Winter 2010

An Examination of the Reading First Program at a Southeastern Virginia Elementary School and the Impact on K–2 Student Reading Achievement

Leslie Ford Lippard
Old Dominion University

AN EXAMINATION OF THE READING FIRST PROGRAM AT A

SOUTHEASTERN VIRGINIA ELEMENTARY SCHOOL

AND

THE IMPACT ON K-2 STUDENT READING ACHIEVEMENT

by

Leslie Ford Lippard
B.A. May 1971, University of North Carolina
M. Ed. May 1982, Lynchburg College
Reading Specialist Certification May 2001, Old Dominion University

A Dissertation Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
Requirement for the Degree of

DOCTOR OF PHILOSOPHY IN EDUCATION

CONCENTRATION IN LITERACY LEADERSHIP

OLD DOMINION UNIVERSITY
December 2010

Approved by:

Jane M. Hager (Chair)

Charlene E. Fleener (Member)

Stephen W. Tonelson (Member)

ABSTRACT

An Examination of the Reading First Program at a Southeastern Virginia
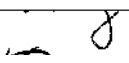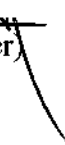Elementary School and the Impact on K-2 Student Reading Achievement

Old Dominion University, 2010
Leslie Ford Lippard
Director: Dr. Jane Hager

Reading First was a federal initiative aimed at improving reading instruction and implementing programs and strategies grounded in scientifically-based reading research. The legislation was predicated on research findings that high-quality reading instruction and intervention in the primary grades significantly reduces the numbers of students who experience difficulties in later grades. This study examined the Reading First program at an elementary school in southeastern Virginia from 2006-2008. Specifically, the researcher investigated the impact of the independent variable, the tier three model of intervention on K-2 student reading achievement. Quantitative data was garnered from 792 K-2 student participants attending the research site.

Using a regression discontinuity design, the study evaluated the significance of the multi-tiered intervention model on student reading achievement using a pre-test/post-test program group strategy (Trochin, 1982; Stanley, 1991; Shadish, Cook, & Campbell, 2002). The Phonological Awareness Literacy Screenings (*PALS*), *K PALS* and *PALS 1-3*, served as the study's dependent measures examining differences in pre-post student scores to determine statistical significance in literacy growth among the population sample (Invernizzi, Meier, & Juel, 2003). Using *PALS* benchmark ranges established by the local division, 2006-2008 K-2 students were identified as tier 1, meeting benchmark standards, tier 2, strategic, or tier 3, intensive. The researcher evaluated the mean

differences between groups using an Analysis of Variance (*ANOVA*). Additional independent variables analyzed included pre-k experience, student tier classification, grade level, and year.

Statistical significance existed between pre-test/post-test scores among the 2006-2007 and 2007-2008 tier 1 student subgroups in Grade 1. No significant relationship was found among year 1 or year 2 tier 1 student subgroups in Kindergarten or Grade 2. Results of one-way analyses of variance showed statistical significance between pre-test/post-test scores among tier 2 student subgroups in Kindergarten, Grade 1, and Grade 2. Statistical significance existed between pre-test/post-test scores among the 2006-2007 and 2007-2008 tier 3 student subgroups in Kindergarten. No significant relationship was found among year 1 or year 2 tier 3 student subgroups in Grade 1 or Grade 2.

ACKNOWLEDGEMENTS

I would like to express my thanks and appreciation to Dr. Jane Hager, my committee chair. Her excellent guidance, patience, and feedback were more than valuable. In addition, my other committee members, Dr. Charlene Fleener and Dr. Stephen Tonelson, provided continuous academic and professional support during the entire dissertation process. The members of the Literacy Leadership Cohort were instrumental in the completion of this process. The benefit of a doctoral cohort is that you develop lasting professional friendships with individuals pursuing a similar goal over the course of a shared journey. Finally, I want to thank my children, Megan, MollyKate, and Matthew, for their unwavering love and support. A life goal has been met, and to each of you, I owe my deep gratitude and appreciation.

TABLE OF CONTENTS

LIST OF TABLES

Table   Page

Table   Page

LIST OF FIGURES

Chapter I

INTRODUCTION

Over the past 40 years, there have been intense and multidisciplinary efforts to understand the causes of reading difficulties and reading disabilities. These efforts have yielded a significant amount of knowledge related to behavioral, cognitive, genetic, and neurological characteristics of children who struggle learning to read (Cutting & Denckla, 2006; Davis et al., 2001; Lyon, 1995). Moreover, this knowledge has led to instructional insights and research that have revealed features of effective instruction which can prevent or remediate many reading difficulties (Denton et al., 2006; Lyon et al., 2005; Vaughn, Gersten, & Chard, 2000).

Background and Context

Educational Reform

The United States government has mandated federal reading policy since the early 1960s. The first legislation was implemented in 1965 through Title I, the Elementary and Secondary Education Act (*ESEA*), a compensatory education program designed to provide extra help to students having difficulty in reading and/or math. Title I was established to supplement instruction, specifically reading instruction, for low-achieving, disadvantaged children (LeTendre,1991; McGill & Allington,1991). Findings from a longitudinal study of Atlanta Public Schools evaluating the effectiveness of the Title I reading programs indicated only significant gains for 12% of the student participants (Atlanta Public Schools, 1981). A limitation cited by the four-year study was student attrition compromising the comparability of study samples and internal validity of the research (Atlanta Public Schools, 1981).

Paralleling the policy actions of the federal government, policy makers at the national level placed reading high on their agendas. The Reading Excellence Act, signed by President Clinton on October 21, 1998, and implemented in 1999, targeted children who were in need of remediation in the primary grades. The objective of the act was to reach the goal of the America Reads Challenge that every child read well and independently by the end of the third grade. The federal mandate linked the legislation to the *ESEA* (Senate Committee on Health, Education, Labor, and Pensions, 1999). This authorization ensured reading programs specifically targeted under-performing schools with high concentrations of students living in poverty. Local school divisions offered professional development on research-based methods to improve the instructional practices of teachers and other instructional staff. Under this legislation, the federal government appropriated $260 million, with a subsequent allocation of $460 million in 2002, in competitive grants for states to improve reading instruction (Committee on Labor and Human Resources, 1998).

Goals 2000, Educate America Act, enacted in 1994 under President Clinton, and amended in 1996, continued the national commitment to improving education and ensuring that all children reached high academic standards (Goals 2000, 1994). The legislation supported states' efforts to develop clear and rigorous standards for improving student achievement. Goals 2000 was tied to states' progress in developing content and student performance standards and implementing comprehensive progress monitoring improvement processes. The legislation played an integral role in the development, alignment, and implementation of both state and local assessments of student performance. More than 61% of legislative subgrants were designated to improve specific

skills or content knowledge of teachers and student teachers through professional development and pre-service activities (Goals 2000, 1994).

In January 2001, George W. Bush included the early reading initiative, Reading First, as part of his No Child Left Behind (*NCLB*) proposal. The legislation was authorized under the *ESEA* as amended by *NCLB*, and designed to ensure that all students read at grade level or above by the end of third grade. Reading First was a five year entitlement grant stressing the importance of scientifically-based reading research (*SBRR*) as the focus of classroom instruction garnered from the findings of the National Reading Panel (*NRP*) (2000). The goal of *NCLB*, as described in its legislative title, was to close the achievement gap of disadvantaged students with accountability, flexibility, and choice, so that no child was left behind (*USDOE,* 2002). The reauthorization of the *ESEA* as part of *NCLB*, encompassing the Reading First program, was widely regarded as the most ambitious federal overhaul of public schools since the 1960s (Bush, 2001).

The National Reading Panel

In 1997, Congress requested the National Institute of Child Health and Human Development (*NICHD*) to convene a national panel to assess the effectiveness of different approaches used to teach children to read (*NICHD*, 2000). To ensure a reasonable standard of quality, an authoritative group was appointed to carry out an objective review of the research and to reach consensus upon standards of practice. The creation of the National Reading Panel (*NRP*) initiated a national, comprehensive, research-based effort on alternative instructional approaches to reading instruction and to guide the development of public policy on literacy instruction. The panel was charged with compiling a report assessing "the status of research-based knowledge, including the

effectiveness of various approaches to teaching children to read, and, if appropriate, with designing a strategy for rapidly disseminating this information to facilitate effective instruction in the schools" (*NICHD*, 2000, p. 1).

The *NRP* was guided by the work of the National Research Council Committee (*NRCC*) (1998) on Preventing Reading Difficulties in Young Children (Committee on Prevention of Reading Difficulties in Young Children, 1998; Snow, Burns, & Griffin, 1998). The *NRCC* had identified and summarized research literature relevant to the critical skills, environments, and early interactions important for developing beginning reading skills. Using these findings, the *NRP* examined the following topics: alphabetics, including phonemic awareness instruction and phonics instruction; fluency; comprehension, including vocabulary instruction, text comprehension instruction, and comprehension strategies; teacher preparation and teacher education; reading instruction; and, computer technology (*NRP*, 2000).

> The majority of children who enter kindergarten and elementary school
> at-risk for reading failure can learn to read at average or above levels,
> but only if they are identified early and provided with systematic,
> explicit, and intensive instruction in phonemic awareness, phonics,
> reading fluency, vocabulary, and reading comprehension strategies.
> Substantial research supported by *NICHD* demonstrates that without
> systematic, focused, and intensive interventions, the majority of children
> rarely catch up (Lyon, 2001, p. 18).

History of Reading Failure

Data highlighting the magnitude of reading failure among elementary students were significant. The National Assessment of Educational Progress (*NAEP*) (1994) describing reading performance among fourth graders identified 42% of the student population below basic levels. According to the *NAEP,* a basic level was defined as "partial mastery of pre-requisite knowledge and skills which are fundamental for proficient work at each

grade" (p. 4). Although prevalent among children from all backgrounds and socioeconomic conditions, the research by Snow et al. (1998) identified reading difficulties more prevalent among poor, non-white, and non-English speaking student subgroups. Table 1 displays the student reading performance data by race/ethnicity described in the 1998 *NAEP* Reading Report Card for the Nation (*NAEP*, 1998).

Table 1

NAEP Report of Student Reading Performance Data by Race/Ethnicity (NAEP, 1998)

	Percentages of Fourth Grade Students within Each Achievement Level			
	Below Basic	Basic	Proficient	Advanced
Caucasian	27%	34%	29%	10%
African-American	64%	26%	9%	1%
Hispanic	60%	26%	11%	2%
Asian	31%	25%	12%	12%
American Indian	53%	33%	12%	2%

Fourth grade subgroups reading below basic levels included: Caucasian = 27%; African American = 64%; Hispanic = 60%; Asian = 31%; and, American Indian = 53%. Subgroups reading at basic levels included; Caucasian = 34%; African American = 26%; Hispanic = 26%; Asian = 25%; and, American Indian = 33%. Fourth grade subgroups reading at proficient levels included: Caucasian = 29%; African American = 9%; Hispanic = 11%; Asian = 12%; and, American Indian = 12%. Subgroups reading at

advanced levels included; Caucasian = 10%; African American = 1%; Hispanic = 2%; Asian = 12%; and, American Indian = 2%.

Comparative data from the 1998 *NAEP* report and the National Education Goals Report (1999) concluded national trends had not improved since the 1992 report (NAEP, 1998): (1) 69% of fourth graders scored below basic levels of reading; and, (2) 31% of 4th grade students scored at the proficient level in reading. The inability of students to read offered compelling evidence that America's educational system was in crisis (Slavin et al., 1994; Pearson, 1999; Allington, 2000; Neuman & Dickinson, 2001).

Early Intervention

The focus on prevention and early intervention efforts became a pivotal initiative aimed at reducing the number of students who were not meeting grade level benchmarks in reading. Intervention research on early reading difficulties provided evidence that poor reading performance was not only modifiable, but in many cases preventable (Denton & Hocker, 2006). Central to this approach was the assumption that for many students, reading achievement was alterable through timely, progressively more intensive instruction relying on research-based instruction and formative assessment (Denton et al., 2006; Vaughan et al., 2007; Harn, Linan-Thompson, & Roberts, 2008).

Supporting the efficacy of early intervention research, the tier three model of Reading First was predicated on findings that high-quality reading instruction and intervention in the primary grades significantly reduced the numbers of students who experienced difficulties in later grades (Vaughn, 2000; Vaughan, Gersten, & Chard, 2000). Torgesen et al. (2001) examined the significance of early interventions implemented during the second half of kindergarten and extending through second grade. At the end of the study,

the mean performance of the study sample was in the average range on all reading measures. The research by Berninger et al. (2002) examined the effect of intervention on at-risk readers in first grade. Eighty-four percent of the students who had received supplemental intervention were performing in the average range on a variety of literacy measures at the end of second grade. Foorman et al. (1997) investigated intervention practices for first and second grade students receiving Title I services. Their study suggested that phonetically explicit interventions (direct, systematic, and comprehensive instruction to build phonemic awareness and phonemic decoding skills) were more effective than interventions which were less phonetically explicit, particularly for the student population weakest in phonological and print related knowledge and skill. Eighty-two percent of the study sample demonstrated significant end-of-year reading improvement. The results of this research indicated that early instructional intervention made a difference for the development and outcomes of reading skills in first and second grade children at-risk of reading failure.

Research by *NICHD* (2000) suggested increased reading skills for 90-95% of poor readers in the primary grades, if provided with prevention and early intervention programs combining instruction in phonemic awareness, phonics, spelling, reading fluency, and reading comprehension. The longitudinal study by O'Connor, Harty, and Fulmer (2005) examined the effectiveness of layers of intervention from kindergarten through third grade. "Of the students who continued to receive intervention beyond kindergarten, more than half were in the average range on reading measures by the end of second grade and needed no assistance to stay in the average range through third grade" (O'Connor, Harty, & Fulmer, p. 534).

Juel (1988) estimated that without intervention, 88% of children who had difficulty reading at the end of first grade displayed similar difficulties at the end of fourth grade. "Failure to develop basic reading skills by age nine predicts a lifetime of illiteracy" (Lyon, 2001, p. 18). These findings had implications for interventions with young children having special learning needs, living in poverty, and reporting early ambivalent or negative feelings about school (Oldfather, 1991; Myers, 1992).

Statement of the Research Problem

The goal of the Reading First program was to improve reading instruction in public schools by encouraging the use of scientifically-validated methods and curricula. Under *NCLB*, State Educational Agencies (*SEAs*) received over $10.4 billion in Reading First funding during the five year initiative. The interim report of the federal Reading First Implementation Evaluation indicated a strong implementation of scientifically- based reading research based practices (*USDOE*, 2007). Findings were based on data collected from surveys completed in spring of 2005 by 6,200 K-3 teachers, 1,570 principals, and 1,320 reading coaches in nationally representative samples of 1,090 Reading First schools (*USDOE*, 2007). The study sample for the Final Reading First Impact Study included 248 schools in 18 divisions within 13 states: 1) 30,000 first through third grade students were assessed during four observations; and, 2) 1,300 first and second grade classrooms were observed during five observations (*USDOE*, 2008).

Key findings of the Interim Evaluation Report and the Final Reading First Impact Study Report included the following:

> (1) Reading First produced a positive and statistically significant impact on the amount of instructional time spent on the five essential components of reading instruction promoted by the program (phonemic awareness, phonics, vocabulary, fluency, and comprehension) in grades one and two.

(2) Reading First produced positive and statistically significant impacts on multiple practices that are promoted by the program, including professional development in scientifically-based reading instruction, support from full-time reading coaches, amount of reading instruction, and supports available through for struggling readers implementing the tier three model of intervention.

(3) Reading First produced a positive and statistically significant impact on decoding among first grade students tested in one school year.

(4) Reading First did not produce a statistically significant impact on student reading achievement in kindergarten, or grades one, two or three during the course of the five year program (*USDOE*, 2008, p. 8).

Purpose of the Study

The purpose of this study is to examine the Reading First program at an elementary school in southeastern Virginia from 2006-2008. Specifically, the study will address the tier three model of intervention impacting K-2 pre-post student scores using the Phonological Awareness Literacy Screenings (*K PALS* and *PALS 1-3*), the study's dependent measures.

Research Questions and Associated Hypotheses

1. To what extent did the evidence indicate a significant difference between pre-test scores and post-test scores for tier 1 student subgroups?

   $Ho1_1$: There is no significant difference between pre-test and post-test scores among the tier 1 subgroup in Kindergarten.

   $Ho1_2$: There is no significant difference between pre-test and post-test scores among the tier 1 subgroup in Grade 1.

   $Ho1_3$: There is no significant difference between pre-test and post-test scores among the tier 1 subgroup in Grade 2.

2. To what extent did the evidence indicate a significant difference between pre-test scores and post-test scores for tier 2 student subgroups?

$Ho2_1$: There is no significant difference between pre-test and post-test scores among the tier 2 subgroup in Kindergarten.

$Ho2_2$: There is no significant difference between pre-test and post-test scores among the tier 2 subgroup in Grade 1.

$Ho2_3$: There is no significant difference between pre-test and post-test scores among the tier 2 subgroup in Grade 2.

3. To what extent did the evidence indicate a significant difference between pre-test scores and post-test scores for tier 3 student subgroups?

$Ho3_1$: There is no significant difference between pre-test and post-test scores among the tier 3 subgroup in Kindergarten.

$Ho3_2$: There is no significant difference between pre-test and post-test scores among the tier 3 subgroup in Grade 1.

$Ho3_3$: There is no significant difference between pre-test and post-test scores among the tier 3 subgroup in Grade 2.

Significance of the Study

The significance and utility of this research is the generalizability of various indicators assessing the effectiveness of the Reading First program implementation. Specifically, the study will address the tier three model of intervention impacting K-2 pre-post student scores, using the study's dependent measures, the Phonological Awareness Literacy Screenings (*K PALS* and *PALS 1-3*). Examining student data compiled from 2006-2008 will provide an analysis of student achievement trends among the K-2 student subgroups, and will provide correlations with evaluation criteria reported

in the Interim Evaluation Report (*USDOE*, 2007) and the Final Reading First Impact

Study (*USDOE*, 2008).

Methodology

Using a regression discontinuity design, the study evaluated the significance of tier

three intervention model on student reading achievement using a pre-test/post-test

program group strategy (Trochin, 1982; Stanley, 1991; Shadish, Cook, & Campbell,

2002). The Phonological Awareness Literacy Screenings, *K PALS* and *PALS 1-3*, served

as the study's dependent measures examining differences in pre-post student scores to

determine statistical significance in literacy growth among the population sample

(Invernizzi, Meier, & Juel, 2003).

Analysis for the present study was chosen based on the work of Trochim (1982)

whose research provided an extensive review of how regression-discontinuity can serve

as a design for program evaluations. Participants are assigned to program or comparison

groups solely on the basis of a cutoff score on a pre-program measure. The most common

implementation of the methodology has been in compensatory education evaluation

where students obtaining scores below a pre-determined cutoff value on an achievement

test are assigned to intervention programs designed to improve their performance.

Using an Analysis of Variance (*ANOVA*), the researcher evaluated mean differences

between K-2 pre-test and post-test scores. Analyses of the independent variables (pre-k

experience, student tier classification, grade level, and year) on the composite variable,

SCOREDIF, were performed to examine significant differences in students' pre-test and

post-test performance. K-2 students (Kindergarten: n = 278; First Grade: n = 252; and,

Second Grade: n = 262) attending the southeastern Virginia school between 2006-2008 comprised the purposeful sampling population.

Definition of Terms

The following terms were used in this study:

1. No Child Left Behind Act (*NCLB*) of 2001: Federal legislation enacted under Bush (2001) focused on having every child reading on grade level by the end of third grade. *NCLB* required schools to use programs that were aligned with scientifically-based reading research (*SBRR*). Further, the programs incorporated the five components of effective reading programs: phonemic awareness, phonics, fluency, vocabulary, and comprehension (*NRP*, 2000; Bush, 2001).

2. Scientifically-Based Reading Research (*SBRR*): According to *NCLB*, scientifically-based reading research is research that applies rigorous, systematic, and objective procedures to obtain valid knowledge relevant to reading development, reading instruction, and reading difficulties (*NRP*, 2000).

3. Reading First: The No Child Left Behind Act of 2001 (*NCLB*) established the Reading First program to ensure that all children in America were reading at or above grade level by the end of third grade. This federal initiative, aimed at improving reading instruction in grades K-3, promoted the use *SBRR*. Additionally, supplemental programs and materials funded by the five year, $10.4 billion grant, were required to include the five essential components of effective reading instruction, identified by the *NRCC* (1998) on Preventing Reading Difficulties in Young Children and the *NRP* (2000).

4. Phonological Awareness Literacy Screening (*PALS*) (Invernizzi, Meier, & Juel, 2003): *PALS K* and *PALS 1-3* were recommended as the pre-post screening instruments in the Commonwealth's Reading First schools by the Virginia Department of Education (*VDOE*) (*USDOE*, 2002).

5. Tier Three Model of Intervention: Using multiple tiers of reading intervention, the model promotes the early identification of students at-risk for academic failure. The design promotes ongoing progress-monitoring to improve reading instruction for all students, especially struggling readers, English language learners, and special education students (Vaughn, 2000).

Delimitations of the Study

Three delimitations will affect the generalizability of the current study.

1. Selection of the Reading First site was based on the researcher's position as the Reading First Coach at the elementary school.

2. Student performance is limited to one measure and two years of the five year program.

3. Only student data from a single Reading First school was examined in the study.

Limitations of the Study

The *VDOE* designated State Reading Specialists to oversee and facilitate the administration of grants, communication, and legislation for the Reading First program. Five *VDOE* State Reading Specialists served the evaluation site throughout the course of the grant. Based on differences in training and experience, their evaluative styles encompassed diverse perceptions about the primary purposes of the Reading First program processes with differing site expectations for program participants.

Site-based attrition factors affecting the reliability and validity of the current research included: (1) a new building principal appointed in July 2006; (2) new K-2 teachers assigned to the school throughout the course of the five year program requiring intensive Reading First professional development; and, (3) high student mobility patterns.

The Interim Implementation Reading First Evaluation (*USDOE*, 2007) indicated a strong implementation of proven practices, as did the findings of the Final Impact Study Report (*USDOE*, 2008). However, neither study provided a statistically significant correlation between the impact of the program and student reading achievement in grades K-2. Due to the absence of longitudinal data for the program, generalizibility of the study was limited due to the narrow lens of the Reading First school and K-2 program participants.

<div align="center">Overview of the Study</div>

The study is comprised into five chapters. Chapter I included an introduction to the study, statement of the problem, significance of the research, guiding questions and associated hypotheses, definitions of terms, delimitations, and limitations. Chapter II provides a historical perspective on federal reading policy and the impact of the legislative endeavors on student reading achievement. A comprehensive review of the literature as it relates to reading difficulties, scientifically-based reading research, and early intervention was examined. Chapter II further explores features of the Reading First program impacting student reading achievement, including professional development, the role of the reading coach, and the tier three model of intervention. Chapter III details the research design and methodology, and includes information pertaining to the population sample, data collection strategies, instrumentation, and

statistical analyses used in the study. Chapter IV reports results of data analyses

concerning each research question and associated hypotheses. Chapter V presents an

overview of the study, an analysis and clarification of the findings, study limitations, and

recommendations for practice and future research.

