EXAMINING THE RELATIONSHIP BETWEEN

INFORMATION OBTAINED AT KINDERGARTEN REGISTRATION

AND READING COMPREHENSION SIX YEARS LATER

by

Paige Colwell Swartz

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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ABSTRACT

The purpose of this correlational study was to determine if variables known upon a group

of students' enrollment in kindergarten had a significant relationship with their high-

stakes reading assessment results obtained six years later, in the students' fifth grade

year. Archival data was gathered from a rural northern Georgia school district. After a

correlation matrix was constructed to examine the relationships among all variables of

interest, bivariate linear regressions were used to determine whether the predictor

variables explained any variance in the results of the fifth grade high-stakes reading

assessment. Results indicated that one of the four predictor variables (vocabulary)

explained a significant amount of variance in fifth grade CRCT Reading scores. In

addition, a second variable (socioeconomic status) was significantly correlated with this

predictor variable. Implications are discussed in terms of risk assessment, instruction,

and assessment of reading comprehension. Recommendations are made for further

longitudinal research in the early assessment and remediation of deficits contributing to

long-term reading comprehension difficulties.

Acknowledgements and Dedication

Looking back on this journey, I see many, many times when there was only one set of

footprints in the sand. Thank you, my Father, for carrying me.

To Toby, my patiently optimistic husband;

To Zeke, my brilliant, determined son;

To Sofia, my ingenious, charismatic daughter;

To my mom, my tireless cheerleader; and

To my dad, the ultimate inspiration:

I humbly dedicate this accomplishment.

Thank you, my wonderful friend, for the quote that planted the seed:

Breadth of knowledge is the single factor within human control that contributes most to

academic achievement and general cognitive competence.

In contradiction to the theory of social determination, breadth of knowledge is a far

greater factor in achievement than socioeconomic status. ~E.D. Hirsch, Jr.

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List of Abbreviations

Constrained Skills Theory (CST)

Construction-Integration Model (CI)

Criterion Referenced Competency Test (CRCT)

Early Longitudinal Program Kindergarten Class (ELP-K)

English as Second Language (ESL)

Georgia Department of Education (GaDOE)

Institutional Review Board (IRB)

Kaufman Assessment Battery for Children (K-ABC)

Kaufman Scale of Early Academic and Language Scales (K-SEALS)

National Assessment of Educational Progress (NAEP)

National Institute for Child Health and Human Development (NICHD)

No Child Left Behind (NCLB)

Organisation for Economic Co-operation and Development (OECD)

Peabody Picture Vocabulary Test – Revised (PPVT-R)

Program of International Student Assessment (PISA)

(Harvard's) Program on Education Policy and Governance (PEPG)

Predictive Analytic SoftWare (PASW)

Progress in International Reading Literacy Study (PIRLS)

Socioeconomic Status (SES)

Stanford-Binet – 4th Edition (SB-IV)

CHAPTER ONE: INTRODUCTION

Today's global society has been characterized as increasingly information-driven (Rapp, van den Broek, McMaster, Kendeou, & Espin, 2007). The myriad literacy demands that the interdependent, rapidly shrinking world places on its citizens cannot be overstated. In fact, some authors have asserted that the ability to read is one of the most important "survival skills" (van den Broek et al., 2005, p. 107) that can be taught. Paris and Hamilton (2009) articulated this point by saying, "Making sense of printed words and communicating through shared texts with interpretive, constructive, and critical thinking is perhaps the central task of formal schooling around the world" (p. 32).

Many children become successful enough at reading to make sense of most of the texts assigned to them; however, many do not. Furthermore, for those children who do become successful, far too few meet the criteria that have been established for placement in the *advanced* category comprised of those "who can read and understand, and also evaluate, critique, compare, and judge the worthiness of the arguments" (Paratore, Cassano, & Schickedanz, 2011, p. 107). The National Assessment of Educational Progress (NAEP) is administered by the U.S. Department of Education and is generally known as the nation's report card. The mediocre reading achievement of American children—with the most recent proficiency level of 31%—remains virtually unchanged from the average reading performance in the 1990's. In a statement issued on November 1, 2011 regarding the *Nation's Report Card: Reading and Math 2011 at Grades 4 and 8*, U.S. Secretary of Education Arne Duncan maintained:

The modest increases in NAEP scores are reason for concern as much as optimism. While student achievement is up since 2009 in both grades in mathematics and in 8th grade reading, it's clear that achievement is not accelerating fast enough for our nation's children to compete in the knowledge economy of the 21st Century. (U.S. Department of Education, 2011)

In order to provide a global perspective on whether American public and private schools are adequately preparing students to compete in the 21st century economy, Harvard's Program on Education Policy and Governance (PEPG) compared the performance of U.S. 8th grade students on NAEP math and reading tests with the performance of students from across the world on similar tests (Peterson, Woessmann, Hanushek, & Lastra-Anadon, 2011). These similar tests originate with the international Organisation for Economic Co-operation and Development (OECD), which administers the Program of International Student Assessment (PISA) to representative samples of 15-year-old students in 65 of the world's school systems. As students from the U.S. also participate in PISA, Harvard is able to make direct comparisons between the average performance of U.S. students and that of their peers in other countries. The overall U.S. proficiency rate of 31% places American students in 17th place among the 65 nations that participate in PISA.

Skilled reading begins with the ability to decode written text. Though far from simple, the ability to decode text requires a finite set of skills that, once mastered, results in the ability to *crack the code* of written English. The skills underlying decoding include letter name knowledge and phonological awareness (Lonigan, Burgess, & Anthony, 2000), the insight that letters represent individual sounds in spoken words (Foorman &

Connor, 2011), knowledge of print conventions (Justice & Piasta, 2011), and an understanding that print conveys meaning (Foorman & Connor, 2011). Skillful decoding alone, however, is insufficient to comprehend text. According to Paris and Hamilton (2009), "without comprehension, reading words is reduced to mimicking the sounds of language, repeating text is nothing more than memorization and oral drill, and writing letters and characters is simply copying or scribbling" (p. 32). In addition, "the development of reading comprehension is inter-related with the development of knowledge and reasoning over a longer period of time than the development of decoding skills" (Paris & Hamilton, 2009, p. 40).

In the earlier stages of learning to read, comprehension is relatively simple, as "both vocabulary and syntax in beginning texts are simplified for easy access" (Paratore, Cassano, & Schickedanz, 2011, p. 110). Therefore, comprehension difficulties often do not become evident until students enter the third or fourth grade, when vocabulary, grammatical structure, and content become less familiar and more complex. Moreover, the skills underlying reading comprehension are complex, vast, and still incompletely understood. These skills include, but are not limited to, vocabulary knowledge (Elleman, Lindo, Morphy, & Compton, 2009; Nagy & Scott, 2000; Ouellette, 2006; Senechal, Ouellette, & Rodney, 2006; Wagner & Meros, 2010), familiarity with various text structures (Goldman & Rakestraw, 2001), awareness of comprehension strategies (Duke, Pearson, Strachan, & Billman, 2011; Paris & Paris, 2007; Willingham, 2006a), motivation and engagement (Guthrie & Wigfield, 2005), background knowledge (Hirsch, 2003; Kintsch, 1988; Recht & Leslie, 1988; Walsh, 2003), oral language skills (Beron &

Farkas, 2004; Biemiller, 2003; Catts, Bridges, Little, & Tomblin, 2008; Kendeou, van

den Broek, White, & Lynch, 2009), and metalinguistic awareness (Nagy, 2007).

Background

There is no shortage in opinions about who or what is to blame for the United

States' continuing struggle with low reading and literacy levels. In general, the most

frequent targets are poorly trained teachers, poorly organized schools, large numbers of

low socioeconomic status (SES) and English as Second Language (ESL) students, low

standards with poorly designed assessments, and ineffective instructional methods

(Kamhi, 2009a).

In 1997, Congress requested the formation of a National Reading Panel of experts

to analyze the existing knowledge base in the science and instruction of reading. Out of

that report, much has been learned and applied in America's schools. In fact, Stanley

(2009) asserted that "because of a growing amount of research in the field of reading,

there are unprecedented opportunities for educators to help students become better

readers" (p. 18). Despite the fact that significant improvements have been made in

teaching young children to decode words accurately and fluently (National Reading

Panel, 2000), gains in later reading achievement have, unfortunately, not followed as

expected (National Assessment of Educational Progress, 2009). Why are so many

students failing to reach proficient levels in reading? Decades of research provide

evidence that students can be taught to read (NRP, 2000). What is happening, or not

happening, between the initial *learning to read* phase and the expected outcome of

reading to learn?

Though literacy experts have long asserted that the types of experiences that children have in their earliest years can account for the fact that many students progress no further than the *basic* category, these assertions "seem to have had little effect on present policy and practice" (Paratore, Cassano, & Schickedanz, 2011, p. 107). Paratore, Cassano, and Schickedanz (2011) asserted that, at least in part, low levels of literacy achievement may be explained by inadequate attention in the early years to the full array of abilities that are required for success in the later years.

It is well documented that early intervention is more effective than later intervention in addressing reading problems (Cavanaugh, Kim, Wanzek, & Vaughn, 2004; National Reading Panel, 2000; Snow, Burns, & Griffin, 1998; Wanzek & Vaughn, 2007). However, this does not necessarily arise from the fact that younger students learn better than older students or that early instruction is better than later instruction. The effectiveness of early instruction and intervention lies in the skills it addresses. Reading decoding involves a well-defined scope of knowledge (e.g., letters, sounds, words) and processes (e.g., blending, decoding) (Paris, 2005); as such, it can be systematically taught and assessed in a meaningful way. On the other hand, unconstrained skills, such as vocabulary and reading comprehension, do not include a narrowly defined scope of knowledge, because they involve a host of complex processes that are much more difficult to teach and assess. Furthermore, it is not immediately evident whether a student has learned what has been taught. Kamhi (2009b) agreed that it is difficult to teach domain-general reading comprehension, but that does not mean it cannot or should not be taught. It must be understood that making a difference in domain-general reading comprehension is an incremental process that happens over long periods of time.

According to Hirsch (2006), if it is assumed that teaching reading comprehension must come after gains in decoding fluency have been made—as though the two processes are distinct and linear—a significant amount of opportunities to teach vocabulary and world knowledge will be lost. Hirsch conceptualized an early start in verbal knowledge and world knowledge that leads children to accrue still more knowledge each subsequent year as "an interest-bearing bank account" (p. 27). Of course, children just beginning to read need to be provided with extremely simple, decodable texts with limited conceptual demands. This is necessary in order for students to attain fluency in their reading. However, when early literacy activities focus exclusively on this type of text, an opportunity to build word and world knowledge is missed. If large amounts of time are not spent reading aloud and discussing challenging material that is well beyond students' ability to decode independently, a critical opportunity to increase knowledge of language and of the world is missed—the very knowledge that will prove decisive for reading in later years.

Schools continually assess students through various state, district, and school-mandated measures. Public Law 107 - 110 - An Act to Close the Achievement Gap with Accountability, Flexibility, and Choice, So That No Child is Left Behind, commonly known as NCLB, was enacted in 2002 by the 107th Congress and placed incredible pressure on schools, teachers, and students to produce ever-increasing results on end-of-year, high stakes assessments. Though enacted in an effort to improve educational outcomes for all students and decrease the achievement gap among various groups of students, researchers have discovered several negative, unintended consequences of the law. According to Coburn, Pearson, and Woulfin (2011), most education policy

researchers have focused on teachers' responses to high stakes assessments, with many results indicating widespread negative views regarding high-stakes testing used for accountability purposes. Studies have also shown that teachers have made changes in their daily instructional practices in the high-stakes testing environment, including increased or extensive test preparation activities (Diamond, 2007; Wright & Choi, 2006); narrowing of curriculum to tested subjects (Diamond, 2007; Manzo, 2008; McMurrer, 2008; Pianta, Belsky, Houts, Morrison, & NICHD, 2007; Wright & Choi, 2006); and reallocation of instructional time and resources to so-called *bubble kids*, whose marginally proficient scores could have the most positive or negative influence on a school's performance rating (Booher-Jennings, 2005). Perhaps inevitably, the result of such changes in teachers' practices is a narrow focus on test scores as the primary measure of student and teacher success (Au, 2007; Crocco & Costigan, 2007; Neuman, 2006; Pedulla et al., 2003).

Problem Statement

Assessment of reading in the earliest grades is very different from assessment of reading in the fifth grade. In early elementary school, when students are just beginning to read, tests are overwhelmingly comprised of items that measure the ability to fluently decode words. If measured at all, comprehension is "a small component of an overall reading score in first and second grade" (Kamhi, 2009a, p. 175). In the third and fourth grades, "as the variability in decoding skills decreases and children begin to read to learn, comprehension abilities begin to account for more of the variance in children's reading levels" (Kamhi, p. 175). After elementary school, essentially all individual differences in reading ability are accounted for by reading comprehension. In effect, an overreliance on

early test scores as an indicator of later reading achievement may result in late identification of struggling students.

Purpose Statement

Research has established reliable predictors of a student's academic achievement, in general, and reading achievement, in particular (Battacharya, 2010; Entwisle, Alexander, & Olson, 2007; Lin, Freeman, & Chu, 2009; Senechal, Ouellette, & Rodney, 2006). These include a student's SES, early vocabulary/language skills, gender, and age of school entry. However, research has yet to establish the nature of the relationship between these variables and students' performance on the high-stakes reading assessments in specific states.

The purpose of the present study was to determine if there was a relationship between a group of variables known upon a group of students' entrance into kindergarten and their performance on an annual high-stakes reading assessment conducted six years later.

