

Investigating the Virginia Preschool Initiative's Role in Preparing  
Students for Kindergarten

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**ABSTRACT**

Although many children enter kindergarten having some form of preschool experience, the quality of these experiences differs greatly among the programs that are available to families. This variability can create school readiness gaps, especially for children from disadvantaged backgrounds (Isaacs, 2012). Children not being ready for school has come to the attention of stakeholders around the country and in the Commonwealth of Virginia. According to a state-wide study, approximately 30% of the students entering Virginia's schools either were not ready academically and/or behaviorally (Joint Legislative Audit and Review Commission [JLARC], 2017). Fortunately, the Virginia Preschool Initiative (VPI) program was created to give students with the greatest risk of school failure an opportunity to overcome potential learning obstacles.

The general purpose of this study was to examine the efficacy of a state-funded prekindergarten program in a rural school division in Central Virginia. Specifically, this study examined academic and behavioral data for four cohorts of kindergarten students to determine if students who participated in the VPI program performed better on school readiness measures compared to their peers without any preschool or prekindergarten experience. Two-tailed *t*-tests were used to determine if any significant differences existed on measures of literacy, mathematics, self-regulation, and social skills between students who attended a state-funded prekindergarten program to their peers without any prekindergarten or preschool experience.

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**GENERAL AUDIENCE ABSTRACT**

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## **Dedication**

This dissertation is dedicated to my father, Douglas Wayne Lyle, Sr. My mother once asked my father why they never saved money for me to go to college. He responded, “I never thought someone like me would have a kid go to college.” Dad, this fourth degree is a testament that the son who bears your name did go to college, and I only hope I have made you proud.



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My colleagues in Amherst County Public Schools helped me tremendously with balancing professional and academic responsibilities. Dr. Dana Norman, my colleague and friend, has always supported my willingness to grow as a leader. Completing this doctoral program is just one of many ways she allowed me to learn so that I can best serve those who matter most in our profession – students.

Finally, my wife, Susan Walker-Lyle, and my mother, Sandra Huff Lyle, have wanted me to earn a doctorate for a number of years. Their encouragement and patience have finally allowed this goal to become a reality. You both have my love and affection for understanding the financial and temporal investment that were required for me to become Dr. Douglas Wayne Lyle, Jr. Praise God from whom all blessings flow!

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## **Chapter One**

### **Introduction**

Across the United States, investment in state-funded prekindergarten has increased over the past 15 years (Friedman-Krauss et al., 2018). In the Commonwealth of Virginia, the Virginia Preschool Initiative (VPI) only served 10,318 students during the 2004-2005 school year, but this enrollment almost doubled by the 2013-2014 school year with 18,021 students (Virginia Department of Education [VDOE], 2013a). Early learning opportunities are advantageous for students by preparing them academically and behaviorally for kindergarten, and economically disadvantaged children especially benefit from quality prekindergarten programs (Ladd, 2017). The purpose of this study was to examine the efficacy of a VPI program located in Central Virginia at preparing students for kindergarten.

#### **Purpose of the Study**

The purpose of this study was to examine the effectiveness of one Virginia school division's VPI program in preparing students for kindergarten related to four areas of school readiness: literacy, mathematics, self-regulation, and social skills. In terms of public accountability, this is particularly salient since lack of school readiness can result in both short-term costs (e.g., staff for providing intervention services, students spending additional years in school, and parents missing work and wages when their children are suspended) and long-term costs (e.g., students at greater risk for dropping out of school, resulting in fewer employment opportunities and increased chances for criminal activity) (Bettencourt, Gross, & Ho, 2016). Whenever taxpayer dollars are spent on education, teachers and administrators providing the educational services assume the responsibility of ensuring they are fulfilling their students' academic and behavioral needs (Pianta, LaParo, & Hamre, 2008).

#### **Organization of the Study**

This study is divided into five chapters. The first chapter is organized around the following topics: purpose of the study, statement of the problem, justification and significance of the study, definitions of terms, research questions, theoretical framework, limitations of the study, delimitations of the study, and chapter summary. Chapter 2 is a review of the literature on factors related to kindergarten readiness (e.g., literacy, numeracy, self-regulation, and social

skills), how these skills are measured by the Phonological Awareness Literacy Screening-Kindergarten (PALS-K) and the Virginia Kindergarten Readiness Program (VKRP), and how the VPI can improve academic and behavioral skills for at-risk students. Chapter 3 describes the methodology that was used, including data sources and proposed analyses. Chapter 4 presents the results of the study along with analyses of the data. Chapter 5 summarizes the findings and offers suggestions for further research.

### **Statement of the Problem**

Since the primary mission of publicly funded prekindergarten programs is to prepare at-risk students for school (Justice, Jiang, Khan, & Dynia, 2017), children's lack of preparation stirs much consternation. Despite prekindergarten being one of the fastest growing educational reform movements in the United States (Shue, Shore, & Lambert, 2012), kindergarten teacher respondents ( $N = 531$ ) to a national survey in the United States reported that most children are not ready for school (Curby et al., 2017). In fact, poverty is a key variable related to school readiness since less than half of the poor children in the United States enter school ready to learn (Isaacs, 2012). This statistic echoes the empirical findings of an early seminal study conducted by Hart and Risley (2003) when they examined preschoolers' vocabulary. This study began when the children were 7-months old, and the researchers projected that the children who lived in poverty ( $n = 6$  children), by age 4, would know 30 million fewer words than the children who came from professional families ( $n = 13$  children).

Although 75% of the children from middle- and upper-class families are ready for school (Isaacs, 2012), the following two studies did not discover the large word gap between advantaged and disadvantaged children like the one found in the Hart and Risley (2003) study. Gilkerson et al.'s (2017) study involving 329 families with children ranging in age between 2 months and 4 years also found a word gap between high-income and low-income groups. Results indicated that children from poverty knew less than 4 million words than their more affluent peers when they turned 4 years old, not 30 million words less by the age of 3.

In a similar study, Sperry, Sperry, and Miller (2018) were unable to replicate the Hart and Risley results with a study that involved 42 children from five different poor and working-class communities. For example, the lowest-income children ( $n = 3$ ) in South Baltimore from Sperry et al. (2018) heard almost 2 times as many words spoken by adults an hour as the poverty children ( $n = 6$ ) from the Hart and Risley study. Poor children ( $n = 11$ ) living in rural Alabama



heard 3 times as many words as the poverty children from the Hart and Risley study. While there is conflicting data supporting the word gap, a poverty gap is prevalent in communities segregated by race and class (Mullen & Kealy, 2013). The effects of poverty create a problem for the children living in these conditions by decreasing their chances for being ready for school (Isaacs, 2012).

### **Study Justification and Significance**

While investment in state-funded prekindergarten programs continues to rise (Bassok & Latham, 2017), the United States has not kept pace with the number of at-risk children who need to attend these programs (Bouffard, 2017; DuFour, 2015). In fact, 2013 marked the first time more than half of the country's public school students were classified as being low income, presenting a greater need for preparing economically disadvantaged students for school (Tough, 2016). At a macro policy level, the federal government's focus on school readiness began under President Bill Clinton when the "Goals 2000: Educate America Act" (U.S. Congress, 1994) was signed into law. A goal of the legislation was "All children in the United States will start school ready to learn" (Goals 2000, p. 6). Three years later, the National Education Goals Panel (1997) added greater specificity to this goal by dividing school readiness into five categories: health and physical development, emotional well-being and social competence, approaches to learning, communication skills, and cognition and general knowledge.

The Commonwealth of Virginia was one of 17 U.S. states in a consortium that created the National School Readiness Indicators Initiative (Rhode Island KIDS COUNT, 2005). This project identified school readiness assessments for policymaking and evaluation purposes (Thompson & Goodman, 2009). This national initiative corresponded with the time when there was a marked increase in the number of peer-reviewed publications on school readiness (Hindin, 2018). As shown in Figure 1, the number of studies in the United States devoted to school readiness more than doubled between 2004 and 2006.

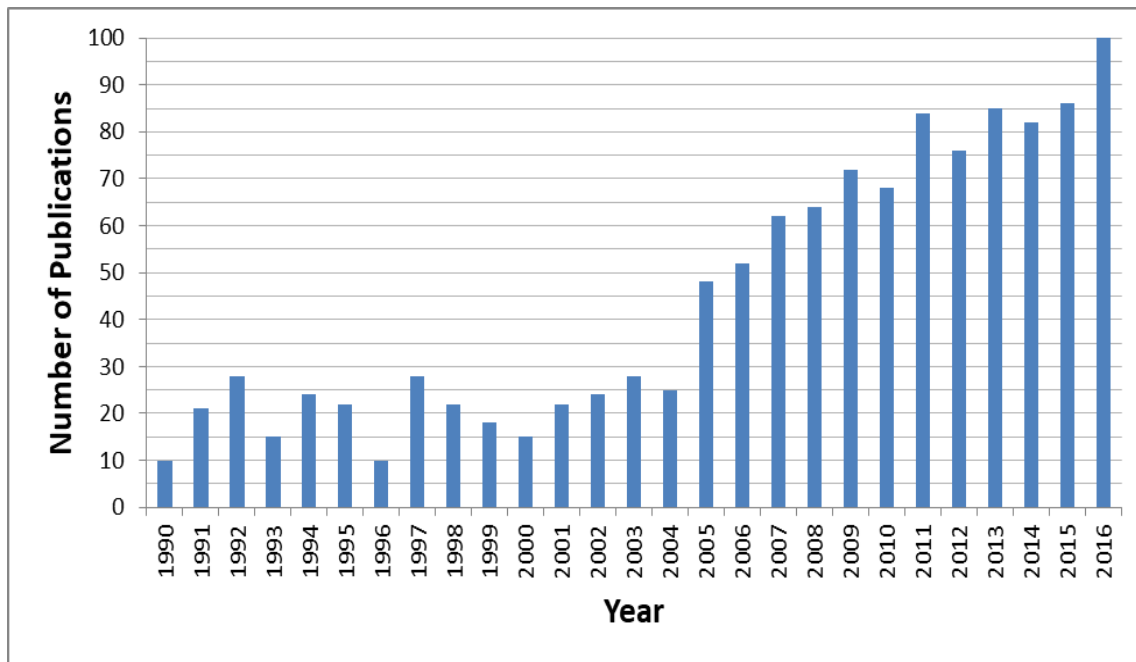


Figure 1. Peer-reviewed studies on school readiness. Adapted from “Engagement, Motivation, Self-Regulation, and Literacy Development in Early Childhood,” by A. Hindin, 2018, *Pivotal research in early literacy: Foundational studies and current practices*, p. 163.

At the micro policy level, when Virginia’s General Assembly directed the Joint Legislative Audit and Review Commission (JLARC) to study the VPI, Virginia lacked a definition of school readiness (JLARC, 2007). In 2008, the Board of Education adopted the following definition of *school readiness* – Resolution Number 2008-19:

“School readiness” describes the capabilities of children, their families, schools, and communities that will best promote student success in kindergarten and beyond. Each component – children, families, schools and communities – plays an essential role in the development of school readiness. No one component can stand on its own (VDOE, 2008).

Table 1

*Virginia’s Definition of School Readiness*

| School Readiness  | Definition  |
|-------------------|---|
| Ready Children    | A ready child is prepared socially, personally, physically, and intellectually within the developmental domains addressed in Virginia’s six <i>Foundation Blocks for Early Learning</i> : literacy, mathematics, science, history and social science, physical and motor development, and personal and social development. Children develop holistically; growth and development in one area depends upon development in other areas.   |
| Ready Families    | A ready family has adults who understand they are the most important people in the child’s life and take responsibility for the child’s school readiness through direct, frequent, and positive involvement and interest in the child. Adults recognize their role as the child’s first and most important teacher, providing steady and supportive relationships, ensuring safe and consistent environments, promoting good health, and fostering curiosity, excitement about learning, determination, and self-control. |
| Ready Schools     | A ready school accepts all children and provides a seamless transition to a high-quality learning environment by engaging the whole community. A ready school welcomes all children with opportunities to enhance and build confidence in their skills, knowledge, and abilities. Children in ready schools are led by skilled teachers, who recognize, reinforce, and extend children’s strengths and who are sensitive to cultural values and individual differences.   |
| Ready Communities | A ready community plays a crucial part in supporting families in their role as primary stewards of children’s readiness. Ready communities, including businesses, faith-based organizations, early childhood service providers, community groups and local governments, work together to support children’s school and long term success by providing families affordable access to information, services, high-quality child care, and early learning opportunities.   |

*Note.* Adapted from Adopting Virginia’s Definition of School Readiness by the VDOE, 2008.

More than a decade prior to the adoption of this definition of school readiness, the Commonwealth of Virginia established a state prekindergarten program in 1995, the VPI, to provide high-quality early learning experiences for at-risk 4-year-olds not already being served

by Head Start (JLARC, 2007). Children are considered susceptible to school failure if they meet one or more of the eligibility criteria: poverty, homelessness, parent's level of education, or special needs or disabilities. Since the VPI's inception, school divisions had flexibility with selecting students for their programs, until the 2015 Appropriation Act (Chapter 665) enacted at the 2015 General Assembly Session included language changes adding specific student eligibility criteria for participation in the state-funded VPI. Two of the four eligibility criteria now relate to family income at certain percentages of the federal poverty level (i.e., students whose families are at or below 200% of poverty and family income is less than 350% of federal poverty guidelines in cases of students with special needs or disabilities).

The Ready Children component of Virginia's definition of school readiness aligns with the *Virginia Foundation Blocks for Early Learning: Comprehensive Standards for Four-Year Olds* (VDOE, 2013b). These standards are described as providing teachers with a measurable range of skills and knowledge essential for 4-year-olds to be successful in kindergarten. The literacy standards are aligned with Virginia's Kindergarten Standards of Learning (SOL) and the PALS-K. Interestingly, this report describes self-regulation as a strong predictor of school achievement that teachers should prioritize along with literacy and mathematics. These early learning standards also include a reference to Blair and Razza (2007), whose research determined that children's self-regulatory behaviors prior to school entry predict their achievement in reading and mathematics more accurately than their IQ scores.

Under the Early Intervention Reading Initiative (EIRI), Virginia's public elementary schools have used the PALS-K since 1997 to determine students' readiness for school related to pre-literacy skills like phonological awareness, alphabet knowledge, and concept of word (Invernizzi, Justice, Landrum, & Booker, 2004), but they have not been required to assess students' other academic and behavioral skills. Similar to the research described in the next paragraph, the study for this dissertation examined multiple areas of school readiness other than just literacy.

In a study of kindergarten readiness in Miami, Florida, Ansari and Winsler (2016) discovered that children who had attended a publicly funded prekindergarten program ( $n = 9,870$ ) performed better on kindergarten entry assessments than their classmates who either received center-based care ( $n = 6,159$ ) or family childcare ( $n = 147$ ). Children who attended the publicly funded program had stronger emergent literacy skills according to the Dynamic

Indicators of Basic Early Literacy Skills (DIBELS). They also had higher scores on 8 of the 11 subscales of the Work Sampling System (WSS) and the Early Childhood Observation System (ECHOS) that measures mathematics, literacy, social skills, motor skills, and health.

A study conducted by Huang, Invernizzi, and Drake (2012) revealed that students across Virginia ( $N = 60,000$ ) who attended the VPI program were less likely to repeat kindergarten, while also increasing the chances of meeting or exceeding minimum literacy standards. Although Parker (2018) examined preschool attendance and literacy achievement, I am unaware of any study that has examined VPI students' performance on school readiness measures beyond literacy (e.g., mathematics, self-regulation, and social skills). This study was the first to examine the kindergarten readiness of VPI students in terms of their academic (literacy and mathematics) and behavior (self-regulation and social skills) prowess. Thus, this research potentially will be an original contribution to the early childhood education literature.

### **Definitions of Terms**

The following definitions are provided for terms used in this study.

*At-risk students.* Children who live in poverty and often have parents with limited education and single mothers who experience high rates of depression and poor health (Isaacs, 2012).

*Public prekindergarten.* State- and locally-administered early childhood programs designed to serve four-year-olds the year before they enter kindergarten (Chaudry & Datta, 2017).

*Preschool.* Center-based services, private centers, and publically-funded settings that serve young children of different ages (Chaudry & Datta, 2017).

*Literacy (emergent).* Development of the association of print with meaning that begins early in a child's life and continues until the child reaches the stage of conventional reading and writing (Harris & Hodges, 1995).

*Mathematics.* Learning about problem solving, collecting data, searching for relationships, and identifying patterns (Murray, 2004).

*Self-regulation.* The ability to regulate one's emotion in social situations or the regulation of attention and selective strategy use in the executive function of cognitive tasks (Blair, 2002).

*Social skills.* Learned initiation and response behaviors that involve interactions with others (Little, Swangler, & Akin-Little, 2017).

## **Research Questions**

This study was guided by the primary research question focusing on whether students who participated in a state-funded prekindergarten program performed better on a particular measure (i.e. literacy, mathematics, self-regulation and social skills) than their peers who did not attend prekindergarten or preschool. This question was: Did students who participated in a state-funded prekindergarten program perform better on measures of literacy, mathematics, self-regulation, and social skills than their peers who did not have any prekindergarten or preschool experience? Based on this question, the following four sub-questions examined separately each area of kindergarten readiness:

- 1) At kindergarten entry, did students who participated in a state-funded prekindergarten program perform better on a measure of literacy than their peers who did not have any prekindergarten or preschool experience?
- 2) At kindergarten entry, did students who participated in a state-funded prekindergarten program perform better on a measure of mathematics than their peers who did not have any prekindergarten or preschool experience?
- 3) At kindergarten entry, did students who participated in a state-funded prekindergarten program perform better on a measure of self-regulation than their peers who did not have any prekindergarten or preschool experience?
- 4) At kindergarten entry, did students who participated in a state-funded prekindergarten program perform better on a measure of social skills than their peers who did not have any prekindergarten or preschool experience?

## **Theoretical Framework**

Since the VPI was created to serve at-risk children, it is not surprising that poverty is the leading reason that students qualify for this program. In fact, the reason 88% of the students who participated in the VPI in 2016-2017 was because their family income was at or below 200% of the federal poverty level (JLARC, 2017). While not always the case, children who live in poverty are more likely to struggle academically, which can lead to grade retention and/or qualification for special education services (JLARC, 2017). Poverty and other risk factors (e.g.,

children in foster care, parents' limited education, and single-family homes) justify the need for offering universal access to programs like the VPI since it is cost prohibitive to provide intervention services to children once they are older (Heckman, 2011).

While the VPI served 17,959 children during the 2017-2018 school year (Annie E. Casey Foundation, 2017), about 190,000 (37%) of Virginia's children aged 0-4 are considered low income (Virginia Early Childhood Foundation, 2017). The fact that more students are not eligible for the VPI is alarming because only 35% of 3- to 4-year-olds evidencing one or more risk factors attend any form of preschool compared to the 55% of their more advantaged peers (Virginia Early Childhood Foundation, 2017). Despite not reaching more children, the VPI is meeting the needs of those who do participate, at least in the area of reading as next described.

In 2013, only 6% of the students who attended the VPI program required reading intervention services when they entered kindergarten compared to 26% of the students who did not attend any preschool program (VDOE, 2013a). This is good news for students who participate in the VPI program, given that letter-sound knowledge is important for school readiness, especially for students from disadvantaged backgrounds (Huang, Tortorelli, & Invernizzi, 2014). While data are available about children's kindergarten readiness related to literacy, little is known about their readiness for school in other areas like mathematics and self-regulation (JLARC, 2007; Jonas & Kassner, 2014; Williford, Downer, & Hamre, 2013).

### **Limitations of the Study**

This study was a non-experiment comparing four cohorts of two intact groups: kindergarten students who participated in the VPI program (intervention group) and those students who did not participate in any prekindergarten or preschool program (control group). Although Christakis (2016) reminds researchers that, while considered the gold standard, experiments that involve randomly assigning participants to control and intervention groups are difficult to conduct in the field of education. However, 4-year-olds not enrolled in any prekindergarten or preschool program are similar to 4-year-olds enrolled in state-funded prekindergarten programs (Walters, 2007). Shared characteristics between both groups usually include students having mothers with limited education, living with one parent, and living in or near poverty.

Comparing two intact groups, like students who attended prekindergarten to those students who did not attend any prekindergarten or preschool program, can lead to selection bias

and fail to capture the effects of preschool participation (Hustedt, Jung, Barnett, & Williams, 2015). For example, parents must apply for their students to participate in the VPI and they must meet at least one of the selection criteria. School divisions in Virginia that participate in the VPI also have the flexibility of using local criteria when selecting students for up to 15% of their approved slots. Despite these limitations, this research design will capture the effects of VPI participation since these students will be compared to children with similar backgrounds like those described in the previous paragraph who did not participate (Frede, Gilliam, & Schweinhart, 2011; Phillips et al., 2017).

### **Delimitations of the Study**

This study is limited to one small school division in Virginia. Other possible effects (e.g., parents who read to their children) on students' performance of school readiness measures beyond attendance in a state-funded prekindergarten program will not be considered. Finally, students who attended a preschool or prekindergarten program outside of the VPI program will not be included in this study. Given these boundaries, generalizing the results of this study to other VPI programs should be avoided.

### **Summary**

Investment in public prekindergarten in the United States continues to rise (Friedman-Krauss et al., 2018), and the Commonwealth of Virginia has followed this trend by increasing the number of VPI slots offered annually. Unfortunately, participation in state prekindergarten programs has not kept pace with the number of children whose families live in poverty (Bouffard, 2017; DuFour, 2015). With increasing academic and behavioral expectations at the kindergarten level (Bassok, Latham, & Rorem, 2016), students from disadvantaged backgrounds are the most vulnerable for lacking school readiness (Isaacs, 2012). The next chapter offers a synthesis of the literature regarding the effects a quality prekindergarten experience has on the children with the greatest propensity for not being ready for kindergarten.



## **Chapter Two**

### **Review of the Literature**

#### **Background**

This chapter is a review of the literature on early childhood education and school readiness in the United States and the Commonwealth of Virginia. In 1997, the Virginia General Assembly created the Early Intervention Reading Initiative (EIRI) to provide assistance to school divisions in preparing kindergarten students to meet state literacy standards (Invernizzi, Justice, Landrum, & Booker, 2004). Until recently, Virginia did not have other measures to determine how ready its kindergarten students were for school in other areas such as mathematics, self-regulation, and social skills. While emergent literacy is important, additional information that captures the whole child's readiness is needed to help kindergarten teachers make appropriate instructional decisions for their students (Williford, Downer, & Hamre, 2013).

As the Institute of Medicine and National Research Council (2015) explains, several states and localities are institutionalizing this process by adopting kindergarten entry assessment systems. Under the appropriate conditions, these assessment systems represent an opportunity to create continuity and support more consistency in high-quality learning experiences for children, building a foundation in early settings that can be sustained continuously into the early elementary years and beyond. (p. 223)

Research focusing on school readiness illustrates the increasing importance of having systems in place that measure students' academic and social-emotional skills. For example, a study conducted by Hustedt, Buell, Hallam, and Pinder (2018) indicated that, despite education legislation like the No Child Left Behind Act of 2001 (NCLB) and Race to the Top, kindergarten teachers in the state of Delaware still placed a higher value on students' social and physical skill development at school entry over academic skills. This was consistent among all three surveys that were administered in 2000, 2011, and 2013. In terms of kindergarten entry assessments, teachers surveyed in 2011 ( $N = 185$ ) and 2013 ( $N = 257$ ) considered having school readiness data for all domains of learning more valuable than teachers surveyed in 2000 ( $N = 171$ ).

