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# The Predictive Nature of the Phelps Kindergarten Readiness Scale Perceptual Score and Reading Achievement: A Mixed-Methods Study

Sarah Bond

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THE PREDICTIVE NATURE OF THE PHELPS KINDERGARTEN READINESS  
SCALE PERCEPTUAL SCORE AND READING ACHIEVEMENT:  
A MIXED-METHODS STUDY

A Dissertation

Submitted to the School of Graduate Studies and Research

in Partial Fulfillment of the

Requirements for the Degree

Doctor of Education

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Indiana University of Pennsylvania

May 2017

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Title: The Predictive Nature of the Phelps Kindergarten Readiness Scale Perceptual Score and Reading Achievement: A Mixed-Methods Study

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The purpose of this mixed-methods study was to identify and describe what correlations, if any, exist between the composite Phelps Kindergarten Readiness Scale (PKRS) score, the visual-perceptual subtest of the PKRS, and reading achievement by the end of grade one. The quantitative data used in this study were the PKRS scores from 421 students entering kindergarten in the 2013 and 2014 school years and the end of first grade Title I Reading rosters for the same cohort of students. The qualitative data collected for this study were the coded transcripts from two focus group discussions that included current and retired kindergarten, first grade, and Title I Reading teachers, one semi-structured interview with an elementary art teacher, and notes on student artwork the art teacher brought to the interview.

The results indicated a significant negative correlation between the Perceptual domain score and end of first grade Title I Reading placement indicating that as students' Perceptual Domain scores increased, it was less likely for them to be placed in Title I Reading. Logistic regression was used to determine what subtests of the PKRS were predictors of later reading achievement. The Auditory domain was found to be the only subtest to make a statistically significant contribution to the model ( $p = .001$ ).

During the art teacher's interview, it was noted that the students the art teacher perceived as receiving Title I Reading services had PKRS Perceptual Domain score at or

below the 50<sup>th</sup> percentile. The researcher made recommendations to teachers and schools on ways to support kindergarten students who may be at-risk for later academic achievement based on their school readiness scores. The researcher recommended to policy makers a need to increase funding for quality early childhood education in order to increase publicly-funded, high-quality early childhood education opportunities for children who might be considered at-risk for school success because of their lower socio-economic status.

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## CHAPTER I

### INTRODUCTION

Readiness for school is a contested and controversial term. Yet it is also a term invoked regularly in discussions on the transition to school. Parents and educators anguish over whether or not a child is *ready* for school as they try to make decisions they believe will best support children as they move into formal schooling. (Dockett & Perry, 2009, p. 20)

#### **Background of the Study**

A free education is a fundamental right for all, including children, and elementary education shall be compulsory (The United Nations, 1948, Art. 26.1). In the United States, 4.6 million five- and six-year-olds begin their formal schooling in kindergarten each fall (United States Census Bureau, 2014). Though kindergarten is only mandatory in 14 out of 50 states, publicly funded kindergartens are widely available (Lewis & Burd-Sharps, 2011). Even before they begin their first school year, many of these five- and six-year-olds will have completed their first school assessment. This assessment might be used for a variety of reasons. For some students, the assessment will help determine if further educational psychological testing is required. For other students, the assessment will help determine who might require extra services within the school, such as reading support, in order to be successful. This study examined The Phelps Kindergarten Readiness Scale composite score and subtest scores (Phelps, 2003), and then determined if there were connections between these scores and later reading difficulty.

There are two types of assessments: developmental screening measures and readiness measures (Gredler, 1997; Panter & Bracken, 2009). The use of screening measures is derived from the medical field, in which physicians conduct noninvasive procedures, such as ask questions, to identify problems and prevent further complications and/or treat problems (Gredler, 1992; May & Kundert, 1997; Richardson, Casanova, Placier, & Guilfoyle, 1989). If a significant problem is identified, physicians start looking into more invasive procedures and treatments. In education, a developmental screening measure is used to help educators identify students who might need more in-depth testing for gifted status or learning disabilities (Rafoth, 1997). While a developmental screening measure is used to determine if further testing is needed, a readiness measure is used to predict school success (Gredler, 1997; Panter & Bracken, 2009). There are four possible outcomes for readiness screeners: students predicted to be at-risk who actually develop problems, students predicted to be at-risk who did not develop problems, students predicted to be not at-risk who actually develop problems, and students predicted to be not at-risk who did not develop problems (Rafoth, 1997). How closely the assessment correctly classifies the students, as at-risk or not at-risk, determines the assessment's index of sensitivity and index of specificity (Gredler, 1992).

### **Theoretical Framework**

Gestalt theory served as the large umbrella theoretical framework for this study. Gestalt helps to explain concepts involving visual perception, including visual-motor connections, intelligence, learning, and memory (Bender, 1938; Köhler, 1938; Köhler, 1947; Serok, 2000; Tolor & Scheulberg, 1963). In Gestalt psychology, the way an object is perceived is determined and understood by the location of the object and surrounding

objects (Zakia, 2002). Gestalt theorist, Köhler, explained that the visual processing area of the brain perceives an object in visual space. Then the brain searches the surrounding environment for any organized patterns to help make sense of the visual information received (Köhler, 1938; Köhler, 1947).

Under the umbrella of Gestalt theory, working memory theory (Baddeley, 1986) serves as another theoretical framework that was used in this study. Working memory is the short-term memory system for processing, holding, and manipulating information needed to perform a task (Baddeley, 1986; Baddeley & Hitch, 1974; Gathercole & Baddeley, 1993) and should not be confused with conventional and casual definitions of short-term memory. Working memory consists of three components: the central executive, the phonological loop, and the visuo-spatial sketchpad (Baddeley, 1986; Gathercole & Baddeley, 1993). The central executive is used for mental arithmetic, recollection of events from long-term, and controlling information transmission between the phonological loop and visuo-spatial sketchpad (Gathercole & Baddeley, 1993). The phonological loop is used to process and store verbal language material while the visuo-spatial sketchpad is used for temporary storage of spatial information (Baddeley, 1986).

The phonological loop and visuo-spatial sketchpad have an important role in learning how to read. In a study of six- to 11-year olds, Oakhill, Yuill, and Garnham (2011) found that the five working memory measures used were significantly related to both reading comprehension and reading accuracy ( $p < .01$ ). In the same study, Verbal Reading Span (students listen to a series of unrelated sentences that are missing the final word, give the final word in each sentences, and at the end of the series recall all the missing words) was strongly and consistently related to reading comprehension

accounting for 3% of the variance (Oakhill, Yuill, & Garnham, 2011). As readers mature, how much they utilize the phonological loop and visuo-spatial sketchpad changes (Baddeley, 1986).

### **Problem Statement**

Based on the 2015 National Assessment of Educational Progress (NAEP) data, the majority of fourth grade students struggle to read materials on grade level. Only one-third of fourth graders (36%) performed at or above the *Proficient* level on the NAEP (U.S. Department of Education, 2015). Results for 2015 did not change significantly from 2014. Historically, the percentage of students who have performed at or above *Proficient* has only increased six points since 1992. With all the interventions that are in place for many of these students, including mandated retention if students are not reading on grade level by third grade, still two-thirds of the fourth grade population are not capable of demonstrating that they comprehend fourth grade material on the NAEP.

Students who have not increased their reading ability so they are reading on current grade level will suffer long-term effects. These students will experience a difficult time completing high school, being accepted into college, and finding a job that will pay a living salary (Lesnick, Goerge, Smithgall, & Gwynne, 2010). The principle that good readers will remain good readers and poor readers will remain poor readers and become poorer, unless they receive some kind of intervention, is referred to as the Matthew Effect (Merton, 1968; Stanovich, 1986). The concept for the theory comes from the Bible, Matthew 25:29 (New Revised Standard Version). “For all those who have, more will be given, and they will have an abundance; but from those who have nothing, even what they have will be taken away.” While federal and state governments continue to increase



funding for schools that serve in areas that are economically disadvantaged to help close the achievement gap, a gap continues to exist (Kober, Chudowsky, & Chudowsky, 2010). A study to investigate if No Child Left Behind had a positive effect on the speed by which the achievement gap is decreasing looked at state test scores and arrived at four main conclusions (Kober, Chudowsky, & Chudowsky, 2010). The first conclusion was that the achievement gaps continued to be large and persistent. Kober, Chudowsky, and Chudowsky (2010) noted that while major student groups made gains to increase achievement since 2002, the gaps have not narrowed significantly. While achievement gaps for some students have narrowed more rapidly than for other students, the current rate of progress is still slow; it would take many years to close most gaps (Kober, Chudowsky, Chudowsky, 2010).

When talking about groups that receive much attention when discussing narrowing the achievement gaps, one group that is zeroed in upon is students who receive Title I Reading. Kober, McMurrer, and Silva (2011) report that achievement has improved for Title I students in most states, and the gaps between Title I and non-Title I students have narrowed more often than they have widened since 2002. In the states which reported that the gaps narrowed between students receiving Title I and students not in Title I, it was likely to be because the students in Title I improved at a faster rate than the students not in Title I (Kober, McMurrer, & Silva, 2011). The faster rate could be attributed to the fact that the students in Title I received intensive intervention. Sadly, however, students in the higher-poverty schools, schools that are often served by Title I, have classes that are often taught by less experienced and less qualified teachers (Kober, McMurrer, & Silva, 2011). A conclusion that could be drawn from the studies is that

once students are placed in Title I Reading, it is rare that the students are removed because there remains a gap between their academic performance and the academic performance of students not in Title I Reading.

Reading at grade level by the end of third grade has been shown to be a strong predictor of whether a student will be reading at grade level in ninth grade (Garcia & Benero, 2011; Lesnick, Goerge, Smithgall, & Gwynne, 2010). End of third grade reading level has also been shown to be a strong predictor for whether a student will graduate from high school or graduate from college (Garcia & Benero, 2011; Lesnick, Goerge, Smithgall, & Gwynne, 2010). Lesnick, Goerge, Smithgall, and Gwynne (2010) reported that 45 percent of third grade students who scored below grade level graduated from high school within five years of starting, while 60 percent of third grade students who scored at grade level, and almost 80 percent of students who scored above grade level, graduated from high school within five years of starting. Before schools can help students meet the demands that will be placed on them by third grade, it is important that schools quickly and correctly identify students who will need more than core instruction.

Children start their educational career with varying academic abilities. Some come to school already knowing how to read some simple words, to read the letters of the alphabet, to write their names, and to write some words. These students might be categorized as school ready. Other students come to school lacking many of the above mentioned skills and would be categorized as not quite school ready, but they still have the right to come to school. Students in the not quite school ready group may require more specialized services to close the gap that exists between themselves and the more school ready students.

### **Purpose of Study**

The purpose of this study was to identify and describe what correlation, if any, exists between the composite Phelps Kindergarten Readiness Scale score, the visual-perceptual subtest of the Phelps Kindergarten Readiness Scale score, and reading achievement by the end of grade one. By understanding a correlation of the composite score, the visual-perceptual subtest, and reading achievement at the end of grade one, educators can make appropriate recommendations for student placement in reading support at the beginning of formal schooling.

### **Research Questions**

There were three questions that were used to guide this study. The questions that guided this study were:

1. What, if any, correlation exists between a student's perceptual score on the Phelps Kindergarten Readiness Scale and later reading achievement?
2. What subtests of the Phelps Kindergarten Readiness Scale, if any, are the predictors for reading achievement?
3. What, if any, are the difficulties students in Title I Reading have with spatial intelligence and visual perception compared with students not in Title I Reading?

### **Methodology**

The design of this study was explanatory mixed-methods. The quantitative data for this study were collected before the qualitative data to insure a complete examination of the research questions. The qualitative data collected in this study helped to explain the quantitative data (Creswell & Plano Clark, 2007; Creswell, Plano Clark, Gutmann, & Hanson, 2003; Gay, Mills, & Airasian, 2006). The quantitative data that were collected

were the archived students' results from the Phelps Kindergarten Readiness Scale (Phelps, 2003) and the end of first grade Title I Reading rosters. Qualitative data collected for this study were the coded transcriptions from two focus group discussions and one semi-structured interview.

### **Significance of the Study**

One of the most pressing issues in education is making sure students are reading on grade level by the end of third grade (Balkcom, 2014; Layton, 2013). Some states, Florida being the most noteworthy, have laws in place requiring students be reading on grade level by the end of third grade or the students will be retained (Balkcom, 2014). These laws and policies have educators looking more closely at early reading practices. One practice is early identification of students who may have difficulties in learning to read and then placing them in an intervention group (Cakiroglu, 2015; Vaughn & Fuchs, 2003). Research on beginning reading intervention has been shown to help students with reading disabilities (RD) and the intervention has a lasting effect (Coyne, Kame'enui, Simmons, & Harn, 2004; Torgesen et al., 2001). Investigating kindergarten students at risk for RD, Coyne, Kame'enui, Simmons, and Harn (2004) found that 75 to 100 percent of those kindergarten students who caught up by the beginning of first grade, through specialized kindergarten intervention, continued to make acceptable progress through February of first grade, without additional intervention in first grade. The study suggests that early intervention can close gaps in students' learning, and for many students keep the gap closed without further intervention (Coyne, Kame'enui, Simmons, & Harn, 2004).

Torgesen et al. (2001) investigated intensive remedial instruction in reading for children with severe reading disabilities. The children in the sample were unable to acquire word-reading ability through regular education and special education instruction. The interventions the students were involved in provided explicit instruction in phonemic awareness, phonemic decoding, and sight word recognition. The study was concerned with what kinds of gains the students would make during the intervention period and also if those gains and growth trajectories continued to grow at the same rate, plateaued, or declined. In fact, the effects were stable and substantial over the course of the two-year follow-up period. The results of the study indicated the sizes of the gains in reading achievement the students achieved during the intervention period and over the two-year follow-up period were greater than the researchers expected, indicating that intervention can have a lasting effect on students' reading growth (Torgesen et al., 2001).

The Phelps Kindergarten Readiness Scale (PKRS) is a school readiness screener. The purpose is to “assess the academic readiness of children preparatory to enrolling in kindergarten” so schools can identify preschoolers who might have developmental delays and have academic difficulties when starting school (Phelps, 2003, p. 1). In the school district where this study took place, how a student performs on the PKRS determines if the student will receive Title I Reading support at the onset of kindergarten. This study helped to determine if just the students' composite scores should be used to determine later reading achievement or if one of the subtests of the PKRS is a better predictor of later reading achievement.

## **Definition of Terms**

**Fluency** The ability to read with “sufficient speed to support understanding” (Moats & Davidson, 2009, p. 76).

**Formal Schooling** Formal schooling begins when children enter school at the compulsory education age. Formal schooling also refers to when children are being taught by a trained educator.

**Gestalt** A German word for a complete pattern, or configuration, often used as a synonym for form or shape (Köhler, 1947; Korb, Gorrell, & Van De Riet, 1989). A gestalt is an organized combination of elements into a meaningful whole (Serok, 2000).

**Phelps Kindergarten Readiness Scale (PKRS)** A norm referenced school readiness assessment developed by LeAdelle Phelps (Phelps, 2003). The assessment consists of eight subtests: vocabulary, verbal reasoning, analogies, visual discrimination, perceptual motor, auditory discrimination, auditory digit memory, and memory for sentences and stories. The subtests are grouped into three larger sections: verbal processing, perceptual processing, and auditory processing. The raw scores are then converted to a standard score that has a mean of 100 and a standard deviation of 15 (Phelps, 2003).

**Phoneme** A phoneme is the smallest unit of meaningful speech sounds that are combined with other language systems to make words (Moats, 2009a). There are between 40 and 44 phonemes in the English language (Moats, 2009a).

**Phonemic Awareness** The ability to hear and manipulate individual, smaller-than-a-syllable sounds in words, and the ability to be cognizant that those sounds are represented by letters (Adams, 1990; Moats, 2009a).

**Reading Comprehension** The hidden process of understanding what is read through making and constructing meaning from print material (Moats & Hennessy, 2010).

**School Readiness** A school's ability to accommodate the normal developmental variations of children appropriately (May & Kundert, 1997). Another view of school readiness is that of chronological age of the child because by a certain age, the majority of children can enter school and experience satisfactory progress (Gredler, 1992). Still some psychologists and educators would express that school readiness is a relative, rather than absolute, concept that depends on the demands the school personnel place on the students (Gredler, 1992).

**School Transition** Consists of actions taken by families and schools to prepare for admitting new children into the system. Schools make changes to create learning environments, make sure the children are adjusting to the new learning environments, and make sure families are able to work with the school system. One popular component of school transition is a school readiness assessment (UNICEF, 2013).

**Vocabulary** The word meanings in an individual's mental dictionary (Moats, 2009b).

### **Summary**

The reality is that not all children come to kindergarten at the same level of readiness, and some may be at-risk for later learning difficulties. Chapter I provided an overview of the research regarding reading on grade level by the end of third grade, the

differences between developmental screening measures and readiness measures, and the positive effect early intervention can have on students who were identified as at-risk. The theoretical frameworks of Gestalt theory and working memory theory guided this current research. Chapter II will review the literature related to kindergarten readiness, Gestalt theory and visual perception, working memory theory, and early literacy.



## CHAPTER II

### REVIEW OF RELATED LITERATURE

This chapter will explore the relevant research and literature related to kindergarten readiness, Gestalt and visual perception, working memory, and components of early literacy. This chapter aims to give historical information on kindergarten and school readiness theories, the different components of readiness assessments, and the way school readiness assessments are used. Gestalt and visual perception are explored as ways the human brain organizes and makes sense of the information it receives. Working memory, as a theoretical framework, explains how a function of the brain processes the information it receives. The conclusion of this chapter is a description of the components of early literacy.

#### **Kindergarten Readiness**

Kindergarten and school readiness have become political buzzwords. The No Child Left Behind Act of 2001 (NCLB) helped raise awareness for the use of universal screening instruments to identify students who might be at risk for academic failure or those students who might be in need of proactive early interventions (No Child Left Behind [NCLB], 2002). NCLB has changed kindergarten curriculum and has made it essential for schools to use a readiness test to screen incoming students. This section will examine the history of kindergarten readiness assessments, government initiatives related to kindergarten, readiness assessments and screenings, what is done with the data, problems related to screening young children, and the theories theorists use to discuss school readiness.

## **Historical Background**

Being old enough to start school is a milestone for a child; five is the magic number. School entrance age has slowly risen over the years. In the 1700s children entered reading and writing schools around age five, the age when many of them were old enough to walk to school and be away from home (Gredler, 1992). In 1890 children were allowed to enter kindergarten at age four-and-a-half and enter primary school at age six, after completing kindergarten (Gredler, 1992). For the Commonwealth of Pennsylvania, in school districts that provide kindergarten, school directors are charged with establishing the district's minimum entry age into kindergarten; minimum entry age can be no less than four years and no months before the first day of school, Pennsylvania school code states:

The board of school directors shall establish the district's minimum entry age for beginners, which may not be less than a chronological age of five years and seven months before September 1, nor more than six years, no months, before the first day of the school term of the district. The board of school directors shall permit a child of beginners' age to attend the district's first grade and may not require the child to attend kindergarten, prefirst grade, transitional class or other grade or class that is not regular first grade without parental consent. (PA.Code § 11.15, Admission of beginners)

The use of screening instruments for incoming students has been common practice in the United States for over 50 years (Gredler, 1992). Originally such tests were given to beginning first graders to determine if a student was likely to have difficulty learning to read (Gredler, 1992). The first screening measures were based on the medical

model of identification-and prevention/treatment-sequence (Gredler, 1992; May & Kundert, 1997; Richardson, Casanova, Placier, & Guilfoyle, 1989). The problem with using a medical model of transition to school and of screening instruments is that it implies a deficit model for failure to meet school expectations instead of focusing on what changes might need to be made to improve educational situations for the children, families, and communities (Petriwskyj, 2014). Now many screening instruments are used to predict academic outcomes or to evaluate for potential placement in special education (Gredler, 1997; Shepard, 1997). A survey from the late 1980s indicated that in seven states, over 50% of the school districts required screening of incoming kindergarten students, and five states required an end of kindergarten exam or a first-grade entrance exam (Gredler, 1992). The kind of readiness test schools administer is mostly a local phenomenon with little or no control by state agencies.

With the change in kindergarten curriculum to more of an academic emphasis, instead of a developmental, socializing, and play emphasis, more is being done by federal and state government to help ready children for school (Strauss, 2014). In 2002, a Bush administration initiative - Good Start, Grow Smart - pushed for states to create standards or guidelines for children ages three to five. It was recommended that the guidelines created align with the K-12 standards that were already in place. In continuing with this trend of federal initiatives, the Obama administration included five billion dollars in new funding for programs for children of lower social-economic status and programs for children with special needs (Daily, Burkhauser, & Halle, 2011).

While the influx of money to states has helped states identify the skills and abilities preschools need to develop, it has not helped states to develop a system of

tracking readiness statewide or develop a single readiness assessment (Daily, Burkhauser, & Halle, 2011). A 1999-2000 survey of state education departments found that 13 states mandated specific procedures for screening; five states mandated screening but allowed local control to determine procedures. Twenty-six states had local, not statewide, control over procedures, and 16 states had statewide procedures being developed for determining readiness (Panter & Bracken, 2009). Many of these local assessments had almost no outside control and were not examined by outside state agencies. These assessments were completed with the intention of identifying students for special education referral or for instructional planning, but were used for both. It was also reported that the results from the assessments were used to deny school entry (Shepard, 1997). Panter and Bracken (2009) reported data from the 1998-1999 Early Childhood Longitudinal Study regarding kindergarten readiness assessment testing. The report suggested that 61% of surveyed schools administered entrance or placement tests to incoming students. Assessment data were primarily used to determine children's needs, 47%, and to guide instruction, 52%. Assessment data were less often used to delay entry to school, 27% (Panter & Bracken, 2009).