Significance of the Study

Reading is a critical skill that is essential for success in all academic domains. While significant progress has been made in teaching children to decode words automatically and fluently, the overall reading proficiency of American students continues to be a concern (Hirsch, 2003). It is well documented that a large percentage of America's high school students enter adulthood with reading and literacy levels characterized as below proficient. The National Assessment of Educational Progress (NAEP)—a tool that provides policymakers, state and local educators, principals, teachers, and parents with nationally representative assessment information in several

academic areas, including reading—provides assessment information every two years and reports trend data every four years. According to the 2008 long-term trend report, reading scores in the eighth and 12th grades remain alarmingly stagnant, despite significant progress in elementary reading instruction (Rampey, Dion, & Donahue, 2009). Specifically, the gains that have been achieved in the earlier grades do not appear to be impacting the long-term reading achievement of American middle and high school students.

Research Questions and Null Hypotheses

- Research Question 1: What is the relationship between students' K-SEALS Vocabulary subtest raw scores and their fifth grade CRCT Reading scores?

- Null Hypothesis (H_{01}): There is no significant relationship between students' K-SEALS Vocabulary subtest raw scores and their fifth grade CRCT Reading scores.

- Research Question 2: What is the relationship between students' socioeconomic status and their fifth grade CRCT Reading scores?

- Null Hypothesis ($H_{02)}$): There is no significant relationship between students' socioeconomic status and their fifth grade CRCT Reading scores.

- Research Question 3: What is the relationship between students' gender and their fifth grade CRCT Reading scores?

- Null Hypothesis ($H_{03)}$): There is no significant relationship between students' gender and their fifth grade CRCT Reading scores.

- Research Question 4: What is the relationship between students' ages at school entry and their fifth grade CRCT Reading scores?

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- Null Hypothesis ($H_{04)}$: There is no significant relationship between students' ages at school entry and their fifth grade CRCT Reading scores.

Identification of Variables

The study's criterion variable was the group of CRCT Reading scale scores for Mountain View (fictitious name) Elementary School's 2009-2010 fifth grade students. The following were the predictor variables in this study: Mountain View Primary School 2004-2005 K-SEALS Vocabulary subtest raw scores, student SES, student gender, and age at school entry.

Research Plan

Participants for the study included those students who entered Mountain View Primary School as kindergartners at the beginning of the 2004-2005 school year and remained students in the Mountain View Elementary School, as fifth graders, at the end of the 2009-2010 school year. Upon their enrollment, each of these students were administered the Kaufman Scales of Early Academic and Language Skills (K-SEALS). Other information obtained at kindergarten enrollment included the students' age, gender, and free-meal status. As required by the Georgia Department of Education, these students were subsequently administered the Criterion Referenced Competency Test (CRCT) in the spring of their fifth grade year school year.

A correlational research design was utilized to determine the relationships between each of these variables and students' later reading performance. According to Allen (2010), "regression models expand on correlational assumptions" (p. 1079) by allowing the researcher to determine the predictive value of variables. Therefore, a series of bivariate linear regressions were also carried out to determine whether the variables—

early vocabulary skills, SES, gender, and age at school entry—had predictive value regarding students' subsequent performances on the fifth grade Reading CRCT.

Definition of Terms

- *Age at school entry* – a student's age on the first day of the 2004-2005 school year. Students' ages were calculated in months.

- *English as Second Language (ESL)* – in this study, ESL is used to refer to a student for whom English is not the primary language.

- *Georgia's Criterion Referenced Competency Test (CRCT)* – the end-of-year assessment designed to measure students' acquisition of the knowledge and skills set forth by the Georgia Performance Standards. THE CRTCs are administered in reading, language arts, and math in the spring of students' first though eighth grade years; social studies and science tests are also administered in the third through eighth grades (Georgia Department of Education, 2009).

- *Kaufman Scales of Early Academic and Language Scales (K-SEALS)* – an individually-administered standardized test designed to assess early academic and language skills in children ages 36 months (3-0) to 83 months (6-11) with three subtests, including (a) Vocabulary; (b) Letters, Words, and Numbers; and (c) Articulation Survey (K-SEALS Product Summary, n.d.).

- *Socioeconomic status (SES)* – in this study, SES is used to describe students' status regarding free and reduced lunch eligibility. In the 2004-2005 school year, eligibility guidelines for a household of four were as follows: gross annual income < $34,873 – eligible for reduced lunch; gross annual income < $24,505 – eligible for free lunch (Child Nutrition Programs – Income Eligibility Guidelines, 2004)

CHAPTER TWO: REVIEW OF THE LITERATURE

Introduction

One of the main purposes of public education is to prepare students to become literate citizens who can participate in and contribute to today's increasingly global and information-driven society (Hirsch, 2006). Few would argue that reading is not essential for academic, economic, and social success. Over the last several decades, an extraordinary amount of research has been conducted in an effort to understand the science of reading and reading instruction.

In 1997, the U.S. Congress tasked the directors of the National Institute for Child Health and Human Development (NICHD) and the U.S. Department of Education to form a committee to determine whether sufficient meaningful research existed that could be applied in American classrooms (Foorman & Connor, 2011). In order to accomplish their mission, the committee conducted several meta-analyses of relevant research from the prior 30 years that met certain criteria (i.e., was published in English in a refereed journal; focused on children's reading development from Pre-K to Grade 12; and used an experimental or quasi-experimental research design with a control group or multiple-baseline methodology) (Foorman & Conner, 2011).

In 2000, the National Reading Panel reported its findings. After extensive review of hundreds of research studies on reading instructional methodology, the panel concluded that there was sufficient scientific evidence to determine how to most effectively teach children to read. The curricular topics studied by the panel included

phonemic awareness, phonics, fluency, vocabulary, and comprehension. Meta-analyses of studies on the benefit of direct instruction of phonemic awareness, the positive impact of early systematic phonics instruction, the usefulness of focusing on decoding fluency, the importance of vocabulary to comprehension, and the advantageous nature of strategy instruction for reading comprehension have significantly impacted both instructional practices and curricular materials in the years following those studies (Foorman & Connor, 2011).

In boiling down one of the most complex activities in the human experience—deriving meaning from printed text—to a list of five component skills, the National Reading Panel may have inadvertently caused educators to regard those five skills as a sequential list of equally important skills necessary for skilled reading. Indeed, educators have traditionally viewed reading instruction as being divided into two stages: first, learning to read and, later, reading to learn (Chall, 1983). In this conceptualization, the teachers of early grades are responsible for teaching children to read so that the teachers of the upper grades can rely on the students' ability to learn academic content through what they read independently. In effect, it appears as if the five skills can be taught and checked off in order, beginning in kindergarten, resulting in a fluent elementary grade reader who can comprehend any text he or she encounters. In reality, this is frequently not the case.

According to the 2009 National Assessment of Education Progress (NAEP), 33% of America's fourth graders performed at the *Below Basic* level. Furthermore, evidence indicates that these issues do not go away, usually persisting into adulthood. In 2003, the National Assessment of Adult Literacy measured adults' comprehension of three literacy

types: prose, document, and quantitative. On these measures, 43%, 34%, and 55%, respectively, of adults were at or below the basic level.

In this review of the literature regarding the early prediction of long-term reading comprehension, attention will first be paid to the conceptual framework that guided the present study. Current findings regarding the nature of reading comprehension will be reviewed. Relevant research regarding the nature of reading assessment at different developmental levels will be explored. Finally, research from the fields of education, psychology, linguistics, developmental literacy, sociology, and cognitive science—all aimed at identifying early variables that predict long-term reading comprehension—will be reviewed. Each of these fields has contributed to greater understanding of the nature of reading and the direct and indirect impact of the variables investigated in the present study: vocabulary, SES, gender, and age at school entry.

Theoretical/Conceptual Framework

While a vast amount of research on *cracking the code* has been conducted in the past few decades, much less research attention has been paid to what happens after the code has been cracked—reading comprehension. Paris and Hamilton (2009) asserted, "given the importance of reading comprehension for children's literacy and learning, it is surprising that there are so few theories about it" (p. 32). Similarly, Sadoski and Paivio (2007) declared that the "current disunified state of reading theory" (p. 337) must be rectified in order to capitalize on research findings in the future.

Two parallel frameworks guided the present study. One framework provides a broad theory of cognition as it relates to reading comprehension, while the other provides practical conceptualization of reading assessment and how it differs at various

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developmental stages. Both the Construction-Integration (CI) Model (Kintsch, 1988, 1998, 2004) and the Constrained Skill Theory (CST) (Paris, Carpenter, Paris, & Hamilton, 2005) have garnered much attention, both positive and negative, in the area of reading research.

Construction-Integration Model

According to Kintsch and Kintsch (2005), reading comprehension "requires the delicate interaction of several component processes that integrate information from the page that the student is reading with his or her background knowledge and experience, subject to a multitude of contextual constraints" (p. 71). The Construction-Integration Model is a theory of cognition, in general, and of reading comprehension, in particular. According to the model, proposed by cognitive scientist Walter Kintsch, readers simultaneously construct a model of the literal text and an elaborated model of the situation implied by the text. Kintsch (1998) explained the concept of construction-integration as a mental activity of first "constructing" mental representations in the form of a situation model, and then "integrating" those representations into a coherent whole (p. 163).

In the Construction-Integration Model, there are essentially three forms of knowledge representation—the verbatim information, a propositional textbase, and a situation model. It can be characterized as both a bottom-up model as well as a top-down model (Kintsch, 2005). It is a bottom-up model because it begins with decoding the literal text, and it is a top-down model because the resulting situation model depends on prior knowledge, vocabulary, and the activation of relevant schema (Paris & Hamilton, 2009).

According to this model of reading comprehension, there are three interactive yet distinguishable levels of comprehension processes in reading: (a) the perceptual and contextual processes involved in decoding the text; (b) the microstructure of the text (i.e., complex network of interrelated idea units, called propositions), macrostructure of the text (i.e., global structure reflecting hierarchical relations among various sections), and textbase (microstructure and macrostructure together—the mental representation that the reader constructs of the text); and (c) the integration of the textbase with the reader's prior knowledge and experience, resulting in the construction of a *situation model.*

At the culmination of these processes, the situation model that is constructed depends on the reader's background knowledge, visual imagery, emotions, and personal experiences to a much greater degree than the textbase. According to Kintsch and Kintsch (2005), "comprehension involves different levels and a variety of skills: the extraction of meaning from the text, the construction of the situation model, and the integration of the reader's prior knowledge and goals with the information provided by the text" (p. 87). For this reason, a reader's situation model is wholly individual and extremely unpredictable. Without adequate background knowledge of the subject matter, the text will "predominate in the comprehension process so readers may be required to connect many disconnected facts and details" (Paris & Hamilton, 2009, p. 35). On the other hand, without knowledge of the actual text, the representation "would rely more heavily on the reader's prior knowledge and experiences so it might distort the intended text meaning" (Paris & Hamilton, 2009, p. 35). Readers are only able to produce a cohesive interpretation of the text, or situation model, when the two levels of analysis are consistent.

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Though Kintsch's conceptualization of reading comprehension provides a model of adult, fluent reading comprehension, there are two compelling reasons for using the model to examine the development of students' reading comprehension. These include the importance of knowing the "goal state" of students as well as the need for an examination between the "striking contrast between the performance of fluent readers and the struggles of beginners" (Kintsch & Kintsch, 2005, p. 71), in order to conceptualize reading comprehension instruction.

This theory places a premium on background knowledge in reading comprehension. According to the model, written text must always leave ideas unstated, taking for granted that a reader will be able to fill in the blanks. In effect, it is impossible to spell out every detail of every idea in its entirety every time it is encountered. Readers must bring background knowledge to the reading in order to glean meaning. Whether the reader can decode the words is, to some degree, irrelevant if he/she has no prior knowledge to which the new can connect.

Constrained Skill Theory

The Constrained Skill Theory (CST) posited by Paris, Carpenter, Paris, and Hamilton (2005) provides a useful means of conceptualizing the issue from an assessment standpoint. According to these researchers, reading skills exist along a continuum comprised of constrained reading skills, less constrained reading skills, and unconstrained reading skills. Constrained reading skills are necessary but insufficient for skilled reading. They include the alphabetic principle and phonemic awareness and are defined by the finite nature of their scope and children's ability to master them entirely. For example, learning the names and sounds of the letters of the alphabet is a constrained

reading skill. Before age three, few children know the names and sounds of the 26 letters of the alphabet, and after age seven, most children know the names and sounds of the 26 letters of the alphabet. There is a clear developmental period of rapid learning during which scores will approximate a normal distribution; following the rapid learning period, mastery is attained, and there is virtually no variance. In other words, constrained skills develop from nonexistence to ceiling levels within a set time frame, and they should not be conceptualized as enduring, individual difference variables.

Paris, Carpenter, Paris, and Hamilton (2005) juxtaposed constrained skills, such as the alphabetic principle, with unconstrained skills, such as vocabulary and reading comprehension. These skills develop over a lifetime and are complex constructs that are neither easy to teach nor easy to measure. Van den Broek et al. (2005) posited that "comprehension is not a unitary phenomenon but rather a 'family' of skills and activities" that "in its different forms cannot be quantified and assessed easily along a single dimension" (p. 109).

