research Study

<table>
<thead>
<tr>
<th>School</th>
<th>Met AMO?</th>
<th>KPREP score %</th>
<th>Kindergarten ready %</th>
<th>Cognitive ready %</th>
<th>Language ready %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No</td>
<td>75.7</td>
<td>89.7</td>
<td>80.4</td>
<td>91.8</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>71.4</td>
<td>66.7</td>
<td>55.0</td>
<td>75.8</td>
</tr>
<tr>
<td>3</td>
<td>Yes</td>
<td>79.9</td>
<td>65.9</td>
<td>56.9</td>
<td>76.4</td>
</tr>
<tr>
<td>4</td>
<td>Yes</td>
<td>81.4</td>
<td>89.4</td>
<td>83.3</td>
<td>86.4</td>
</tr>
<tr>
<td>5</td>
<td>Yes</td>
<td>76.7</td>
<td>76.5</td>
<td>63.5</td>
<td>77.4</td>
</tr>
<tr>
<td>6</td>
<td>No</td>
<td>56.9</td>
<td>28.4</td>
<td>21.6</td>
<td>73.0</td>
</tr>
<tr>
<td>7</td>
<td>No</td>
<td>78.1</td>
<td>72.2</td>
<td>66.7</td>
<td>90.3</td>
</tr>
<tr>
<td>8</td>
<td>No</td>
<td>61.2</td>
<td>53.1</td>
<td>41.5</td>
<td>69.2</td>
</tr>
<tr>
<td>9</td>
<td>Yes</td>
<td>65.4</td>
<td>37.5</td>
<td>26.4</td>
<td>79.2</td>
</tr>
<tr>
<td>DA*</td>
<td>N/A</td>
<td>56.1</td>
<td>51.9</td>
<td>39.2</td>
<td>66.7</td>
</tr>
</tbody>
</table>

(Note: AMO—Annual Measurable Objective as set by the state department of education; KPREP—Kentucky Performance Rating for Educational Progress as required by Senate Bill One passed in 2009 by the State General Assembly. Brigance uses the Anastasi and Urbina [2008] definition of School/Kindergarten Readiness. “School readiness means that a child possesses a set of prerequisite skills and abilities that will allow that child to benefit from instruction at the kindergarten level” [p. 84]).

* DA represents the District Average for EDS.

Figure 9 shows achievement data comparing the averages of study participants to district averages for EDS. When comparing my sample to the district, I used the school-level variables of KPREP scores as well as the percentages of kindergarten readiness, cognitive readiness, and language readiness. The average of all indicators for the sample is 67.57% as compared to the district average of 53.47%. The sample population for this study includes both high performing and low performing schools, which is a representation of the achievement in EDS.
Figure 9. Comparison of averages of schools included in the study to district averages for EDS for achievement

Procedures

Pre-existing data were used for the purposes of this study. Specifically, the data management department of EDS collected and analyzed data in the 2014-2015 and 2015-2016 school years was analyzed to determine the relationship effects of each variable and kindergarten readiness. I used student-level data retrieved from the EDS district. The data are collected annually within the first 30 days of the school year through the administration of the Brigance Kindergarten Screener (BKS). Trained educators administer the screener and enter the data into the Brigance online management system. The EDS data management department imported this data into the EDS student records management system to which district staff have access. Student-level data (i.e., race, SES, attendance, prior setting, and school climate) as well as classroom-level data (i.e., music inclusion, time allotted to instruction) were not publicly available and were
requested through the EDS online data request system. A committee of data management specialists reviewed the request and granted approval for the release of data for this capstone study. The EDS data management department coded the data to protect the confidentiality of the participants prior to releasing the file to the capstone group.

Specifically for my study variables, information on music inclusion and time allotted to music instruction information was listed on teacher schedules from classrooms included in my study. On each schedule, the amount of time was listed as well as if additional activities were included with the music instruction such as opportunities for students to move with the music.

Through the review of publicly available EDS data notebooks, the capstone group selected the schools and classrooms from which the existing panel data were requested. The data notebooks reflected demographic characteristics and funding sources of all schools within the district. I used the EDS informational website to obtain a list of schools that have tuition-based and federally funded preschool programs. This data set was assessed to determine the classrooms included in the capstone. All of the schools were selected using a random sample based on the following characteristics: a) where the preschool was housed; b) whether the school where they were housed has a student body of at least 350 students; and c) whether the school has a full-day preschool program. Schools with 350 or more students were selected due to the use of the Comprehensive School Survey to determine school climate ratings.

The requested BKS data included student-level results in the domains of cognitive/general knowledge and language/communication. These results were analyzed according to the raw score reported by EDS. The BKS scores range from 0 to 125 for a
composite score of all five domains. Below average scores range from 0-89; average scores range from 90-109; and above average scores range from 110-125.

**Data Analysis**

Descriptive statistics, correlations, and multiple regressions were used to address the study research questions. Descriptive statistics were used to report the data collected on the key variables (e.g., race, SES, prior setting, attendance, and climate). Correlations were used to examine the relationship among study variables. Lastly, regressions were used to examine the variance explained by the addition my study variables (e.g., music inclusion and time allotted for music instruction). Each procedure is subsequently described in detail as related to addressing the study research questions.

Descriptive statistics are used to categorize, describe, and summarize numerical data (Cronk, 2012; Hinkle et al., 2003). Descriptive statistics permit researchers to dichotomize the sample into sub groups allowing the researcher to determine if the study sample is representative of the population of the district as a whole. The characterization of the study sample provided by the descriptive statistics provides an intensive understanding of the population being studied.

Descriptive statistics were run on all variables to describe the data set that was used to answer the research questions. The descriptive statistics expressed the characterizations of the sample as a whole and included cross tabulations for each dichotomous independent variable in relation to each dependent variable. This allowed me to report the performance of study participants in relation to their demographic groups of race, SES, and prior setting. Percentages of students from each group who scored average or above or below average are reported in the following chapter.
Correlations establish the relationships between two variables (Cronk, 2012). Correlations enhance my understanding of the relationships between study independent and dependent variables, and they were used to examine the relationship among the variables including race, SES, language/communication, and cognitive/general knowledge. Subsequently, correlations were used to examine the relationship among the continuous independent variables of attendance and climate and the dependent variables of Brigance scores. The mean BKS score for language/communication and cognitive/general knowledge was determined for each level or value represented within the independent variables. This allowed for scoring comparisons between variables and each of the sub groups within the variables. The Pearson correlation outlines the linear relationship between my study specific independent variables (e.g., music inclusion and time allotted to music instruction) and the capstone study dependent variables of language/communication and cognitive/general knowledge. This statistical analysis allowed me to determine whether a positive or negative correlation existed among variables as well as the strength of the relationship between variables. According to Hinkle et al. (2003), a correlation value can be reported from .00 to 1.00 with .00 showing no relationship and 1.00 showing a very high relationship. Hinkle et al. (2003) reported guidelines for determining the strength of the relationship between variables. A correlation value can be reported as a little positive (.00 to .30) or negative (.00 to -.30) correlation, low positive (.30 to .50) or negative (-.30 to -.50) correlation, moderate positive (.50 to .70) or negative (-.50 to -.70) correlation, high positive (.70 to .90) or negative (-.70 to -.90) correlation, or very high positive (.90 to 1.00) or negative (-.90 to 1.00) correlation. The significance of the relationship was determined at $p < .05$. Cronk
(2012) noted that a reliable relationship exists between variables that are found to have a significant correlation. For the significance of the Pearson correlation to be reliable, both independent and dependent variables should be normally distributed (Cronk, 2012).