With historical background on readiness and knowledge of how readiness assessments are used, it is important to have an understanding of what school readiness includes, some of the definitions of school readiness, and the different components of readiness. Definitions of school readiness vary depending on which theorist the researchers use for their theoretical base, along with other factors (Kagan, 1990). Even in polite conversation with other teachers or parents, the topic of school readiness is considered "contested and controversial" (Dockett & Perry, 2009 p. 20). When thinking

about school readiness, parents often try to decide if their child is ready for school, but Stipek's idea of readiness puts the onus of readiness on the school (Stipek, 2002). Stipek believes that the focus of school readiness should be making schools ready for the diversity in children and helping tailor learning opportunities for all children instead of making the child "ready" for schools (Stipek, 2002).

### **Readiness Components**

The US National Education Goals Panel identified three components of school readiness: 1) Children's readiness for schooling, making sure students are ready to participate in classroom and learning experiences. 2) School's readiness for children, school officials responding to the needs of all the children who enrolled. 3) Family and community supports and services that contribute to children's readiness, promoting environments in home and the community that support learning (Dockett & Perry, 2009). Kagan, Moore, and Bredekamp (1995) wrote about five dimensions of children's readiness for school. They include physical well being and motor development, social and emotional development, approaches to learning, language development, and cognition and general knowledge. Kagan, Moore, and Bredekamp's five dimensions can be combined so the five dimensions are sub-components of the US National Education Goal's three components (see Table 1).

Table 1

*US National Education Goals and Kagan, Moore, and Bredekamp's Five Dimensions*

US National Education Goals	Kagan, Moore, and Bredekamp's Five Dimensions of Children's Readiness				
Children's readiness for schooling	Physical well being and motor development	Social and emotional development	Approaches to learning	Language development	Cognition and general knowledge
Schools' readiness for children	Approaches to learning	Language development	Cognition and general knowledge		
Family and community supports	Physical well being and motor development	Social and emotional development	Approaches to learning	Language development	Cognition and general knowledge

To help with the process of becoming school ready with regard to the US National Education Goals and the five dimensions of children's readiness, Sahin, Sake, and Tuncer (2013) have suggestions for parents, children, teachers, and school practices. Parents can assist in the process of getting their children ready for school by helping develop positive attitudes towards school and education, by being knowledgeable about preschool education and primary education, and by taking care of their children. Children can be effectively ready for school by attending preschool before starting school. For teachers, Sahin, Sake, and Tuncer mainly aim their suggestions at preschool teachers to develop and enhance all developmental domains of children, plan appropriate readiness activities, and visit and communicate with first grade teachers. Sahin, Sake, and Tuncer reported that teachers in primary education schools have varying views on what are important areas for being school ready, but eight teachers in Turkey stated that preschool attendance is important and should be compulsory (2013).

For students who come to kindergarten already identified as needing special accommodations or specialized instruction, or have an individualized education plan (IEP), schools are encouraged to design transition activities to prepare the child and families for attending school. Vicker (2009) recommended that families with students with autism create time before the summer to meet with the school's director of special education and then give a list of specific special needs that the students may have such as the need for sensory breaks or to give a list of activities that seem to tire the students. During the summer before students return to school, the students with special needs and their families should tour the buildings, meet with the teachers, and play on the playgrounds to help the students with special needs transition into the new school environment (Vicker, 2009).

### **School Readiness Assessments**

There are two types of assessment instruments that are used with early childhood age children: developmental screening measures and readiness measures (Gredler, 1997; Panter & Bracken, 2009). This system was derived from the practice of early medical screening: identify the problem and prevent further complications and/or treat the problem sequence (Gredler, 1992; May & Kundert, 1997; Richardson, Sasanova, Placier, & Guilfoyle, 1989). Both assessments have their place and purpose but sometimes are talked about interchangeably. For clarity in this dissertation, when developmental screening, or just screening, is used, it is referring to the term that will be used to describe an assessment that considers a child's potential to acquire new skills, examine motor coordination, memory of visual sequences, verbal expression, language comprehension, and social-emotional status (Gredler, 1997; Panter & Bracken, 2009). When the purpose

of an assessment is to measure predictive school success by examining cognitive skills, language, motor skills, copying shapes, concept development, and perceptual processes, it will be referred to as readiness (Gredler, 1997; Panter & Bracken, 2009). Development screening measures are designed to identify more subtle developmental problems. Screening tests are only preliminary, and many times shorter, to a more thorough assessment. Screening tests do not have to meet the same rigorous criteria as developmental assessments (Shepard, 1997). Developmental screening is used to help identify students who might need more in-depth testing for gifted and handicapped, grouping students in kindergarten classes, school readiness placements, and/or planning and individualizing instruction (Rafoth, 1997). It is not appropriate for the purpose of a screener to deny school entry of certain children. Such purpose would be to deny the students the constitutional right to receive a free education (Rafoth, 1997). Screening programs today have adopted a model which seeks to identify students who, if they do not receive special services, are at risk for school failure (Pavelski-Pyle, 2002). This purpose of screening begins to blur lines with the purpose of readiness measures.

Assessment validity can be affected if an assessment measure is not being used for its intended purpose (Shepard, 1997). Certain guidelines need to be followed closely by schools administering screening measures or readiness measures to insure the results are valid. Schools should first choose proper program goals. Once these goals are determined, then schools need to match the assessment choices to the goals of kindergarten or first grade curriculum. Assessments assess skills important to the school's programs and include tasks that are similar to tasks that will be completed in the classroom (Rafoth, 1997). It is also important that schools ensure, as much as possible,



that the assessments have an adequate standardized sample, are being given in a standardized way, are low in cost, contain adequate validity and reliability, and that there is a follow-up evaluation structure in place (Gredler, 1997; Rafoth, 1997).

The readiness assessment used in this current study was the Phelps Kindergarten Readiness Scale (PKRS) (Phelps, 2003). The PKRS is an individual measure and requires approximately 20 minutes to administer. There are three domains within the PKRS which examine the student's verbal processing, perceptual processing, and auditory processing to predict if the student is at-risk for later academic difficulties (Phelps, 2003). A study by Augustyniak, Cook-Cottone, and Calabrese (2004) investigated the predictive validity of the PKRS and later academic achievement for 148 children with school records from kindergarten that completed the New York State fourth-grade language arts and mathematics exams. The results indicated that the PKRS domain scores and the Total Readiness Score correlated significantly with later academic achievement ( $p < .01$ ). Duncan and Rafter (2005) had similar results when they examined the concurrent and predictive validity of the PKRS using the Woodcock-Johnson III Brief Intellectual Ability Score. All three domain scores were significant with coefficients between .41 and .60 ( $p < .0001$ ).

Pavelski-Pyle (2002) developed a checklist of suggestions for school psychologists to help develop a best practice approach to readiness (pp. 70-71) (see Table 2).

Table 2

*Pavelski-Pyle Checklist*

Category	Description
Technical adequacy	Review the assessment's validity, sensitivity, specificity, and reliability
Multiple sources	Information on students includes family attributes, strengths, and context
Multiple raters	Information is gathered from family members, teacher, and other significant individuals in the child's life
Multiple gates	Students are assessed on multiple occasions, over time, because of significant changes that can occur over time in a child's development, as well as changes in family status
Families as partners	Include families in the information gathering stage and also as key members on the decision-making team
Cultural sensitivity	Adopt a more holistic approach to understanding disability, resiliency, and vulnerability within the broader socio-economic, religious, and cultural systems
Coordination	Help families connect with community agencies and services
Multivariate decision making	Because no one condition or factor leads to a predictable outcome, it is important that the multiple sources of evidence are given different weights in decisions made over time

For readiness assessments, there are four possible outcomes:

- 1) Students predicted to be at-risk who actually develop problems,
- 2) Students predicted to be at-risk who did not develop problems,
- 3) Students predicted to be not at-risk who actually develop problems, and
- 4) Students predicted to be not at-risk who did not develop problems. (Rafoth, 1997)

While the instruments used as readiness measures and developmental screeners have some potential positives, such as helping to identify students who need further evaluation, helping teachers and school officials group students for kindergarten, and/or helping school officials identify students who might need extra support and help tailor programs

to help recover the student, they do contain potential negatives as well. Time is one of the first, and largest, problems with giving four-, five-, or six-year-old students an assessment three to five months before school starts; children at this age change significantly in short periods of time. Testing so early could reflect behaviors in children that may not remain present a few months later, identify an excessive number of children as at-risk for later learning problems, and be considered a way to reinstitute tracking of students (Gredler, 1997; Shepard, 1997; Sparrow, Blackman, & Chauncey, 1983). The results of any before school screeners or readiness measures should be considered tentative as students have not been in a formal learning environment or experienced the demands of the environment (Gredler, 1992).

Some states are no longer assessing kindergarten students before they enter kindergarten and instead are giving readiness assessments during the first nine weeks of school. The state of Florida uses two screening instruments to screen all kindergarten students attending public schools during the first 30 days (Florida Department of Education, 2013). One is a developmental screening tool, the Work Sampling System, and the other is a screening task. The Work Sampling System is a developmental authentic performance assessment. The Work Sampling System was designed to allow all teachers to use daily classroom experiences and activities as assessment opportunities (Florida Department of Education, 2013). The screening task consists of three components: Alphabetics, Oral Language, and Comprehension (Florida Department of Education, 2013).

Ohio's kindergarten readiness assessment is similar to Florida's (Ohio Department of Education, 2016). Kindergarten students attending public school in Ohio

participate in the Kindergarten Readiness Assessment. The assessment window is from the first day of kindergarten until November first. Teachers are to use the assessment data to identify strengths and weaknesses of each child and then to plan instruction. The assessment results are not to be used to deny or delay entering kindergarten nor are the results to be used to force a student to withdraw from kindergarten. The activities used to assess appear to be ordinary activities found in a kindergarten classroom. A teacher could be facilitating a guided activity or observing students playing on the playground to obtain assessment data (Ohio Department of Education, 2016). The Kindergarten Readiness Assessment also assesses students' social abilities such as sharing and working with other students (Ohio Department of Education, 2016).

Parents might be reluctant to send their young five-year-old students to school because they fear they are too young, are too immature, or are not ready for all the demands that will be placed on the young children and so parents may hold children from entering school until the following year. This practice is referred to as academic “redshirting” after the practice at the collegiate level of holding athletes out of play for a year to develop physical strength and improve skills (Katz, 2000). If redshirting can have positive outcomes for athletes, it would seem that the same philosophy would work for children – hold the child back one year in order to develop academic or social strengths. Athletes who are redshirted still participate in practice and trainings, but not all redshirted children participate in academic or social practices: going to preschool (Lincove & Painter, 2006). Research on redshirting and the age children start kindergarten, either five or six, and later school success is mixed. The same pieces of research have been used to make a case for both sides of the debate (Katz, 2000). A practice of redshirting could

result in problems with kindergarten screenings if, during the year held back, the children are not in a preschool or academic setting. For some children there might be an initial benefit to redshirting and their incoming screening scores might be higher than the scores for children who were not held back, but this academic advantage disappears by third grade (Livcove & Painter, 2006; Stipek, 2002). It might be better for schools and parents to consider children's behavioral age, which is generated using readiness screenings and assessments, than chronological age (Gredler, 1992; May & Kundert, 1997). One of the ways behavioral age has been assessed over the last few years has been to evaluate how a child perceives concepts, especially wholes, or Gestalt.

### **Gestalt and Visual Perception**

Gestalt theory helps to explain some of the concepts surrounding visual perception, though originally, when the Gestalt theory was first established, the facts around sensory organization were not given the central position they have now obtained (Köhler, 1947). Gestalt theory and psychology have been used to help explain how our brains interpret and perceive visual space: how our brains organize space. Gestalt theory and psychology have also been used to explain visual-motor connection, intelligence, learning, and memory (Bender, 1938; Köhler, 1938; Köhler, 1947; Serok, 2000; Tolor & Schulberg, 1963). *Gestalt*, the German word for a complete pattern or configuration, is often a synonym for the words form or shape. The concept of Gestalt comes from the works of Wetheimer, Koffka, and Köhler (Köhler, 1947; Korb, Gorrell, & Van De Riet, 1989). There is no single word translation for Gestalt in English. The main principle of Gestalt psychology is that how an object is perceived is determined and understood by the location of the object (Zakia, 2002). One example might be that a circle touching a

diamond is perceived as one object, or gestalt, because of the close proximity of the two shapes. If the shapes are separated with enough space between them, the circle and diamond can now be perceived as two separate objects (Bender, 1938). Consideration is given to the whole instead of the individual components. The physically touching circle and diamond are considered a single whole, but when separated, they become two separate objects.

Gestalt theory explains that objects and their pieces are organized into patterns, or gestalts. Gestalt theorist Köhler explained that the visual area of the brain perceives an object in visual space (Köhler, 1938; Köhler, 1947). The human brain searches the environment for organized patterns to help make sense of the world around it. These patterns help the brain to comprehend the experience and help the brain to reduce tension. If too much information is presented at one time, the brain tries to group the information into meaningful pieces and patterns (Zakia, 2002). Once the pieces become organized, they become a meaningful, whole gestalt (Serok, 2000; Zakia, 2002). The gestalt helps the mind make sense of what is happening, what is seen, and what is being experienced.

The parts that create a gestalt are divided into two major groups: primary and secondary elements (Serok, 2000). Both elements serve specific functions in the formation of a gestalt. Primary elements are the components that are fundamental and necessary to the formation of the gestalt. Examples of primary elements would be a circle, the four sides of a square, the people living together forming a family, or the whistle, cars, caboose, and engine of a train. Without the primary elements, the structure, definition, and inherent meaning of the whole, the gestalt, would be difficult to comprehend. Secondary elements are not critical to the basic definition of gestalt. The

secondary elements are those that add to the richness, color, texture, and details of the gestalt. Secondary elements might be the shading around the circle to make it appear three-dimensional, the details added to a facial drawing, and the color of the square (Serok, 2000). To determine the primary and secondary elements, the person is required to look and observe the object.

It is important to make the distinction between the primary and secondary elements of an object when looking at an object and reproducing it either by using three-dimensional shapes or by making a two-dimensional drawing. The shift from looking and manipulating an object to reproducing the object involves the process of visual motor integration (Bender, 1938).

Visual motor abilities vary from age to age as children mature. The first motor activity for young children is scribbling, and the significance of the scribble becomes clearer after it is produced. The patterns young children are able to see first are difficult for them to reproduce, but through motor experimenting and practice, children can copy the correct pattern. At about three years of age, children can copy a circle; at four years of age they can make a cross. Around the age of five, children start to show several advance abilities; they can now over-lap shapes and create the star shape (Bender, 1938). Many of the children in this age group, three- to five-years-old, are considered pre-readers. Reproducing a rotated shape into something new, such as rotating a square shape 90 degrees to draw a diamond, or drawing an object in a reduced size, is more difficult for students to complete, especially for younger children (Bender, 1938; Harriman & Harriman, 1950). Four-year-olds are considered to have normal intelligence on the Stanford-Binet Test of Intelligence if they can copy a square. If the square is turned to

make a diamond, the four-, five-, and six-year-olds may have a difficult time reproducing the diamond, but seven-year-olds should be able to reproduce the diamond (Bender, 1938).

Teachers need to have knowledge of their students' visual motor ability, as the level of ability has been shown to predict later learning disruptions and school achievement (Koppitz, 1958; Koppitz, Mardis, & Stephens, 1961; Koppitz, Sullivan, Blyth, & Shelton, 1959). The Bender Gestalt Test is a popular assessment to determine visual motor ability. One study to determine if the Bender Gestalt Test could differentiate between students whose potential achievement in reading, writing, and spelling is above average or below average shows several results (Koppitz, 1958). Some components of the aspects of the shapes reproduced such as rotation, more than three angles in curves, substitution of circles and dashes for dots differed significantly ( $p < .05$ ) between the above average students and below average students (Koppitz, 1958). The above average students tended to make fewer mistakes; however, the below average students tended to make more mistakes indicating that the Bender Gestalt Test can be used to differentiate between students who are more likely to make satisfactory school achievement and those who are likely to have learning difficulties (Koppitz, 1958). Visual motor ability, as indicated on the Bender Gestalt Test, has been shown to predict later achievement on the Metropolitan Achievement Test ( $p \leq .01$ ) (Koppitz, Mardis, & Stephens, 1961) and end-of-year first grade achievement (Koppitz, Sullivan, Blyth, & Shelton, 1959).

Art teachers have claimed that when students are given increased general experiences in art those experiences enhance certain visual skills (Wiley, 1984) and academic achievement (Cirillo, DeMurro, & Young, 2008; Gibson & Larson, 2007;



Vicars & Senior, 2013; Ward, 2014). Haanstra (1996), in a quantitative review of the effects of art education on visual-spatial and aesthetic perception, found that the highest average effect size on visual-spatial ability was achieved with young children. Haanstra (1996) also found in studies involving training in visual-spatial abilities, programs with heavy emphasis on perceptual training only made significant difference with kindergarten children. Gardiner, Fox, Knowles, and Jeffrey (1996) concluded in their study of first graders that learning art skills may force students to stretch their mental capabilities; this could be useful in other areas of learning. In the Gardiner, Fox, Knowles, and Jeffery study (1996), 83% of the kindergarten students in the experimental group were behind the children in the control group in having scores at least at the national average. Seven months after the treatment, the experimental group had caught up to be statistically equal on reading and were ahead on learning in math ( $p < 0.05$ ).

Beyond the elementary school years, visual motor ability has also been shown to predict geometry ability in high school students. Goldsmith, Hetland, Hoyle, and Winner (2016) examined the effects of two years of intensive visual arts training in high school on the growth in reasoning that calls upon visual-spatial thinking. They found that the students who were already more advanced with visual art skills on the pretest, namely students who had still life drawings that were proportional, could draw the still life from another perspective without moving it, and could add the correct shading on an object based on the location of a nonexistent light source, continued to perform better on the geometry tasks than those students who were not as proficient (Goldsmith, Hetland, Hoyle, and Winner, 2016). Beyond high school, Chishti and Jehangir (2014) found that the effects of visual arts exposure at the elementary level could be found later in

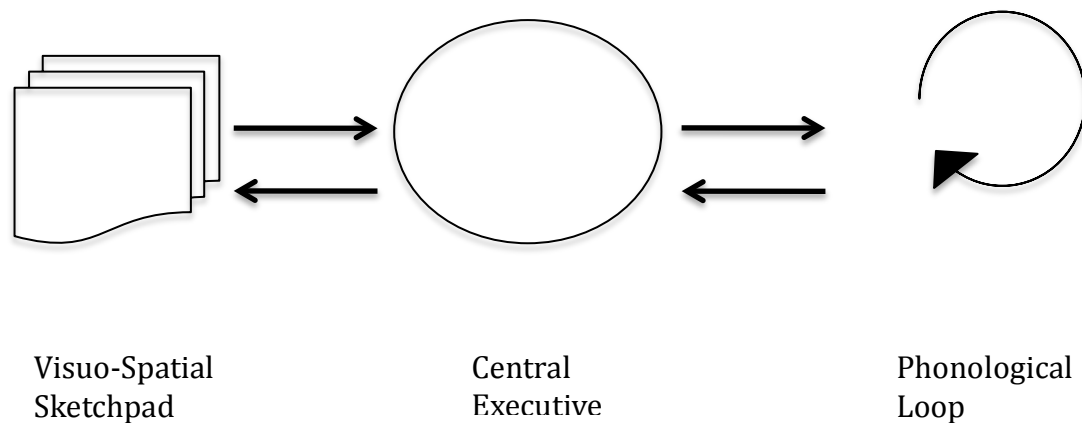
adulthood. Examining college age students, participants who received visual arts instruction at the elementary level had better results on problem solving tasks in adulthood than those who had not received visual arts instruction ( $p < .01$ ) (Chishti & Jehangir, 2014).

Gestalt and visual perception help to explain how a brain interprets what the brain is seeing. The working memory process of the brain relies on what is being seen to assist the student in learning.

### **Working Memory**

Alan Baddeley, along with various colleagues, is the name most often associated with the theory of working memory. Working memory is a short-term memory system for the temporary processing, holding, and manipulation of information during the performance of a range of cognitive tasks such as comprehension, learning, and reasoning (Baddeley, 1986; Baddeley & Hitch, 1974; Gathercole & Baddeley, 1993). This is not to be confused with layman's thoughts on short-term storage (Baddeley & Hitch, 1974). Working memory is utilized in everyday cognitive activities such as reasoning, language comprehension, long-term learning, and mental arithmetic (Gathercole & Baddeley, 1993). It has also been asserted that the comprehension of both written and spoken language depends on some form of working memory (Baddeley, 1986). Working memory consists of three components: the central executive, phonological loop, and the visuo-spatial sketchpad (see Figure 1) (Baddeley, 1986; Gathercole & Baddeley, 1993). The remainder of this section will focus on the phonological loop and the visuo-spatial sketchpad. The central executive component is considered the crucial component of working memory, but, as Baddeley (1986) said, there "has been little said about it" (p.