Ultimately, the "basic notion is that the multiple components involved in reading comprehension interact in different and nonlinear ways according to the proficiency of the reader and the characteristics of the text" (Paris & Hamilton, 2009, p. 46). In order to characterize these complex interactions among various developmental trajectories, Paris and Hamilton (2009) introduced the concept of *skill thresholds*. According to this model of reading, comprehension does not occur below a certain threshold that enables decoding; however, once that decoding threshold is met, people can comprehend in different ways and to different degrees. As such, lack of comprehension is a categorical state that is evident only when skill thresholds are not met. On the other hand, after

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thresholds are met, comprehension of texts can yield "graded levels, depths, or thoroughness . . . " (p. 46).

Paris and Hamilton (2009) asserted that the notion of thresholds is a valuable conceptualization of reading for three reasons. First, they "represent the interaction between the reader's skills and the characteristics of the text . . . [situating] comprehension in the interactions among the individual, text, and context" (p. 47). Second, the notion of thresholds re-conceptualizes comprehension as both categorical and continuous. Difficulties with reading comprehension can occur when any of the component skills do not meet threshold values; furthermore, lack of comprehension can occur even when some skills exceed thresholds. The third value noted by Paris and Hamilton is that the notion of thresholds helps to re-interpret developing relations among skills, thus ensuring that the nonlinear growth and discontinuous nature of variables over the course of reading development are acknowledged.

As the relatively new practice of relying on scientifically-based reading research to guide reading instruction and assessment continues to gain momentum, some researchers warn against the lure of quick and easy fixes to very complex problems. Specifically, Paris (2005) questioned the veracity of correlational data that is frequently used to establish predictive and concurrent validity of reading assessments. Paris contended that there are "fundamental differences in the developmental trajectories of (constrained and unconstrained) reading skills" (p. 184) and that they differ along several dimensions: age of skill onset, durations of acquisition, and asymptotic levels of performance.

In the seminal article, *Reinterpreting the Development of Reading Skills*, Paris (2005) expressed concern that misplaced confidence in constrained reading skills as an accurate predictor of long-term reading comprehension—a decidedly unconstrained skill—leads to an overemphasis on the instruction and assessment of those skills to the detriment of other important skills. Skills referred to by Paris et al. (2005) as "spurious correlates of reading comprehension" (p. 148) include print knowledge and oral reading fluency.

At issue are the many research studies that have found modest, positive correlations between early, constrained reading skills (phonemic awareness, oral reading fluency, etc.) and reading comprehension. Paris (2005) contended that there are several conceptual and statistical reasons why this relationship should not be taken at face value. Among the main points in challenging these claims is that both constrained and unconstrained skills are correlated with many other intellectual skills. This indicates that both sets of skills may be proxy measures for other influences on reading development. Paris agreed that, before they are mastered, constrained reading skills are positive predictors of reading but asserted that once they are mastered, they lose their predictive power. Furthermore, by inferring causal status in a predictive relation, meaningless interventions may be prescribed for the predictor variable. Duke and Carlisle (2011) cautioned against teaching or fostering development of a construct just because it predicts later reading comprehension and reiterated the need to be cautious when "applying findings about predictors of reading comprehension directly to instructional practice" (p. 206).

Review of the Literature

Reading is arguably one of the most researched topics in education. The impact that recent findings have had on educational policy and practice in the United States cannot be overstated. As the majority of recent reading research has very successfully attempted to identify component skills and factors involved in *cracking the code* of reading, the research-based instructional methods that have been endorsed are "primarily code-based methods which incorporate instruction in phonological awareness and letter-sound correspondence" (Adlof, Catts, & Lee, 2010, p. 332). Ironically, reading comprehension, the ultimate aim of reading, has garnered much less research attention, though this is beginning to change. Given the fact that reading comprehension is a complex mental event that can only be inferred indirectly from a person's behavior in a certain context coupled with the fact that prerequisite early literacy skills are observable and measureable, it is not entirely surprising that the knowledge base for reading comprehension is growing at a much slower pace.

Reading comprehension is a complex act involving a host of components, skills, and processes that must work together to allow a reader to make sense of written text. Huey (1908) recognized the complexity of reading comprehension in his classic text, *The Psychology and Pedagogy of Reading*:

> And so to completely analyze what we do when we read would almost be the acme of a psychologist's achievements, for it would be to describe very many of the most intricate workings of the human mind, as well as to unravel the tangled story of the most remarkable specific performance that civilization has learned in all its history. (p. 6)

Since that time, much knowledge has been gained, though most reading researchers would likely concede that there is more to be learned. Cognitive scientists, linguists, and psychologists have joined educational researchers in their efforts to further the understanding of the science of reading. This is evident in the growing consensus about the importance of general language skills, vocabulary, and background knowledge in reading comprehension. As assessment lies at the heart of the standards-based accountability reform movement, it may be unsurprising that the amount of research in this area is increasing. Current challenges in designing meaningful assessments of reading comprehension include the identification of component skills and an understanding of their developmental nature.

Educators have aimed to accurately predict long-term educational achievement for as long as schools have been organized institutions. In the field of sociology, the "social stratification of children's educational trajectories" is a focus of inquiry, due in large part to the fact that research suggests that children are "launched into achievement trajectories when they start formal schooling" (Entwisle, Alexander, & Olson, 2005, pp. 1458-1460). In an effort to discover which first grade intrinsic and extrinsic variables are helpful in predicting long-term academic achievement, Entwisle et al. (2005) conducted longitudinal research, examining data from a group of first graders who were followed for 16 years, until they reached age 22. As hypothesized, several extrinsic variables, including both SES and gender, were highly correlated with later academic achievement.

For the last several years, research has been centered on accurately predicting which students will struggle in the attainment of constrained, short-term skills, including the alphabetic principle, phonemic awareness, decoding, and oral reading fluency—those

skills that are predominantly taught in the earliest grades. The focus on early reading instruction and intervention has led to increased decoding proficiency in the early grades; this increase, coupled with the common but erroneous assumption that decoding proficiency naturally leads to the ability to comprehend texts, may have led educators to incorrectly assume that a rise in later reading achievement scores would follow (Duke & Carlisle, 2011). Unfortunately, the success seen in earlier grades does not typically result in improved long-term reading comprehension as students progress through school.

The Nature of Reading Comprehension

The comprehension of text is the ultimate goal of reading and a deceptively simple act for some readers. Reading is sometimes considered the natural result of fluent decoding; however, researchers are beginning to understand that reading is a complex, multifaceted act involving myriad skills and processes. Paris and Hamilton (2009), two prominent reading researchers, put forth the following definition:

> Reading comprehension is only a subset of an ill-defined larger set of knowledge that reflects the communicative interactions among the intentions of the author/speaker, the content of the text/message, the abilities and purposes of the reader/listener, and the context/situation of the interaction. (p. 32)

At this juncture in the history of reading research, there is little agreement about a singular definition of reading comprehension. This is not surprising, given the dynamic and complex nature of the activity. Paris and Hamilton (2009) asserted that the difficulty of defining comprehension, in contrast to the relative ease of defining decoding, is due to three problems:

First, reading comprehension is not a static or uniform outcome; it varies widely

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across people reading the same text and within the same person reading the text as each new reading, stance, or recursive thinking about text may lead to new envisionments, new inferences, and new ideas. Second, comprehension is often defined by (a) successive depths of processing, (b) increasing numbers of ideas, inferences, or connections, or (c) larger units of coherence or more structured models of the text base and situation, but there are few operational measures of comprehension depth and thoroughness. Third, developmental changes in reading comprehension are evident in the quality and quantity of ideas as outcomes, but underlying these changes are important cognitive processes such as better working memory, more automatic and fluent reading, and greater use of strategies and self-control over skills that enhance comprehension. (p. 40)

Research on the construct of reading comprehension has lagged considerably behind efforts to understand the construct of reading decoding. In fact, the 2009 publication of the *Handbook of Research on Reading Comprehension* was described as a "watershed" (Pearson, 2009, p. 3) in the field of reading by one of its contributing authors According to Pearson (2009), "comprehension, by its very nature, can only be observed indirectly . . . [and researchers] can only rely on indirect symptoms and artifacts of its occurrence" (p. 3). Unfortunately, these symptoms and artifacts are what researchers must use to better understand the construct of reading comprehension.

In their discussion of the development of reading comprehension, Duke and Carlisle (2011) drew an important distinction between mastery constructs and growth constructs. According to the authors, mastery constructs are those that "can be learned to mastery, 100%" (Duke & Carlisle, 2011, p. 200). Examples of mastery constructs

include letter names and letter sounds—skills that virtually all students eventually learn to perfect mastery. On the other hand, though students can improve on a growth construct and continue developing in that area throughout their lives, growth constructs can never really be mastered. Reading comprehension is the "quintessential growth construct" (Duke & Carlisle, 2011, p. 200).

Educators must come to understand what research in cognitive science says about reading comprehension—that is, there exists an inextricable link between language skills and reading comprehension (Beron & Farkas, 2004; Senechal, Oulette, & Rodney, 2006; Storch & Whitehurst, 2002; Whitehurst & Lonigan, 1998). In an interpretation of current research findings, Hirsch (2006) posited that reading comprehension should be conceptualized as what it is: "a sub-category of language comprehension" (p. 130). Duke and Carlisle (2011) maintained that "we must remember that comprehension is a receptive language process" (p. 201). While it may seem intuitive that a person's oral language skills (i.e., listening /language comprehension, vocabulary, background knowledge, etc.) set the limit for his or her reading comprehension, many educators—especially those teaching the earliest grades—fail to fully appreciate the strong bidirectional ties binding the two processes. Hirsch (as cited in Catts, 2009) asserted that schools' "inadequate attention to building broad content knowledge" (p. 179) lies behind the relatively low reading scores in the United States, as compared to many other countries, as well as the significant achievement gap between economically advantaged and disadvantaged students. Similarly, Chall and Jacobs (2003) suggested that deficits in schools' attention underlie what is referred to as the *Fourth Grade Slump*. According to an earlier study (Chall, Jacobs, & Baldwin, 1990), students of high and low SES

performed comparably on reading tests in the early grades but began to differ in performance by the fourth grade. At that time, the low SES students did not perform as well as the high SES students on tests of word meaning. By the seventh grade, the low SES students also performed worse on measures of reading comprehension than their high SES counterparts.

Oral language skills. Storch and Whitehurst (2002) were among the first reading researchers to highlight the long-term stability of oral language skills as an individual difference characteristic in reading comprehension outcomes. These researchers studied a group of 626 four-year-old Headstart children—following them from preschool through the fourth grade—to investigate the relationships between and among code-related skills (constrained), language ability (unconstrained), and later reading. Storch and Whitehurst's findings indicated high longitudinal continuity of oral language skills: 90% of the variance of kindergarten oral language skills was accounted for by preschool oral language, 96% of the variance of first and second grade oral language skills was accounted for by kindergarten oral language skills, and 88% of the variance of third and fourth grade oral language skills was accounted for by first and second grade oral language skills. On the other hand, the results also indicated much weaker longitudinal continuity in code-related skills. The researchers concluded that they had produced empirical support for the view that "code-related and oral language skills play their most significant roles at different points during the development of reading ability" (Storch &Whitehurst, p. 943). These results highlight the contrast between the stability of unconstrained skills as individual difference characteristics and the temporary individual differences manifested by constrained, code-related skills.

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Recent cognitive-developmental research indicates that "(language) comprehension skills relevant to reading comprehension start developing well before children reach elementary school age" (van den Broek et al., 2005, p. 108). In fact, most children arrive at school with language skills that far exceed what they need to understand early reading materials. Those early reading materials tend not to be linguistically challenging, meaning they primarily place demands on children's ability to decode words, and place little emphasis on imparting sophisticated knowledge.

Listening comprehension begins to develop around 12 months of age and continues to grow until children reach early middle school; reading comprehension is typically beginning to develop in kindergarten or first grade (Biemiller, 2003). In early to middle childhood, a child's listening comprehension is much higher than his or her reading comprehension, until late elementary school, when reading skills generally reach the same level. There is evidence that, for the majority of children, comprehension of printed language continues to lag behind comprehension of spoken language well past the third grade (Sticht & James, 1984). Emphasizing this point, Biemiller (2003) suggested that "average children don't reach the point of being able to read what they could understand if they heard it until around 7th or 8th grade" (p. 2) and further asserted, "Oral comprehension sets the ceiling on reading comprehension" (p. 1).

Research conducted in the speech and language scientific community provides evidence of the impact of language deficits on reading comprehension. According to their findings, Nation, Clarke, Marshall, and Durand (2004) concluded that "poor comprehenders' impaired reading comprehension should be considered within the broader context of fairly pervasive difficulties with oral language" (p. 208). Following a

study examining the reading achievement of poor comprehenders with average word recognition skills, Nation et al. concluded that "as a group, poor comprehenders have relative weaknesses across a range of language skills that are important to reading comprehension, from understanding the meaning of individual words to understanding figurative language" (p. 208). In effect, the normal reading recognition skills of these students mask more pervasive and complex underlying language difficulties.

Catts, Bridges, Little, and Tomblin (2008) attempted to determine the long-term impact of language impairment on reading achievement growth. In an epidemiologic investigation of an earlier epidemiologic study, Catts et al. compared reading achievement growth data for language-impaired students with data for students with typical language development. Their results showed that language impairment in kindergarten is a reliable indicator of reading disability in later school years.

Vocabulary. According to some reading specialists, a person must understand around 90% to 95% of the words in a passage in order to learn to understand the remaining 5% to 10% (Nagy & Scott, 2000). While reading the passage, readers who know 90% to 95% of the words will comprehend the general meaning of the passage, leading to a growing understanding of the remaining 5% to 10%. Those readers who do not know 90% to 95% of the words miss the opportunity to learn the content presented in the text or learn new words.