An HLMR allows the researcher to identify the entry order of the independent variables into the regression equation (Ho, 2013). Due to the flexibility of this regression, an HLMR was used to address the study research questions. The common independent variables of race, SES, prior setting, attendance, and school climate as well as music inclusion and time allotted to music were entered into SPSS using HLMR. This HLMR is an explanatory statistical procedure. Osborne (2000) suggested using this procedure when the researcher is trying to understand a phenomenon through group-level variables. I analyzed data from the HLMR outputs that included music inclusion and the amount of time allocated for music instruction. The dependent variable was kindergarten readiness in the domains of cognitive/general knowledge and language/communication.

The use of HLMR analysis allowed for the creation of variable blocks which when included in the analysis produced the variance explained among the blocks within the same sample to understand the relationship between music inclusion and kindergarten readiness. This method was selected because the research questions sought to explain the variance among groups of variables after accounting for the variances attributed to covariates (Tabachnick & Fidell, 2013). My study included three variable blocks: a) student-level variables of SES (Qualifies for free/reduced lunch = 0); race (African American = 0), attendance (number of days absent); b) school-level variable of climate (average student climate CSS scores); c) teacher level of credentials (bachelor’s degree or higher = 0); and d) teacher years of experience. Block 1 served to control for the student-
level demographic variables prior to the addition of school and classroom-level variables. I expected to find a significant outcome with the addition of each block explaining the variance. I looked for a significant increase in $R^2$. I also examined the change in the $R^2$ value to determine the significance of adding variables into the analysis at different stages (Petrocelli, 2003). This allowed me to determine the amount of change in variance by adding more variable blocks to the analysis.

The variables entered/removed table shows the order in which the variables were added to the study while the model summary table reports the variance accounted for after each variable was added to the regression (Ho, 2013). In order to determine the variance explained, I used the $R^2$ value which reports “the degree in which a phenomenon exists” (Cohen, 1965, p. 9). Analyzing the differences in $R^2$ values after each block is added, allowed me to determine the variance explained by the combination of variables included with the addition of each block. The $f$ change value was used to determine the effect size of variance explained by each block. According to Cohen (1988) a small effect size is .0196, a medium effect size is .1300, and a large effect size is .2600. Ho (2013) states the coefficients table helps to examine how the variables were entered into the regression equation and the significance attributed to each variable as it relates to the dependent variable.

An issue in correlational research is the nature of the relationship among variables. In particular for multiple regression, multicollinearity occurs when two or more variables are too strongly correlated. To gauge the multicollinearity of variables, the variance inflation factor (VIF) was used to determine if a strong linear relationship existed between any predictor variables (Stevens, 2009). Ho (2013) and Stevens (2009)
asserted that VIF levels below 10 indicate multicollinearity are not an issue. The collinearity diagnostics output table measures how interrelated the variables are (Becker & Wu, 2007).

The significance of each predictor Block was determined through the use of regression equation $f, (df1, df2) = f$ change, $p < .05$ (Ho, 2013). After the significance of the Block was determined, Beta weights were analyzed to determine the significance of each predictor included within the Block. Predictors were found to be significant at the $p < .05$ level. According to Ho (2013), Beta weights less than $p < .05$ level show a significant contribution to the Block. After a significance of the predictors within the significant Block was determined at the $p < .05$ level I was able to reject or accept the null hypothesis (Hinkle et al., 2003). When the predictor was significant, I was able to reject the null hypothesis. When the predictor was not significant, I was able to accept the null hypothesis. When the null hypothesis was rejected, I examined the $t$-statistic to evaluate the difference between the population mean and the observed sample mean (Hinkle et al., 2003). The $t$-statistic critical value is significant at or above 1.960 when $p < .05$ (Hinkle et al., 2003).

The use of HLMR analysis allowed the capstone group to input the independent variables in the order that was dictated by logical considerations (Ho, 2013). Initial analysis of the research on each independent variable dictated that the order of input into the regression was as follows: 1) funding; 2) school location; 3) school classification; 4) teacher credentials; 5) teachers years of experience; 6) music inclusion; and 7) amount of time allotted to music instruction. The capstone group anticipated that funding would have the strongest relationship to the dependent variable with the independent variable of
teacher credentials in the second priority position and the relationship between music inclusion and the dependent variable in the third priority position. The order of entry allowed me to see the importance of each independent variable Block and the variance provided by each Block in relation to the dependent variable of kindergarten readiness (Ho, 2013).

The variable Blocks’ (e.g., Block 1, Block 2, and Block 3) null hypothesis can be rejected at the $p < .05$ level (Hinkle et al., 2003), or when the parameter is statistically different from zero. This allowed me to determine if there was a statistical significance of the variable Blocks in the HLMR analysis. This informed me when the variables in the Block collectively accounted for the variance in the dependent variables.

Rejecting the null hypothesis allowed me to determine if the addition of the independent variables within Block 3 enhanced the prediction music inclusion and time allotted to music instruction had a positive relationship on kindergarten readiness. This change was reflected in the $R^2$ value through the addition of Block 3 to the model.

**Assumptions.** Statistical procedures have assumptions that must be tested before the outputs can be considered reliable. The HLMR tests assumptions during the data analysis. According to Snijders (2012), the assumptions include the following:

- Are the right variables included in the fixed section of the regression?
- Are the right variables included in the random section of the regression?
- Are the residuals normally distributed, is the variance of the residuals constant?
- Are the coefficients distributed normally?
- And do the coefficients have a construct co-variance matrix?
I addressed these assumptions in the data analysis section. Assumptions were addressed by assigning variables to blocks according to their school level, classroom level, and student level. Additional assumptions were addressed by examining residual plots for clustering of data as described by Stevens (2009).
Chapter XIV is divided into two sections that report study findings: *Descriptive Statistics* and *Hierarchical Linear Multiple regression (HLMR)*. The first section, *Descriptive Statistics*, reports the descriptive statistics of the collected data on the key variables (e.g., race, Socioeconomic Status (SES), prior setting, attendance, and climate). The second section, *Hierarchical Linear Multiple Regression Results (HLMR)*, reports the results of the HLMR. Results are reported from the three HLMR blocks and from not only the aforementioned independent variables, but also the addition the school level variable school climate and classroom level variables of music inclusion and time allotted for music instruction.