Chapter II

LITERATURE REVIEW

One seldom sifts through the oratory of U.S. politicians without observing the rhetoric

that reading education is his or her top priority. An analysis of initiatives spanning the

past 40 years highlights the succession of major educational policy initiatives that have

emerged, embedded within the federal landscape.

Section 1: History of Federal Policy and Educational Initiatives in Reading

Title I and the Coleman Report

A legislative hallmark of President Lyndon Johnson's War on Poverty, the 1965

passage of the Title I Elementary and Secondary Education Act (*ESEA*) initiated financial

assistance to state and local education agencies to meet the special needs of educationally

disadvantaged students. At a cost of more than $8 billion, it was the largest program

funded under the *ESEA* in 2000, serving 11 million children in more than 14,000 school

districts across the nation (*USDOE*, 2000). Federal funding has supported a variety of

supplemental services sharing the collective purpose of improving educational

opportunities and outcomes for low-achieving students. Findings from the meta-analysis

by Borman et al. (1995) suggested Title I had not fulfilled its original expectation of

closing the achievement gap between at-risk students and their more advantaged peers.

In 1966, the Office of Education published the Coleman Report, assessing the nation's

progress in achieving school integration mandated by the 1954 Brown v. Board of

Education ruling (Coleman et al., 1966). The Equality of Educational Opportunity Study

(*EEOS*), commissioned by the United States Department of Health, Education, and

Welfare in 1966, assessed the availability of equal educational opportunities to students

of different race, color, religion, and, national origin (Coleman et al., 1966). Coleman et

al. (1966) found that children attending the nation's schools were highly segregated by

race. "A pupil's achievement is strongly related to the educational backgrounds and

aspirations of the other students in the school. Children from a given family background,

when put in schools of different social composition, will achieve at quite different levels"

(Coleman et al., 1966, p. 302). Findings of the Coleman Report suggested that student

background and socioeconomic status were much more important in determining

educational outcomes than were measured differences in school resources (i.e. per pupil

spending provided by Title 1) (Coleman, 1979).

Becoming a Nation of Readers: The Report of the National Commission on Reading

During the Reagan administration, The Report of the National Commission on

Reading and First Lessons: A Report On Elementary Education in America (1985),

cemented the term basics in the national lexicon of literacy policy (Bennett, 1987).

Largely ignoring the mechanics of reading as emphasized in phonics instruction, its

proponents viewed learning to read as a natural process that children acquire as they are

exposed to interesting stories and meaningful texts (Durkin,1979; Chall,1967;

Hatch,1998). The movement for a return to phonics simmered for many years among

those philosophically opposed to what they perceived as the lack of discipline in whole

language pedagogy (Adams, 1991; Juel, 1991; Allington, 1999). The Great Debate

polarized ideological differences between political conservatives embracing phonics as a

traditionalist, back-to-basics approach to reading instruction, and liberals subscribing to

the whole language approach (Chall, 1983; Stahl & Miller,1989).

Goals 2000

During the Clinton administration, Goals 2000: The Educate America Act, was

passed by Congress in 1994. The legislation provided (1) a national framework for

education reform; (2) promoted the research, consensus building, and systemic changes

needed to ensure equal educational opportunities and high levels of educational

achievement for all American students; (3) provided a framework for re-authorization of

federal educational programs; and, (4) promoted the development and adoption of a

voluntary national system of skill standards and certifications (Goals 2000, 1994). A

federally-funded grant designed to support states' development of standards and

assessments, as well as local divisions' implementation of standards-based reform, the

legislation recognized, and supported, the systemic reform efforts that many states had

under way. Rather than targeting a specific student demographic subgroup, the legislation

supported a generic reform strategy that emphasized the development of state standards

and the assessments needed to measure progress toward identified goals. The emphasis

on results was embodied in changes to instructional and institutional systems that were

aligned to content and performance standards (Goals 2000, 1994). Most educators agreed

that "reform initiatives could be strengthened greatly by being integrated with high

academic standards and related accountability systems" (*The Progress of Education

Reform: 1996*, p.12).

Paralleling the policy actions at the national level during the 1990's, political debates

regarding early literacy pedagogy were contested at all levels. The 1998 National

Assessment of Educational Progress (*NAEP*) reported that in grade 4, no significant

changes had occurred in the percentages of students attaining proficiency in reading

achievement since 1992. Further, students of lower socioeconomic status (*SES*) demonstrated lower average reading scores (*USDOE*, 1999; Donahue, et al., 1999; Grissmer et al., 2000). Sustained evidence of reading failure offered the most compelling evidence that America's educational system was in crisis (Pearson, 1999; Neuman & Dickinson, 2001).

No Child Left Behind

In January 2001, President Bush included two major reading initiatives, Reading First and Early Reading First, as part of his No Child Left Behind (*NCLB*) proposal. The legislation mandated that education programs use scientifically-validated research to find solutions for education issues. Federal programs were required to statistically prove with measurable results that they were succeeding in educating the nation's children (Johnson, 2002; Lyon, 1998; National Institute of Child Health and Human Development, 2000). Reid Lyon, appearing before the Subcommittee on Education Reform, described how reading research findings were reflected in the Reading First initiative:

> The President's reading initiative has been developed on the basis of the best scientific evidence and knowledge relevant to reading development, reading difficulties, and reading instruction currently available. The initiative is also noteworthy for the attention given to (a) the early identification of children at-risk for reading failure; (b) the development and implementation of evidence-based prevention and early reading intervention programs at the local level; (c) the critical need to provide support to states to ensure that schools and teachers have the necessary professional development to identify and/or develop the most effective instructional materials, programs, and strategies; (d) the critical need to provide support to states and local educational agencies to identify and/or develop the most reliable and valid screening and diagnostic reading assessment instruments that can be used to identify at-risk children and to document the effectiveness of the instructional materials, programs, and strategies; and, (e) the need to strengthen coordination among schools, early literacy programs, and family literacy programs to ensure that these programs use evidence-based materials, instructional interventions, and strategies. In short, his proposal is predicated on a science of reading development and reading instruction, rigorous peer review, and monitoring to ensure high quality program design and

implementation, the provision of technical assistance when indicated by peer review, and the systematic assessment of clear and measurable achievement goals to ensure accountability (Lyon, 2001, p. 12).

The scientific pedagogy also required that teaching methods undergo research through observation and testing to measure their impact on student achievement. *NCLB* required states to establish accountability programs testing students in the core academic areas: math, reading, and science. These accountability programs measured schools' Adequate Yearly Progress (*AYP*) during successive yeas, in addition to measuring the overall performance among a number of subgroups, including minorities and students with disabilities (Bush, 2001). In addition, *NCLB* focused on the preparation, training, and recruiting of high quality teachers for every classroom in the nation. The federal government, addressing the needs of improving teacher quality, established grants for states and schools to strengthen the skills and knowledge of their teachers. Funding could be used for professional development, class size reduction, and for recruiting and retaining teachers (Darling-Hammond & Sykes, 2003).

Section II: The National Reading Panel

Scientifically-Based Reading Research

In 1997, Congress requested the director of the National Institute of Child Health and Human Development (*NICHD*) to appoint a panel to conduct a comprehensive investigation of research in the field of reading. Reid Lyon, Director of *NICHD*, emerged as the liaison between the scientific community and the arena of federal educational policy. The creation of the National Reading Panel (*NRP*) initiated a national, comprehensive, research-based effort on alternative instructional approaches to reading instruction, and to guide the development of public policy on literacy instruction. The

NRP was charged with compiling a report assessing the status of research-based knowledge, including the effectiveness of various approaches in teaching children to read, and, if appropriate, with designing a strategy for rapidly disseminating this information to facilitate effective instruction in the school (Committee on Prevention of Reading Difficulties in Young Children, 1998).

Findings from scientifically-based reading research (*SBRR*) provided compelling guidance for improved reading practice (Snow et al., 1998). The publication of the National Research Council report, Preventing Reading Difficulties in Young Children, brought a focus to, and turned the spotlight on, a legacy of federal, state, and local legislative efforts to ensure that children develop early literacy (National Research Council, 1998). The report captured considerable attention with its empirically validated conclusion that excellent instruction grounded in phonics was essential for overcoming barriers to literacy (*NICHD*, 2000; Torgesen, Wagner, & Rashotte, 1994; Burns, Griffin, & Snow, 1999).

Conducting a meta-analysis, the Panel reviewed an estimated 100,000 experimental or quasi-experimental research studies on reading published since 1966 (*NRP*, 2000). The *NRP* reviewed the findings of the National Research Council report designating three topic areas central to learning to read: alphabetics, fluency, and comprehension. In addition, five essential components of reading instruction were identified by the *NRP*: phonemic awareness, phonics, vocabulary development, reading fluency, and reading comprehension.

In April 2000, the *NRP* published its findings and recommendations in each of the topic and subtopic areas, in the form of the Report of the National Reading Panel: Report

of the Subgroups (*NRP*, 2000). Langenberg, Chair of the panel, stated that the *NRP* "was committed to identifying the most reliable research so it can be put into practice in all classrooms in America" (Langenberg & Associates, 2000, p. 9). Despite perceived flaws in the research methodology of the panel, Pressley (2001) noted the findings were an objective and authoritative basis for ending divisive polarities in federal legislation and for determining standards of instructional practices in U.S. reading education. The *NRP* meta-analysis, the Report of the National Reading Panel: Teaching Children to Read: An Evidence-Based Assessment of the Scientific Research Literature on Reading and Its Implications for Reading Instruction, seemed destined to have considerable clout. Backed by Congress and the *NICHD*, it had an unprecedented potential for affecting reading instruction in the U.S. (Johnson, 2002).

History of Reading Failure

The charge to the National Reading Panel took into account the foundational work of the National Research Council Committee and Preventing Reading Difficulties in Young Children (Snow, Burns, & Griffin, 1998). The committee estimated that "the educational careers of twenty-five to forty percent of American children were imperiled because they didn't read well enough, quickly enough, or easily enough to ensure comprehension in their content courses in middle and secondary school" (Snow, Burns, & Griffin, 1998, p. 98). National longitudinal studies revealed that more than 17.5% of the nation's children would likely encounter reading problems in the crucial first three years of their schooling (*NRP*, 2000). Reading failure was the most significant reason that children were retained, assigned to special education, or given long-term remedial services (Coyne, Kameenui, & Simmons, 2001).

In 2003, an analysis of fourth grade reading scores estimated the numbers of students performing below the basic level of proficiency to be 37% (National Assessment of Educational Progress, 2003). The findings of the study (National Assessment of Educational Progress, 2003) suggested that students eligible for free or reduced lunch were 32% more likely to score below the basic level of reading achievement as those student who did not qualify (Grigg et al., 2003). *NCLB* legislation required states to describe how schools and local divisions would be monitored and evaluated to attain Adequate Yearly Progress (*AYP*) with regard to improving the academic achievement of all students and students in specific subgroups (economically disadvantaged, students with disabilities, students identified as limited English proficient, and students in each of the major racial/ethnic groups present in the state) (Bush, 2001). States were required to establish annual measurable objectives for student performance on academic assessments and on other academic indicators. According to the 2005 *VDOE* Annual Yearly Progress Report *(AYP),* 52% percent of the Commonwealth's school divisions did not make *AYP,* and 154 Title I schools were identified as "needing improvement" (*VDOE*, 2005).

Section III: Site-Based Implementation of Reading First

Background of Reading First

Reading First promoted the use of scientifically-based reading research (*SBRR*) and supporting practices in grades K-3. The initiative used a rigorous application and review process to distribute $10.4 billion during a five year period to state and local education agencies for use in low-performing schools with well-conceived plans for improving the quality of reading instruction. The amount of the federal grant funding was calculated by a local school division's share of the state's Title I, Part A, funds distributed during the

preceding fiscal year, and by the percent of K-3 students in the district reading below grade level (*USDOE*, 2002). Grant stipulations required funding to be applied to reading curricula and professional development activities consistent with empirically-validated reading research. Once approved for funding, schools were expected to: (1) ensure that research-based reading programs and materials were used to teach students in K-3; (2) increase access and quality of professional development of all teachers who taught K-3 students and to ensure that they demonstrated effective skills for teaching reading; and, (3) to build the capacity of classroom teachers in the screening, monitoring, and evaluation of assessment data that was highly predictive of future outcomes in reading achievement (Jenkins, 2003; *USDOE*, 2002).

In September 2003, grant eligibility for the Commonwealth of Virginia was based upon the following criteria according to standards established by the Virginia Board of Education: (1) all eligible schools were identified as Title I schools; (2) each Title I school was Provisionally Accredited with Warning/Needs Improvement in English; (3) eligible schools had a pass rate of less than 60% on the 2001 Third Grade English Standards Of Learning (*SOL*) Test; and, (4) eligible schools had a poverty index of at least 40% as defined by Virginia's *ESEA* No Child Left Behind Consolidated Plan (*USDOE*, 2002; Bush, 2001). On January 9, 2003, the U.S. Department of Education awarded the Virginia Department of Education (*VDOE*) $16.9 million dollars in Reading First funds to support critical improvements in classroom instruction based on scientifically-based reading research (*SBRR*). Two hundred and twenty-one schools in sixty-six divisions were eligible to receive *VDOE* funding effective July 1, 2003 (*VDOE*, 2003).

The Reading First grant is a great investment in the children of Virginia, said Governor Mark R. Warner. It will provide our hard working teachers with the training and tools they need to further narrow the achievement gap in reading. It compliments the work already begun by this administration to help students in our lowest achieving schools through our Partnership for Achieving Successful Schools (*VDOE*, 2003, p. 1).

Reading First Professional Development

Reading First legislation mandated the use of programs and materials grounded in *SBRR*. The most rigorous definition of *SBRR* presumed evidence that programs had been evaluated in comparison to control groups (*NRP*, 2000). Findings from the *NRP* review were incorporated into the early literacy initiative. The federal legislation stressed that instructional decisions were to be made using *SBRR*, thereby aligning reading policy and practice to the findings of the *NRP* (*USDOE*, 2002; Bush, 2001; *NRP*, 2000).

The responsibility of Reading First professional development was to ensure that articulated goals lead to observable changes in teachers' classroom reading instruction. Conditions essential to sustaining and scaling research-based reading instruction were highlighted by Moats (2001) in A Blueprint for Professional Development for Teachers of Reading and Writing: Knowledge, Skills, and Learning Activities for Reading First Schools:

> Our national goal to teach every child to read by third grade is attainable for all but two to five percent of children with serious learning disabilities. Reaching this goal, however, will require teachers with greater expertise who work with validated assessment and instructional tools in well-supported contexts. Research-based comprehensive instructional programs in reading are necessary, but will not be sufficient without continuous, long-term professional development and support that allow teachers to learn the foundations of their discipline and to reach all learners (Moats, 2002, p.12).

Moats cited the empirical evidence of three studies: (1) Torgeson et al. (1999) found that while most of the struggling students who received explicit reading instruction

attained average levels of reading achievement, 24% of low responders, an estimated 2.4% of the total student population, were unable to attain gradelevel reading achievement; (2) Lyon et al. (2001) concluded that when students received classroom and tutorial interventions, the number of students who were at-risk for learning disabilities was less than 2% of the total population; and, (3) Good, Simmons, and Smith (1998) reported that after third grade, when the requirements of reading shift from learning to read to reading to learn, students' trajectories of reading progress become resistant to change.

The National Center for Reading First Technical Assistance (2005) reported a strategic, systematic professional development plan that: (1) prepared classroom and special education teachers in the five essential components of reading instruction; (2) included information on scientifically-based research materials; (3) aligned programs and strategies with performance and academic standards; (4) enhanced teachers' ability to implement intervention and remediation programs; (5) facilitated use of assessment data to inform instruction; and, (6) provided teachers with guidance and support thorough ongoing coaching.

In her report, Teaching Reading is Rocket Science: What Expert Teachers of Reading Should Know and Be Able To Do, Moats (1999) summarized current research on effective reading instruction and recommended improvements to teacher preparation, in-service, and classroom practice. The report examined curriculum construction and instructional design which provided a framework, sequence of prioritized objectives, and explicit strategies that supported students' initial learning and transfer of knowledge

and skills to other contexts (Moats, 1999). A Consumer's Guide to Evaluating a Core

Reading Program Grades K-3: A Critical Elements' Analysis (Simmons & Kameenui,

2003) evaluated potential core reading programs for the Reading First program. Al

Otaiba et al. (2005) reported that effective core reading programs aligned with Reading

First shared three important features: (1) a clearly articulated statement of *SBRR*; (2)

explicit instructional strategies; and, (3) consistent organizational and instructional

routines.

On January 23, 2004, JoLynne DeMary, Superintendent of *VDOE* Public Instruction,

announced the scheduling of Virginia's Reading First Summer Reading Academies

replicated from *A Blueprint for Professional Development for Teachers of Reading and*

Writing: Knowledge, Skills, and Learning Activities for Reading First Schools

(Moats, 2001). The intent of the academies was to have in place an effective, statewide

reading professional development plan for the Reading First initiative. Pivotal topics

addressed during the summer workshops included methods and measures for consistent

implementations of *SBRR* programs, building school capacity, increasing faculty morale

through collaboration and commitment, and improving student reading achievement.

Additional professional development included best practices, the tier three model of

intervention, progress monitoring, data analysis, differentiation, explicit intervention

instruction, and developmental word study (*VDOE*, 2003).

The Role of the Reading Coach

The federal grant required that Reading First schools employ an on-site reading coach

to prepare K-3 teachers to teach the essential components of reading instruction and

support the implementation of state policies regarding instructional programs,

instructional materials, strategies and assessments (*USDOE*, 2002). Joyce and Showers (1995) advocated coaching to be an integral component of a high-quality professional development plan. According to their research, 95% of teachers who received ongoing support from coaching were likely to learn and implement new practices in the classroom (Joyce & Showers, 1995).

Neufeld and Roper (2003) reported that teachers whose professional development includes coaching were more likely to try out the new ideas they learned, while Walpole and McKenna (2004) advocated coaching to be one of the most promising new approaches to professional growth in education due to the opportunity in providing ongoing, sustainable support for teachers. Leana and Pil (2006) suggested that coaching thrives in a context in which there are: (1) positive relationships and a sense of community in schools; (2) building sites share a common vision and goals; and, (3) there is an instructional framework that helps establish a roadmap for teachers. Moxley and Taylor (2006) suggested that coaching offer current, research-based professional development while supporting sustainability of new practices by meeting with classroom teachers until there is evidence of successful implementation.

No single predictor appeared more significant in school-wide reading success than well-trained teachers who applied current research to their classroom practices (Learning First Alliance, 2000; Snow, Burns, & Griffin, 1998). Empirical studies on preventing reading difficulties correlated improved teaching and student achievement (Moats, 1999; Birman et al, 2000; Cunningham & Allington, 2003). Researchers from the Foundation for Comprehensive Early Literacy Learning reported a positive effect on student achievement linked to coaching (Swartz, 2003). Likewise, Lyons and Pinnell (2001)

reported a connection between literacy coaching and increased achievement in reading and writing when quality professional development in reading instruction focused on the five components of early reading instruction identified by the *NRP*: phonemic awareness, phonics, fluency, vocabulary, and comprehension. According to Joyce and Showers (2002), exemplary professional development should include four critical elements: theoretical knowledge and understanding, demonstration, practice, and feedback. Their research suggested that change and paradigm shifts required support and professional development in order to craft teachers' deep understanding of the theory surrounding the reading process as well as practical instructional practices to use in the classroom.

According to the North Central Regional Educational Laboratory (2004b), the primary responsibility of reading coaches was supporting professional development. The coach's primary professional development responsibilities included classroom support, assessment assistance, ongoing development, and collaboration with leadership. In addition, coaches were required to be knowledgeable about empirically-validated reading methodologies, as well as the components of the core program and supplemental materials in order to promote increased reading achievement in their schools (*VDOE*, 2003). Coaching roles included the following:

> (a) providing technical assistance to administrators in the development of a strong literacy plan (i.e. master scheduling, intervention scheduling), (b) implementing and monitoring the *SBRR* core program, (c) providing *SBRR* professional development opportunities that are tailored to the needs of the staff, (d) modeling effective strategies for implementing the five essential components of reading instruction, (e) demonstrating expertise in the range of formative and summative assessments required by Reading First for purposes of screening, diagnosis, and progress monitoring, (f) ensuring use of data for grouping students and instructional decisions based on *SBRR*, (g) ongoing monitoring of school-wide reading instruction and intervention practices, (h) consulting with teachers on a one-to-one basis or facilitating gradelevels in identifying areas of need, and, in learning strategies, assessments, classroom

organizational and management practices, as well as Reading First program requirements, and (i) seeking ways to act as a bridge between the administration and the teachers in designing, developing, implementing, and evaluating the school's reading program (*USDOE*, 2002, p. 46).

The National Center for Children in Poverty expressed the need for additional research to determine the type, amount, and combination of education and professional development training that would lead to increased achievement for low- income children (Klein & Knitzer, 2007). Given the increasing demand for accountability, the implementation and evaluation of scientifically-based interventions and strategies were required. Little and Houston (2003) suggested that educational change occurred for high poverty low-performing schools when the following behaviors were observable: (1) change was directly related to issues to be solved within the classroom; (2) coaching support was provided for quality implementation; (3) scientifically-based instructional practices were introduced utilizing principles of adult learning theory; and, (4) change was directly related to student achievement.

Section IV: The Tier Three Model of Intervention

One of the most salient conclusions from the research on beginning reading is the importance of learning to read in the early grades. The National Research Council, concluded in their landmark report, Preventing Reading Difficulties in Young Children (Snow, Burns, & Griffin, 1998), that most reading problems can be prevented by providing effective instruction and intervention in pre-school and in the primary grades. Because students who do not learn to read in the first and second grades are likely to struggle with reading throughout their lives, effective reading interventions for students early in their educational careers are critical (Juel, 1988). The longitudinal study by Juel

(1988) found poor readers in first grade had a .88 probability of remaining poor readers in fourth grade. Her research provided insight into the deficits confronted by struggling readers: (1) early writing skills did not predict later writing skills as well as early reading ability predicted later reading ability; (2) children who became poor readers entered first grade with little phonemic awareness; (3) by the end of fourth grade, poor readers had not achieved the level of decoding skill that good readers had achieved at the beginning of second grade; and, (4) poor readers read considerably less than the good readers both in and out of school, which appeared to contribute to the lack of readers' growth in some reading and writing skills.