224). Tasks that have suggested central executive use are mental arithmetic, recollection of events from long-term memory, reasoning, along with controlling information transmission between other parts of the cognitive system, and allocating inputs to the two slave systems—phonological loop and visuo-spatial sketchpad (Gathercole & Baddeley, 1993).



*Figure 1.* The three components of working memory and how they interact when encountering information. (Kibby, Marks, Morgan, & Long, 2004)

The phonological loop slave system of working memory, as the name suggests, helps in processing and storing verbal language material (Baddeley, 1986, Gathercole & Baddeley, 1993). There are two sections of the phonological loop: the phonological store and the articulatory loop. Active phonological information is maintained for about two seconds in the phonological store, and the information is refreshed through the articulatory loop (Baddeley, 1986). The phonological loop is what is activated when one repeatedly spells a word sub-vocally while trying to find it in a dictionary.

Visually presented information will only enter the phonological loop if it can be articulated. An example would be reading and remembering a telephone number from

the phone book. The material is presented visually as there is not a person reading the number to you from the book. The person might then rehearse the number sub-vocally in a hushed voice.

When the information to be processed is spatial in nature, the visuo-spatial sketchpad (VSSP) is the working memory slave system that is called upon. The VSSP is well adapted to temporary storage of spatial information (Baddeley, 1986). Similar to the phonological loop system where storage and processing information can be disrupted by listening or speaking tasks, studies have shown the VSSP process can be disrupted by spatially determined motor tasks (Baddeley, 1986; Godijn & Theeuwes, 2012; Keogh & Pearson, 2011). The adult participants in these studies demonstrated a reduction in completing VSSP tasks if there was a distracter in place. Distracters could include fixating eyes on a specific spot, reciting numbers or letters while trying to observe a figure, or saying or doing something while observing and trying to remember spatial information.

Both the phonological loop and the visuo-spatial sketchpad play an important role in reading, though how much of a role each plays in reading changes as readers mature (Gathercole & Baddeley, 1993). During the beginning-to-read years of four and five, the visuo-spatial sketchpad does more of the processing than the phonological loop. This is because children at this age do not utilize the phonological loop to store the sequence of two or three pictures but instead use the visuo-spatial sketchpad (Gathercole & Baddeley, 1993). In a meta-analysis of 161 studies of the relationship between visual perceptual skills and reading achievement, visual perceptual skills appeared to be most predictive of reading achievement in kindergarten to grade three (Kavale, 1982). Similarly in six-to

11-year olds, spatial working memory was moderately correlated with both reading accuracy and comprehension overall but was not predictive of comprehension once age and spatial ability had been partialled out (Oakhill, Yuill, & Garnham, 2011).

### **Early Literacy**

In 2000 the National Reading Panel (NRP) released their report on effective reading programs. After examining thousands of research articles on early and emergent literacy, the committee reported what they considered the five essential components of an effective reading program: phonemic awareness, systematic phonics instruction, fluency, vocabulary, and comprehension (National Institute of Child Health and Human Development, 2000). In their examination of hundreds of reading studies, it was clear that students who received reading instruction or participated in reading programs that included phonemic awareness, systematic phonics instruction, fluency, and ways to enhance comprehension and vocabulary had better outcomes on reading assessments than those students who did not participate in such programs (National Institute of Child Health and Human Development, 2000). Before being proficient readers or early readers can be discussed, it is important to pause and take a closer look at what emergent readers need to accomplish on their way to becoming successful readers. Before students can become proficient readers in the intermediate grades, they must have an understanding of phonemic awareness, have systematic phonics instruction, have opportunities to increase fluency, and have developed comprehension strategies.

### **Phonemic Awareness**

Phonemic awareness is the ability to hear and manipulate individual, smaller-than-a-syllable, sounds in words, and to be cognizant that those sounds are represented by

letters (Adams, 1990; Moats, 2009a). Phonemic awareness is a skill under the larger phonological awareness umbrella. Phonological awareness is the ability to identify, think about, and manipulate parts of words (Moats, 2009a). Phonological awareness includes the following skills: identifying syllables and individual words in spoken language, recognizing rhymes, and producing rhymes. Students who lack age-appropriate phonological awareness ability have been shown to become struggling readers because they have a difficult time matching letters to sounds in pseudoword task (Lipka, Lesaux, & Siegel, 2006). While students who lack phonological awareness have been shown to struggle as readers, they can be trained in phonological awareness skills. In a study of kindergarten students, the students considered at-risk who were given training and lessons in phonological awareness significantly outperformed the control group ( $p < .01$ ) on post test phonological awareness tasks (Schneider, Ennemoser, Roth, & Küspert, 1999). Skills in phonemic awareness include the following: onset-rime, phoneme segmentation, phoneme blending, phoneme deletion, and phoneme substitution (Moats, 2009a). Phonemic awareness ability has been shown to be a strong predictor in later reading success (Adams, 1990; Engen & Høien, 2002; Frost, 2001; Juel, 1988; Marston, Pickart, Reschly, Heistad, Muyskens, & Tindal, 2007; Morris, Bloodgood, & Perney, 2003; Muter, Hulme, Snowling, & Stevenson, 2004; Nation & Hulme, 1997). Mann (1993) found that first grade students' kindergarten phoneme segmentation and invented spelling assessments scores were significantly related to their current reading ability ( $p < .01$ ). The same study also found significant correlations between phonemic segmentation, invented spelling, and students' IQ (Mann, 1993). Students who entered

school with higher phonemic awareness scores perform better on reading assessments than students with lower phonemic awareness scores (Adams, 1990; Moats, 2009a).

There are many tasks that are labeled phonemic awareness. Adams (1990) divided the tasks into six categories: phonemic segmentation, phoneme manipulation, syllable-splitting, blending, oddity, and knowledge of nursery rhymes. In the hierarchy of skills, the hardest would be segmentation and manipulation; the easiest would be oddity and nursery rhyme knowledge. In a study of first, third, and fourth graders, it was found that first grade students were better at onset-rime segmentation than phonemic segmentation ( $p < .001$ ), third grade students performed similarly on both tasks, and fourth grade students performed better on phonemic segmentation than onset-rime segmentation ( $p < .06$ ) (Nation & Hulme, 1997).

Phonemic, or phoneme, segmentation is the ability to separate a word into its individual phonemes (Adams, 1990; Moats, 2009a). According to linguists, English has 40 to 44 phonemes (Moats, 2009a). Phonemes are speech sounds that are combined with other language systems to make words (Moats, 2009a). In the word “cat” there are three phonemes: /c/, /a/, and /t/. In “cat”, each phoneme corresponds to a letter, but that is not always the case. In the word “light” there are also three phonemes: /l/, /ī/, /t/ - even though there are five letters. To practice phonemic segmentation, students usually start by segmenting larger chunks of words instead of starting with the individual phonemes. It would not be uncommon for students to begin by segmenting compound words (“cupcake” segmented into “cup” and “cake”), segmenting syllables of non-compound words (umbrella segmented into “um-brel-la”), segmenting onset and rime (run into “r-un”), segmenting individual phonemes of single syllable words, and then segmenting

multisyllabic words. Phonemic segmentation is the skill students later use when trying to spell words and use their orthographic system.

Students who do well on segmentation assessments are more likely to do well on later reading assessments as are students who do well on the oddity or nursery rhyme assessments (Adams, 1990). The main difference between the segmentation group and nursery rhyme group is the age at which students are assessed in these areas. The nursery rhyme and oddity assessments are done with younger, preschool age children before they receive any formal reading instruction, and the segmentation and manipulation assessments are completed with children who already have begun formal reading instruction (Adams, 1990).

Phoneme manipulation can include removing initial or final phonemes or substituting phonemes. An example of removing initial phoneme would be asking a student to say “bike” without the /b/ (“ike”). Removing a final phoneme would be asking students to say “state” without the final /t/ (“stay”). A harder task in phoneme removal is removing a medial sound (like “bust” without the /s/, “but”). Phoneme manipulation also includes removing the initial or final phoneme and substituting it with a different phoneme: take the /b/ from “bike” and make it a /p/ (“pike”).

Syllable-splitting is a skill that on the phonemic awareness hierarchy would be listed as an easier skill than phonemic segmentation. Syllables are the sounds in words organized around a vowel. Syllables may or may not have consonants before or after the vowel (Moats, 2009a). Syllables are large sections of sounds and, therefore, are easier for students to orally segment words into them (Adams, 1990). Syllable-splitting is a helpful skill when students are trying to spell a multisyllabic word. For example, if



students are trying to spell *basketball*, first, students would segment, or split, the word into three syllables (bas-ket-ball). Then students would segment each syllable into its individual phonemes. In the example of *basketball*, students would start with the “bas” syllable, segment the syllable into the phonemes /b/ /a/ /s/, and then write the letter(s) that match the phonemes.

If phoneme segmentation is the gateway to spelling, then phoneme blending is the gateway to reading. Phoneme blending is the ability to take individual phonemes in a word and put them together into the word (Moats, 2009a). Students practice phoneme blending when they use the decoding strategy “sound it out.” Students give the phoneme for each letter, or group of letters, they read, and then try to put these phonemes together into the correct word. For example, when students come across the word “scat,” they would probably sound it out like /s/ /c/ /a/ /t/, and then blend some phonemes first (like /sc/), and then blend all the phonemes together to say the word (Adams, 1990; Moats, 2009a).

### **Systematic Phonics Instruction**

Phonics instruction is comprised of lessons that teach the letter(s) sound(s) correspondences. In English there are 26 letters, 21 consonants and five vowels, and these letters can be put into other combinations to make 40 to 44 sounds in words (Moats, 2009a). In order for learners to decode words proficiently and effectively, they need to be able to quickly know and recall what sound the letters in the word make in order to determine what to say. Systematic phonics instruction and sequential phonics instruction are used to make sure that students are receiving correct phonics instruction using step-by-step procedures and routines within a scope and sequence that makes sense for the

grade level and reading level of the students (Moats & Hall, 2010). In kindergarten, using systematic and sequential phonics would look like spending time working on learning the individual letter names and then the dominant sound the letter represents (/k/ for *c* instead of /s/ and /g/ for *g* instead of /j/). After learning a few letters and sounds, the students would begin putting those letters together to make small words such as vowel-consonants (vc) words (“am”) and consonants -vowel- consonants (cvc) words (“map”) (Bear et al., 2009). Within phonics instruction there is instruction through analogy or synthetic. Analogy phonics is teaching students common consonants and common rimes then combining the visual rime with the common consonants to read words (Finnegan, 2012). Synthetic phonics is teaching students individual letter sounds and how to blend those letters and sounds into words (Finnegan, 2012). In a study of five-to twelve-year-old students with significant cognitive disabilities, there was a significant difference between adjusted mean scores between the students receiving synthetic phonics and the control group (Finnegan, 2012). Students who received the synthetic phonics treatment had significantly higher scores on the transfer word identification task than the analogy or control group (Finnegan, 2012). This outcome suggests that students taught phonics using a systematic and synthetic method can better decode unknown words than students taught in an unsystematic way or through analogy.

## **Fluency**

The act of reading, and listening to someone read, can be very difficult when there is no fluency. Fluency in reading is the ability to read with “sufficient speed to support understanding” (Moats & Davidson, 2009, p. 76). Allington (2006) also described reading fluency as expressing the meaning in the text with an appropriate voice or with

prosody. Students who read text fluently have been shown to comprehend the story better than students who do not read fluently (Pearce & Gayle, 2009). The results of a study of fifth grade students supports the theory that accurate, fluent reading frees cognitive energy that can be diverted to reading comprehension (Klauda & Guthrie, 2008). The reading fluency and reading comprehension connection can be found as early as kindergarten. In a study of kindergarten students, text reading fluency ( $p = .003$ ), along with listening comprehension ( $p = .005$ ), were uniquely related to reading comprehension (Kim, Park, & Wagner, 2014).

In order to read fluently, students need to be able to quickly decode words with automaticity and prosody (Applegate, Applegate, & Modla, 2009). Automaticity is when a learned skill is performed without conscious effort, automatically, and prosody is using correct phrasing, intonation, and rhythm when speaking (Moats & Davidson, 2009). In a reading task, a student demonstrates good control over automaticity and prosody by reading a text in a way similar to how the text would be spoken instead of a way that sounds like it is a struggle. Automaticity and prosody typically are present in students' oral reading after students have a strong foundation of the letter-sound correspondence and have memorized some sight words—as it is developmentally appropriate (Kim, Park, & Wagner, 2014). Before students can fluently read connected text, they must first be fluent at the individual phoneme level, then fluent at the syllable/rime level, next fluent at the whole word level, then fluent at the phrase level, and then, finally, at the sentence level (Adams, 1990; Moats & Davidson, 2009). While fluency is usually thought of as reading connected text, fluency ability can be assessed before students are able to read words.

One of the first fluency assessments given to students is a letter naming fluency test, like the DIBELS Letter Naming Fluency subtest (Good & Kaminski, 2002). Along with phonemic awareness, basic fluent letter knowledge has been shown to be the strong predictor for early reading achievement (Adams, 1990; Moats & Hancock, 2012). Two reasons letter name knowledge may help predict reading achievement are 1) it provides students with a decoding strategy, and 2) it provides a measure of visual-phonological associative learning, a skill that has been shown to predict individual differences in reading skills (Hulme & Snowling, 2013). The ability to name uppercase and lowercase letters is the single factor that accounts for 25 to 36 percent of the variation in reading ability at the end of first grade (Adams, 1990). A rationale given for teaching letter names is that students have a label for a to-be-learned concept. The idea is that if students fluently know the names of the letters, such as being able to sing the alphabet song, they are able to connect the sounds of the letters to the visual forms and names while reading and writing. Another name for this is Rapid Automatic Naming, or RAN.

In kindergarten, RAN would include letter names and letter sounds. RAN assessments many times consist of rows of letters that are assessed by timing participants to see how quickly they can identify the letters. RAN assessments may also include naming numbers, colors, or pictures in a row, or even letters with participants giving the letter sounds. RAN has been shown to predict reading ability of the student (Compton, DeFries, & Olson, 2001; Litt, 2010; Savage et al., 2005). Students who have deficits in RAN seem to have a difficult time with tasks that require fast and fluent responses when compared with students without RAN deficits (Compton, DeFries, & Olson, 2001). Students who receive training in RAN do not seem to do significantly better on RAN

tasks than students in the control group, but as students received more instruction in reading, RAN scores increased (Litt, 2010). It would seem to make sense that as students become more proficient and fluent readers, they become better at identifying letters, tracking across a line, and successfully completing a return sweep to read the next line.

At this point in a student's schooling, reading instruction now includes a visual aspect and not just oral and verbal aspects. The action of teaching print and return sweep requires the student to use visual perceptual skills. Visual perceptual skills are essential in letter learning, and visual discrimination is essential in the learning-to-read process (Woodrome & Johnson, 2009).

While many aspects of language, such as speaking and listening, are natural and learned without any formal teaching, reading is not (Moats & Tolman, 2009). When students begin to practice their phonics skills while reading, it is important for the teacher to select decodable texts. Decodability of text is a critical characteristic of early reading since it increases the likelihood of a student's ability to use strategies to decode the words (Cheatham & Allor, 2012). Many times, these decodable texts do not have complex story structure because the goal is to have students practice decoding strategies. An example of decodable text would be:

I have a bat.

Can you play?

Nat can. Sam can.

Cam and Pam can.

Sam can bat.

"Hit it, Sam! Hit it!"

Can Nat bat?

“Pop it, Nat! Pop it!”

Pit, pat. It is rain! (Helfer, nd)

The skills in this passage are to practice decoding short a, short o, short i, initial /b/ and /l/, and review some sight words. Students are focusing on decoding the words with the targeted phonics skills and not the story. This kind of reading is more of a visual task than a comprehension task. The difference is that the students are asked to discriminate between visual forms of letters, where students have to access visual-spatial memory, and not use a comprehension strategy to decode most of the words.

Visual-spatial memory is a right hemisphere brain activity while reading is a left hemisphere brain activity (Zascavage, McKenzie, Buot, Woods, & Orton-Gillingham, 2012). In early reading development, the right brain hemisphere is dominant (Woodrome & Johnson, 2009) and supports a reported positive correlation between visual discrimination ability and reading achievement with beginning readers (Feagans & Merriwether, 1990). Kaval and Forness (2000), also reported that visual discrimination appears to be a most useful visual skill indicator of reading ability, even after accounting for IQ. This association appears to be stronger in preschool and emergent readers than older children (Woodrome & Johnson, 2009) and corresponds with the idea that first, students learn to read, and then, they read to learn. In the primary grades, students are working on decoding strategies and, therefore, rely more on discriminating the visual forms of the letters to decode words than on the meaning of the passage. Woodrome and Johnson (2009) reported that over time there is an inverse relationship between reading

achievement and visual discrimination as students are relying more on comprehension strategies to read and understand a text than just decoding the words.

When discussing comprehension strategies, there are seven metacognitive strategies that are viewed as strategies students need to be fluent in using in order to understand the text they are reading. The seven strategies are monitoring for meaning, using and creating schema, asking questions, determining importance, inferring, using sensory and emotional images, and synthesizing (Keene & Zimmerman, 2007).

Understanding text, through the use of the above strategies, is the ultimate goal of reading instruction. Jennifer Serravallo (2015) said that these seven strategies need to go “underground” as students, on their way to becoming proficient readers, develop automaticity of these strategies.

### **Summary**

Chapter II gave an overview and summary of the literature and research related to kindergarten readiness, Gestalt and visual perception, working memory theory, and components of early literacy. The purpose of this study was to identify and describe what correlation, if any, exists between the composite Phelps Kindergarten Readiness Scale score, the visual-perceptual subtest of the Phelps Kindergarten Readiness Scale score, and reading achievement at the end of grade one. Each component of the literature reviewed slowly builds upon each other to better paint a picture of how the performance of children on readiness assessments could be influenced by their visual perception and working memory, and then, how visual perception and working memory can be used to predict later reading achievement. Chapter III will give an overview of the methodology,

the purpose and research questions, the design of the study, the assessment instrument, and the data collection procedures.



# CHAPTER III

## METHODOLOGY

### OVERVIEW

This chapter details the methodology used to collect and analyze the data in this study. The first section describes the purpose of the study and the research questions; the second section describes the population of the study and the data collection tools. The chapter concludes with a description of the process used to analyze the qualitative data and the quantitative data and a section about how human subjects were protected and how permission was obtained to conduct the study.

#### **Purpose of the Study and Research Questions**

The purpose of this study was to identify and describe what correlation, if any, exists between the composite Phelps Kindergarten Readiness Scale score, the visual-perceptual subtest of the Phelps Kindergarten Readiness Scale score, and reading achievement at the end of grade one. By understanding the existing correlation of the composite score, the visual-perceptual subtest, and reading achievement at the end of grade one, educators can make appropriate recommendations for student placement in reading support at the beginning of formal schooling. The following questions were used to guide this study:

1. What, if any, is the correlation between a student's perceptual score on the Phelps Kindergarten Readiness Scale and later reading achievement?
2. What subtests of the Phelps Kindergarten Readiness Scale, if any, are the predictors for reading achievement?

3. What, if any, are the difficulties students in Title I Reading have with spatial intelligence and visual perception compared with students not in Title I Reading?

The first two questions were quantitative in nature and were explored by examining archived Phelps Kindergarten Readiness Scale (PKRS) scores and end of grade one Title I Reading rosters using statistical tests. In a meta-analysis completed by Kavale (1982), there were 161 studies that contained an identifiable visual perceptual skill along with reading ability. These studies represent a significant relationship between visual perceptual skills and predict primary reading achievement ( $p < .001$ ) (Kavale, 1982). The third research question was qualitative in nature and was examined through focus group discussions involving kindergarten teachers, first grade teachers, Title I Reading teachers, and retired teachers who have retired from positions within the last three years from the different elementary schools in Riverside School District and a semi-structured interview with one of Riverside School District's elementary art teachers. It was hoped that the data from the focus group discussions and interview would assist in explaining and expanding on the results of the first two research questions. Through an examination of the quantitative data first, followed by the qualitative data, an explanatory mixed-methods design was used to best interpret this study.

The significance of this study was to explore possible connections between visual-spatial difficulties and early reading issues in light of the sense of urgency to ensure that students are reading at grade level by the end of third grade (Fiester, 2010; Lesnick, Goerge, Smithgall, & Gwynne, 2010). For many children in the United States, pre-reading instruction, and some formal reading instruction, begins in kindergarten. To help all students reach the goal of reading on or beyond grade level expectations by the

end of third grade, it is important to identify and provide interventions early for those students whose trajectories toward the end of third grade goal expectations are in question.

### **Design of Study**

In the explanatory mixed-methods design, quantitative data were collected before qualitative data and were chosen to insure a thorough examination of the research questions. The qualitative data collected in this study helped explain the quantitative data (Creswell & Plano Clark, 2007; Creswell, Plano Clark, Gutmann, & Hanson, 2003; Gay, Mills, & Airasian, 2006). This design allowed the qualitative data to enrich, support, and give a more complete picture to the quantitative data outcomes. Quantitative data that were collected were the coded archived students' results from the Phelps Kindergarten Readiness Scale (Phelps, 2003) and the end of first grade Title I Reading rosters. Title I Reading rosters were chosen as a data source because students who were having reading difficulties would be referred to Title I for reading interventions. Qualitative data collected for this study were the coded transcriptions of the focus group discussions and semi-structured interview.