**Descriptive Statistics**

Table 38 and Table 39 report cross tabulations with the independent variables being race, SES, and prior setting and the dependent variables of each of the included domains of the Brigance Kindergarten Screener (BKS). Specifically, Table 38 reports descriptive statistics for each of the student-level independent variables for the language/communication domain, whereas Table 39 reports descriptive statistics for the cognitive/general knowledge domain.

As shown in Table 38, 27.4% of African American students scored below average in the domain of language/communication, while 26.3% of non-African American
students scored below average. Therefore, African American students were 1.1% more likely than non-African American students to score below average in the language/communication domain of the BKS. A Chi-Square statistic was used to examine whether African American students who scored below average were significantly different than the non-African American group, and there was no significant difference between the groups, $X^2 (1) = .02, p = .88$.

For students who qualified for free/reduced lunch, 29.6% scored below average, while 70.3% scored above average in the domain of language/communication. Of the students who did not qualify for free/reduced lunch status, 19.5% scored below average and 80.4% scored above average. Students who qualified for free/reduced lunch were 10.1% more likely to score below average on the language/communication domain of the BKS compared to those who did not qualify. A Chi-Square statistic was used to examine whether students who qualified for free/reduced lunch who scored below average were significantly different than students who did not qualify for the free/reduced lunch group, and there was no significant difference between the groups, $X^2 (1) = 1.76, p = .19$.

Table 38 also reports that 30.8% of Head Start students scored below average, and 69.1% scored on or above average. Of the tuition-based students, 17.6% scored below average and 82.3% scored average or above on the language/communication domain of the BKS. Students who were enrolled in Head Start programs in their prior setting were 13.2% more likely to score below average on this domain. A Chi-Square statistic showed that Head Start students who scored below average were significantly different than the students in the tuition-based group and there was not a significant difference between the groups, $X^2 (1) = 3.21, p = .07$. 
Table 38

Language/Communication Readiness

<table>
<thead>
<tr>
<th></th>
<th>Average or above</th>
<th>Below average</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>74</td>
<td>28</td>
</tr>
<tr>
<td>Non-African American</td>
<td>53</td>
<td>19</td>
</tr>
<tr>
<td><strong>SES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualifies for</td>
<td>90</td>
<td>38</td>
</tr>
<tr>
<td>free/reduced lunch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does not qualify for</td>
<td>37</td>
<td>9</td>
</tr>
<tr>
<td>free/reduced lunch</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Prior setting</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head Start</td>
<td>85</td>
<td>38</td>
</tr>
<tr>
<td>Tuition-based</td>
<td>42</td>
<td>9</td>
</tr>
</tbody>
</table>

*(Note. N = 174)*

As reported in Table 39, 61.7% of the African American students scored below average in the domain of cognitive/general knowledge, while 36.1% of the non-African American students scored below average. Therefore, African American students were 25.6% more likely than non-African American students to score below average in the cognitive/general knowledge domain of the BKS. A Chi-Square statistic was used to examine whether or not African American students who scored below average were significantly different than the non-African American group, and there was significant difference between the groups, $X^2 (1) = 10.28, p < .01$.

For students who qualified for free/reduced lunch, 60.1% scored below average, while 39.8% scored above average in the domain of cognitive/general knowledge. Of the students who did not qualify for free/reduced lunch status, 26.0% scored below average and 73.9% scored above average. Students who qualified for free/reduced lunch were 33.3% more likely to score below average on the cognitive/general knowledge domain of the BKS. A Chi-Square statistic was used to examine whether students who qualified for free/reduced lunch scoring below average were significantly different than the students who did not qualify for the free/reduced lunch group and there was a significant
difference between the groups, $X^2 (1) = 15, p < .00$.

Table 39 also reports that 59.3% of Head Start students scored below average and 40.6% scored on or above average. Of the tuition-based students, 31.3% scored below average and 68.6% scored average or above on the cognitive/general knowledge domain of the BKS. Students who were enrolled in Head Start programs in their prior setting were 27.2% more likely to score below average on this domain. A Chi-Square statistic was used to examine whether Head Start students who scored below average were significantly different than the students in the tuition-based group and there was a significant difference between the groups, $X^2 (1) = 10.64, p < .00$.

### Table 39

**Cognitive/General Knowledge Readiness**

<table>
<thead>
<tr>
<th></th>
<th>Average or above</th>
<th>Below average</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>39</td>
<td>63</td>
</tr>
<tr>
<td>Non-African American</td>
<td>46</td>
<td>26</td>
</tr>
<tr>
<td><strong>SES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualifies for</td>
<td>51</td>
<td>77</td>
</tr>
<tr>
<td>free/reduced lunch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does not qualify for</td>
<td>34</td>
<td>12</td>
</tr>
<tr>
<td>free/reduced lunch</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Prior setting</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head Start</td>
<td>39</td>
<td>63</td>
</tr>
<tr>
<td>Tuition-based</td>
<td>46</td>
<td>26</td>
</tr>
</tbody>
</table>

*(Note. N = 174)*

Table 40 reports the Pearson correlations between study independent variables and study dependent variables of language/communication and cognitive/general knowledge. All of the relationships between the independent variables and language/communication were found to have little to no relationship with values ranging from -.108 to .039. There is little to no relationship between cognitive/general knowledge and attendance (-.154), climate (.148), and time allotted (.190).
Table 40

Pearson Correlations for Dependent Variables, Attendance, Climate, and Time Allotted

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Attendance-days absent</th>
<th>Climate</th>
<th>Time allotted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language/communication</td>
<td>-.108</td>
<td>.052</td>
<td>.039</td>
</tr>
<tr>
<td>Cognitive/general knowledge</td>
<td>-.154*</td>
<td>.148*</td>
<td>.190</td>
</tr>
</tbody>
</table>

(Note. * represents $p < .05$)

Table 41 reports the mean number of sample participants included in the level of each independent variable included in Block 3 (N) and standard deviation of dependent variable scores for students in the sample. The mean score for language/communication and cognitive/general knowledge are reported for each level of Block 3 variables (i.e., music inclusion and time allotted to music instruction). The mean score for the independent variable of music inclusion is reported for students who received music instruction or did not receive music instruction for each of the dependent variables. Students who received music instruction averaged 1.5 points higher in language/communication than students who did not receive music instruction. Students who received music instruction scored on average 4.13 points higher in cognitive/general knowledge than students who did not receive music instruction.