While the teachers in the Delaware surveys prioritized non-academic skills, 80% of the teachers ( $N = 2,700$ ) who responded to a national survey conducted in 2010 indicated that children should learn to read in kindergarten (Bassok, Latham, & Rorem, 2015, 2016). The 80%

who responded this way was more than double the 30% of the teachers ( $N = 2,500$ ) who responded similarly in a 1998 study. A comparison of the results from these state and national surveys illustrates the potential national legislation has on influencing teachers' beliefs about kindergarten readiness skills. Increased academic expectations associated with legislation like NCLB (e.g., kindergartners learning to read) have resulted in researchers referring to kindergarten as the new first grade (Bassok et al., 2015, 2016).

### **Search Procedures for Literature Review**

Online sources were consulted to search for research related to this study's topic on students' prekindergarten experiences and school readiness. In addition to Google searches, I used the online Discovery Search engine available through Virginia Tech. Key terms used in these searches included *state-funded preschool programs*, *Virginia Preschool Initiative (VPI)*, *kindergarten and school readiness*, *kindergarten entry assessments*, *emergent literacy and numeracy*, *self-regulation*, and *social skills*. These searches were conducted between September 2017 and October 2018 after I became interested in this topic due to the Commonwealth of Virginia's early pilots of kindergarten readiness assessments. More importantly, legislation passed by the Virginia General Assembly now requires all school divisions throughout the state to assess all kindergarten students using the Virginia Kindergarten Readiness Program (VKRP) by the end of the 2019-2020 school year and annually thereafter (VDOE, 2018).

To determine which studies to include and exclude in this literature review, article abstracts were read to establish which sources were closely related to the topic and research questions. Studies were included that involved evaluations of students' preschool experiences based on students' performance on academic and/or developmental assessments once they entered kindergarten. In an effort to narrow the searches, *state-funded prekindergarten and school readiness* were entered in the Virginia Tech Discovery Search engine. The following criteria were selected: full text availability, scholarly (peer reviewed) journals, and publication between 2008 and 2018. This window of time was chosen to reflect 2008, the year Virginia officially adopted a definition of school readiness (VDOE, 2008). This search yielded 1,601 results. To make the results more manageable, *Virginia* was added to the existing search terms, reducing the results to 422. Of these studies, the focus was on those conducted by researchers well-known in the field of early childhood education in Virginia and the United States. The

studies most relevant to the research topic were organized into a literature review table that is included in Appendix A.

Limited research has been conducted on the VPI's role in preparing students for kindergarten outside of comparisons of students' Phonological Awareness Literacy Screening-Kindergarten (PALS-K) scores (Huang, Invernizzi, & Drake, 2012). While Parker (2018) did examine preschool attendance and literacy achievement, his study did not include other aspects of school readiness. Hence, there is a gap in the literature concerning how the VPI program prepares students in other domains of school readiness like numeracy, self-regulation, and social skills.

### **Emergent Literacy and Kindergarten Readiness**

According to the National Reading Panel (2000), phonemic awareness and letter knowledge are the strongest school-entry predictors of how well children will learn to read. Phonemic awareness refers to one's understanding of phonemes (the smallest units of sound) and the ability to hear and produce these sounds in words (Rog & Galloway, 2017). McClelland and Tominey (2016) identified three components of emergent literacy that form the foundation for reading skills: oral language, phonological awareness (phonemic awareness is a subset of phonological awareness), and print knowledge (includes letter names and sounds).

In terms of alphabet knowledge, Reutzel (2015) placed its importance in perspective by explaining that "complete and total mastery of all alphabet letters is a universal prerequisite in order for students to make progress in reading and writing" (p. 16). Piasta (2014) expanded the necessity of letter recognition to include their corresponding sounds. In addition to letter names and letter sounds, Stahl (2014) asserted alphabet knowledge encompasses how to form letters, all of which predict later literacy achievement. Ultimately, it is children's use and application of letter knowledge that promotes their success as readers (Mesmer, 2019).

State prekindergarten programs have been found to positively impact children's early language and literacy development (Barnett, Lamy, & Jung, 2005). JLARC (2007) discovered similar results while researching the effects of the VPI by determining that fewer students who participated in this program (11%) during the 2005-2006 school year required reading intervention at kindergarten entry compared to their peers who did not participate in the program (17%). This finding was based on Fall 2006 PALS-K scores ( $N = 87,597$ ), despite the fact that children were in the VPI program according to on one or more risk factors (e.g., low-income

families with less education than their middle- and upper-class counterparts). Not only did the VPI students have strong pre-literacy skills, division and school-level staff reported that these students were prepared to function successfully in school. This is critical for kindergarten since children at this age are acquiring early literacy skills that involve forming associations between abstract pieces of information like letter symbols and letter names, and then are expected to switch to somewhat different tasks like breaking words into smaller units of sound (Bodrova & Leong, 2015).

### **Mathematics and Kindergarten Readiness**

Although research has shown that early mathematics proficiency is one of the best predictors of school success across all content areas, American early childhood educators devote much more instructional time to literacy compared to numeracy (Brownell, Chen, & Ginet, 2014). This is especially problematic for children from low-income families (like those enrolled in the VPI) who are less likely to be immersed in mathematics in the early years, which can lead to achievement gaps that already exist when children enter kindergarten (Institute of Medicine and National Research Council, 2015). However, a quality early childhood education program can help reduce these risk factors so that gaps in literacy and numeracy no longer exist at the beginning of kindergarten (Interlandi, 2018).

According to Neuman and Roskos (2007), number and quantity are the most fundamental mathematical concepts in a child's early years. Unfortunately, teachers in the United States do not have an adequate level of mathematics understanding (Clements & Sarama, 2015), and early childhood educators often assume that young children can only learn basic skills like rote counting and shape identification (Institute of Medicine and National Research Council, 2015). Ineffective mathematics instruction should cause alarm for parents since few, if any, of them would accept the fact that their fourth-grade children were receiving an education from teachers who could only read at the fourth grade level (Clements & Sarama, 2015). This most likely is one of the reasons prekindergarten teachers rely too heavily on prepared curricula (Schickedanz & Marchant, 2018). The use of packaged teaching programs stems from the fact that early childhood educators are not prepared with the knowledge and skills they need to best support their students, especially since a bachelor's degree alone does not guarantee that prekindergarten teachers will have a strong understanding of child development or be able to provide age-appropriate instruction (Lieberman, Cook, & Jackson, 2018).

## **Social Skills and Kindergarten Readiness**

Social skills are learned initiation and response behaviors that involve interactions with others (Little, Swangler, & Akin-Little, 2017). By their nature, classroom settings involve children engaging in learning tasks that require socially interacting with their classmates and teachers (Williford et al., 2013). Young children who struggle with cooperating with peers and adults are less likely to benefit from classroom instruction, although it is important for children to experience conflict in order to develop social skills in early childhood settings (Thompson & Goodman, 2009). Early childhood educators can help instill skills such as helpfulness, sharing, and kindness in their students by creating emotionally consistent and secure classrooms where students know what to expect and what is expected of them (Curby, Brock, & Hamre, 2013).

Students with better cognitive and social skills at kindergarten entry increase their chances of learning more their first year of school, and their self-confidence, ability to learn, and social skills will evolve as they continue in school (Bartik, 2014). While a child's brain is more malleable birth through age three, prekindergarten programs for 3- and 4-year-olds can help these children acquire the social skills they need for formal school entry than if they had no such experience (Bartik, 2014). Early educators who focus on academic skills without any regard for children's social functioning are providing a huge disservice to these children, especially those who live in less than optimal environments (Thompson & Goodman, 2009). In fact, effective programs create more long-term effects related to social skills rather than academic outcomes, which is why students should be assessed on both hard (cognitive) and soft (social) skills in terms of program accountability and school readiness (Bartik, 2014).

## **Self-Regulation and Kindergarten Readiness**

Blair (2002) defines *self-regulation* as “the ability to regulate one's emotion in social situations or the regulation of attention and selective strategy use in the executive function of cognitive tasks” (p. 112). Self-regulation encompasses skills related to emotion, behavior, and cognition, which are socially influenced by the classroom interactions children have with their peers (Rimm-Kaufman et al., 2009). However, the relations among these skills are not entirely understood (McClelland et al., 2007). For preschool children, they experience both tremendous development and expectations involving their ability to regulate their emotion, behavior, and cognition (Williford et al., 2013).

In a study conducted by Alejandro et al. (2016), the researchers predicted that students who attended preschool ( $n = 28$ ) would have higher self-regulation compared to their counterparts who were not enrolled in a preschool program ( $n = 9$ ). Their hypothesis was based on Tough's (2016) assertion that preschools, serving as students' formal introduction to school life, are the ideal place for students to develop self-regulation. This particular study involved a comparison of students' performance on behavioral measures and teachers' ratings of these students' self-regulation. The results revealed that those who attended preschool scored higher on measures of self-regulation, illustrating the need for providing all students with access to preschool education.

However, Virginia is among several states that does not provide universal preschool (Mead, 2015), but it has joined 43 other states that are either requiring or piloting the use of kindergarten readiness measures beyond literacy (VKRP, 2016). It is important to note that universal does not mean compulsory, which allows the states offering universal programs to make them available for all families without the use of qualifying criteria (Bartik, 2014). While Alejandro et al. (2016) found that students who attended preschool exhibited greater control on the tasks associated with the behavioral measures, the teachers' ratings did not corroborate these findings. This is contrary to the research conducted by Rimm-Kaufman, Curby, Grimm, Nathanson, and Brock (2009) who did find a strong correlation between teachers' ratings and behavioral measures of self-regulation.

Despite the importance of students developing emergent reading and numeracy skills, self-regulation supersedes both of these domains in terms of its influence on a student's achievement, regardless of aptitude (Williford, Downer, Hamre, & Pianta, 2014). Blair and Razza (2007), while finding that students' self-regulation behavior was a better predictor of their reading and mathematics achievement than their IQ, cautioned that most studies involving self-regulation are correlational and are unable to establish any causal relation. As noted by Williford et al. (2013), children of preschool age begin to experience higher expectations for regulating their behavior.

When analyzing survey results regarding teachers' beliefs about school readiness, Abry, Latham, Bassok, and LoCasale-Crouch (2015) found that both preschool ( $n = 2,650$ ) and kindergarten ( $n = 2,650$ ) teachers rated academic competence, self-regulatory competence, and interpersonal competence all as important skills, although both groups rated academics as the

least important. However, preschool teachers rated academics higher than the kindergarten teachers, which is surprising given that preschool teachers were under less pressure from educational reforms like NCLB. Both groups of teachers rated the interpersonal domain as the most important.

McClelland and Tominey (2016) offered the following guidelines for early childhood educators to help young children develop self-regulation:

- 1) building secure relationships with children so that children feel safe and comfortable in the classroom and thus are better able to learn;
- 2) practicing self-regulation themselves so that children have models of these skills to observe and imitate; and
- 3) adopting an authoritative caregiving style, embedding language and approaches that promote critical thinking and perspective taking, and supporting the development of internal regulation. (p. 30)

### **Virginia Kindergarten Readiness Program**

To fulfill the need for capturing school entry skills beyond literacy, the mission of the VKRP is to provide a more complete understanding of each student's kindergarten readiness (Williford et al., 2014). VKRP selected assessments that teachers administer during the first four to six weeks of kindergarten entry. Teachers and families can use the data from the assessments to support students' learning during the kindergarten school year and beyond. Currently, only 18 states assess all of their kindergarten students in multiple areas at school entry (JLARC, 2017). Based on a recommendation from JLARC (2017), the General Assembly amended Title 22.1 of the Code of Virginia and now requires all school divisions to participate in the VKRP by the end of the 2019-2020 school year.

Although physical and motor skills are also important for school readiness (Cameron, 2018), they are not currently included in the VKRP assessment. The Code of Virginia, § 22.1-214 already requires schools to assess all kindergarten students' motor skills within their first sixty days of school enrollment. However, individual school divisions do not collect this data for the Commonwealth to determine how kindergarten students throughout the state are performing in these areas (JLARC, 2017).

In connection with the PALS-K, which assesses students' literacy skills, VKRP expands the assessment to add a focus on mathematics, self-regulation, and social skills. Research shows

that these four areas of kindergarten readiness are critical for students’ initial and later success in school (Markowitz, Bassok, & Hamre, 2017). Based on data collected from the VKRP pilot study, approximately one third of the students sampled were not ready in at least one domain of school readiness (JLARC, 2017). Table 2 summarizes the VKRP assessment results from a sample ( $N = 2,036$ ) of Virginia kindergarteners in Fall 2014:

Table 2

*VKRP Results from Pilot Study*

|                       |  |
|-----------------------|--|
| Fully ready – 66%     | Includes all domains (mathematics, literacy, social skills, and self-regulation)                                     |
| Not fully ready – 34% | Percentage not ready by domain<br>Mathematics – 9%<br>Literacy – 11%<br>Social skills – 20%<br>Self-regulation – 16% |

*Note.* VKRP data from JLARC (2017).

Although some of these children will catch up with their peers, readiness gaps based on race/ethnicity and income have already developed when children start school, and are likely to persist and even widen over time (Latham, 2018). Children in the pilot study falling below the benchmark in one or more areas of school readiness struggled to master basic literacy, numeracy, self-regulation, and social skills. These results were shared with the Virginia State Legislature, and the statewide implementation of VKRP began.

**Measures and Correlations to Virginia’s Foundation Blocks**

*The Virginia Foundation Blocks for Early Learning: Comprehensive Standards for Four-Year Olds* provide teachers with a measurable range of skills and knowledge essential for 4-year-olds to be successful in kindergarten (VDOE, 2013a). The literacy standards are aligned with Virginia’s Kindergarten Standards of Learning (SOL) and the PALS-K. The following sections provide descriptions of how many of the literacy, mathematics, social, and self-regulation standards taught in VPI classes will now be measured by the assessments (PALS-K and VKRP) administered in the fall of kindergarten.

**Literacy.** The PALS-K is a measure of children's knowledge of several important literacy fundamentals: phonological awareness, alphabet recognition, concept of word, knowledge of letter sounds and spelling (Invernizzi, Juel, Swank, & Meier, 2015). The PALS-K provides a



direct means of matching literacy instruction to specific literacy needs and provides a means of identifying those children who are relatively behind in their acquisition of these fundamental literacy skills. (Note: Since the Foundation Blocks are intended to prepare students for kindergarten, comparison charts were completed to illustrate the extent each assessment measures the skills students learn in the VPI program.)

Table 3

*Phonological Awareness Literacy Screening-Kindergarten (PALS-K)*

| Skills Tested      | Correlations to Virginia's Foundation Blocks  |
|--------------------|---|
| Rhyme              | Phonological Awareness a) Identify words that rhyme and generate simple rhymes.   |
| Beginning Sounds   | Phonological Awareness d) Successfully detect beginning sounds in words.  |
| Alphabet Knowledge | Letter Knowledge and Early Word Recognition a) Identify and name uppercase and lowercase letters in random order d) Begin to match uppercase and lowercase letters and f) Notice letters in familiar everyday context and ask an adult how to spell words, names, and titles. |
| Letter Sounds      | Phonological Awareness c) Begin to produce letter sounds in isolation. Letter Knowledge and Early Word Recognition b) Identify the letter that represents a spoken sound and c) Provide the most common sound for the majority of letters.                                    |
| Spelling           | Writing g) Use phonetically spelled words to convey messages or tell a story.   |
| Concept of Word    | Print and Book Awareness d) Follow text with a finger, point to each word as it is read from left to right and top to bottom with assistance.   |

*Note.* Skills tested for PALS-K from Invernizzi, Juel, Swank, & Meier (2015) and correlations to Virginia's Foundation Blocks from VDOE (2013b).

**Numeracy.** The Early Mathematics Assessment System (EMAS), also known as the Birthday Party, is a reliable and valid research based assessment of early mathematical thinking (Ginsburg, Pappas, & Lee, 2010). This tool was designed to measure several areas of mathematical content, specifically, number, operations, shape, space, and pattern. Additionally, the domains assessed by the Birthday Party are aligned with National Council of Teachers of Mathematics and the Virginia Kindergarten SOL in Mathematics (VKRP, n.d.).

Teachers use a flipbook and manipulatives to administer the Birthday Party in about 20 minutes. Like the PALS-K, the Birthday Party is administered to individual students, which is the preferred method in early education since group-administered tests often are not adequate assessment tools and can actually do harm (Clements & Sarama, 2015). (Note: Since the Foundation Blocks are intended to prepare students for kindergarten, comparison charts were completed to illustrate the extent each assessment measures the skills students learn in the VPI program.)

Table 4

*Birthday Party*

| Skills Tested                           | Correlations to Virginia’s Foundation Blocks   |
|---|--|
| Counting and Cardinality                | Number and Number Sense a) Count forward to 20 or more. Count backward from 5, b) Count a group (set/collection) of five to ten objects by touching each object as it is counted and saying the correct number (one-to-one correspondence), and c) Count the items in a collection of one to ten items and know the last counting word tells “how many.” |
| Number Comparison and Ordering Numerals | Number and Number Sense d) Compare two groups (sets/collections) of matched objects (zero through ten in each set) and describe the groups using the terms more, fewer, or same.   |
| Adding and Subtracting                  | Computation a) Describe changes in groups (sets/collections) by using more when groups of objects (sets) are combined (added together) and b) Describe changes in groups (sets/collections) by using fewer when groups of objects (sets) are separated (taken away).   |
| Patterns                                | Patterns and Relationships b) Identify and explore simple patterns, i.e., AB, AB; red, blue, red, blue and c) Use patterns to predict relationships between objects, i.e., the blue shape follows the yellow shape, the triangle follows the square.   |

(continued)

Table 4 (cont.)

| Skills Tested                       | Correlations to Virginia's Foundation Blocks   |
|-------------------------------------|--|
| Shape Recognition and Properties    | Geometry a) Match and sort shapes (circle, triangle, rectangle, and square) b) Describe how shapes are similar and different and c) Recognize and name shapes (circle, triangle, rectangle, and square).   |
| Directionality, Order, and Position | Number and Number Sense e) Use ordinal numbers (first through fifth) when describing the position of objects or groups of children in a sequence and Geometry d) Describe the position of objects in relation to other objects and themselves using the terms next to, beside, above, below, under, over, top, and bottom. |
| Understands Grids                   | No standard for this item.   |

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*Note.* Skills tested for Birthday Party from Ginsburg, Pappas, and Lee (2010) and correlations to Virginia's Foundation Blocks from VDOE (2013b).

**Social skills and self-regulation skills.** The Child Behavior Rating Scale (CBRS) is an instrument completed by the teacher that measures an individual student's self-regulation and social skills (Bronson, Goodson, Layzer, & Love, 1990). Requiring 3-5 minutes per child to complete, the CBRS focuses on children's interactions with other children and adults in the classroom, as well as their academic performance. Seven items on the CBRS comprise the Social Skills domain, and ten items comprise the Self-Regulation domain. Items are assessed using a 5-point scale (1= never, 5= always). (Note: Since the Foundation Blocks are intended to prepare students for kindergarten, I completed comparison charts to illustrate the extent each assessment measures the skills students learn in the VPI program.)

Table 5

*Child Behavior Rating Scale (CBRS) – Social Skills*

| Skills Tested   | Correlations to Virginia's Foundation Blocks   |
|---|--|
| Frequently be willing to share toys or other things with other children when playing; do not fight or argue with playmates in disputes over property        | Interaction with Others c) Interact appropriately with other children and familiar adults by cooperating, helping, sharing, and expressing interest and Social Problem Solving d) Increase the ability to share materials and toys with others over time.                |
| Rarely express hostility to other children verbally   | Interaction with Others e) Demonstrate respectful and polite vocabulary and Social Problem Solving a) Express feelings through appropriate gestures, actions, and words and Self-Concept b) Begin to recognize and express own emotions using words rather than actions. |
| Rarely express hostility to other children physically   | Self-Concept b) Begin to recognize and express own emotions using words rather than actions and Social Problem Solving a) Express feelings through appropriate gestures, actions, and words.   |
| Sometimes cooperate with playmates when participating in a group play activity; willing to give and take in the group, to listen to or help others          | Citizenship a) Cooperate with others in a joint activity and Interaction with Others c) Interact appropriately with other children and familiar adults by cooperating, helping, sharing, and expressing interest and d) Participate successfully in group settings.      |
| Sometimes take turns in a game situation with toys, materials, and other things <i>without being told to do so</i>  | Responsible Behaviors b) Share equipment and space, and take turns <i>with help from the teacher</i> and Social Problem Solving c) Allow others to take turns.   |
| Frequently comply with adult directives; giving little or no verbal or physical resistance, even with tasks that they dislike                               | Self-Regulation b) Follow rules and routines within the learning environment.  |
| Frequently do not fuss when they have to wait briefly to get attention from teacher or other adult; child may be asked once to wait by the teacher or adult | No standard for this item.   |

*Note.* Skills tested for Child Behavior Rating Scale from Bronson, Goodson, Layzer, and Love (1990) and correlations to Virginia's Foundation Blocks from VDOE (2013b).

Table 5 shows how the CBRS items related to social skills correspond with similar skills in the Foundation Blocks. Table 6 show how the CBRS items related to self-regulation correspond with similar skills in the Foundation Blocks.

Table 6

*Child Behavior Rating Scale (CBRS) – Self-Regulation*

| Skills Tested  | Correlations to Virginia’s Foundation Blocks  |
|--|---|
| Sometimes observe rules and follow directions without requiring repeated reminders                   | Responsible Behaviors d) Listen to and follow simple directions and Self-Regulation b) Follow rules and routines within the learning environment. |
| Sometimes complete learning tasks involving two or more steps in organized way                       | No standard for this item.  |
| Sometimes complete tasks successfully  | No standard for this item.  |
| Sometimes attempt new challenging tasks  | Self-Regulation e) Develop positive responses to challenges.  |
| Sometimes concentrate when working on a task; is not easily distracted by surrounding activities     | Approaches to Learning c) Increase attention to a task or activity over time.   |
| Sometimes respond to instructions and then begin an appropriate task without being reminded          | Responsible Behaviors d) Listen to and follow simple directions.  |
| Sometimes take time to do their best on a task   | No standard for this item.  |
| Sometimes find and organize materials and work in an appropriate place when activities are initiated | Self-Concept e) Demonstrate self-direction in use of materials.   |
| Rarely see own errors in a task and correct them   | No standard for this item.  |
| Sometimes return to unfinished tasks after interruption  | Approaches to Learning c) Increase attention to a task or activity over time.   |

*Note.* Skills tested for Child Behavior Rating Scale from Bronson, Goodson, Layzer, and Love (1990) and correlations to Virginia’s Foundation Blocks from VDOE (2013b).