More specifically, the follow-up explanation model is a variation of the explanatory design that was used for this study. The follow-up explanation model is used when researchers want to identify specific quantitative findings that need more exploration by collecting qualitative data from participants who can best explain the findings (Creswell & Plano Clark, 2007). For this study, the participants who were providing data for the qualitative portion of this study were the ones who could best explain and provide additional information on students' spatial and visual-perceptual

skills since the focus group participants had observed the students participating in visual-perceptual tasks and/or reading activities.

### **Population of Study**

This study took place in Riverside School District, a small-town school district located in Western Pennsylvania, which serves an overall population of about 28,000 residents. At the time of this study, the district facilities consisted of one senior high school (grades 9-12), one junior high school (grades 6-8), two intermediate elementary schools (grades 4-5), and two primary elementary schools (prekindergarten-grade 3). The sample for the quantitative data consisted of incoming kindergarten students from the 2013-2014 and 2014-2015 school years, 421 students. The sample for the qualitative data were Title I Reading teachers, kindergarten teachers, first grade teachers, an art teacher, along with a kindergarten and first grade teacher who had retired from the elementary schools within the last three years, all of whom volunteered to participate in a focus group. The age range of teachers for the focus group was between 22-50+; a total of 12 teachers participated in the focus groups.

The kindergarten student population's age range was from four-years-old to six-years-old. The students who were four at the time of the assessment would be five by the start of September, which is district policy for starting kindergarten. The majority of the students (over 90%) were White, 5% Black, 1% Asian, and less than 1% other races.

The sample of kindergarten students' data was a convenience sample (Gay, Mills, & Airasian, 2006). There was no random selection of students to a treatment group as it was their coded archived test results that were examined in this study. Similarly, the selection of potential focus group participants was a convenience sample, based on their

positions as either elementary art teachers, Title I Reading teachers, kindergarten and first grade teachers, or retired teachers.

### **Instrumentation**

Four data sources were used to complete this study: coded archived test results, Title I Reading rosters, transcripts from focus group discussions, and notes on the students' art samples. The coded archived test data that were examined in this study came from the Phelps Kindergarten Readiness Scale (PKRS) that was developed by LeAdelle Phelps (Phelps, 2003). The assessment consisted of eight subtests: vocabulary, verbal reasoning, analogies, visual discrimination, perceptual motor, auditory discrimination, auditory digit memory, and memory for sentences/stories. The subtests were grouped into three larger sections that examined verbal processing, perceptual processing, and auditory processing. The composite score of all items was obtained by summing the three domain scores which then resulted in a raw score. The raw score was then converted to a standard score having a mean of 100 and a standard deviation of 15 (Phelps, 2003). Administration of this assessment required approximately 20 minutes and was administered to one child at a time. Since PKRS was designed to be used by a wide range of school personnel, proper administration does not require specialized training, just familiarity with the testing procedures and scoring format.

In 2002 the PKRS went through a restandardization process to recalibrate the norming tables, but this did not change the content of the assessment (Phelps, 2003). The standardization sample consisted of districts that closely resembled the 2000 U. S. Census data. The PKRS is a valid and reliable assessment. Test-retest reliability coefficients ranged from .78 to .80 with a total readiness reliability coefficient of .91. Concurrent

validity correlations were determined by giving 74 children the PKRS-II and the Woodcock Johnson III Test of Cognitive Abilities – Brief Ability measure. All concurrent correlations between the PKRS-II and the Woodcock Johnson III Test of Cognitive Abilities – Brief Ability measure fell within the significant range ( $p \leq .001$ ). Predictive validity of the PKRS-II was obtained using state-normed achievement tests: the Tennessee Comprehensive Assessment Program (TCAP), the New York State English Language Arts Test, and the New York State Mathematics Test. The end of second grade TCAP scores along with the end of fourth grade New York scores showed significant correlations. The PKRS-II subtests and the TCAP total battery correlations were significant at  $p \leq .0001$ . The correlations between the New York State English Language Arts Test, New York State Mathematics Test, and the PKRS-II were all significant ( $p \leq .0001$ ) (Phelps, 2003). Because of its high correlation to later school success as measured by state normed standardized tests, using the PKRS-II before the start of kindergarten may help school personnel make student placement decisions that could have a positive effect on later student achievement for a relatively small initial investment of time.

### **Data Collection Procedures**

Upon obtaining permission to conduct this study from Indiana University of Pennsylvania's Institutional Review Board (see Appendix A) and the Riverside School District, a pseudonym for the actual school district (see Appendix B), the targeted teacher sample was contacted by email or letter (see Appendices C & D). Included in the letter to the teacher sample was a copy of the informed consent letter, a brief summary of the purpose, and information about the focus group session. The focus group sessions and

semi-structured interview were video and audio recorded to support accurate transcription and coding of the conversations.

The coded archived Phelps Kindergarten Readiness Scale (PKRS) data and Title I Reading rosters were obtained from the school district's Title I Reading coordinator and Title I Reading teachers. To meet the inclusion criterion for student data, the student must have been screened using the PKRS either prior to the start of kindergarten or in the first weeks of the school year. Similarly, the exclusion criterion used for student data was that students who were not screened using the PKRS. Students who were retained in kindergarten or first grade were included in this study.

Title I Reading teachers, art teachers, kindergarten teachers, first grade teachers, and retired teachers who taught in those areas from each elementary school were invited to participate in a focus group discussion. During this study, these different groups of teachers saw a variety of students for different purposes, in different settings, and for different lengths of time. In the school district where this study takes place, the Title I Reading teachers come into the classroom for kindergarten and work with the students who are identified as at-risk by the PKRS because their composite score is below the 30<sup>th</sup> percentile, but the Title I Reading teachers would also work with students who are not considered at-risk. When the students are in first grade, second grade, or third grade, the Title I Reading teachers would take students identified for Title I Reading support from their homerooms to a different classroom for small group instruction. The varied student interactions allow the Title I Reading teachers to have experiences with the students for multiple years and in multiple settings; this was one of the reasons the Title I Reading teachers were included in the focus groups. The other reason Title I Reading

teachers were included was because of their extensive background in reading and reading instruction. The first reason the art teacher was included in this group was because she would have students for multiple years which allowed her the opportunity to observe the students grow and mature. The other reason the art teacher was included was because she was more likely to have students participate in visual-motor activities as part of their lesson outcomes more than Title I teachers. Kindergarten teachers were included in the focus group because they would have the opportunity to observe the students when they are just starting school. The kindergarten teachers were given PKRS scores for the students at the start of the school year. The kindergarten teachers, along with the Title I teachers, would observe and monitor the progress of the students who were labeled at-risk for later reading difficulty and would monitor the progress of the students who were considered not at-risk, to help confirm and/or contradict the results of the PKRS. Kindergarten teachers also would have a more holistic view of students because the teachers observe the students completing academic tasks, such as reading and math, and also visual-motor tasks, such as learning to write letters and numbers and drawing shapes. Lastly, first grade teachers were included in the focus groups because first grade is the grade level where reading instruction starts to be more than just emergent literacy tasks. For students who did not receive Title I Reading support in kindergarten, their first grade teacher could recommend Title I Reading support. Similar to the kindergarten teachers, first grade teachers are able to get a more holistic view of the students because they have the students for the majority of the day.

There were a total of two focus groups and one semi-structured interview. The two focus groups consisted of the kindergarten, first grade, Title I Reading teachers, and



the teachers who had retired within the last three years from teaching those grades, and the semi-structured interview consisted of the elementary art teacher. The two focus groups were given the same protocol. The art teacher, for her semi-structured interview, was asked to bring samples of students' work. Prior to attending the interview, the art teacher was to sort the students' work samples into two groups: students she thought receive Title I Reading services and students who did not receive Title I Reading services. The researcher compared the student codes on the artwork to the codes on the Title I Reading roster and made notes regarding the overall appearance of the work.

The focus group discussions and semi-structured interview took place at Riverside School District's two primary elementary buildings. The teachers were given light refreshments as a thank you for participating. After receiving permission from each member of the focus group, each focus group discussion was auditorally and visually recorded. The text transcriptions of the focus group discussions and semi-structured interview became the primary source of data analysis and were coded.

### **Data Analysis Procedures**

The methodological design for this study was mixed-methods. Some of the data from this study were quantitative and some was qualitative. The kind of mixed-methods this study utilized was explanatory mixed methods design (Creswell & Plano Clark, 2003; Gay, Miller, & Airasian, 2006). Archived PKRS data and Title I Reading rosters data provided descriptive analysis for mean, standard deviation, and correlations. Analysis of the data included the direction and magnitude of the relationship between PKRS scores and Title I Reading outcomes. The PKRS and Title I Reading roster data

were entered into the computer statistical program Statistical Package for Social Sciences (SPSS) version 24.

The focus group discussions and the semi-structured interview were transcribed from the audio and video recordings. The transcriptions were coded for phrases, key words, key ideas, and themes related to visual-perception, reading ability, and school success. The information from the transcripts, along with the students' art samples, explained and enriched the quantitative data.

### **Protecting Human Subjects and Permission**

In order to protect the human subjects in this study, pseudonyms were used for the school district where the study took place and for participants of the focus group. Participation in the focus groups was voluntary. Participants were informed before agreeing to attend the focus group sessions or semi-structured interview of the process for withdrawing from the study at any time without penalty. The protocol for withdrawing from the study was either a written email to the researcher or by not attending the scheduled focus group or semi-structured interview session. Participants were informed that there were no known risks for participating in the focus group sessions. The archived PKRS data, Title I Reading rosters, and transcripts of focus group discussions and semi-structured interview are being kept in a locked cabinet. All documents will be destroyed after the required three years.

Permission to use PKRS was granted to the researcher by Charles Jakiela, publisher of Psychology Press (see Appendix E). Permission to use the archived PKRS data and Title I Reading rosters was granted to the researcher by the school district used in this study (see Appendix B).

## Summary

The purpose of this study was to identify and to describe the direction and degree of correlation that exists between the composite Phelps Kindergarten Readiness Scale score, the visual-perceptual subtest of the Phelps Kindergarten Readiness Scale score, and later reading achievement. Chapter Three described the methodological framework of this explanatory mixed-methods study.

The sample consisted of about 421 incoming kindergarten children and comments from 11 kindergarten teachers, first grade teachers, Title I Reading teachers, and retired teachers, and one elementary art teacher. The school district was located in a small to mid-sized college town. The quantitative data for this study were coded archived Phelps Kindergarten Readiness Scale (PKRS) scores and end of first grade Title I Reading rosters. Qualitative data for this study were focus group discussion transcripts from kindergarten teachers, first grade teachers, and Title I Reading teachers, the transcript from the elementary art teacher's semi-structured interview, and the notes on the students' art samples. The PKRS and Title I Reading rosters data were analyzed using Pearson  $r$  correlation coefficient, descriptive statistics, and logistic regression. The focus group transcripts and the semi-structured interview were coded and used to explain and expand the qualitative data. Chapter IV describes the results of this study.

## CHAPTER IV

### RESULTS

The purpose of this mixed methods study was to identify and describe what correlation, if any, exists between the composite Phelps Kindergarten Readiness Scale score, the visual-perceptual subtest of the Phelps Kindergarten Readiness Scale score, and reading achievement at the end of grade one. The three questions guiding this study were:

1. What, if any, is the correlation between a student's perceptual score on the Phelps Kindergarten Readiness Scale and later reading achievement?
2. What subtests of the Phelps Kindergarten Readiness Scale, if any, are the predictors for reading achievement?
3. What, if any, are the difficulties students in Title I Reading have with spatial intelligence and visual perception compared with students not in Title I Reading?

Chapter IV explains the data analysis techniques used in this study and presents the findings for each question.

The data for this study were gathered from Riverside School District in Western Pennsylvania. Phelps Kindergarten Readiness Scale (PKRS) scores from students entering kindergarten in both 2013 and 2014 school years were used to answer the first two research questions, and focus group discussions with kindergarten, first grade, Title I Reading, and art teachers ( $N = 11$ ) took place to answer the third research question.

## **Description of Sample**

PKRS data were used to answer the first two research questions. The researcher was able to obtain full PKRS scores for 421 students ( $N = 421$ ). The PKRS has three domain scores (verbal processing, perceptual processing, and auditory processing). The composite score was obtained by summing the three domain scores, which resulted in a raw score. The raw score was then converted to a standard score having a mean of 100 and a standard deviation of 15, and then a percentile score was recorded (Phelps, 2003). All scores listed in this chapter refer to the percentile score, not the raw score. Once the data sets were cleaned and all missing data were added, descriptive statistics were done on the domain and the composite scores using the computer program Statistical Package for the Social Sciences (SPSS) version 24. Descriptive statistics were used to help describe the sample and to check assumptions so other statistical tests could be run. The mean composite percentile score for this sample was 59.93 with a standard deviation of 27.125. The mean Verbal score for this sample was 61.19 with a standard deviation of 27.309. The mean Perceptual score for this sample was 58.45 with a standard deviation of 37.00. The mean Auditory score for this sample was 53.69 with a standard deviation of 28.895 (see Table 3). Table 3 also includes the skewness value and kurtosis for each domain and composite. The skewness value indicates the symmetry of the distribution of scores and kurtosis indicates the “peakedness” of the distribution (Pallant, 2016). A skewness value and kurtosis value of 0.00 would indicate a distribution that is perfectly normal. A skewness value that is positive suggests that the scores are clustered to the left of the curve, toward the lower values, and a negative value suggests that scores are clustered to the right of the curve, or toward the higher values. Positive kurtosis values

suggest the distribution is clustered toward the center with long thin tails. A kurtosis value that is less than 0.00 suggests the distribution is mostly flat (Pallant, 2016). For this study's sample, all the scores had negative skewness values, which indicate that most scores were above the 50<sup>th</sup> percentile. The kurtosis values were also negative which indicates if the curve of distribution was overlaid on a histogram, the curve would be more flat than a steep peak. If the distribution curve of this sample was the topography of a country side, the topography would be more like the rolling hills of the Flint Hills of Kansas instead of the steep peaks of the Rocky Mountains of Colorado. The Perceptual kurtosis value was the greatest of the four scores, and it was greater than -1.00. The remainder of the data analysis focused around each of the three research questions.

Table 3

*Descriptive Statistics from PKRS for all 421 Participants*

	N	Min.	Max.	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	St. Error
Verbal	421	0	98	61.19	27.309	-.760	.119	-.493	.237
Perceptual	421	0	98	58.31	29.810	-.369	.119	-1.145	.237
Auditory	421	0	98	53.69	28.895	-.379	.119	-.971	.237
Composite	421	0	97	59.93	27.125	-.855	.119	-.391	.237

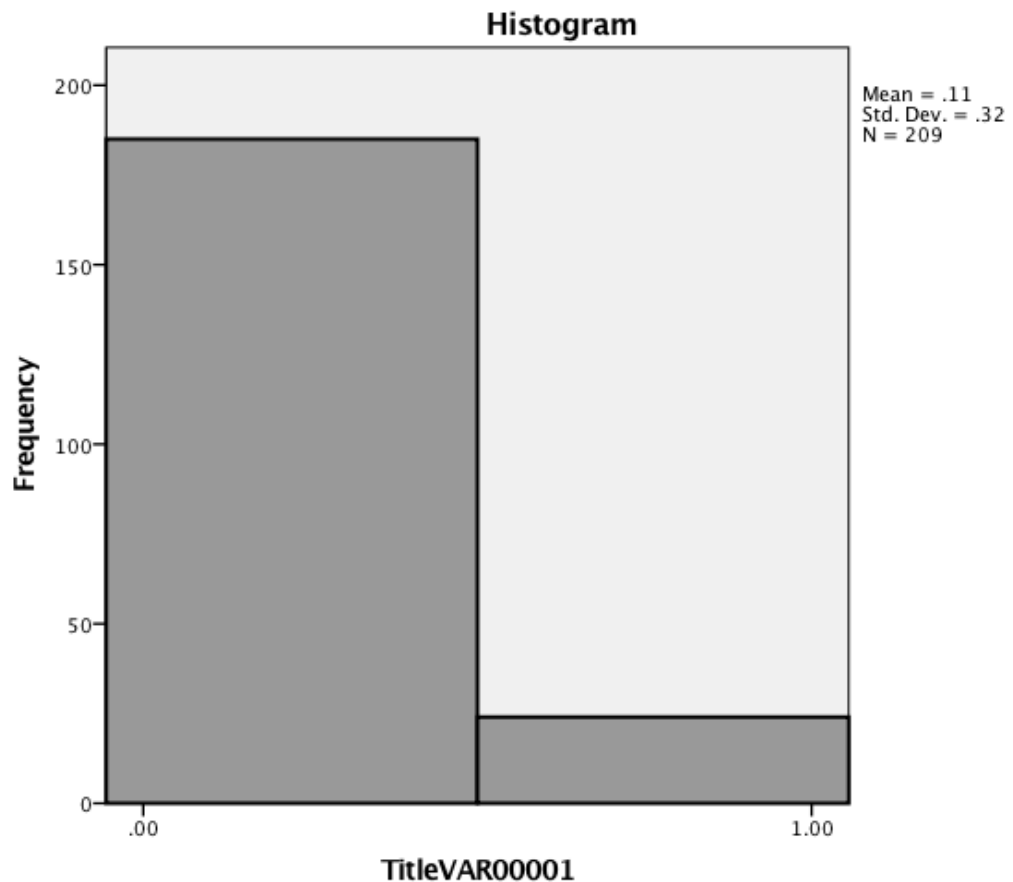
**Research Question 1: What, if any, is the Correlation Between a Student's  
Perceptual Score on the Phelps Kindergarten Readiness Scale and Later Reading  
Achievement?**

In Riverside School District, a student's composite PKRS score is used for initial placement in Title I Reading. The cut off score for Title I placement is the 30<sup>th</sup> percentile. Students who score at or above the 31<sup>st</sup> percentile are not put on the initial

kindergarten Title I Reading roster. Students who score at or below the 30<sup>th</sup> percentile are put on the initial kindergarten Title I Reading roster. For the 2013-2014 school year, Riverside School District had 209 children initially enroll in kindergarten. Of those 209 children, 35 kindergarten students, or 16.7 % of students, were initially placed on the Title I Reading roster for the 2013-2014 school year (see Figure 2). On the data Riverside School District gave the researcher, this number included students who were identified as probably in need of English as a Second Language (ESL) services ( $N = 8$ ). An identification of needing ESL services does not exclude the student from also receiving Title I Reading services. There were 212 children who were initially enrolled for the 2014-2015 school year; 37 of those students, or 17% of students, were initially placed on the Title I Reading Roster (see Figure 3). Only one student was identified as bilingual on the printout that Riverside School District gave to the researcher.

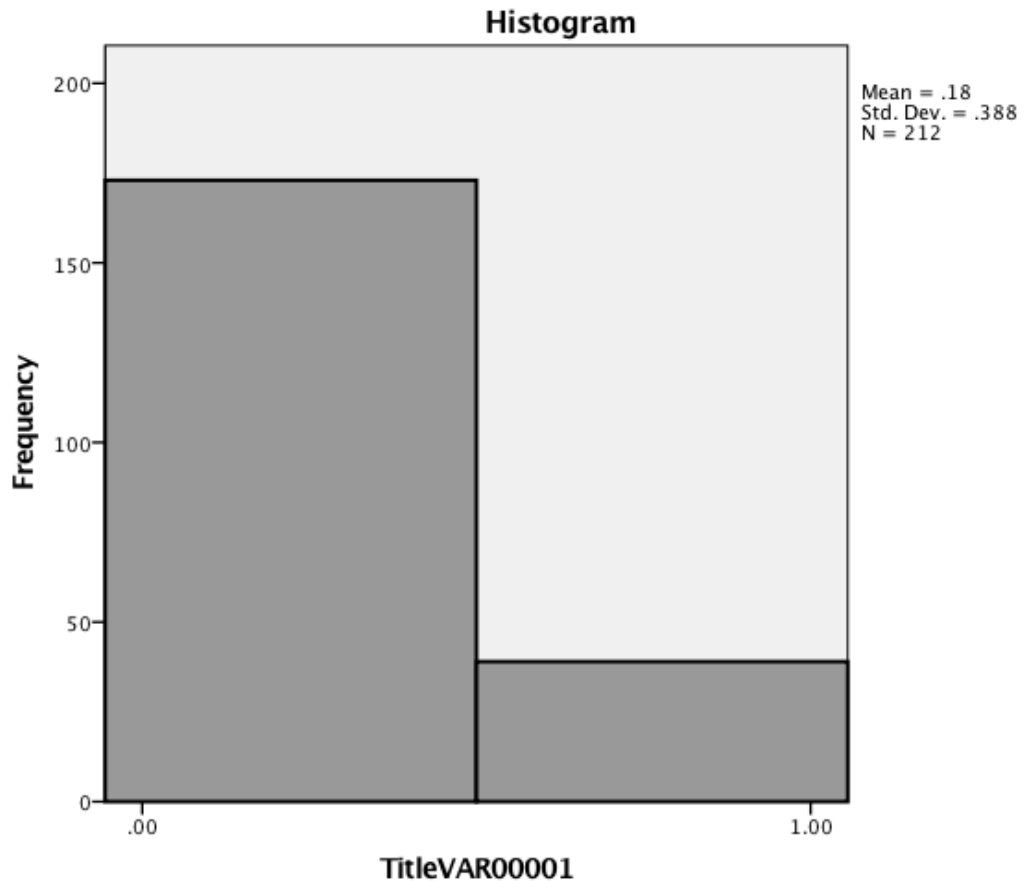
In Riverside School District, teachers may recommend students be placed in Title I Reading based on classroom observations and students' testing results. Title I Reading rosters can be in a state of constant change as teachers recommend students for services and as students enter and leave the schools and/or the school district. Along with PKRS scores, the end of first grade Title I Reading rosters for students who entered kindergarten in 2013 or 2014 were also used to help answer Research Question 1. At the end of first grade for the 209 students who entered kindergarten in 2013, 24 students were on the Title I Reading roster. At the end of first grade for the 212 students who entered kindergarten in 2014, 39 students were on the Title I Reading roster. There were a number of children who did not take the PKRS but were on the end of first grade Title I Reading roster. The students who entered kindergarten in 2013 had 12 students on the

Title I Reading roster who had not taken the PKRS; 2014 had 10 students on the Title I Reading roster who had not taken the PKRS. Students on the Title I Reading roster might not have a PKRS score because they started school in a Riverside School District school well after the first month of school.