For classrooms that included music instruction, the time allotted to music instruction ranged from one class having 10 minutes to one class providing 40 minutes. Students who received music instruction for 10 minutes per day on average scored the highest of all groups on the language/communication domain with an average score of 105 points, which is 8.99 points above the total average scores. Students who received 25 minutes of music instruction scored the lowest, with an average score of 90.37 points, which is 5.64 points below the total average for the sample. The range of scores for the language/communication domain had a difference of 14.63 points. Students who received
music instruction for 40 minutes a day scored the highest of all groups on the cognitive/general knowledge domain, with an average score of 104.58 points, which is 15.44 points above the total average. Students who received music instruction for 25 minutes scored the lowest with an average score of 82.67 points, which is 6.47 points below the total average. The range of scores for the domain of cognitive/ general knowledge had a difference of 21.91 points.
### Table 41

Mean Scores for Music Inclusion, Time Allotted, and Dependent Variables Included in Study

<table>
<thead>
<tr>
<th>Block 3 variable</th>
<th>Variable levels</th>
<th>LangCom</th>
<th>CogGenK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Music inclusion</strong></td>
<td>Music</td>
<td>Mean 96.55</td>
<td>90.64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N 111</td>
<td>111</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD 13.009</td>
<td>15.148</td>
</tr>
<tr>
<td>No music</td>
<td>Mean 95.05</td>
<td>86.51</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N 63</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD 14.567</td>
<td>14.842</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Mean 96.01</td>
<td>89.14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N 174</td>
<td>174</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD 13.571</td>
<td>15.126</td>
<td></td>
</tr>
<tr>
<td><strong>Time allotted to music instruction</strong></td>
<td><strong>0 minutes</strong></td>
<td>Mean 95.05</td>
<td>86.51</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N 63</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD 14.567</td>
<td>14.842</td>
</tr>
<tr>
<td></td>
<td><strong>10 minutes</strong></td>
<td>Mean 105.00</td>
<td>95.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N 8</td>
<td>8</td>
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<tr>
<td></td>
<td></td>
<td>SD 10.876</td>
<td>16.725</td>
</tr>
<tr>
<td></td>
<td><strong>15 minutes</strong></td>
<td>Mean 97.72</td>
<td>88.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N 25</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD 10.188</td>
<td>13.952</td>
</tr>
<tr>
<td></td>
<td><strong>20 minutes</strong></td>
<td>Mean 92.40</td>
<td>92.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N 15</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD 15.693</td>
<td>12.967</td>
</tr>
<tr>
<td></td>
<td><strong>25 minutes</strong></td>
<td>Mean 90.37</td>
<td>82.67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N 24</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD 14.449</td>
<td>13.818</td>
</tr>
<tr>
<td></td>
<td><strong>30 minutes</strong></td>
<td>Mean 99.78</td>
<td>91.93</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N 27</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD 11.188</td>
<td>15.314</td>
</tr>
<tr>
<td></td>
<td><strong>40 minutes</strong></td>
<td>Mean 98.75</td>
<td>104.58</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N 12</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD 12.337</td>
<td>11.712</td>
</tr>
<tr>
<td>Total</td>
<td>Mean 96.01</td>
<td>89.14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N 174</td>
<td>174</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD 13.571</td>
<td>15.126</td>
<td></td>
</tr>
</tbody>
</table>

(Note. LangCom represents Language/Communication; CogGenK represents Cognitive/General Knowledge; SD represents Standard deviation)

(Note. N = 174 for each Block 3 variable)

**Multicollinearity explained.** The test outputs for multicollinearity of the independent variables included in my study were reported in Block 3 results in the coefficients table that was produced by the HLMR. The results showed that multicollinearity is not an issue when Block 3 is inserted into the HLMR for either
dependent variable language/communication or cognitive/general knowledge. After examining the Beta weights, it can be noted that even though multicollinearity does not pose an issue, only the independent variable of SES was found to be significant ($p < .05$) in the HLMR for the dependent variable of cognitive/general knowledge. No independent variables were found to be significant for the dependent variable of language/communication.

**Hierarchical Linear Multiple Regression (HLMR) Results**

My research questions for this study are: **Research question 1.** What is the relationship between the inclusion of music curriculum in the preschool setting and kindergarten readiness? **Research question 2.** What is the relationship between the amount of time allotted on inclusion of music curriculum in the preschool setting and kindergarten readiness?

Each of these questions was answered using the HLMR statistical procedure using three blocks of variables. Block 1 was comprised of student-level variables (e.g., race, SES, prior setting, and attendance); Block 2 was comprised of the school level variable of climate; lastly Block 3 contained the classroom level variables of music inclusion and time allotted for music instruction.

**Reports for HLMR blocks.** Table 42 reports the amount of variance explained by each Block, the Beta coefficients, and the standard error statistics for the predictor variables included in each Block of the HLMR for the dependent variables. Block 1 included the demographic variables of race, SES, and attendance, and accounted for 1.9% of the variance in language/communication, which was not statistically significant, $F(3, 170) = 1.084, p > .05$. The addition of Block 2, which included the school level variable
(school climate), explained 2.2% of the variance in language/communication, which resulted in an increase of .3% of the variance explained and was not statistically significant, $F(1,169) = .505, p > .05$. The inclusion of Block 3 provided a test of whether the variables of music inclusion and time allotted for music instruction contributed to explain the variance in language/communication. As reported, the variable blocks accounted for 2.8% of the variance in language/communication, which is an increase of 0.6% and was not statistically significant, $F(2,167) = .573, p > .05$. As such the independent variables were not strong predictors of kindergarten readiness in the BKS domain of language/communication.

Block 1 included the demographic variables of race, SES, and attendance and accounted for 11.3% of the variance in cognitive/general knowledge which is statistically significant, $F(3,170) = 7.226, p < .05$. The variable of SES was found to be significant at the $p < .05$ with a $t$-statistic of 3.217 showing the cognitive/general knowledge mean score of the study population was more than three standard deviations away from the hypothesized mean score of the population. The addition of Block 2 that included the school-level variable (school climate) explained 11.4% of the variance in cognitive/general knowledge, which resulted in an increase of .1% of the variance explained and was not statistically significant, $F(1,169) = .179, p > .05$.

The inclusion of Block 3 provided a test of whether the variables of music inclusion and time allotted for music instruction contributed to explaining the variance in cognitive/general knowledge. As reported, the variable blocks accounted for 13.4% of the variance, which is an increase of 2.0% and was not found to be statistically significant, $F(2,167) = 1.934, p > .05$. The addition of music inclusion and time allotted to music
instruction as a Block were not strong predictors in the domain of cognitive/general knowledge. The predictor variables of music inclusion and time allotted to music inclusion were not statistically significant at $p < .05$. I accepted the null hypothesis that there would be no difference in kindergarten readiness rates for students with music included in their instruction.