**Early Childhood Program Quality**

State-funded prekindergarten programs like the VPI were established to help ensure children enter school ready, especially those who experience one or more risk factors in their

young lives. Pianta, Downer, and Hamre (2016) found, that although definitions of quality early childhood programs usually include structural elements, classroom environment, teacher-student interactions, and quality ratings, the factor that influences child outcomes the most is the interactions teachers have with their students. One might think that the length of the school day, teacher education, and teacher-student ratios positively impact student achievement in early childhood settings. However, Pianta et al. (2016) neither found little evidence to support this assumption, nor did they find that features of the classroom environment (e.g., classroom arrangement, instructional resources, schedule of activities, etc.) mattered in defining quality in these classrooms. Instead, it was the teacher-child interactions that greatly separate those programs of quality from the rest, and the quality of these interactions can either negate or increase children's vulnerability to risk factors.

Despite evidence that quality teacher-child interactions positively influence emotional support, classroom management, and conceptual learning, data collected from 240 preschool classrooms using the Classroom Assessment Scoring System (CLASS) indicated that teachers either had high average (emotional support and classroom organization) or barely adequate (instructional support) interactions with their students (Wasik & Newman, 2009). Teachers were rarely observed engaging in elaborate interactions with their students, but 8% were observed having frequent conversations with them by asking open-ended questions and using advanced language. The minimal interactions that were observed involved the teachers giving directions and asking simple questions without repeating and extending the children's responses. What is even more unsettling is that no interactions occurred between teachers and students for 73% of the time observed. Figure 2 illustrates teacher-child interactions based on data from Wasik and Newman (2009):

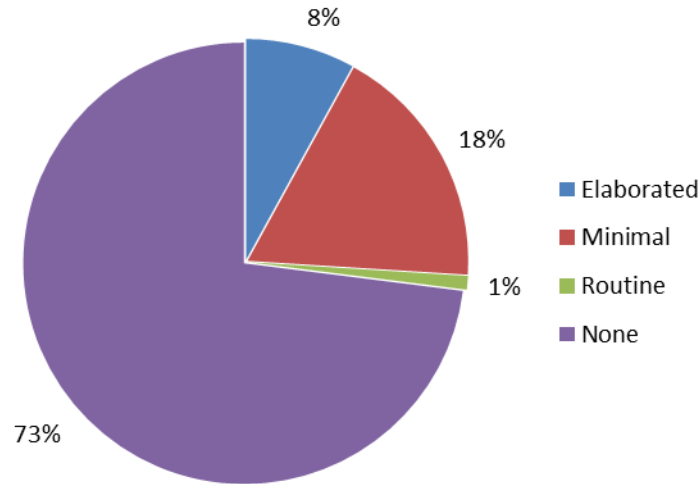


Figure 2. Percent of time observed for teacher-child interactions across the day. Adapted from “Teaching and Learning to Read,” by B. H. Wasik and B. A. Newman, 2009, *Handbook of child development & early education: Research to practice*, p. 318.

To increase and improve teacher-child interactions, Hamre, Downer, Jamil, and Pianta (2015) identified four components of intentional teaching: teachers *knowing* and understanding children’s development and how they learn, teachers *seeing* exemplars of effective practices, teachers *doing* or practicing new skills to become more effective, and teachers *reflecting* on or evaluating their professional growth to determine future goals. A report written by Phillips et al. (2017) explained that teacher-child interactions are best facilitated by teachers using an evidence-based curriculum that includes teacher support on the implementation of this curriculum through professional development and coaching. JLARC (2017) included similar recommendations for improving the quality of the VPI by providing teachers with professional development for improving their interactions with students, using a research-based curriculum, and gathering data that includes VKRP at the local and state levels for program evaluation.

### Principal Quality

Behind teachers, principals are the second greatest school-level variable in terms of influencing student achievement (Waters & Cameron, 2007). Although much of the research has focused on teacher quality in early childhood settings, less attention has been devoted to the importance of how school leaders can and should support these programs (Lieberman, 2017). When Shue, Shore, and Lambert (2012) surveyed elementary principals ( $N = 163$ ) in North Carolina regarding their leadership programs, training, knowledge, attitudes, and confidence

levels related to prekindergarten programs, many of the respondents indicated they had limited or no preparation for administering prekindergarten programs. Comparisons were made according to school setting, prior teaching experience, years of experience, and level of education, but the principals' confidence levels with having prekindergarten programs in their schools were not statistically significant. However, several of the principals indicated they needed professional development to effectively supervise these programs.

Despite prekindergarten classes being included in elementary schools, most principals never receive any specialized training related to early childhood education (Brown, Squires, Connors-Tadros, & Horowitz, 2014). One way to address this issue is for states to revise their licensing standards to include stipulations that all elementary school principals have elementary teaching experience or serve as an elementary assistant principal first (Lieberman, 2017). Illinois is currently the only state that has mandated principal licensure requirements that include early childhood content (Brown et al., 2014).

In the Commonwealth of Virginia, prospective administrators earn a pre-K – 12 endorsement for administration and supervision, but these educators are not required to have any experience or content knowledge related to early childhood education (Code of Virginia, § 22.1-298.1). Furthermore, Virginia is not unlike other states in that a professional development budget is not available for school administrators (Brown et al., 2014). According to Lieberman (2017), this deficit could be addressed by minimum state licensing standards requiring that anyone aspiring to serve as an elementary principal have former elementary teaching and/or administrative experience.

## **Summary**

This literature review provides an overview of Virginia's commitment to school readiness, and illustrates the need for providing free and universal preschool education. Access to prekindergarten is especially important for students who are most disadvantaged due to the effects of poverty that can hinder their early school success and worsen over time (Blair & Raver, 2015). However, research suggests that any improvements in kindergarten readiness scores can positively impact future earnings (Latham, 2013), and the VPI has and continues to play an important role in mitigating the risk factors for and preparing them for kindergarten entry. It is important to remember that readiness is more than just the capacity of children to learn; it also means that kindergarten teachers can interpret and use the results to remediate or



enrich the learning experiences of their students (Institute of Medicine and National Research Council, 2015).

## **Chapter Three**

### **Methodology**

The purpose of this study was to examine the effectiveness of the Virginia Preschool Initiative (VPI) program in a rural school division in Central Virginia. With increased state and national attention on kindergarten readiness (Isaacs, 2012), this study's goal was to determine if a particular VPI program is meeting the Commonwealth of Virginia's mission of preparing at-risk 4-year-olds for school. The scores from assessments that measure literacy, mathematics, self-regulation, and social skills were analyzed and compared for students who attended this VPI program to their peers without any prekindergarten and preschool experience.

The data for this study came from a sample of 1,199 students who attended kindergarten in 6 elementary schools in a rural school division in Central Virginia. The participants' scores were computed and analyzed using data from the 2015, 2016, 2017, and 2018 administration of the Phonological Awareness Literacy Screening-Kindergarten (PALS-K), the Early Mathematics Assessment System (EMAS), and the Child Behavior Rating Scale (CBRS). These tests are administered to kindergarten students every fall in public schools in the Commonwealth of Virginia to capture student growth across four domains of learning.

The central interest in this study was to understand student participation in a VPI program and its impact on kindergarten readiness based on academic and behavioral outcomes. The primary research question was: Did students who participated in a state-funded prekindergarten program perform better on measures of literacy, mathematics, self-regulation, and social skills than their peers who did not have any prekindergarten or preschool experience? This study was designed to address the following four sub-questions:

- 1) At kindergarten entry, did students who participated in a state-funded prekindergarten program perform better on a measure of literacy than their peers who did not have any prekindergarten or preschool experience?
- 2) At kindergarten entry, did students who participated in a state-funded prekindergarten program perform better on a measure of mathematics than their peers who did not have any prekindergarten or preschool experience?
- 3) At kindergarten entry, did students who participated in a state-funded prekindergarten program perform better on a measure of self-regulation than their peers who did not have any prekindergarten or preschool experience?

- 4) At kindergarten entry, did students who participated in a state-funded prekindergarten program perform better on a measure of social skills than their peers who did not have any prekindergarten or preschool experience?

This chapter describes the methods used in the study, and includes a description of the sample selection, instrumentation, reliability and validity of the data set, data analysis procedure, research design, and data collection, treatment, and management.

### Sample Selection

The students chosen for participation in this study were based on convenience since I am employed in the school division where these students attended the VPI program and entered kindergarten. This rural school division is located in Central Virginia and serves approximately 4,000 students in grades K-12 annually and consists of six elementary schools, two middle schools, one high school, and one alternative school. Two VPI classes are in the elementary school serving the highest percentage of elementary students receiving free and reduced lunches (323 of 431 students or 75%). Students in two other VPI classes attend the elementary school with the second highest number of elementary students participating in the free and reduced price lunch program (249 of 356 students or 70%). The fifth VPI class serves students in the elementary school with the third highest number of elementary students qualifying for free and reduced price lunches (236 of 438 students or 53%).

Table 7

#### *Sample*

| School Year | Cohort Size | VPI Students | Other Programs | No Preschool | Excluded        |
|-------------|-------------|--------------|----------------|--------------|-----------------|
| 2015        | 291         | 57           | 185            | 48           | 1 <sup>+</sup>  |
|             |             | 52           |                | 45           | 8 <sup>*</sup>  |
| 2016        | 284         | 73           | 126            | 42           | 43 <sup>+</sup> |
|             |             | 70           |                | 39           | 6 <sup>*</sup>  |
| 2017        | 306         | 76           | 145            | 44           | 41 <sup>+</sup> |
|             |             | 76           |                | 44           | 0 <sup>*</sup>  |
| 2018        | 318         | 78           | 136            | 36           | 68 <sup>+</sup> |
|             |             | 77           |                | 36           | 1 <sup>*</sup>  |
| Total       | 1,199       | 275          | 592            | 164          | 168             |

<sup>+</sup> Preschool experience unknown

<sup>\*</sup> One or more data points missing

Students were excluded from the sample when their preschool experience was unknown, most likely due to parents not providing this information when they enrolled their children in school. In cases where students had one or more data points missing (i.e., PALS-K, EMAS, or CBRS), these students were also removed from the sample. One additional student was removed from the 2015 cohort since this student's scores were extreme outliers. While the specific reasons for such extreme scores are unknown, a likely explanation is the student did not put forth his/her best effort. Another possibility was the student had an educational disability and was not exempted from taking these assessments. Each cohort was analyzed separately due to teacher changes that occurred over these four school years, and the benchmark score for the EMAS changed beginning with the 2017 cohort (see next section for details).

### **Instrumentation**

**PALS-K.** The PALS-K is a measure of children's knowledge of several important literacy fundamentals: phonological awareness, alphabet recognition, concept of word, knowledge of letter sounds and spelling (Invernizzi, Juel, Swank, & Meier, 2015). In order to assess these important predictors of later reading achievement, the PALS-K consists of six subtasks: Rhyme Awareness, Initial Phoneme Awareness, Alphabet Knowledge, Letter-Sound Knowledge, Spelling, and Concept of Word. The PALS-K provides a direct means of matching literacy instruction to specific literacy needs and offers a means of identifying those children who are relatively behind in their acquisition of these fundamental literacy skills (Invernizzi, Justice, Landrum, & Booker, 2004).

An early literacy screening measure like the PALS-K should be reliable, which means the results should be similar regardless of who administers the assessment (Invernizzi et al., 2004). For test reliability, three aspects of the PALS-K were assessed by Invernizzi et al. (2015): test-retest reliability, subtask reliability, and inter-rater reliability. In terms of test-retest reliabilities, Pearson correlations ranged from .78 to .95. For the subtask reliability or internal consistency, Cronbach's alpha averaged .86, with a range of .78 to .88 for Fall 2008 and Spring 2009. The inter-rater reliability coefficients yielded a range of .96 to .99, which indicated the PALS-K can be administered and scored with a high degree of reliability.

Invernizzi et al. (2004) also stressed the importance of using an instrument that is valid, or assesses what it is intended to measure. Invernizzi et al. (2015) assessed both the predictive and concurrent forms of criterion-related validity. To determine predictive validity, PALS-K

scores for Fall 1998 were compared with Stanford Achievement Test scores during the spring of the same school year. Both the kindergarten and first-grade versions of the Stanford-9 contain three subtests that are similar to several of the PALS-K tasks: Sounds and Letters, Word Reading, and Sentence Reading. Both the Fall 1998 PALS-K summed scores and subtask scores were significantly correlated with the Spring 1999 Stanford-9 scaled scores ( $p < .001$ ). When assessing concurrent validity, the PALS-K summed scores from the Spring 1999 were compared to the Total Reading scaled scores of the Stanford-9 also given in Spring 1999. The correlation was strong and significant ( $r = .72, p < .001$ ).

The benchmark for the PALS-K at the beginning of kindergarten is a summed score of 29 out of a maximum score of 102. Students receive a summed score based on their performance on Rhyme Awareness (5 out of 10), Initial Phoneme Awareness (5 out of 10), Alphabet Knowledge (12 out of 26), Letter-Sound Knowledge (5 out of 26), Spelling (2 out of 20), and Concept of Word (0 out of 10). For the purposes of this study, students who earned a summed score of 29 or higher, regardless of individual task performance, were considered proficient and ready to learn emergent reading skills. Students who earned a summed score of 28 or lower were deemed at risk, which meant they would likely struggle with learning kindergarten literacy concepts.

**EMAS or birthday party.** The Early Mathematics Assessment System (EMAS), also known as the Birthday Party, is a reliable and valid research based assessment of early mathematical thinking (Ginsburg, Pappas, & Lee, 2010). This tool was designed to measure several areas of mathematical content, specifically, number, operations, shape, space, and pattern. Additionally, the domains assessed by the Birthday Party are aligned with National Council of Teachers of Mathematics and the Virginia Kindergarten Standards of Learning in Mathematics (VKRP, n.d.). Teachers use a flipbook and manipulatives to administer the Birthday Party in about 20 minutes. Like the PALS-K, the Birthday Party is administered to individual students, which is the preferred method in early education since group-administered tests often are not adequate assessment tools and can actually do harm (Clements & Sarama, 2015).

The EMAS is a reliable and valid research based assessment of early mathematical thinking that draws on both modern cognitive science and developmental and educational research (Ginsburg, Pappas, & Lee, 2010). In one study, Lee (2016) examined the Birthday Party's reliability using Cronbach's alpha, test-retest, and inter-rater reliability. All three

versions of the Birthday Party (English, Spanish, and short screening) were checked for their reliability, and the *alpha* coefficients were found to be at or above the acceptable standard, ranging from .70 to .94. In terms of test-retest, the Number and Operation measure had the largest value of .82 for age 4, while the Pattern and Space measures had the lowest values for ages 3, 4, and 5 (Pattern: .37, .49, and .24 and Space: .46, .37 and .43, respectively). Using shadow scoring to measure inter-rater reliability, all coefficients were  $> .90$ , with the exceptions of the Pattern and Space measures for age 3 (.71 and .81, respectively).

In the study described in the previous paragraph, Lee (2016) determined that the Birthday Party had predictive and concurrent validity. Correlation coefficients were calculated between Birthday Party scores from the beginning of one school year and the Young Child's Achievement Test (YCAT) scores from the spring of the same school year. The YCAT is a norm-referenced achievement measure used with preschool, kindergarten, and first-grade students (Hresko, Peak, Herron, & Bridges, 2000). All coefficients were significant at the .05 level, with the Number and Operation measure having the highest correlations for all three groups (.56 for age 3, .66 for age 4, and .62 for age 5). According to Lee (2016), the Birthday Party also has adequate concurrent validity (Crocker & Algina, 1986) with the mathematics subtest of the YCAT. Again, all coefficients were significant at .05, with the Number and Operation measure having the highest correlations of .63 (age 3), .73 (age 4), and .75 (age 5).

During the 2015-2016 and 2016-2017 school years, the benchmark for the Birthday Party at the beginning of kindergarten was a summed score of 23 out of a maximum score of 39. Students received a summed score based on their performance on four subtasks: Numeracy (8 out of 16), Patterning (4 out of 4), Computation (0 out of 4), and Geometry (11 out of 15). A student who entered kindergarten during the 2015-2016 and 2016-2017 school years and earned a  $\geq 23$  had the prerequisite skills to begin learning kindergarten math concepts. For the 2017-2018 and 2018-2019 school years, the benchmark (25) and maximum (43) scores were adjusted to accommodate revisions to the EMAS. Test content changes resulted in revised subtask expectations as well: Numeracy (8 out of 16), Patterning (4 out of 4), Computation (2 out of 8), and Geometry (11 out of 15). Therefore, students in the two latter cohorts who earned a  $\geq 25$  demonstrated their capacity for meeting or exceeding kindergarten math standards.

**CBRS.** The Child Behavior Rating Scale (CBRS) is an instrument completed by the teacher that measures an individual student's self-regulation and social skills (Bronson,

Goodson, Layzer, & Love, 1990). Requiring 3-5 minutes per child to complete, the CBRS focuses on children's interactions with other children and adults in the classroom, as well as their academic performance. Seven items on the CBRS comprise the Social Skills domain, and ten items comprise the Self-Regulation domain. Items are assessed using a 5-point scale (1= never, 5= always).

Research conducted by Tindal, Irvin, Nese, and Slater (2015) found that the CBRS has high internal reliability (Cronbach's alpha > .96), which supports similar findings from previous work involving the use of this measure (Schmitt, Pratt, and McClelland, 2014). To determine construct validity, Ponitz, McClelland, Matthews, and Morrison (2009) conducted exploratory analyses of the CBRS and determined the two largest factors were related to classroom behavioral regulation and interpersonal skills. The first factor included 10 items related to assessing classroom behavioral regulation, while the second factor included seven items that corresponded to interpersonal skills.

For the 10 items related to self-regulation, the benchmark score is 2.9 with 5.0 being the maximum score. The benchmark score for the seven items related to social skills is 3.71, and the maximum score is also 5.0. Students in this study who met or exceeded the minimum thresholds in both areas of the CBRS at kindergarten entry demonstrated their prowess for managing the behavioral and social expectations necessary for school success. Anyone falling below the benchmark scores in either area was more likely to experience challenges making the transition to kindergarten.

### **Reliability and Validity**

Threats to internal validity often cannot be controlled but should be acknowledged. For example, students who attend the VPI program in one school division do not always attend kindergarten in the same school division due to, for example, family mobility. Student transience results in sample mortality since students who moved to another school division were not included in the study. Although some environmental differences (e.g., teacher attrition) exist among the five VPI classrooms included in this study, only the scores for students within the same cohort were compared.

In terms of external validity, comparing two intact groups of students can lead to selection bias and fail to capture the effects of preschool participation (Hustedt, Jung, Barnett, & Williams, 2015). For example, parents must apply for their children to participate in the VPI

program, and their children must meet at least one of four eligibility criteria: poverty, homelessness, parent's level of education, or special needs or disabilities. School divisions also have the flexibility of using local criteria when selecting children for up to 15% of their state-funded slots. However, students who attend state-funded prekindergarten programs like the VPI share similar characteristics (e.g., living in or near poverty, mothers with limited education, and single parent households) to students who do not attend a preschool or prekindergarten program (Walters, 2007). These common qualities between the two groups of students strengthened this research study by increasing the chances of measuring outcomes based on VPI participation rather than on differences that existed before the prekindergarten year began (Frede, Gilliam, & Schweinhart, 2011; Phillips et al., 2017).

### **Data Analysis Procedure**

This quantitative study was a nonexperimental design that compared the kindergarten readiness assessment (PALS-K, EMAS, and CBRS) mean scores of two intact groups of kindergarten students within four different cohorts (2015, 2016, 2017, and 2018). Independent samples *t*-tests (non-directional, two-tailed) were used to determine if students who attended a state-funded prekindergarten program performed better on school readiness measures than their peers who did not attend a prekindergarten or preschool program. The IBM SPSS Statistics software program was used to run the analyses of the students' kindergarten entry assessment scores. Each student was assigned a number in place of his or her name. Dichotomous variables (e.g., 0 and 1) were used to identify VPI participation.

**Cleaning.** Four separate data files representing four different cohorts of kindergarten students were downloaded from the PALS website (<https://pals.virginia.edu>). Each file contained the PALS-K scores for the kindergarten students who entered school in 2015, 2016, 2017, and 2018. These files were saved as Excel spreadsheets, and because they contained numerous data points (see Appendix B for the PALS K-3 Data Dictionary Prior to School Year 2016-2017 and the PALS K-3 Data Dictionary Beginning School Year 2016-2017), the data points unrelated to the research questions were removed. The following data points were retained in the Excel files: the students' names, PALS-K scores for each student, and codes for the students' preschool experience.

Before the files were transferred to SPSS for analyses, the students were assigned numbers and their names were removed. The kindergarten teachers assigned preschool



experience codes to their students using the following variables: 0 = did not attend preschool, 1 = did attend preschool, and 2 = teacher did not know. Although parents/guardians are asked to report their child's preschool experience at kindergarten registration, this information is sometimes omitted on the school entrance forms. In cases where the preschool experience was unknown, these students were not included in the study since I wanted to compare the scores of students who participated in the VPI program to the students without any preschool or prekindergarten experience.

**Recoding.** Although the data files indicated which students participated in a preschool program, it did not specify which programs they attended. Since I supervise the VPI program in this school division and am aware of the students who participate, a separate column was added to the Excel files using dichotomous variables to identify VPI participation (0 = did not participate and 1 = did participate). In order to compare the mean scores of the VPI students to the mean scores of the students with no preschool or prekindergarten experience, an additional variable was created called preparation. The variable was code 1= and code 2 =. In doing so, students were identified as having no preschool/prekindergarten experience or enrolled in the VPI. The CBRS scores for self-regulation and social skills and the EMAS scores were also downloaded from the Virginia Kindergarten Reading Program (VKRP) portal of the PALS website (<https://pals.virginia.edu>) and copied and pasted into the Excel files containing the students' names, PALS-K scores, and codes for the students' preschool experience.

## **Research Design**

The study was a quantitative non-experiment using existing PALS-K and VKRP data for four student cohorts based on assessments that were administered during the 2015-2016, 2016-2017, 2017-2018, and 2018-2019 school years. Independent samples, two-tailed *t*-tests were used to determine if students who attended a VPI program performed differently on measures of literacy, mathematics, self-regulation, and social skills than students within their cohort who did not attend a prekindergarten or preschool program. The independent variables were VPI participation and students without a prekindergarten or preschool experience. The dependent variables were the PALS-K (literacy), the EMAS (mathematics), and the CBRS (self-regulation and social skills).

In a similar study, Parker (2018) examined the effectiveness of a preschool program attended by 3-year-olds in a rural school division in Eastern Virginia. Parker's study was a

dissertation that was written while he was enrolled in Virginia Tech’s Educational Leadership and Policy Studies program. Using literacy achievement data for five student cohorts, Parker’s goal was to determine if any differences existed in the literacy achievement between the students who attended the preschool program and students who did not attend. The literacy measures included PALS, the Scholastic Reading Inventory (SRI), Get Ready to Read – Revised (GRTR-R), and teacher-generated student growth assessments (SGAs). Two-tailed *t*-tests were used to identify potential differences in mean scores on the literacy tests for students who participated in the preschool program and students without the preschool intervention. Table 8 is a summary of the similarities and differences between these two studies.