*Figure 2.* Histogram of number of students initially not placed versus students placed in Title I based on composite PKRS 2013-2014 school year. Students placed in Title are labeled 1.00 and students not initially placed in Title are labeled .00.





*Figure 3.* Histogram of number of students initially not placed versus students placed in Title I based on composite PKRS 2014-2015 school year. Students placed in Title are labeled 1.00 and students not initially placed in Title are labeled .00

Students' PKRS Perceptual domain score and at the end of first grade Title I Reading rosters were examined to help answer Research Question 1. A Bivariate Correlation test to determine Pearson Correlation  $r$  was conducted using Perceptual score and Title 1 placement as variables (see Table 4). As indicated in Table 4, there was a negative correlation between Perceptual score and Title I ( $r = -.242$ ). A Pearson  $r = -.242$  correlation is significant at the 0.01 level. The negative value indicates that as students' Perceptual domain score increases, the likelihood of students receiving Title I Reading services decreases.

Table 4

*Correlation between Student Perceptual Score and Title I Placement*

		Perceptual	Title I Placement
Perceptual	Pearson Correlation	1	-.242**
	Sig. (2-tailed)		.000
	<i>N</i>	421	421
Title I Placement	Pearson Correlation	-.242**	1
	Sig. (2-tailed)	.000	
	<i>N</i>	421	421

\*\* Correlation is significant at the 0.01 level (2-tailed)

**Research Question 2: What Subtests of the Phelps Kindergarten Readiness Scale, if any, are the Predictors for Reading Achievement?**

In Riverside School District, teachers use the PKRS composite score to determine initial placement in Title I Reading. Besides the composite score, Research Question 2 was interested in determining if any of the subtests were predictors for later reading achievement. Logistic regression allows researchers to test models to predict outcomes with two or more categories (Pallant, 2016). To answer the second research question, logistic regression with a dichotomous dependent variable was conducted using SPSS. A dichotomous dependent variable is a variable that has only two categories or values. In this study, the dichotomous dependent variable was Title I Reading placement because students are either in Title I Reading or they are not. In SPSS, students who were placed in Title I Reading were given the value 1; students not in Title I Reading were given the value 0. Before completing the logistic regression three assumptions needed to be met: sample size, multicollinearity, and outliers (Pallant, 2016).

The sample size for this study was 421 ( $N = 421$ ) and represented two years of incoming kindergarten tests results. When completing a logistic regression, a small sample size with a large number of predictors may be troublesome, especially when

working with categorical predictors (Pallant, 2016). This study did not use categorical predictors and the sample was relatively large.

Multicollinearity occurs when the relationship among the independent variables is highly correlated ( $r = .9$ ). For logistic regression, the predictor variables should be strongly related to the dependent variables but not too strongly related to each other. To check for multicollinearity, a bivariate correlation was preformed on Verbal, Perceptual, Auditory, and Percentile (see Table 5). All the variables were correlated at a 0.01 significant level but were below  $r = .9$  suggesting there was high intercorrelation among the predictor variables. Percentile had the highest correlations ( $r = .677, .875$ , and  $.890$ ), and, because percentile score was used to determine initial Title I placement, it was not included when completing the logistic regression.

Table 5

*Correlations Among Verbal, Perceptual, Auditory, and Percentile*

		Verbal	Perceptual	Auditory	Percentile
Verbal	Pearson	1	.465**	.668**	.875**
	Correlation				
	Sig. (2-tailed)		.000	.000	.000
	N	421	421	421	421
Perceptual	Pearson	.465**	1	.493**	.677**
	Correlation				
	Sig. (2-tailed)	.000		.000	.000
	N	421	421	421	421
Auditory	Pearson	.668**	.493**	1	.890**
	Correlation				
	Sig. (2-tailed)	.000	.000		.000
	N	421	421	421	421
Percentile	Pearson	.875**	.677**	.890**	1
	Correlation				
	Sig. (2-tailed)	.000	.000	.000	
	N	421	421	421	421

\*\* . Correlation is significant at the 0.01 level (2-tailed).

The last assumption before completing a logistic regression was to check for outliers. All three domain scores were normally distributed, as was noted in Table 3 titled *Descriptive Statistics from PKRS for all 421 Participants* located on page 53. The mean Percentile score for each of the four variables fell between 53.64 and 61.19.

All three assumptions for logistic regression, sample size, multicollinearity, and outliers have been met. As noted above, because students' Percentile scores were used to determine initial Title I Reading placement, Percentile was not included as a predictor variable when the direct logistic regression test was performed.

Direct logistic regression was preformed to assess what PKRS subtests, if any, were predictors for reading achievement. The model contained three independent variables (Verbal score, Perceptual score, and Auditory score). The full model containing all predictors was statistically significant. Before any of the independent variables were used in the model, SPSS predicted that PKRS would correctly place 84.8 percent of the students in Title I Reading (see Table 6).

Table 6

*Block 0 Classification Table<sup>a,b</sup>*

			Predicted		Percentage Correct
			TitleVAR00001		
Observed			.00	1.00	
Step 0	Title VAR00001	.00	357	0	100.00
		1.00	64	0	.0
Overall Percentage					84.8

a. Constant is included in this model.

b. The cut value is .500

The Omnibus Tests of Model Coefficients, sometimes referred to as a goodness fit, indicates how well the model performs, over and above the predicted results, without the predictors entered into this model. The researcher sought a highly significant value

( $p < .05$ ) for the result. In this study, the significant value was  $p = .000$  (see Table 7).

The chi-square value was 46.595 with three degrees of freedom. The scores suggested the model, with the predictors, was better than SPSS's original prediction.

Table 7

*Omnibus Tests of Model Coefficients*

		Chi-square	df	Sig.
Step 1	Step	46.595	3	.000
	Block	46.595	3	.000
	Model	46.595	3	.000

The results from the Hosmer-Lemeshow test also supported PKRS as being an effective model for predicting Title I Reading placement. According to Pallant (2016), the Hosmer-Lemeshow test is the “most reliable test of model fit in SPSS” (p. 176).

Unlike Omnibus test, a significance value of greater than .05 suggests support for the model ( $p > .05$ ). The chi-square value for the Hosmer-Lemeshow Test was 14.318 with a significance level of .074 (see Table 8). The significance level is greater than .05 ( $p = .074$ ); therefore, the Hosmer-Lemeshow indicates support for the model.

Table 8

*Hosmer-Lemeshow Test*

Step	Chi-square	df	Sig.
1	14.318	8	.074

The Cox & Snell R Square and the Nagelkerke R Square indicate the amount of variation in the dependent variable. The values are pseudo R square statistics instead of true R square values. The Cox and Snell R Square value was .105 and the Nagelkerke R Square value was .183 (see Table 9). The Cox and Snell explains 10-18% of the variance students receiving a 0 or a 1 (not being in Title I Reading or being placed in Title I Reading).

Table 9

*Model Summary*

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	312.262 <sup>a</sup>	.105	.183

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001

The Block 1 Classification Table indicates how well the model was able to predict the correct category (not in Title/placed in Title) for each case (see Table 10).

Comparing the Block 1 Classification Table results with Block 0 Classification, the overall percentage decreased from 84.8 in Block 0 to 82.2 in Block 1.

Table 10

*Block 1 Classification Table<sup>a</sup>*

		Predicted TitleVAR00001		Percentage Correct
Observed		.00	1.00	
Step 1	Title VAR00001	.00	346	96.9
		1.00	64	.0
Overall Percentage				82.2

a. The cut value is .500

The percentage correct in Block 1 Classification Table (Table 10) also indicates the sensitivity and specificity of the PKRS. With this sample, PKRS was able to correctly classify zero percent of students who were going to be initially placed in Title I Reading, also known as test sensitivity. PKRS test specificity was 96.9 percent; this means PKRS correctly identified 96.9 percent of the students who would not be placed in Title I Reading. The positive predictive value, percentage of cases that the model classified as being in Title I Reading that were actually observed in the sample, was determined by dividing the number of cases in the predicted = 1.00, observed = 1 cell (0) by the total number in the predicted = 1.00 cells (11 + 0 = 11) and then multiplying by 100 to give the percentage. The positive predictive value was 0. The negative predictive

value, the percentage of students predicted by the model to not be placed in Title I Reading that were actually observed to not be placed in Title I Reading, was calculated by dividing the number of cases in the observed = .00, predicted = .00 cell (346) then dividing by the total number in the predicted = .00 cells (346 + 64 = 410) and multiplying by 100. The negative predictive value was 84.39 percent, or 84.39 percent of students predicted to not be place in Title I Reading were not placed in Title I Reading.

The logistic regression was performed to assess what, if any, of the PKRS subtests predict reading achievement. The full model containing all predictors was statistically significant,  $X^2(3, N = 421) = 46.595, p < .001$ , indicating that the model was able to distinguish between students who would not be placed in Title I Reading and students who would be placed in Title I Reading. The model, as a whole, explained between 10.5% (Cox and Nell R square) and 18.3% (Nagelkerke R square) of the variance in Title I Reading placement of 82.2% students. As shown in Table 11, only one of the independent variables made a statistically significant contribution to the model (Auditory), recording an odds ration of .977. Controlling for other factors in the model, the odds ratio of .997 is less than 1, indicating that for every increase unit in Auditory score, students are .997 times less likely to be placed in Title I Reading.

Table 11

*Variables in the Equation*

		B	S.E.	Wald	df	Sig.	Odds Ratio Exp(B)
Step 1a	Verbal	-.005	.007	.645	1	.422	.995
	Perceptual	-.008	.006	2.326	1	.127	.992
	Auditory	-.023	.007	10.551	1	.001	.977
	Constant	.057	.303	.036	1	.850	1.059

a. Variable(s) entered on step 1: Verbal, Perceptual, and Auditory

**Research Question 3: What, if any, Are the Difficulties Students in Title I Reading Have With Spatial Intelligence and Visual Perception Compared With Students not in Title I Reading?**

To answer Research Question 3, qualitative data were obtained using focus groups. As outlined in Chapter 3, the original plan for obtaining the qualitative data was to have three focus group sessions: two groups comprised of current and retired kindergarten, first grade, and Title I Reading teachers; and a third focus group comprised of elementary art teachers. The sample size for the current and retired kindergarten, first grade, and Title I Reading teachers' focus groups was 11 teachers (see Table 12). The teachers who participated in the focus group had a wide range of teaching experience from first year teachers to those with up to 35 years of teaching experience. The mean years of teaching experience for the focus group was 19 with a median years of teaching experience of 24.

Table 12

*Summary of Teachers Who Participated in the Current and Retired Teachers Focus Groups*

Subject Taught	Number of Current Teachers	Number of Retired Teachers
Kindergarten	6	1
First Grade	2	1
Title I Reading	1	0

The focus group of current and retired kindergarten, first grade, and Title I Reading teachers was asked seven questions (see Appendix F for focus group protocol). The transcripts of the focus group discussions were entered into the computer program NVivo. The first time the researcher read over the transcripts, she noted themes and main



ideas from the teachers' responses to the questions. After the first read, the researcher took the list of themes and main ideas and created nine larger categories that are called "Nodes" in NVivo. The nine Nodes were the following: Title I, Spatial, Quality of Work, Other Services, Fine Motor, Executive Function, Background, Average and Above Average, and Age (see Table 13).

Table 13

*Node Frequency Chart for Current and Retired Kindergarten, First, and Reading Teachers Focus Groups*

Node	First focus group	Second focus group	Total
Title I	37	48	85
Spatial	14	14	28
Quality of Work	26	15	41
Other Services	1	1	2
Fine Motor	22	14	36
Executive Function	14	9	23
Background	7	5	12
Average and Above Average	20	15	35
Age	3	0	3
Total Nodes	144	121	265

The node that was mentioned the most in the current and retired teacher focus group was Title I followed by Quality of Work. With NVivo, the sentences, words, and phrases can be coded with more than one Node. Since this research question aimed to explore the students in Title I Reading and students who were not in Title I Reading, a frequency query was completed to establish the number of times items were coded with Title I and one of the other eight nodes, and then items that were coded Average and Above Average and one of the other eight nodes (see Table 14 and Table 15).

Table 14

*Frequency of Nodes That Were Coded With Title I and Another Node*

Node Code with Title	First Focus Group	Second Focus Group	Total
Quality of Work	12	12	24
Spatial	7	14	21
Fine Motor	13	14	27
Executive Function	6	6	12
Background	4	4	8
Average/Above Average	0	2	2
Age	2	0	2

Table 15

*Frequency of Nodes That Were Coded With Average/Above Average and Another Node*

Node Code with Average/Above Average	First Focus Group	Second Focus Group	Total
Quality of Work	11	4	15
Spatial	2	0	2
Fine Motor	4	0	4
Executive Function	1	3	4
Background	0	1	1
Title	0	2	2
Age	1	0	1

Examining Tables 14 and 15 demonstrated a large difference in frequencies of the Nodes between Nodes coded with Title I versus Nodes coded with Average/Above Average. The Average/Above Average Nodes were given to statements regarding students whom the teachers perceived as functioning at or above grade level based on their classroom observations and classroom assessments, in other words, the students who did not receive Title I Reading services. By examining the frequencies tables, Quality, Fine Motor, and Spatial were the top Nodes that were coded with Title I.

**Quality of Work**

Some of the comments made by the teachers regarding the quality of work from students who receive Title I services had to do with coloring and color choices, the speed of completing work, and overall appearance of students' work. Four teachers mentioned

that when it came time to color an activity, many times the students receiving Title I services would only use one or two colors. One teacher mentioned that a student might pick orange to use when nothing in the picture, or in real life, was orange. Another teacher mentioned that the students “have problems with knowing the correct color. The realistic color [for objects]. They use, I’m just thinking about the first day of school self-portraits and they’ll have purple hair.” One of the kindergarten teachers remarked, “They [students receiving Title I Reading] are quick. They want to get it done and over with, it seems like. ‘I colored it all orange, teacher, I’m done.’”

For students receiving Title I Reading, one teacher mentioned, “Sometimes it’s nothing,” meaning that sometimes there was nothing for the teacher to look at, grade, or observe because the students had not completed the work. Another comment that was coded as Quality was, “It’s like pulling teeth to get it.” The teacher’s comment was related to how it was very difficult for the students receiving Title I Reading to complete the work or even initiate a project without assistance, sometimes step-by-step assistance, from the teacher. A first grade teacher commented that some tasks, especially writing tasks, were “overwhelming [for the students] to try and narrow it [what to write] down from this verbal thing to a written [thing].”

A few teachers mentioned that students they perceived to fall within the average to above average range would sometimes rush. But, many of these same teachers noticed that the students within the average to above average range would put more detail into their work, used a variety of colors, and that the finished products looked more similar to the teacher’s sample.

They [students who fall within the average to above average range] take whatever we're doing and add more to it and take it to the next level. There's opportunities [*sic*] in everything we do for enrichment if children are inclined to do that. The above average child realizes how it can be more. What else they can add to that piece of writing or artwork, or they'll say something that they noticed about math we're doing and bring some outside experience into that [conversation] that makes sense and apply it.

Another teacher mentioned that the complete work would be "for the most part, I'd say it's pretty neat," and another teacher quickly followed up with "organized." One of the kindergarten teachers commented that one difference was "the fact that it's complete [the work]," that is received from the students who fall within the average to above average range, and another teacher added, "They can do it [the work] independently."

Interestingly enough under the theme of Quality of Work, one teacher mentioned that she had received papers from students who received Title I Reading with nibbles or holes taken out of the paper. Her reasoning for the holes was that the student was frustrated and nibbled on the paper. Two teachers mentioned the work they received from the students in Title I Reading looked like they were scribbling. Mentions of scribbling were coded as Quality of Work and also coded as Fine Motor.

### **Fine Motor**

Statements that were coded as Fine Motor were statements the participants made in reference to handwriting, letter formation, planning space, size of letters, shapes,

numbers, and details. When coded with Fine Motor and Title I, there were ten mentions of handwriting. The following phrases were used when discussing handwriting:

- “To make a letter, the students start at the bottom and go to the top, rather than top-down.”
- “Spaghetti noodles. Pieces put together just trying to figure out how the letter is made or drawn.”
- “Very immature. Pieces of letters and pieces of lines put together to try to form a letter.”
- “Students not lifting their pencils when writing numbers and lifting too often when writing letters.”
- “Students need help with their grip. Many times they are fisting the writing tools.”
- “The letters are not anchored to the line, or situated between the top and bottom lines. If there is only a bottom line, sometimes the letters are written through the line.”
- “If students are to put their name on the back of a paper, they will write their name large enough to fill the paper.”
- “The writing is very light and hard to read.”
- “The writing is very squiggly with few straight lines.”

One teacher commented that writing is, “a struggle for them to put anything on paper when they—just any kind of response. It seems like most of them don’t want to write, or don’t like to write.” The Title I Reading teacher responded to the other

teacher's comment that while her students struggle with reading, they also struggle with writing.

That's what I see the most struggle with in my small groups is writing. Like, I have students that will just completely refuse to do it because they know that it's difficult for them. So writing is probably the biggest struggle with my first graders that I have.

Few statements were made that were coded with Average/Above Average and Fine Motor (N= 4). In one of the statements, a kindergarten teacher mentioned that she had noticed her students who were within the average to above average range would come to school already comfortable with writing their names with all uppercase letters, and it was very difficult to break them of this habit. Another teacher mentioned that she noticed if students within the average to above average range would happen to make a reversal letter (b instead of d), they quickly noticed the mistake and changed it.

Both first grade and kindergarten teachers mentioned that they noticed students drawing their letters and numbers instead of writing their letters and numbers. One kindergarten teacher remarked, "I think a lot of times they're trying to draw based on what they see. So how can I get that thing up there to look the same down here?" A first grade teacher in the other focus group shared something similar regarding letter formation. She called them "spaghetti noodles. Piecing them together just trying to figure out how that letter is made. Or drawn." And a few comments later, this same teacher said, "They're putting the letters together with pieces where the number four is written as an 'L' and then a 'U' and then brought back down. They don't want to make that letter – that number four with two pieces."

## Spatial

Both current and retired teachers' focus groups discussed student artwork. Some of the teachers' statements were coded as Fine Motor and Title I, but many were coded as Fine Motor, Title I, and Spatial. The projects the teachers were discussing involved the students having to either draw something or having to cut and glue pieces together. One teacher mentioned that when students draw a character or character's face "things are not always proportional or even in the right location." A kindergarten teacher related that some students in Title I Reading have amoeba-like figures for self-portraits. When describing the amoeba self-portrait, she said, "There would be one circle used both as the head and body. The arms and legs would be coming out of the head." A different kindergarten teacher related that some body parts might be missing, or there might be extra body parts in a self-portrait for students receiving Title I Reading. One of the kindergarten teachers talked about doing direct drawing activities with her class.

I do directed drawing with my kids. And even that, even step-by-step, drawing your rectangle and you can see mine, and somehow it's a circle down in the bottom corner. And you're just like, how did you get here [*sic*]?

For projects that would be put together out of pieces of construction paper, the projects completed by the students receiving Title I Reading might have pieces in areas opposite that of the teacher's model. One kindergarten teacher shared that a former kindergarten colleague called a project like that a —

Picasso deer, because their [the deer] body parts would not be sticking in the right place or they'd [the body part pieces] be smashed all on top of each other [*sic*].

Like antlers are the legs, or the legs are the antlers. It would be all gluey if it was something glued.

A first grade teacher gave an additional comment about students tracing forms that would be cut out for different pieces of a project.

This might be a little bit off subject, but that also applies to when they're tracing anything. It's going to be in the center of the paper, no matter whether you show them if you put it up here in the corner, you could have a lot more space to work with. Everything's centered!

Even spatial directional words seemed to be difficult concepts for the students who received Title I Reading services. One teacher commented, "top to bottom, left to right, all that spatial stuff is just overwhelming for them." One of the first grade teachers said:

The visual spatial relationship is also a weak area...They know – the words little, in and out, but not necessarily things that are less said such as behind or in front of. Things [words] that we less commonly use for spatial relationships.

A kindergarten teacher mentioned the PKRS assessment and that she had noticed how many of the students who received Title I Reading had a difficult time with the visual perception part of the PKRS assessment. "I think the perception—the writing part of the screener [PKRS] is what pulls them in. I mean—Cleo's tough—Cleo the clown [a character in the PKRS]."