### Table 42

**HLMR Analysis of the Relationship of Kindergarten Readiness to Student Demographics, School Climate, and Music Inclusion in Preschools**

<table>
<thead>
<tr>
<th>Variable</th>
<th>LangCom Estimates</th>
<th>CogGenK Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$R^2$</td>
<td>Δ $R^2$</td>
</tr>
<tr>
<td><strong>Block 1</strong></td>
<td>.019</td>
<td>.113</td>
</tr>
<tr>
<td>Race</td>
<td>-.087</td>
<td>2.312</td>
</tr>
<tr>
<td>SES</td>
<td>.070</td>
<td>2.719</td>
</tr>
<tr>
<td>Attendance</td>
<td>-.091</td>
<td>.103</td>
</tr>
<tr>
<td><strong>Block 2</strong></td>
<td>.022</td>
<td>.003</td>
</tr>
<tr>
<td>Race</td>
<td>-.101</td>
<td>2.372</td>
</tr>
<tr>
<td>SES</td>
<td>.056</td>
<td>2.789</td>
</tr>
<tr>
<td>Attendance</td>
<td>-.092</td>
<td>.103</td>
</tr>
<tr>
<td>Climate</td>
<td>.059</td>
<td>12.001</td>
</tr>
<tr>
<td><strong>Block 3</strong></td>
<td>.028</td>
<td>.007</td>
</tr>
<tr>
<td>Race</td>
<td>-.106</td>
<td>2.383</td>
</tr>
<tr>
<td>SES</td>
<td>.105</td>
<td>3.142</td>
</tr>
<tr>
<td>Attendance</td>
<td>-.080</td>
<td>.105</td>
</tr>
<tr>
<td>Climate</td>
<td>.078</td>
<td>13.083</td>
</tr>
<tr>
<td>Music in</td>
<td>-.193</td>
<td>5.119</td>
</tr>
<tr>
<td>Time all</td>
<td>.174</td>
<td>.195</td>
</tr>
</tbody>
</table>

(Not e: LangCom represents language/communication; CogGenK represents cognitive/general knowledge; SES represents socioeconomic status; Climate represents school climate; Music in represents music inclusion; Time all represents time allotted for music instruction.

### Conclusion

For each of the research questions for my study, I accepted the null hypotheses. The inclusion of music, as well as measuring the time allotted to music inclusion, was not significantly related to performance on the BKS domains of language/communication and
cognitive/general knowledge Chapter XV will provide discussion and implications of my study’s findings.
CHAPTER XV
DISCUSSION

Introduction

Chapter XV is a summary of the methods, major findings according to the research questions, limitations of research design, and a conclusion of my study. The purpose of my research was to identify research-based pathways for preschool students to reach kindergarten ready to learn. The findings from my study can be used to determine curricular decisions at the preschool level, involving the inclusion of music education. Although the findings were not statistically significant, students who had music instruction scored higher on both domains of the Brigance Kindergarten Screener (BKS).

The examination of preschool curricular decisions demands the attention of school leaders when determining what subjects and skills to teach. These decisions must be supported with pertinent data. Kindergarten readiness must be a focus of school districts as the bar for academic performance in elementary schools continues to rise. Students must arrive to kindergarten ready to learn and equipped for academic success in the future. Supporters of preschool education believe that early education is the most influential factor to improve academic success for all students (Heckman & Masterov, 2007; Perez, Johnson, & Maynard, 2007). Curricular decisions involving the inclusion on non-tested subjects such as music must be scrutinized in order to determine its effectiveness in preparing students to be kindergarten ready. With little oversight
of curricular programs in preschools, research into which instructional activities create pathways towards academic success and kindergarten readiness was critical. Research that focuses on preschool curriculum and its ability to prepare young students for future success is an important, underdeveloped aspect of educational research.

**Summary of Method**

The correlational design of my research allowed for the examination of existing student groups and the factors that contribute to their differences (Cohen, Manion, & Morison, 2000). A Hierarchical Linear Multiple Regression (HLMR) was used with three variable blocks. Block 1 contained the student-level variables of race, SES, prior setting, and attendance. Block 2 contained the school-level variable of school climate. The factors included in Block 3 were music inclusion and time allotted to music instruction. This data yielded preliminary correlations between the kindergarten readiness of students and their exposure to music instruction.

**Summary of Findings for Research Questions**

**Research question 1.** What is the relationship between the inclusion of music curriculum in the preschool setting and kindergarten readiness?

My analysis revealed a difference of 4.13 points in mean scores and a positive correlation that exists between music inclusion and performance on the cognitive/general knowledge domain. My finding of an increase in cognitive scores on a standardized test paralleled Catterall’s (2009) 12-year longitudinal study, which found a connection between cognitive development and involvement in instrumental music classes. I found a smaller difference between mean scores for the language/communication domain (i.e., 1.50 points). The higher scores in both domains were not significant; however, the
difference that I found prompts the need for further research into this relationship at the preschool level.

Although the relationship between the provision of music into the curriculum and student achievement scores was a positive one, the results were not statistically related. As such, educational leaders and teachers should be cautious in making curriculum decisions based on my findings.

Block 3 of the HLMR was not significant as a block and each of the predictor variables of music inclusion and time allotted to music instruction were not significant. Future research should examine music inclusion individually rather than as a combined block of variables. Previous studies (Fitzpatrick, 2006; Johnson & Memmott, 2006; Schellenberg, 2004; Wilkins et al., 2003) examined music as an independent predictor variable and found its influence to be significant. Due to the inclusion of other independent variables in Block 3, it is possible that some or all of these variables influenced the significance of the block. Isolating music as an independent predictor may provide more insight into its correlation with achievement without the influence of additional variables such as the ones included in my study.

Although research on music and its influence on the young child’s brain is very limited (Fox, 2000), the few existing studies reported similar results to my study. Greenberg’s (1972) study of the association of music and movement with the development of language skills for preschool age students supported my study’s findings. The present study reaffirms Marin’s (2009) study associating linguistic abilities and early musical training with students.

Additional studies should address the domains of the BKS and the effect of music
inclusion as a singular variable using experimental or quasi-experimental designs. Appropriate instructional techniques for preschool students must also be examined to determine if research-based music education techniques influence achievement on this kindergarten screener. Researchers should observe classrooms to examine the quality of instruction as well as determine if teachers are implementing music instruction with fidelity. Quality of implementation should be included in future studies into the influence of music inclusion at the preschool level.

Examining the quality of implementation allows educational leaders at the preschool level to make research-based curricular decisions concerning the implementation of music. This type of research will also influence funding decisions when determining the purchase of music equipment, teacher training, and additional support needed for quality music education instruction. If leaders decide to include music, it will also be important for the teachers to understand and implement activities that coordinate with music national standards, as well as utilize strategies based in the methods of Dalcroze, Kodály, and Orff. Implementation of these methods will require training for both administrators and teachers.

**Research question 2.** What is the relationship between the amount of time allotted to inclusion of music curriculum in the preschool setting and kindergarten readiness?