Vocabulary is considered an important component of language skills, and thus, a significant contributing factor to linguistic comprehension. Though vocabulary acquisition is one of the most researched topics in psychology, it is still incompletely understood (Hirsch, 2006). According to Ouellette (2006), though there exists no

consensus on the exact nature of the relationship between oral vocabulary and specific reading skills, longitudinal studies have repeatedly demonstrated that oral vocabulary influences reading comprehension (Senechal, Ouellette, & Rodney, 2006; Share & Leikin, 2004). Hirsch (2006) also pointed out that what is known about vocabulary is that it is acquired "in fits and starts, with advances and retreats and slow progress in small increments along a broad front" (p. 58). As such, vocabulary is difficult to measure with confidence in the short-term. Certainly, vocabulary acquisition cannot be measured on a daily basis. Hirsch questioned whether gains can be accurately measured on yearly high-stakes tests. According to Baumann (2009), the simplicity of acknowledging the import of word knowledge to reading comprehension "belies its knottiness" (p. 323).

Wagner and Meros (2010) examined the direct, indirect, and reciprocal influences of vocabulary on reading comprehension. They asserted that three reviews of relevant literature (Elleman, Lindo, Morphy, & Compton, 2009; NRP, 2000; Stahl & Fairbanks, 1986) provided "at least modest support for a direct influence of vocabulary on reading comprehension" (Wagner & Meros, 2010, p. 4). The authors explained their interpretation of effect sizes as small due to the fact that large effects are "observed reliably for researcher-developed measures but not for standardized measures of reading comprehension, which presumably are less sensitive to small effects" (Wagner & Meros, 2010, p. 5). They further asserted that according to the results of several studies, phonological processing, through vocabulary, exerts an indirect influence on reading comprehension (Bowey, 1994; Chaney, 1992; Cooper, Roth, Speece, & Schatschneider, 2002; Lonigan, 2007; Lonigan, Burgess, & Anthony, 2000; Wagner, Torgesen, Laughton, Simmons, & Rashotte, 1993; Wagner et al., 1997).

Wagner and Meros (2010) pointed out the existence of reciprocal influences between vocabulary and reading comprehension that has been reflected in research indicating that poor comprehenders have more difficulty learning new words from context than good comprehenders do (Nation, Snowling, & Clarke, 2007; Perfetti et al., 2005; Ricketts, Nation, & Bishop, 2007). Given that a substantial number of new vocabulary words are learned in this fashion (i.e., in context), a reciprocal relationship between vocabulary and reading comprehension must exist. Wagner and Meros further asserted that according to the existing research, the relationship between vocabulary and reading comprehension is at least partly due to a joint relation to other variables, such as "conceptual knowledge, metalinguistic awareness, or verbal ability" (p. 7).

Verhoeven and van Leeuwe (2008) used longitudinal data on several thousand Dutch Children to predict the roles of decoding, vocabulary, and listening comprehension skills in the development of reading comprehension. The results indicated reciprocal effects between vocabulary and reading comprehension, reflecting that the "levels of vocabulary and listening comprehension characteristic of a child at the onset of reading instruction (highly predicted) his or her later reading development" (Verhoeven, & van Leeuwe, 2008, p. 420).

Researchers have long been concerned with the predictive role of oral vocabulary on future reading comprehension. Senechal, Oulette, and Rodney (2006) reanalyzed archival data to examine how kindergarten vocabulary knowledge affects reading comprehension in the first, third, and fourth grades. The control variables in the study included those whose relationships to reading were well established in previous research: education and literacy levels of parents, child early literacy skills, phonological

awareness, and listening comprehension. The researchers found that vocabulary in kindergarten was a significant predictor of fourth grade reading comprehension, after controlling for first grade decoding and fourth grade fluency; however, kindergarten vocabulary was not found to be a predictor of differences in first grade decoding. Senechal, Oulette, and Rodney concluded that the results of their study support the well-documented finding that "word recognition skills have to be well-established before language comprehension skills can exert their full force" (p. 178). The results of this study further suggest the indirect nature of vocabulary's contribution to early reading skills and its direct relation to long-term reading comprehension.

Cunningham and Stanovich (1997) examined the predictive relations of 27 first grade students' receptive vocabulary skills and measured the students' reading comprehension and vocabulary skills 10 years later, when they reached the 11th grade. The researchers found that the students' receptive vocabulary in first grade correlated modestly, yet significantly, with their vocabulary scores in the 11th grade. More importantly, first grade vocabulary predicted 11th grade reading comprehension for the students in the study.

Background knowledge. It is commonly assumed that a person reads to gain knowledge; however, "understanding what we read actually involves more the modification of the knowledge that we already have than the collection of new knowledge" (Catts, 2009, p. 178). Citing work in cognitive science, particularly that of Kintsch's (1988) situation model, Catts (2009) pointed out that understanding text involves not only remembering the content, but also "combining this content with past knowledge to form a durable representation that can inform future behavior and learning"

(p. 179). According to Kintsch and Kintsch (2005), reading comprehension is not a unitary construct; furthermore, "it requires the delicate interaction of several component processes that integrate information from the page that the student is reading with his or her background knowledge and experience, subject to a multitude of contextual constraints" (p. 71). Research in cognitive psychology has concluded that reading comprehension, as well as listening comprehension, depends upon the reader and listener successfully "filling in a lot of the unstated connections between the words to create an imagined situation model based on domain-specific knowledge" (Hirsch, 2006, p. 38). The reader must construct this situation model by not only understanding the literal meanings of the text, but also combining this meaning with the meanings inferred or constructed from his or her relevant background knowledge. In a passage containing the phrase *north against the south*, the reader must be able to accurately decode the words to glean meaning; moreover, he or she must have relevant, domain-specific background knowledge about the Civil War. This explains why a passage can be read accurately and fluently but without true comprehension.

Willingham (2006b) asserted that background knowledge actually "speeds and strengthens reading comprehension, learning, and thinking" (p. 1) and called on research from cognitive science to make his case for the importance of background knowledge. Research indicates that having background knowledge facilitates new information being taken in—whether through listening or reading—when a person thinks about this information and when the information is stored in memory. Essentially, background knowledge fills in blanks that are inherent in spoken and written language.

A powerful example of the significant influence that background knowledge has on reading comprehension can be found in the work of Recht and Leslie (1988). The researchers compared the reading comprehension of students with poor decoding skills but high background knowledge to students with good decoding skills but a lack of knowledge about the subject matter. The results showed that the reading comprehension of the knowledgeable, poor decoders was superior to that of the less knowledgeable, good decoders. Specifically, when eighth grade boys characterized as poor readers read a passage about baseball, a subject about which they were interested and knew a great deal, they outperformed good readers who knew little about baseball. This vividly illustrates that "prior knowledge about a topic speeds up basic comprehension and leaves working memory free to make connections between the new material and previously learned information, to draw inferences, and to ponder implications" (Hirsch, 2003, p. 13).

In a study designed to determine the effects of decoding and background knowledge on students' comprehension of different text genres (i.e., narrative and expository), Best, Floyd, and McNamara (2008) presented both types of text to 61 average third graders. Immediately after reading the passages, the students completed three tasks: a free recall, a cued recall, and multiple-choice questions. Confirming the researchers' expectations based on prior research results, the students' comprehension scores on all tasks for narrative passages were significantly higher than their scores on the tasks for expository passages. Furthermore, the authors' hypotheses regarding the differential importance that decoding and world knowledge would have on the comprehension of narrative versus expository text were supported. Specifically, they hypothesized that the strength of the relationship between the comprehension of

expository text and prior knowledge would be comparable to the strength of the relationship between comprehension of narrative text and decoding skills. For the narrative text, decoding skills accounted for more than 20% of the variance in the students' performances on the comprehension measures. For the expository text, world knowledge accounted for 14% to 19% of the variance in the students' performances on the comprehension measures. The researchers' findings led them to conclude that "children with less prior knowledge struggle to form coherent mental representations of text because of their challenges generating the inferences that informational text often demands" (Kucan & Palinscar, 2011, p. 351). Obviously, the "skill sets that are necessary for understanding narratives are different from that of expository texts" (Best, Floyd, & McNamara, 2008, p. 152).

Reading comprehension strategies. Given the many complex factors that have been shown to provide a foundation for reading comprehension, it seems mistaken to reduce reading comprehension to a set of skills that can be listed, taught, and then checked off as completed. According to Catts (2009), "traditional models of reading have conflated word recognition and comprehension" (p. 1), leading reading professionals to make incorrect assumptions. Specifically, many teachers assume that teaching reading comprehension is "as straightforward as teaching word recognition" (Catts, 2009, p. 1), leading them to teach children to comprehend what they have read by applying a set of strategies. Hirsch (2006) asserted that this "vague combining of decoding and comprehension has caused confusion" (p. 36) because it leads people to think that if they can just get children to pronounce the words fluently and understand

simple texts, then—in the normal developmental course of things—these skills will gradually increase and will be successfully applied to more advanced texts.

While research does indicate that initial instruction in comprehension strategies is beneficial (National Reading Panel, 2000), the positive effect does not appear to increase significantly with practice (Willingham, 2006a). In fact, research indicates that short reading strategy programs, consisting of approximately six sessions, are just as effective as those including as many as 50 sessions (Willingham, 2006a). It appears that the benefit of initially teaching general reading comprehension strategies lies occurs because it informs students about the meaning of reading—that the text is providing the reader with a message and, therefore, that the reader is expected to extract meaning from the text. Once that concept is understood, further practice yields some benefit; but whether time should be allocated to further instruction versus other activities is debatable (Willingham, 2006a).

A closer look at some of the specific strategies generally taught to students provides significant insight into the issue of their relevance and usefulness. According to the National Reading Panel (2000), positive effects occurred for the following subset of strategies: summarizing, asking questions, answering questions, comprehension monitoring, graphic organizers, and cooperative learning. In addition, the panel emphasized that a combination of these strategies can be effective. In an analysis of the panel's findings from the 205 studies it reviewed, Willingham (2006a) explained that of the eight strategies deemed by the panel to have an adequate scientific basis for concluding that they improve reading comprehension, only two allow for a discussion of how much the strategies actually help. An examination of the effect sizes of the research

findings on the remaining six strategies explains why only studies regarding question generation and multiple strategy instruction possess the necessary statistical properties to ascertain the efficacy of these strategies.

The key finding from the two groups of studies reviewed by the National Reading Panel (2000) is the importance of how reading comprehension is assessed. Specifically, the effect sizes in the studies showed significant variability, depending on whether comprehension was measured by a standardized reading test or an experimenter-written test. According to Willingham (2006a), the difference between the students' demonstrated comprehension on the two types of tests is likely the result of the differing nature of the questions. On experimenter-written tests, there is a greater likelihood that "an experimenter might unconsciously select passages that are well-suited to the strategy that students are learning" (Willingham, 2006a, p. 43). Hence, students perform much better on these tests than the standardized reading tests. On the other hand, standardized reading tests contain passages that are unpredictable and require readers to rely on more varied, general knowledge resources.

Assessment of Reading Comprehension

The complexity of reading comprehension, coupled with the wide variety of purposes for which it is assessed, results in a wide array of tools and activities for that purpose. These tools and activities range from statewide high-stakes tests to district-wide paper-and-pencil silent reading tests, universal screening measures administered periodically to all students, individually administered assessments intended to diagnose, and qualitative assessment in the classroom. Carlisle and Rice (2004) identified the four most common purposes for school-based reading assessments: (a) program evaluation

and accountability, (b) identification of children with special needs in reading, (c) identification of children at risk for problems, and (d) measurement of student progress during the course of interventions. Perhaps the best-known reading assessments used in today's educational climate are the group-administered, multiple-choice, standardized tests used for program quality and teacher effectiveness (i.e., accountability) purposes.

Reading assessments in the early grades (K, 1, 2) typically measure foundational, constrained reading skills, including phonemic awareness, letter naming, letter-sound correspondence, nonsense word decoding, and oral reading fluency. These skills are assessed in universal screenings both in the classroom and on end-of-year assessments. Though these skills are crucial for successful reading, students can perform very well on the standardized assessments but lag in other skills that are necessary for later reading comprehension and general academic success. For this reason, assessments frequently administered in the early grades are not particularly useful in identifying students with higher-order deficits such as language/thinking skills, vocabulary, and background knowledge that ultimately result in more pervasive and long-term academic struggles. Given that the ultimate goal of reading is long-term reading comprehension, Paris (2005) contended that overreliance on these early measures of necessary but insufficient skills shortchanges students in the long-term, creating a "minimum competency approach to reading assessment that does not adequately assess children's emerging use and control of literacy" (p. 201). This approach also creates the illusion that mastery of constrained skills equates to reading proficiency.

According to Kamhi (2009b), reading comprehension is "notoriously difficult to assess because numerous factors influence comprehension and there are many levels of

understanding" (p. 213). The high-stakes tests from NCLB reduce a child's level of

reading comprehension to a single score. Unfortunately, if early educators rely on this

single score as the most critical measure of a student's grade-level success, deficits in

higher order, unconstrained skills will not become obvious until the student is in

elementary school; then, assessments become more demanding of these higher-order

skills. From that point, a gap emerges that continues to widen as students progress

through middle and high school. This phenomenon, which has been labeled *The Matthew*

Effect (Stanovich, 1986), refers to a pattern of increasing advantage or disadvantage

following an initial advantage or disadvantage. According to the Gospel of Matthew,

"Unto every one that hath shall be given, and he shall have in abundance; but from him

that hath not shall be taken away even that which he hath" (Matthew 25:29, KJV).