Reading First, mandated by No Child Left Behind (*NCLB*) (Bush, 200), was an initiative to improve students' literacy skills and reading achievement using pre-post diagnostic assessments to measure student progress. With the 2004 re-authorization of the federal Individuals with Disabilities Education Act (*IDEA*), The Office of Special Education Programs coordinated an investigation into the effectiveness of multiple tiers of reading intervention. The utility of empirical research indicated that increasingly intensive tiers of intervention held promise as a means of reducing the number of students at-risk for reading difficulties, and provided insight into a prevention-oriented, school-wide model for identifying students with learning and behavior problems (Denton et al., 2006; Lyon et al., 2001; Vaughn, 2000; Kavale, Hirshoren, & Forness, 1998; Simmons et al., 2002; Vaughn, Linan-Thompson & Hickman-Davis, 2003; Fuchs & Fuchs, 2005).

Interest in the design stemmed from concern over the increasing number of children diagnosed with learning disabilities. The number of children categorized as learning

disabled nearly tripled, from 1.8 % of U.S. children in the late 1970s to 5.2% in the late 1990s (National Center for Learning Disabilities, 2002). Reading problems accounted for 80% of students in this category (National Center for Learning Disabilities, 2002). The increase in the number of children receiving special education services and the disproportionate representation of minority children within this group alarmed educators and raised suspicions that schools were over-identifying, as learning disabled, children who lacked pre-reading skills from home or pre-school (Wendorf, 2002). The potential benefits of the multi-tiered intervention model ensured that students experiencing educational difficulties received more judicious and efficacious support (Vaughn, Linan-Thompson, & Hickman-Davis, 2003; Fuchs & Fuchs, 2005).

The southeastern Virginia elementary school implemented the design, including the identification process, multi-tiered levels of intervention intensity, and duration of treatment, to strengthen the rigor and effectiveness of reading instruction for at-risk students. The logic of the model was based on the tenet that all students received empirically-validated reading instruction from which they benefited. Services were provided on a continuum and differentiated instruction was provided as needed. The site-based initiative provided a comprehensive professional development process for effectively reforming the school's efforts to prevent reading difficulties for approximately 80% of the K-2 student population (Denton, Fletcher, & Vaughn, 2003). Figure 1 illustrates the tier three model of intervention adapted from the research of Vaughn (2000).
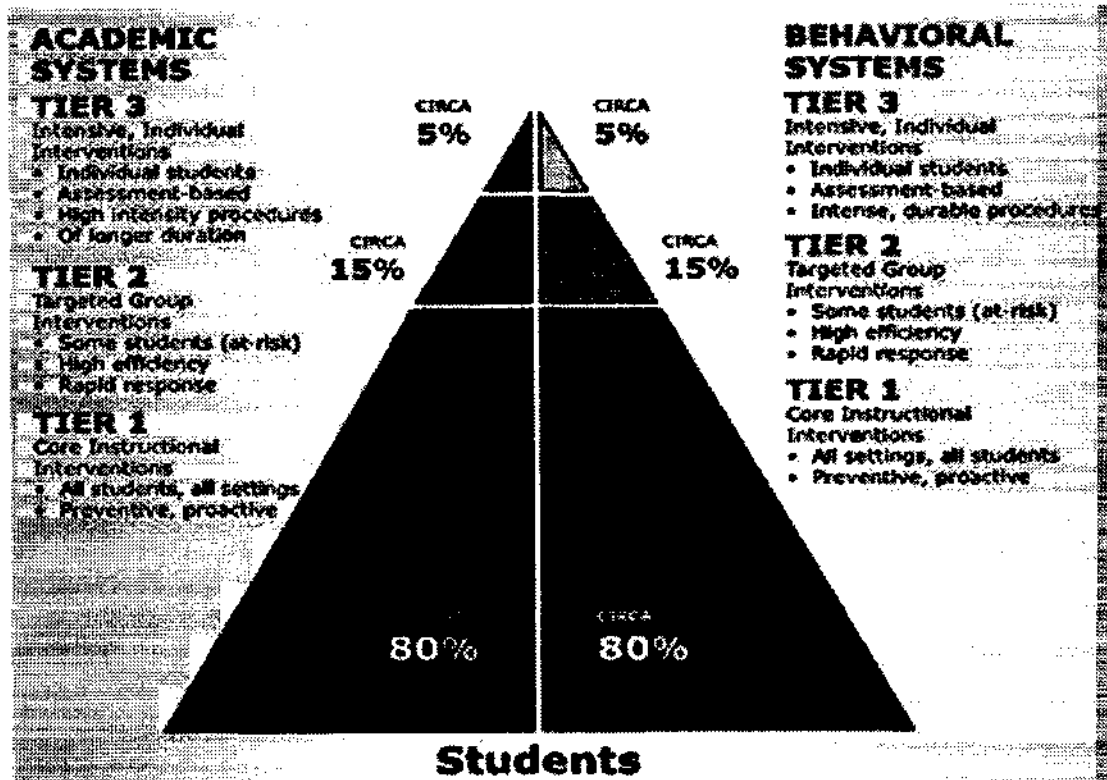
Figure 1: Tier Three Model of Intervention adapted from Vaughn (2000).

Within the context of the tier three model, universal screening was the first step in

identifying students at risk for learning difficulties. It was the measure for targeting

students who struggled to learn when provided a rigorous general education (Jenkins,

Hudson, & Johnson, 2007). Universal screening was typically conducted three times per

year (fall, winter, and spring). Screening instruments consisted of early literacy

assessments focused on target skills (e.g., phonological awareness, phonemic awareness,

and phonics) that were highly predictive of future outcomes (Jenkins, 2003). The goal of

early identification was to increase the likelihood of at-risk students developing adequate

academic competence.

The primary level of intervention, tier 1, was the regular classroom setting in which

reading instruction was based on *SBRR* practices. O'Connor, Harty, and Fulmer (2005)

examined models of intervention which incorporated general classroom teachers as the first layer of intervention. "In these studies, improvements in classroom teaching were brought about by ongoing professional development for teachers with frequent measurement of students' reading progress" (O'Connor, Harty, & Fulmer, p. 533).

Students not responding positively to tier 1 instruction, and whose pre-test assessment scores indicated below gradelevel performance, received secondary intervention. Empirical studies provided evidence that the majority of students eligible for secondary prevention benefit from a well-designed, structured intervention program (Vaughn, Linan-Thompson, & Hickman-Davis, 2003; Simmons et al., 2002; Fuchs et al., 2006). Simmons et al. (2002) assessed the effectiveness of a tier 2 intervention that was designed to increase the phonemic awareness skills of low-income kindergarten students. Tier 2 intervention for beginning sound awareness was provided twice weekly in small groups over 6 weeks by trained teachers and speech-language pathologists. The intervention was successful for 71% of the children, as indicated by medium to large effect sizes.

Fuchs et al. (2006) reviewed existing studies of tier 2 interventions in beginning reading and analyzed the effects of students' responses to intervention as demonstrated by subsequent reading achievement. Their findings demonstrated that the intervention was effective across four large urban school districts, suggesting a correlation between the intervention condition and the observed improvement in student performance. Vaughn, Linan-Thompson, and Hickman-Davis (2003) examined the role of intensifying instructional time for at-risk first graders in schools implementing research-based instructional and assessment practices within multi-tiered instructional support systems. Results indicated that students receiving more intensive intervention made significantly

more progress across a range of early reading measures. The supplemental instruction provided programs, strategies, and practices designed to enhance and support primary prevention for those students identified with marked difficulties (Vaughn, Linan-Thompson, & Hickman-Davis, 2003).

Denton, Fletcher, and Vaughn (2003) investigated children's responsiveness to secondary intervention. The study indicated that at-risk students who received secondary intervention instruction demonstrated reading growth in identified deficits, primarily phonemic awareness and word recognition. Tier 2 intervention consisted of brief periods of more intensive, systematic, explicit, instruction, during which students' progress was closely monitored. Progress-monitoring assessments were used to determine which students made adequate progress (i.e., were responsive to secondary prevention within approximately 12 weeks or 50 hours). Figure 2 illustrates the example of supplemental instruction to portray the sequential steps of tier 2 intervention used during professional development at the elementary school.

Example of Tier 2 Intervention Rotation

2

The second round of instruction was in the form of small group instruction with the classroom teacher. This instruction followed the Before-During-After structure for strategy instruction and application, with a differentiated approach for students based on the most current data.

3

1

Tier 2 students received their initial instruction from the classroom teacher through whole group shared reading. This instruction covered current material and reviewed a specific focus skill that was a deficit based on the most current data.

The third round of supplemental instruction was provided by the classroom teacher or literacy and/or special education personnel. This block of time was designated explicitly for skill instruction and practice to target the deficits that were reflected in the data, commonly a heavy emphasis on phonemic awareness, phonics and word recognition.

Figure 2: Tier 2 Intervention Rotation.

Tertiary intervention was designed and customized specifically for students who continued to have marked reading disabilities, despite primary prevention and secondary intervention efforts, typically 5% of the K-3 students (Denton, Fletcher, & Vaughn, 2003). The longitudinal study by Vaughn, Wanzek, and Fletcher (2007) investigated the effectiveness of tier 3 intervention on first grade students' responses to reading intervention and placement in special education services. Higher responders received 13 to 26 weeks of secondary intervention for 30 minutes daily. Instruction was provided in group sizes of 4 to 6 students with one interventionist hired and trained by the research team. Low responders were provided a tertiary intervention (100 sessions, approximately

26 weeks) in second grade. The tertiary intervention was more intensive: (1) group size = 2 to 4; and, (2) the duration of daily intervention averaged 50 minutes daily with a tutor trained and supervised by the research team. The effectiveness of tertiary intervention was assessed using the regression-discontinuity research design to determine if a main effect existed for the intervention. A significant program effect was found for pre-post achievement scores. Students who remained unresponsive during tier 3 intervention were evaluated by a multidisciplinary team to determine if special education screening was warranted. Examining the variables of attendance, socio-economic status, and English language learner classification, in addition to the lack of response to research-based interventions, assisted the referral process of identifying which students required special education services (Vaughn, Wanzek, & Fletcher, 2007). Figure 3 shows the example of supplemental instruction to portray the sequential steps of tier 3 intervention used during professional development at the elementary site.

Example of Tier 3 Intervention Rotation

The second round of instruction was in the form of small group instruction with the classroom teacher. This instruction followed the Before-During-After structure for strategy instruction and application, with a differentiated approach for students based on the most current data.

The fourth round of supplemental instruction was provided by literacy or special education personnel. This block of time is designated for explicit skill instruction of severe deficits reflected in the data.

Tier 3 students received their initial instruction from the classroom teacher through whole group shared reading. This instruction covered current material and reviewed a specific focus skill that was a deficit based on the most current data.

The third round of supplemental instruction was provided by literacy or special education personnel. This block of time was designated explicitly for skill instruction and practice to target the severe deficits that were reflected in the data, commonly a heavy emphasis on phonemic awareness, phonics and word recognition.

Figure 3: Tier 3 Intervention Rotation.

Professional development on the tier three model was replicated from the research of Vaughn (2000), Vaughan, Gersten, and Chard (2000), and Vaughn, Linan-Thompson, and Hickman-Davis (2003). Table 2 displays the tier three model of intervention adapted by Vaughn (2000) highlighting key implementation variables: (1) duration; (2) intensity; (3) progress monitoring; and, (4) group size.

Table 2

Tier Three Model of Intervention adapted by Vaughan (2000)

	Tier Three Model of Intervention		
Criteria	Tier I	Tier 2	Tier 3
Focus	All students K-3	At-risk students identified by diagnostic assessment	Students with marked difficulties who have not responded to Tiers 1 and 2
Program	*SBRR*, 5 essential components identified by the *NRP*, Core program	Explicit, systematic *SBRR*, 5 essential components identified by the *NRP*	Sustained, intensive *SBRR*, 5 essential components identified by the *NRP*
Grouping	Whole-group, differentiated small groups, differentiated literacy workstations, independent practice	Homogeneous small group (1:3; 1:4; or, 1:5)	Homogenous small group (1:3) or individual student
Time	90 min./day	Tier 1 plus 30 min./day, approximately 50 sessions	Tier 1 plus 60 min./day
Assessment	Benchmarks at beginning/ mid/end of year using screening assessment	Progress-monitoring 2x/month on target skills using diagnostic assessments	Progress-monitoring 3x/month on target skills using diagnostic assessments
Interventionist	Classroom teacher	Classroom teacher, Literacy Teacher, Special Education Teacher	Literacy Teacher, Special Education Teacher
Setting	Classroom	Push-in or pull-out	Pull-out

Components of the design included: (1) the use of students' responses to rigorous classroom instruction to guide educational decisions including decisions about the efficacy of instruction and intervention; (2) evaluating non-responders for eligibility in special programs; (3) examining accommodations of individualized educational services; and, (4) reviewing the effectiveness of services provided. By increasing the level of precision and accuracy of instructional practices, while identifying accommodations for identified students, all students were allowed equitable opportunities to benefit from their education.

Standardized screening assessments, the Phonological Awareness Literacy Screenings (*PALS*), *PALS* K and *PALS* 1-3 (identifying levels of deficiency in phonological and phonemic awareness, phonics, fluency, vocabulary, and comprehension), layered with diagnostic progress-monitoring assessments, provided the student data which tailored intervention instruction. Intervention materials supported Harcourt, the core curriculum, adopted from A Consumer's Guide to Evaluating a Core Reading Program Grades K–3: A Critical Elements Analysis (Simmons & Kameenui, 2003).

Strategies for secondary and tertiary intervention were similar, however, the daily doses, duration of intervention, and student teacher ratio were specific to the two tiers. Due to limited literacy personnel and the numbers of students identified during the five year initiative, the research model was modified at the elementary site: the typical student teacher ratio was 1:6 for tier 2 and 1:5 for tier 3. Rotations for tier 2 intervention = 20 minutes/day and tier 3 = 40 minutes/day. Sufficient duration was dependent on a number of factors, including the age of the student, and the severity of the deficit. Figure 4 illustrates the progression through the three tiers based on student performance of

progress-monitoring assessments that was replicated during professional development at

the elementary school (Vaughn, 2000).
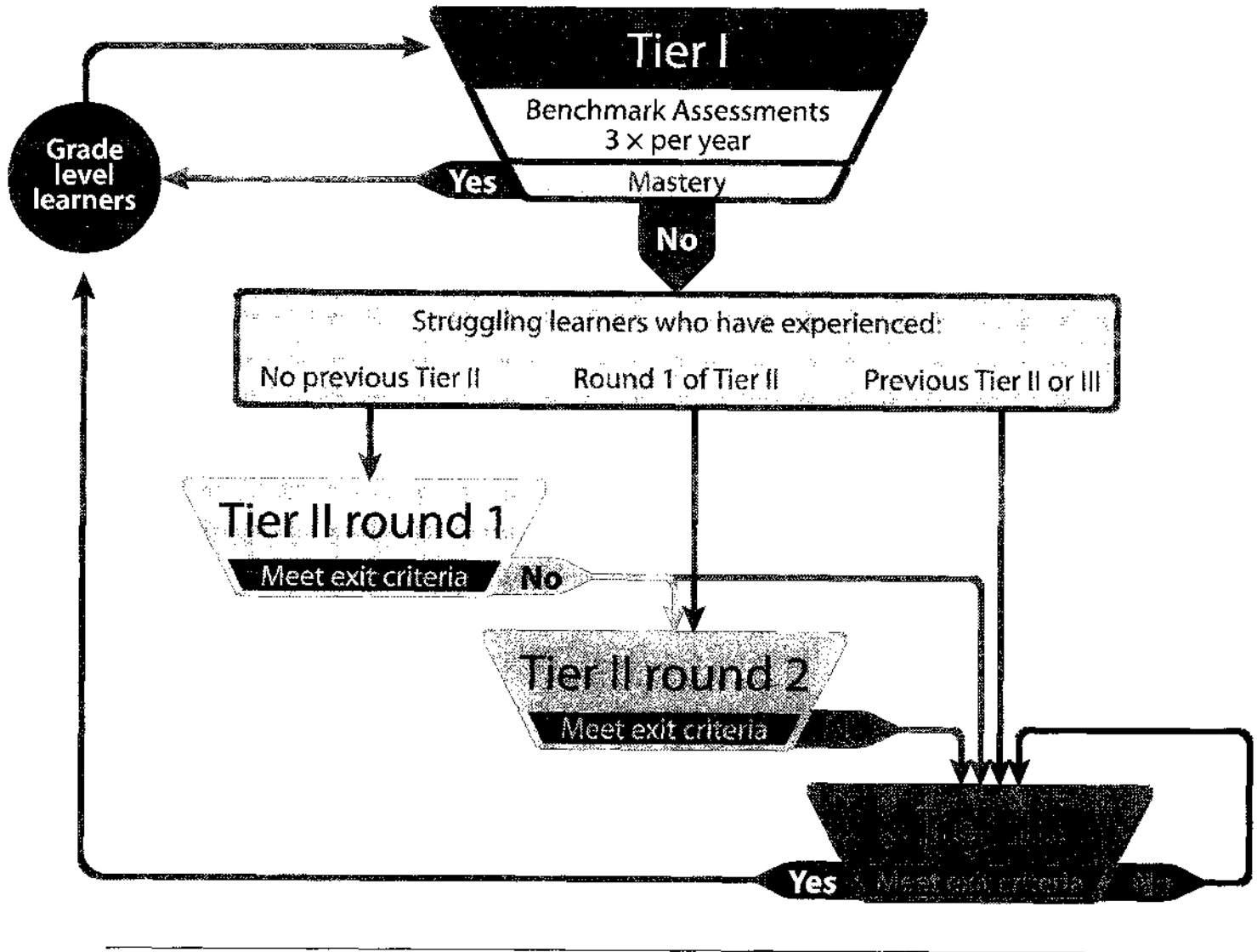
Figure 4: Progression Through the Tier Three Model adapted by Vaughn (2000).

Summary

Findings by the Interim Reading First Implementation Report (*USDOE*, 2007) and the

Final Reading First Impact Study (*USDOE*, 2008) included a significant increase in

instructional time on key components of reading instruction in Reading First schools.

Additional positive impacts of the initiative included professional development on scientifically-based reading instruction (*SBRI*), support from full-time reading coaches, an increase in the amount of daily reading instruction, and supports available for struggling readers provided within the tier three model of intervention. However, there was no evidence of improvement in student reading achievement cited in either report (*USDOE*, 2007; *USDOE*, 2008).

Chapter III details the research design and methodology, and includes information pertaining to the student sample, data collection strategies, instrumentation, and statistical analyses used in the study. Chapter IV reports results of data analyses concerning each research question and associated hypotheses. Chapter V provides an overview of the study, an analysis and clarification of the findings, study limitations, and recommendations for practice and future research.

Chapter III

METHODOLOGY

Reading First was a federal initiative predicated on the scientifically based reading research (*SBRR*) findings of the National Reading Panel (*NRP*, 2000). The program provided technical assistance and professional development to implement methods of scientifically based reading instruction in classrooms in order to prevent reading difficulties in grades K-3 (*USDOE*, 2002). Professional development supported (1) the implementation of state policies, practices, and strategies designed to prepare teacher participants to teach the essential components of reading instruction; (2) the implementation of the tier three model of intervention; (3) the administration of screening and diagnostic assessments; and, (4) the use of progress monitoring systems to measure student literacy growth. The purpose of this study was to examine the Reading First program at an elementary school in southeastern Virginia from 2006-2008 and the extent to which implementation guidelines impacted K-2 student reading achievement.

Using a regression discontinuity design, the study evaluated the significance of the program on student reading achievement using a pre-test/post-test program group strategy (Trochin, 1982; Stanley,1991; Shadish, Cook, & Campbell, 2002). The Phonological Awareness Literacy Screenings (*PALS*), *K PALS* and *PALS 1-3* (Invernizzi, Meier, & Juel, 2003), served as the study's dependent measures examining differences in pre-test and post-test scores to determine statistical significance in literacy growth among the student sample. Using an Analysis of Variance (*ANOVA*), the researcher investigated the impact of the independent variable, the tier three model of intervention, on student reading achievement. Additional factors analyzed through an Analysis of Variance

(*ANOVA*) included pre-k experience, student tier classification (tier 1, tier 2, and tier 3), and year.

This chapter is divided into the following sections: (1) statement of the research questions and hypotheses; (2) an overview of the research design; (3) a description of the research setting; (4) a description of the student sample; (5) a description of the instruments; and, (6) a description of data collection and analysis.

<center>Research Questions and Hypotheses</center>

Throughout this evaluation of the Reading First program, three research questions and associated hypotheses were examined:

1. To what extent did the evidence indicate a significant difference between pre-test scores and post-test scores for tier 1 student subgroups?

    $Ho1_1$:   There is no significant difference between pre-test and post-test scores among the tier 1 subgroup in Kindergarten.

    $Ho1_2$: There is no significant difference between pre-test and post-test scores among the tier 1 subgroup in Grade 1.

    $Ho1_3$: There is no significant difference between pre-test and post-test scores among the tier 1 subgroup in Grade 2.

2. To what extent did the evidence indicate a significant difference between pre-test scores and post-test scores for tier 2 student subgroups?

    $Ho2_1$: There is no significant difference between pre-test and post-test scores among the tier 2 subgroup in Kindergarten.

    $Ho2_2$: There is no significant difference between pre-test and post-test scores among the tier 2 subgroup in Grade 1.

Ho2₃: There is no significant difference between pre-test and post-test

scores among the tier 2 subgroup in Grade 2.

4. To what extent did the evidence indicate a significant difference between pre-test

scores and post-test scores for tier 3 student subgroups?

Ho3₁: There is no significant difference between pre-test and post-test

scores among the tier 3 subgroup in Kindergarten.

Ho3₂: There is no significant difference between pre-test and post-test

scores among the tier 3 subgroup in Grade 1.

Ho3₃: There is no significant difference between pre-test and post-test

scores among the tier 3 subgroup in Grade 2.

Research Design

The study investigated the impact of the Reading First program on student literacy

achievement using a regression discontinuity design. The design assigns research

participants to treatment programs or comparison groups solely on the basis of a cutoff

score on a pre-program measure (Van Der Klaauw, 2008). Leake and Lesik (2007)

suggest that the regression discontinuity model can provide researchers with a valid

assessment measure of the effectiveness of developmental programs and educational

interventions. The central issue in evaluating the impact of interventions is to separate

their causal effect from the confounding effect of other factors influencing the outcomes

of interest (Lesik, 2006). The evaluative question is whether any observed outcome

differences between groups is attributable to the program or to some other factor. In order

to argue for strong internal validity, the analyst must attempt to demonstrate that the

program, rather than a plausible alternative explanation, is responsible for the effect.