Through the examination of the teacher schedules from each classroom that were included in the sample, music inclusion and time allotted were compared. Ten teacher schedules included additional activities combined with music such as movement, while three classrooms listed music as an independent activity. Students who had music
instruction as an independent activity for 10 minutes a day scored the highest on the language/communication domain. This class also had the smallest number of students (N=8), suggesting several possible factors that may correlate to these students’ higher achievement on the language/communication domain on the BKS. In a smaller class setting, teachers can interact more with students on an individual basis. The increased number of interactions may positively influence these students’ language development resulting in higher achievement on the language/communication domain. The increase of language development resulting from music instruction parallels previous research from Catterall and Rauscher (2008).

The majority of teachers’ schedules included additional activities in addition to music instruction. The use of music with movement activities may suggest that music was not the primary focus of instruction; instead, the teacher may have been focused on providing an opportunity for these young students to move in an organized activity with accompanying music. Teachers who included music with movement in their daily schedules also had longer durations of time devoted to this activity, and most of their students’ average scores on language/communication were above the total average for all participants. Students who had music instruction for 40 minutes per day scored the highest and this teacher included movement with the music activities. Determining if the correlation was to actual music instruction or the combination of music with students being able to move and expel energy to help them focus on other activities cannot be reported in this study. This finding suggested that allotting time for students to move around with the use of music may correlate to more focus on other traditional academic instruction. Movement combined with music may positively influence a child’s linguistic
skills (Greenberg, 1972; Jordan-DeCarbo & Galliford, 2011). In addition, popular music education strategies used at the preschool level, such as Dalcroze, Kodály, and Orff, incorporate movement. At the preschool level, it may be difficult to separate the influence of music or movement due to these age-appropriate instructional activities that combine the two.

Future research should not only examine teacher schedules, but also observe the classrooms that are included in the study to determine the actual number of minutes devoted to music instruction as well as how music is being taught. As stated, for Research Question 1, the quality of instruction must also be examined. By observing the classrooms, recommendations could be made to administrators concerning appropriate music education techniques that could be implemented. Through this observation, the researcher could examine quality, techniques, and the actual number of minutes of instruction rather than the time allotted in a teacher’s schedule. Classroom observation would allow the researcher to determine the amount of time of music instruction that most benefits students on the BKS. Determining the time that maximizes student achievement will allow for the creation of more efficient teacher schedules at the preschool level. Research into the amount of time that most benefits students on any activity, including music, should influence EDS policies concerning curriculum inclusion and teacher scheduling by creating mandates for the inclusion of subjects as well as time allotted for instruction into these subjects.

Neville et al. (2008) suggested that increased adult attention may be an underlying key component in improving students’ cognitive skills, which parallels with my study. The smallest class reported the highest scores on the BKS domain of
language/communication and received music instruction for 10 minutes per day. Focused adult interaction with smaller classes may have a greater impact than adult interactions with larger classes. In addition, the focus of music alone rather than including movement activities may have had a similar influence on achievement. Future research should address whether students who receive music instruction report significantly higher scores in academic domains of the BKS.

**Limitations of Research Design**

My study supported the examination of correlations between music inclusion and time allotted to music instruction to achievement on two domains of the BKS: language/communication and cognitive/general knowledge. This research design does not predict causation and cannot be used to determine if music instruction results in increased performance on academic screeners such as the BKS. The findings in this study support previous research into the correlation between achievement in young students and their exposure to music (Greenberg, 1972; Marin, 2009; Neville et al., 2008; Standley, 2008).

My study’s research design did not allow for the examination of the quality of music instruction. Using teachers’ schedules as the data source for music inclusion and time allotted to music instruction, quality could not be assessed. The instructional activities that were used during the time allotted for music instruction were not examined. The time specified for music may have included instruction on music-specific curriculum or simply the playing of music for the students to listen to during movement activities. In addition, my study did not examine previous instructional training that preschool teachers were provided on the inclusion of specific music education activities, such as Dalcroze, Kodály, and Orff techniques. These instructional methods are designed for younger
students like preschool students, and they require training to ensure quality implementation. This limitation in design could be the source of future research into preschool music instruction and its influence on student achievement.

**Conclusion**

Music education advocates will continue to research the influence of music education on achievement in other curricular areas as a means to support its inclusion in schools. Under current accountability systems, music can no longer be considered an essential component of school curriculums simply because educational leaders believe it should be included as part of a holistic educational experience. Research into the relationship between music and student achievement must continue in order to support music inclusion in schools. Additional research into the achievement of younger students and music education must address the quality of instruction as well as cross-curricular connections in order to support its inclusion in preschool and elementary settings.
EXECUTIVE SUMMARY

Students who begin their education careers kindergarten ready are more likely to build on these skills, and they are more prepared to succeed academically in both the short-term and long-term. The success of the elementary schools in Elementary District Schools (EDS) rests on the ability of preschool programs to deliver students who are prepared for kindergarten and thereby ready for success in elementary school. Policies at all levels of government must address inequities in students’ kindergarten readiness. Although stringent accountability measures are found at the elementary level, preschools must hold themselves responsible for creating a quality, enriched learning environment in order to prepare students for the accountability they will face as they continue their education. The public and policymakers must hold preschool programs to high standards in order to create better educational foundations. Mead (2008) noted, “When it comes to pre-k programs, quality is the operative word. All of the research showing positive effects from pre-k focuses on programs that are of very high quality” (p. 26). The perception of preschool programs as an important aspect of early childhood learning has not changed; however, debate continues about how to best utilize resources in order to prepare students for future success.

Kindergarten Readiness at the National Level

Across the United States, many students who enter kindergarten are not ready to learn (Konold & Pianta, 2005). Students who are not kindergarten ready are at risk to
face challenges, including lower graduation rates (Chapman, Laird, Ifill, & KewalRamani, 2011; Brooks-Gunn & Duncan, 1997), lower attendance rates (Rappaport, Daskalakis, & Andrel, 2011; Arthurs, Patterson, & Bentley, 2014), and fewer academic gains throughout their school career (Barnett, 1995; Reynolds, Temple, Robertson, & Mann, 2001). With increased accountability, educational leaders are increasing their focus on preschool programs (Williams, Landry, Anthony, Swank, & Crawford, 2012). Research that examines successful correlations to increased academic achievement at the preschool level demands the attention of educational leaders. National legislation, such the *Every Student Succeeds Act (ESSA)* (Public Law 114-95, 2015), forces preschool leaders to focus more on academic achievement in order to best prepare students for standards in elementary schools (Stipek, 2006). The inclusion of pre-k initiatives in ESEA has made preschool programs a focus of national importance.

**Kindergarten Readiness in Elementary District Schools (EDS)**

The state in which EDS resides finds that on average children from disenfranchised homes enter kindergarten at least two grade levels behind other students (State Department of Education. 2015). Additionally, the state currently labels 51% of kindergarten students as “not ready for school” (State Department of Education, 2015). Students who are deemed kindergarten ready are more likely to successfully assimilate into the school environment and show academic gains (State Department of Education. 2015). On average, students from Head Start preschools reach kindergarten readiness at a rate of 45.8% (State Department of Education. 2015). Kindergarten readiness issues that were found in the state in which EDS resides are representative of EDS and its students.
Gaps in Kindergarten Readiness Research

This section of the executive summary outlines gaps in the existing research from each of the individual studies in which the capstone was based.