Morgan, Farkas, and Hibel (2008) further supported the existence of a Matthew

Effect in their study. Interestingly, however, their results indicated the presence of a one-

sided effect only as opposed to the fan-spread effect that was expected. The population

subgroups identified as being most at risk for reading disabilities (i.e., low SES, ethnic

minority, boys) fell further behind typical readers over time, but typical readers remained

typical. In effect, the rich did not become richer, but the poor did, indeed, become

poorer.

Early Predictors of Long-term Reading Success

Numerous studies have been conducted to determine early predictors of reading

achievement in the primary grades, and much has been learned. Converging evidence

suggests that the strongest predictors of primary grade students' reading success are

alphabet knowledge and phonological awareness (Adlof, Catts, & Lee, 2010). Of course,

these skills form the foundation of the ability to decode the written word, but they are not particularly useful in predicting long-term reading outcomes. Far fewer studies have explored the existence of early predictors of long-term reading comprehension.

According to the Simple View of Reading (SVR) (Gough & Tunmer, 1986; Hoover & Gough, 1990), the combination of reading decoding and linguistic comprehension accounts for the most variance in reading comprehension across all grades, but "the relative importance of each factor in predicting reading comprehension changes over time" (Adlof, Catts, & Lee, 2010, p. 333). In the early grades, reading decoding is most highly correlated with reading comprehension, while in later grades, linguistic comprehension is most highly correlated with reading comprehension. Adlof, Catts, and Little (2006) used structural equation modeling to examine the SVR and found that for students in eighth grade, the constructs of linguistic comprehension and reading comprehension were indistinguishable.

Research reflects the existence of several additional, extrinsic, early predictors of long-term reading success, including SES, gender, and relative age at school entry. These variables have little predictive value regarding mastery of early, constrained reading skills, which has likely led many educators to undervalue their importance and potential usefulness in providing earlier indication of those students who will struggle later with reading comprehension.

SES. Family SES is a reliable predictor of many aspects of child development. A considerable amount of research has been conducted linking low SES with negative, long-term social, emotional, and educational outcomes (Bhattacharya, 2010; Chall et al., 1990; Cunningham, 2006; Dubow, 1994). Socioeconomic status and child development

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are complex and multifaceted variables, so precise interpretations of any causal relationship between them are difficult, if not impossible (Hoff, 2003).

In describing the differences with which children from high and low socioeconomic backgrounds enter school, Tunmer and Nicholson (2011) introduced the concept of *literate cultural capital*, which refers to essential reading-related knowledge, skills, and experiences. These factors are "an outgrowth of activities in the home environment that support early literacy development" (Tunmer & Nicholson, 2011, p. 420). Varying greatly, these *cognitive entry behaviors* impact the degree of readiness with which children enter school and include:

> . . . familiarity with "book" or "decontextualized" language and basic understanding of concepts and conventions of printed language; knowledge of letter names and sounds; ability to produce preconventional spellings of words; sensitivity to the subcomponents of spoken words, or phonological awareness; and sensitivity to the semantic and syntactic constraints of sentence contexts, or grammatical awareness. (Tunmer & Nicholson, 2011, p. 420)

Children who enter school with higher levels of cognitive entry abilities—typically those students from higher socioeconomic backgrounds—profit more from reading instruction, learn to read sooner, and read better than their lower socioeconomic counterparts (Whitehurst & Lonigan, 2001). In a study from New Zealand, Tunmer, Chapman, and Prochnow (2006) measured the readiness skills of a group of beginning kindergarten students, in order to determine whether those factors had predictive value seven years later. Students' results on a composite measure of literate cultural capital—phonological awareness, grammatical awareness, letter-name knowledge, and receptive

vocabulary—accounted for almost 50% of the variance in reading comprehension skills measured seven years later. Furthermore, children from low socioeconomic backgrounds had considerably less literate cultural capital when they arrived at school. It follows that students from low socioeconomic backgrounds are "more dependent on school experiences for their academic literacy development" (Goldenberg, 2001, p. 212).

Hart and Risley (1995) classic work dramatically illustrated the disparity of academic readiness skills with which children from different SES backgrounds enter school, specifically in the area of language. Their research compared the early language experience—in terms of number of words and quality of words—of children from professional, working class, and welfare families. They found that by the time a child from a professional family enters school, he or she has been exposed to approximately 30 million more words than the child from a welfare family. Furthermore, the former child is acquiring and accumulating vocabulary and language skills at a much faster rate than the latter. Finally, the quality of the words encountered by the children is very different (Hoff, 2003). Higher SES mothers were more likely to use affirmatives and conversation-eliciting utterances, whereas lower SES mothers tended to use more directives and prohibitions. Children from professional families experienced a ratio of six encouragements to one discouragement, while children from welfare families received one encouragement for every two discouragements.

A substantial body of research indicates that children from lower socioeconomic backgrounds enter school with significantly lower levels of literacy-related skills and experiences than children from more advantaged backgrounds (Snow, Burns, & Griffin, 1998; Tunmer, Chapman, & Prochnow, 2006; Whitehurst & Lonigan, 2001). Hart and

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Risley (1995) attributed much of the difference between the entry-level pre-reading skills of lower socioeconomic students to their home literacy environments, claiming that families with lower socioeconomic backgrounds tend to have lower levels of formal education and may not demonstrate a high regard for literacy.

Gender. The gender gap in educational achievement is responsible for much of the research conducted throughout the history of public education in the United States (Gates, 1961; Robinson, 1955; Stroud & Lindquist, 1942). Girls have historically outperformed boys in grades and on reading-related literacy assessments. In the most recent administration of the Program for International Student Assessment (PISA), female students outperformed male students in reading skills in every participating country (OECD, 2009). Likewise, on the 2009 administration of the National Assessment of Educational Progress (NAEP) to 12th graders around the United States, girls consistently outperformed boys on reading indicators. In 2006, fourth grade girls outscored boys in 38 of the 40 countries that participated in the Progress in International Reading Literacy Study (PIRLS) (Mullis, Martin, Kennedy, & Foy, 2006). Robinson and Lubienski (2010) analyzed data from the Early Childhood Longitudinal Program Kindergarten Class of 1998-99 (ECLP-K) spanning from kindergarten to eighth grade. Their analysis indicated that there is a reading achievement gap favoring girls in kindergarten, which shrinks somewhat throughout elementary school and then widens again by late middle school. Furthermore, by eighth grade, boys make up about 67% of the group below the 5th percentile in the distribution.

Boys are more frequently identified as having reading disabilities, especially in the early grades (Martin, Foels, Clanton, & Moon, 2004). Though some researchers

question the veracity of this phenomenon, when differences between boys' and girls'

motivation, engagement, interest, and socialization are accounted for, more boys than

girls are served in special education programs across the country.

Age at school entry. Researchers have investigated the long-term effects of age

at school entry on academic success for over 70 years (Bigelow, 1934; Green &

Simmons, 1962). In general, findings indicate that the relatively older or younger age at

which a child enters school does play a part in the child's short and long-term academic

achievement, with relatively younger students scoring significantly lower on achievement

tests than their older classmates.

In the recent past, kindergarten *red-shirting* has become common (Lin, Freeman,

& Chu, 2009). In hopes of giving their child an academic advantage, parents frequently

delay enrolling their child in kindergarten until the year following their first year of

eligibility. This phenomenon has had some long-term negative consequences for children

who enter kindergarten as five-year-olds. Kindergarten teachers are encountering many

older students who enter with much higher readiness skills their younger classmates,

forcing them to "increase curriculum expectations to meet their needs" (Lin, Freeman, &

Chu, 2009, p. 46). Also contributing to the trend of increased curricular demands are the

high-stakes assessments that have come about since the passage of NCLB. In efforts to

prepare students as early as possible and raise student achievement, many schools have

begun to push the curriculum down, prompting the popular media to question whether

kindergarten has become the new first grade (Schoenberg, 2010).

Research on the correlation between age of school entry and subsequent academic

performance has frequently found that age-based achievement differences between

students exist early but diminish as students advance into higher grades. However, Lin et al. (2009) cautioned that most of these studies have been conducted in socioeconomically homogenous settings. Far fewer research studies have been conducted in an effort to determine if and how age and socioeconomic variables are related. However, given the myriad negative outcomes associated with low SES, it may be assumed that the relatively younger ages of these children, as compared to their classmates, would be yet another strike against them.

Summary

Since the formation of the National Reading Panel in 2000, the passage of No Child Left Behind in 2002, and various other large-scale, high profile reading initiatives, the literacy landscape in public education has shifted considerably. There has been an attempt to refocus literacy instruction on the so-called *Big Five* critical components of reading development identified by the National Reading Panel that has coincided with an emphasis on regular assessment and the use of research-based reading instruction. These changes have dramatically affected the conceptualization of reading instruction and assessment in America's public schools. According to Pearson (2009), while:

> . . . there has been nothing in these reforms to suggest that comprehension instruction should be suspended, there is a subtle repositioning . . . [in which] comprehension has become the natural consequence of teaching the code well in the early stages of instruction instead of the primary goal and focus of attention from the very beginnings of a child's instructional lives in school. (p. 24)

The first three essential components of early reading success identified by the National Reading Panel are easy to conceptualize, teach, and assess. That is, the

constrained nature of their scope provides educators with a finite set of skills that simplify their instruction and assessment. Furthermore, an abundance of research has been conducted that provides guidance on the best ways to teach and assess these necessary but insufficient skills to facilitate the ultimate goal of reading— comprehension. Unfortunately, the flawed research on the predictive value of these constrained skills has also resulted in a disproportionate amount of instructional time being spent on teaching and assessing these skills. Regarding the unconstrained skill of reading comprehension, Catts (2009) asserted that the conflation of decoding and comprehension has led to instruction of rules and strategies to be applied to text, frequently separate from the subject matter that forms the content of the reading material. According to Catts, this practice "underestimates the complexity of reading comprehension" (p. 178).

The last two essential components of early reading success identified by the National Reading Panel are difficult to define, teach, and assess. To some degree, the very complexity of their nature, as well as the impossibility of assessing them meaningfully in the short-term, has limited the amount of research and instructional focus on these skills in the early grades. This is particularly detrimental, as research has shown that unconstrained skills such as these are the very foundation upon which successful reading comprehension rests.

It would appear that the widely held belief that reading comprehension is simply the natural, developmental result of fluent decoding is erroneous, as it does not take into account the immensely complex nature of comprehending written text. Reading comprehension involves a host of higher-level mental processes that include "thinking,

reasoning, imagining, and interpreting" (Kamhi, 2009a, p. 175). Furthermore, reading comprehension cannot be achieved by teaching a set of general strategies to be applied to any text situation. Reading comprehension must be conceptualized as language in written form. A person would not be expected to gain meaning from a speech by listening to it and then summarizing it or finding its main idea; instead, he or she would listen, connect the content of the speech to what is already known, and then modify the knowledge that already existed before the speech started. Catts (2009) asserted that the practice of teaching these reading comprehension strategies is inherently flawed. Indeed, if a student is able to find the main idea of a passage, he or she must be able to comprehended it— finding the main idea is the product of reading comprehension, not the cause of reading comprehension.

There is a growing research interest in the phenomenon of late-emerging poor readers (Compton, Fuchs, Fuchs, Elleman & Gilbert, 2008). For these students, adequate progress in reading decoding in the early school years belies the fact that they will struggle in later school years when reading demands change. The Simple View of Reading (SVR) (Gough & Tunmer, 1986) would explain that some students may only appear to be late-emerging poor readers; in fact, the foundations of later poor reading for those students were present all along. Adlof, Perfetti, and Catts (2011) cite research indicating that "measures of oral language skills can be used to identify children who are at risk for reading [comprehension] difficulties *prior to* [italics added] the onset of reading instruction" (p. 196). Following this logic, the SVR would imply that different measures would be necessary to predict students at risk for reading decoding difficulties as opposed to those for whom reading comprehension may become a problem. The early

grades rely on predictors of early reading outcomes (i.e., phonological awareness, alphabet knowledge, rapid automatized naming, etc.). Research suggests that, in addition to these predictors, measures of broader language skills would allow educators to identify students with weaknesses that could predispose them to later reading comprehension difficulties (Adlof, Perfetti & Catts, 2011).

Overreliance on the multitudinous assessments of constrained reading skills conducted in the early elementary grades provides educators with a false sense of confidence about which students are on track to become successful readers. Many students perform these tasks to complete mastery (i.e., they can decode fluently); yet, they are, in reality, on track to encounter difficulty in later elementary years, when their comparatively lower language skills begin to betray their struggle. If educators continue to view reading and language as separate developmental processes, little time will be spent on enhancing coherent knowledge and language (Hirsch, 2006). This is particularly harmful to the children who are already behind in all of these areas. Many students' reading problems are centered on weak constrained skills, and these are the same students that educators have learned to identify, intervene with, and support early so that can be more likely to catch up to their peers. However, students with more subtle, yet pervasive, difficulties in unconstrained skills are at a distinct disadvantage when their satisfactory performance on earlier assessments leads educators and parents to believe that all is well and on track.

It is fairly easy to understand how the present system came to be. Deficits in constrained reading skills appear earlier, are easier to identify, and are relatively simple to remediate. Deficits in unconstrained reading skills may not become evident until much

later, and they are much more difficult to identify, assess, and remediate. Research has shown that some populations are more vulnerable to the ill effects of the present system. A large body of research indicates that those children who come from socioeconomically disadvantaged backgrounds arrive at school well behind their more affluent classmates in language skills, including vocabulary and background knowledge; furthermore, they are at greater risk for general educational failure (Arnold & Doctoroff, 2003; Bowey, 2005; Bradley & Corwin, 2002). Researchers have found that this fact alone increases the low SES children's risk of having long-term difficulties with reading comprehension. According to the research, male students and students who are younger than their classmates are also at an immediate disadvantage.