The current study afforded a pre-test/post-test regression discontinuity analysis of the Reading First program using a quantitative evaluation of the tier three model of intervention impacting K-2 pre-test/post-test student scores using the study's dependent measures, *K PALS* and *PALS 1-3*. Legislation passed by the Virginia General Assembly in 1997 identified the Phonological Awareness Literacy Screenings (*K PALS* and *PALS 1-3*) as the state-provided screening tools for the Early Intervention Reading Initiative (*EIRI*) (Invernizzi, Meier, & Juel, 2003). The state initiative allocated funding to assist participating school divisions in identifying students in need of additional instruction and providing early intervention services to students with diagnosed deficits. Subsequently, the screening assessments were recommended by the Virginia Department of Education (*VDOE)* to serve as the pre-post diagnostic instruments for the Commonwealth's Reading First schools (*PALS* & Reading First, 2002).

Research Setting

The study examined the Reading First program at an elementary school in southeastern Virginia. The site was awarded the grant in October 2003, meeting the federal and state eligibility criteria for Reading First eligibility requirements. Table 3 shows facility resources for the elementary school from 2006-2008.

Table 3

Facility Resources at the Reading First Elementary School from 2006-2008

Facility Resources	2006-2007	2007-2008
	K-2	K-2
Composite Population	382	410
Classroom Teachers	18	23
Number of Classrooms	16	16
Reading Specialist	1	1
Reading First Coach	1	1
Literacy Teachers	2	2
Title I School-wide Teachers	2	2
Part-time Retired Teacher	1	1

Study Sample

Student Participants

All K-2 students enrolled at the elementary school were administered the Phonological

Awareness Literacy Screenings (*K PALS* and *PALS 1-3*). Data garnered from the 2006-

2008 *PALS* K-2 School History Reports described 792 student participants (2006-2007:

n = 382; and, 2007-2008: n = 410). Using *PALS* benchmark ranges established by the

local division, 2006-2008 K-2 students were identified as tier 1, meeting benchmark

standards, tier 2, strategic, or tier 3, intensive. Table 4 displays *PALS* K-2 benchmark

ranges for pre-test and post-test tier classification.

Table 4

PALS K-2 Benchmark Ranges for Pre-Test and Post-Test Tier Classification

	Tier 1		Tier 2		Tier 3	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
Kindergarten	28-102	81-102	11-27	51-80	0-10	0-50
Grade 1*	39-77*	35-68	25-38	21-34	0-24	0-20
Grade 2	35-76	54-76	19-34	35-53	0-18	0-34

*Letter Sounds are assessed during the pre-test.

Table 5 displays 2006-2007 and 2007-2008 K-2 pre-test and post-test tier classification data for the student sample.

Table 5

2006-2007 and 2007-2008 K-2 Pre-Test and Post-Test Tier Classification Data for the Student Sample

2006-2007	Kindergarten				Grade 1				Grade 2			
	Pre-test		Post-test		Pre-test		Post-test		Pre-test		Post-test	
Tier 1	100	79%	92	72%	109	81%	94	70%	86	71%	84	69%
Tier 2	12	9%	3	2%	18	13%	10	7%	33	27%	18	15%
Tier 3	15	12%	12	9%	7	5%	6	4%	2	2%	2	2%

2007-2008	Kindergarten				Grade 1				Grade 2			
	Pre-test		Post-test		Pre-test		Post-test		Pre-test		Post-test	
Tier 1	114	75%	111	74%	104	88%	92	78%	114	81%	114	81%
Tier 2	20	13%	11	7%	13	11%	7	6%	17	12%	13	9%
Tier 3	17	11%	5	3%	1	1%	1	1%	10	7%	8	6%

Protection of Human Subjects

The study was reviewed and deemed exempt by the Human Subjects Review Committee of the Darden College of Education at Old Dominion University. The following provisions were taken to protect human subjects with anonymity:

1. No identifying information concerning an individual school or school district was included in the study.

2. Only the researcher reviewed school test data.

3. School test data were secured in a locked location and shredded after the study was completed.

4. The final report does not include information that will identify an individual

    school or school district.

<div align="center">Measures</div>

K PALS and PALS 1-3

K PALS and PALS 1-3 served as the dependent measures of the current study. The

screenings measured key variables identified by the meta-analysis of the National

Reading Panel (*NRP*) as robust predictors of children's later literacy achievement:

(1) Phonological Awareness; (2) Alphabet Knowledge; (3) Letter-Sound Knowledge; (4)

Phonetic Spelling; and, (5) Word Knowledge (*NRP*, 2000; Committee on Prevention of

Reading Difficulties in Young Children, 1998; Allington, 2000; Juel, 1998; National

Institute for Literacy, 2003).

Standards for test construction, evaluation, and documentation, as outlined in

the Standards for Educational and Psychological Testing, were employed throughout the

construction of *K PALS* and *PALS* 1-3 (American Educational Research Association et

al., 1999). Efforts were made to satisfy all the major criteria for acquiring and reporting

technical data (Invernizzi et al., 2005). "In addition, the *VDOE* sought the opinion of

several external reviewers whose charge was to determine the technical soundness of

K PALS and *PALS 1-3* as valid and reliable instruments for the *EIRI*" (Invernizzi, Meier,

& Juel, 2003, p. 24).

During pilot studies and field tests, efforts were made to ensure that samples

approximated state-wide school enrollments in terms of gender, ethnicity, and student

socio-economic status (*SES*). Scores for various *K PALS* and *PALS* 1-3 scales from

multiple scorers were compared to determine the inter-rater reliability (*PALS &*

Reading First, 2002). Subtest scores are analyzed each year for indices of central tendency, internal consistency, and item reliability (*PALS* & Reading First, 2002). *K PALS* and *PALS 1-3* test-retest reliability estimates, expressed as Pearson correlation coefficients, have been consistently significant, ranging from .87 to .98 (*PALS* & Reading First, 2002). Using Cronbach's alpha, statistical analyses of *PALS* scores for over 4000,000 students statewide in grades K-3 have produced reliability coefficients for individual Entry Level tasks ranging from .81-.96 (*PALS* & Reading First, 2002).

Scales included in *K PALS* are representative of sample tasks included in other measures of early literacy (Clay, 1966; Durkin, 1989; Stallman & Pearson, 1990a; Stiggins, 1995; NRP, 2000; Learning First Alliance, 2000; Justice et al., 2004). Items were selected based on early literacy research and because of their correlation to Virginia's Standards of Learning (Invernizzi, Meier, & Juel, 2003). Table 6 displays the two early literacy domains and sample scales included in *K PALS* and inter-rater reliabilities garnered from item analyses (Invernizzi, Meier, & Juel, 2003).

Table 6

Conceptual Framework for K PALS (Invernizzi, Meier, & Juel, 2003)

Domain	Scale	Inter-rater Reliability
Phonological Awareness	Rhyme Awareness	$r = .99, p < .01$
	Beginning Sound Awareness	$r = .99, p < .01$
Literacy Skills	Upper-case Alphabet Knowledge	$r = .94, p < .01$
	Lower-case Alphabet Knowledge	$r = .99, p < .01$
	Letter Sounds	$r = .99, p < .01$
	Spelling	$r = .99, p < .01$
	Concept of Word	$r = .84, p < .01$
	Word Recognition in Isolation	$r = .76, p < .01$

K PALS summed scores are garnered through composite subtask scores. Discriminant function analyses based on the subtasks included in the summed core classified 95% of students correctly as identified or not-identified during fall 2003 and spring 2003 testing administrations (Invernizzi et al., 2004).

PALS 1-3 uses a three tier framework to determine an entry level summed score benchmark estimating a student's proficiency in reading: (1) Level A assesses accuracy, fluency, rate, and comprehension of oral reading; (2) Level B assesses emergent and beginning reading variables in alphabetic knowledge and concept of word; and, (3) Level C provides an in-depth evaluation of student proficiency in phonemic awareness skills such as blending and segmenting articulated sounds (Invernizzi, Meier, & Juel, 2003). Each task contains a criterion score for meeting minimal competence in each domain.

Table 7 presents the three tier conceptual framework for *PALS 1-3*, with specific

domains, sample literacy scales, and inter-rater reliabilities compiled from item analyses

(Invernizzi, Meier, & Juel, 2003).

Table 7

Conceptual Framework for PALS 1-3 (Invernizzi, Meier, & Juel, 2003)

Level	Domain	Scale	Inter-rater Reliability	
Entry Level	Orthographic Knowledge	Word Recognition	Preprimer:	$r = .89, p < .01$
			Primer:	$r = .90, p < .01$
			Grade 1:	$r = .88, p < .01$
			Grade 2:	$r = .93, p < .01$
		Spelling	Grade 1:	$r = .92, p < .01$
			Grade 2:	$r = .89, p < .01$
Level A	Oral Reading in Context	Oral Reading Accuracy	Readiness:	$r = .74, p < .01$
		Oral Reading Fluency	Preprimer A:	$r = .77, p < .01$
		Oral Reading Rate	Preprimer B:	$r = .89, p < .01$
		Oral Reading Comprehension	Preprimer C:	$r = .83, p < .01$
			Primer:	$r = .97, p < .01$
			Grade 1:	$r = .97, p < .01$
			Grade 2:	$r = .85, p < .01$
Level B	Alphabetics	Alphabet Recognition	Grade 1:	$r = .99, p < .01$
			Grade 2:	$r = .99, p < .01$
		Letter Sounds	Grade 1:	$r = .99, p < .01$

			Grade 2:	$r = .98, p < .01$
		Concept of Word	Grade 1:	$r = .97, p < .01$
			Grade 2:	$r = .97, p < .01$
Level C	Phonemic Awareness	Blending	Grade 1:	$r = .98, p < .01$
			Grade 2:	$r = .97, p < .01$
		Segmenting	Grade 1:	$r = .97, p < .01$
			Grade 2:	$r = .94, p < .01$

PALS 1-3 entry level summed scores consist of word recognition and spelling subscales. *PALS 1-3* discriminant analyses functions have classified 93% to 99% of students correctly as identified or not identified, based on their subtask scores (*PALS &* Reading First, 2002).

Data Collection and Analysis

Descriptive and inferential statistics were used to investigate the research questions in the current study. The Statistical Package for the Social Sciences (*SPSS*) Version 16 was used to analyze data. Using a pre-test/post-test regression discontinuity analysis, students were classified into an identifying group assignment (tier 1, tier 2, or tier 3) using *K PALS* and *PALS 1-3* fall pre-test and spring post-test subscale summed scores. Table 8 displays the regression discontinuity design adapted from Trochin (2006).

Table 8

Regression Discontinuity Design Adapted From Trochin (2006)

C	O_1	X	O_2
Tier 1	K *PALS* and *PALS* 1-3	Classroom instruction	F value, p value, and η^2 for tier 1
C	O_1	X	O_2
Tier 2	K *PALS* and *PALS* 1-3	Secondary intervention	F value, p value, and η^2 for tier 2
C	O_1	X	O_2
Tier 3	K *PALS* and *PALS* 1-3	Tertiary intervention	F value, p value, and η^2 for tier 3

- C indicates that groups are assigned by means of a cutoff score.
- O_1 stands for the administration of a measure to a group.
- X depicts the implementation of a program.
- O_2 represents effect differences due to program implementation.

The researcher evaluated the mean differences between groups within the tier three model of intervention using an Analysis of Variance (*ANOVA*). Additional factors analyzed included: pre-k experience (1 = yes; 2 = no); student tier classification (1 = tier 1; 2 = tier 2; 3 = tier 3); grade level (1 = K; 2 = Grade 1; 3 = Grade 2), and, year (1 = 2006-2007; 2 = 2007-2008). Differences among the variances (mean squares), the F value, between-groups and within groups degrees of freedom (df), and the p-value were reported for each factor. An alpha level of .05 was used for all statistical tests and partial eta squared (η^2) was calculated as the effect size. The researcher used guidelines for the interpretation of η^2 from Cohen (1988): (1) small effect = .01 - .05; (2) moderate effect = .06 - .13; and, (3) large effect = .14 and greater. Simple main effects tests were conducted to determine if the groups mean effect size index was significant, and F tests evaluated mean differences across the comparison interactions. If the F value was

significant at a given level of confidence, indicating significant interactions were evident, the Scheffe post hoc analysis was evaluated.

Summary

Chapter III included the research design, population sample, and statistical procedures used to analyze the research questions and associated hypotheses of the current study. Chapter IV presents the findings of the data analyses, and Chapter V includes a summary of the findings and recommendations for practice and further research.

Chapter 4

DATA ANALYSIS

The primary purpose of this study was to examine the effects of the Reading First program at an elementary school in southeastern Virginia from 2006-2008. The researcher used a pre-test/post-test regression discontinuity analysis of Reading First program efficacy. Specifically, the study addressed the tier three model of intervention impacting K-2 pre-post student scores using *K PALS* and *PALS 1-3* as dependent measures. All of the quantitative data were entered into the statistical software program, *SPSS*, Version 16, for coding and analysis. Statistical significance was determined by a .05 alpha level.

This chapter consists of three sections. The first section provides a summary of the demographic characteristics of the student sample utilized in this study. The second section presents the results for each of the research questions and corresponding hypotheses. The final section summarizes the purpose of the data analyses.

Demographic Characteristics

Student Sample

The 2006-2008 K-2 student sample included 792 participants (2006-2007: n = 382; 2007-2008: n = 410). Student populations were evaluated for descriptive characteristics including ethnicity, gender, free/reduced lunch eligibility, and pre-k experience. The demographic data for ethnicity of the student samples are outlined in Table 9.

Table 9

2006-2007 and 2007-2008 K-2 Demographic Data for Ethnicity

	2006-2007		2007-2008	
	Frequency	%	Frequency	%
African-American	332	87	336	82
Caucasian	27	7	37	9
Hispanic	20	5	29	7
American Indian	1	.3	0	0
Unspecified	2	.5	8	2
Total	n = 382		n = 410	

Table 10 presents descriptive statistics for pre-k experience, gender, and free/reduced lunch eligibility.

Table 10

*2006-2007 and 2007-2008 K-2 Descriptive Statistics for Gender, Free/Reduced Lunch
Eligibility, and Pre-K Experience*

	2006-2007		2007-2008	
	Frequency	%	Frequency	%
Gender	382	100	410	100
Male	211	55	227	55
Female	171	45	183	45
Free Reduced Lunch	382	100	410	100
Yes	329	86	372	91
No	53	14	38	9
Pre-K	382	100	410	100
Yes	54	14	70	17
No	54	14	61	15
Unspecified	19	5	20	5
Not Applicable	255	67	259	63

Using *K PALS* and *PALS 1-3* pre-test and post-test benchmark ranges established by
the local division, 2006-2008 K-2 student participants at the school site were identified as
tier 1, meeting benchmark standards, tier 2, strategic, or tier 3, intensive. Table 11
displays *PALS* K-2 benchmark ranges for pre-test and post-test tier classification.

Table 11

PALS K-2 Benchmark Ranges for Pre-Test and Post-Test Tier Classification

	Tier 1		Tier 2		Tier 3	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
Kindergarten	28-102	81-102	11-27	51-80	0-10	0-50
Grade 1*	39-77*	35-68	25-38	21-34	0-24	0-20
Grade 2	35-76	54-76	19-34	35-53	0-18	0-34

*Letter Sounds are assessed during the pre-test.

Table 12 displays 2006-2007 and 2007-2008 K-2 pre-test and post-test tier

classification data for the student sample.

Table 12

2006-2007 and 2007-2008 K-2 Pre-test and Post-test Tier Classification Data for the Student Sample

2006-2007	Kindergarten		Grade 1		Grade 2	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Tier 1	100 79%	92 72%	109 81%	94 70%	86 71%	84 69%
Tier 2	12 9%	3 2%	18 13%	10 7%	33 27%	18 15%
Tier 3	15 12%	12 9%	7 5%	6 4%	2 2%	2 2%
2007-2008	Kindergarten		Grade 1		Grade 2	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Tier 1	114 75%	111 74%	104 88%	92 78%	114 81%	114 81%
Tier 2	20 13%	11 7%	13 11%	7 6%	17 12%	13 9%
Tier 3	17 11%	5 3%	1 1%	1 1%	10 7%	8 6%

Research Questions and Analysis of Data

The analysis of the data for each research question and corresponding hypotheses are presented in this section. Using a pre-test post-test regression discontinuity analysis, students were classified into an identifying group assignment (tier 1, tier 2, or tier 3) using *K PALS* and *PALS 1-3* fall pre-test and spring post-test subscale summed scores. A one-way analysis of variance was conducted to evaluate the relationship between fall pre-test and spring post-test subscale summed scores for all students who participated in the study. In order to determine the differences between students' pre-test and post-test scores, a composite variable was generated. This variable was computed by subtracting students' pre-test scores from their post-test scores. SCOREDIF, the composite variable

was used as the dependent variable in all subsequent analyses.

Differences among the variances (mean squares), the F value, between-groups and within groups degrees of freedom (df), and the p-value were reported for each factor. An alpha level of .05 was used for all statistical tests, and partial eta squared (η^2) was calculated as the effect size. The researcher used guidelines for the interpretation of η^2 from Cohen (1988): (1) small effect = .01 - .05; (2) moderate effect = .06 - .13; and, (3) large effect = .14 and greater. Simple main effects tests were conducted to determine if the groups mean effect size was significant, and F tests evaluated mean differences across the comparison interactions.

Results of Data Analyses for the 2006-2007 Tier 1 Student Subgroups

The findings of 2006-2007 data analyses are presented by research questions and associated null hypotheses developed for statistical testing.

1. To what extent did the evidence indicate a significant difference between pre-test
   scores and post-test scores for tier 1 student subgroups?

   $Ho1_1$: There is no significant difference between pre-test scores and post-test

   scores among the tier 1 subgroup in Kindergarten.

In order to begin testing the first of this study's hypotheses (H_o1_1), an *ANOVA* was performed to determine the mean difference between the pre-test and post-test scores for the 2006-2007 tier 1 Kindergarten subgroup (n = 100). SCOREDIF was the dependent variable and the two independent factors were pre-test tier and post-test tier. No statistical difference was identified, $F(2, 98) = 1.23$, $p = .30$. Because the p value was greater than .05, the results of the *ANOVA* supported the hypothesis that no significant difference

existed between the pre- test and post-test scores among the tier 1 subgroup in

Kindergarten. The descriptive statistics for the analysis are included in Table 13.

Table 13

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-test and Post-test
Tier Classification Among the 2006-2007 Tier 1 Student Sample in Kindergarten

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-test
and Post-test Tier Classification Among the 2006-2007 Tier 1 Student Sample in
Kindergarten

Fall Classification	Spring Classification	M	SD	N
Tier 1	Tier 1	34.32	14.17	92
	Tier 2	31.57	13.55	7
	Tier 3	13.00		1
	Total	33.91	14.17	100

Table 14 shows the results of the *ANOVA* analyzing the dependent variable,

SCOREDIF, and pre-test and post-test tier classification among the tier 1 student sample

in Kindergarten.

Table 14

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2006-2007 Tier 1 Student Sample in Kindergarten

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-test and Post-test Tier Classification Among the 2006-2007 Tier 1 Student Sample in Kindergarten

	SS	df	MS	F	p
Between Groups	490.62	2	245.31	1.23	.30
Within Groups	19377.57	98	199.77		
Total	19868.19	100			

A one-way analysis of variance was conducted to evaluate the relationship between the dependent variable and the independent variable, pre-k experience. Results showed statistical significance between the mean scores of students with pre-k experience (n = 50), those without pre-k experience (n = 41), and for students whom the local division had no information (n = 9), $F(2, 98) = 2.87, p = .06$. The effect size of the pairwise comparisons was moderate, $\eta^2 = .06$, and Levene's Test of Equality of Error Variances lacked significance, $p = .18$, suggesting the population variances were equal. Table 15 displays the descriptive statistics for the analysis.

Table 15

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-K Experience Among the 2006-2007 Tier 1 Student Sample in Kindergarten

Descriptive Statistics for SCOREDIF and Pre-K Experience Among the 2006-2007 Tier 1 Student Sample in Kindergarten

	M	SD	N
2005-2006 Pre-K	32.32	12.29	50
No	33.56	16.36	41
Unspecified	44.33	8.99	9
Total	33.91	14.17	100

Table 16 presents the results of the *ANOVA* analyzing the dependent variable, SCOREDIF, and pre-k experience among the tier 1 student sample in Kindergarten.

Table 16

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-K Experience Among the 2006-2007 Tier 1 Student Sample in Kindergarten

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-K Experience Among the 2006-2007 Tier 1 Student Sample in Kindergarten

	SS	df	MS	F	p
Between Groups	1109.21	2	554.61	2.87	.06
Within Groups	18758.98	98	193.39		
Total	19868.19	100			

Table 17 displays the results of the Scheffe post hoc analysis.

Table 17

Results of the Scheffe Post Hoc Analysis Comparing Mean Differences Between the Dependent Variable, SCOREDIF, and Pre-K Experience Among the 2006-2007 Tier 1 Student Sample in Kindergarten

Results of the Scheffe Post Hoc Analysis Comparing Means Between the Dependent Variable, SCOREDIF, and Pre-K Experience Among the 2006-2007 Tier 1 Student Sample in Kindergarten

	(I) Fall Classification	(J) Spring Classification	Mean Difference (I-J)	Standard Error	p	95% Confidence Interval	
						Lower Bound	Upper Bound
Scheffe	2005-2006 Pre-K	No	1.24	2.93	.91	8.53	6.04
		Unspecified	12.01*	5.04	.06	24.53	.51
	Unspecified	2005-2006 Pre-K	12.01*	5.04	.06	.51	24.53
		No	10.80	5.12	.12	1.95	23.50

* The mean difference is significant at the .05 level.

The analysis shows significant pairwise interactions at the .05 level between 2005-2006 students with pre-k experience, and students whose pre-k experience was unspecified ($MD = 12.01$, $SE = 5.04$, $p = .06$).

A one-way analysis of variance was performed to begin testing the second hypothesis ($Ho1_2$) for the first research question: There is no significant difference between pre-test scores and post-test scores among the tier 1 subgroup in Grade 1. An *ANOVA* evaluated

the mean differences between the pre-test and post-test scores for the 2006-2007 tier 1 student sample in Grade 1 (n = 109). SCOREDIF was the dependent variable and the two independent factors were the pre-test tier and post-test tier. The test was significant, $F(2, 107) = 4.23, p = .04$. Because the p value was less than .05, the null hypothesis was rejected: There is a significant difference between pre-test scores and post-test scores among the tier 1 subgroup in Grade 1. The effect size of the pairwise comparisons was moderate, $\eta^2 = .07$, and Levene's Test of Equality in Error Variances were not statistically significant, $p = .64$, confirming that population variances were equal. The descriptive statistics for the analysis are included in Table 18.

Table 18

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2006-2007 Tier 1 Student Sample in Grade 1

Descriptive Statistics for SCOREDIF and Pre-test and Post-test Tier Classification Among the 2006-2007 Tier 1 Student Sample in Grade 1

Fall Classification	Spring Classification	M	SD	N
Tier 1	Tier 1	6.40	10.31	94
	Tier 2	14.23	8.65	14
	Tier 3	16.50	7.78	1
	Total	7.52	10.41	109

Table 19 displays the results of the *ANOVA* analyzing the relationship between the dependent variable and pre-test and post-test tier classification among the tier 1 student sample in Grade 1.