**S. Nutter study.** Current researchers concentrate on state funding and funding arrangements (Bushouse, 2009; Magnuson, Ruhm, & Waldfogel, 2007; Mashburn et al., 2008). Nutter focused on federal funding and tuition-based programs, expanding the research on funding to multiple sources. Another gap in current literature is that state- and district-level data are largely used to measure the rate of kindergarten readiness (Johnson & Schoeni, 2007; Karoly, Kilburn, & Cannon, 2006; US Department of Education, 2015). Nutter addressed this gap by including student-level kindergarten readiness data. Kindergarten readiness research design was also seen as a gap in current research. LoCasale-Crouch et al. (2007) asserted that “this provides an opportunity for future work to explore factors that conspire to hold quality down, like high concentrations of risk, and influences that could potentially push quality up” (p. 15). LoCasale-Crouch et al. (2007) suggested that research should be conducted in ways other than through cluster analysis, thereby allowing for more individual data analysis. In response to the LoCasale-Crouch et al.’s (2007) call for additional research, Nutter used a hierarchical linear multiple regression (HLMR), which allowed for the analysis of individual blocks of variables to individual student data. The HLMR was used determine the relationship between school funding, school location, school classification and the academic growth of children attending preschool sites.

**D. Rivera study.** Research that examines the link between student outcomes and teacher education has shifted in recent years from structure to practice (Williams, Landry,
Anthony, Swank, & Crawford, 2012; Pianta, Barnett, Burchinal, & Thornburg, 2009; Mashburn, Justice, McGinty, & Slocum, 2016). While these studies have highlighted the importance of teacher practice, more recent research has demonstrated that teacher effectiveness must be evaluated using multiple teacher dimensions (Bill & Melinda Gates Foundation, 2013). Rivera’s study addressed this recent call to research by seeking to measure student outcomes, combining two teacher-level variables (i.e., teacher education and teacher years of experience) to determine effectiveness as measures by a common kindergarten screener. In response to the Bill and Melinda Gates Foundation (2013), Rivera utilized HLMR, which allowed for analysis of teacher-level variables as a Block to individual student readiness data. The HLMR was used to determine the relationship between teacher credentials, years of experience, and kindergarten readiness as measured by multiple measures of the BKS (i.e., cognitive/general knowledge and language/communication).

A. Forrest study. Several research studies focus on the impact of music instruction on older students, with a particular focus on those enrolled in performance classes such as band, orchestra, or choir (Catterall, Chapleau, & Iwanaga, 1999; Gouzouasis, Guhn, & Kishor, 2007; Kinney, 2008; Vaughn & Winner, 2000). Gaps in music education research exist when examining preschool students and other early childhood educational experiences (Fox, 2000; Levinowitz, 2011). Forrest addressed the gap in preschool music education research by addressing both the inclusion of music and the actual time allotted to music instruction. Combining these two variables into an HLMR allowed Forrest to examine the relationships between two different academic performance variables (i.e., language/communication and cognitive/general knowledge),
as well as multiple independent variables of music instruction. Forrest’s research will serve as a basis for future studies on the influence of music at the preschool level, including multiple independent variables to student-level data.

**Local Policies Affected by the Nutter-Rivera-Forrest Research**

Nutter, Rivera, and Forrest explored three local policies and policy papers in connection to their capstone: EDS Board Policies Fiscal Management 4.1, Curriculum and Instruction 8.11, and Instruction IGC (as outlined in the EDS 2015 Policy Manual). These policies have a direct connection with the capstone research and set the foundation for the creation and operation of early childhood within EDS.

Fiscal Management 4.1, *Budget Planning and Adaption*, mandates that the superintendent create a plan that supports the growth of all EDS students. The policy states, “The Superintendent shall present an educational plan outlining the programs necessary to achieve the broad objectives established by the Board” (Elementary District Schools, 2015a). This policy led to the creation of the new district vision document titled, *Vision 2020: Excellence with Equity* (Elementary District Schools, 2015b). Vision 2020 is divided into three focus areas: a) Focus Area 1: *Learning, Growth and Development*; b) Focus Area 2: *Increasing Capacity and Improving Culture*; and c) Focus Area 3: *Improving Infrastructure and Integrating Systems* (Elementary District Schools, 2015b). Focus Area 1 has the greatest connection with the Nutter-Rivera-Forrest kindergarten readiness capstone. Specifically, the goal of deeper learning strategy 1.1.6 states the following:

Strengthen early childhood education: Create a comprehensive early childhood education plan to significantly increase kindergarten readiness that addresses the improvement and expansion of EDS programs; recruitment, retention, and professional development of educators; expansion of summer kindergarten
readiness camps; community partnerships; and communications, support and outreach to parents and caregivers. (Elementary District Schools, 2015b)

Strategy 1.1.6 places kindergarten readiness as a priority for EDS. This strategy directly connects early childhood education with the ability of students to be ready for kindergarten.

Curriculum and Instruction 8.11, Course of Study, outlines the design of the instructional program that will serve preschool to twelfth grade students (Elementary District Schools, 2015a). The policy states the following:

A basic instructional program shall be designed and implemented to meet the needs of students in P1-12 and preschool as required by law. This program shall include, but not be limited to, instruction in the foundation skills of reading/language arts, mathematics, science, social studies, arts and humanities, practical living and vocational studies. (Elementary District Schools, 2015a)

This policy directly connected the EDS preschool program to the success of the kindergarten through twelfth grade program. Preschool is becoming a priority in the race to provide students the support they need.

The final policy, Instruction IGC: IGCF Early Childhood Program, outlines the role that EDS plays in providing education to children from zero to age four (Elementary District Schools, 2015a). The policy further states that in order to financially support the program, EDS can accept tuition, grants, awards, or federal funds. This policy was adopted in 1995, demonstrating that preschool has long been considered a viable option for educating the district’s youngest students.

**Implications of S. Nutter Study**

The Nutter study sought to determine the relationship between funding source, school location, school classification, and kindergarten readiness scores as measured by the Brigance Kindergarten Screener (BKS). Although school funding was not significant
in Block 3 of the HLMR descriptive, statistics showed that students in a tuition-based preschool program had higher rates of kindergarten readiness than students in a federally funded preschool program. This conclusion suggests that funding indeed has a relationship with kindergarten readiness, but not at a significant level. Nutter also found that students who were enrolled in a school classified as distinguished had higher rates of kindergarten readiness than students who were not enrolled in a school classified as distinguished, which is significant and consistent with findings reported by Karen (2005). These findings could influence how EDS funds preschool and into which public schools preschool classrooms are placed. The analysis shows that placing preschools in schools that are classified as distinguished has a positive effect on kindergarten readiness scores. This in turn would have an impact on the local fiscal management policy of EDS Board of Education. The EDS Board Policy of Fiscal Management 4.1, *Budget Planning and Adaption*, sets forth the task for the superintendent to create a plan that supports the growth of all EDS students. The findings of Nutter’s research suggest that the plan created by the superintendent includes a study of financial support and school classifications before deciding where preschool classrooms are housed.