A number of researchers have expressed concern over the current reading comprehension assessment practices in America's schools. Though the topic is subject to ongoing debate, most researchers agree that reading comprehension is not a unitary construct that can be reduced to a single score on an end-of-year, high-stakes reading assessment. Depending upon the developmental level of the student, as well as the state in which he or she resides, it can be argued that very different constructs are being measured. In the lower grades, assessment scores most likely reflects students' proficiency in decoding words. As students progress in school, that score becomes less a reflection of their decoding proficiency and more an indication of various language competencies—vocabulary, background knowledge, motivation, engagement—all constructs that are directly and indirectly affected by myriad other internal and external factors. The situation is simply not as black and white as many believe.

If policymakers and educators continue to misunderstand what is actually being assessed on the various tests that inform policy and instruction, schools will continue to miss the mark in their goal of raising levels of long-term reading proficiency in this country. It is very difficult for many educators to conceptualize that achievement in higher grades and adulthood relies heavily on instruction that occurs in the earliest school years. The very nature of vocabulary and background knowledge acquisition—that is, the ambiguity of its development and the inherent difficulty in meaningfully measuring it—prevents a widespread, general understanding of its importance. Further complicating the matter is the inability to measure these reading comprehension foundations in a simple, immediate manner. Unfortunately, in this era of accountability, producing short-term, observable, positive results in all areas is expected and required, whether it is possible or not.

CHAPTER THREE: METHODOLOGY

According to Gall, Gall, and Borg (2007), prediction research is frequently utilized in the field of education and has made "a major contribution to educational practice" (p. 342). In general, prediction studies provide three types of information: the extent to which a criterion can be predicted, data for developing a theory, and evidence of the predictive validity of an assessment tool. The present study sought to provide the first type of information.

Research has established several predictors of a student's academic achievement, in general, and reading achievement, in particular. Among these are students' early receptive/expressive language skills, SES, gender, and age at school entry. However, research has yet to establish the nature of the relationships among these early and routinely obtained variables and students' subsequent performances on the high-stakes reading assessments administered in specific states. The purpose of this study was to determine how well a group of variables known upon a group of students' entrance into kindergarten predicted their performances on an annual high-stakes reading assessment conducted six years later, in the students' fifth grade year.

Research Design

A correlational research design was utilized to examine the relationships between each of these variables and the students' later reading performance. An initial analysis of the magnitude of the relationships between the five variables of interest was accomplished through construction of a correlation matrix. According to Allen (2010), "regression models expand on correlational assumptions" (p. 1079) by allowing the researcher to determine the how, and to what extent, the criterion variable changes as a

function of changes in the predictor variable. Therefore, a series of bivariate linear regressions was subsequently carried out to determine whether the variables—early vocabulary skills, SES, gender, and age at school entry—had predictive value regarding the students' subsequent performances on the fifth grade Reading CRCT.

Research Questions and Null Hypotheses

- Research Question 1: What is the relationship between students' K-SEALS Vocabulary subtest raw scores and their fifth grade CRCT Reading scores?

- Null Hypothesis (H_{01}): There is no significant relationship between students' K-SEALS Vocabulary subtest raw scores and their fifth grade CRCT Reading scores.

- Research Question 2: What is the relationship between students' socioeconomic status and their fifth grade CRCT Reading scores?

- Null Hypothesis ($H_{02)}$): There is no significant relationship between students' socioeconomic status and their fifth grade CRCT Reading scores.

- Research Question 3: What is the relationship between students' gender and their fifth grade CRCT Reading scores?

- Null Hypothesis ($H_{03)}$): There is no significant relationship between students' gender and their fifth grade CRCT Reading scores.

- Research Question 4: What is the relationship between students' ages at school entry and their fifth grade CRCT Reading scores?

- Null Hypothesis ($H_{04)}$): There is no significant relationship between students' ages at school entry and their fifth grade CRCT Reading scores.

Participants

Participants for this study included a single group of students who had attended a rural, public school system for six consecutive years. The convenience sample was comprised of those students who entered Mountain View Primary School (fictitious name) as kindergartners at the beginning of the 2004-2005 school year and remained students in the Mountain View School System as fifth graders at the conclusion of the 2009-2010 school year. Students who repeated a grade between the 2004-2005 and 2009-2010 school years were not included in the study.

Setting

The study took place in a rural, public school district in northern Georgia that is currently comprised of 2,591 students. Mountain View Schools, a Title I system, consist of one preschool, one primary school (grades K-2), one elementary school (grades 3-5), one middle school (grades 6-8), one high school (grades 9-12), and one comprehensive school (grades K-12). The student population is 94% White, 3% Hispanic, and 2% multiracial. Of the 2,591 students in the district, approximately 52% qualify for free and reduced lunches, 14% have disabilities, 2% have limited English proficiency, and 23% are in the early intervention program (The Governor's Office of Student Achievement, n.d.).

Instrumentation

Kaufman Scales of Early Academic and Language Skills (K-SEALS)

The K-SEALS is an individually administered, standardized test designed to assess early academic and language skills in children ages 3 years 0 months to 6 years 11 months. The K-SEALS includes three subtests, including (a) Vocabulary; (b) Letters,

Words & Numbers; and (c) Articulation Survey. On the Vocabulary Subtest, the student, using gestures or names, identifies pictures of objects or actions based on verbal descriptions of their attributes. On the Letters, Words & Numbers Subtest, the student selects or names numbers, letters, or words; counts; indicates knowledge of number concepts; and solves number problems. The Articulation Survey provides information about the correctness of sound production based on students' naming of common objects or actions. The raw scores on the subtests yield standard scores with a mean of 100 and standard deviation of 15 (K-SEALS Product Summary, n.d.).

Technical report information on the reliability of the K-SEALS indicates that internal consistency for the subtests ranges from .88 to .94, and median test-retest reliability for the subtests ranges from .87 to .94. Information is provided regarding concurrent and predictive validity. The K-SEALS correlates significantly (low .80s) with the Kaufman Assessment Battery for Children (K-ABC), the Stanford Binet – 4th Edition (SB-IV) Verbal Reasoning, and the SB-IV Test Composite. Correlations of the K-SEALS language and composite scores with the Peabody Picture Vocabulary Test – Revised (PPVT-R) range from .66 to .73 (K-SEALS Product Summary, n.d.).

Georgia's Criterion Referenced Competency Test (CRCT)

The CRCT is an end-of-year assessment designed to measure students' acquisition of the knowledge and skills set forth by the Georgia Performance Standards. Typically, CRCTs are administered in reading, language arts, and math in the spring of students' first though eighth grade years; social studies and science tests are also administered in Grades 3 through 8. Information is provided at the student, class, school, system, and state levels and is used to diagnose individual student strengths and

weaknesses as well as gauge the quality of education throughout the state of Georgia (Georgia Department of Education, 2009).

Student performances are reported as a scale score, a mathematical transformation of a raw score that provides a uniform metric for interpreting scores. Performance levels represent ranges of scores defining a specific level of performance. Performance levels are labeled as *Does Not Meet Standard* (scale score below 800), *Meets Standard* (scale score from 800 to 849), or *Exceeds Standard* (scale score 850 or above) (Georgia Department of Education, 2009).

The Assessment Research and Development Division of the Georgia Department of Education (GaDOE) provides information regarding the reliability and validity of the 2010 CRCT in *An Assessment & Accountability Brief: Validity and Reliability for the 2010 Criterion-Referenced Competency Tests*. This document outlines the meticulous process by which the CRCTs are developed, which strictly "adheres to the *Standards for Educational and Psychological Testing* (1999) as established by the American Educational Research Association (AERA), the American Psychological Association (APA), and the National Council on Measurement in Education (NCME)" (p. 1).

The validity of the CRCTs is ensured through the test development process, which provides "evidence that the CRCT are valid instruments for the uses for which the department has developed the test" (GaDOE, 2010, p. 6). Information about the reliability of the CRCTs is provided for each subject at each grade level through the calculation of a Cronbach's alpha reliability coefficient as well as standard errors of measurement. For the 2010 Grade 5 Reading test administration, the reliability index was reported at .87 with a standard error of measurement at 2.55. According to GaDOE

(2010), "the reliabilities for the 2010 CRCT are consistent with previous administrations and suggest that the CRCT assessments are sufficiently reliable for their intended purpose" (p. 5).

Procedures

After receiving Institutional Review Board (IRB) approval and permission from the Superintendent of the Mountain View School System, the researcher obtained data from the student records of each participant. These data included students' 2009-2010 fifth grade CRCT Reading results and 2004-2005 K-SEALS Vocabulary subtest results. The researcher obtained permission from the school nutrition program, through the Superintendent, to gather information about each participant's free or reduced lunch status during the 2004-2005 school year. Finally, the researcher obtained data regarding student gender and age upon school entry from student records.

Data Analysis

The data was transferred into the Predictive Analytic SoftWare (PASW) 18.0 for analysis, screening the data for accuracy, missing data, and outliers. Then, the responses were examined to be certain that inclusion criteria were met. To determine that responses were within the possible range of values and that the data was not distorted by outliers, descriptive statistics and frequency distributions were calculated. A correlation matrix was constructed between the five variables of interest (gender, age, SES, K-SEALS, and CRCT scores). When both variables were continuous, Pearson correlations were conducted; when one variable was dichotomous, point-biserial correlations were conducted. Finally, in order to determine whether any of the predictor variables

explained a significant amount of variance in the students' fifth grade CRCT Reading

scores, bivariate linear regression analyses were carried out.

CHAPTER FOUR: FINDINGS

The purpose of this study was to determine how well a group of variables known upon a group of students' entrance into kindergarten predicted their performances on an annual high-stakes reading assessment conducted six years later, in the students' fifth grade year. The following research questions and null hypotheses guided this study:

Research Questions and Null Hypotheses

- Research Question 1: What is the relationship between students' K-SEALS Vocabulary subtest raw scores and their fifth grade CRCT Reading scores?

- Null Hypothesis (H_{01}): There is no significant relationship between students' K-SEALS Vocabulary subtest raw scores and their fifth grade CRCT Reading scores.

- Research Question 2: What is the relationship between students' socioeconomic status and their fifth grade CRCT Reading scores?

- Null Hypothesis ($H_{02)}$): There is no significant relationship between students' socioeconomic status and their fifth grade CRCT Reading scores.

- Research Question 3: What is the relationship between students' gender and their fifth grade CRCT Reading scores?

- Null Hypothesis ($H_{03)}$): There is no significant relationship between students' gender and their fifth grade CRCT Reading scores.

- Research Question 4: What is the relationship between students' ages at school entry and their fifth grade CRCT Reading scores?

- Null Hypothesis ($H_{04)}$): There is no significant relationship between students' ages at school entry and their fifth grade CRCT Reading scores.

This chapter is organized into three sections. In the first section, a summary of the study's methodology is presented, including a description of the participants, setting, and instrumentation, as well as a rationale for the selected data analysis. In the second section, findings are presented, including descriptive statistics, correlations between variables of interest, and bivariate linear regression analyses. The final section is a summary of the findings.

Participants

Participants for the study included those students who entered Mountain View Primary School as kindergartners at the beginning of the 2004-2005 school year and remained students in the Mountain View Elementary School, as fifth graders, at the end of the 2009-2010 school year. Upon their enrollment, each of these students was administered the Kaufman Scales of Early Academic and Language Skills (K-SEALS). Other information obtained at kindergarten enrollment included the student's age, gender, and free-meal status. As required by the Georgia Department of Education, these students were subsequently administered the Criterion Referenced Competency Test (CRCT) in the spring of their fifth grade year.

Instrumentation

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The K-SEALS is an individually administered standardized test designed to assess early academic and language skills in children ages 3 years 0 months to 6 years 11 months. The K-SEALS consists of three subtests, including (a) Vocabulary; (b) Letters, Words & Numbers; and (c) Articulation Survey. On the Vocabulary Subtest, the student, using gestures or names, identifies pictures of objects or actions based on verbal

descriptions of their attributes. On the Letters, Words & Numbers Subtest, the student

selects or names numbers, letters, or words; counts; indicates knowledge of number

concepts; and solves number problems. The Articulation Survey provides information

regarding the correctness of sound production after the student names common objects or

actions. The K-SEALS subtest raw scores yield standard scores with a mean of 100 and

standard deviation of 15 (K-SEALS Product Summary, n.d.).

Technical report information regarding reliability of the K-SEALS indicates

internal consistency for the subtests as .88 to .94 and median test-retest reliability for the

subtests as .87 to .94. Information is provided regarding concurrent and predictive

validity. The K-SEALS correlates significantly (low .80s) with the Kaufman Assessment

Battery for Children (K-ABC), Stanford Binet – 4th Edition (SB-IV) Verbal Reasoning,

and SB-IV Test Composite. Correlations of the K-SEALS language and composite scores

with the Peabody Picture Vocabulary Test – Revised (PPVT-R) range from .66 to .73 (K-

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The CRCT is an end-of-year assessment designed to measure student acquisition

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administered in reading, language arts, and math in the spring of students' first though

eighth grade years; social studies and science is also administered in grades 3 through 8.

Information is provided at the student, class, school, system, and state levels and is used

to diagnose individual student strengths and weaknesses as well as gauge the quality of

education throughout Georgia (Georgia Department of Education, 2009).