Table 8  
*Comparison of Parker’s Study and Lyle’s Study*

|            | Parker (2018)   | Lyle (2020)   |
|------------|---|---|
| Setting    | One rural school division in Eastern Virginia                             | One rural school division in Central Virginia                                     |
| Population | Five cohorts of at-risk 3-year-old preschoolers                           | Four cohorts of at-risk 4-year-old prekindergarteners                             |
| Measures   | PALS (literacy)<br>SRI (literacy)<br>GRTR-R (literacy)<br>SGAs (literacy) | PALS (literacy)<br>EMAS (mathematics)<br>CBRS (self-regulation and social skills) |
| Analyses   | Non-directional, two-tailed <i>t</i> -tests                               | Non-directional, two-tailed <i>t</i> -tests                                       |

While there are commonalities between Parker’s research design and the methods used for my study, there are distinctions that made the latter study comprehensive and unique. For example, Parker (2018) used PALS to measure possible literacy achievement differences between students with and without a preschool experience. The current study also examined possible literacy achievement differences as measured by PALS between students who participated in a prekindergarten program to their peers who did not attend any preschool or prekindergarten program. However, to capture a holistic overview of school readiness, my study examined students’ foundational, mathematical knowledge using the EMAS. Beyond academic

competence, my study also measured students' social-emotional skills using data captured by the CBRS.

Parker (2018) was interested in determining if there were any differences in literacy achievement between students who participated in a preschool program and those who did not. His research question was: What, if any, difference is found in literacy achievement, as measured by PALS, the SRI, SGAs, and the GRTR-R, between the students who received a 3-year-old preschool intervention and those who did not? Parker (2018) used non-directional, two-tailed *t*-tests to answer his research question since his goal was to determine possible differences between two groups of students (Howell, 2013). Using two-tailed *t*-tests was also appropriate for the present study to determine if students who participated in a state-funded prekindergarten program performed better on academic and social-emotional measures than their peers without any preschool or prekindergarten experience.

Another aspect of Parker's study that is similar to my study involved analyzing data among multiple student cohorts, although Parker examined the literacy achievement of five student cohorts, and this study involved four student cohorts. Parker (2018) compared students' test scores within the same cohort, and my study followed the same procedure of comparing only students within the same cohort due to variables like teacher attrition that exist among the four student cohorts. Although both programs serve students living in poverty, the preschool program described in Parker's study serves at-risk 3-year-olds, and the state-funded prekindergarten program in the current study was created to serve at-risk 4-year-olds not already being served by Head Start (JLARC, 2007).

## **Data Collection**

Existing data were used to conduct this study. Between 2015 and 2018, kindergarten teachers in the school division where I am employed assessed incoming kindergarten students on measures of literacy, mathematics, self-regulation, and social skills. The teachers entered the scores for these measures into the PALS website (<https://pals.virginia.edu>), which serves as a database for storing the students' literacy, mathematics, self-regulation, and social skills scores. Data were downloaded to run statistical analyses to determine if students who participated in a state-funded VPI program performed better than students who did not attend this program or any other prekindergarten or preschool program.

## **Data Treatment and Management**

This study used existing data (PALS-K, EMAS, and CBRS) that were collected between 2015 and 2018 by kindergarten teachers in a rural school division located in Central Virginia. The data were retrieved from the PALS database (<https://pals.virginia.edu>), downloaded over a secured network where I am employed, and transferred into an Excel spreadsheet. This process allowed the data to be transferred to the IBM SPSS Statistics software program for analyses. The data were saved on a password protected computer issued by the school division where I am employed. Paper copies of any data were stored in a locked filing cabinet in my office.

As an administrator in the school division where the data were obtained, I have authorized access to the data. Other than teachers and administrators sharing individual student scores with parents/guardians, these data are not available to the public with the exception of overall trends. For example, aggregate school division pass rates for the PALS-K can be found on certain websites (e.g., <https://datacenter.kidscount.org/>). The data used for this study contained identifiers such as students' names, race, and gender. Students' names were redacted and each student was assigned a number to keep his or her test scores confidential. Any data (electronic or paper copies) that were downloaded and included personal identifiers were destroyed once this study was completed and approved by Virginia Tech.

The certificate issued by the Collaborative Institutional Training Initiative (CITI) indicating successful completion of the program course on Social and Behavioral Research on February 15, 2019 is included in Appendix C. A request to conduct the study was submitted to Virginia Tech's Institutional Review Board (IRB) using the Existing Data Research Protocol once the prospectus examination was successfully defended. The IRB Office notified me on October 7, 2019 that approval was granted to proceed with the study (see Appendix D). Permission was also obtained from my superintendent to use the data for the study (see letters requesting and granting permission in Appendices E and F). These letters were submitted to the IRB with the Existing Data Research Protocol.

## **Summary**

The purpose of this study was to evaluate the effectiveness of a school division's VPI program at preparing students for kindergarten. While a similar study examined the relationship between preschool attendance and literacy achievement (Parker, 2018), the present study was the first to examine students who attended a VPI program and their school readiness based on measures of literacy, mathematics, self-regulation, and social skills. The methodology described in this chapter provides a sufficient estimation of kindergarten preparation and addresses the research questions in the next chapter.

## **Chapter Four**

### **Results of Data Analysis**

#### **Introduction**

The purpose of this study was to examine the effectiveness of a school division's Virginia Preschool Initiative (VPI) program in Central Virginia at preparing students for kindergarten. Did students who participated in a VPI program enter kindergarten better prepared academically and behaviorally than their peers who did not have any prekindergarten or preschool experience? Scores from assessments that measure literacy, mathematics, self-regulation, and social skills were analyzed and compared to determine if differences existed between these groups of students.

The data were analyzed to respond to the research questions posed for this study: Did students who attended a VPI program demonstrate stronger literacy skills than students who did not attend a preschool or prekindergarten program? Did the VPI students have higher mathematics scores? Were the VPI students better at regulating their emotions and behaviors? Were the VPI students more adept at having social interactions with adults and other children? A two-tailed *t*-test was used on each set of assessment data within four different cohorts of kindergarten students to test the null hypothesis (i.e., no differences in the mean scores between the two groups of students within each cohort) and the alternate hypothesis (differences in the mean scores between the two groups of students within each cohort). The Phonological Awareness Literacy Screening-Kindergarten (PALS-K) measured the students' emergent literacy skills, the Early Mathematics Assessment System (EMAS) measured the students' understanding of numeracy concepts, and the Child Behavior Rating Scale (CBRS) was used to rate the students' self-regulation and social skills.

#### **Data Analysis**

Independent samples *t*-tests were conducted to determine if there were differences between VPI students and students with no preschool or prekindergarten experience in the areas of literacy, mathematics, self-regulation, and social skills. Assumptions for normality were tested, and these assumptions were violated in some cases. However, the *t*-test is a robust test, and research has shown that two non-normal distributions of the same shape will result in reliable results (Havlicek & Peterson, 1974). Sample distributions in this study were consistently

negatively skewed. This is not surprising since some students typically score at the lower end of academic and behavioral measures.

**Cohort one.** The school division that is the focus of this study began assessing kindergarten students in four areas of school readiness (i.e., literacy, mathematics, self-regulation, and social skills) at the beginning of the 2015-2016 school year. Students in Cohort One entered the fourth grade in the fall of 2019. Of these 291 kindergarten students, one was excluded from the study since the preschool experience was unknown. One other student was removed from the sample since the student’s scores were extreme outliers. Students were also excluded if one or more assessment scores were missing from the data file. Within this cohort, 57 students (five excluded) attended the VPI program and 48 students (three excluded) entered kindergarten without having any preschool or prekindergarten experience. Demographic data for these students are included in Table 9.

Table 9

*Demographic Characteristics of Cohort One (N = 97)*

| Characteristic  | <i>n</i> | <i>%N</i> |
|-----------------|----------|-----------|
| Gender          |          |           |
| Males           | 35       | 36        |
| Females         | 62       | 64        |
| Race            |          |           |
| Caucasian       | 69       | 71        |
| Other           | 28       | 29        |
| Prekindergarten |          |           |
| VPI             | 52       | 54        |
| No PK           | 45       | 46        |

These 97 students were assessed with the PALS-K, the EMAS, and the CBRS. Students who attend state-funded prekindergarten programs share common risk factors with children who do not attend any program prior to kindergarten (Walters, 2007). However, students who experience a full year of school prior to entering kindergarten would be expected to perform at a higher level on both academic and behavioral measures. Table 10 reports the results of the outcomes assessed via a *t*-test.

Table 10

*Results of t-tests for Cohort One (N = 97)*

| Outcome         | VPI      |           | Group    |          |           | 95% CI for Mean Difference |         | <i>t</i> | <i>df</i> | Sig Val. |      |
|-----------------|----------|-----------|----------|----------|-----------|----------------------------|---------|----------|-----------|----------|------|
|                 | <i>M</i> | <i>SD</i> | <i>n</i> | <i>M</i> | <i>SD</i> | <i>n</i>                   |         |          |           |          |      |
| PALS-K Literacy | 70.48    | 16.14     | 52       | 46.80    | 23.42     | 45                         | -31.941 | 15.421   | -5.709    | 95       | .000 |
| EMAS Math       | 31.00    | 5.08      | 52       | 28.22    | 7.00      | 45                         | -5.284  | -.271    | -2.206    | 95       | .030 |
| CBRS Social     | 4.00     | .770      | 52       | 4.11     | .586      | 45                         | -.17331 | .38500   | .753      | 95       | .453 |
| CBRS Regulation | 3.67     | .868      | 52       | 3.33     | .778      | 45                         | -.67027 | .00153   | -1.994    | 95       | .049 |

*p*<.05

According to the PALS-K, students who attended the VPI program had a mean score of 70.48, while students without any preschool or prekindergarten experience achieved a mean score of 46.80. The mean difference was 23.68, and the standard deviations were 16.14 (VPI) and 23.42 (no experience). Equal variances could not be assumed based on Levene's Test for Equality of Variances ( $p=.003$ ). A *t*-test comparing the two groups was statistically significant ( $p=.000<.05$ ), and the 95% confidence interval for the difference was -31.941, -15.421. Results indicate that students who attended the VPI program scored significantly higher than their peers who did not attend a preschool or prekindergarten program. Therefore, the null hypothesis is rejected.

The EMAS measured students' readiness to learn kindergarten mathematics concepts. Students who attended the VPI program had a mean score of 31.00, while students in the comparison group earned 28.22. The mean difference was 2.78, and the standard deviations were 5.08 (VPI) and 7.00 (no experience). Equal variances could not be assumed based on Levene's Test for Equality of Variances ( $p=.022$ ). A *t*-test comparing the two groups was statistically significant ( $p=.030<.05$ ), and the 95% confidence interval for the difference was -5.284, -.271. Results indicate that students who attended the VPI program scored significantly higher than their peers who did not attend a preschool or prekindergarten program. Therefore, the null hypothesis is rejected.

The CBRS measured students' self-regulation and social skills. Two different scores were generated when the kindergarten teachers assigned ratings for the seven social skills items



and the 10 self-regulation items. For social skills, the students who participated in the VPI program had a mean score of 4.00, while the students in the comparison group obtained a mean score of 4.11. The mean difference was .11, and the standard deviations were .770 (VPI) and .586 (no experience). Equal variances were assumed based on Levene's Test for Equality of Variances ( $p=.253$ ). A  $t$ -test comparing the two groups was statistically insignificant ( $p=.453>.05$ ), and the 95% confidence interval for the difference was -.17331, .38500. Results indicate there is no statistical difference between the groups, so the null hypothesis is accepted.

When examining these students' self-regulation results, students who attended the VPI program had a mean score of 3.67, and students in the comparison group received a mean score of 3.33. The mean difference was .34, and the standard deviations were .868 (VPI) and .778 (no experience). Equal variances were assumed based on Levene's Test for Equality of Variances ( $p=.283$ ). A  $t$ -test comparing the two groups was statistically significant ( $p=.049<.05$ ), and the 95% confidence interval for the difference was -.67027, -.00153. Results indicate there is a statistical difference between the groups, so the null hypothesis is rejected.

**Cohort two.** The 284 students in Cohort Two were the second group of students in this school division to participate in the Virginia Kindergarten Readiness Program (VKRP). In addition to being screened with the PALS-K, these students were screened with the EMAS and CBRS in the fall of 2016. Students in this cohort entered the third grade in the fall of 2019, and 43 of them were excluded from the study since their preschool experience was unknown. In addition, six students were not included since one or more assessment scores were missing from the data file. This resulted in 70 VPI students and 39 students with no preschool or prekindergarten experience in the study. Demographic data for these students are summarized in Table 11.

Table 11

*Demographic Characteristics of Cohort Two (N = 109)*

| Characteristic  | <i>n</i> | % <i>N</i> |
|-----------------|----------|------------|
| Gender          |          |            |
| Males           | 63       | 58         |
| Females         | 46       | 42         |
| Race            |          |            |
| Caucasian       | 74       | 68         |
| Other           | 35       | 32         |
| Prekindergarten |          |            |
| VPI             | 70       | 64         |
| No PK           | 39       | 36         |

The literacy, mathematics, self-regulation, and social skills data for the 109 students in this cohort are included in Table 12.

Table 12

*Results of t-tests for Cohort Two (N = 109)*

| Outcome         | VPI      |           | Group    |          |           | 95% CI for Mean Difference |         | <i>t</i> | <i>df</i> | Sig Val. |      |
|-----------------|----------|-----------|----------|----------|-----------|----------------------------|---------|----------|-----------|----------|------|
|                 | <i>M</i> | <i>SD</i> | <i>n</i> | <i>M</i> | <i>SD</i> | <i>n</i>                   |         |          |           |          |      |
| PALS-K Literacy | 69.31    | 19.45     | 70       | 43.44    | 22.53     | 39                         | -34.037 | -17.720  | -6.288    | 107      | .000 |
| EMAS Math       | 32.17    | 5.86      | 70       | 27.90    | 8.33      | 39                         | -7.288  | -1.260   | -2.837    | 107      | .006 |
| CBRS Social     | 4.01     | .886      | 70       | 3.77     | .857      | 39                         | -.58530 | .10836   | -1.363    | 107      | .176 |
| CBRS Regulation | 3.66     | .982      | 70       | 3.10     | .995      | 39                         | -.94795 | -.16634  | -2.826    | 107      | .006 |

*p*<.05

For the PALS-K, students who attended the VPI program had a mean score of 69.31, and their counterparts without a preschool or prekindergarten experience acquired a mean score of 43.44. The mean difference was 25.87, and the standard deviations were 19.45 (VPI) and 22.53 (no experience). Equal variances were assumed based on Levene's Test for Equality of Variances (*p*=.082). A *t*-test comparing the two groups was statistically significant (*p*=.000<.05), and the 95% confidence interval for the difference was -34.037, -17.720. Results indicate there is a statistical difference between the groups, so the null hypothesis is rejected.

When analyzing the EMAS results, VPI students had a mean score of 32.17 while their peers without any preschool or prekindergarten experience earned a mean score of 27.90. The mean difference was 4.27, and the standard deviations were 5.86 for VPI students and 8.33 for students in the comparison group. Equal variances could not be assumed based on Levene's Test for Equality of Variances ( $p=.002$ ). A  $t$ -test comparing the two groups was statistically significant ( $p=.006<.05$ ), and the 95% confidence interval for the difference was -7.288, -1.260. Results indicate there is a statistical difference between the groups, so the null hypothesis is rejected.

In terms of social skills, the VPI students in this cohort had a mean score of 4.01, and students in the comparison group received a mean score of 3.77. The mean difference was .24, and the standard deviations were .886 for VPI students and .857 for the other students. Equal variances were assumed based on Levene's Test for Equality of Variances ( $p=.901$ ). A  $t$ -test comparing the two groups was statistically insignificant ( $p=.176>.05$ ), and the 95% confidence interval for the difference was -.58530, .10836. Since there is no statistical difference between the groups, the null hypothesis is accepted.

The CBRS results for self-regulation skills were 3.66 for VPI students and 3.10 for students in the comparison group. The mean difference was .56, and the standard deviations were .982 for the VPI group and .995 for the other group. Equal variances were assumed based on Levene's Test for Equality of Variances ( $p=.456$ ). A  $t$ -test comparing the two groups was statistically significant ( $p=.006<.05$ ), and the 95% confidence interval for the difference was -.94795, -.16634. Results indicate there is a statistical difference between the groups, so the null hypothesis is rejected.

**Cohort three.** At the beginning of the 2017-2018, the 306 students in Cohort Three were the third group of students in this school division to participate in the VKRP. These students began their second grade year in the fall of 2019, and 41 students were excluded from the study since their preschool experience was unknown. Of the 120 students from this cohort included in the study, 76 of them attended the VPI program and 44 of them did not have any preschool or prekindergarten experience. Demographic data for this cohort are displayed in Table 13.

Table 13

*Demographic Characteristics of Cohort Three (N = 120)*

| Characteristic  | <i>n</i> | % <i>N</i> |
|-----------------|----------|------------|
| Gender          |          |            |
| Males           | 66       | 55         |
| Females         | 54       | 45         |
| Race            |          |            |
| Caucasian       | 81       | 68         |
| Other           | 39       | 32         |
| Prekindergarten |          |            |
| VPI             | 76       | 63         |
| No PK           | 44       | 37         |

The literacy, mathematics, self-regulation, and social skills data for the 120 students in this cohort are included in Table 14.

Table 14

*Results of t-tests for Cohort Three (N = 120)*

| Outcome         | VPI      |           | Group    |          |           | 95% CI for Mean Difference |         | <i>t</i> | <i>df</i> | Sig Val. |      |
|-----------------|----------|-----------|----------|----------|-----------|----------------------------|---------|----------|-----------|----------|------|
|                 | <i>M</i> | <i>SD</i> | <i>n</i> | <i>M</i> | <i>SD</i> | <i>n</i>                   |         |          |           |          |      |
| PALS-K Literacy | 62.92    | 20.76     | 76       | 47.59    | 24.87     | 44                         | -24.173 | -6.488   | -3.452    | 118      | .001 |
| EMAS Math       | 35.88    | 6.76      | 76       | 30.14    | 10.04     | 44                         | -9.140  | -2.350   | -3.379    | 118      | .001 |
| CBRS Social     | 4.09     | .651      | 76       | 3.94     | .769      | 44                         | -.41493 | .10768   | -1.164    | 118      | .247 |
| CBRS Regulation | 3.78     | .800      | 76       | 3.40     | .887      | 44                         | -.69986 | -.07502  | -2.456    | 118      | .016 |

*p*<.05

Students who attended the VPI program had a PALS-K mean score of 62.92, and those in the no preschool or prekindergarten experience group earned a mean score of 47.59. The mean difference was 15.33, and the standard deviations were 20.76 (VPI) and 24.87 (no experience). Equal variances could not be assumed based on Levene's Test for Equality of Variances (*p*=.025). A *t*-test comparing the two groups was statistically significant (*p*=.001<.05), and the 95% confidence interval for the difference was -24.173, -6.488. Results indicate there is a statistical difference between the groups, so the null hypothesis is rejected.

Results from the EMAS show that students in the VPI group had a mean score of 35.88 whereas the students who did not attend preschool or prekindergarten obtained a mean score of 30.14. The mean difference was 5.74, and the standard deviations were 6.76 for the VPI and 10.04 for the no experience group. Equal variances could not be assumed based on Levene's Test for Equality of Variances ( $p=.002$ ). A  $t$ -test comparing the two groups was statistically significant ( $p=.001<.05$ ), and the confidence interval for the difference was -9.140, -2.350. Results indicate there is a statistical difference between the groups, so the null hypothesis is rejected.

Social skills results from the CBRS show that the VPI group had a mean score of 4.09, and the comparison group achieved a mean score of 3.94. The mean difference was .15, and the standard deviations were .651 (VPI) and .769 (no experience). Equal variances were assumed based on Levene's Test for Equality of Variances ( $p=.334$ ). A  $t$ -test comparing the two groups was statistically insignificant ( $p=.247>.05$ ), and the confidence interval for the difference was -.41493, .10768. Results indicate there is no statistical difference between the groups, so the null hypothesis is accepted.

Self-regulation results for the VPI students show this group had a mean score of 3.78 while the no experience group acquired a mean score of 3.40. The mean difference was .38, and the standard deviations were .800 (VPI) and .887 (no experience). Equal variances were assumed based on Levene's Test for Equality of Variances ( $p=.148$ ). A  $t$ -test comparing the two groups was statistically significant ( $p=.016<.05$ ), and the confidence interval for the difference was -.69986, -.07502. Results indicate there is a statistical difference between the groups, so the null hypothesis is rejected.

**Cohort four.** In Fall 2018, the fourth group of students in this school division was assessed in literacy, mathematics, self-regulation, and social skills. These students became first graders in the fall of 2019, and 68 were excluded from the study since their preschool experience was unknown. Of the 318 students in Cohort Four, 78 participated (one excluded due to missing assessment data) in the VPI program whereas 36 entered kindergarten without having attended any preschool or prekindergarten program. Demographic data for this cohort are in Table 15.

Table 15

*Demographic Characteristics of Cohort Four (N = 113)*

| Characteristic  | <i>n</i> | % <i>N</i> |
|-----------------|----------|------------|
| Gender          |          |            |
| Males           | 61       | 54         |
| Females         | 52       | 46         |
| Race            |          |            |
| Caucasian       | 88       | 78         |
| Other           | 25       | 22         |
| Prekindergarten |          |            |
| VPI             | 77       | 68         |
| No PK           | 36       | 32         |

The literacy, mathematics, self-regulation, and social skills data for the 113 students in this cohort are included in Table 16.

Table 16

*Results of t-tests for Cohort Four (N = 113)*

| Outcome         | Group    |           |          |          |           |          | 95% CI for Mean Difference |        | <i>t</i> | <i>df</i> | Sig Val. |
|-----------------|----------|-----------|----------|----------|-----------|----------|----------------------------|--------|----------|-----------|----------|
|                 | VPI      |           | No PK    |          |           |          |                            |        |          |           |          |
|                 | <i>M</i> | <i>SD</i> | <i>n</i> | <i>M</i> | <i>SD</i> | <i>n</i> |                            |        |          |           |          |
| PALS-K Literacy | 62.55    | 21.19     | 77       | 44.72    | 26.71     | 36       | -27.966                    | -7.680 | -3.520   | 111       | .001     |
| EMAS Math       | 33.51    | 8.18      | 77       | 31.92    | 8.15      | 36       | -4.858                     | 1.679  | -.964    | 111       | .337     |
| CBRS Social     | 4.10     | .770      | 77       | 4.22     | .670      | 36       | -.17475                    | .41741 | .812     | 111       | .419     |
| CBRS Regulation | 3.59     | .792      | 77       | 3.40     | 1.04      | 36       | -.57913                    | .20546 | -.955    | 111       | .344     |

*p*<.05

In the area of literacy, students who were in the VPI program had a mean score of 62.55, and students in the no experience group earned a mean score of 44.72. The mean difference was 17.83, and the standard deviations were 21.19 (VPI) and 26.71 (no experience). Equal variances could not be assumed based on Levene's Test for Equality of Variances (*p*=.006). A *t*-test comparing the two groups was statistically significant (*p*=.001<.05), and the confidence interval for the difference was -27.966, -7.680. Results indicate there is a statistical difference between the groups, so the null hypothesis is rejected.