Table 19

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2006-2007 Tier 1 Student Sample in Grade 1

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-Test and Post-test Tier Classification Among the 2006-2007 Tier 1 Student Sample in Grade 1

	SS	df	MS	F	p
Between Groups	863.74	2	431.87	4.22	.04
Within Groups	10839.45	107	102.26		
Total	11703.19	109			

The Scheffe post hoc test was not performed at least one group had fewer than two cases (Tier 3: n =1).

A one-way analysis of variance was performed to begin testing the study's third hypothesis (Ho1$_{3}$) for the first research question: There is no significant difference between pre-test scores and post-test scores among the tier 1 student subgroup in Grade 2. The analysis evaluated the mean differences between the pre-test and post-test scores for the 2006-2007 tier 1 student subgroup in Grade 2 (n = 86). SCOREDIF was the dependent variable and the two independent factors were pre-test tier and post-test tier. No statistical difference was identified, $F(1, 85) = 0.50, p = .83$. Because the p value was greater than .05, the results of the *ANOVA* supported the hypothesis that no significant difference existed between pre-test scores and post-test scores among the tier 1 student subgroup in Grade 2. Table 20 presents the descriptive statistics for the analysis.

Table 20

Descriptive Statistics for SCOREDIF and Pre-Test and Post-Test Tier Classification Among the 2006-2007 Tier 1 Student Sample in Grade 2

Descriptive Statistics for SCOREDIF and Pre-test and Post-test Tier Classification Among the 2006-2007 Tier 1 Student Sample in Grade 2

Fall Classification	Spring Classification	Mean	SD	N
Tier 1	Tier 1	17.50	6.34	84
	Tier 2	16.50	3.54	2
	Total	17.48	6.28	86

Table 21 shows the results of the *ANOVA* analyzing the relationship between the dependent variable, SCOREDIF, and pre-test and post-test tier classification among the tier 1 student sample in Grade 2.

Table 21

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2006-2007 Tier 1 Student Sample in Grade 2

ANOVA Analyzing the Relationship Between SCORDEIF and Pre-test and Post-test Tier Classification Among the 2006-2007 Tier 1 Student Sample in Grade 2

	SS	df	MS	F	p
Between Groups	1.95	1	1.95	.05	.83
Within Groups	3347.50	85	39.85		
Total	3349.45	86			

Results of Data Analyses for the 2006-2007 Tier 2 Student Subgroups

The following 2006-2007 data analyses investigated the second research question and associated null hypotheses: To what extent did the evidence indicate a significant difference between pre-test scores and post-test scores for the tier 2 student subgroup?

Ho2$_1$: There is no significant difference between pre-test scores and post-test scores among the tier 2 subgroup in Kindergarten.

Ho2$_2$: There is no significant difference between pre-test scores and post-test scores among the tier 2 subgroup in Grade 1.

Ho2$_3$: There is no significant difference between pre-test scores and post-test scores among tier the 2 subgroup in Grade 2.

In order to begin testing the first hypothesis (H$_o$2$_1$) of the second research question, an *ANOVA* was performed to determine the mean differences between the pre-test and post-test scores for the 2006-2007 tier 2 Kindergarten subgroup (n = 12). SCOREDIF was the dependent variable, and the two independent factors were pre-test tier and post-test tier. The results of the one-way analysis of variance were significant, $F(1, 11) = 7.05, p = .02$. Because the p value was less than .05, the null hypothesis was rejected: There is a significant difference between pre-test and post-test scores among the 2006-2007 tier 2 student subgroup in Kindergarten. The effect size of the pairwise comparisons was large, $\eta^2 = .41$, and Levene's Test of Equality of Error Variances was not statistically significant, $p = .89$, suggesting that population variances were equal. Table 22 presents the descriptive statistics for the analysis.

Table 22

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2006-2007 Tier 2 Student Sample in Kindergarten

Descriptive Statistics for SCOREDIF and Pre-test and Post-test Tier Classification Among the 2006-2007 Tier 2 Student Sample in Kindergarten

Fall Classification	Spring Classification	M	SD	N
Tier 2	Tier 1	69.25	12.51	8
	Tier 2	50.50	8.85	4
	Total	63.00	14.36	12

Table 23 shows the results of the *ANOVA* analyzing the relationship between the dependent variable, SCOREDIF, and pre-test and post-test tier classification among the tier 2 student sample in Kindergarten.

Table 23

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2006-2007 Tier 2 Student Sample in Kindergarten

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-test and Post-test Tier Classification Among the 2006-2007 Tier 2 Student Sample in Kindergarten

	SS	df	MS	F	p
Between Groups	937.50	1	937.50	7.05	.02
Within Groups	1330.50	11	133.05		
Total	2268.00	12			

The Scheffe post hoc analysis was not performed because there were fewer than three groups.

A one-way analysis of variance was conducted to evaluate the relationship between the dependent variable, SCOREDIF, and pre-k experience. Results showed no statistical significance between the mean scores of students with pre-k experience (n = 2), those without pre-k experience (n = 5), and for students whom the local division had no information (n = 5), $F(2, 10) = 1.26$, $p = .33$. Table 24 shows the descriptive statistics for the analysis.

Table 24

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-K Experience Among the 2006-2007 Tier 2 Student Sample in Kindergarten

Descriptive Statistics for SCOREDIF and Pre-K Experience Among the 2006-2007 Tier 2 Student Sample in Kindergarten			
	M	SD	N
2005-2006	49.00	9.89	2
No	64.20	19.90	5
Unspecified	67.40	4.72	5
Total	63.00	14.36	12

Table 25 shows the results of the *ANOVA* analyzing the relationship between the dependent variable, SCOREDIF, and pre-k experience among the tier 2 student sample in Kindergarten.

Table 25

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-K Experience Among the 2006-2007 Tier 2 Student Sample in Kindergarten

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-K Experience Among the 2006-2007 Student Sample in Kindergarten

	SS	df	MS	F	p
Between Groups	496.00	2	248.00	1.26	.33
Within Groups	1772.00	10	196.89		
Total	2268.000	12			

*Interpret with caution.

A one-way analysis of variance was performed to begin testing the second hypothesis ($Ho2_2$) of the second research question: There is no significant difference between pre-test scores and post-test scores among the tier 2 subgroup in Grade 1. An *ANOVA* was performed to determine the mean differences between the pre-test and post-test scores for the 2006-2007 student subgroup (n = 18). SCOREDIF was the dependent variable and the two independent factors were pre-test tier and post-test tier. The results of the one-way analysis of variance were significant, $F(2, 16) = 8.85$, p = .01. Because the p value was less than .05, the null hypothesis was rejected: There is a significant difference between pre-test scores and post-test scores among the year one tier 2 subgroup in Grade 1. The effect size of the pairwise comparisons was large, $\eta^2 = .54$, and Levene's Test of Equality of Error Variances was not statistically significant, p = .19, suggesting

that population variances were equal. Table 26 presents the descriptive statistics for the analysis.

Table 26

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2006-2007 Tier 2 Student Sample in Grade 1

Descriptive Statistics for SCOREDIF and Pre-test and Post-test Tier Classification Among the 2006-2007 Tier 2 Student Sample in Grade 1

Fall Classification	Spring Classification	M	SD	N
Tier 2	Tier 1	5.63	12.61	2
	Tier 2	1.00	7.16	10
	Tier 3	16.50	6.59	6
	Total	2.78	13.79	18

Table 27 shows the results of the *ANOVA* analyzing the relationship between the dependent variable, SCOREDIF, and pre-test and post-test tier classification among the tier 2 student sample in Grade 1.

Table 27

*Results of the ANOVA Analyzing the Relationship Between the Dependent Variable,
SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2006-2007
Tier 2 Student Sample in Grade 1*

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-test and Post-test
Tier Classification Among the 2006-2007 Tier 2 Student Sample in Grade 1

	SS	df	MS	F	p
Between Groups	1751.74	2	875.87	8.85	.01
Within Groups	1485.38	16	99.03		
Total	3237.11	18			

*Interpret with caution.

Table 28 shows the results of the Scheffe post hoc analysis.

Table 28

Results of the Scheffe Post Hoc Analysis Comparing Mean Differences Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the Tier 2 2006-2007 Student Sample in Grade 1

Results of the Scheffe Post Hoc Analysis Comparing Mean Differences Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2006-2007 Tier 2 Student Sample in Grade 1

	(I) Fall Classification	(J) Spring Classification	Mean Difference (I-J)	Standard Error	p	95% Confidence Interval	
						Lower Bound	Upper Bound
Scheffe	Tier 2	Tier 1	4.63	6.09	.75	21.16	11.91
		Tier 2	22.13[*]	5.37	.01	36.71	7.54
		Tier 3	17.50[*]	6.42	.01	34.93	.07

*The mean difference is significant at the .05 level.

The analysis shows significant pairwise interactions at the .05 level between fall tier 2 and spring tier 2 student subgroups ($MD = 22.13$, $SE = 5.37$, $p = .01$); and, between fall tier 2 and spring tier 3 student subgroups ($MD = 17.50$, $SE = 6.42$, $p = .01$).

A one-way analysis of variance was performed to begin testing the third hypothesis ($Ho2_3$) of the second research question: There is no significant difference between pre-test scores and post-test scores among the tier 2 subgroup in Grade 2. An *ANOVA* evaluated the mean differences between the pre-test and post-test scores for the 2006-2007 tier 2 student subgroup in Grade 2 ($n = 33$). SCOREDIF was the dependent variable and the two independent factors were pre-test tier and post-test tier. Results

showed statistical significance, $F(2, 31) = 10.75$, p = .01. Because the p value was less

than .05, the null hypothesis was rejected: There is a significant difference between tier 2

pre-test scores and post-test scores among the student subgroup in Grade 2. The effect

size of pairwise comparisons was large, $\eta^2 = .42$, and Levene's Test of Equality of Error

Variances was not statistically significant, $p = .70$, suggesting that population variances

were equal. Table 29 presents the descriptive statistics for the analysis.

Table 29

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2006-2007 Tier 2 Student Subgroup in Grade 2

Descriptive Statistics for SCOREDIF and Pre-test and Post-test Tier Classification Among the 2006-2007 Tier 2 Student Subgroup in Grade 2

Fall Classification	Spring Classification	M	SD	N
Tier 2	Tier 1	29.31	10.27	16
	Tier 2	18.44	4.68	16
	Tier 3	3.00		1
	Total	23.24	10.12	33

Table 30 shows the results of the *ANOVA* analyzing the relationship between the

dependent variable, SCOREDIF, and pre-test and post-test tier classification among the

tier 2 student sample in Grade 2.

Table 30

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2006-2007 Tier 2 Student Sample in Grade 2

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-test and Post-test Tier Classification Among the 2006-2007 Tier 2 Student Sample in Grade 2

	SS	df	MS	F	p
Between Groups	1368.69	2	684.34	10.75	.01
Within Groups	1909.38	31	63.65		
Total	3278.06	33			

*Interpret with caution.

The Scheffe post hoc test was not performed at least one group had fewer than two cases (Tier 3: n =1).

Results of Data Analyses for the 2006-2007 Tier 3 Student Subgroups

The following 2006-2007 data analyses investigated the third research question and associated null hypotheses: To what extent did the evidence indicate a significant difference between pre-test scores and post-test scores for tier 3 student subgroups?

$Ho3_1$: There is no significant difference between pre-test scores and post-test scores among the tier 3 subgroup in Kindergarten.

$Ho3_2$: There is no significant difference between pre-test scores and post-test scores among the tier 3 subgroup in Grade 1.

$Ho3_3$: There is no significant difference between pre-test scores and post-test scores among the tier 3 subgroup in Grade 2.

In order to begin testing the first hypothesis (H_o3_1) of the third research question, an *ANOVA* was performed to determine the mean differences between the pre-test and post-test scores for the 2006-2007 tier 3 Kindergarten subgroup (n = 15). SCOREDIF was the dependent variable and the two independent factors were pre-test tier and post-test tier. The results of the one-way analysis of variance showed significance, $F(2, 13) = 31.18$, p = .00. Because the *p* value was less than .05, the null hypothesis was rejected: There is a significant difference between pre-test scores and post-test scores among the year one tier 3 subgroup in Kindergarten. The effect size of pairwise comparisons was large, $\eta^2 = .84$, and Levene's Test of Equality of Error Variances was not statistically significant, $p = .34$, suggesting that population variances were equal. Table 31 displays the descriptive statistics for the analysis.

Table 31

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2006-2007 Tier 3 Student Sample in Kindergarten

Descriptive Statistics for SCOREDIF and Pre-test and Post-test Tier Classification Among the 2006-2007 Tier 3 Student Sample in Kindergarten

Fall Classification	Spring Classification	M	SD	N
Tier 3	Tier 1	76.50	2.12	2
	Tier 2	64.00		1
	Tier 3	27.33	9.30	12
	Total	36.33	20.56	15

Table 32 displays the results of the *ANOVA* analyzing the relationship between the dependent variable and pre-test tier and post-test tier classification among the tier 3 student sample in Kindergarten.

Table 32

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2006-2007 Tier 3 Student Sample in Kindergarten

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-test and Post-test Tier Classification Among the 2006-2007 Tier 3 Student Sample in Kindergarten

	SS	df	MS	F	p
Between Groups	4964.17	2	2482.08	31.18	.00
Within Groups	955.17	13	79.60		
Total	5919.33	15			

*Interpret with caution.

The Scheffe post hoc test was not performed at least one group had fewer than two cases (Tier 2: n = 1).

A one-way analysis of variance was conducted to evaluate the relationship between the dependent variable and pre-k experience. Results showed no statistical significance between the mean scores of students with pre-k experience (n = 2), those without pre-k experience (n = 8), and for students whom the local division had no information (n = 5), $F(2, 12) = .99, p = .40$. Table 33 displays the descriptive statistics for the analysis.

Table 33

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-K Experience Among the 2006-2007 Tier 3 Student Sample in Kindergarten

Descriptive Statistics for SCOREDIF and Pre-K Experience Among the 2006-2007 Tier 3 Student Sample in Kindergarten

	M	SD	N
2005-2006	26.00	4.242	2
No	43.25	21.04	8
Unspecified	29.40	22.18	5
Total	36.33	20.56	15

Table 34 presents the results of the *ANOVA* analyzing the relationship between the dependent variable and pre-k experience among the tier 3 student sample in Kindergarten

Table 34

Results of the ANOVA Analyzing the Dependent Variable, SCOREDIF, and Pre-K Experience Among the 2006-2007 Tier 3 Student Sample in Kindergarten

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-K Experience Among the 2006-2007 Tier 3 Student Sample in Kindergarten

	SS	df	MS	F	p
Between Groups	836.63	2	418.32	.99	.40
Within Groups	5082.70	13	423.56		
Total	5919.33	15			

*Interpret with caution.

A one-way analysis of variance was conducted to begin testing the second hypothesis (H_o3_2) of the third research question: There is no difference in the pre-test scores and post-test scores among the tier 3 student subgroup in Grade 1. An *ANOVA* was performed to determine the mean differences between the pre-test and post-test scores for the 2006-2007 tier 3 student subgroup in Grade 1 (n = 7). SCOREDIF was the dependent variable and the two independent factors were pre-test tier and post-test tier classification. The results were not statistically significant, $F(1, 5) = .05, p = .85$, supporting the hypothesis that no significant difference existed between pre-test scores and post-test scores among the tier 3 student subgroup in Grade 1. Table 35 displays the descriptive statistics for the analysis.

Table 35

Descriptive Statistics for SCOREDIF and Pre-Test and Post-Test Tier Classification Among the 2006-2007 Tier 3 Student Sample in Grade 1

Descriptive Statistics for SCOREDIF and Pre-test and Post-test Tier Classification Among the 2006-2007 Tier 3 Student Sample in Grade 1

Fall Classification	Spring Classification	M	SD	N
Tier 3	Tier 2	3.00		1
	Tier 3	4.33	5.35	6
	Total	4.14	4.91	7

Table 36 shows the results of the *ANOVA* analyzing the relationship between the

dependent variable, SCOREDIF, and pre-test and post-test tier classification among the

tier 3 student sample in Grade 1.

Table 36

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2006-2007 Tier 3 Student Sample in Grade 1

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-test and Post-test Tier Classification Among the 2006-2007 Tier 3 Student Sample in Grade 1

	SS	df	MS	F	p
Between Groups	1.52	1	1.52	.05	.83
Within Groups	143.33	5	28.67		
Total	144.86	6			

A one-way analysis of variance was conducted to begin testing the third hypothesis ($H_o 3_3$) of the third research question: There is no significant difference between pre-test scores and post-test scores among the tier 3 student subgroup in Grade 2. A one-way analysis of variance was performed to determine the mean differences between the pre-test and post-test scores for the 2006-2007 tier 3 student subgroup in Grade 2 (n = 2). SCOREDIF was the dependent variable, and the two independent factors were pre-test tier and post-test tier classification. Results showed no significant differences among the tier 3 pre-test and post-test scores for the two cases in the student sample. An *ANOVA* table was not computed due to the absence of an interaction effect between the pre-test and post-test scores of the tier 3 student subgroup in Grade 2 and the dependent variable, SCOREDIF. Table 37 displays the descriptive statistics for the analysis.

Table 37

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2006-2007 Tier 3 Student Sample in Grade 2

Descriptive Statistics for SCOREDIF and Pre-test and Post-test Tier Classification Among the 2006-2007 Tier 3 Student Sample in Grade 2

Fall Classification	Spring Classification	M	SD	N
Tier 3	Tier 3	15.50	6.36	2
	Total	15.50	6.36	2

Results of Data Analyses for the 2007-2008 Tier 1 Student Subgroups

Findings of data analyses for 2007-2008 are presented by research questions and associated null hypotheses developed for statistical testing. In order to begin testing the first of the study's hypotheses (H_o1_1) for year two, an *ANOVA* was performed to determine the mean differences between the pre-test and post-test scores for the 2007-2008 tier 1 Kindergarten subgroup (n = 114). SCOREDIF was the dependent variable and the two independent factors were pre-test tier and post-test tier. No statistical difference was identified, $F(1, 112) = 1.55, p = .22$. Because the p value was greater than .05, the results of the analysis supported the hypothesis that no significant difference existed between pre-test scores and post-test scores among the year two tier 1 subgroup in Kindergarten. Table 38 displays the descriptive statistics for the analysis.

Table 38

Descriptive Statistics for the Dependent Variable, SCOREDIF, and the Pre-Test and Post-Test Tier Classification Among the 2007-2008 Tier 1 Student Subgroup in Kindergarten

Descriptive Statistics for SCOREDIF and Pre-test and Post-test Tier Classification Among the 2007-2008 Tier 1 Student Subgroup in Kindergarten

Fall Classification	Spring Classification	M	SD	N
Tier 1	Tier 1	31.63	16.91	111
	Tier 2	19.33	15.95	3
	Total	31.31	16.94	114

Table 39 shows the results of an *ANOVA* analyzing the relationship between the dependent variable, SCOREDIF, and pre-test and post-test tier classification among the

tier 1 student sample in Kindergarten.

Table 39

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2007-2008 Tier 1 Student Sample in Kindergarten

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-test and Post-test Tier Classification Among the 2007-2008 Tier 1 Student Sample in Kindergarten

	SS	df	MS	F	p
Between Groups	441.73	1	441.73	1.55	.22
Within Groups	31980.52	113	285.54		
Total	32422.25	114			

A one-way analysis of variance was conducted to evaluate the relationship between the dependent variable and pre-k experience. Results showed statistical significance between the mean scores of those students with pre-k experience (n = 62), those without pre-k experience (n = 40), and for students whom the local division had no information (n = 12), $F(2, 112) = 12.16, p = .00$. The effect size of the pairwise comparisons was large, $\eta^2 = .18$, and Levene's Test of Equality of Error Variances lacked significance, $p = .12$, suggesting the population variances were equal. Table 40 displays the descriptive statistics for the analysis.

Table 40

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-K Experience Among the 2007-2008 Tier 1 Student Sample in Kindergarten

Descriptive Statistics for SCOREDIF and Pre-K Experience Among the 2007-2008 Tier 1 Student Sample in Kindergarten

	M	SD	N
2006-2007 Pre-K	24.77	13.60	62
No	39.46	18.01	40
Unspecified	37.83	15.54	12
Total	31.31	16.94	114

Table 41 presents the results of the *ANOVA* analyzing the relationship between the dependent variable, SCOREDIF, and pre-k experience among the tier 1 student sample in Kindergarten.

Table 41

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-K Experience Among the 2007-2008 Tier 1 Student Sample in Kindergarten

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-K Experience Among the 2007-2008 Tier 1 Student Sample in Kindergarten

	SS	df	MS	F	p
Between Groups	5825.77	2	2912.89	12.16	.00
Within Groups	26596.48	112	239.61		
Total	32422.25	114			

Table 42 shows the results of the Scheffe post hoc analysis.

Table 42

Results of the Scheffe Post Hoc Analysis Comparing Mean Differences Between the Dependent Variable, SCOREDIF, and Pre-K Experience Among the 2007-2008 Tier 1 Student Sample in Kindergarten

Results of the Scheffe Post Hoc Analysis Comparing Mean Differences Between the Dependent Variable, SCOREDIF, and Pre-K Experience Among the 2007-2008 Tier 1 Student Sample in Kindergarten

	(I) Fall Classification	(J) Spring Classification	Mean Difference (I-J)	Standard Error	p	95% Confidence Interval	
						Lower Bound	Upper Bound
Scheffe	2006-2007 Pre-K	No	15.09*	2.39	.00	23.05	7.12
		Unspecified	13.85*	3.08	.00	24.12	3.58
	No	2006-2007 Pre-K	15.09*	2.39	.00	23.05	7.12
		Unspecified	1.23	2.73	.90	7.88	10.35

* The mean difference is significant at the .05 level.

The analysis shows significant pairwise interactions at the .05 level between 2006-2007 students with pre-k experience, and students with without pre-k experience (MD = 15.09, SE = 5.04, p = .00); and, between 2006-2007 students with pre-k experience, and students whose information was unspecified (MD = 13.85, SE = 3.08, p = .00).

A one-way analysis of variance was performed to begin testing the second hypothesis ($Ho2_2$) of the first research question for year two: There is no significant difference between pre-test scores and post-test scores among the tier 1 subgroup in Grade 1. An *ANOVA* evaluated the mean difference between the pre-test and post-test scores for the

2007-2008 tier 1 subgroup in Grade 1 (n = 104). SCOREDIF was the dependent variable and the two independent factors were pre-test tier and post-test tier. The test was significant, $F(2, 101) = 13.84$, $p = .00$. Because the p value was less than .05, the null hypothesis was rejected: There is a significant difference between pre-test scores and post-test scores among the tier 1 subgroup in Grade 1. The effect size of the pairwise comparisons was large, $\eta^2 = .22$, and Levene's Test of Equality of Error Variances lacked significance, $p = .20$, suggesting the population variances were equal. Table 43 presents the descriptive statistics of the analysis.