**Implications of D. Rivera Study**

The Rivera study sought to determine the relationship between teacher credentials, teacher years of experience, and kindergarten readiness scores as measured by the BKS. Block 3 of the Rivera study found that when the variables of race, SES, attendance, climate, years of experience, and credentials were added as a block, the block was significant. Within Block 3, SES was found to be highly significant. These results were consistent with the findings of Darling-Hammond (2010), which supported teacher
certification and/or college attainment for underserved student populations. The Measures of Effective Teaching Project study answered fundamental questions regarding identification of effective teachers (Bill & Melinda Gates Foundation, 2013). These findings could affect how EDS decides which credentials are required for preschool teachers in the district by providing evidence that the investment in teacher salaries will have a positive effect on student outcomes. Higher salaries might encourage teachers to remain in the classroom, providing more experienced teachers in the district. This in turn could have an impact on the local early childhood policy of EDS Board of Education.

*Instruction IGC: IGCF Early Childhood Program* outlines the role that EDS sets forth in providing education to children from zero to age four. The findings of this research study suggest that traditionally marginalized preschool students may benefit from preschool teachers who hold an education degree and have educational experience.

**Implications of A. Forrest Study**

The Forrest study sought to determine the relationship between music inclusion, time allotted to music instruction, and kindergarten readiness as measured by the BKS. Forrest found higher BKS scores in the domains of language/communication and cognitive/general knowledge, although the increase was not statistically significant. This positive difference in scores demands further attention from researchers. Future studies should examine quality of teaching as well actual time spent on the instruction of music to more accurately examine the influence of music inclusion. Examination of teaching methods, as well as implementation of national standards for music in preschool classrooms, will provide more insight into the influence of quality and non-quality music education strategies. Classroom observations and measurement of the actual time spent
on music instruction will also provide more insight into the influence of music inclusion on the kindergarten screeners such as the BKS, as well as provide detail into the most effective type of instruction and most productive amount of time spent on music education strategies.

Preschools in EDS must create programs that enrich all students’ knowledge bases in order to prepare them for kindergarten. Curricular decisions must be made to ensure quality educational experiences for all students. The inclusion of non-assessed subjects such as music is supported by Forrest’s study. Although not significant, Forrest found increases in the level of performance on the BKS by students who received music instruction, suggesting that the inclusion of music in the preschool curriculum positively contributed to student outcomes, albeit insignificantly. Forrest’s study adds further evidence of the positive contribution to student learning that music instruction brings to student academic achievement (Cogo-Moreira, De Avila, Ploubidis, & Mari, 2013; Ho, Cheung, & Chan, 2003; Gouzouasis et al., 2007; Piro & Ortiz, 2009; Schellenberg, 2004; Standley, 2008).

Educational leaders in EDS must continue to examine the influence of music education strategies at the preschool level. These findings could influence how EDS determines curricular decisions at the preschool level. The EDS Board of Education Policy, Curriculum and Instruction 8.11, Course of Study, describes curriculum and instructional activities to be implemented in all preschool classrooms. Research such as the Forrest study should examine the effectiveness of activities listed in teachers’ schedules as well as the appropriate amount of time that should be allotted for those activities in order to provide the maximum benefit for students. Forrest’s study could
influence EDS policies such as Curriculum and Instruction 8.11 by increasing the oversight and mandates for the inclusion of curriculum such as music and by creating more universal schedules for teachers with stringent times for educational activities proven to positively influence student achievement in the BKS. Preschool curriculum may be scrutinized much like elementary and secondary school curriculum in order to provide the most beneficial, research-based schedule and educational opportunities for these students.

The findings of Forrest’s research suggest that music instruction, as an independent activity, should be included for preschool students. In addition, EDS should include music instruction as a mandated instructional activity in preschool classrooms and provide the support that teachers need in order to implement quality musical experiences for these students. Quality is a key component to including music education at any level and must be addressed in future research studies in order to determine the effectiveness of music inclusion at the preschool level. Likewise, educational leaders in EDS must address the quality of music instruction in order to determine the influence of music on the achievement of its preschool students.

Conclusion

Although significant investments have been made over the last decade to expand and improve early childhood programs, the belief that these programs will realize their potential as an asset for creating learning for young children has not been realized. Students from low socioeconomic backgrounds are continuing to enter kindergarten far behind many of their peers (Jacobson-Chernoff, Flanagan, McPhee, & Park, 2007). Public policies at the local level must reflect the needs of students in preschools and
ensure quality educational experiences for these young students to foster future success. The Nutter-Rivera-Forrest studies, individually and as a whole, provide information about which EDS can base future policy decisions. The inclusion of funding, school location, school classification, teacher credentials, teacher years of experience, music inclusion, and time allotted to music instruction provides research on successful pathways to kindergarten readiness.
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EDUCATION & TRAINING: B.A., Elementary Education
Florida Atlantic University
2000-2004

M.Ed., Education
Indiana University
2006-2009

Ed.D., Educational Leadership and Organizational Development
University of Louisville
2013-2016

AWARDS: Hilliard Lyons Excellence Award—Principal of the Year 2015
Gheens Academy Innovation Award 2013

PROFESSIONAL SOCIETIES: National Education Association
Jefferson County Association of School Administrators
Golden Key National Honor Society
CURRICULUM VITA

NAME: Ashley Taylor Forrest

ADDRESS: College of Education and Human Development
University of Louisville
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DOB: Owensboro, Kentucky – July 15, 1977

EDUCATION & TRAINING:
B.M., Music Education
University of Louisville
1995-1999

MAT, Music Education
University of Louisville
1999-2000

EdS, Educational Leadership
University of Louisville
2005-2009

Ed.D., Educational Leadership and Organizational Development
University of Louisville
2013-2016

AWARDS: Ashland Corporation Kentucky Middle School Teacher of the Year 2011

PROFESSIONAL SOCIETIES:
Kentucky Music Educators Association (KMEA)
National Association for Music Education (NAfME)
Jefferson County Association of School Administrators
Delta Omicron Music Fraternity


INVITED PRESENTATIONS:  University Council for Educational Administration National Conference (UCEA) presenter for Grandparent Involvement in JCPS Research Study 2014

JCPS district CHAMPS behavior management program professional development presenter 2007

JCPS district music in-service presenter for positive behavior strategies in the music classroom and district music vision/mission development 2007, 2014 respectively