Math results show that students in the VPI group had a mean score of 33.51, and students with no preschool or prekindergarten experience received a mean score of 31.92. The mean difference was 1.59, and the standard deviations were 8.18 (VPI) and 8.15 (no experience). Equal variances were assumed based on Levene's Test for Equality of Variances ( $p=.951$ ). A  $t$ -test comparing the two groups was statistically insignificant ( $p=.337>.05$ ), and the confidence interval for the difference was -4.858, 1.679. Since there is no statistical difference between the groups, the null hypothesis is accepted.

Examining the social skills results shows that the VPI group had a mean score of 4.10, and students in the comparison group achieved a mean score of 4.22. The mean difference was .12, and the standard deviations were .770 (VPI) and .670 (no experience). Equal variances were assumed based on Levene's Test for Equality of Variances ( $p=.246$ ). A  $t$ -test comparing the two groups was statistically insignificant ( $p=.419>.05$ ), and the confidence interval for the difference was -.17475, .41741. There is no statistical difference between the groups, so the null hypothesis is accepted.

Self-regulation results show that the VPI group had a mean score of 3.59, and the no experience group obtained a mean score of 3.40. The mean difference was .19, and the standard deviations were .792 (VPI) and 1.04 (no experience). Equal variances could not be assumed based on Levene's Test for Equality of Variances ( $p=.007$ ). A  $t$ -test comparing the two groups was statistically insignificant ( $p=.344>.05$ ), and the confidence interval for the difference was -.57913, .20546. There is no statistical difference between the groups, so the null hypothesis is accepted.

## **Summary**

According to the data collected and analyzed for four different cohorts, students who attended the VPI program in this school division scored significantly higher on the PALS-K compared to their peers who entered kindergarten with no preschool or prekindergarten experience. The VPI students in Cohort One, Cohort Two, and Cohort Three also scored significantly higher on the EMAS compared to the students who did not attend a program prior to kindergarten. However, there was no statistical difference in the EMAS mean scores for the VPI students and the students without a preschool or prekindergarten experience in Cohort Four. When analyzing the students' social skills scores from the CBRS, there was no statistical difference for the comparison groups in any of the cohorts. The students' self-regulation scores

from the CBRS were similar to the mathematics scores from the EMAS. The VPI students in Cohort One, Cohort Two, and Cohort Three scored significantly higher on this portion of the CBRS than the students in the comparison groups. Conversely, there was no statistical difference in the self-regulation mean scores for the two comparison groups in Cohort Four.



## Chapter Five

### Findings, Summary and Conclusions

#### Introduction

The purpose of this study was to examine the effectiveness of a school division's Virginia Preschool Initiative (VPI) program in Central Virginia at preparing students for kindergarten. Did students who participated in a VPI program perform better on the Phonological Awareness Literacy Screening-Kindergarten (PALS-K), the Early Mathematics Assessment System (EMAS), and the Child Behavior Rating Scale (CBRS) than their peers who did not have any preschool or prekindergarten experience? Scores from these assessments that measure literacy (PALS-K), mathematics (EMAS), self-regulation (CBRS), and social skills (CBRS) were analyzed and compared for students who attended this VPI program to their peers without any preschool or prekindergarten experience.

#### Summary of Findings

Using independent samples *t*-tests, scores for each assessment (i.e., PALS-K, EMAS, and CBRS) that was administered to four cohorts of kindergarten students (2015, 2016, 2017, and 2018), were analyzed to answer the four secondary research questions included in each of the following findings.

**Finding one.** Students who participated in the VPI program performed significantly higher on the PALS-K than the students without any preschool or prekindergarten experience. This was true for all four cohorts when comparisons were made between the two groups of students within each cohort.

**Finding two.** In Cohorts One, Two, and Three, there was a significant difference in the mean scores of the EMAS between the VPI students and the students who did not attend a preschool or prekindergarten program. However, a statistical difference did not exist between the two comparison groups in Cohort Four when analyzing their EMAS scores.

**Finding three.** When analyzing the students' social skills scores from the CBRS, there was no statistical difference between the comparison groups in any of the cohorts. In fact, the students who did not attend preschool or prekindergarten in Cohort One and Cohort Four had higher mean scores on the social skills portion of the CBRS compared to the mean scores of their VPI counterparts.

**Finding four.** For the students' self-regulations scores, the results were similar to those from the EMAS. There was a statistical difference in the self-regulation mean scores from the CBRS between the comparison groups in Cohorts One, Two, and Three. No difference existed in the self-regulation scores between the comparison groups in Cohort Four.

## **Discussion of Findings**

**Literacy.** The VPI students in all four cohorts did extremely well on the PALS-K based on a comparison of their mean scores to those of their counterparts without any preschool or prekindergarten experience. These results are not surprising since Huang, Invernizzi, and Drake (2012) found that students who participated in the VPI program were likely to meet or exceed the basic literacy standards measured by the PALS-K. In addition, only 6% of the students in the Commonwealth of Virginia who were in the VPI program in 2013 required reading intervention services when they entered kindergarten compared to the 26% of the students who did not attend a preschool or prekindergarten program (Virginia Department of Education [VDOE], 2013a).

**Mathematics.** In terms of mathematics readiness, the VPI students in Cohorts One, Two, and Three scored significantly higher on the EMAS than students in the comparison groups. This was not true, however, for the VPI students in Cohort Four. There was no statistical difference in the EMAS mean scores between the VPI group and the students who entered kindergarten without having attended a preschool or prekindergarten program. The fact that VPI students in the first three cohorts performed exceptionally well on the EMAS is an important finding since early mathematics proficiency is one of the best predictors of school success across all content areas (Brownell, Chen, & Ginet, 2014). This finding also challenges the assertion made by Clements and Sarama (2015) that early childhood teachers in the United States lack the understanding needed to teach mathematics proficiently.

**Social skills.** There was no statistical difference in the social skills scores from the CBRS when comparing the VPI students' mean scores to their peers without a preschool or prekindergarten experience in any of the four cohorts. In two cases (Cohorts One and Four), the students who did not attend a preschool or prekindergarten program earned higher mean scores on the social skills portion of the CBRS than the VPI students. Students who attended this VPI program were no more prepared for kindergarten in this area of school readiness than students who entered kindergarten without attending preschool or prekindergarten. This finding counters

the claim made by Bartik (2014) that effective early childhood programs create more long-term effects related to social skills rather than academic outcomes.

**Self-regulation.** The VPI students in Cohorts One, Two, and Three earned statistically significant self-regulation scores on this portion of the CBRS when comparing their mean scores to the students who did not participate in a preschool or prekindergarten program. This trend did not continue with the VPI students in Cohort Four since there was no statistical difference between their self-regulation mean score and the mean score of the comparison group. Alejandro et al. (2016) also found that students who attended preschool scored higher on measures of self-regulation than students who did not attend preschool. While this finding was not universal across all four cohorts in this study, it is an important outcome since self-regulation supersedes literacy and mathematics in terms of its influence on a student's achievement, regardless of aptitude (Williford, Downer, Hamre, & Pianta, 2014).

### **Implications of Findings**

Early educators who focus on academic skills with little regard for children's social functioning are doing a huge disservice to these children, especially those who live in less than optimal environments (Thompson & Goodman, 2009). While prekindergarten students must acquire emergent literacy skills to become conventional readers, American early childhood educators often devote most of their instructional time to literacy (Brownell, Chen, & Ginot, 2014). Although the overall results from this study do not indicate the VPI teachers prioritized literacy over mathematics instruction, the results do raise questions about the amount of attention given to teaching students how they should cooperate, interact, and share with others. The suspicion that emphasis was placed on teaching academic content over teaching social skills is concerning since VPI teachers are responsible for teaching students the social skills outlined in *Virginia's Foundation Blocks for Early Learning: Comprehensive Standards for Four-Year-Olds* (VDOE, 2013b).

When analyzing the items assessed by the CBRS, the first 10 tasks relate to self-regulation and the remaining seven evaluate children's social skills. For example, the first item requires teachers to evaluate how well students observe rules and follow directions. Item six asks teachers to rate how well children respond to instructions and then begin working without being reminded. Both of these items are about compliance, or how well children are able to follow the rules, expectations, and procedures established by the teacher. Students are usually

successful in classrooms where norms are consistently enforced by their teachers. The VPI students in Cohorts One, Two, and Three possibly benefitted from structured learning environments established by their VPI teachers, which may also account for how these students received high self-regulation ratings from their kindergarten teachers when they entered school.

On the other hand, the social skills items included on the CBRS require intentional teaching beyond creating classroom settings that are characterized by students who are able to work independently. The social skills items evaluate how well children are able to cooperate and share without arguing and fighting with their classmates. Students are assessed on their social interactions with peers and adults, unlike the self-regulation items that focus primarily on their ability to complete individual tasks assigned by the teacher. Based on the overall results from the CBRS, many of the VPI students entered kindergarten with strong self-regulation skills, most likely due to the consistent way in which the VPI teachers managed their classrooms. Since social skills must be explicitly taught like cognitive skills, teachers must be as deliberate with planning social skills lessons as they are with literacy and mathematics. Given the pressure VPI teachers feel with preparing students academically for kindergarten, much less time was probably devoted to teaching social skills.

Although the VPI students in Cohort Four earned a statistically higher mean score on the PALS-K, the VPI students in Cohort Four did not perform statistically better than their peers without any preschool experience in the areas of mathematics and self-regulation. To explain factors that may have contributed to the results in Cohort Four differing from the other cohorts, I considered possible causes. First, a change in the curriculum did not occur until the 2019-2020 school year, so this would not have affected the students in my study. However, two changes did take place beginning with the 2017-2018 school year that may account for the VPI results in Cohort Four.

The first change involved moving one of the VPI classrooms from a school on the south end of the county to another school on the north end of the county. The classroom was moved to increase student access to the VPI program in a growing part of the county. When the veteran teacher involved in this move realized she would have to transfer to a different school, she resigned. The teacher who was hired to replace the teacher who left did not have any previous teaching experience. Although she had the proper credentials to teach a VPI class, she was replacing someone who had taught in the VPI program for more than a decade. The new

teacher's lack of experience could explain why some of the VPI students in Cohort Four did not perform as well in the areas of mathematics and self-regulation compared to the VPI students in the other three cohorts.

## **Conclusions**

Based on previous research about early childhood programs, the findings from this study were not completely unanticipated. For example, it was expected that the VPI students in this study would demonstrate proficiency of emergent literacy skills based on state-wide results from similar studies (Huang, Invernizzi, & Drake, 2012; VDOE, 2013a). Furthermore, early childhood educators are known to spend more time teaching literacy than other content areas like mathematics (Brownell, Chen, & Ginet, 2014). With the exception of Cohort Four, this does not appear to be the case since the VPI students in the other three cohorts had statistically significant mean scores on the EMAS in contrast to the students in the comparison groups. However, the amount of social skills instruction the VPI students in all four cohorts received is questionable since their scores from the CBRS do not indicate they learned the social skills standards included in *Virginia's Foundation Blocks for Early Learning: Comprehensive Standards for Four-Year-Olds* (VDOE, 2013b). Other than the VPI students in Cohort Four, the VPI students in the other three cohorts did demonstrate the ability to manage their emotions and behavior based on the self-regulation items assessed by the CBRS.

## **Implications for Practice**

Given the importance of students learning to interact with others, early childhood educators should devote more time to helping students get along with peers and adults. This would involve VPI teachers using a social skills curriculum with fidelity that aligns with the social skills standards included in *Virginia's Foundation Blocks for Early Learning: Comprehensive Standards for Four-Year-Olds* (VDOE, 2013b). With the exception of one standard, the social skills standards correlate with the social skills items on the CBRS, so the curriculum would need to align with the social skills standards as well.

Early childhood educators need to balance how much time they spend teaching academic, social, and behavioral skills. The VPI teachers in this study adequately prepared students for kindergarten in the areas of literacy and mathematics (although the EMAS scores for Cohort Four were statistically insignificant). The VPI students in Cohorts One, Two, and Three also

benefitted from having a prekindergarten experience based on their self-regulation scores, which offers support for the Virginia General Assembly to increase access to the VPI program. Table 17 is a summary of the findings, along with supporting data and literature as well as implications of findings and for practice.

Table 17

*Summary of Findings*

| Findings   | Supporting Data and Literature  | Implications of Findings and for Practice  |
|--|---|--|
| <p><b>Finding One</b><br/>           Students who participated in the VPI program performed significantly higher on the PALS-K than the students without any preschool or prekindergarten experience. This was true for all four cohorts when comparisons were made between the two groups of students within each cohort.</p> | <p><b>Supporting Data from Chapter Four</b><br/>           PALS-K Results by Cohort<br/>           Cohort One (<math>p=.000&lt;.05</math>)<br/>           Cohort Two (<math>p=.000&lt;.05</math>)<br/>           Cohort Three (<math>p=.001&lt;.05</math>)<br/>           Cohort Four (<math>p=.001&lt;.05</math>)</p> <p><b>Supporting Literature from Chapter Two</b><br/>           Huang, Invernizzi, and Drake (2012) found that students who participated in the VPI program were likely to meet or exceed the basic literacy standards measured by the PALS-K.</p> <p>Only 6% of the students who were in the VPI program in 2013 required reading intervention services when they entered kindergarten compared to the 26% of the students who did not attend a preschool or prekindergarten program (VDOE, 2013a).</p> | <p><b>Implications of Finding</b><br/>           American early childhood educators often devote most of their instructional time to literacy (Brownell, Chen, &amp; Ginet, 2014).</p> <p><b>Implications for Practice</b><br/>           Prekindergarten students must acquire emergent literacy skills to become conventional readers.</p> |

(continued)

Table 17 (cont.)

| Findings  | Supporting Data and Literature  | Implications of Findings and for Practice  |
|---|---|--|
| <p><b>Finding Two</b><br/>           In Cohorts One, Two, and Three, there was a significant difference in the mean scores of the EMAS between the VPI students and the students who did not attend a preschool or prekindergarten program. However, a statistical difference did not exist between the two comparison groups in Cohort Four when analyzing their EMAS scores.</p>  | <p><b>Supporting Data from Chapter Four</b><br/>           EMAS Results by Cohort<br/>           Cohort One (<math>p=.030&lt;.05</math>)<br/>           Cohort Two (<math>p=.006&lt;.05</math>)<br/>           Cohort Three (<math>p=.001&lt;.05</math>)<br/>           Cohort Four (<math>p=.337&gt;.05</math>)</p> <p><b>Supporting Literature from Chapter Two</b><br/>           Early mathematics proficiency is one of the best predictors of school success across all content areas (Brownell, Chen, &amp; Ginet, 2014).</p>  | <p><b>Implications of Finding</b><br/>           Finding does not support assertion made by Clements and Sarama (2015) that early childhood teachers in the United States lack the understanding needed to teach mathematics proficiently.</p> <p><b>Implications for Practice</b><br/>           Results do not indicate that the VPI teachers prioritized literacy over mathematics instruction.</p>   |
| <p><b>Finding Three</b><br/>           When analyzing the students' social skills scores from the CBRS, there was no statistical difference between the comparison groups in any of the cohorts. In fact, the students who did not attend preschool or prekindergarten in Cohort One and Cohort Four had higher mean scores on the social skills portion of the CBRS compared to the mean scores of their VPI counterparts.</p> | <p><b>Supporting Data from Chapter Four</b><br/>           CBRS Results (social skills) by Cohort<br/>           Cohort One (<math>p=.453&gt;.05</math>)<br/>           Cohort Two (<math>p=.176&gt;.05</math>)<br/>           Cohort Three (<math>p=.247&gt;.05</math>)<br/>           Cohort Four (<math>p=.419&gt;.05</math>)</p> <p><b>Supporting Literature from Chapter Two</b><br/>           Finding counters claim made by Bartik (2014) that effective early childhood programs create more long-term effects related to social skills rather than academic outcomes.</p> | <p><b>Implications of Finding</b><br/>           Early educators who focus on academic skills with little regard for children's social functioning are doing a huge disservice to these children, especially those who live in less than optimal environments (Thompson &amp; Goodman, 2009).</p> <p><b>Implications for Practice</b><br/>           Using a social skills curriculum with fidelity could teach the VPI students how they should cooperate, interact, and share with others.</p> |

(continued)



Table 17 (cont.)

| Findings  | Supporting Data and Literature  | Implications of Findings and for Practice  |
|---|---|--|
| <p><b>Finding Four</b><br/>                     For the students' self-regulations scores, the results were similar to those from the EMAS. There was a statistical difference in the self-regulation mean scores from the CBRS between the comparison groups in Cohorts One, Two, and Three. No difference existed in the self-regulation scores between the comparison groups in Cohort Four.</p> | <p><b>Supporting Data from Chapter Four</b><br/>                     CBRS Results (self-regulation) by Cohort<br/>                     Cohort One (<math>p=.049&lt;.05</math>)<br/>                     Cohort Two (<math>p=.006&lt;.05</math>)<br/>                     Cohort Three (<math>p=.016&lt;.05</math>)<br/>                     Cohort Four (<math>p=.344&gt;.05</math>)</p> <p><b>Supporting Literature from Chapter Two</b><br/>                     Alejandro et al. (2016) also found that students who attended preschool scored higher on measures of self-regulation than students who did not attend preschool.</p> | <p><b>Implications of Finding</b><br/>                     Self-regulation supersedes literacy and mathematics in terms of its influence on a student's achievement, regardless of aptitude (Williford, Downer, Hamre, &amp; Pianta, 2014).</p> <p><b>Implications for Practice</b><br/>                     Results indicate that the VPI students benefitted from their participation in prekindergarten based on their ability to manage their emotions and behavior after entering kindergarten.</p> |

## **Implications for Policy**

As explained in Chapter Two, the teacher-child interactions that occur in early childhood classrooms have the greatest impact on children's learning outcomes. While structural elements such as curriculum, learning standards, and teacher preparation contribute to the quality of these classrooms, it is the process of how teachers implement the curriculum, prepare lessons around the learning standards, and apply their professional knowledge that has the most influence on children's academic and social development. Unfortunately, data collected during observations using the Classroom Assessment Scoring System (CLASS) revealed that teachers spent only around 25% of the school day interacting with their students (Wasik & Newman, 2009). These same researchers explained that less than 10% of the interactions consisted of teachers asking their students open-ended questions and using advanced language.

Since the VPI began in 1995, the Commonwealth of Virginia has continued to invest money in this program to increase access for at-risk children. School divisions with VPI programs are required to conduct CLASS observations in their VPI classrooms at least twice a year. While administrators providing teachers feedback about the quality of their interactions with students is important, the Virginia General Assembly is encouraged to designate early childhood funds to provide VPI teachers coaching and professional development to improve their interactions.

Chapter Two also discussed how prekindergarten classes continue to be added to elementary schools, but principals of these schools do not receive any formal training related to early childhood education (Brown, Squires, Connors-Tadros, & Horowitz, 2014). In fact, educators in Virginia who pursue administration and supervision licensure (pre-K – 12) are not required to have any experience or content knowledge related to early childhood education (Code of Virginia, § 22.1-298.1). Since Virginia does not have a professional development budget for school administrators (Brown et al., 2014), the Virginia General Assembly could also allocate funds in the early childhood education budget for training for elementary administrators. The training might include learning to conduct reliable CLASS observations as well as provide feedback to their VPI teachers based on the observations.

## **Implications for Research**

**Mixed-methods studies.** The results from this study revealed that VPI students were better prepared academically than socially for kindergarten. The VPI students in Cohorts One, Two, and Three had stronger mathematics skills than the students in the no preschool/prekindergarten comparison groups, and the VPI students in all four cohorts scored significantly higher on the PALS-K than the students without any preschool/prekindergarten experience. While results from the CBRS indicated that VPI students in the Cohorts One, Two, and Three were able to self-regulate when they entered kindergarten, the VPI students in none of the cohorts demonstrated they were better prepared to interact socially with adults and peers than students in the comparison groups.

It is easy to conclude that these VPI students received little social skills instruction based on the data, but this cannot be proven. One way to expand future studies would be to include document reviews and teacher observations and surveys. Researchers could review the VPI teachers' daily schedules to see how much instructional time they devote to teaching academic and social skills. The VPI teachers could then complete a survey that included questions about the types of lessons they plan and teach. Data from the document review and surveys could then be triangulated using teacher observations to draw credible conclusions about the instruction provided to VPI students.

**Longitudinal studies.** The Virginia Kindergarten Readiness Program (VKRP) is capturing literacy, mathematics, self-regulation, and social skills data for kindergarten students when they enter school in the fall. Data from the PALS-K, the EMAS, and the CBRS are used to evaluate kindergarten students' readiness for school throughout Virginia. The primary goal of this study was to determine if the VPI program better prepared students for kindergarten than students who did not participate in a preschool or prekindergarten program. The results indicate the VPI students in this study were ready in the areas of literacy, mathematics, and self-regulation.

Will these effects persist beyond kindergarten entry or fade as the VPI students progress through school? One way to answer this question would be to conduct a similar study using VKRP results when the PALS-K, the EMAS, and the CBRS are administered to kindergarten students in the spring. Mean scores could be compared to determine if statistical differences in

the areas of literacy, mathematics, and self-regulation continue to exist between the comparison groups after completing kindergarten.

**Include other school divisions.** This study was limited to students in one, rural school division in Central Virginia. Other studies could explore if academic and behavioral differences exist between VPI students and those without any preschool or prekindergarten experience in other school divisions with demographics similar to those in this study. Results from multiple school divisions could be compared to determine if their VPI students are better prepared for kindergarten than students who did not attend a preschool or prekindergarten program. Favorable findings could be used to support the expansion of VPI programs throughout Virginia.

### **Reflections**

As the administrator who oversees this VPI program, there was anecdotal evidence that students who completed the program were being prepared for kindergarten. For example, kindergarten teachers have shared with me they always know which of their students were in the VPI program because of the smooth transition these students make to kindergarten. Some of the kindergarten teachers have also shared that the VPI students usually know most, if not all, of their letters and sounds when they enter kindergarten. What I rarely hear involves how well VPI students get along with peers and adults once they enter kindergarten, or how well these students manage their behavior and emotions when faced with challenging learning tasks. Beyond being able to recognize numbers and shapes, little information is shared about VPI students' mathematical knowledge either.

Conducting this study allowed me to gather evidence about the quality of this VPI program in terms of how well it is preparing students for kindergarten. Overall, data support that VPI students had the academic skills they needed to learn kindergarten literacy and numeracy concepts. While not universal across all cohorts, the VPI students in this study were generally ready to follow directions, rules, and routines in a structured learning environment. The social skills results were disappointing, but they create an opportunity for the VPI teachers to reflect on how they can improve their students' kindergarten readiness in this area. Nevertheless, the students who participated in this VPI program were ready to enter kindergarten in at least one area of school readiness according to their PALS-K and VKRP results.