Student performances are reported in scale scores, a mathematical transformation of a raw score that provides a uniform metric for interpreting scores. Performance levels represent ranges of scores defining a specific level of performance. Performance levels are labeled as "Does Not Meet Standard" (scale score below 800), "Meets Standard" (scale score from 800 to 849), or "Exceeds Standard" (scale score 850 or above) (Georgia Department of Education, 2009).

The Assessment Research and Development Division of the Georgia Department of Education (GaDOE) provides information regarding the reliability and validity of the 2010 CRCT in *An Assessment & Accountability Brief: Validity and Reliability for the 2010 Criterion-Referenced Competency Tests*. This document provides an outline of the meticulous process by which the CRCTs are developed, which strictly "adheres to the *Standards for Educational and Psychological Testing* (1999) as established by the American Educational Research Association (AERA), the American Psychological Association (APA), and the National Council on Measurement in Education (NCME)" (p. 1).

Validity of the tests is ensured through the test development process which provides "evidence that the CRCT are valid instruments for the uses for which the department has developed the test" (GaDOE, 2010, p. 6). Reliability information is provided for each subject at each grade level through the calculation of a Cronbach's alpha reliability coefficient as well as standard errors of measurement. For the 2010 Grade 5 Reading test administration, the reliability index is reported at .87 with a standard error of measurement at 2.55. According to GaDOE (2010), "the reliabilities for

the 2010 CRCT are consistent with previous administrations and suggest that the CRCT assessments are sufficiently reliable for their intended purpose" (p. 5).

Procedures

After receiving Institutional Review Board (IRB) approval and permission from the Superintendent of the Mountain View School System, data were obtained from each member of the sample's student records. These data included students' 2009-2010 fifth grade CRCT Reading results and 2004-2005 K-SEALS Vocabulary subtest results. Permission was obtained from the school nutrition program, through the Superintendent, to gather information regarding each member of the sample's free or reduced lunch status during the 2004-2005 school year. Finally, data regarding student gender and age upon school entry was obtained from student records.

A correlational research design was utilized to examine the relationships between each of these variables and the students' later reading performance. An initial analysis of the magnitude of the relationships between the five variables of interest was accomplished through construction of a correlation matrix. According to Allen (2010), "regression models expand on correlational assumptions" by allowing the researcher to determine the how, and to what extent, the criterion variable changes as a function of changes in the predictor variable (p. 1079). Therefore, a series of bivariate linear regressions were carried out to determine whether the variables, early vocabulary skills, SES, gender, and age at school entry, had predictive value regarding the students' subsequent performances on the fifth grade CRCT Reading test.

Findings

Descriptive Statistics

Fifty-one of the participants (51.0%) were male. The majority of the participants

had free or reduced lunch (60, 60.0%) with the remaining having full lunch (40, 40.0%).

Frequencies and percentages for gender and socioeconomic status are presented in Table

1.

Table 1

Frequencies and Percentages for Gender and Socioeconomic Status

Demographic	n	%
Gender		
Male	51	51.0
Female	49	49.0
Socioeconomic Status		
Free/reduced Lunch	60	60.0
Full Lunch	40	40.0

Participants ranged in age from 59 to 76 months old (4.92 to 6.33 years). The

average age was 65.33 months (5.44 years) ($SD = 3.84$ months). The K-SEALS

vocabulary subtest raw scores ranged from 21 to 38 ($M = 32.44$, $SD = 2.91$). The reading

scores on the CRCT ranged from 796 to 920 ($M = 840.96$, $SD = 21.22$). Means and

standard deviations are presented in Table 2.

Table 2

Means and Standard Deviations for Participant Characteristics

Characteristic	M	SD
Age in months	65.33	3.84
K-SEALS	32.44	2.91
CRCT	840.96	21.22

A correlation matrix was constructed between the five variables of interest (gender, age, SES, K-SEALS Vocabulary subtest raw scores, and fifth grade CRCT Reading scores). When both variables were continuous, a Pearson correlation was conducted; when one variable was dichotomous, point-biserial correlations were conducted. Results of the correlations showed a positive correlation between SES and K-SEALS Vocabulary subtest raw scores ($r_{pb} = .22$, $p = .027$), suggesting that those students with full lunch had higher K-SEALS vocabulary subtest raw scores. The correlations also showed a positive correlation between K-SEALS Vocabulary subtest raw scores and fifth grade CRCT Reading scores ($r = .40$, $p < .001$), suggesting that when K-SEALS Vocabulary subtest raw scores increased, so did fifth grade CRCT Reading scores. The results of the correlations are presented in Table 3.

Table 3

Correlation Matrix between Variables of Interest

	Gender	Age	SES	K-SEALS	CRCT
Gender	-				
Age	.09	-			

SES	.10	†	-		
K-SEALS	.07	.15	.22*	-	
CRCT	-.01	.00	.12	.40**	-

Note. * $p < .05$. ** $p < .01$. † a chi square was conducted instead since these variables are dichotomous. $\chi^2 (1) = 0.96$, $p = .327$.

Bivariate Linear Regression Analyses

In order to determine whether the null hypotheses could be rejected, a bivariate linear regression was conducted on each of the four predictor variables. According to Andrew, Pederson, and McEvoy (2011), linear regression analysis provides two additional pieces of valuable information over the correlation matrix. First, linear regression analysis produces a regression equation that can be used for prediction purposes. Second, linear regression analysis provides a coefficient of determination, allowing the researcher to determine the extent to which the predictor variable successfully predicts the criterion variable.

- Research Question 1: What is the relationship between students' K-SEALS Vocabulary subtest raw scores and their fifth grade CRCT Reading scores?

- Null Hypothesis (H_{01}): There is no significant relationship between students' K-SEALS Vocabulary subtest raw scores and their fifth grade CRCT Reading scores.

To examine Null Hypothesis 1, a bivariate linear regression was conducted to assess how the students' K-SEALS Vocabulary subtest raw scores predict their fifth grade CRCT Reading Scores, where the K-SEALS Vocabulary subtest raw score is the

predictor variable, and the fifth grade CRCT Reading score is the criterion variable. The

assumptions of normality and homoscedasticity were assessed and met via examining P-P

and residuals scatterplots, respectively. The results of the bivariate linear regression were

significant ($B = 2.94$, $p < .001$), suggesting that the variable K-SEALS Vocabulary

subtest raw score is a significant predictor of fifth grade CRCT Reading scores. Null

Hypothesis 1 can be rejected in favor of Alternative Hypothesis 1: There is a significant

relationship between students' K-SEALS Vocabulary subtest raw scores and their fifth

grade CRCT Reading scores. The results of the bivariate linear regression are presented

in Table 4.

Table 4

Linear Regression with K-SEALS Vocabulary subtest raw scores predicting 5th grade

CRCT Reading Scores

Source	*B*	*SE*	*β*	*t*	*P*
K-SEALS	2.94	0.67	.40	4.37	.001

- Research Question 2: What is the relationship between students' socioeconomic
  status and their fifth grade CRCT Reading scores?
- Null Hypothesis ($H_{02)}$: There is no significant relationship between students'
  socioeconomic status and their fifth grade CRCT Reading scores.

To examine Null Hypothesis 2, a bivariate linear regression was conducted to

assess how the students' SES predicted their fifth grade CRCT Reading Scores, where

student SES is the predictor variable and the fifth grade CRCT Reading score is the

criterion variable. The assumptions of normality and homoscedasticity were assessed and

met via examining P-P and residuals scatterplots, respectively. The results of the

bivariate linear regression were not significant ($B = 5.36$, $p = .218$), suggesting that the

variable SES is not a significant predictor of fifth grade CRCT Reading scores. Null

Hypothesis 2 cannot be rejected in favor of Alternative Hypothesis 2: There is a

significant relationship between students' socioeconomic status and their fifth grade

CRCT Reading scores. The results of the bivariate linear regression are presented in

Table 5.

Table 5

Linear Regression with SES predicting 5th grade CRCT Reading Scores

Source	B	SE	β	t	P
SES	5.36	4.32	.12	1.24	.218

- Research Question 3: What is the relationship between students' gender and their

  fifth grade CRCT Reading scores?

- Null Hypothesis ($H_{03)}$: There is no significant relationship between students'

  gender and their fifth grade CRCT Reading scores.

  To examine Null Hypothesis 3, a bivariate linear regression was conducted to

assess how gender of the students predict fifth grade CRCT Reading scores, where

gender is the predictor variable and fifth grade CRCT Reading score is the criterion

variable. The assumptions of normality and homoscedasticity were assessed and met via

examining P-P and residuals scatterplots, respectively. The results of the bivariate linear

regression were not significant (B = -0.36, p = .993), suggesting that the variable gender

is not a significant predictor of CRCT Reading scores. Null Hypothesis 3 cannot be

rejected in favor of Alternative Hypothesis 3: There is a significant relationship between

students' gender and their fifth grade CRCT Reading scores. The results of the bivariate

linear regression are presented in Table 6.

Table 6

Linear Regression with Gender predicting 5th grade CRCT Reading Scores

Source	B	SE	β	t	p
Gender	-0.36	4.27	-.01	-0.09	.933

- Research Question 4: What is the relationship between students' ages at school
  entry and their fifth grade CRCT Reading scores?

- Null Hypothesis ($H_{04)}$: There is no significant relationship between students' ages
  at school entry and their fifth grade CRCT Reading scores.

To examine Null Hypothesis 4, a bivariate linear regression was conducted to

assess how age at school entry of the students predicted fifth grade CRCT Reading

scores, where age at school entry is the predictor variable and fifth grade CRCT Reading

score is the criterion variable. The assumptions of normality and homoscedasticity were

assessed and met via examining P-P and residuals scatterplots, respectively. The results

of the bivariate linear regression were not significant (B = -0.01, p =.989) suggesting that

the variable age at school entry is not a significant predictor of fifth grade CRCT Reading

scores. Null Hypothesis 4 cannot be rejected in favor of Alternative Hypothesis 4: There

is a significant relationship between students' ages at school entry and their fifth grade CRCT Reading scores. The results of the bivariate linear regression are presented in Table 7.

Table 7

Linear Regression with Age predicting CRCT Reading Scores

Source	B	SE	β	t	p
Age (in months)	-0.01	0.56	.00	-0.01	.989

Findings Summary

The purpose of this study was to examine the relationships among variables known upon a group of students' entrance to kindergarten and their performance six years later, in their fifth grade year, on a high-stakes reading assessment. Initial examination of correlations among the five variables of interest indicated significant relationships between SES and K-SEALS Vocabulary subtest raw scores as well as between K-SEALS Vocabulary subtest raw scores and fifth grade CRCT Reading scores. Four bivariate linear regressions were performed in order to determine whether any of these variables had predictive value regarding students' performance on a high-stakes reading test. Data analysis indicated that one of the four variables, K-SEALS Vocabulary subtest raw score, was a significant predictor, accounting for 16% of the variance in fifth grade CRCT Reading scores. None of the remaining three variables—SES, gender, and age—predicted unique variance in fifth grade CRCT Reading scores.

CHAPTER FIVE: DISCUSSION

The accountability mandates of NCLB have altered the landscape of public education in unprecedented ways. At no time in the history of American public schools has the focus on student test performance been more intense. Unfortunately, this can result in an overreliance on test scores as the primary indicator of student and teacher success (Au, 2007; Crocco & Costigan, 2007; Neuman, 2006; Pedulla et al., 2003). While test scores undeniably provide valuable information to teachers, parents, and administrators, the variety of instruments and skills assessed at different developmental levels may lead to misplaced confidence in early positive results. For example, assessment of reading in first grade is very different from assessment of reading in fifth grade. In the early years, tests are overwhelmingly comprised of items that measure a student's ability to accurately and fluently decode words; however, accurate and fluent decoding does not guarantee comprehension. Consequently, students who score well on those early assessments may very well encounter difficulty in later elementary years, when reading tests measure higher-order comprehension skills.

The objective of this chapter is to summarize and discuss the purpose of the study, the findings, and the implications of those findings. In addition, the researcher will acknowledge the limitations of the study and provide recommendations for further research.

Purpose of the Study

The ultimate, long-term goal of reading instruction is to prepare students to be able to comprehend what they read. Research has identified many component skills

that are necessary, but alone insufficient, to accomplish this goal. In the earliest grades, reading comprehension is primarily associated with a students' ability to decode words. As students progress through the upper elementary grades and beyond, language comprehension predicts more individual differences among students' reading comprehension. Researchers have shown that the contribution of each construct— reading decoding and language comprehension—to reading comprehension changes over time (Adlof, Perfetti, & Catts, 2011; Kendou, van den Broek, White, & Lynch, 2009). The correlation between reading decoding and reading comprehension decreases as students progress through school, while the correlation between language comprehension and reading comprehension increases. In effect, in the early grades, reading decoding sets the ceiling on reading comprehension; therefore, in the early grades, reading decoding best predicts individual differences. Later, language comprehension sets the ultimate ceiling on reading comprehension; therefore, language comprehension is a more effective way to predict individual differences.

Educators armed with the earliest and most accurately predictive information regarding their youngest students will be able to maximize time and resources in order to benefit those students as much as possible. The purpose of the present study was to determine if there was a significant relationship between a group of variables known upon a group of students' entrance into kindergarten and their performance on an annual high-stakes reading assessment conducted six years later.

Review of Methodology

In order to answer the research questions that guided this study, a correlational research design was employed. The convenience sample was comprised of 100 students

who entered a rural, Title I public school's kindergarten during the 2004-2005 school year and remained in the school system to be administered a high-stakes reading test six years later, at the conclusion of their fifth grade year. The researcher's intention was to determine the predictive value of variables known upon the students' entrance to school regarding their performance on the subsequent reading assessment. A correlation matrix was conducted to examine relationships between the five variables of interest, after which a series of bivariate linear regression analyses were conducted to determine whether the null hypotheses could be rejected in favor of the alternate hypotheses.