Table 43

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2007-2008 Tier 1 Student Sample in Grade 1

Descriptive Statistics for SCOREDIF and Pre-test and Post-test Tier Classification Among the 2007-2008 Tier 1 Student Sample in Grade 1

Fall Classification	Spring Classification	M	SD	N
Tier 1	Tier 1	6.66	8.41	92
	Tier 2	17.60	5.64	11
	Tier 3	27.50	3.54	1
	Total	8.12	9.13	104

Table 44 shows the results of the *ANOVA* analyzing the relationship between the dependent variable, SCOREDIF, and pre-test and post-test tier classification among the tier 1 student sample in Grade 1.

Table 44

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2007-2008 Student Tier 1 Sample in Grade 1

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-test and Post-test Tier Classification Among the 2007-2008 Tier 1 Student Sample in Grade 1

	SS	df	MS	F	p
Between Groups	1845.16	2	922.58	13.84	.00
Within Groups	6731.45	102	66.65		
Total	8576.62	104			

The Scheffe post hoc test was not performed at least one group had fewer than two cases (Tier 3: n = 1).

In order to begin testing the third hypothesis (H_o1_3) of the first research question for year two, a one-way analysis of variance was performed to evaluate the mean differences between the pre-test and post-test scores for the 2007-2008 tier 1 subgroup in Grade 2 (n = 114). SCOREDIF was the dependent variable and the two independent factors were pre-test tier and post-test tier. No statistical difference was identified,

$F(1, 113) = .58, p = .45$. Because the *p* value was greater than .05, the results of the *ANOVA* supported the hypothesis that no significant difference existed between pre-test scores and post-test scores among the tier 1 student sample in Grade 2. The descriptive statistics for the analysis are included in Table 45.

Table 45

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2007-2008 Tier 1 Student Sample in Grade 2

Descriptive Statistics for SCOREDIF and Pre-test and Post-test Classification Tier Among the 2007-2008 Tier 1 Student Sample in Grade 2

Fall Classification	Spring Classification	M	SD	N
Tier 1	Tier 1	16.15	9.87	114
	Total	16.05	6.80	114

Table 46 shows the results of the *ANOVA* analyzing the relationship between the dependent variable, SCOREDIF, and pre-test and post-test tier classification among the tier 1 student sample in Grade 2.

Table 46

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2007-2008 Tier 1 Student Sample in Grade 2

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-test and Post-test Tier Classification Among the 2007-2008 Tier 1 Student Sample in Grade 2

	SS	df	MS	F	p
Between Groups	27.01	1	27.01	.58	.45
Within Groups	5192.67	113	46.36		
Total	5219.68	114			

Results of Data Analyses for the 2007-2008 Tier 2 Student Subgroups

A one-way analysis of variance was performed to begin testing the first hypothesis

(Ho2$_1$) of the second research question for year two: There is no significant difference

between pre-test scores and post-test scores among the tier 2 subgroup in Kindergarten.

An *ANOVA* was performed to determine the mean difference between the pre-test and

post-test scores among the 2007-2008 tier 2 student subgroup in Kindergarten (n = 20).

SCOREDIF was the dependent variable and the two independent factors were pre-test tier

and post-test tier. The results of the one-way analysis of variance were significant,

$F(2, 18) = 19.77, p = .00$. Because the p value was less than .05, the null hypothesis was

rejected: There is a significant difference between pre-test scores and post-test scores

among the year two tier 2 subgroup in Kindergarten. The effect size of the pairwise

comparisons was large, $\eta^2 = .70$, and Levene's Test of Equality of Error Variances was

insignificant, $p = .21$. Table 47 displays the descriptive statistics for the analysis.

Table 47

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Classification Among the 2007-2008 Tier 2 Student Sample in Kindergarten

Descriptive Statistics for SCOREDIF and Pre-test and Post-test Tier Classification Among the 2007-2008 Tier 2 Student Sample in Kindergarten

Fall Classification	Spring Classification	M	SD	N
Tier 2	Tier 1	69.63	5.37	8
	Tier 2	46.90	14.04	11
	Tier 3	20.00	8.49	1
	Total	53.30	18.93	20

Table 48 shows the results of the *ANOVA* analyzing the dependent variable,

SCOREDIF, and pre-test and post-test tier classification among the tier 2 student sample

in Kindergarten.

Table 48

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable,
SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2007-2008
Tier 2 Student Sample in Kindergarten

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-test and Post-test
Tier Classification Among the 2007-2008 Tier 2 Student Sample in Kindergarten

	SS	df	MS	F	p
Between Groups	4759.43	2	2379.71	19.77	.00
Within Groups	2046.78	18	120.40		
Total	6806.20	20			

*Interpret with caution.

The Scheffe post hoc test was not performed at least one group had fewer than two

cases (Tier 3: n = 1).

A one-way analysis of variance was conducted to evaluate the relationship between

the dependent variable and the independent factor, pre-k experience. Results showed no

statistical significance between the mean scores of students with pre-k experience (n = 6),

those without pre-k experience (n = 10), and for students whom the local division had no

information (n = 4), $F(2, 17) = 2.77$, $p = .10$. The effect size of the pairwise comparisons

was large, $\eta^2 = .22$, and Levene's Test of Equality of Error Variances lacked significance,

$p = .99$, suggesting the population variances were equal. Table 49 displays the

descriptive statistics for the analysis.

Table 49

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-K Experience Among the 2007-2008 Tier 2 Student Sample in Kindergarten

	M	SD	N
Descriptive Statistics for SCOREDIF and Pre-K Experience Among the 2007-2008 Tier 2 Student Sample in Kindergarten			
2006-2007 Pre-K	47.83	15.79	6
No	62.00	18.43	10
Unspecified	39.75	16.66	4
Total	53.30	18.93	20

Table 50 presents the results of the *ANOVA* analyzing the dependent variable,

SCOREDIF, and pre-k experience among the tier 2 student sample in Kindergarten.

Table 50

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-K Experience Among the 2007-2008 Tier 2 Student Sample in Kindergarten

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-K Experience Among the 2007-2008 Tier 2 Student Sample in Kindergarten

	SS	df	MS	F	p
Between Groups	1670.62	2	835.31	2.77	.10
Within Groups	5135.58	17	302.09		
Total	6806.20	19			

A one-way analysis of variance was performed to begin testing the second hypothesis $(Ho1_2)$ of the first research question for year two: There is no significant difference between pre-test scores and post-test scores among the tier 2 subgroup in Grade 1. An *ANOVA* evaluated the mean differences between the pre-test and post-test scores for the 2007-2008 tier 2 subgroup in Grade 1 (n = 13). SCOREDIF was the dependent variable and the two independent factors were pre-test tier and post-test tier. Results showed statistical significance, $F(2, 12) = 4.54$, p = .04. Because the *p* value was less than .05, the null hypothesis was rejected: There is a significant difference between pre-test scores and post-test scores among the tier 2 student sample in Grade 1. The effect size of pairwise comparisons was large, $\eta^2 = .48$, and Levene's Test of Equality of Error Variances lacked significance, $p = .22$, suggesting that population variances were equal. Table 51 presents the descriptive statistics of the analysis.

Table 51

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2007-2008 Tier 2 Student Sample in Grade 1

Descriptive Statistics for SCOREDIF and Pre-tier and Post-tier Tier Classification Among the 2007-2008 Tier 2 Student Sample in Grade 1

Fall Classification	Spring Classification	M	SD	N
Tier 2	Tier 1	4.33	2.89	3
	Tier 2	10.43	10.83	7
	Tier 3	15.33	1.52	3
	Total	8.15	10.74	13

Table 52 displays the results of the *ANOVA* analyzing the relationship between the dependent variable and pre-test and post-test tier classification among the tier 2 student sample in Grade 1.

Table 52

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2007-2008 Tier 2 Student Sample in Grade 1

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-test and Post-test Tier Classification Among the 2007-2008 Tier 2 Student Sample in Grade 1

	SS	df	MS	F	p
Between Groups	658.65	2	329.32	4.54	.04
Within Groups	725.05	12	72.51		
Total	1383.69	12			

*Interpret with caution.

Table 53 displays the results of the Scheffe post hoc analysis.

Table 53

Results of the Scheffe Post Hoc Analysis Comparing Mean Differences Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2007-2008 Tier 2 Student Sample in Grade 1

Results of the Scheffe Post Hoc Analysis Comparing Mean Differences Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2007-2008 Tier 2 Student Sample in Grade 1

	(I) Fall Classification	(J) Spring Classification	Mean Difference (I-J)	Standard Error	p	95% Confidence Interval	
						Lower Bound	Upper Bound
Scheffe	Tier 2	Tier 1	4.90	5.88	.71	11.92	21.74
		Tier 2	14.76*	5.88	.04	31.59	2.07
		Tier 3	5.20	7.32	.76	13.25	24.89

*The mean difference is significant at the .05 level.

The analysis shows significant pairwise interactions at the .05 level between fall tier 2 and spring tier 2 student subgroups ($MD = 14.76$, $SD = 5.88$, $p = .04$).

A one-way analysis of variance was performed to begin testing the third hypothesis ($Ho2_3$) of the second research question: There is no significant difference between pre-test scores and post-test scores among the tier 2 subgroup in Grade 2. An *ANOVA* evaluated the mean differences between the pre-test and post-test scores for the 2007-2008 tier 2 subgroup in Grade 2 (n = 17). SCOREDIF was the dependent variable and the two independent factors were pre-test tier and post-test tier. Results showed statistical significance, $F(1,16) = 25.50$, $p = .00$. Because the p value was less than .05,

the null hypothesis was rejected: There is a significant difference between pre-test scores

and post-test scores among the tier 2 population sample in Grade 2. The effect size of the

pairwise comparisons was large, η^2 =.63, and Levene's Test of Equality of Error

Variances lacked significance, p = .17, suggesting the population variances were equal.

Table 54 displays the descriptive statistics for the analysis.

Table 54

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2007-2008 Tier 2 Student Sample in Grade 2

Descriptive Statistics for SCOREDIF and Pre-test Tier and Post-test Tier Classification Among the 2007-2008 Tier 2 Student Sample in Grade 2

Fall Classification	Spring Classification	M	SD	N
Tier 2	Tier 1	35.50	11.73	4
	Tier 2	15.24	5.21	13
	Total	20.00	11.17	17

Table 55 shows the results an *ANOVA* analyzing the relationship between the

dependent variable, SCOREDIF, and pre-test and post-test tier classification among the

tier 2 student sample in Grade 2.

Table 55

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2007-2008 Tier 2 Student Sample in Grade 2

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-test and Post-test Tier Classification Among the 2007-2008 Tier 2 Student Sample in Grade 2

	SS	df	MS	F	p
Between Groups	1256.69	1	1256.69	25.50	.00
Within Groups	739.31	16	49.29		
Total	1996.00	17			

*Interpret with caution.

The Scheffe post hoc analysis was not performed because there were fewer than three groups.

Results of Data Analyses for the 2007-2008 Tier 3 Student Subgroups

A one-way analysis of variance was performed to begin testing the first hypothesis ($Ho3_2$) of the third research question for year two: There is no significant difference between pre-test scores and post-test scores among the tier 3 subgroup in Kindergarten. An *ANOVA* evaluated the mean differences between the pre-test and post-test scores for the 2007-2008 tier 3 subgroup in Kindergarten (n = 17). SCOREDIF was the dependent variable and the two independent factors were pre-test tier and post-test tier. The results of the one-way analysis of variance were significant, $F(2, 15) = 55.28$, p = .00. Because the *p* value was less than .05, the null hypothesis was rejected: There is a significant

difference between pre-test scores and post-test scores among the tier 3 subgroup in

Kindergarten. The effect size of pairwise comparisons was large, η^2 =.88, and Levene's

Test of Equality of Error Variances lacked significance, p = .92, suggesting that

population variances were equal. Table 56 displays the descriptive statistics for the

analysis.

Table 56

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-Test and
Post-Test Tier Classification Among the 2007-2008 Tier 3 Student Sample in
Kindergarten

Descriptive Statistics for SCOREDIF and Pre-test and Post-test Tier Classification
Among the 2007-2008 Tier 3 Student Sample in Kindergarten

Fall Classification	Spring Classification	M	SD	N
Tier 3	Tier 1	78.75	7.07	1
	Tier 2	55.25	8.66	9
	Tier 3	24.40	12.03	7
	Total	57.24	25.33	17

Table 57 displays the results of the *ANOVA* analyzing the relationship between the

dependent variable and pre-test and post-test tier classification among the tier 3 student

sample in Kindergarten.

Table 57

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2007-2008 Tier 3 Student Sample in Kindergarten

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-test and Post-test Tier Classification Among the 2007-2008 Tier 3 Student Sample in Kindergarten

	SS	df	MS	F	p
Between Groups	9109.61	2	4554.80	55.28	.00
Within Groups	1153.45	15	82.39		
Total	10263.06	17			

*Interpret with caution.

The Scheffe post hoc test was not performed because at least one group had fewer than two cases (Tier 1: n = 1).

A one-way analysis of variance was conducted to evaluate the relationship between the dependent variable and pre-k experience. Results showed statistical significance between the mean scores of students with pre-k experience (n = 2), those without pre-k experience (n = 11), and for students whom the local division had no information (n = 7), $F(2, 15) = 5.71$, $p = .02$. The effect size of pairwise comparisons was large, $\eta^2 = .45$, and Levene's Test of Equality of Error Variances was not statistically significant, $p = .81$, suggesting that population variances were equal. Table 58 displays the descriptive statistics for the analysis.

Table 58

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Pre-K Experience Among the 2007-2008 Tier 3 Student Sample in Kindergarten

Descriptive Statistics for SCOREDIF and Pre-K Experience Among the 2007-2008 Tier 3 Student Sample in Kindergarten

	M	SD	N
2006-2007 Pre-K	38.00	18.38	2
No	69.36	19.58	11
Unspecified	33.50	22.22	4
Total	57.23	25.33	17

Table 59 presents the results of the *ANOVA* analyzing the relationship between the dependent variable and pre-k experience among the tier 3 student sample in Kindergarten.

Table 59

Results of the ANOVA Analyzing the Relationship Between the Dependent Variable, SCOREDIF, and Pre-K Experience Among the 2007-2008 Tier 3 Student Sample in Kindergarten

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-K Experience Among the 2007-2008 Tier 3 Student Sample in Kindergarten

	SS	df	MS	F	p
Between Groups	4611.51	2	2305.76	5.71	.02
Within Groups	5651.55	15	403.68		
Total	10263.06	17			

Table 60 shows the results of the Scheffe post hoc analysis.

Table 60

Results of the Scheffe Post Hoc Analysis Comparing Means Between the Dependent Variable, SCOREDIF, and Pre-K Experience Among the 2007-2008 Tier 3 Student Subgroup in Kindergarten

Results of the Scheffe Post Hoc Analysis Comparing Mean Differences Between the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2007-2008 Tier 3 Student Sample in Kindergarten

	(I) Fall Classification	(J) Spring Classification	Mean Difference (I-J)	Standard Error	p	95% Confidence Interval	
						Lower Bound	Upper Bound
Scheffe	2006-2007 Pre-K	No	31.36	15.44	.16	73.60	10.87
		Unspecified	4.50	17.40	.97	43.08	52.08
	No	2006-2007 Pre-K	31.36	15.44	.16	10.87	73.60
		Unspecified	35.86*	11.73	.03	3.78	67.94

* The mean difference is significant at the .05 level.

*Interpret findings cautiously.

The results of the Scheffe post hoc analysis were significant at the .05 level between students with no pre-k experience and for students whose information was unspecified ($MD = 35.86$, $SD = 11.73$, $p = .03$).

A one-way analysis of variance was performed to begin testing the second hypothesis ($Ho3_2$) of the third research question for year two: There is no significant difference between pre-test scores and post-test scores among the tier 3 student subgroup in

Grade 1. Because there was only a single case in the data set, no analyses were performed for the 2007-2008 tier 3 population in Grade 1.

An *ANOVA* was performed to begin testing the third hypothesis (Ho3$_3$) of the third research question for year two: There is no significant difference between pre-test scores and post-test scores among the tier 3 student subgroup in Grade 2. A one-way analysis of variance was conducted to determine the mean differences between the pre-test and post-test scores among the year two tier 3 population sample (n = 10). SCOREDIF was the dependent variable and the two independent factors were pre-test tier and post-test tier. Results showed no statistical significance, $F(1, 9) = .76, p = .41$, supporting the hypothesis that no significant differences existed between pre-test scores and post-test scores among the 2007-2008 tier 3 student subgroup in Grade 2. Table 61 displays the descriptive statistics for the analysis.

Table 61

Descriptive Statistics for the Dependent Variable, SCOREDIF, and Tier 3 Pre-Test and Post-Test Tier Classification Among the 2007-2008 Student Sample in Grade 2

Descriptive Statistics for SCOREDIF and Tier 3 Pre-test and Post-test Tier Classification Among the 2007-2008 Student Sample in Grade 2

Fall Classification	Spring Classification	M	SD	N
Tier 3	Tier 2	13.33	4.72	2
	Tier 3	9.00		8
	Total	12.90	4.65	10

Table 62 shows the results of the *ANOVA* analyzing the dependent variable,

SCOREDIF, and tier 3 pre-test and post-test tier classification among the student sample

in Grade 2.

Table 62

Results of the ANOVA Analyzing the Dependent Variable, SCOREDIF, and Pre-Test and Post-Test Tier Classification Among the 2007-2008 Tier 3 Student Sample in Grade 2

ANOVA Analyzing the Relationship Between SCOREDIF and Pre-test and Post-test Tier Classification Among the 2007-2008 Tier 3 Student Sample in Grade 2

	SS	df	MS	F	p
Between Groups	16.90	1	16.90	.76	.41
Within Groups	178.00	9	22.250		
Total	194.900	10			

*Interpret findings cautiously.

Summary

In this chapter, an analysis of the statistical methodology and results for the study's

three research questions and associated hypotheses were presented. Subjects of the two

year study consisted of 792 K-2 students attending a Reading First school in southeastern

Virginia. The quantitative analyses used by the researcher examined if statistical

significant differences in K-2 pre-test and post-test student scores were attributable to

Reading First's tier-three model of intervention during 2006-2007 and 2007-2008.

ANOVA's evaluated mean differences between pre-test and post-test scores using the

study's dependent measures, *K PALS* and *PALS 1-3*. Analyses of the independent

variables (pre-k experience, student tier classification, grade level, and year) on the

composite variable, SCOREDIF, were performed to evaluate significant differences

between students' pre-test and post-test performance. A summary and discussion of the

study's results along with conclusions and recommendations for practice and further

research are included in Chapter V.

Chapter V

SUMMARY, FINDINGS, AND FUTURE RESEARCH

Chapter I included an introduction to the study, statement of the problem, significance of the study, research questions, definitions of terms, delimitations, and limitations. Chapter II provided a historical perspective on federal reading policy and the impact of the legislative endeavors on student reading achievement. A comprehensive review of the literature as it relates to reading difficulties, scientifically based reading research, and early intervention were examined. Chapter II further explored features of the Reading First program impacting student reading achievement and teachers' reading instruction. Chapter III detailed the research design and methodology, and included information pertaining to the population sample, data collection strategies, instrumentation, and statistical analyses used in the study. Chapter IV reported results of data analyses concerning each of the study's three research question and associated hypotheses. Chapter V chapter presents an overview of the study, an analysis and clarification of the findings, study limitations, and recommendations for practice and future research.

Overview of the Study

Over the past 40 years, there have been intense and multidisciplinary efforts to understand the causes of reading difficulties and reading disabilities. These efforts have yielded a significant amount of knowledge related to behavioral, cognitive, genetic, and neurological characteristics of children who struggle to learn to read (Cutting & Denckla, 2006; Lyon, 1995; Shaywitz et al, 1992). Moreover, this knowledge has led to research and instructional insights which have revealed features of effective instruction that can prevent or remediate many reading difficulties (Denton et al., 2006; Lyon et al, 2005;

Denton, Vaughn, & Fletcher, 2003). The focus on prevention and early intervention efforts has become a pivotal initiative aimed at reducing the number of students who are not meeting grade level benchmarks in reading. Intervention research on early reading difficulties provides evidence that poor reading performance is not only modifiable but in many cases preventable (Denton & Hocker, 2006). Central to this approach is the assumption that for many students, reading achievement is alterable through timely, progressively more intensive instruction that relies on research-based instruction and formative assessment (Denton et al., 2006; Vaughan et al., 2007; Harn, Linan-Thompson, & Roberts, 2008).

Torgesen et al. (2001) examined the significance of early interventions implemented during the second half of kindergarten and extending through second grade. At the end of the study, the mean performance of the study sample was in the average range on all reading measures. The research by Berninger et al. (2002) examined the effect of intervention on at-risk readers in first grade. Eighty-four percent of the students who had received supplemental intervention were performing in the average range on a variety of literacy measures at the end of second grade. Foorman et al. (1997) investigated intervention practices for first and second grade students receiving Title I services. Their study suggested that phonetically explicit interventions (direct, systematic, and comprehensive instruction to build phonemic awareness and phonemic decoding skills) were more effective than interventions which were less phonetically explicit, particularly for the student population weakest in phonological and print related knowledge and skill. Eighty-two percent of the study sample demonstrated significant end-of-year reading improvement. The results of this research indicated that early instructional intervention

made a difference for the development and outcomes of reading skills in first and second grade children at-risk of reading failure.

Research by *NICHD* (2000) suggested increased reading skills for 90-95% of poor readers in the primary grades, if provided with prevention and early intervention programs combining instruction in phonemic awareness, phonics, spelling, reading fluency, and reading comprehension. The longitudinal study by O'Connor, Harty, & Fulmer (2005) examined the effectiveness of layers of intervention from kindergarten through third grade. "Of the students who continued to receive intervention beyond kindergarten, more than half were in the average range on reading measures by the end of second grade and needed no assistance to stay in the average band through third grade" (O'Connor, Harty, & Fulmer, p. 534).

Supporting the efficacy of early intervention research, the 2001 No Child Left Behind Act *(NCLB)* legislation endorsed an early reading program promoting the use of scientifically-based reading practices in grades K-3. Reading First was a federal initiative aimed at improving reading instruction and implementing programs and strategies grounded in scientifically-based reading research *(SBRR)* (Committee on Prevention of Reading Difficulties in Young Children, 1998; Snow, Burns, & Griffin, 1998; National Reading Panel, 2000; National Institute for Literacy, 2003). The legislation used a rigorous application and review process to distribute $10.4 billion dollars during a five year period to state and local education agencies for use in low-performing schools with well-conceived plans for improving the quality of reading instruction. Grant stipulations required funding to be applied to reading curricula and

professional development activities consistent with empirically-validated reading research (Moats, 2001; *USDOE*, 2002).