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## Appendix A

### Review of Prekindergarten Attendance and School Readiness Sources

*Review of Prekindergarten Attendance and School Readiness Sources* (Lyle, 2019)

| Author and Year                               | Topical Focus  | Questions   | Participants  | Methods/Data Sources   | Findings   |
|---|--|---|---|--|--|
| Abry, Latham, Bassok, & LoCasale-Crouch, 2015 | Preschool and Kindergarten teachers' beliefs about school readiness skills | <p>What domains of early school competence (i.e. academic, self-regulatory, and interpersonal) do preschool and kindergarten teachers rate as most important for children entering kindergarten and to what extent do these beliefs align?</p> <p>Does misalignment in teachers' beliefs about the importance of early school competencies predict children's early kindergarten adjustment as measured by academic achievement and sociobehavioral skills assessed in the fall of children's kindergarten year?</p> <p>Does the association between belief misalignment and kindergarten adjustment differ as a function of children's socioeconomic background?</p> | Students ( $n = 2,650$ ) tracked from a nationally representative sample of children born in 2001 who attended a formal preschool program (childcare center, prekindergarten program, or Head Start program) before entering kindergarten | <p><i>Methods</i></p> <p>Regression model</p> <p>Moderation model</p> <p><i>Data Sources</i></p> <p>Early Childhood Longitudinal-Birth data</p> <p>Teachers' ratings of the importance of various skills for kindergarten readiness</p> <p>Reading Assessment</p> <p>Math Assessment</p> <p>Teachers' ratings of their students sociobehavioral skills</p> | <p>Misalignment was greatest for teachers' beliefs about the importance of academic competence.</p> <p>Greater misalignment in beliefs pertaining to all three domains of competence predicted poorer ratings of approaches to learning, social skills, and lower math achievement.</p> <p>Children from socioeconomically disadvantaged backgrounds were more susceptible to the negative influence of misalignment, across adjustment outcomes, compared to their more-advantaged peers.</p> |
| Alejandro, Leslie, Manley,                    | Preschool attendees' self-regulation in                                    | Does preschool attendance affect self-regulation and increase the likelihood of acquiring self-   | Children who attended preschool ( $n =$   | <i>Methods</i><br>Analysis of Variance   | Balance Beam and Gift Wrap scores were significantly higher for preschool attendees.   |

| Author and Year                  | Topical Focus   | Questions  | Participants   | Methods/Data Sources  | Findings  |
|----------------------------------|---|--|--|---|---|
| Rivas, Wiltermoor & Bainum, 2016 | kindergarten  | discipline at an earlier age?  | 28) and children who did not attend preschool ( $n = 9$ )  | <i>Data Sources</i><br>Preschool Self-Regulation Assessment (Balance Beam and Gift Wrap subtests)<br><br>Teacher's Self-Control Rating Scale (modified) | No significant main effects for sex or condition by sex intersections for the Balance Beam or Gift Wrap scores.<br><br>The main effect for sex was significant with teachers' ratings of behavioral self-control for girls higher than for boys.<br><br>The main effect for sex was significant with teachers' ratings of cognitive self-control for girls higher than for boys.<br><br>No significant main effects for condition or condition by sex interactions for the teacher ratings of behavioral or cognitive self-control. |
| Bassok, Latham, & Rorem, 2016    | Changes in kindergarten classrooms due to increased accountability related to the No Child Left Behind (NCLB) Act of 2001 | To what extent and along what dimensions has the public school kindergarten experience changed between 1998 and 2010?<br><br>Is kindergarten the new first grade? To what extent do kindergarten classrooms in 2010 mirror first-grade classrooms from the late '90s?<br><br>Are changes in the kindergarten experience over this period systematically different in schools | 1998:<br>Kindergarten teachers ( $N = 2,500$ ) and Kindergarten students ( $N = 21,000$ )<br><br>2010:<br>Kindergarten teachers ( $N = 2,700$ ) and Kindergarten | <i>Methods</i><br>Logistic regression model<br><br><i>Data Sources</i><br>Early Childhood Longitudinal Study (ECLS-K:1998 and ECLS-K:2011)              | More kindergarten teachers in 2010 believed that academic instruction should begin before students entered kindergarten.<br><br>More of the 2010 cohort also believed students should leave kindergarten knowing how to read. This corresponded with more time being spent on literacy and math instruction, but a decrease in instructional time for art, music, and science.  |



| Author and Year     | Topical Focus  | Questions   | Participants  | Methods/Data Sources  | Findings   |
|---------------------|--|---|---|---|--|
|                     |  | serving high proportions of children eligible for free or reduced-price lunch (FRPL) or children who are non-White?   | students ( $N = 18,000$ )                               |   | <p>More teachers in the latter group reported using standardized tests at least once a month.</p> <p>Overall, these changes were more prevalent in kindergarten classes serving higher percentages of low-income and non-White students.</p> |
| Blair & Razza, 2007 | Role of self-regulation in emerging academic ability | <p>What relations exist among measures of effortful control and executive function in young children attending Head Start, and to what extent each is uniquely related to emerging math and literacy ability measured in kindergarten?</p> <p>What is the relation of false belief understanding to effortful control and executive function?</p> | Children ( $N = 141$ ) who attended Head Start programs | <p><i>Methods</i><br/>Multiple regression</p> <p><i>Data Sources</i><br/>Executive function:<br/>Peg-tapping measure</p> <p>Effortful control:<br/>Children's Behavior Questionnaire</p> <p>False belief understanding:<br/>Unexpected contents and changed locations tasks*</p> <p>Intelligence:<br/>Peabody Picture</p> | Children's self-regulation in their early years is a better predictor of their reading and math achievement than their IQ scores.  |

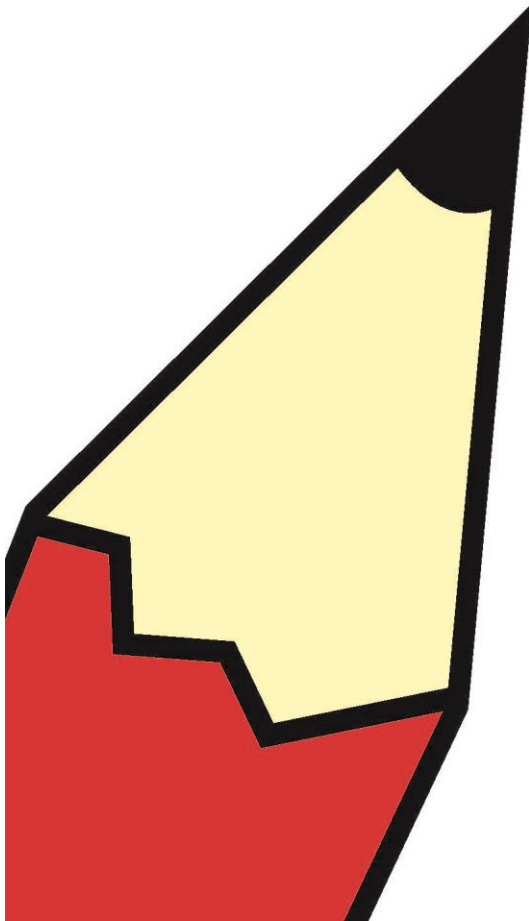
| Author and Year                  | Topical Focus  | Questions   | Participants  | Methods/Data Sources  | Findings  |
|----------------------------------|--|---|---|---|---|
|                                  |  |   |   | Vocabulary Test-3 and Raven's Progressive Colored Matrices  |   |
|                                  |  |   |   | Academic ability: Math battery adapted from the Early Childhood Longitudinal Study-Kindergarten   |   |
|                                  |  |   |   | Elision subtest of the Preschool Comprehensive Test of Phonological and Print Processing          |   |
|                                  |  |   |   | Letter knowledge assessment from the Head Start National Reporting System Direct Child Assessment |   |
| Huang, Invernizzi, & Drake, 2012 | Differential and persistent effects of Virginia's state-funded prekindergarten program | Were VPI-funded program attendees less likely to repeat kindergarten compared to students who did not attend preschool, while controlling for student- and school-level | Students ( $N = 60,000$ ) nested in approximately 1,000 schools | <i>Methods</i><br>Hierarchical logistic regression models<br><br><i>Data Sources</i>              | Attending a VPI-funded program decreased the likelihood of repeating kindergarten, while also increasing the chances of meeting or exceeding minimum literacy competencies. The |

| Author and Year                        | Topical Focus  | Questions  | Participants   | Methods/Data Sources   | Findings  |
|--|--|--|--|--|---|
|  |  | <p>variables?<br/>           At the beginning of kindergarten, did VPI-funded program attendees have a higher likelihood of meeting minimum literacy competencies compared to students who did not attend preschool, while controlling for student- and school-level variables?</p> <p>At the end of kindergarten and first grade, were potential early gains associated with attending a VPI-funded program sustained or did they lessen/fade out over time?</p> <p>In terms of repeater status and meeting minimum literacy competencies, did VPI-funded program attendees benefit differentially based on race/ethnicity and disability status?</p> |  | <p>Repeater status<br/>           Phonological Awareness<br/>           Literacy Screening</p> <p>Prekindergarten experience codes</p>               | <p>benefits were especially profound for Hispanic and Black students, as well as those with disabilities.</p>   |
| Hustedt, Buell, Hallam, & Pinder, 2018 | Changes in Kindergarten in relation to Kindergarten teachers' beliefs about school readiness | <p>What skills do kindergarten teachers prioritize as most important for children entering kindergarten?</p> <p>Have kindergarten teachers' beliefs about specific readiness skills changed over time?</p>   | <p>2000: Kindergarten teachers (<math>N = 171</math>)</p> <p>2011: Kindergarten teachers (<math>N =</math></p> | <p><i>Methods</i><br/>           Chi-squared test of independence</p> <p><i>Data Sources</i><br/>           Delaware Kindergarten Teacher Survey</p> | <p>Kindergarten teachers increasingly prioritize assessment information across all domains of development at kindergarten entry. However, they continue to rank nonacademic skills as most important.</p> |

| Author and Year | Topical Focus | Questions  | Participants   | Methods/Data Sources | Findings |
|-----------------|---------------|--|--|----------------------|----------|
|                 |               | How do kindergarten teachers define readiness, in their own words? | 185)<br>2013:<br>Kindergarten teachers ( <i>N</i> = 257) |                      |          |

\*False belief understanding relates a preschooler's inability to understand that others can have differing beliefs. These tasks, while not formal assessments, are commonly used to measure false belief understanding.

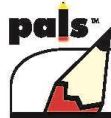
**Appendix B**  
**PALS K-3 Data Dictionaries**



*PALS K-3 Data Dictionary*  
BEGINNING SCHOOL YEAR 2016–2017

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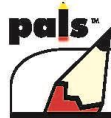
|   |    |
|---|----|
| PALS-K  |    |
| Student Information Fields.....                         | 2  |
| Student Assessment Window Fields, Including Scores..... | 5  |
| PALS 1-3  |    |
| Student Information Fields.....                         | 7  |
| Student Assessment Window Fields, Including Scores..... | 10 |



| PALS-K STUDENT INFORMATION FIELDS |  |           |
|-----------------------------------|--|-----------|
| Field                             | Description  | Data Type |
| SchoolYear                        | School Year (e.g., 2017-2018)  | Char (10) |
| AssessmentWindow                  | F = Fall<br>M = Mid-Year<br>S = Spring   | Char (1)  |
| STI                               | VA State Testing Identifier  | Integer   |
| StudentLastName                   | Student's Last Name  | Char (32) |
| StudentFirstName                  | Student's First Name   | Char (32) |
| PreSchool                         | Student attended preschool:<br>0 = no<br>1 = yes<br>2 = teacher does not know  | Integer   |
| StudentAge                        | Student's age in months  | Integer   |
| Gender                            | Student's gender:<br>F = female<br>M = male  | Char (1)  |
| SpecialEdNeeded                   | Special Education needed:<br>0 = not needed<br>1 = needed and administered PALS under non-standard conditions<br>2 = needed and exempt from PALS | Integer   |
| Ethnicity                         | Hispanic:<br>0 = no<br>1 = yes<br>2 = unspecified  | Integer   |

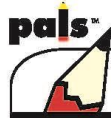


| PALS-K STUDENT INFORMATION FIELDS (CONTINUED) |  |           |
|---|--|-----------|
| Field   | Description  | Data Type |
| RaceCode                                      | Race Code:<br>1 = American Indian or Alaska Native<br>2 = Asian<br>3 = Black or African American<br>4 = Unspecified<br>5 = White<br>6 = Native Hawaiian or Other Pacific Islander<br>7 = American Indian or Alaska Native <i>and</i> Asian<br>8 = American Indian or Alaska Native <i>and</i> Black or African American<br>9 = American Indian or Alaska Native <i>and</i> White<br>10 = American Indian or Alaska Native <i>and</i> Native Hawaiian or Other Pacific Islander<br>11 = Asian <i>and</i> Black or African American<br>12 = Asian <i>and</i> White<br>13 = Asian <i>and</i> Native Hawaiian or Other Pacific Islander<br>14 = Black or African American <i>and</i> White<br>15 = Black or African American <i>and</i> Native Hawaiian or Other Pacific Islander<br>16 = Native Hawaiian or Other Pacific Islander <i>and</i> White<br>17 = American Indian or Alaska Native, Asian, <i>and</i> Black or African American<br>18 = American Indian or Alaska Native, Asian, <i>and</i> White<br>19 = American Indian or Alaska Native, Asian, <i>and</i> Native Hawaiian or Other Pacific Islander<br>20 = Asian, Black or African American, <i>and</i> White<br>21 = Asian, Black or African American, <i>and</i> Native Hawaiian or Other Pacific Islander<br>22 = Black or African American, Native Hawaiian or Other Pacific Islander, <i>and</i> White<br>23 = American Indian or Alaska Native, Black or African American, <i>and</i> Native Hawaiian or Other Pacific Islander<br>24 = American Indian or Alaska Native, Black or African American, <i>and</i> White<br>25 = American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, <i>and</i> White<br>26 = Asian, Native Hawaiian or Other Pacific Islander, <i>and</i> White<br>27 = American Indian or Alaska Native, Asian, Black or African American, <i>and</i> White<br>28 = Asian, Black or African American, Native Hawaiian or Other Pacific Islander, <i>and</i> White<br>29 = American Indian or Alaska Native, Black or African American, Native Hawaiian or Other Pacific Islander, <i>and</i> White<br>30 = American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, <i>and</i> White<br>31 = American Indian or Alaska Native, Asian, Black or African American, <i>and</i> Native Hawaiian or Other Pacific Islander<br>32 = American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, <i>and</i> White | Integer   |



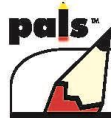
| PALS-K STUDENT INFORMATION FIELDS (CONTINUED) |  |                   |
|---|--|-------------------|
| Field   | Description  | Data Type         |
| Disability                                    | Primary Disability:<br>1 = None<br>4 = Multiple Disabilities<br>5 = Orthopedic Impairment<br>6 = Visual Impairment (includes Blindness)<br>7 = Hearing Impairment (includes Deafness)<br>8 = Specific Learning Disability<br>9 = Emotional Disturbance (includes Emotional Disability)<br>10 = Speech or Language Impairment<br>11 = Other Health Impairment<br>12 = Deaf-Blindness<br>13 = Autism<br>14 = Traumatic Brain Injury<br>15 = Otherwise Qualified Handicapped under Sec. 504<br>16 = Developmental Delay (through age 8)<br>19 = Intellectual Disability | Integer           |
| BirthDate                                     | Date of birth  | Date (mm/dd/yyyy) |
| NativeEnglish                                 | Native English Speaker:<br>0 = no<br>1 = yes<br>2 = teacher does not know  | Integer           |
| DualLanguage                                  | Dual-Language Instruction:<br>0 = no<br>1 = yes<br>2 = teacher does not know   | Integer           |



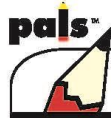


**PALS-K STUDENT ASSESSMENT WINDOW FIELDS, INCLUDING SCORES**

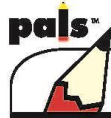
| Field             | Description   | Data Type                |
|-------------------|---|--------------------------|
| Division          | Division Name   | Char (64)                |
| School            | School Name   | Char (64)                |
| TitleI            | Title I School  | Boolean<br>(0=no, 1=yes) |
| TATitleI          | Title I Targeted Assistance School  | Boolean<br>(0=no, 1=yes) |
| Grade             | Class Grade   | Char (1)                 |
| TeacherLastName   | Teacher's Last Name   | Char (32)                |
| TeacherFirstName  | Teacher's First Name  | Char (32)                |
| Service_ESL       | Services — English as a Second Language   | Boolean<br>(0=no, 1=yes) |
| Service_TitleI    | Services — Title I  | Boolean<br>(0=no, 1=yes) |
| Service_Tutor     | Services — one-on-one tutor   | Boolean<br>(0=no, 1=yes) |
| Service_None      | Services — none   | Boolean<br>(0=no, 1=yes) |
| Service_Other     | Services — other  | Boolean<br>(0=no, 1=yes) |
| Service_OtherName | Services — name of other service  | Char (50)                |
| Completed         | Scores Completion Status:<br>0 = Standard Administration, incomplete scores for required tasks<br>1 = Standard Administration, Fall and Spring — complete scores for required tasks, Mid-Year — at least one score entered<br>2 = Non-Standard Administration | Integer                  |
| EWRI              | E-WRI was used to enter word list scores  | Boolean<br>(0=no, 1=yes) |



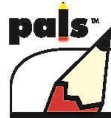
| PALS-K STUDENT ASSESSMENT WINDOW FIELDS, INCLUDING SCORES (CONTINUED) |  |                       |
|---|--|-----------------------|
| Field   | Description  | Data Type             |
| ScoreEntryOptionID  | Scores entered using:<br>1 = Traditional Score Entry<br>2 = Online Assessment Wizard (OAW) | Integer               |
| Form  | Assessment form (A, B, or C)   | Char (1)              |
| AssessmentDate  | Assessment date  | Date (mm/dd/yyyy)     |
| GroupRhymeAwareness   | Group Rhyme Awareness  | Integer               |
| IndRhymeAwareness   | Individual Rhyme Awareness   | Integer               |
| GroupBegSoundAwareness  | Group Beginning Sound Awareness  | Integer               |
| IndBegSoundAwareness  | Individual Beginning Sound Awareness   | Integer               |
| LCAphabet   | Alphabet Recognition – Lowercase   | Integer               |
| LetterSounds  | Letter Sounds  | Integer               |
| Spelling  | Spelling – Total Score   | Integer               |
| COWPointing   | Concept of Word: Pointing  | Integer               |
| COWWordID   | Concept of Word: Word ID   | Integer               |
| COWWordList   | Concept of Word: Word List   | Integer               |
| COWSummedScore  | Concept of Word: Total   | Integer               |
| WordRecognition_pp  | Preprimer Word List  | Integer               |
| WordRecognition_p   | Primer Word List   | Integer               |
| WordRecognition_1   | First Grade Word List  | Integer               |
| KSummedScore  | Kindergarten Summed Score (Fall/Spring Only)   | Integer               |
| Identified  | Identified Below Kindergarten Summed Score Benchmark (Fall/Spring Only)                    | Boolean (0=no, 1=yes) |
| DateTimeStamp   | Date and Time of Data Download (e.g., Nov 21 2017 9:15 AM)                                 | Char                  |



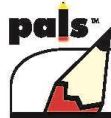
| <b>PALS 1-3 STUDENT INFORMATION FIELDS</b> |  |                  |
|--|--|------------------|
| <b>Field</b>                               | <b>Description</b>   | <b>Data Type</b> |
| SchoolYear                                 | School Year (e.g., 2017-2018)  | Char (10)        |
| AssessmentWindow                           | F = Fall<br>M = Mid-Year<br>S = Spring   | Char (1)         |
| STI  | VA State Testing Identifier  | Integer          |
| StudentLastName                            | Student's Last Name  | Char (32)        |
| StudentFirstName                           | Student's First Name   | Char (32)        |
| StudentAge                                 | Student's age in months  | Integer          |
| Gender                                     | Student's gender:<br>F = female<br>M = male  | Char (1)         |
| SpecialEdNeeded                            | Special Education needed:<br>0 = not needed<br>1 = needed and administered PALS under non-standard conditions<br>2 = needed and exempt from PALS | Integer          |
| Ethnicity                                  | Hispanic:<br>0 = no<br>1 = yes<br>2 = unspecified  | Integer          |



| PALS 1-3 STUDENT INFORMATION FIELDS (CONTINUED) |  |           |
|---|--|-----------|
| Field   | Description  | Data Type |
| RaceCode  | Race Code:<br>1 = American Indian or Alaska Native<br>2 = Asian<br>3 = Black or African American<br>4 = Unspecified<br>5 = White<br>6 = Native Hawaiian or Other Pacific Islander<br>7 = American Indian or Alaska Native <i>and</i> Asian<br>8 = American Indian or Alaska Native <i>and</i> Black or African American<br>9 = American Indian or Alaska Native <i>and</i> White<br>10 = American Indian or Alaska Native <i>and</i> Native Hawaiian or Other Pacific Islander<br>11 = Asian <i>and</i> Black or African American<br>12 = Asian <i>and</i> White<br>13 = Asian <i>and</i> Native Hawaiian or Other Pacific Islander<br>14 = Black or African American <i>and</i> White<br>15 = Black or African American <i>and</i> Native Hawaiian or Other Pacific Islander<br>16 = Native Hawaiian or Other Pacific Islander <i>and</i> White<br>17 = American Indian or Alaska Native, Asian, <i>and</i> Black or African American<br>18 = American Indian or Alaska Native, Asian, <i>and</i> White<br>19 = American Indian or Alaska Native, Asian, <i>and</i> Native Hawaiian or Other Pacific Islander<br>20 = Asian, Black or African American, <i>and</i> White<br>21 = Asian, Black or African American, <i>and</i> Native Hawaiian or Other Pacific Islander<br>22 = Black or African American, Native Hawaiian or Other Pacific Islander, <i>and</i> White<br>23 = American Indian or Alaska Native, Black or African American, <i>and</i> Native Hawaiian or Other Pacific Islander<br>24 = American Indian or Alaska Native, Black or African American, <i>and</i> White<br>25 = American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, <i>and</i> White<br>26 = Asian, Native Hawaiian or Other Pacific Islander, <i>and</i> White<br>27 = American Indian or Alaska Native, Asian, Black or African American, <i>and</i> White<br>28 = Asian, Black or African American, Native Hawaiian or Other Pacific Islander, <i>and</i> White<br>29 = American Indian or Alaska Native, Black or African American, Native Hawaiian or Other Pacific Islander, <i>and</i> White<br>30 = American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, <i>and</i> White<br>31 = American Indian or Alaska Native, Asian, Black or African American, <i>and</i> Native Hawaiian or Other Pacific Islander<br>32 = American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, <i>and</i> White | Integer   |



| PALS 1-3 STUDENT INFORMATION FIELDS (CONTINUED) |  |                          |
|---|--|--------------------------|
| Field   | Description  | Data Type                |
| Disability                                      | Primary Disability:<br>1 = None<br>4 = Multiple Disabilities<br>5 = Orthopedic Impairment<br>6 = Visual Impairment (includes Blindness)<br>7 = Hearing Impairment (includes Deafness)<br>8 = Specific Learning Disability<br>9 = Emotional Disturbance (includes Emotional Disability)<br>10 = Speech or Language Impairment<br>11 = Other Health Impairment<br>12 = Deaf-Blindness<br>13 = Autism<br>14 = Traumatic Brain Injury<br>15 = Otherwise Qualified Handicapped under Sec. 504<br>16 = Developmental Delay (through age 8)<br>19 = Intellectual Disability | Integer                  |
| BirthDate                                       | Date of birth  | Date<br>(mm/dd/yyyy)     |
| HighBenchmark                                   | Met High Benchmark designation   | Boolean<br>(0=no, 1=yes) |
| HB_APID   | Assessment period in which first marked high benchmark – not eligible until spring of 1st  | Integer                  |
| PreSchool                                       | Student attended preschool:<br>0 = no<br>1 = yes<br>2 = teacher does not know  | Integer                  |
| NativeEnglish                                   | Native English Speaker:<br>0 = no<br>1 = yes<br>2 = teacher does not know  | Integer                  |
| DualLanguage                                    | Dual-Language Instruction:<br>0 = no<br>1 = yes<br>2 = teacher does not know   | Integer                  |