Summary and Discussion of Findings

- Research Question 1: What is the relationship between students' K-SEALS Vocabulary subtest raw scores and their fifth grade CRCT Reading scores?

A bivariate linear regression analysis indicated that students' K-SEALS Vocabulary subtest raw scores were significantly predictive of their fifth grade CRCT Reading scores ($B = 2.94$, $p < .001$); therefore, Null Hypothesis 1 was rejected. According to the analysis, for every one point increase in students' K-SEALS Vocabulary subtest raw scores, a 2.94 point increase would be expected on the fifth grade CRCT Reading test. This result is consistent with previous research suggesting that reading comprehension in the upper elementary grades and beyond can be predicted by the oral language skills of very young children, well before formal reading instruction even begins (Adlof, Catts, & Lee, 2010; Adlof, Perfetti, & Catts, 2011).

- Research Question 2: What is the relationship between students' socioeconomic status and their fifth grade CRCT Reading scores?

A bivariate linear regression analysis indicated that students' SES was not a significant predictor of fifth grade CRCT reading scores ($B = 5.36$, $p = .218$); therefore, Null Hypothesis 2 was not rejected. It should be noted, however, that a significant correlation between SES and K-SEALS Vocabulary subtest raw scores was identified when correlations between all variables of interest were examined. The significant correlation between SES and K-SEALS Vocabulary subtest raw scores is consistent with previous research indicating that students from lower socioeconomic backgrounds tend to enter school with weaker vocabulary skills than peers with upper socioeconomic backgrounds (Bhattacharya, 2010; Hart & Risley, 1995).

- Research Question 3: What is the relationship between students' gender and their fifth grade CRCT Reading scores?

A bivariate linear regression analysis indicated that students' gender was not a significant predictor of fifth grade CRCT reading scores ($B = -0.36$, $p = .993$); therefore, Null Hypothesis 3 was not rejected. This result was inconsistent with research reflecting a tendency for girls to outperform boys on various measures of academic achievement (Mullis, Martin, Kennedy, & Foy, 2006; NAEP, 2009; OECD, 2009; Robinson & Lubienski, 2010).

- Research Question 4: What is the relationship between students' ages at school entry and their fifth grade CRCT Reading scores?

A bivariate linear regression analysis indicated that students' relative age at school entry was not a significant predictor of their fifth grade CRCT reading scores ($B = -0.01$, $p = .989$); therefore, Null Hypothesis 4 was not rejected. This was inconsistent

with research indicating that the academic achievement of students who are young relative to classmates tends to be lower (Lin, Freeman, & Chu, 2009; Schoenberg, 2010).

Implications

Recently, "motivated by evidence that, despite decades of attention to early intervention, low levels of literacy achievement persist" (Paratore et al., 2011 p. 123), Paratore et al. directed educators to attend to some of the *knowns* in reading research, which included the following:

1. There are skills, abilities, and concepts that have their roots in early childhood that influence competency "at different points in the literacy learning trajectory" (Paratore et al., 2011, p. 123). In effect, the authors cautioned educators against teaching only what is measureable at the time. In order to address the issue, the curricula used with young children must focus as relentlessly on developing vocabulary and knowledge as they do on developing code-related skills.

2. Teachers and parents' verbal interactions with young children should include rare or sophisticated words and focus on topics that develop conceptual knowledge. This issue should be addressed by providing direct instruction to parents and teachers.

3. In order to increase vocabulary and language learning, books shared with young children should introduce them to unfamiliar topics, use interesting and complex syntax, and contain rare or sophisticated words.

4. Young children benefit when shared book readings are repeated and discussions are "interactive and elaborative, and focused on plot, language, and interesting, or important words" (Paratore, 2011, p. 124).

5. Activities designed to foster phonological awareness are important.

6. Activities designed to demonstrate how print works are important.

Findings in the present study regarding the possibility of predictive value from variables known when students enter kindergarten yield implications pertinent to three areas: risk assessment, instruction, and reading comprehension assessment. Each of these areas, and their relationships to the study's findings, will be explored in turn.

Risk Assessment

Schools are, and should be, intensely invested in the early identification of students for whom learning is, or will become, difficult. In the economic reality of today's world, care must be taken to cause the most difference with scarce resources in as effective and efficient a manner as possible. The findings in this study have implications for universal pre-school and kindergarten reading screening practices, as well as reading instruction in the elementary grades.

Current screening protocols, with their main focus on pre-reading skills such as phonological awareness and alphabet knowledge, are likely to miss students who are at risk for reading comprehension deficits that do not emerge until later grades. In addition to measures intended to assess these necessary pre-reading and reading skills, measures should be administered that have predictive value regarding long-term reading comprehension. These assessments should include measures of language skills that can be quantified long before a child is taught to read. There will be a challenge, however, to then take appropriate steps to mitigate students' low language skills.

Deficits resulting in poor performance on assessments of constrained skills are relatively amenable to intervention. When a student performs poorly on phonological

awareness or alphabet knowledge tasks, it is relatively simple to intervene, assess, and determine progress. Decades of research indicate that the majority of these difficulties can be overcome. On the other hand, language is such a complex construct that designing interventions is not straightforward, because it is not apparent what should be addressed (Adlof et al., 2010). Furthermore, the effectiveness of interventions targeting a construct as complex and unconstrained as language skills, including vocabulary and background knowledge, cannot be readily assessed to determine if progress is being made.

Instruction

Duke, Pearson, Strachan, and Billman (2011) posited that educators should "be concerned about the will and thrill, not just the skill, of reading comprehension" (p. 61). Indeed, students should be learning content that is well beyond their reading ability from the time they enter school. When students begin kindergarten, they are excited and eager to learn. Capitalizing on this enthusiasm and receptivity from the beginning will yield huge rewards down the road. Biemiller (2003) lamented the fact that scant opportunities exist in primary classrooms for exposure to concepts and texts beyond a student's reading ability. Walsh (2003) described use of typical reading programs as a "lost opportunity" (p. 1) to build the foundation upon which later reading comprehension and achievement will depend Specifically, she pointed out three ways in which these programs miss opportunities to build word and world knowledge:

1) They don't focus on systematically building essential knowledge and vocabulary during teacher read-alouds and discussions aimed at building background knowledge; 2) They waste time by including many more lessons on

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formal reading comprehension skills than researchers have found are needed; and

3) By offering mostly incoherent, banal themes, they miss opportunities to

develop word and world knowledge by offering and exploiting content-rich

themes. (p. 24)

Regarding direct instruction of vocabulary, Wagner and Meros (2010) maintained

that while no single method has been shown to be superior to others, some commonsense

characteristics of effective vocabulary instruction includes the following five

characteristics:

1. Words should be introduced using everyday language as opposed to dictionary
   definitions.

2. Providing a vocabulary word in multiple contexts is preferable to a single context.

3. Instructional activities should promote deep rather than shallow processing of
   meaning.

4. Multiple exposures are better than single exposures to new words.

5. Encourage students to attend to occurrences of new vocabulary words in settings
   outside of the classroom. (p. 5)

Decades of reading research have informed our understanding of the role that

various basic skills play in successful reading. However, it has also become apparent that

higher order reading skills are just as essential (Oakhill, Cain, & Bryant, 2003; Paris &

Paris, 2005; van den Broek et al., 2005).

Assessment of Reading Comprehension

Hirsch (2003) maintained that reading comprehension assessments in the later

grades are actually measures of background knowledge. If, on a traditional measure of

reading, a large part of what is being measured is actually background knowledge, it is conceivable that students from more impoverished backgrounds, though cognitively equal and nondisabled, may begin to evidence their weaknesses in the later elementary grades, when tests of domain-general reading comprehension prevail.

The accurate assessment of reading comprehension is complicated by several issues. First and foremost, there is no clear consensus regarding the exact definition of reading comprehension, much less how to isolate and measure it. Cognitive scientists maintain that it is futile to reduce reading comprehension to a single score, asserting that "there is no uniform comprehension process to be measured" (Kintsch & Kintsch, p. 86). As a nonunitary construct, it is impossible to quantify and assess reading comprehension along a single dimension—unlike phenomena such as height, weight, and basic reading skills like decoding and fluency. Unfortunately, the accomplishment of reading comprehension can only be fully appreciated when made public in some way (Calfee & Miller, 2005). What teachers regard as reading comprehension (i.e., answering questions about text, retelling important ideas, discussing text.) and what researchers regard as reading comprehension (i.e., comprised of microprocesses and global processes) differ considerably. Ultimately, "the de facto definition and public benchmarks of reading comprehension are standardized test scores usually derived from reading text silently and responding to multiple-choice questions" (Paris & Hamilton, 2005, p. 131). Paris and Hamilton cautioned that "the wide variation in the definitions, assessments, and standards of reading comprehension is where educational practices, theories, and policies may converge and conflict" (p. 131).

Developmental issues further confound matters, because reading comprehension means different things and may look very different in beginning readers and expert readers. Most reading researchers acknowledge that "there is still much more to learn about how to measure a phenomenon that is as elusive as it is important" (Pearson & Hamm, 2005, p. 63). Kamhi (2009b) proposed that, in order to more accurately assess reading, three elements of reading should be assessed separately: word recognition, domain-general reading comprehension, and subject-specific knowledge. In this conceptualization, high-stakes reading tests would be considered measures of domain-general reading comprehension. Essentially, Kamhi's reasoning was that assessing these skills separately would allow "educators to observe and measure the impact of instruction that is designed to improve each of these areas," insuring that "educators and policymakers will be confronted with evidence that word recognition and subject-specific knowledge are more responsive to instruction than are domain-general measures of reading comprehension" (p. 213). The crux of the matter is that as long as reading is defined, broadly, as merely a combination of reading decoding and reading comprehension, efforts to improve students' performance in general reading achievement will be in vain. In fact, "the domain specificity of comprehension raises serious questions about the meaning of domain-general measures of comprehension" (Kamhi, 2009b, p. 175).

Limitations

This study, its realization, and its findings are not without limitations that must be acknowledged. They are as follows:

1. Correlational research does not provide the means to make causative statements.

2. In this study, students with disabilities were not disaggregated; some of these students may have taken the CRCT with significant accommodations.

3. This study did not account for those students who repeated kindergarten. In fact, a significant number of students were retained (N = 20; 17%), but remained in the school system. Of those 20 students who remained in the school system, 60% were boys and 70% were eligible for free/reduced lunch. These students took the fifth grade CRCT at the conclusion of the 2010-2011 school year.

4. Results are specific for this convenience sample only and cannot be generalized.

Recommendations for Further Research

Besides addressing the sampling and design limitations considered above, future research is needed to clarify which elements would be most beneficial to measure in a kindergarten screening protocol. Specifically, which language skills, in what combination, and at what times, will be most useful to assess? Identifying a student who is at risk for later reading comprehension difficulties is only the first step. Research is needed to remediate the deficits that have been identified. The nature of this research will necessarily be longitudinal, as the pertinent skills are unconstrained and, therefore, not amenable to short-term intervention and assessment.

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APPENDIX A

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The Graduate School at Liberty University

October 4, 2011

Paige Swartz
IRB Exemption 1161.100411: Examining the Relationship between Enrolling Kindergarteners'
Vocabulary Skills, Socioeconomic Status, Gender, and Relative Age and their Performance Six Years
Later on the Fifth Grade Reading Criterion-Referenced Competency Test

Dear Paige,

The Liberty University Institutional Review Board has reviewed your application in accordance with the
Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and
finds your study to be exempt from further IRB review. This means you may begin your research with the
data safeguarding methods mentioned in your approved application, and that no further IRB oversight is
required unless your data collection extends past the one year approval granted by this memo, in which
case you would submit the annual review form attached to your approval email.

Your study falls under exemption category 46.101 (b)(4), which identifies specific situations in which
human participants research is exempt from the policy set forth in 45 CFR 46:

> (4) Research involving the collection or study of **existing data**, documents, records, pathological specimens, or
> diagnostic specimens, if these sources are publicly available or if the information **is recorded by the
> investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to
> the subjects**.

Please note that this exemption only applies to your current research application, and that any changes to
your protocol must be reported to the Liberty IRB for verification of continued exemption status. You may
report these changes by submitting a new application to the IRB and referencing the above IRB Exemption
number.

If you have any questions about this exemption, or need assistance in determining whether possible
changes to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,

Fernando Garzon, Psy.D.
IRB Chair, Associate Professor
Center for Counseling & Family Studies

(434) 592-5054

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40 Years of Training Champions for Christ: 1971-2011

APPENDIX B

August 29, 2011

Mr. Gary Steppe
Superintendent
Union County Schools
124 Hughes Street
Blairsville, Georgia 30512

Dear Mr. Steppe,

As you know, I have successfully defended my proposed dissertation research study and am now ready to move forward with data collection and analysis. This letter is to formally request your permission for access to the following:

- 2004-2005 Kindergarten students' Birthdates, Gender, Free/Reduced lunch status, and K-SEALS results
- 2009-2010 5th grade CRCT results

Your signature at the bottom of this letter will serve to grant permission for me to collect the above data.

Thank you,

Paige Swartz
Doctoral Candidate
Liberty University
Lynchburg, Virginia
Email: pswartz@liberty.edu
Phone: 706-781-7506

Committee Chair: Dr. Carol Mowen
Email: cmowen@liberty.edu
Phone: 270-982-9231

Signature: _____ Date: _____