The tier three model of intervention promoted by Reading First was predicated on research findings that high-quality reading instruction and intervention in the primary grades significantly reduces the numbers of students who experience difficulties in later grades (Vaughn, 2000). With the 2004 reauthorization of the Federal Individuals with Disabilities Education Act (*IDEA*), The Office of Special Education Programs coordinated an investigation into the effectiveness of multiple tiers of reading intervention. The utility of empirical research indicated that increasingly intensive tiers of intervention held promise as a means of reducing the number of students at-risk for reading difficulties and provided insight into a prevention-oriented, school-wide model for identifying students with learning and behavior problems (Denton et al., 2006; Lyon et al., 2001; Vaughn, Gersten, & Chard, 2000; Kavale, Hirshoren, & Forness, 1998; Simmons et al., 2002; Vaughn, Linan-Thompson, & Hickman-Davis, 2003; Fuchs & Fuchs, 2005).

Interest in the multi-tiered design stemmed from concern over the increasing number of children diagnosed with learning disabilities. The number of children categorized as learning disabled nearly tripled, from 1.8 % of U.S. children in the late 1970s to 5.2% in the late 1990s (National Center for Learning Disabilities, 2002). Reading problems accounted for 80% of students in this category (National Center for Learning Disabilities, 2002). The potential benefits of the multi-tiered intervention model ensured that students experiencing educational difficulties received more judicious and efficacious support (Vaughn, Linan-Thompson, & Hickman-Davis, 2003; Fuchs & Fuchs, 2005).

The significance of this research is the generalizability of various indicators assessing the effectiveness of the Reading First program implementation. Evaluating student data compiled from 2006-2008 provides an analysis of student achievement trends among the K-2 student subgroups and correlations with evaluation criteria reported in the Interim Report of the Reading First Implementation Evaluation (*USDOE*, 2007) and the Final Reading First Impact Study (*USDOE*, 2008). Findings of the Interim Report were based on survey data compiled from 6,200 K-3 teachers, 1,570 principals and 1,320 reading coaches in nationally representative samples of 1,090 Reading First schools during the spring of 2006 (*USDOE*, 2007). The study sample for the Final Reading First Impact Study included: (1) 248 schools in 18 divisions within in 13 states; (2) 30,000 first through third grade students assessed during four observations; and, (3) 1,300 first and second grade classrooms observed during five observations (*USDOE*, 2008).

Key findings of the Interim Evaluation Report and the Final Reading First Impact Study Report included the following:

(1) Reading First produced a positive and statistically significant impact on the amount of instructional time spent on the five essential components of reading instruction promoted by the program (phonemic awareness, phonics, vocabulary, fluency, and comprehension) in grades one and two.

(2) Reading First produced positive and statistically significant impacts on multiple practices that are promoted by the program, including professional development in scientifically-based reading instruction, support from full-time reading coaches, amount of reading instruction, and supports available through for struggling readers implementing the tier three model of intervention.

(3) Reading First produced a positive and statistically significant impact on decoding among first grade students tested in one school year.

(4) Reading First did not produce a statistically significant impact on student reading achievement in kindergarten, or grades one, two or three during the course of the five year program (*USDOE*, 2008, p. 8).

Purpose and Research Design

The purpose of this study was to examine the effects of the Reading First program at an elementary school in southeastern Virginia and the extent to which site-based implementation guidelines impacted K-2 pre-test and post-test student reading achievement. The elementary site implemented the tier three model of intervention to strengthen the rigor and effectiveness of reading instruction for at-risk students, which, in turn, was intended to prevent chronic school failure. The initiative provided a comprehensive professional development process for effectively reforming the school's efforts to prevent reading difficulties for approximately 80% of the K-2 student population (Denton, Fletcher, & Vaughn, 2003).

The study afforded a pre-test/post-test regression discontinuity analysis of Reading First program efficacy using a quantitative evaluation of the tier three model of intervention impacting K-2 reading achievement. The research questions and associated hypotheses guiding this study included an analysis and clarification of the findings. Using the study's dependent measures, the Phonological Awareness Literacy Screenings, *K PALS* and *PALS 1-3*, the study examined differences in pre-test and post-test scores to determine statistical significance in literacy growth among the research sample. Subtest score ranges established by the local school division classified K-2 students as tier 1, meeting benchmark, tier 2, strategic, or tier 3, intensive. The researcher evaluated the mean differences between groups within the tier three model of intervention using an Analysis of Variance (*ANOVA*). Additional independent variables analyzed included pre-k experience, student tier classification, grade level, and year.

Findings

The results of 2006-2007 and 2007-2008 data analyses are presented by research

question and associated null hypotheses developed for statistical testing. Results of

significant relationships between pre-test and post-test scores and the study's independent

variables are reported for year one and year two tier 1, tier 2, and tier 3 student

subgroups in Kindergarten, Grade 1, and Grade 2.

Research Question One

To what extent did the evidence indicate a significant difference between pre-test

scores and post-test scores for tier 1 student subgroups?

Results of a one-way analysis of variance indicated an absence of statistical

significance between pre-test and post-test scores among the 2006-2007 tier 1 student

subgroup in Kindergarten. Significant differences existing between year one pre-test and

post-test scores were attributable to pre-k experience. No statistical significant

relationship existed between pre-test and post-test scores among the 2007-2008 tier 1

student sample in Kindergarten. Results showed statistical significance between pre-test

and post-test scores attributable to pre-k experience among the year two tier 1 student

subgroup in Kindergarten.

Results of an *ANOVA* conducted to examine pre-test and post-test scores among the

2006-2007 tier 1 student subgroup in Grade 1 were significant. Statistical significance

existed between pre-test and post-test scores among the year two tier 1 student sample in

Grade 1.

No significant difference existed between pre-test and post-test scores among the

2006-2007 tier 1 student subgroup in Grade 2. Findings indicated an absence of

statistical significance between pre-test and post-test scores among the year two tier 1 student sample in Grade 2.

<div align="center">Research Question Two</div>

To what extent did the evidence indicate a significant difference between pre-test scores and post-test scores for tier 2 student subgroups?

A statistical significant relationship existed between pre-test and post-test scores among the 2006-2007 tier 2 student subgroup in Kindergarten. Results showed no statistical significance between pre-test and post-test scores attributable to pre-k experience among the 2006-2007 tier 2 student sample in Kindergarten. Results of an *ANOVA* showed statistical significance between pre-test and post-test scores among the 2007-2008 tier 2 student subgroup in Kindergarten. Findings indicated an absence of statistical significance between pre-test and post-test scores attributable to pre-k experience among the 2007-2008 tier 2 student sample in Kindergarten.

Statistical significance existed between pre-test and post-test scores among the 2006-2007 tier 2 student subgroup in Grade 1. Results of an *ANOVA* indicated a significant difference between pre-test and post-test scores among the 2007-2008 tier 2 student sample in Grade 1.

Statistical significance existed between pre-test and post-test scores among the 2006-2007 tier 2 student subgroup in Grade 2. Findings of a one-way analysis of variance indicated a significant difference between pre-test and post-test scores among the 2007-2008 tier 2 student subgroup in Grade 2.

Research Question Three

To what extent did the evidence indicate a significant difference between pre-test scores and post-test scores for tier 3 student subgroups?

Results of an *ANOVA* showed statistical significance between pre-test and post-test scores among the 2006-2007 tier 3 student subgroup in Kindergarten. Findings indicated an absence of statistical significance between pre-test and post-test scores attributable to pre-k experience among the year one tier 3 student sample in Kindergarten. Statistical significance existed between pre-test and post-test scores among the 2007-2008 tier 3 student subgroup in Kindergarten. Results of a one-way analysis of variance indicated a significant difference between pre-test and post-test scores attributable to pre-k experience among the year two tier 3 student sample in Grade 1.

Findings indicated an absence of statistical significance between pre-test and post-test scores among the 2006-2007 tier 3 student subgroup in Grade 1. No analyses were performed for the 2007-2008 tier 3 student sample in Grade 1 because there was only a single case in the data set.

Results of an *ANOVA* showed no significant difference between the pre-test and post-test scores among the 2006-2007 tier 3 student subgroup in Grade 2. Findings indicated an absence of statistical significance between pre-test and post-test scores among the 2007-2008 tier 3 student sample in Grade 2.

Discussion

Research evidence has supported the efficacy of prevention and intervention efforts with young children identified at-risk for reading difficulties (Foorman, 2003; Lyon & Chhabra, 1996; Simmons et al., 2002; Mathes et al., 2005). Studies have

provided considerable guidance for research-based practices using a multi-tiered model of intervention that serves the early intervention and disability identification objectives of the tier three model of Reading First. The model is a comprehensive early detection and preventative strategy that identifies struggling readers and assists them before they fall behind their peers. Procedural systems combine universal screening and high quality instruction for all students with interventions targeted at struggling students. Variables of the tier three model, including the identification process, levels of intervention intensity, and duration of treatment are examined to evaluate the impact on student reading achievement.

The southeastern Virginia elementary school implemented the design, including the identification process, multi-tiered levels of intervention intensity and duration of treatment, to strengthen the rigor and effectiveness of reading instruction for at-risk students, which, in turn, was intended to prevent chronic school failure. The logic of the model was based on the tenet that all students received empirically validated reading instruction from which they benefited. Services were provided on a continuum and differentiated instruction was provided as needed.

Tier 1 Student Subgroups

Analyses for the 2006-2007 and 2007-2008 K-2 tier 1 student subgroups identified no statistically significant differences between pre-test and post-test student scores, with the exception of the year one and year two Grade 1 student samples. Statistical significance between pre-test and post-test student scores among the 2006-2007 and 2007-2008 student subgroups in Kindergarten was attributable to pre-k.

Study outcomes at the southeastern Virginia elementary school correspond to the findings of the Interim Reading First Implementation Evaluation (*USDOE*, 2007) and the Final Reading First Impact Study Report (*USDOE*, 2008). Each evaluation indicated a strong implementation of key components of the Reading First legislation, however, neither study provided a statistically significant correlation of the impact of the program on student reading achievement in grades K-2 (*USDOE*, 2007; *USDOE*, 2008; Center on Education Policy, 2008). There was no statistically significant relationship between the school's implementation of Reading First aligned activities and students' levels of reading performance.

Of the four composite measures related to activities aligned with Reading First strategies (classroom reading instruction, strategies to help struggling readers, participation in professional development and uses of assessment to inform instruction), only one, strategies to help struggling readers, was statistically significant (*USDOE*, 2007; *USDOE*, 2008; Center on Education Policy, 2008). This study's results of a significant relationship between pre-test and post-test scores among the 2006-2007 and 2007-2008 student subgroups in Grade 1 support the gains found among first grade students in the Final Reading First Impact Study Report (*USDOE*, 2008).

The primary mechanism through which the Reading First program was expected to affect positive changes in student achievement was by promoting the use of scientifically-based reading research (*SBRR*) in the classroom (*USDOE*, 2002). The legislation entailed the implementation of scientifically-based reading instruction through systematic, strategic, professional development (*USDOE*, 2002; *USDOE*, 2007; *USDOE*, 2008). The

federal grant required that Reading First schools employ an on-site reading coach to

prepare K-2 teachers to teach the essential components of reading instruction and support

the implementation of state policies regarding instructional programs, instructional

materials, strategies and assessments, and the tier three model of intervention (Center on

Education Policy, 2008). According to the North Central Regional Educational

Laboratory (2004b), the primary responsibility of reading coaches was supporting

professional development. Coaches were required to be knowledgeable about

empirically-validated reading methodologies, as well as the components of the core

program and supplemental materials in order to promote increased reading achievement

in their schools (*VDOE*, 2003). Coaching roles included the following:

> (a) providing technical assistance to administrators in the development of a
> strong literacy plan (i.e. master scheduling, intervention scheduling), (b)
> implementing and monitoring the scientifically-based reading research
> (*SBRR*) core program, (c) providing *SBRR* professional development
> opportunities that are tailored to the needs of the staff, (d) modeling
> effective strategies for implementing the five essential components of
> reading instruction, (e) demonstrating expertise in the range of formative
> and summative assessments required by Reading First for purposes of
> screening, diagnosis, and progress monitoring, (f) ensuring use of data for
> grouping students and instructional decisions based on *SBRR*, (g) ongoing
> monitoring of school-wide reading instruction and intervention practices, (h)
> consulting with teachers on a one-to-one basis or facilitating gradelevels in
> identifying areas of need, and, in learning strategies, assessments, classroom
> organizational and management practices, as well as Reading First program
> requirements, and (i) seeking ways to act as a bridge between the
> administration and the teachers in designing, developing, implementing, and
> evaluating the school's reading program (*USDOE*, 2002, p. 46).

The Reading First coach at the study site provided weekly K-2 professional

development sessions crafted to increase the capacity of teachers' knowledge of

SBRR. Title I literacy personnel and the reading coach provided extensive staff

development on the five components of effective reading instruction identified by the

NRP (2000): (1) phonemic awareness; (2) phonics; (3) vocabulary development; (4) reading fluency; and, (5) reading comprehension. Additional topics included best practices, progress monitoring, data analysis, differentiation, explicit intervention instruction, and developmental word study. Daily in-class coaching and modeling in K-2 classrooms was provided by the reading coach to assist teachers in the implementation of strategies provided during the professional development sessions. All K-2 faculties participated in Reading First Summer Reading Academies replicated from *A Blueprint for Professional Development for Teachers of Reading and Writing: Knowledge, Skills, and Learning Activities for Reading First Schools* (Moats, 2001).

Survey data compiled by reading coaches for the Interim Reading First Evaluation (*USDOE*, 2007) and the Final Reading First Impact Study Report (*USDOE*, 2008) indicated that K–2 teachers were knowledgeable about *SBRR*. During 2006–2007, teacher respondents in Reading First schools rated a higher proportion of scientifically-based teaching strategies and materials as central to their instruction (*USDOE*, 2007). An increased use of materials and strategies aligned with *SBRR* was coupled with teachers reporting increased participation in professional development in the five dimensions of reading instruction (phonemic awareness, phonics, vocabulary, fluency and comprehension) (*USDOE*, 2007; *USDOE*, 2008; Center on Education Policy, 2008).

These findings supported the research of Joyce and Showers (1995) suggesting that change and paradigm shifts require support and professional development in order to craft teachers' deep understanding of the theory surrounding the reading process as well as practical instructional practices to use in the classroom. According to their studies, 95% of teachers who received ongoing support from coaching were likely to learn and

implement new practices in the classroom (Joyce & Showers, 1995). Researchers from the Foundation for Comprehensive Early Literacy Learning (Swartz, 2003) reported a positive effect on student achievement linked to coaching. Moxley and Taylor (2006) suggested that coaching offer current, researched-based professional development while supporting sustainability of new practices by meeting with classroom teachers until there was evidence of successful implementation.

A core tenet of the Reading First program was to provide additional support to students who are struggling to learn to read. Research has documented that no single predictor appears more significant in school-wide reading success than well-trained teachers who apply current research to their classroom practices (Learning First Alliance, 2000; Snow, Burns, & Griffin, 1998). Empirical studies on preventing reading difficulties have correlated improved teaching and student achievement (Moats, 1999; Birman et al, 2000; Cunningham & Allington, 2003). A key premise Reading First's tier three model of intervention was the need to ensure that the first tier of reading instruction was exemplary. Primary intervention, provided by classroom teachers to all students in general education classrooms, is designed to serve the majority of students in a school and reduce the number of children who later become at-risk for reading problems (Good et al., 2002). Research findings have suggested that when systematic improvements are made to the first tier of instruction, substantial numbers of children are predicted to respond to this first tier of support, thereby reducing their risk for future reading difficulty (Vaughn, Linan-Thompson, & Hickman, 2003; Vellutino et al., 2003).

O'Connor, Harty, and Fulmer (2005) examined models of intervention that incorporated general classroom teachers as the first layer of intervention. "In these

studies, improvements in classroom teaching were brought about by ongoing professional

development for teachers with frequent measurement of students' reading progress"

(p. 533). The findings by O'Connor (2002) revealed a significant correlation among

several design variables: (1) ongoing professional development; (2) feedback to teachers

on students' progress; and, (3) a reduction in the numbers of poor readers in their sample.

Professional development at the elementary site on the tier three model of intervention

was grounded in the research of the Vaughn (2000). Key variables of the model,

including levels of intensity and duration of treatment, and the development of a

progress-monitoring system to track student growth were targeted by the reading coach

during monthly school-wide inservices, weekly K-2 professional development, and

weekly gradelevel planning.

The Final Reading First Impact Study Report (*USDOE*, 2008) reported the following

findings regarding the implementation of the tier three model of intervention from survey

data garnered during 2006-2007: (a) principals and reading coaches reported 97% of

classroom teachers provided direct instruction to struggling readers; (b) 99% of reading

coach respondents reported that classroom teachers provided additional practice

opportunities to meet the needs of struggling readers; (c) 92% of teacher respondents

reported providing additional practice in phonemic awareness, phonics, and fluency to

struggling readers; and, 84% of teachers reported using diagnostic assessments to

determine core deficits of struggling readers (*USDOE*, 2008). Connor et al. (2009)

examined how student reading growth varied by the degree to which teachers employed a

specific differentiation program during small group instruction. This differentiation

program relied on progress-monitoring assessments to make decisions on how to group,

regroup students, or about continuing, revising, or changing an area of emphasis. Student reading growth was higher for teachers who implemented the program with fidelity.

A Consumer's Guide to Evaluating a Core Reading Program in Grades K-3: A Critical Elements' Analysis (Simmons & Kameenui, 2003) evaluated potential core reading programs for the Reading First program. The findings by Fuchs, Fuchs, and Vaughan (2008) suggested that implementing evidence-based reading programs characterized by explicit and systematic reading instruction fostering both code-based and text-based strategies for phonological and phonemic awareness, word identification, and comprehension promoted student reading achievement. Substantial numbers of Reading First schools reported making changes to the instructional materials used in their reading programs (*USDOE*, 2007; *USDOE*, 2008; Center on Education Policy, 2008). During 2006–2007, results of survey data from a sample of Kindergarten teachers found that 92% of the respondents indicated *SBRR*-aligned phonemic awareness and phonics activities were central to their instruction (*USDOE*, 2007).

The fact that the findings of the Interim Reading First Implementation Evaluation (*USDOE*, 2007) and the Final Reading First Impact Study Report (*USDOE*, 2008) indicated no statistical significance between the implementation of several Reading First aligned activities (classroom reading instruction; participation in professional development; and, uses of assessment to inform instruction) and reading achievement may be a result of several factors. It may be that the relationship between reading performance and program implementation is stronger than was evident in the analyses, and the measures employed were insufficiently sensitive to accurately depict the true strength of the relationship. Alternatively, it may be the case that students need to be

exposed to more years of *SBRR* instruction aligned with Reading First before meaningful gains in their reading achievement are manifested.

During 2006-2007 and 2007-2008, significant differences existing between pre-test and post-test scores among the tier 1 Kindergarten student subgroups were attributable to pre-k experience. Research findings from longitudinal studies and program evaluations have embraced early education as an effective strategy to help ensure that all children are prepared to enter kindergarten, and able to achieve academic proficiency by the end of third grade (Gormley et al., 2005; Frede et al., 2009; Barrett et al., 2009). Evidence has shown that quality pre-k programs reduce the achievement gap between low-income students and their more affluent peers, thereby setting all children on a positive learning trajectory. Howes et al. (2008) found that children who attended pre-k had vocabulary scores 31% higher and math gains 42% higher than those not participating. In addition, sample participants with pre-k experience had an 85% increase in print awareness, suggesting that these outcomes strongly predict future reading success.

Tier 2 Student Subgroups

Analyses for 2006-2007 and 2007-2008 identified statistically significant differences between pre-test and post-test student scores among all K-2 tier 2 student subgroups. Study outcomes corresponded to syntheses findings which have provided considerable guidance for research-based practices serving the early intervention and disability identification objectives using the tier three model (Fuchs & Fuchs, 1998; Vaughn, Gersten, & Chard, 2000; Kavale & Simmons et al, 2002; Vaughn, Linan-Thompson, & Hickman-Davis, 2003). An underlying assumption of the tier three model is that there is a window of opportunity wherein reading difficulty is not only modifiable but in many

cases preventable (Fuchs, Fuchs, & Vaughn, 2006; Vellutino et al., 1996). Evidence

suggests a differential and positive benefit of intervention that begins prior to first grade

(O'Connor, Harty, & Fulmer, 2005; O'Connor, 2000; Simmons et al., 2001 Compton et

al., 2006; Juel, 1988; Phillips et al., 2002).

Within tier 2, students not making adequate progress in the core curriculum are

provided with increasingly intensive instruction matched to their needs on the basis of

levels of performance and rates of progress. The supplemental instruction provided

during secondary intervention provides programs, strategies, and practices designed and

employed to enhance and support primary prevention for those students identified with

marked difficulties (Denton, Fletcher, & Vaughn, 2003). Empirical studies have

provided evidence that the majority of students eligible for secondary prevention benefit

from a well-designed, structured intervention program (Vaughn, Linan-Thompson, &

Hickman-Davis, 2003; Simmons et al., 2002; Fuchs et al., 2006).

Fuchs et al. (2006) reviewed existing studies of secondary interventions in beginning

reading and analyzed the effects of students' responses to intervention as demonstrated

by subsequent reading achievement. Their findings demonstrated that the intervention

was effective across four large urban school districts, suggesting a correlation between

the intervention condition and the observed improvement in student performance. The

research of Vaughn, Linan-Thompson, and Hickman-Davis (2003) indicated that students

receiving more intensive intervention made significantly more progress across a range of

early reading measures.

Secondary intervention consisted of more intensive, systematic, and explicit

instruction during which students' progress was closely monitored. The Reading First

coach provided professional development implementing a three week progress monitoring cycle which fulfilled two main goal of the tier three model: (1) an ongoing assessment of students' academic progress, and (2) an evaluation of the effectiveness of intervention. Both purposes emphasized the accountability endeavor and roles of the classroom teacher and literacy personnel collecting formative assessment data. A tool kit of progress-monitoring assessments which were administered to track tier 2 student growth on specific areas of deficiency during the three week cycle was collated by the reading coach.

Secondary intervention at the elementary school included double dosing tier 2 students with a small group interventionist/student ratio of 1:6 due to limited resource personnel; a frequency of intervention three days/week for 20 minutes/day lasting approximately 50 sessions; and, a three week progress-monitoring cycle on target skills using diagnostic assessments to determine which students were making adequate progress (i.e., were responsive to secondary prevention within approximately 12 weeks or 50 hours) (Vaughn, Linan-Thompson, & Hickman-Davis, 2003). Tier 2 students received their initial instruction from the classroom teacher through whole group shared reading. This instruction covered current material and reviewed a specific focus skill that was a deficit based on the most current data. The second round of instruction was in the form of small group instruction with the classroom teacher. The instructional format followed explicit strategy instruction and application, with a differentiated approach for students based on the most current data. The third round of instruction was provided by literacy or special education personnel. This block of time was designated explicitly for skill instruction and practice to target the deficits that were reflected in the data, commonly a heavy emphasis

on phonemic awareness, phonics, and word recognition.