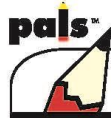


| PALS 1-3 STUDENT ASSESSMENT WINDOW FIELDS, INCLUDING SCORES |   |                          |
|---|---|--------------------------|
| Field   | Description   | Data Type                |
| Division  | Division Name   | Char (64)                |
| School  | School Name   | Char (64)                |
| TitleI  | Title I School  | Boolean<br>(0=no, 1=yes) |
| TATitleI  | Title I Targeted Assistance School  | Boolean<br>(0=no, 1=yes) |
| Grade   | Class Grade   | Char (1)                 |
| TeacherLastName   | Teacher's Last Name   | Char (32)                |
| TeacherFirstName  | Teacher's First Name  | Char (32)                |
| Service_ESL   | Services — English as a Second Language   | Boolean<br>(0=no, 1=yes) |
| Service_TitleI  | Services — Title I  | Boolean<br>(0=no, 1=yes) |
| Service_Tutor   | Services — one-on-one tutor   | Boolean<br>(0=no, 1=yes) |
| Service_None  | Services — none   | Boolean<br>(0=no, 1=yes) |
| Service_Other   | Services — other  | Boolean<br>(0=no, 1=yes) |
| Service_OtherName   | Services — name of other service  | Char (50)                |
| Completed   | Scores Completion Status:<br>0 = Standard Administration, incomplete scores for required tasks<br>1 = Standard Administration, Fall and Spring — complete scores for required tasks, Mid-Year — at least one score entered<br>2 = Non-Standard Administration | Integer                  |
| ScoreEntryOptionID  | Score Entry:<br>1 = Traditional Score Entry<br>2 = Online Assessment Wizard (OAW)   | Integer                  |



| PALS 1-3 STUDENT ASSESSMENT WINDOW FIELDS, INCLUDING SCORES (CONTINUED) |   |                          |
|---|---|--------------------------|
| Field   | Description   | Data Type                |
| EWRI  | E-WRI was used to enter word list scores  | Boolean<br>(0=no, 1=yes) |
| Form  | Assessment form (A, B, or C)  | Char (1)                 |
| AssessmentDate  | Assessment Date   | Date<br>(mm/dd/yyyy)     |
| WordRecognition_pp  | Preprimer Word List   | Integer                  |
| WordRecognition_p   | Primer Word List  | Integer                  |
| WordRecognition_1   | First Grade Word List   | Integer                  |
| WordRecognition_2   | Second Grade Word List  | Integer                  |
| WordRecognition_3   | Third Grade Word List   | Integer                  |
| WordRecognition_4   | Fourth Grade Word List  | Integer                  |
| WordRecognition_5   | Fifth Grade Word List   | Integer                  |
| WordRecognition_6   | Sixth Grade Word List   | Integer                  |
| WordRecognition_7   | Seventh Grade Word List   | Integer                  |
| WordRecognition_8   | Eighth Grade Word List  | Integer                  |
| Spelling  | Spelling — Total Score  | Integer                  |
| LetterSounds  | Letter Sounds   | Integer                  |
| EntryLevelSummedScore   | Entry Level Summed Score (Fall/Spring Only)                                     | Integer                  |
| Identified  | Identified Below Entry Level Summed Score Benchmark (Fall/Spring Only)          | Boolean<br>(0=no, 1=yes) |
| BeginningSounds   | Spelling — beginning sounds (valid fall and mid-year of first grade only)       | Integer                  |
| EndingSounds  | Spelling — ending sounds (valid fall and mid-year of first grade only)          | Integer                  |
| BegEndSounds  | Spelling — beginning/ending sounds (not valid fall and mid-year of first grade) | Integer                  |
| Digraphs  | Spelling — digraphs   | Integer                  |
| Blends  | Spelling — blends   | Integer                  |

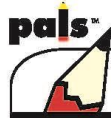




**PALS 1-3 STUDENT ASSESSMENT WINDOW FIELDS, INCLUDING SCORES (CONTINUED)**

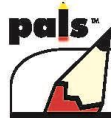
| Field                | Description   | Data Type |
|----------------------|---|-----------|
| ShortVowels          | Spelling — short vowels   | Integer   |
| Nasals               | Spelling — nasals   | Integer   |
| CVCe                 | Spelling – CVCe   | Integer   |
| LongVowels           | Spelling – long vowels  | Integer   |
| RandLInfluenced      | Spelling – R & L influenced   | Integer   |
| AmbiguousVowels      | Spelling – ambiguous vowels   | Integer   |
| SyllableJuncture     | Spelling – syllable juncture  | Integer   |
| Affixes              | Spelling – affixes  | Integer   |
| Derivational         | Spelling – derivational relations   | Integer   |
| SpellingStageCode    | Spelling Stage:<br>E/ELN = Emergent/Early Letter Name<br>LN = Letter Name<br>WW = Within Word Pattern<br>S&A = Syllables & Affixes<br>DR = Derivational Relations | Char      |
| Passage_r_accuracy   | PALS Readiness passage accuracy   | Integer   |
| Passage_ppa_accuracy | PALS Preprimer A passage accuracy   | Integer   |
| Passage_ppb_accuracy | PALS Preprimer B passage accuracy   | Integer   |
| Passage_ppc_accuracy | PALS Preprimer C passage accuracy   | Integer   |
| Passage_p_accuracy   | PALS Primer passage accuracy  | Integer   |
| Passage_p_fluency    | PALS Primer passage fluency rating  | Integer   |
| Passage_p_rate       | PALS Primer passage words per minute (rate)   | Integer   |
| Passage_p_comp       | PALS Primer passage number of comprehension questions correct out of six  | Integer   |





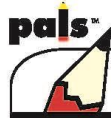
**PALS 1-3 STUDENT ASSESSMENT WINDOW FIELDS, INCLUDING SCORES (CONTINUED)**

| <b>Field</b>       | <b>Description</b>   | <b>Data Type</b> |
|--------------------|--|------------------|
| Passage_1_accuracy | PALS first grade passage accuracy  | Integer          |
| Passage_1_fluency  | PALS first grade passage fluency rating  | Integer          |
| Passage_1_rate     | PALS first grade passage words per minute (rate)                               | Integer          |
| Passage_1_comp     | PALS first grade passage number of comprehension questions correct out of six  | Integer          |
| Passage_2_accuracy | PALS second grade passage accuracy   | Integer          |
| Passage_2_fluency  | PALS second grade passage fluency rating                                       | Integer          |
| Passage_2_rate     | PALS second grade passage words per minute (rate)                              | Integer          |
| Passage_2_comp     | PALS second grade passage number of comprehension questions correct out of six | Integer          |
| Passage_3_accuracy | PALS third grade passage accuracy  | Integer          |
| Passage_3_fluency  | PALS third grade passage fluency rating  | Integer          |
| Passage_3_rate     | PALS third grade passage words per minute (rate)                               | Integer          |
| Passage_3_comp     | PALS third grade passage number of comprehension questions correct out of six  | Integer          |
| Passage_4_accuracy | PALS fourth grade passage accuracy   | Integer          |
| Passage_4_fluency  | PALS fourth grade passage fluency rating                                       | Integer          |
| Passage_4_rate     | PALS fourth grade passage words per minute (rate)                              | Integer          |
| Passage_4_comp     | PALS fourth grade passage number of comprehension questions correct out of six | Integer          |
| Passage_5_accuracy | PALS fifth grade passage accuracy  | Integer          |
| Passage_5_fluency  | PALS fifth grade passage fluency rating  | Integer          |
| Passage_5_rate     | PALS fifth grade passage words per minute (rate)                               | Integer          |
| Passage_5_comp     | PALS fifth grade passage number of comprehension questions correct out of six  | Integer          |



**PALS 1-3 STUDENT ASSESSMENT WINDOW FIELDS, INCLUDING SCORES (CONTINUED)**

| <b>Field</b>       | <b>Description</b>  | <b>Data Type</b> |
|--------------------|---|------------------|
| Passage_6_accuracy | PALS sixth grade passage accuracy   | Integer          |
| Passage_6_fluency  | PALS sixth grade passage fluency rating   | Integer          |
| Passage_6_rate     | PALS sixth grade passage words per minute (rate)                                | Integer          |
| Passage_6_comp     | PALS sixth grade passage number of comprehension questions correct out of six   | Integer          |
| Passage_7_accuracy | PALS seventh grade passage accuracy   | Integer          |
| Passage_7_fluency  | PALS seventh grade passage fluency rating                                       | Integer          |
| Passage_7_rate     | PALS seventh grade passage words per minute (rate)                              | Integer          |
| Passage_7_comp     | PALS seventh grade passage number of comprehension questions correct out of six | Integer          |
| Passage_8_accuracy | PALS eighth grade passage accuracy  | Integer          |
| Passage_8_fluency  | PALS eighth grade passage fluency rating  | Integer          |
| Passage_8_rate     | PALS eighth grade passage words per minute (rate)                               | Integer          |
| Passage_8_comp     | PALS eighth grade passage number of comprehension questions correct out of six  | Integer          |
| LCAphabet          | Alphabet Recognition — Lowercase  | Integer          |
| COWPointing        | Concept of Word: Pointing   | Integer          |
| COWWordID          | Concept of Word: Word ID  | Integer          |
| COWWordList        | Concept of Word: Word List  | Integer          |
| COWSummedScore     | Concept of Word: Total  | Integer          |
| Blending           | Blending  | Integer          |
| SoundToLetter      | Sound-to-letter   | Integer          |



PALS 1-3 STUDENT ASSESSMENT WINDOW FIELDS, INCLUDING SCORES (CONTINUED)

| Field                   | Description  | Data Type                |
|-------------------------|--|--------------------------|
| ReadingLevelCode        | Instructional Reading Level:<br>1 = Readiness<br>2 = Between Readiness & Preprimer<br>3 = Preprimer<br>4 = Between Preprimer & Primer<br>5 = Primer<br>6 = Between Primer & First Grade<br>7 = First Grade<br>8 = Between First & Second Grade<br>9 = Second Grade<br>10 = Between Second & Third Grade<br>11 = Third Grade<br>12 = Between Third & Fourth Grade<br>13 = Fourth Grade<br>14 = Between Fourth & Fifth Grade<br>15 = Fifth Grade<br>16 = Between Fifth & Sixth Grade<br>17 = Sixth Grade<br>18 = Between Sixth & Seventh Grade<br>19 = Seventh Grade<br>20 = Between Seventh & Eighth Grade<br>21 = Eighth Grade<br>22 = Not enough information to designate level | Integer                  |
| TooSlow                 | Passage reading rate too slow  | Boolean<br>(0=no, 1=yes) |
| IndependentReadingLevel | Independent Reading Level:<br>0 = no independent reading level<br>1 = independent at instructional level   | Integer                  |
| LevelBSummedScore       | Level B total score  | Integer                  |
| LevelCSummedScore       | Level C total score  | Integer                  |
| DateTimeStamp           | Date and Time of Data Download (e.g., Nov 21 2017 9:15 AM)   | Char                     |



**PALS K-3 Data Dictionary – PRIOR TO School Year 2016-2017**

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| <i>PALS 1-3</i> ..... | 7 |

Note: Prior to 2016-2017, the Assessment Window and the Grade Level precede the rest of the data field's name. For example, ??\_abc will be f1\_abc for the Fall 1<sup>st</sup> grade Assessment Window, m1\_abc for the Mid-Year of 1<sup>st</sup> grade Assessment Window and s1\_abc for the Spring of 1<sup>st</sup> grade Assessment Window.

**PALS-K Data Dictionary- PRIOR TO School Year 2016-2017**

| PALS-K Fields Used 2004-2016                 |  |                       |
|--|--|-----------------------|
| ?k_datadate (school year 2009 and earlier)   | Data data was extracted from PALS database   | Date (mm/dd/yyyy)     |
| ?k_std_eth (school year 2009 and earlier)    | Ethnicity:<br>1 = Black (Not of Hispanic Origin)<br>2 = White (Not of Hispanic Origin)<br>3 = Hispanic<br>4 = American Indian or Alaska Native<br>5 = Asian/Pacific Islander (Defunct)<br>6 = Ethnicity Not Listed (Defunct)<br>7 = Unspecified<br>8 = Asian<br>9 = Native Hawaiian/Other Pacific Islander | Integer               |
| ?k_sch_rf (school year 2009 and earlier)     | Reading First School   | Boolean (0=no, 1=yes) |
| ?k_std_svcl (school year 2006 and earlier)   | Services - Learning Disabled (yes or no)   | Boolean (0=no, 1=yes) |
| ?k_std_svc (school year 2006 and earlier)    | Services - Emotional Difficulties (yes or no)  | Boolean (0=no, 1=yes) |
| ?k_std_svcdd (school year 2006 and earlier)  | Services - Developmental Delay (yes or no)   | Boolean (0=no, 1=yes) |
| ?k_std_svcmr (school year 2006 and earlier)  | Services - Mental Retardation (yes or no)  | Boolean (0=no, 1=yes) |
| ?k_std_svcsp (school year 2006 and earlier)  | Services - Speech & Language Services (yes or no)  | Boolean (0=no, 1=yes) |
| ?k_std_svclep (school year 2006 and earlier) | Services- Limited English Proficiency (yes or no)  | Boolean (0=no, 1=yes) |
| ?k_gain (school year 2006 and earlier)       | Name Writing Gain  | Integer               |
| ?k_sch_ses (school year 2008 and earlier)    | SES (% free/reduced lunch by school)   | Float (##.##%)        |
| ?k_std_sti (prior to school year 2015-2016)  | VA State Testing Identifier  | Char (20)             |
| ?k_std_sid (prior to school year 2015-2016)  | Student – Teacher Supplied ID (Not for Virginia)   | Char (20)             |
| ?k_std_nm (prior to school year 2015-2016)   | Student – last name, first name  | Char (100)            |

|  |   |  |
|--|---|--|
| ?k_std_prek (prior to school year 2015-2016) | Student attended Preschool  | (0=no, 1=yes, 2=teacher does not know) |
| ?k_std_age (prior to school year 2015-2016)  | Student age in months   | Integer                                |
| ?k_std_gen (prior to school year 2015-2016)  | Student gender  | Char (1)                               |
| ?k_std_nsa (school years 2010-2016)          | Special Education Needed:<br>0 = Not Needed<br>1 = Needed and administered PALS under non-standard conditions<br>2 = Needed and exempt from PALS  | Integer                                |
| ?k_std_hisp (school years 2010-2016)         | Hispanic  | Boolean (0=no, 1=yes, 2=unspecified)   |
| ?k-std-race (school years 2010-2016)         | Race Code:<br>01 = American Indian/Alaska Native<br>02 = Asian<br>03 = Black or African American<br>04 = Unspecified<br>05 = White<br>06 = Native Hawaiian/Other Pacific Islander<br>07 = American Indian/Alaska Native and Asian<br>08 = American Indian/Alaska Native and Black or African American<br>09 = American Indian/Alaska Native and White<br>10 = American Indian/Alaska Native and Native Hawaiian<br>11 = Asian and Black or African American<br>12 = Asian and White<br>13 = Asian and Native Hawaiian<br>14 = Black or African American and White<br>15 = Black or African American and Native Hawaiian<br>16 = Native Hawaiian and White<br>17 = American Indian/Alaska Native, Asian and Black or African American<br>18 = American Indian/Alaska Native, Asian and White<br>19 = American Indian/Alaska Native, Asian and Native Hawaiian<br>20 = Asian, Black or African American and White | Char(2)                                |

|   |  |         |
|---|--|---------|
|   | <p>21 = Asian, Black or African American and Native Hawaiian</p> <p>22 = Black or African American, White and Native Hawaiian</p> <p>23 = Black or African American, Native Hawaiian and American Indian/Alaska Native</p> <p>24 = White, Black or African American and American Indian/Alaska Native</p> <p>25 = White, Native Hawaiian and American Indian/Alaska Native</p> <p>26 = White, Native Hawaiian and Asian</p> <p>27 = American Indian/Alaska Native, Asian, Black or African American and White</p> <p>28 = Asian, Black or African American, White and Native Hawaiian</p> <p>29 = Black or African American, White, Native Hawaiian and American Indian/Alaska Native</p> <p>30 = White, Native Hawaiian, American Indian/Alaska Native and Asian</p> <p>31 = Native Hawaiian, American Indian/Alaska Native, Asian and Black or African American</p> <p>32 = American Indian/Alaska Native, Asian, Black or African American, White and Native Hawaiian</p> |         |
| ?k_std_dis (prior to school year 2015-2016) | <p>Primary Disability:</p> <p>1 = None</p> <p>3 = Severe Disabilities</p> <p>4 = Multiple Disabilities</p> <p>5 = Orthopedic Impairment</p> <p>6 = Visual Impairment (including blindness)</p> <p>7 = Hearing Impairment / Deaf</p> <p>8 = Learning Disability</p> <p>9 = Emotional Disturbance</p> <p>10 = Speech / Language Impairment</p> <p>11 = Other Health Impairment</p> <p>12 = Deaf-Blind</p> <p>13 = Autism</p> <p>14 = Traumatic Brain Injury</p> <p>15 = Otherwise Qualified Handicapped under Sec.504</p> <p>16 = Developmental Delay (through age 8)</p> <p>19 = Intellectual Disabilities</p>  | Integer |

|  |  |                       |
|--|--|-----------------------|
| ?k_std_dob (prior to school year 2015-2016)      | Date of Birth  | Date (mm/dd/yyyy)     |
| ?k_dist_nm (prior to school year 2015-2016)      | District Name  | Char (100)            |
| ?k_sch_nm (prior to school year 2015-2016)       | School Name  | Char (100)            |
| ?k_sch_t1 (prior to school year 2015-2016)       | Title 1 school   | Boolean (0=no, 1=yes) |
| ?k_sch_tat1 (prior to school year 2015-2016)     | Title 1 targeted assisted school   | Boolean (0=no, 1=yes) |
| ?k_cl_grade (prior to school year 2015-2016)     | Class grade  | Char (1)              |
| ?k_tch_nm (prior to school year 2015-2016)       | Teacher (last name, first name)  | Char (100)            |
| ?k_std_svcesl (prior to school year 2015-2016)   | Services – English as a Second Language  | Boolean (0=no, 1=yes) |
| ?k_std_svct1 (prior to school year 2015-2016)    | Services – Title 1   | Boolean (0=no, 1=yes) |
| ?k_std_svctutor (prior to school year 2015-2016) | Services – One-on-one tutor  | Boolean (0=no, 1=yes) |
| ?k_std_svcn (prior to school year 2015-2016)     | Services - None  | Boolean (0=no, 1=yes) |
| ?k_std_svcnthm (prior to school year 2015-2016)  | Services - Other   | Char (50)             |
| ?k_scores (prior to school year 2015-2016)       | Scores Available   | Boolean (0=no, 1=yes) |
| ?k_sctype (prior to school year 2015-2016)       | Scores entered using:<br>1 = Traditional Score Entry<br>2 = Online Assessment Wizard | smallint              |
| ?k_form (prior to school year 2015-2016)         | Assessment Form (A, B, or C)   | Char (1)              |
| ?k_asses (prior to school year 2015-2016)        | Assessment Date  | Date (mm/dd/yyyy)     |



|  |                                      |                       |
|--|--------------------------------------|-----------------------|
| ?k_grhyme (prior to school year 2015-2016) | Group Rhyme Awareness                | Integer               |
| ?k_irhyme (prior to school year 2015-2016) | Individual Rhyme Awareness           | Integer               |
| ?k_gbegs (prior to school year 2015-2016)  | Group Beginning Sound Awareness      | Integer               |
| ?k_ibegs (prior to school year 2015-2016)  | Individual Beginning Sound Awareness | Integer               |
| ?k_abc (prior to school year 2015-2016)    | Alphabet Recognition - Lowercase     | Integer               |
| ?k_ls (prior to school year 2015-2016)     | Letter Sounds                        | Integer               |
| ?k_spell (prior to school year 2015-2016)  | Spelling – Total Score               | Integer               |
| ?k_cowpt (prior to school year 2015-2016)  | Concept of Word: Pointing            | Integer               |
| ?k_cowid (prior to school year 2015-2016)  | Concept of Word: Word ID             | Integer               |
| ?k_cowwl (prior to school year 2015-2016)  | Concept of Word: Word List           | Integer               |
| ?k_cowto (prior to school year 2015-2016)  | Concept of Word: Total               | Integer               |
| ?k_ppwri (prior to school year 2015-2016)  | Preprimer Word List                  | Integer               |
| ?k_pwri (prior to school year 2015-2016)   | Primer Word List                     | Integer               |
| ?k_1wri (prior to school year 2015-2016)   | First Grade Word List                | Integer               |
| ?k_elsum (prior to school year 2015-2016)  | Entry Level Summed Score             | Integer               |
| ?k_idbb (prior to school year 2015-2016)   | Identified Below Benchmark           | Boolean (0=no, 1=yes) |