One teacher mentioned how she observed students who received Title I Reading had a difficult time when drawing, or copying, a form or shape that the teacher projected



onto the interactive white board. “It’s either really big, or really, really small. I feel like a lot of my kids have trouble with like scaling things down.”

One of the first grade teachers mentioned that she noticed students receiving Title I Reading also had a difficult time in math class. In the primary grades it would be common for students to use some form of physical object, called a manipulative or counter, to learn different math concepts. The first grade teacher commented that because some of the students receiving Title I Reading would have a difficult time organizing the space around them, either at a table or at a desk, the students might not have the correct number in the answer because the students counted the same manipulative twice or missed a manipulative. The teacher found that by reducing the students’ opportunities to move the pieces around, the students had more success with the concept being taught and also with correct completion of the work.

I noticed Unifix cubes [a kind of manipulative] to be the best tool for them [students in Title I Reading], because they connect or they have the plastic trays. The pieces can’t slide; the trays help keep them stationary. Then they are not dealing with the visual spatial relationship if it’s something that connects. Where they have individual counters, they want the gems [a kind of plastic manipulative that looks like a jewel] for the counter and everything, they have less success with things that can actually be moved on the surface. It needs to be attached. Something that they can still manipulate, but connect together in order to get that idea or a number or even to keep things organized within their space.

While not coded as Spatial, but related to how students who received Title I Reading handled manipulatives, the researcher questioned the differences teachers

observed in visual motor tasks in math. This was the back-and-forth conversation between four teachers regarding how the students who received Title I Reading would misuse the manipulatives.

Researcher: What about working with manipulatives in math?

Teacher 1: The little kids usually want to play.

Teacher 2: It's almost a distraction.

Teacher 3: Exactly, not so much using it as a tool where the top kids would use it more as a tool.

Teacher 4: We try. We let them play before we [use them as tools]. First time around, you just play with it. Second time around, you do something productive with it.

A few teachers mentioned that some of the students who received Title I Reading had a hard time recognizing space in general. One teacher commented, "They also cross desk lines. It's not obvious to them that the cracks between the desks are bordering their area. So their materials are often scattered." One of the kindergarten teachers in response said, "We have tables in kindergarten. So they [students receiving Title I Reading] are all the way over in their partner's area."

### **Executive Function**

One of the first questions in the current and retired teachers' focus groups asked what the teachers noticed about students who they perceived to be within the average to above average range with regards to academic and non-academic tasks, and then what they noticed about students who received Title I Reading with regards to academic and non-academic tasks. Many of the comments related to processes that fall under executive

function skills, such as attention, organization, and ability to problem solve. One teacher commented when talking about students who received Title I Reading services, “I think there’s an attention piece that seems to be a correlation sometimes.”

One of the first grade teachers commented:

I feel like there is, a lot of times, with correlation between – with students like that [students who received Title I Reading], there’s a piece that’s either like a memory piece or a processing piece, because even as you say – you’re asking them orally so it’s not just the written component. You’re asking them orally. They still are not able to bring that. There’s something misfiring there. Whether it is memory, whether it’s processing. Each child is different, but typically there’s something going on there.

One of the retired kindergarten teachers, who now volunteers two days a week in the one school’s kindergarten classes, commented:

It’s harder and harder to keep their attention. Just volunteering in small groups and finding that there could be two adults and four kids, and it’s hard to keep them on track, and where they’re supposed to be. They want to do what they want to do. You know you ask them to put their finger and follow along. They don’t wanna do it, so they don’t.

A kindergarten teacher talked about how she noticed that students who received Title I Reading services were very dependent on the classroom routines.

The routines. They take longer; they need more repetitions for the routine. But they’re also the ones that are very comfortable once they have that established. They don’t want the boat rocked. They don’t want a change in anything.

Another kindergarten teacher quickly added “Even if it’s an undesirable task, why didn’t we have rest time? Or, you know, because that’s what we do, right after – whatever that routine is, they need – thrive with – that structure.”

One of the teachers added that it was getting “harder and harder to keep their attention.” Another teacher mentioned that the students’ lack of attention affects many areas of the school day as the students need to be able to follow directions.

Even when you break it [directions] down, it’s hard for them to follow a step-by-step. They’re easily distracted. You get that – you’re going step-by-step but they get on this...And multiple steps of course are difficult for them.

## **Background**

While the teachers answered the questions posed during the focus groups, there were statements the teachers made that fell under the node Background. Statements that were coded with Background included statements about the students’ home lives and experiences provided at home. One of the kindergarten teachers said, “I think a lot of times, too, with those situations [students who did poorly on the perception section of the PKRS], like some kids have never been exposed to letters at all. Or numbers.” Another kindergarten teacher reported, “So, if you have a student who hasn’t been exposed to a lot of things, they would probably do poorly on it [PKRS]” because the students might lack the knowledge to complete some of the items in the Verbal Processing Domain such as analogies and verbal reasoning. The difficulty in learning new concepts for student who received Title I Reading may stem from their lack of vocabulary. Their home life vocabulary may be limited as one teacher responded:

It's really the vocabulary I often find that those students struggle with. They might know a concept, but they can't verbalize it. They don't have that vocabulary or that – the ability to generate that word. They know it, and I think sometimes it's inside them, but they just don't know how to express it.

Another kindergarten teacher mentioned limited exposure as something that she observed in students who received Title I Reading services.

Limited exposure to some of those [inaudible]. They don't often talk to a parent about that. Well, no, they don't have this. So they don't always get as many opportunities just to do things like that, even though a lot of them have gone to Head Start or Pre-K where those things are available to them. They're not encouraged at home to use supplies and those kinds of things [talking about coloring].

One of the kindergarten teachers even mentioned that if she sent things home that might help students, many times she was unsure if the activities were completed. "They don't often bring things back. We don't send that much homework home, but when we do, those students [students who received Title I Reading services] – some of them; it's difficult to get things back."

The researcher noted that many of the teachers in the focus groups felt that home life and lack of experiences set up some students so that it was necessary for them to receive Title I Reading services when they came to kindergarten.

### **Art Teacher Interview**

The researcher only received a consent form from one of the Riverside's elementary art teachers, so the art teacher was interviewed instead of conducting a focus

group. The art teacher had 11 years of teaching experience and was currently teaching pre-kindergarten to grade three but previously had taught up to grade six. The art teacher was also interviewed to help answer research question three. As part of the interview protocol (see Appendix G), the art teacher and the researcher discussed student art samples the art teacher brought with her. The art teacher sorted the pieces based on whether the art teacher perceived that the student received Title I Reading or did not received Title I Reading. The transcript of the interview was coded in NVivo to look for themes similar to what was done with the current and retired teachers' focus group transcripts. Many of the themes identified in the art teacher's interview were also found in the current and retired teachers' focus groups: Quality of Work, Spatial, Title I, Average/Above Average, Age, and Fine Motor. The researcher added nodes for Radial Design and Candy Wrapper: the two projects the art teacher had chosen to share.

The first art projects were from a radial design unit. The researcher was not aware of the concept of a radial design and had the art teacher explain the concept and the project. The art teacher explained that a radial design starts in the center of the paper and grows from there. A target or spiral are two examples of a radial design. For the radial project the art teacher was sharing, the students first planned their design on graph paper. Then the students were to make a mosaic on a large square piece of construction paper. For the individual tiles of the mosaic, the art teacher cut strips of paper, about one inch wide by several inches long; the students were responsible for cutting each strip into squares or rectangles.

One of the samples from a student the art teacher predicted received Title I Reading services, and did receive services, had many mosaic pieces that were not squares

or rectangles, were not universal in size, and had sides that were uneven. The mosaic pieces in the student's artwork overlapped. The art teacher reported that the mosaic pieces were to be squares or rectangles approximately the same size and were not to overlap.

Right, and I think they just wanted to try and fit everything on there, so they just maybe – instead of – they could have just taken out a row, or, like, when they were trying to fit it all on there [the construction paper].

The researcher asked if the art teacher had noticed the student having other fine motor problems that would cause the student to have difficulties cutting.

Not that I'm aware of. In my experience, I've had the student since kindergarten, and my experience is that they [the student] are another student who just kind of races through things. Um, just kind of sloppy work, and gets it done and moves on. Like, wants to go to the next thing instead of fine-tuning and doing quality work.

The art teacher shared another radial example from a student who the teacher thought did not receive Title I Reading services. The radial design was easy to recognize, as there was one colored square in the middle of the work and a stair-step style design growing out from middle square. The mosaic pieces were cut mostly uniform in size, unlike the first example. The mosaic pieces did not overlap significantly and were well spaced on the paper, so the viewer could identify the stair-step influence.

A third radial example the art teacher shared included pieces that were not very square and contained a significant number of overlapping mosaic pieces, similar to the piece that the art teacher had labeled as being completed by a student receiving Title I

Reading. When the researcher questioned the choice of putting this sample with the non-Title students, the art teacher reported she struggled with which group the pieces belonged.

Okay, well, I struggled with this one. Now, the reason I did put this one in the non-Title pile is because this is the only student in second grade who came up with a spiral idea. And, I was impressed with that, and he pulled it off! I know that the squares are overlapping, but I thought it was going to be very challenging for that student, and he pulled it off. He wanted to give up – he did. But he persevered, and I was impressed with it. I know it's not necessarily such a clean example as some of these other ones, but the fact that he came up with it, and he pulled it off, was very impressive to me.

The art teacher brought with her another group of student work samples that consisted of enlarged copies of candy wrappers. The students were given a candy wrapper and an index card with a window cut out of it (see Figure 4). The art teacher described the project as follows:

For this particular project, we were looking at a candy wrapper through, like, a little window, so they had to – they had to just enlarge what they saw on that, um, and that was difficult for a lot of the students

The researcher asked what kind of students seemed to have a difficult time with the project. The art teacher mentioned it was a difficult project for many of the students with the lower-performing students struggling more with the concept.





*Figure 4.* A sample of the candy wrapper with window in index card project. For the project, the student would only recreate “mmy Ca” as those are the only letters seen in the window.

The researcher asked what part of the concept did the students have a hard time with, such as enlarging the text to fill the space. The art teacher replied:

Well, honestly, the whole concept was sort of maybe a little too abstract for them, or just too—like, they wanted to fit in everything. Instead of saying, like “We might not see the whole—when we look through the little window on our candy wrapper, we might not see every word. We might just see ‘Twil.’ We might not see the X. I don’t see an X here,” but they want to squeeze it all in. They want to see the whole word. Or sometimes they would just, um, like, you might find some [projects] where things aren’t spelled correctly. They just rushed through and get it done, and then they realized that they spelled it wrong.

One aspect of this project included the students enlarging what they saw on a regular letter-sized paper as a pre-plan and then enlarging again to a larger piece of construction paper. The art teacher stated that adjusting proportions was “tricky” for the students, and that she just kept repeating, “Big, big, big.” The students wanted to keep the details they saw small, like the size they were through the window, instead of

enlarging them, with the correct proportions, to fill the space. A few of the students made their enlargements so large that it went beyond the space of the paper.

That was usually not a problem [student trying to do the enlargement too large to fill the space]. I mean, every once in a while, students would do that and, uh – but, it was more, everything was too small. That was more the majority of the problem.

The art teacher shared that one of the wrappers had the words “lemon chew” curved along the bottom. There were students working on the lemon chew candy wrapper.

I would say they were both lower-performing students, and they struggled [with the project]. Um, actually, the one wrote it, like, straight, and I had to go back and say, like, ‘Let’s look at that wrapper. See how it says, like, ‘Lemon chew?’ Like, ‘Lemon’ is here, and then ‘chew’ is over there.’

The students had a difficult time with writing “lemon chew” in a curved style and wanted to write the words in a straight line. The researcher asked if the students could tell the art teacher that the words “Lemon chew” were curved on the packaging. The art teacher responded: “I don’t think that that [asking the students to articulate that the words were curved] came up. I would just say, like, is that what it looks like on your wrapper?” Even after the art teacher had pointed out the curved nature of the words, the students had a difficult time noticing the words were curved on the wrapper, and the words on their project were not.

I think they figured it out, once they took a look at it, and then they went back and fixed it on their paper. So I would say that they figured – they did figure it out,

but I don't even remember them actually saying, like, 'Yes, I see that' or – you know.

The researcher asked what criteria the art teacher used to help determine what artwork samples went into which group: students who receive Title I Reading and students who do not. While pointing to the pile she thought were from students who received Title I Reading services, the art teacher stated this:

These are the – these ones struggled more with directions. Uh, the quality of the work may not have been as up to standards as maybe some of the ones in this pile [pointing to the non-Title]. Um, just their attention to detail may not have been as up to the same standards as these [pointing to the non-Title pile once again]. Um, a lot of times, they won't – these students would just kind of rush through things, and they don't really take their time or want to revise, go back and revise their work.

One of the questions in the interview protocol asked if the art teacher was able to distinguish between which students struggled in reading and math and which students were doing average or better. "I would say no, I can't tell with reading. I really can't, but sometimes with math, I can tell who likes math or who's good at math, based on some of the projects that we do." One project that she referenced was a symmetrical design project the third grade completes.

We do a symmetry project in third grade, and students who challenge themselves with different symmetrical designs, I can tell that they usually like math. One-point perspective: something that I used to do with older students. I don't do it so much – I used to introduce it more in fourth grade. Um, I could definitely tell

who liked math when we did one-point perspective...we use a ruler, we use a vanishing point, and we, um, try to make things look more 3D. Um, but usually, kids who like math really enjoy a one-point perspective. So if kids were doing really well and enjoying it, I would usually say, 'So, do you enjoy math?' And they usually do!

She also shared that she tried to pick projects where most students would experience success.

I try to pick projects that I think students can mostly be successful, no matter what, like, what areas they're strong in or struggle in. Actually, this project [radial design], a lot of times, kids that aren't the best kids usually, doing their art projects, a lot of kids do really well with this project. Like I said, like, this kid [spiral radial design] this surprised me coming from him. But, that, um – yeah. I usually can't tell, and I see a different side of students, like, sometimes when I'm speaking with another teacher in the building who is not a classroom teacher, she'll come up with saying about this students struggles, or their reading levels are low, and I don't know that about any – I can't tell who's a low students and who isn't in my room.

The art teacher, before the interview, did not think of students in terms of receiving Title I Reading services or not. Because her students worked in so many different media, it was possible for them to have success in art; it was not always possible for them to have success in the regular classroom. She said:

I know that some students who struggle with – maybe other things, or I know that the classroom teachers say that they're struggling with certain things, a lot of

times, they're good working with their hands. So, working with clay, a lot of time, students, like, surprise me with some of the things they come up with when they're doing a clay project, and I can just tell they're really comfortable working with clay and can do some great things with it. Um, so that might be one thing that I've noticed about some kids who may be Title students. But again, I don't know who Title students are.

When the researcher compared the student codes on the artwork with the student codes on the Title I Reading roster, it was noted that all of the pieces picked to share were from students on the Title I Reading roster. It was later discovered that when the art teacher went to pick pieces and coded them, she was not given the correct list. As each piece needed to be coded to keep the identities of the students confidential, the art teacher only picked pieces from students who were on the list she was given. This later proved to be the list of students in Title I Reading, but, as the art teacher had stated earlier, she did not think in terms of students in Title I Reading or not in Title I Reading, or in terms of students who may be struggling with reading.

The researcher recorded the codes on the student's work that the art teacher thought received Title I Reading services to compare the students' PKRS scores (see Table 16). The four students the art teacher predicted received Title I Reading services all had Perceptual Domain scores at or below the 50<sup>th</sup> percentile while the six students the art teacher predicted had not received Title I Reading services had Perceptual Domain scores that ranged from the 25<sup>th</sup> percentile to the 95<sup>th</sup> percentile.

Table 16

*PKRS Scores for Students' Artwork Samples*

Student Code	Verbal Domain	Perceptual Domain	Auditory Domain	Total	Title Set	Non-Title Set
13-38	95	25	95	84	X	
13-160	63	9	37	42	X	
13-179	50	50	9	25	X	
13-191	16	50	9	14		X
14-10	95	91	75	91		X
14-94	63	95	50	73		X*
14-156	50	50	25	42		X**
14-160	37	25	50	39	X	
14-181	16	37	37	27		X
14-183	16	25	37	25		X

\* The art teacher commented that student 14-94 seemed to struggle and while she put the student in the non-Title I group she guessed the student probably received Title I Reading services.

\*\*Student 14-156 art sample was noted as being a wonderful example as the sample contained all the components required and had a more appealing appearance than the other samples.

### Summary

In Chapter IV, the researcher reported results of both quantitative and qualitative data analysis. Quantitative analysis was used to answer the first two research questions: (1) What, if any, is the correlation between a student's perceptual score on the Phelps Kindergarten Readiness Scale and later reading achievement? (2) What subtests of the Phelps Kindergarten Readiness Scale, if any, are the predictors for reading achievement? Qualitative data analysis was used to answer the third research question: (3) What, if any, are the difficulties students in Title I Reading have with spatial intelligence and visual perception compared with students not in Title I Reading?

The instruments used to collect the quantitative data were the Phelps Kindergarten Readiness Scale (PKRS) and Title I Reading rosters from Riverside School District. The statistical technique to analyze the data for research question one was Pearson Correlation  $r$ . The Pearson Correlation  $r$  results indicated that there were a significant negative correlation between a student's perceptual score and later reading achievement ( $r = -.242$ ,  $p < 0.01$ ). Logistic regression was the statistical technique utilized to analyze the data for research question two. The results indicated that the Auditory subtest of the PKRS did a better job than the Verbal or Perceptual subtest in predicting later reading achievement ( $p < .001$ ).

Focus groups of current and retired kindergarten, first grade, and Title I Reading teachers, along with a semi-structured interview of one of Riverside School District's art teachers were used as qualitative instruments to answer research question three. Upon coding the transcript from the current and retired kindergarten, first grade, and Title I Reading teachers' focus group, nine themes, or nodes, were identified. Of the seven nodes, three – quality, fine motor, and spatial – were the most often mentioned when analyzing how Title I Reading students differ from students considered average and above average. Similarly, the transcript from the art teacher interview yielded most of the same nodes used with the current and retired teachers' focus group. Many of the samples that the art teacher perceived as from students who received Title I Reading services showed that the students had a difficult time with the concepts that were being taught and with correctly producing the expected products.

Chapter V will include further discussion of the quantitative data and qualitative data results. The final chapter will present summaries, conclusions, implications of the findings, and conclude with recommendations for future research.



## CHAPTER V

### SUMMARY, FINDINGS, DISCUSSION, AND RECOMMENDATIONS

This chapter will provide summaries of the purpose of this research study and the study's findings. Implications for teachers and schools and implications for policy makers will be discussed. This chapter will also include limitations of this research study along with opportunities for further research. This chapter ends with the final conclusion.

#### **Summary of Purpose**

The purpose of this study was to identify and describe what correlation, if any, exists between the composite Phelps Kindergarten Readiness Scale score, the visual-perceptual subtest of the Phelps Kindergarten Readiness Scale, and reading achievement by the end of grade one. Through examination, and growing understanding of the composite score, visual-perceptual subtest, and reading achievement at the end of grade one, educators will be able to make appropriate recommendations for student placement in reading support at the beginning of formal schooling to help increase the likelihood of students reading on level by the end of third grade. The end of third grade is considered an important success marker for students (Fiester, 2010; Garcia & Benero, 2011; Lesnick, Goerge, Smithgall, & Gwynne, 2010). Students who are not reading on current grade level by the end of third grade may suffer long-term effects such as having difficulty completing high school, not being accepted into college, and failure to secure a job that will provide a living salary (Lesnick, Goerge, Smithgall, & Gwynne, 2010).

Through an explanatory mixed-methods design, quantitative data and qualitative data were collected and analyzed in order to answer the three research questions that guided this study:

1. What, if any, correlation exists between a student's perceptual score on the Phelps Kindergarten Readiness Scale and later reading achievement?
2. What subtests of the Phelps Kindergarten Readiness Scale, if any, are the predictors for reading achievement?
3. What, if any, are the difficulties students in Title I Reading classes have with spatial intelligence and visual perception compared with students not in Title I Reading?

### **Summary of Methodology**

The design of this study was the follow-up explanatory mixed-methods. The quantitative data for this study were collected before the qualitative data. The quantitative data that were collected were the archived 2013 and 2014 incoming kindergarten students' results from the Phelps Kindergarten Readiness Scale (Phelps, 2003) and the end of first grade Title I Reading rosters for students who entered kindergarten in 2013 or 2014. The qualitative data collected for this study were the coded transcriptions of three focus groups discussions.

This study took place in Riverside School District in Western Pennsylvania. Convenience sampling was used for the quantitative portion and the qualitative portions of this study. There was no random selection of students to a treatment group as it was the students' archived test data the researcher used for this study. The selection for focus group participants was not random either since the researcher sought the experiences and expertise of teachers who worked with the age range of students from the quantitative data, therefore, only current and retired elementary art teachers, Title I Reading teachers,

kindergarten and first grade teachers from Riverside School District were asked to participate in the focus groups.

To answer the first two research questions, data from 421 Phelps Kindergarten Readiness Scale test results and end of first grade Title I Reading rosters were used. To answer the third research question, 11 current and retired kindergarten, first grade, and Title I Reading teachers agreed to participate in one of two focus group discussions, and one art teacher agreed to participate in a semi-structured interview. The art teacher was also asked to bring samples of student work that she had sorted into two groups: students the art teacher thought received Title I Reading services and students she thought did not received Title I Reading services.