**PALS 1-3 Data Dictionary- PRIOR TO School Year 2016-2017**

| <b>PALS 1-3 Fields Used 2004-2016</b>         |  |                       |
|---|--|-----------------------|
| ??_std_eth (school year 2009 and earlier)     | Ethnicity:<br>1 = Black (Not of Hispanic Origin)<br>2 = White (Not of Hispanic Origin)<br>3 = Hispanic<br>4 = American Indian or Alaska Native<br>5 = Asian/Pacific Islander (Defunct)<br>6 = Ethnicity Not Listed (Defunct)<br>7 = Unspecified<br>8 = Asian<br>9 = Native Hawaiian/Other Pacific Islander | Integer               |
| ??_std_lepstat (school year 2009 and earlier) | Student LEP status   | Integer               |
| ??_std_lepprof (school year 2009 and earlier) | Student LEP proficiency  | Integer               |
| ??_sch_rf (school year 2009 and earlier)      | Reading First School   | Boolean (0=no, 1=yes) |
| ??_datadate (school year 2009 and earlier)    | Date data was extracted from PALS database   | Date (mm/dd/yyyy)     |
| ??_std_svcd (school year 2006 and earlier)    | Services - Learning Disabled (yes or no)   | Boolean (0=no, 1=yes) |
| ??_std_svced (school year 2006 and earlier)   | Services - Emotional Difficulties (yes or no)  | Boolean (0=no, 1=yes) |
| ??_std_svcdd (school year 2006 and earlier)   | Services - Developmental Delay (yes or no)   | Boolean (0=no, 1=yes) |
| ??_std_svcmr (school year 2006 and earlier)   | Services - Mental Retardation (yes or no)  | Boolean (0=no, 1=yes) |
| ??_std_svcsp (school year 2006 and earlier)   | Services - Speech & Language Services (yes or no)  | Boolean (0=no, 1=yes) |
| ??_std_svclep (school year 2006 and earlier)  | Services- Limited English Proficiency (yes or no)  | Boolean (0=no, 1=yes) |
| ??_inven (school year 2006 and earlier)       | Reading Inventory  | Integer               |
| ??_adjwl (school year 2006 and earlier)       | Adjusted Word List (not valid for fall of 1st grade)   | Integer               |
| ??_adjrl (school year 2006 and earlier)       | Adjusted Reading Level   | Float (##.###)        |
| ??_adjsu (school year 2006 and earlier)       | Adjusted Sum Score (not valid for fall of 1st grade)   | Integer               |

|  |  |  |
|--|--|--|
| ??_sch_ses (school year 2008 and earlier)        | SES (% free/reduced lunch by school)   | Float (##.##%)                         |
| ??_std_sid (school year 2013 and earlier)        | Student – Teacher Supplied ID  | Char (20)                              |
| ??_spins (school year 2013 and earlier)          | Spelling Feature Instructional Level:<br>1 = Beginning sounds(Valid fall of first grade)<br>2 = Ending sounds(Valid fall of first grade)<br>3 = Beginning/Ending sounds<br>4 = Digraphs<br>5 = Blends<br>6 = Short vowels<br>7 = Nasals<br>8 = CVCe<br>9 = Long vowels<br>10 = R & L influenced<br>11 = Ambiguous vowels<br>12 = Syllable Juncture<br>13 = Affixes | Integer                                |
| ??_std_sti (school year 2015-2016 and earlier)   | VA State Testing Identifier  | Char (20)                              |
| ??_std_nm (school year 2015-2016 and earlier)    | Student – last name, first name  | Char (100)                             |
| ??_std_age (school year 2015-2016 and earlier)   | Student age in months  | Integer                                |
| ??_std_gen (school year 2015-2016 and earlier)   | Student gender   | Char (1)                               |
| ??_std_nsa (school year 2010 through 2015-2016)  | Special Education Needed:<br>0 = Not Needed<br>1 = Needed and administered PALS under non-standard conditions<br>2 = Needed and exempt from PALS   | Integer                                |
| ??_std_hisp (school year 2010 through 2015-2016) | Hispanic   | Char (1)<br>(0=no,1=yes,2=unspecified) |

|   |  |                |
|---|--|----------------|
| <p>??_std_race (school year 2010 through 2015-2016)</p> | <p>Race Code:<br/> 01 = American Indian/Alaska Native<br/> 02 = Asian<br/> 03 = Black or African American<br/> 04 = Unspecified<br/> 05 = White<br/> 06 = Native Hawaiian/Other Pacific Islander<br/> 07 = American Indian/Alaska Native and Asian<br/> 08 = American Indian/Alaska Native and Black or African American<br/> 09 = American Indian/Alaska Native and White<br/> 10 = American Indian/Alaska Native and Native Hawaiian<br/> 11 = Asian and Black or African American<br/> 12 = Asian and White<br/> 13 = Asian and Native Hawaiian<br/> 14 = Black or African American and White<br/> 15 = Black or African American and Native Hawaiian<br/> 16 = Native Hawaiian and White<br/> 17 = American Indian/Alaska Native, Asian and Black or African American<br/> 18 = American Indian/Alaska Native, Asian and White<br/> 19 = American Indian/Alaska Native, Asian and Native Hawaiian<br/> 20 = Asian, Black or African American and White<br/> 21 = Asian, Black or African American and Native Hawaiian<br/> 22 = Black or African American, White and Native Hawaiian<br/> 23 = Black or African American, Native Hawaiian and American Indian/Alaska Native<br/> 24 = White, Black or African American and American Indian/Alaska Native<br/> 25 = White, Native Hawaiian and American Indian/Alaska Native<br/> 26 = White, Native Hawaiian and Asian<br/> 27 = American Indian/Alaska Native, Asian, Black or African American and White<br/> 28 = Asian, Black or African American, White and Native Hawaiian<br/> 29 = Black or African American, White, Native Hawaiian and American Indian/Alaska Native<br/> 30 = White, Native Hawaiian, American Indian/Alaska Native and Asian</p> | <p>Char(2)</p> |
|---|--|----------------|

|   |  |   |
|---|--|---|
|   | 31 = Native Hawaiian, American Indian/Alaska Native, Asian and Black or African American<br>32 = American Indian/Alaska Native, Asian, Black or African American, White and Native Hawaiian  |   |
| ??_std_dis (school year 2015-2016 and earlier)  | Primary Disability:<br>1 = None<br>3 = Severe Disabilities<br>4 = Multiple Disabilities<br>5 = Orthopedic Impairment<br>6 = Visual Impairment (including blindness)<br>7 = Hearing Impairment / Deaf<br>8 = Learning Disability<br>9 = Emotional Disturbance<br>10 = Speech / Language Impairment<br>11 = Other Health Impairment<br>12 = Deaf-Blind<br>13 = Autism<br>14 = Traumatic Brain Injury<br>15 = Otherwise Qualified Handicapped under Sec.504<br>16 = Developmental Delay (through age 8)<br>19 = Intellectual Disabilities | Integer                                 |
| ??_std_dob (school year 2015-2016 and earlier)  | Date of birth  | Date (mm/dd/yyyy)                       |
| ??_std_hben (school year 2015-2016 and earlier) | Met high benchmark designation   | Boolean (0=no,1=yes)                    |
| ??_std_hbap (school year 2015-2016 and earlier) | Assessment period in which first marked high benchmark – not eligible until spring of 1st  | Char (25)                               |
| ??_std_prek (school year 2015-2016 and earlier) | Student attended Preschool   | (0=no, 1=yes, 2= teacher does not know) |
| ??_dist_nm (school year 2015-2016 and earlier)  | District Name  | Char (100)                              |
| ??_sch_nm (school year 2015-2016 and earlier)   | School Name  | Char (100)                              |
| ??_sch_t1 (school year 2015-2016 and earlier)   | Title 1 school   | Boolean (0=no, 1=yes)                   |

|   |   |                          |
|---|---|--------------------------|
| ??_sch_tat1 (school year 2015-2016 and earlier)     | Title 1 targeted assisted school                | Boolean<br>(0=no, 1=yes) |
| ??_grade (school year 2015-2016 and earlier)        | Class Grade                                     | Char (1)                 |
| ??_tch_nm (school year 2015-2016 and earlier)       | Teacher (Last name, First Name)                 | Char (100)               |
| ??_std_svcesl (school year 2015-2016 and earlier)   | Services-English as Second Language             | Boolean<br>(0=no, 1=yes) |
| ??_std_svct1 (school year 2015-2016 and earlier)    | Services-Title 1                                | Boolean<br>(0=no, 1=yes) |
| ??_std_svctutor (school year 2015-2016 and earlier) | Services- One-on-one tutor                      | Boolean<br>(0=no, 1=yes) |
| ??_std_svcn (school year 2015-2016 and earlier)     | Services- None                                  | Boolean<br>(0=no, 1=yes) |
| ??_std_svco (school year 2015-2016 and earlier)     | Services- Other                                 | Boolean<br>(0=no, 1=yes) |
| ??_std_svcothnm (school year 2015-2016 and earlier) | Services- Other Name                            | Char (50)                |
| ??_scores (school year 2015-2016 and earlier)       | Scores available                                | Boolean<br>(0=no, 1=yes) |
| ??_sctype (school year 2015-2016 and earlier)       | Score Entry Option ID (1=traditional, 2=Wizard) | Char (1)                 |
| ??_ewri (school year 2015-2016 and earlier)         | E-WRI was used to enter word list scores        | Boolean<br>(0=no, 1=yes) |
| ??_form (school year 2015-2016 and earlier)         | Assessment form (A, B, or C)                    | Char (1)                 |
| ??_asses (school year 2015-2016 and earlier)        | Assessment date                                 | Date<br>(mm/dd/yyyy)     |
| ??_ppwri (school year 2015-2016 and earlier)        | Preprimer word list                             | Integer                  |
| ??_pwri (school year 2015-2016 and earlier)         | Primer word list                                | Integer                  |

|   |  |                       |
|---|--|-----------------------|
| ??_1wri (school year 2015-2016 and earlier)   | First grade word list  | Integer               |
| ??_2wri (school year 2015-2016 and earlier)   | Second grade word list   | Integer               |
| ??_3wri (school year 2015-2016 and earlier)   | Third grade word list  | Integer               |
| ??_4wri (school year 2015-2016 and earlier)   | Fourth grade word list   | Integer               |
| ??_5wri (school year 2015-2016 and earlier)   | Fifth grade word list  | Integer               |
| ??_6wri (school year 2015-2016 and earlier)   | Sixth grade word list  | Integer               |
| ??_7wri (school year 2015-2016 and earlier)   | Seventh grade word list  | Integer               |
| ??_8wri (school year 2015-2016 and earlier)   | Eighth grade word list   | Integer               |
| ??_spell (school year 2015-2016 and earlier)  | Spelling-Total Score   | Integer               |
| ??_ls (school year 2015-2016 and earlier)     | Letter Sounds  | Integer               |
| ??_elsum (school year 2015-2016 and earlier)  | Entry Level Summed Score (Fall/Spring Only)  | Integer               |
| ??_idbb (school year 2015-2016 and earlier)   | Identified Below Benchmark (Fall/Spring Only)  | Boolean (0=no, 1=yes) |
| ??_beg (school year 2015-2016 and earlier)    | Spelling-beginning sounds (Valid fall and mid-year of first grade only)                        | Integer               |
| ??_end (school year 2015-2016 and earlier)    | Spelling- ending sounds (Valid fall and mid-year of first grade only)                          | Integer               |
| ??_begend (school year 2015-2016 and earlier) | Spelling-beginning/ending sounds (Not Valid fall and mid-year of first grade) first grade only | Integer               |

|  |                                   |         |
|--|-----------------------------------|---------|
| ??_digra (school year 2015-2016 and earlier) | Spelling-digraphs                 | Integer |
| ??_blen (school year 2015-2016 and earlier)  | Spelling-blends                   | Integer |
| ??_short (school year 2015-2016 and earlier) | Spelling-short vowels             | Integer |
| ??_nasal (school year 2015-2016 and earlier) | Spelling-nasals                   | Integer |
| ??_cvce (school year 2015-2016 and earlier)  | Spelling-CVCe                     | Integer |
| ??_longv (school year 2015-2016 and earlier) | Spelling-long vowels              | Integer |
| ??_randl (school year 2015-2016 and earlier) | Spelling-R & L influenced         | Integer |
| ??_ambig (school year 2015-2016 and earlier) | Spelling-ambiguous vowels         | Integer |
| ??_sylju (school year 2015-2016 and earlier) | Spelling-syllable juncture        | Integer |
| ??_affix (school year 2015-2016 and earlier) | Spelling-affixes                  | Integer |
| ??_deriv (school year 2015-2016 and earlier) | Spelling-derivational relations   | Integer |
| ??_r_a (school year 2015-2016 and earlier)   | PALS Readiness passage accuracy   | Integer |
| ??_ppa_a (school year 2015-2016 and earlier) | PALS Preprimer A passage accuracy | Integer |
| ??_ppb_a (school year 2015-2016 and earlier) | PALS Preprimer B passage accuracy | Integer |
| ??_ppc_a (school year 2015-2016 and earlier) | PALS Preprimer C passage accuracy | Integer |
| ??_p_a (school year 2015-2016 and earlier)   | PALS Primer passage accuracy      | Integer |



|  |  |         |
|--|--|---------|
| ??_p_f (school year 2015-2016 and earlier) | PALS Primer passage fluency rating                                     | Integer |
| ??_p_r (school year 2015-2016 and earlier) | PALS Primer passage words per minute/rate                              | Integer |
| ??_p_c (school year 2015-2016 and earlier) | PALS Primer passage # comprehension questions correct out of six       | Integer |
| ??_1_a (school year 2015-2016 and earlier) | PALS first grade passage accuracy                                      | Integer |
| ??_1_f (school year 2015-2016 and earlier) | PALS first grade passage fluency rating                                | Integer |
| ??_1_r (school year 2015-2016 and earlier) | PALS first grade passage words per minute/rate                         | Integer |
| ??_1_c (school year 2015-2016 and earlier) | PALS first grade passage # comprehension questions correct out of six  | Integer |
| ??_2_a (school year 2015-2016 and earlier) | PALS second grade passage accuracy                                     | Integer |
| ??_2_f (school year 2015-2016 and earlier) | PALS second grade passage fluency rating                               | Integer |
| ??_2_r (school year 2015-2016 and earlier) | PALS second grade passage words per minute/rate                        | Integer |
| ??_2_c (school year 2015-2016 and earlier) | PALS second grade passage # comprehension questions correct out of six | Integer |
| ??_3_a (school year 2015-2016 and earlier) | PALS third grade passage accuracy                                      | Integer |
| ??_3_f (school year 2015-2016 and earlier) | PALS third grade passage fluency rating                                | Integer |
| ??_3_r (school year 2015-2016 and earlier) | PALS third grade passage words per minute/rate                         | Integer |
| ??_3_c (school year 2015-2016 and earlier) | PALS third grade passage # comprehension questions correct out of six  | Integer |

|  |  |         |
|--|--|---------|
| ??_4_a (school year 2015-2016 and earlier) | PALS fourth grade passage accuracy                                     | Integer |
| ??_4_f (school year 2015-2016 and earlier) | PALS fourth grade passage fluency rating                               | Integer |
| ??_4_r (school year 2015-2016 and earlier) | PALS fourth grade passage words per minute/rate                        | Integer |
| ??_4_c (school year 2015-2016 and earlier) | PALS fourth grade passage # comprehension questions correct out of six | Integer |
| ??_5_a (school year 2015-2016 and earlier) | PALS fifth grade passage accuracy                                      | Integer |
| ??_5_f (school year 2015-2016 and earlier) | PALS fifth grade passage fluency rating                                | Integer |
| ??_5_r (school year 2015-2016 and earlier) | PALS fifth grade passage words per minute/rate                         | Integer |
| ??_5_c (school year 2015-2016 and earlier) | PALS fifth grade passage # comprehension questions correct out of six  | Integer |
| ??_6_a (school year 2015-2016 and earlier) | PALS sixth grade passage accuracy                                      | Integer |
| ??_6_f (school year 2015-2016 and earlier) | PALS sixth grade passage fluency rating                                | Integer |
| ??_6_r (school year 2015-2016 and earlier) | PALS sixth grade passage words per minute/rate                         | Integer |
| ??_6_c (school year 2015-2016 and earlier) | PALS sixth grade passage # comprehension questions correct out of six  | Integer |
| ??_7_a (school year 2015-2016 and earlier) | PALS seventh grade passage accuracy                                    | Integer |
| ??_7_f (school year 2015-2016 and earlier) | PALS seventh grade passage fluency rating                              | Integer |
| ??_7_r (school year 2015-2016 and earlier) | PALS seventh grade passage words per minute/rate                       | Integer |

|  |   |         |
|--|---|---------|
| ??_7_c (school year 2015-2016 and earlier)   | PALS seventh grade passage # comprehension questions correct out of six | Integer |
| ??_8_a (school year 2015-2016 and earlier)   | PALS eighth grade passage accuracy                                      | Integer |
| ??_8_f (school year 2015-2016 and earlier)   | PALS eighth grade passage fluency rating                                | Integer |
| ??_8_r (school year 2015-2016 and earlier)   | PALS eighth grade passage words per minute/rate                         | Integer |
| ??_8_c (school year 2015-2016 and earlier)   | PALS eighth grade passage # comprehension questions correct out of six  | Integer |
| ??_abc (school year 2015-2016 and earlier)   | Alphabet Recognition  | Integer |
| ??_cowpt (school year 2015-2016 and earlier) | Concept of Word: Pointing   | Integer |
| ??_cowid (school year 2015-2016 and earlier) | Concept of Word: Word Identification                                    | Integer |
| ??_cowwl (school year 2015-2016 and earlier) | Concept of Word: Word List  | Integer |
| ??_cowto (school year 2015-2016 and earlier) | Concept of Word: Total  | Integer |
| ??_blend (school year 2015-2016 and earlier) | Blending  | Integer |
| ??_sndtl (school year 2015-2016 and earlier) | Sound-to-letter   | Integer |

|  |  |                          |
|--|--|--------------------------|
| ??_insrl (school year 2015-2016 and earlier)   | Instructional Reading Level:<br>1 = Readiness<br>2 = Between Readiness & Preprimer<br>3 = Preprimer<br>4 = Between Preprimer & Primer<br>5 = Primer<br>6 = Between Primer & First Grade<br>7 = First Grade<br>8 = Between First & Second Grade<br>9 = Second Grade<br>10 = Between Second & Third Grade<br>11 = Third Grade<br>12 = Between Third & Fourth Grade<br>13 = Fourth Grade<br>14 = Between Fourth & Fifth Grade<br>15 = Fifth Grade<br>16 = Between Fifth & Sixth Grade<br>17 = Sixth grade<br>18 = Between Sixth & Seventh Grade<br>19 = Seventh grade<br>20 = Between Seventh & Eighth Grade<br>21 = Eighth grade<br>22 = Not enough information to designate level | Integer                  |
| ??_rateslo (school year 2015-2016 and earlier) | Passage reading rate too slow  | Boolean<br>(0=no, 1=yes) |
| ??_indr (school year 2015-2016 and earlier)    | Independent Reading Level:<br>0 = No Independent Reading Level<br>1 = Independent at Instructional Level   | Integer                  |
| ??_bsum (school year 2015-2016 and earlier)    | Level B total score  | Integer                  |
| ??_csum (school year 2015-2016 and earlier)    | Level C total score  | Integer                  |

**Appendix C**  
**CITI Program Course Completion**



Completion Date 15-Feb-2019  
Expiration Date 14-Feb-2022  
Record ID 30520879

This is to certify that:

**Douglas Lyle**

Has completed the following CITI Program course:

**Social & Behavioral Research** (Curriculum Group)  
**Social & Behavioral Research** (Course Learner Group)  
**1 - Basic Course** (Stage)

Under requirements set by:

**Virginia Polytechnic Institute & State University (Virginia Tech)**



Verify at [www.citiprogram.org/verify/?w0be2ada2-d7ec-4d65-a4ec-1fd54327c4f4-30520879](http://www.citiprogram.org/verify/?w0be2ada2-d7ec-4d65-a4ec-1fd54327c4f4-30520879)

## Appendix D

### IRB Approval Letter



Division of Scholarship, Integrity, and  
Research Compliance  
Institutional Review Board  
North End Center, Suite 4120 (MC 0497)  
300 Turner Street NW  
Blacksburg, Virginia 24061  
540/231-3732  
ib@vt.edu  
<http://www.research.vt.edu/irb/app>

#### MEMORANDUM

**DATE:** October 7, 2019  
**TO:** Carol Ann Mullen, Douglas Wayne Lyle Jr  
**FROM:** Virginia Tech Institutional Review Board (FWA00000572, expires January 29, 2021)  
**PROTOCOL TITLE:** Investigating Virginia Preschool Initiative's Role in Preparing Students for Kindergarten  
**IRB NUMBER:** 19-411

Effective October 7, 2019, the Virginia Tech Institutional Review Board (IRB) approved the New Application request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report within 5 business days to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at:

<https://secure.research.vt.edu/external/irb/responsibilities.htm>

(Please review responsibilities before beginning your research.)

#### PROTOCOL INFORMATION:

Approved As: **Expedited, under 45 CFR 46.110 category(ies) 5**  
Protocol Approval Date: **October 7, 2019**  
Progress Review Date: **October 6, 2020**

#### ASSOCIATED FUNDING:

The table on the following page indicates whether grant proposals are related to this protocol, and which of the listed proposals, if any, have been compared to this protocol, if required.

*Invent the Future*

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY  
*An equal opportunity, affirmative action institution*

| Date* | OSP Number | Sponsor | Grant Comparison Conducted? |
|-------|------------|---------|-----------------------------|
|       |            |         |                             |
|       |            |         |                             |
|       |            |         |                             |
|       |            |         |                             |
|       |            |         |                             |
|       |            |         |                             |
|       |            |         |                             |
|       |            |         |                             |
|       |            |         |                             |

\* Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this protocol is to cover any other grant proposals, please contact the HRPP office ([irb@vt.edu](mailto:irb@vt.edu)) immediately.

**Appendix E**  
**Permission to Use Letter to Superintendent**



Dr. Robert Arnold, Superintendent

Amherst County Public Schools  
153 Washington Street  
Amherst, VA 24521

May 1, 2019

Dear Dr. Arnold:

As you know, I am enrolled in Virginia Tech's Educational Leadership and Policy Studies doctoral program. I will complete coursework this summer, and my prospectus exam is scheduled for September 3, 2019. Right after my prospectus has been successfully defended, I have been encouraged by my dissertation chair, Dr. Carol Mullen, to submit a request to Virginia Tech's Institutional Review Board (IRB) to begin conducting research related to my topic on the efficacy of the Virginia Preschool Initiative (VPI) program in Amherst County Public Schools (ACPS) at preparing students for kindergarten. In order to conduct this study, I will need your permission to use existing Phonological Awareness Literacy Screening-Kindergarten (PALS-K) and Virginia Kindergarten Readiness Program (VKRP) data for four cohorts of kindergarten students who were enrolled in ACPS during the following years: 2015-2016, 2016-2017, 2017-2018, and 2018-2019.

I plan to analyze the data for each cohort by comparing the mean scores from the PALS-K and VKRP of the students who attended the VPI program to the students within the same cohort who did not have any preschool experience. Comparing these groups of students will reduce threats to internal validity since students who attend state-funded prekindergarten programs share similar characteristics to students who do not participate in a preschool program. Safeguards will be taken to keep this existing data confidential by storing all data on a password protected computer issued to me by ACPS. No foreseeable risks are anticipated since students' names will be redacted and not used when findings are reported to my committee. However, I will share more specific details with you and others within the school division with a legitimate interest in knowing the identified strengths and limitations of our VPI program.

Please let me know if you have any questions or concerns regarding this request. I am happy to meet with you in person to discuss how this research can potentially benefit ACPS. If you approve for me to use the data described above, I would appreciate having a signed letter from you giving me permission to do so that can be submitted with my IRB application. Thank you for your consideration and support of my educational endeavors.

Sincerely,

A handwritten signature in black ink that reads "Wayne Lyle". The signature is written in a cursive, flowing style.

Wayne Lyle



**Appendix F**  
**Superintendent Approval Letter**



AMHERST COUNTY PUBLIC SCHOOLS  
School Administration Office  
153 Washington Street  
Amherst, VA 24521

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Office of the Superintendent  
Dr. Robert Arnold

(434) 946-9387

[rarnold@amherst.k12.va.us](mailto:rarnold@amherst.k12.va.us)

Mr. Wayne Lyle  
153 Washington Street  
Amherst, VA 24521

Dear Mr. Lyle:

After careful review of your research proposal requesting the use of existing Phonological Awareness Literacy Screening – Kindergarten (PALS-K) and Virginia Kindergarten Readiness Program (VKRP) data from Amherst County Public Schools, I have decided to grant you permission to conduct your study.

Sincerely,

Dr. Robert Arnold  
Superintendent  
Amherst County Public Schools