### **Summary of Findings**

The following section summarizes the findings of this study. The research questions will be discussed individually.

#### **Research Question One**

The first research question examined what correlation might exist between students' Perceptual domain score on the Phelps Kindergarten Readiness Scale (PKRS) and later reading achievement. Phelps Kindergarten Readiness Scale data from students who entered kindergarten in 2013 and 2014 ( $N = 421$ ) along with end of first grade Title I Reading rosters for students who entered kindergarten in 2013 and 2014 were used to answer this research question. The researcher was interested in investigating whether a correlation might exist between the Perceptual domain score on the PKRS and later reading achievement as visual motor ability has been shown to predict later learning disruptions and school achievement (Koppitz, 1958; Koppitz, Mardis, & Stephens, 1961;

Koppitz, Sullivan, Blyth, & Shelton, 1959). A Bivariate Correlation test to determine Pearson Correlation  $r$  was conducted using the Perceptual domain score and end of first grade Title I Reading placement as variables. A significant negative correlation was found between the Perceptual domain score and end of first grade Title I was value of  $r = -.242$  ( $p < 0.01$ ). The negative value indicates that as students' Perceptual domain scores increase, it is less likely the students will be placed in Title I Reading. This supports a similar claim by Koppitz (1958) that above average students tended to make fewer mistakes on the Bender Gestalt Test, a test of visual perception. Cameron et al. (2015) also found a connection between visuomotor ability in preschool students and later early literacy achievement. The Perceptual domain section of the PKRS contained items where students were to draw shapes, similar to the Bender Gestalt Test. The fewer mistakes students made on the Perceptual domain of the PKRS, the higher their domain score. Likewise, the current study's results support Kavale's meta-analysis findings of 161 studies where visual perceptual skills appeared to be most predictive of reading achievement in kindergarten to grade three (1982) and a study by Oakhill, Yuill, and Garnham (2011) where spatial working memory was moderately correlated with both reading accuracy and comprehension in six-year olds to 11-year olds.

### **Research Question Two**

The second research question sought to determine, besides the composite PKRS score, if any of the subtests were predictors of later reading achievement. Logistic regression was used as the statistical test to answer the second question. The dichotomous dependent variable was Title I Reading placement at the end of first grade because students are either placed in Title I Reading or they are not placed in Title I

Reading. The three assumptions for completing a logistic regression were met: sample size, multicollinearity, and outliers (Pallant, 2016). When checking for multicollinearity, Percentile was noted to have Pearson  $r$  values closest to 1.00 ( $r = .875, .677$ , and  $.890$ ). All values were significant at  $p < 0.01$ . In Riverside School District, students' percentile scores were used to determine initial placement in Title I Reading and, therefore, were not included as a predictor variable. Only one of the independent variables made statistically significant contribution to the model, Auditory,  $p = .001$ .

The Auditory section of the PKRS includes items that could be considered taxing on the working memory system. The working memory system is the short-term memory system for the temporary processing, holding, and manipulation of information (Baddeley, 1986; Baddeley & Hitch, 1974; Gathercole & Baddeley, 1993). The test items in the Auditory section of the PKRS included auditory discrimination of two words, auditory digit memory of one to five digits, memory of sentence to restate the sentence, and memory of sentence to recall details from a short story. Cameron et al. (2015) included working memory as one of the components of executive function (EF) and stated the need to measure early variation in EF and visuomotor processing to explore the variation in learning outcomes to later support children who may struggle in the classroom. Children with auditory processing disorder have also been shown to have lower memory and attention skills as well as lower test scores for language and reading (de Wit et al., 2016). The results from the current study are supported by current research where students with auditory processing disorder performed poorer on digit span tests, both forward and backwards, and working memory digit span assessments (Barry, Tomlin, Moore, & Dillon 2015; Sharma, Dhamani, Leung, & Carlile 2014; Tomlin,

Dillon, Sharma, & Rance, 2014). Boets et al. (2011) had similar results with an investigation into whether impairments in auditory processing in preschool predicted future reading problems. Even when controlling for letter knowledge and phonological awareness, two early literacy skills used to predict later reading success, their study indicated that children who received a dyslexia diagnosis later in their schooling had scored poorly on both the auditory processing and speech-in-noise perception assessments in kindergarten (Boets et al., 2011).

### **Research Question Three**

The third research question investigated if students in Title I Reading had difficulties with spatial intelligence and visual perception when compared to the students who did not receive Title I Reading. To examine research question three, qualitative data were collected in the form of transcripts from two focus group discussions and one semi-structured interview. The first two focus groups consisted of 11 current and retired kindergarten, first grade, and Title I Reading teachers. When the transcriptions were entered into NVivo there were nine themes: Title I, Spatial, Quality of Work, Other Services, Fine Motor, Executive Function, Background, Average and Above Average, and Age. Two of the nine themes, Age and Other Services, were mentioned fewer than five times. The other seven themes were mentioned more than ten times, and many of the themes were interrelated. Because of the interrelationship, one sentence could be coded with two or three themes. Quality of Work and Fine Motor were the two themes most mentioned when the researcher ran a query for individual themes.

To help answer the third research question, and to investigate the differences between students who received Title I Reading services and students who did not receive

Title I Reading services, a query for Title I and the other nodes were run; Fine Motor and Quality of Work were the two themes most often coded with Title I. Quality of Work was the theme that was most coded with Average/Above Average. This suggests that one of the differences between students who received Title I Reading and students who did not receive Title I Reading was completing work in a way that would be easy for the teachers to read. One teacher commented that the work she received from students who received Title I Reading had writing that was “very light and hard to read.” Another teacher stated that the writing was “very squiggly with few straight lines.” A kindergarten teacher noted that, “The letters are not anchored to the line, or situated between the top and bottom lines. If there is only a bottom line, sometimes the letters are written through the line.”

There were also multiple mentions of students using only one color when completing a coloring or drawing activity. One teacher mentioned that the students “have problems with knowing the correct color. The realistic color [for objects]. They use, I’m just thinking about the first day of school self-portraits and they’ll have purple hair.” A kindergarten teacher remarked, “They [students receiving Title I Reading] are quick. They want to get it done and over with, it seems like. ‘I colored it all orange, teacher, I’m done.’” Many teachers talked about students having a difficult time writing letters and numbers in a consistent and readable manner. One first grade teacher said that the letter and numbers looked like “spaghetti noodles. Piecing them together just trying to figure out how that letter is made. Or drawn.” One kindergarten teacher said, “I think a lot of times they’re trying to draw [letters and numbers] based on what they see. So how can I get that thing up there to look the same down here?”

During the current and retired first, kindergarten, and Title I Reading teachers' focus groups, it was mentioned that students who received Title I Reading also had a difficult time when asked to draw something or cut and glue pieces together to make a project. These comments fell under the theme Spatial. As the current and retired teachers discussed art projects, some mentioned that the students who received Title I Reading would draw the wrong shape in the wrong location on the paper.

I do directed drawing with my kids. And even that, even step-by-step, drawing your rectangle, and you can see mine, and somehow, it's a circle down in the bottom corner. And you're just like, how did you get here [*sic*]?

Another teacher mentioned difficulties with gluing pieces in the right location. One kindergarten teacher shared that a former kindergarten colleague called a project like that —

A Picasso deer, because their [the deer] body parts would not be sticking in the right place or they'd [the body part pieces] be smashed all on top of each other [*sic*]. Like antlers are the legs, or the legs are the antlers. It would be all gluey if it was something glued.

The teachers explained that projects completed by students who did not receive Title I Reading would look more like the teacher's model.

They [students who fall within the average to above average range] take whatever we're doing and add more to it and take it to the next level. There's opportunities [*sic*] in everything we do for enrichment if children are inclined to do that. The above average child realizes how it can be more. What else they can add to that piece of writing or artwork, or they'll say something that they noticed about math



we're doing and bring some outside experience into that [conversation] that makes sense and apply it.

This suggests that the students who received Title I Reading did have differences in spatial ability when compared to students who did not receive Title I Reading, based on the observations the teachers made of the students while completing projects in the classroom. These results are similar to a study of students who completed the Bender Gestalt Test (Koppitz, 1958). The students in the above average range tended to make fewer mistakes while students in the below average range tended to make more mistakes (Koppitz, 1958).

A third area that was discussed during the current and retired teachers' focus groups was executive functioning of students who received Title I Reading and students who did not receive Title I Reading. One recurring topic under executive function was attention. Many teachers commented that it was hard to keep the attention of students who received Title I Reading during lessons and or completing work. One retired kindergarten teacher who does volunteer work with the kindergarten classrooms commented:

It's harder and harder to keep their attention. Just volunteering in small groups and finding that there could be two adults and four kids, and it's hard to keep them on track, and where they're supposed to be. They want to do what they want to do. You know you ask them to put their finger and follow along. They don't wanna do it, so they don't.

These findings are similar to statements made by Graham, Collins, and Rigby-Wills (2017) that students with learning difficulties seemed to have weakened memory

skills as well as difficulties with executive functioning when compared to their typical peers.

When interviewing the art teacher, many of the same themes from the current and retired teachers' focus groups emerged. The art teacher brought student art samples which she sorted into students she perceived as receiving Title I Reading services and students who did not. The pieces of art from the students that the art teacher perceived who received Title I Reading were observed to be not as neat or as organized as the pieces from students the art teacher perceived who did not receive Title I Reading services.

These are the – these ones struggled more with directions. Uh, the quality of the work may not have been as up to standards as maybe some of the ones in this pile [pointing to the non-Title]. Um, just their attention to detail may not have been as up to the same standards as these [pointing to the non-Title pile once again]. Um, a lot of times, they won't – these students would just kind of rush through things, and they don't really take their time or want to revise, go back and revise their work.

One project involved cutting paper into small pieces that the students positioned into a radial, spiral design. Radial projects completed by students the art teacher thought received Title I Reading services contained pieces that were not square or rectangular in shape, and the pieces overlapped. Radial projects completed by students the art teacher thought did not receive Title I Reading services had pieces that were more uniform in size and shape, and the pieces did not overlap.

The other art project samples the art teacher brought with her were enlarged candy wrapper designs. While discussing the candy wrapper project, the art teacher mentioned that students she perceived to have received Title I Reading services had a difficult time with the concept, especially with the idea that the finished product might contain only some of the letters or words from the wrapper.

Well, honestly, the whole concept was sort of maybe a little too abstract for them, or just too—like, they wanted to fit in everything. Instead of saying, like “We might not see the whole—when we look through the little window on our candy wrapper, we might not see every word. We might just see ‘Twi.’ We might not see the X. I don’t see an X here,” but they want to squeeze it all in. They want to see the whole word. Or sometimes they would just, um, like, you might find some [projects] where things aren’t spelled correctly. They just rushed through and get it done, and then they realized that they spelled it wrong.

The other issue the students who the art teacher perceived received Title I Reading services had was adjusting the proportions in order to make the recreation of the candy wrapper large enough to fill the entire piece of construction paper. The art teacher commented that she just kept repeating, “Big, big, big” because “everything was too small. That was more the majority of the problem.”

The art teacher confessed that she did not think about students as struggling in reading or math, but she could tell which students enjoyed math and were good in math based on some of projects that they would complete. She commented, “I would say no, I can’t tell with reading [who struggles]. I really can’t, but sometimes with math, I can tell who likes math or who’s good at math based on some of the projects that we do.” This

was supported by comparing PKRS scores of the students the art teacher perceived received Title I Reading services and students who did not. The four students the art teacher predicted received Title I Reading had PKRS Perceptual Domain scores at or below the 50<sup>th</sup> percentile. The six students the art teacher predicted did not receive Title I Reading services had PKRS Perceptual Domain scores that ranged from the 25<sup>th</sup> percentile to the 95<sup>th</sup> percentile. The results from this study support the conclusion by Burger and Winner (2000) that a reliable relationship was demonstrated between arts instruction and reading improvement since all the students the art teacher predicted who received Title I Reading had lower PKRS Perceptual Domain scores.

### **Implications**

This study investigated what correlation, if any, exists between students' composite PKRS score, the visual-perceptual subtest of the PKRS, and reading achievement by the end of grade one. Based on the findings of this study, implications for teacher and schools, and policy makers will be discussed.

### **Teachers and Schools**

Children will continue to start school at different levels due to the nature of humanity: some will come to kindergarten more ready for school than others. In order for schools and teachers to meet the variety of needs the incoming students might have and to ensure student success, kindergarten screening tools are beneficial. For schools that use the PKRS to help determine student placement in reading support, the composite score was shown to help predict who would need later reading support. For students who score just above the composite score cut off, it may be beneficial to look at the students' Auditory Domain score. This study found that the Auditory Domain score was

highly correlated to Percentile and was also shown to make a statistically significant contribution in determining whether students are placed in Title I Reading. Because of these findings, students who scored poorly on the Auditory Domain section, but had a Percentile score higher than the cutoff, might benefit from being initially placed in reading support.

During the current and retired teachers' focus groups, many of the teachers shared that students who received Title I Reading services struggled with fine motor and visual-spatial perception. In this study, the Perceptual Domain was found to have a significant negative correlation suggesting that students who scored lower on the Perceptual Domain section of the PKRS were more likely to receive Title I Reading services. Because of this finding, students who scored poorly on the Perceptual Domain section, but had a Percentile score higher than the cutoff, might also benefit from being initially placed in reading support.

In schools and districts that do not have a Title I Reading program, or reading specialists, placing students in reading support may not be a possibility. Instead, teachers will need to look into classroom-based interventions to help students who scored poorly on the school's readiness screener. One classroom-based intervention that would be beneficial to all students is for districts to invest in an evidence-based core reading program that includes phonemic awareness and systematic phonics instruction. Within the language arts block of time, teachers should plan instruction that incorporates engaging purposeful activities that include practice of taught objectives. Teachers and school should also investigate flexible instructional groupings based on on-going formative assessments and universal screeners. Flexible groupings will help to ensure

students are receiving differentiated instruction based on needs and learning styles. The differentiated groups could be contained in a single classroom, or, if the school has multiple sections of the same grade, teachers could create groupings that include students from other classrooms who are working on the same early literacy skills.

For students who struggle with fine motor and/or spatial abilities, schools could create a specialized art class. The class would only be opened to students who either scored poorly on the perceptual component of the readiness screener or have been observed in the classroom as struggling with fine motor or visual-motor activities. The art teacher could do two things. First, the art teacher could plan activities that would give students opportunities to incorporate fine motor and visual tasks. Second, the art teacher could plan instruction on looking at wholes and breaking them down into the parts and then giving the students the parts for them to recreate the wholes.

The music class can also be utilized to support students who struggle with early literacy concepts. Many of the nursery rhymes and songs have strong rhyming patterns and structure. Singing songs that have strong rhymes can help develop an ear for rhyme. Traditional school songs like “Down by the Bay” (Raffi, 1980) not only work on rhyming words, but also are fun for students as they sing about bears in chairs and a moose kissing a goose. Students can play and manipulate language when singing other traditional songs like “Apples and Bananas” (Sauls, 1997) and “Willoughby Wallaby Woo” (Raffi, 1980).

Outside of the fine arts classrooms, the general classroom teacher could plan activities and projects that would tap into the students’ visual-motor capabilities. This could include activities that move from gross motor movement to fine motor. An example could be as simple as playing Simon Says or Follow the Leader. Teacher could

also plan activities that involve gross motor movement to practice learned concepts. For example, when learning about syllables the students could play syllable hopscotch and hop the number of syllables in each word. There are many fun and engaging activities teachers have easy, and free, access to use that could help students who struggle with spatial and fine motor abilities to learn and practice the content being taught.

Classroom teachers and physical education teachers could also collaborate to offer a class that would blend literacy objectives with physical education objectives. For example, the classroom teacher could give a list of sight words to the physical education teacher, and the physical education teacher could create an activity where students practice reading the sight words while jumping with their feet together. If the physical education teacher is teaching a unit on basketball, the students could practice dribbling the ball while reciting their alphabet or segmenting words.

### **Policy Makers**

When the researcher examined the PKRS data, especially the distribution of student scores, students who entered Riverside School District's kindergarten did so with a wide range of readiness. One of the topics that the current and retired teachers mentioned as a possible barrier to learning was lack of exposure to vocabulary and experiences. Based on the National Center for Education Statistics report, much has been done in the last years to expand quality early schooling experiences for children as the percentage of three-year-old and four-year-olds who are in a preschool program has increased from 1990's rates of 33 and 56 percent to the current rates of 43 and 66 percent (NCES, 2016). While national numbers of children attending a preschool program have increased, the Commonwealth of Pennsylvania reported in 2016 that 64.2 percent, or

114,329 children, of the Commonwealth's three- and four-year-old children living in families that earned up to 300 percent of the federal poverty guidelines did not have access to publicly-funded high-quality early childhood education (Pennsylvania Department of Education and Human Resources, 2016). According to this same report, between 46 and 63 percent of three- and four-year-old children in that same category (living in families earning 300 percent of the federal poverty guidelines) living in the county the current study took place in did not have access to publicly-funded, high-quality early childhood education. There is a great need to continue, and to increase, publicly-funded early childhood education. This will increase access to publicly-funded early childhood education facilities for children who currently have limited access. Increasing the accessibility to quality early childhood facilities will help all children, especially children who might be considered at-risk because of socio-economic status, by increasing background experiences and exposure to school vocabulary.

### **Limitations of Study**

The results of this study were obtained from a medium size school district, total enrollment of about 2,800 students, in Western Pennsylvania. First grade teachers, kindergarten teachers, Title 1 Reading teachers, and an art teacher were included in this study. As a result of the small and geographically limited sample, findings from this study may not be generalized to other students in different districts to determine the predictive nature of the Phelps Kindergarten Readiness Scale (Phelps, 2003).

Another limitation to this study is age of the population being examined. Predictive studies of children in early elementary have had mixed results, because children at that age change and learn so much in such a relatively short period of time



(Gredler, 1997). In fact, Gredler (1992) stated, “perhaps the most important objection to early screening programs is that they are not very accurate” (pg. 27). Some students begin school with little exposure to school readiness opportunities. Some of the teachers in the focus group stated that some of the students had few opportunities to use pencils before coming to school. While students can have a very low score on a readiness instrument, they can make great strides in a short amount of time.

A third limitation also has to do with the location of the study: the researcher is an employee of the district in which the study took place that resulted with the participants being familiar with the researcher. The researcher was aware of this concern and was conscientious of the extra diligence required to ensure the confidentiality of the focus group participants.

A fourth limitation was a mistake with the list of student codes the art teacher received. The art teacher only received student codes from students who were receiving Title I Reading services and therefore only chose art samples from those students. This limited the number of samples she could pick from to less than 50. The art teacher even commented during the interview that she would have picked other samples to share, but she did not have codes for those students.

### **Opportunities for Further Research**

This study identified a negative correlation between students’ visual perceptual score and placement into Title I Reading. The qualitative data identified some common characteristics that students who received Title I Reading struggled with in the regular classroom, small group reading class, and art class. The following are possible research opportunities that could arise from this study.

1. This study could be replicated with a larger sample of both student test scores and with a larger sample of teachers who participated in the focus group discussion. There were a large number of kindergarten teachers who participated in the focus groups, but the voices and experiences from first grade and reading teachers was limited because there were fewer of those participants. A larger number of participants, and participants from different regions of the country, could create a study that would be more generalizable to the larger population.
2. The samples of student art work the art teacher brought to share during the focus group was limited to only ten pieces; the pieces were also limited to two-dimensional pieces. Opening the number of pieces to more than ten, especially multiple pieces from the same student using different art media, could help explore if students with reading difficulties favor one kind of art medium, and if those students also experience difficulties with projects that require more visual-perceptual skills, such as enlarging, reducing, or rotating objects.
3. As noted in the literature review and in the problem statement, reading at the end of third grade has been shown to be predictive of completing high school, of being accepted into college, and of finding a job (Lesnick, Goerge, Smithgall, & Gwynne, 2010). This study only looked at end of first grade Title I Reading rosters as a data source for reading achievement. A longitudinal study, using the end of third grade Title I Reading rosters, would be beneficial to districts that use the PKRS to help determine if the PKRS is sensitive enough to help identify students who are at-risk of not being on grade level by the end of third grade.

4. During the current and retired teachers focus groups, the topic of student background was mentioned, especially the lack of exposure that some of the students had to experiences and to commonly used school supplies such as crayons, pencils, and scissors. Further research could segregate the PKRS and Title I Reading data based on whether students had a prior early childhood school experience and the different kinds of experience, such as Head Start, private care, publicly funded pre-K, or no experience at all. Information from the study could then be used to help proponents of quality early childhood show policy makers the depth of need for support of publicly funded early childhood experiences for students or even to increase the amount of funding.

### **Conclusion**

Elementary school is a short period of time in the life of a student. Researchers have found a strong connection between end of third grade reading level and later school and personal success. Students do not have time for teachers and schools to waste in readying them to be reading on grade level by the end of third grade. Students must have schools that have readiness screening measures in place that are rigorous and can predict which students might develop learning problems. These readiness measures will ensure that students will have success in their beginning years of school.

This study examined the PKRS and found that the PKRS correctly predicted over 80 percent of the sample population who would receive Title I Reading services, which left 20 percent of those who needed Title I Reading services unidentified until after the start of kindergarten. Some people might think that 80 percent is a good percentage, but 20 percent is far too many children who do not have supports in place at the beginning of

school. Even though the Perceptual Domain was not found to make a significant contribution to the logistic regression, using the observations of the teachers, schools should look closely at the whole student and not just a composite score for initial school readiness. Schools and teachers need to be prepared to have interventions in place for those students who may come to school with limited background experiences, limited vocabularies, and limited exposure to pre-school activities. For some schools, one of the interventions for students who might be at-risk for later reading difficulties could be placement in a reading support classroom with a reading specialist or Title I Reading teacher. Other interventions for students who might be at-risk for reading difficulties could include the use of flexible ability groups to teach targeted skills to students who are struggling to master the concepts being taught in the classroom. Another intervention could be to offer parent workshops to give parents tools for working with their children at home to practice the emergent and early literacy concepts being taught. For schools that do not have a reading support program, classroom teachers will need to look closely at their classrooms' early literacy practices, instruction, and assessments to make sure all students in their classroom will experience success in the first years of school.

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## Appendix A

### Institutional Review Board Approval Letter



Indiana University of Pennsylvania

[www.iup.edu](http://www.iup.edu)

Institutional Review Board for the  
Protection of Human Subjects  
School of Graduate Studies and Research  
Stright Hall, Room 113  
210 South Tenth Street  
Indiana, Pennsylvania 15705-1048

P 724-357-7730  
F 724-357-2715  
[irb-research@iup.edu](mailto:irb-research@iup.edu)  
[www.iup.edu/irb](http://www.iup.edu/irb)

October 14, 2016

Sarah M. Bond  
1244 School Street  
Indiana, PA 15701

Dear Ms. Bond:

Your proposed research project, "The Predictive Nature of the Phelps Kindergarten Readiness Scale Perceptual Score and Reading Achievement: A Multiple Regression Study," (Log No. 16-220) has been reviewed by the IRB and is approved. In accordance with 45CFR46.101 and IUP Policy, your project is exempt from continuing review. This approval does not supersede or obviate compliance with any other University requirements, including, but not limited to, enrollment, degree completion deadlines, topic approval, and conduct of university-affiliated activities.

You should read all of this letter, as it contains important information about conducting your study.

Now that your project has been approved by the IRB, there are elements of the Federal Regulations to which you must attend. IUP adheres to these regulations strictly:

1. You must conduct your study exactly as it was approved by the IRB.
2. Any additions or changes in procedures must be approved by the IRB before they are implemented.
3. You must notify the IRB promptly of any events that affect the safety or well-being of subjects.
4. You must notify the IRB promptly of any modifications of your study or other responses that are necessitated by any events reported in items 2 or 3.

The IRB may review or audit your project at random or for cause. In accordance with IUP Policy and Federal Regulation (45CFR46.113), the Board may suspend or terminate your project if your project has not been conducted as approved or if other difficulties are detected

Although your human subjects review process is complete, the School of Graduate Studies and Research requires submission and approval of a Research

IRB to Sarah M. Bond, October 14, 2016

Topic Approval Form (RTAF) before you can begin your research. If you have not yet submitted your RTAF, the form can be found at <http://www.iup.edu/page.aspx?id=91683>.

While not under the purview of the IRB, researchers are responsible for adhering to US copyright law when using existing scales, survey items, or other works in the conduct of research. Information regarding copyright law and compliance at IUP, including links to sample permission request letters, can be found at <http://www.iup.edu/page.aspx?id=165526>.

I wish you success as you pursue this important endeavor.

Sincerely,

Jennifer Roberts, Ph.D.  
Chairperson, Institutional Review Board for the Protection of Human Subjects  
Professor of Criminology

JLR:jeb

Cc: Dr. Sue Rieg, Dissertation Advisor  
Dr. Kelli Jo Kerry-Moran, Graduate Coordinator  
Ms. Brenda Boal, Secretary

## Appendix B

### Site Permission from Riverside School District

November 4, 2016

Dear Sarah Bond,

Your request to evaluate the extent to which the Phelps Kindergarten Readiness scores correctly identify students who need reading support in order to be successful readers per your October 24, 2016 letter for your doctoral dissertation research is approved.

Sincerely,

A handwritten signature in blue ink, appearing to be "Sarah Bond", is written below the text "Sincerely,".

## Appendix C

### Contact Letter and Consent Form for Current and Retired Teachers' Focus Group



Indiana University of Pennsylvania

[www.iup.edu](http://www.iup.edu)

**Department of Professional Studies  
in Education**

Davis Hall, Room 303  
570 South Eleventh Street  
Indiana, PA 15705-1050

**P** 724-357-2400

**F** 724-357-2961

[www.iup.edulpse](http://www.iup.edulpse)

### The Predictive Nature of the Phelps Kindergarten Readiness Scale Perceptual Score and Reading Achievement: A Multiple Regression Study

Dear Educator,

My name is Sarah Bond, a kindergarten teacher at Elementary School and I am also a doctoral candidate in the Curriculum and Instruction program at Indiana University of Pennsylvania. Today I am contacting you as a researcher. You are being invited to participate in a focus group as part of my research study. I am asking you to participate because you are a kindergarten teacher, first grade teacher, reading teacher, or recently retired teacher at Riverside School District. The following information is provided in order to help you to make an informed decision as to whether or not to participate in this study. If you have any questions, please, do not hesitate to contact me.

The purpose of this study is to investigate how accurate the Phelps Kindergarten Readiness Assessment is at identifying students who are at-risk for later reading problems. The information gained from this study may help educators make more informed decisions regarding kindergarten students' placement in Title I reading support. Participation in this study will require approximately 90 minutes of your time. The session will be audio and video-recorded. Light refreshments will be provided. Participation or non-participation will not affect your teacher evaluations. Neither the superintendent nor your building principal will know who is participating.



One risk to participating in this study is that someone else in the focus group may disclose what the other says. In order to reduce this risk and insure others outside of the focus group do not find out who is participating and what is discussed, focus group ground-rules will be discussed at the beginning of the focus group. One ground-rule is specific students' names will not be used during our focus group to protect their identity. Another ground-rule is that content discussed during the focus group is not to be discussed with others or discussed in a location where others might be able to eavesdrop. You will be participating in a focus group discussion on what you observe about students.

Your participation in this study is voluntary. You are free to decide not to participate in this study or to withdraw at any time without adversely affecting your relationship with the investigator or Riverside School District. Your decision will not result in any loss of benefits to which you are otherwise entitled. If you choose to participate, you may withdraw at any time by notifying me. Upon your request to withdraw, all information pertaining to you will be destroyed and not included in the study. If you choose to participate, all information will be held in strict confidence and will have no bearing on your teacher evaluations. The information obtained in the study will be published as part of my dissertation, and may be published in academic journals or presented at education conferences but your identity will be kept strictly confidential. No identifiers will be provided in any published documentation. You will be given a transcript of the discussion for review and all participants will have access to the final results of the study, at their request.

The primary researcher conducting this study is Sarah Bond. If you have questions, you may contact Sarah Bond via email at [s.bond@iup.edu](mailto:s.bond@iup.edu) or 1-724-549-6093 or the dissertation chairperson, Dr. Sue Rieg via email at [srieg@iup.edu](mailto:srieg@iup.edu) or 1-724-357-2400.

If you are willing to participate in this study, you may either email Sarah Bond at [s.bond@iup.edu](mailto:s.bond@iup.edu) or send a signed copy of this form to Sarah Bond at Elementary School. For those who decide to send an email, you will be asked to sign a consent form when you attend the focus group. At the focus group, each member will receive an extra, unsigned copy for your records. If you choose not to participate then you may dispose of this letter.

**Statement of Consent:** I have read the above information, and have received answers to any questions I asked. I consent to volunteer to be a participant in this study. I understand that my responses are completely confidential and that I have the right to withdraw at any time. I have received an unsigned copy of this informed Consent Form to keep in my possession.

Your Signature \_\_\_\_\_

Date \_\_\_\_\_

Your Name (printed)

\_\_\_\_\_

Phone number or email you would like the researcher to use to reach you.

\_\_\_\_\_

Best days and times to reach you

\_\_\_\_\_

Would you be interested in receiving a digital copy of the final dissertation (please check)?

\_\_\_\_\_ Yes      \_\_\_\_\_ No

This project has been approved by the Indiana University of Pennsylvania Institutional Review Board for the Protection of Human Subjects (Phone: 724/357-7730).

## Appendix D

### Contact Letter and Consent Form for Art Teachers' Focus Group



Indiana University of Pennsylvania

[www.iup.edu](http://www.iup.edu)

**Department of Professional Studies  
in Education**

Davis Hall, Room 303  
570 South Eleventh Street  
Indiana, PA 15705-1050

**P** 724-357-2400

**F** 724-357-2961

[www.iup.edu/pse](http://www.iup.edu/pse)

### The Predictive Nature of the Phelps Kindergarten Readiness Scale Perceptual Score and Reading Achievement: A Multiple Regression Study

Dear Educator,

My name is Sarah Bond, a kindergarten teacher at Elementary School and I am also a doctoral candidate in the Curriculum and Instruction program at Indiana University of Pennsylvania. Today I am contacting you as a researcher. You are being invited to participate in a focus group as part of my research study. I am asking you to participate because you are a kindergarten teacher, first grade teacher, reading teacher, or recently retired teacher at Riverside School District. The following information is provided in order to help you to make an informed decision as to whether or not to participate in this study. If you have any questions, please, do not hesitate to contact me.

The purpose of this study is to investigate how accurate the Phelps Kindergarten Readiness Assessment is at identifying students who are at-risk for later reading problems. The information gained from this study may help educators make more informed decisions regarding kindergarten students' placement in Title I reading support. Participation in this study will require approximately 90 minutes of your time. The session will be audio and video-recorded. Light refreshments will be provided. Participation or non-participation will not affect your teacher evaluations. Neither the superintendent nor your building principal will know who is participating. You will be participating in a focus group discussion on what you observe about students. You will need to bring samples of students' artwork that you have sorted into two groups with you to the focus group. One

group should be students you think received Title I reading services and the other group should be students you think do not received Title I reading services. Please make sure that all student names have been replaced with the special code you received from the Title I teacher.

One risk to participating in this study is that someone else in the focus group may disclose what the other says. In order to reduce this risk and insure others outside of the focus group do not find out who is participating and what is discussed, focus group ground-rules will be discussed at the beginning of the focus group. One ground-rule is specific students' names will not be used during our focus group to protect their identity. Another ground-rule is that content discussed during the focus group is not to be discussed with others or discussed in a location where others might be able to eavesdrop. You will be participating in a focus group discussion on what you observe about students.

Your participation in this study is voluntary. You are free to decide not to participate in this study or to withdraw at any time without adversely affecting your relationship with the investigator or Riverside School District. Your decision will not result in any loss of benefits to which you are otherwise entitled. If you choose to participate, you may withdraw at any time by notifying me. Upon your request to withdraw, all information pertaining to you will be destroyed and not included in the study. If you choose to participate, all information will be held in strict confidence and will have no bearing on your teacher evaluations. The information obtained in the study will be published as part of my dissertation, and may be published in academic journals or presented at education conferences but your identity will be kept strictly confidential. No identifiers will be provided in any published documentation. You will be given a transcript of the discussion for review and all participants will have access to the final results of the study, at their request.

The primary researcher conducting this study is Sarah Bond. If you have questions, you may contact Sarah Bond via email at [s.bond@iup.edu](mailto:s.bond@iup.edu) or 1-724-549-6093 or the dissertation chairperson, Dr. Sue Rieg via email at [srieg@iup.edu](mailto:srieg@iup.edu) or 1-724-357-2400.

If you are willing to participate in this study, you may either email Sarah Bond at [s.bond@iup.edu](mailto:s.bond@iup.edu) or send a signed copy of this form to Sarah Bond at Elementary School. For those who decide to send an email, you will be asked to sign a consent form when you attend the focus group. At the focus group, each member will receive an extra, unsigned copy for your records. If you choose not to participate then you may dispose of this letter.

**Statement of Consent:** I have read the above information, and have received answers to any questions I asked. I consent to volunteer to be a participant in this study. I understand that my responses are completely confidential and that I have the right to withdraw at any time. I have received an unsigned copy of this informed Consent Form to keep in my possession.

Your Signature \_\_\_\_\_

Date \_\_\_\_\_

Your Name (printed)  
\_\_\_\_\_

Phone number or email you would like the researcher to use to reach you.

---

Best days and times to reach you  
\_\_\_\_\_

Would you be interested in receiving a digital copy of the final dissertation (please check)?

\_\_\_\_\_ Yes      \_\_\_\_\_ No

This project has been approved by the Indiana University of Pennsylvania Institutional Review Board for the Protection of Human Subjects (Phone: 724/357-7730).

## Appendix E

### Permission to Use the Phelps Kindergarten Readiness Scale

9/20/2016

Re: Permission to use the Phelps Kindergarten Readiness Scale

**Subject: Re: Permission to use the Phelps Kindergarten Readiness Scale**  
**From:** Phelps Kindergarten Readiness Scale <pkrs1@great-ideas.org>  
**Date:** 11/01/12 09:54 AM  
**To:** Sarah Bond <s.bond@iup.edu>

Sarah,  
Please feel free to use the PKRS for your dissertation.  
If you would be kind enough to send us a copy of the final form of the dissertation, we would appreciate it.  
With regards,  
Ch

On 10/31/2012 10:08 PM, Sarah Bond wrote:

*Thank you for your response. I hope to examine how the PKRS perceptual results of incoming kindergarten students correlate with later difficulty in learning to read, using Title I reading placement as the criterion for reading difficulty. I would be using archived data from a school district that has been using the PKRS at kindergarten spring enrollment for many years and therefore would not need to order testing materials. I am requesting permission to use the PKRS so that I may continue with this dissertation study idea.*

*If you have further questions I would be happy to discuss them over the phone.*

*I look forward to reading your reply.*

Sarah Bond

On Tue, 16 Oct 2012 09:37:19 -0400

Phelps Kindergarten Readiness Scale <pkrs1@great-ideas.org> wrote:

Sarah,

Please describe how you propose to use the PKRS in your research and how we might facilitate what you are doing.

Regards,  
Ch

On 10/15/2012 9:53 PM, Sarah Bond wrote:

*To Whom it May Concern,*

*I am interested in possibly using the Phelps Kindergarten Readiness Scale as part of my dissertation and am wondering who I need to contact to gain permission to use it. If you are able to give me any further direction on the proper channels for this inquiry, I would appreciate it.*

*Thank you,*

Sarah Bond  
Doctoral Candidate  
Indiana University of Pennsylvania

-- Charles Jakiela  
Publisher  
Psychology Press

## Appendix F

### Current and Retired Teachers' Focus Group Protocol

#### Welcome

Thank you for coming and agreeing to participate in this focus group. I'm Sarah Bond, a Doctoral Candidate in the Curriculum and Instruction program at Indiana University of Pennsylvania. Today you will be participating in a semi-structured, large-group interview. A semi-structured focus group means there are preplanned questions the researcher would like answered. This structure of focus group also allows the researcher to ask other follow-up questions, depending on the discussion that takes place. I have seven questions I would like to ask but may add more, depending on the conversation. These questions are related to your perceptions of students' fine motor skills, reading achievement, and overall academic achievement. There are no wrong answers. I will be recording our discussion. The recording will then be transcribed and the transcription will be coded to look for common themes. The transcription and recordings will be kept in a secure location for seven years.

Before we begin I would like to go over the ground rules for today's discussion.

- 1). Everyone is free, and encouraged, to share their thoughts and feelings while answering the questions. There are no wrong answers and there are no consequences for your answers. This may lead to some disagreements. Please be respectful of everyone's opinions.

- 2). No sidebar conversations as it deters from the main conversation and is difficult to pick up on the recordings.

3). To help protect the identities of your students, please use a pseudonym or just “a girl in my room”. Similarly, we will not be using our names today to help protect identities when this conversation is transcribed. If you need to identify another person in the group please use the appropriate pronoun or identify them by the grade level or topic they teach.

4). At anytime, if you do not want to continue to be a part of this focus group, please feel free to leave. I will make a note that you left and anything you said during the focus group will not be used

5). Topics discussed during this focus group are considered confidential and should not be talked about in the presence of others who were not part of this group. This is to help protect the identities of those participating today and so everyone feels they are free to share their thoughts on the topic.

Just as a reminder, as it is stated on your consent form, I will not share with the superintendent or other district administrators who participated in the focus group or what was discussed.

Do you have any questions regarding the ground rules for today’s discussion? If you need a question repeated, please let me know.

Then let’s begin.

Questions:

1) Please introduce yourself to the group by telling what you teach and about how long you have been teaching. Remember, we are not using names today.



- 2) Students in your classroom perform at different levels in the different subject areas.

What do you notice about students who are above average in regards to academic and nonacademic tasks?

- 3) Follow-up question: what about students who receive Title I services? What do you notice about students on the Title roster and how they do in all areas of school, academic, and nonacademic?

- 4) Please describe the quality of completed work you get from your students.

a) Follow up question: Describe the quality of work your students who are average and above average give you.

b) Describe the quality of work your students on the Title I roster give you.

- 5) There are many tasks you might ask your students that would be considered visual motor—where a student looks at something and then has to recreate it, either by drawing or making with three dimensional shapes. Describe how your students do on those tasks, thinking about students on the Title roster and the students who are average and above average.

a) Do you notice a difference between visual-motor tasks in math versus reading?

- 6) In your classroom, when you have students draw a shape, write a number or letter what have you noticed?

- 7) If you could give your students just one assessment to see if they might struggle academically, what would that assessment be and what does it involve?

Wrap-up

Thank you all for coming to this evening's focus group. Do you have any questions? As stated earlier, you will be receiving a transcript of your contribution to tonight's

discussion. Please read over it and if you feel something was incorrectly quoted, please let me know. If you are interested in receiving a digital copy of my final product please email me. My information is located at the bottom of your copy of the consent form.

Thank you again and have a good rest of your day.

#### Matrix of focus group protocol and research questions

Protocol number	Research question number
1	NA
2	3
3	3
4	3
5	3
6	3
7	NA

## Appendix G

### Art Teachers' Focus Group Protocol

#### Welcome

Thank you for coming and agreeing to participate in this focus group. I'm Sarah Bond, a Doctoral Candidate in the Curriculum and Instruction program at Indiana University of Pennsylvania. Today you will be participating in a semi-structured, large-group interview. A semi-structured focus group means there are preplanned questions the researcher would like answered. This structure of focus group also allows the researcher to ask other follow-up questions, depending on the discussion that takes place. I have five questions I would like to ask but may add more, depending on the conversation. These questions are related to your perceptions of students' fine motor skills, visual-spatial ability, and overall academic achievement. There are no wrong answers. I will be recording our discussion. The recording will then be transcribed and the transcription will be coded to look for common themes. The transcription and recordings will be kept in a secure location for seven years.

Before we begin I would like to go over the ground rules for today's discussion.

1). Everyone is free, and encouraged, to share their thoughts and feelings while answering the questions. There are no wrong answers and there are no consequences for your answers. This may lead to some disagreements. Please be respectful of everyone's opinions.

2). No sidebar conversations as it deters from the main conversation and is difficult to pick up on the recordings.

3). To help protect the identities of your students, please use a pseudonym or just “a girl in my room”. Similarly, we will not be using our names today to help protect identities when this conversation is transcribed. If you need to identify another person in the group please use the appropriate pronoun or identify them by the grade level or topic they teach.

4). At anytime, if you do not want to continue to be a part of this focus group, please feel free to leave. I will make a note that you left and anything you said during the focus group will not be used

5). Topics discussed during this focus group are considered confidential and should not be talked about in the presence of others who were not part of this group. This is to help protect the identities of those participating today and so everyone feels they are free to share their thoughts on the topic.

Just as a reminder, as it is stated on your consent form, I will not share with the superintendent or other district administrators who participated in the focus group or what was discussed.

Do you have any questions regarding the ground rules for today’s discussion? If you need a question repeated, please let me know.

Then let’s begin.

Questions:

- 8) Please introduce yourself to the group by telling what you teach, the grade levels you teach, and about how long you have been teaching. Remember, we are not using names today.
- 9) You were each asked to bring samples of students' work sorted into students you think receive Title I reading services and those who do not receive those services. I will be taking a look at the names on the artwork and comparing them to the Title I reading roster. Please explain how you sorted the samples you brought.
- 10) You may not have to teach reading and math to the students you have but while doing art lessons and projects in the classroom, are you able to probably tell which students struggle in reading and math and which students are doing average or better? What do you notice? You might want to think of a few specific students you know struggle in reading and math and a few students you know do not struggle and do well in reading and/or math.
  - a) What differences do you notice between media and the ability of those students you're thinking about?
- 11) Once most students have better fine motor skills, what do you notice regarding a difference in work between the students who struggle and students who are average/above average?
- 12) If you had to evaluate a student's spatial intelligence and visual perception, what kind of assignment would you give? What would you be looking for in the assignment to indicate the student met with your expectations?

## Wrap-up

Thank you all for coming to this evening's focus group. Do you have any questions? As stated earlier, you will be receiving a transcript of your contribution to tonight's discussion. Please read over it and if you feel something was incorrectly quoted, please let me know. If you are interested in receiving a digital copy of my final product please email me. My information is located at the bottom of your copy of the consent form. Thank you again and have a good rest of your day.

## Matrix of focus group protocol and research questions

Protocol number	Research question number
1	NA
2	3
3	3
4	3
5	3