Collaboration among interventionists and classroom teachers utilized available evidence about the progress-monitoring assessments and literacy instruction of students receiving tier 2 services. This process required a shared vision and common goals for language and literacy instruction, in addition to adequate time for communication and coordinated planning. Rotation schedules made by the reading coach and literacy teachers reflected the double dosing schedule of identified students and exit/entry of students based on diagnostic assessments. The challenge implementing an effective tier three model implementation was to ensure that efforts to strengthen the rigor and effectiveness of reading instruction for tier 2 students was sustained by the principles of procedural fidelity and differential effects of intervention intensity and duration.

According to the results of the Final Reading First Impact Study Report (*USDOE*, 2008), 40% of Reading First teacher survey respondents reported that they had added new intervention programs for struggling readers during 2006–2007. Similar to practices at the research site, survey respondents reported that they increased their level of effort to help struggling readers through use of diagnostic assessments to identify struggling readers and by placing these students in intervention programs. Data compiled from the Final Reading First Impact Study Report (*USDOE*, 2008) reported: (1) 99% of principals in the study sample reported using diagnostic tests, progress-monitoring tests, and teacher recommendations to identify students for reading interventions; (2) 99% of principal respondents reported using progress-monitoring systems; (3) 89% of reading coaches reported that reading intervention materials were aligned with scientifically-based reading research; and, (4) 70% of teachers reported that time was set aside to

coordinate their reading activities with literacy personnel.

Statistical significance between pre-test and post-test scores among the tier 2 student subgroups in Grade 1 and Grade 2 during year one and year two were likely due to the implementation of word study during 2006-2007. In additional to becoming an integral component of small group instruction differentiated by the classroom teacher, literacy personnel provided explicit word study instruction to tier 2 students during their double dose of intervention. Collaborative dialogue of anecdotal note observations between the classroom teacher and literacy teacher was essential. Instructional dialogue during professional development regarding evidence of student mastery or need for re-teaching offered encouragement to the potential for continued student progress during the school year if levels of duration and intensity were feasible.

Tier 3 Student Subgroups

Analyses for the 2006-2007 and 2007-2008 K-2 tier 3 student subgroups identified no statistically significant differences between pre-test and post-test student scores, with the exception of the year one and year two Kindergarten student samples. Findings at the southeastern Virginia elementary school demonstrated a significant reduction in K-2 tier 3 student participants, linking the impact of secondary and tertiary interventions at the study site to current research studies (Vaughn, Wanzek, & Fletcher, 2007; Vaughn, Linan-Thompson, & Hickman-Davis, 2003; Vaughn, Blair, & Wanzek, 2004).

Tertiary intervention was designed and customized specifically for students who continued to have marked difficulties in reading or reading disabilities, despite primary and secondary intervention efforts, typically 5% of K-2 students (Denton, Fletcher, & Vaughn, 2003; Simmons et al., 2002). Tier 3 intervention at the elementary school

included triple dosing tier 3 students with a small group interventionist/student ratio of 1:3; a level of intervention frequency four days/week for 60 minutes/day; and, a two week progress-monitoring cycle on target skills using diagnostic assessments. Tier 3 students received their initial instruction from the classroom teacher through whole group shared reading. This instruction covered current material and reviewed a specific focus skill that was a deficit based on the most current data. The second round of instruction was in the form of small group instruction with the classroom teacher. Instruction followed explicit strategy instruction and application, with a differentiated approach for students based on the available data. The third round of instruction was provided by literacy or special education personnel. This block of time was designated explicitly for skill instruction and practice to target the severe deficits that were reflected in the data, commonly a heavy emphasis on phonemic awareness, phonics, and word recognition. The fourth round of instruction was also provided by a literacy or special education personnel. This block of time was also designated for explicit skill instruction of severe deficits reflected in the data.

Vaughn, Wanzek, and Fletcher (2007) investigated the effectiveness of tertiary intervention on first grade students' responses to reading intervention and placement in special education services. Higher responders received 13 to 26 weeks of secondary intervention for 30 minutes daily. Instruction was provided in group sizes of 4 to 6 students with one interventionist hired and trained by the research team. Low responders were provided a tertiary intervention (100 sessions, approximately 26 weeks) in second grade. The tertiary intervention was more intensive: (1) group size = 2 to 4; and, (2) the duration of daily intervention averaged 50 minutes daily with a tutor trained and supervised by the research team. The effectiveness of tertiary intervention was assessed

using the regression-discontinuity research design to determine if a main effect existed

for the intervention. A significant program effect was found for pre-test and post-test

achievement scores. Students who remained unresponsive during tier 3 intervention were

evaluated by a multidisciplinary team to determine if special education screening was

warranted. Examining the variables of attendance, socio-economic status, and English

language learner classification, in addition to the lack of response to research-based

interventions, assisted the referral process of identifying which students required special

education services (Vaughn, Wanzek, & Fletcher, 2007).

Implications for Instructional Practice

In September 2003, Reading First grant eligibility for the Commonwealth of

Virginia was based upon the following criteria according to standards established by the

Virginia Board of Education: (1) all eligible schools were identified as Title I schools;

(2) each Title I school was Provisionally Accredited with Warning/Needs Improvement

in English; (3) eligible schools had a pass rate of less than 60% on the 2001 Third Grade

English Standards Of Learning (*SOL*) Test; and, 4) eligible schools had a poverty index

of at least 40% as defined by Virginia's Elementary and Secondary Education Act

(*ESEA*) (P.L. 107-110), No Child Left Behind Consolidated Plan (*USDOE*, 2002; Bush,

2001).

The National Center for Children in Poverty expressed the need for additional

research to determine the type, amount, and combination of education and professional

development training that would lead to increased achievement for low-income children

(Klein & Knitzer, 2007). Little and Houston (2003) suggested that educational change

occurred for high-poverty low-performing schools when the following behaviors were

observable: (1) change was directly related to issues to be solved within the classroom; (2) coaching support was provided for quality implementation; and (3) change was directly related to student achievement. The vision of linking student literacy achievement to changes in teacher's literacy practices supported empirical studies on preventing reading difficulties which correlated improved teaching and student achievement (Moats, 1999; Birman et al, 2000; Cunningham & Allington, 2003).

The Reading First initiative supported instructional practices that were identified by the National Reading Panel's systematic review of reading research as effective, scientifically-based strategies for teaching reading. The ultimate goal of the federal initiative was to improve reading achievement among K-3 students by increasing classroom teachers' use of research-based instructional practices in reading. Findings from the Interim Reading First Implementation Evaluation (*USDOE*, 2007) demonstrated that the federal initiative increased the provision of professional development for teachers, reading coaches, and supports for struggling readers in schools that received funding. Results of evaluation data (*USDOE*, 2007) indicated the program influenced teachers' classroom reading instruction using the five components of effective reading instruction (phonemic awareness, phonics, vocabulary, fluency and comprehension) aligned with *SBRR*, a key goal of the legislation.

The results of the Final Reading First Impact Study Report (*USDOE*, 2008) suggested that the ultimate goal of improving student reading achievement was not accomplished by the federal initiative. Similarly, statistical analyses of the current study examining the impact of the tier three intervention program of Reading First could not link significant measurable effects of tier 1 K-2 pre-test and post-test scores to the multi-

tiered model. As new analyses shed more light on the relationship between impacts on instruction and scientifically-based reading research and effects on student achievement, the current state of knowledge suggests:

1. The findings of the National Reading Panel (2000) which reflect a meta-analysis of research studies, remain the best available evidence about how to teach reading effectively to young children.

2. Changing teachers' instructional practices to include the core components of scientifically-based reading instruction can be attainable with professional development resources which support the sustainability of new practices.

Limitations of Study

Several limitations may have contributed to the results and conclusions described in this study.

1. The generalizability of the study was likely affected due to the setting being limited to one Reading First school.

2. Selection of the Reading First site was based on the researcher's position as the Reading First coach at the study site.

3. Implementation variables of the tier three model were hampered by local funding resources limiting adequate literacy personnel to serve the K-2 tier 2 and tier 3 population subgroups at the elementary school.

4. Analyses performed for 2006-2007 and 2007-2008 tier 2 and tier 3 student samples were likely compromised due to the limited numbers of cases in each student subgroup.

5. The Virginia Department of Education (*VDOE*) designated State Reading

   Specialists to oversee and facilitate the administration of grants, communication,

   and legislation for the Reading First program. Five *VDOE* State Reading

   Specialists served the evaluation site throughout the course of the grant. Based on

   differences in training and experience, their evaluative styles encompassed

   diverse perceptions about the primary purposes of the Reading First program

   processes with differing site expectations for program participants.

6. Site-based attrition factors affecting the reliability and validity of the current

   research included: (1) a new building principal appointed in July 2006; (2) new

   K-2 teachers assigned to the school throughout the course of the two year study

   requiring intensive Reading First professional development; and, (3) student

   mobility patterns.

7. The lack of available literature and longitudinal data to measure the impact of

   Reading First on student reading achievement may have been a flaw in the federal

   government's pre-planning phase of the initiative.

Recommendations for Future Research

Future research to study K-2 student achievement specific to federally funded reading

legislation implementing the tier three model of intervention address some of the

limitations of the current study.

1. The available evidence garnered from research findings on the tier three model

   of Reading First does not address whether the needs of students unresponsive to

   treatment were ultimately being met through the use of research-based, high

   quality materials and instructional strategies. Investigate the features of early

intervention that should be in place to maximize the learning of children unresponsive to treatment.

2. Because reading research has been embroiled in the political landscape for the last 30 years, research scientists must expend greater effort ensuring their studies become accessible to the public in order to have an impact on the use of federal funding.

3. To examine student achievement specific to federally funded reading initiatives, evaluation directives should consider including rigorous, quantitative research investigations of demonstrated student achievement gains, rather than garnering qualitative survey data assessing the effectiveness of site-based program implementations.

4. Reading First required the implementation of a program based on the scientific research summarized in the report findings of the National Reading Panel (2000) and Preventing Reading Difficulties in Young Children (Snow, Burns, & Griffin, 1998). In the future, federally funded reading initiatives may consider reflecting a wide range of researchers and practitioners, drawing on information from a relatively broad spectrum of research and promising practices (Pressley et al., 2007).

Summary

An examination of the implementation of the Reading First program at a southeastern Virginia elementary school during 2006-2007 and 2007-2008 formed the basis of this research. Key findings include the following: (1) a strong implementation of key components of the legislation at the research site; (2) an increased provision for

professional development focusing on the five components of effective reading instruction; (3) the use of *SBRR* to inform and change teachers' reading instruction; (4) the implementation of the tier three model of intervention to improve students' literacy achievement; (5) a significant difference between pre-test and post-test student scores among 2006-2007 and 2007-2008 tier 2 student subgroups in Kindergarten, Grade 1, and Grade 2; (6) statistical significance between pre-test and post-test scores among the 2006-2007 and 2007-2008 tier 1 student subgroup in Grade 1; and, (7) a significant difference between pre-test and post-test student scores among the 2006-2007 and 2007-2008 tier 3 student subgroups in Kindergarten.

Results of analyses between pre-test and post-test scores among 2006-2007 and 2007-2008 year tier 1 student subgroups in Kindergarten and Grade 2 lacked statistical significance. Findings of the current study concurred with similar research findings on Reading First compiled by the Interim Implementation Evaluation (*USDOE*, 2007), the Final Impact Study Report (*USDOE*, 2008), and the Institute of Education Sciences (*IES*) at the U.S. Department of Education (Gamse et al., 2008). Analyses indicated no statistical significance between the implementation of several Reading First aligned activities (classroom reading instruction; participation in professional development; and, uses of assessment to inform instruction) and student reading achievement (*USDOE*, 2007; *USDOE*, 2008; Center on Education Policy, 2008; Gamse et al., 2008). Only the strategy to assist struggling readers was statistically significant (*USDOE*, 2007; *USDOE*, 2008; Center on Education Policy, 2008).

Federal, state, and local policymakers face critical choices about how to best use federal funding to support early reading instruction and achievement. The focus on

student achievement emphasizes the political nature of literacy achievement. Because the federal government provides substantial financial support to state governments for funding reading initiatives, it is necessary to explore efficient means to measure the impact of student reading achievement. Use of effect sizes can be combined with other data, such as cost, to provide a measure of cost-effectiveness. This is a question the U.S. Department of Education must weigh, having allocated over $10.4 billion in federal funding promoting the Reading First initiative to improve the quality of reading instruction in low-performing schools for grades K-3.

K-2 faculties at the research site implemented the tier three model of intervention including the identification process, multi-tiered levels of intervention intensity, and duration of treatment throughout the current study. Efforts to strengthen the rigor and effectiveness of reading instruction for all students provided a comprehensive professional development initiative which directly addressed questions related to sustaining educational innovations. According to federal Reading First guidelines, continued grant funding for schools was predicated by the demonstration of significant progress toward the goal that all children learn to read by the end of third grade. The articulated mission and vision statements at the Reading First school addressed the urgency of closing achievement gaps for all student subgroups.

References

A Nation at Risk. Retrieved on June 17, 2008 from www.ed.gov.pubs/AatAtRisk.html.

Adams, M. (1990). *Beginning to read: Thinking and learning about print.* Cambridge,

MA: MIT Press.

Allington, R. (1999). Critical issues: Crafting state educational policy: The slippery role

of research and researchers. *Journal of Literacy Research, 31,* 457-482.

Allington, R. (2000). *What really matters for struggling readers.* New York:

Longman.

Al Otaiba, S., Kosanovich-Grek, M. L., Torgesen, J. K., Hassler, L., & Wahl, M. (2005).

Reviewing core kindergarten and first-grade reading programs in light of No Child

Left Behind: An exploratory study. *Reading & Writing Quarterly, 21*(4), 377–400.

American Psychological Association (2005). Publication manual of the American

Psychological Association, *5ᵗʰ ed.* Washington, DC: American Psychological

Association.

Angrist, J. D., & Lavy, V. (1999). Using Maimonide's rule to estimate the effect of class

size on scholastic achievement. *The Quarterly Journal of Economics, 114*(2), 533-

575.

Atlanta Public Schools. (1981). *A Study of the Longitudinal Effects of the Title I Reading

Component from 1976 through 1980.* (ERIC No. ED 210 355).

Becoming a Nation of Readers: The Report of the Commission on Reading. (1985).

National Academy of Education, National Institute of Education, and Center for the

Study of Reading. Washington, DC: U.S. Department of Education.

Bennett, W. J. (1987). *First Lessons.* Washington, DC: U.S. Department of Education.

Birman, B. F., Desimone, L., Porter, A. C., & Garet, M. S. (2000). Designing

professional development that works. *Educational Leadership, 57*(8), 28-33.

Borman, G. D., D'Agnostina, Jerome, V. (1995, April). *Title I and Student Achievement:*

A Meta-analysis of 30 years of Test Results. Paper presented at the Annual Meeting of

the American Educational Research Association, San Francisco, CA.

Boyle, B., While, D., & Boyle, T. (2004). A longitudinal study of teacher change.: What

makes professional development effective? The *Curriculum Journal, 15*(1), 45-68.

Boyle, B., While, D., & Boyle, T. (2005). A longitudinal study of teacher change.: What

makes professional development effective? Report of the second year of the study.

School Effectiveness and School Improvement, 16(1), 1-27.

Bush, G.W. (2001). *No Child Left Behind: Improving Literacy by Putting Reading First.*

Washington, DC: U.S. Government Printing Office. Retrieved June 24, 2004 from

www.whitehouse.gov/news/reports/no-child-left-behind.

Center on Education Policy (2008). *Instructional time in elementary schools: A closer*

look at changes for specific subjects. Series Report: From the Capital to the

Classroom: Year 5 of the No Child Left Behind Act. Washington DC.

Chall, J. (1967). *Reading: The great debate.* New York: McGraw-Hill.

Chall, J. S. (1983). *Learning to read: The great debate.* New York, NY: McGraw-Hill.

Clay, M.M. (1966). *Emergent Reading Behavior.* Unpublished doctoral dissertation,

University of Auckland, New Zealand.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences, 2nd ed.*

Hillsdale, NJ: Erlbaum.

Coleman, J. S., Ernest Q. C., Carol, J. H., McPartland, J., Mood, A. M., Weinfeld, F. D.,

Robert, L., & York, R. L.(1966). *Equality of educational opportunity*. Washington,

DC: U.S. Government Printing Office.

Coleman, J. (1979). *Equality of educational opportunity*. Washington, DC: U.S.

Government Printing Office.

Committee on Labor and Human Resources. (1998). *Reading excellence act.*

Washington, D.C.

Committee on Prevention of Reading Difficulties in Young Children. Snow, C. E.,

Burns, M. S., Griffin, P., & NetLibrary, Inc. (1998). *Preventing reading difficulties*

in young children. Washington, DC: National Academy Press.

Connor, C. M., Piasta, S. B., Fishman, B., Glasney, S., Schatschneider, C., Crowe, E.,

Underwood, P., & Morrison, F. J. (2009). Individualizing student instruction

precisely: Effects of child and instruction interactions on first graders' literacy

development. *Child Development, 80*(1), 77-100.

Coyne, M. D., Kameenui, E. J., & Simmons, D. C. (2001). Prevention and intervention in

beginning reading: Two complex systems. *Learning Disabilities Research and*

Practice, 16(2), 62-73.

Cunningham, J.W. (2001). The national reading panel report. *Research Reading*

Quarterly, 36(3), 326-333.

Cunningham, P., & Allington, R. (2003). *Classrooms that work: They can all read and*

write, 3rd ed. Boston: Allyn & Bacon.

Cutting, L. E., & Denckla, M. B. (2006). Attention: Relationships between attention

   deficit hyperactivity disorder and learning disabilities. In L. Swanson, K. Harris, &

   S. Graham (Eds.), *Handbook of Learning Disabilities* (pp. 125 -139). New York:

   Guilford.

Darling-Hammond, L., & Sykes, G. (2003, September 17). Wanted: A national teacher

   supply policy for education: The right way to meet the "Highly Qualified Teacher"

   challenge. *Education Policy Analysis Archives, 11*(33). Retrieved March 23, 2009

   from http://epaa.asu.edu/epaa/v11n33/.

Davis, C. J., Knopik, V. S., Olson, R. K., Wadsworth, S. J., & DeFries, J. C. (2001).

   Genetic and environmental influences on rapid naming and reading ability: A twin

   study. *Annals of Dyslexia, 51*, 231-247.

Denton, C. A., Vaughn, S., & Fletcher, J. M. (2003). Bringing research-based practice in

   reading intervention to scale. *Learning Disabilities Research and Practice, 18*(3),

   201–211.

Denton, C. A., Fletcher, J. M., Anthony, J. L., & Francis, D. (2006). An evaluation of

   intensive interventions for students with persistent reading difficulties. *Journal of

   Learning Disabilities, 39*(5), 447-466.

Donahue, P. L., Voelkl, K. E., Campbell, J. R., & Mazzeo. J. (1999). *The NAEP 1998

   reading report card for the nation and the states.* Washington, DC: U.S. Department

   of Education.

Durkin, D. (1979). What classroom observations reveal about reading comprehension.

   Reading Research Quarterly, 14(4), 481-533.

Durkin, D. (1989). *Teaching Then To Read, 5th ed.* Boston; Allyn & Bacon.

Edmonds, R. (1979). Effective schools for the urban poor. *Educational Leadership,*
37(1), 15-18.

Fixen, D., Blase, K. A., Friedman, R. M., & Wallace, F. (2005). *Implementation*
research: A synthesis of literature. Tampa: University of South Florida, Louis de la
Parte Florida Mental Health Institute, National Implementation Research Network.
Retrieved July 20, 1010, from http://www.fpg.unc.edu/sisep/docs/Concept Paper
SISEP 0409 web.pdf

Foorman, B. R., Francis, D. J., Winikates, D., Mehta, P., Schatschneider, C., & Fletcher,
M. (1997). Early interventions with childrens' disabilities. *Scientific Studies of*
Reading, 1(3), 255-276.

Foorman, B. R. (2003). *Preventing and remediating reading difficulties: Bringing*
science to scale. Baltimore: York Press.

Frede, E., Jung, K., Barnett, W. S., Lamy, C. E., & Dunn, L. M. (2009). *The Abbott*
Preschool Program Longitudinal Effects Study (APPLES). New Brunswick, NJ:
National Institute for Early Education Research, Rutgers University.

Fuchs, L. S., & Fuchs, D. (1998). Treatment validity: A unifying concept for
reconceptualizing the identification of learning disabilities. *Learning Disabilities*
Research and Practice, 13(4), 204-219.

Fuchs, D., & Fuchs, L. S. (2005). Responsiveness-to-intervention: A blueprint for
practitioners, policymakers, and parents. *Teaching Exceptional Children, 38*(1), 57-
61.

Gamse, B. C., Bloom, H. S., Kemple, J. J., Jacob, R. T. (2008). *Reading First Impact Study: Interim Report* (NCEE 2008-4016). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

Gillies, W. D. (1995). Program evaluation for school improvement: Guidelines for school administrators. National association of secondary school principals. *NASSP Bulletin, 79*(5), 76-82.

Goals 2000: Educate America Act, Pub. L. No. 103-227. 103rd Congress, 2nd session (March 31, 1994).

Goals 2000 and the Standards Movement. In Diane Ravitch (Ed.), *Brookings Papers on Education Policy: 2000* (pp. 169-190). Washington, DC: Brookings Institution.

Good, R. H., Simmons, D. C., & Smith, S. (1998). Effective academic intervention in the United States: Evaluating and enhancing the acquisition of early reading skills. *School Psychology Review, 27*(1), 45-56.

Good, R. H., Kameenui, E. J., Simmons, D. S., & Chard, D. J. (2002). *Focus and nature of primary, secondary, and tertiary prevention: The CIRCUITS model* (Tech. Rep. No. 1). Eugene: University of Oregon, College of Education, Institute for the Development of Educational Achievement.

Gormley, W., Gayer, T., Phillips, D., & Dawson, B. (2005). The effects of universal pre-k on cognitive development. *Developmental Psychology, 41*(6), 872-884.

Grigg, W. S., Daane, M. C., Jin, Y., & Campbell, J. R. (2003). *The nation's report card: Reading 2002*. Washington, DC: U.S. Department of Education, Institute of Education Sciences.

Grissmer, D., Flanagan, A., Kawata, J., & Williamson, S. (2000). *Improving student achievement: What NAEP state test scores tell us*. Santa Monica, CA: RAND.

Hahn, J., Todd. P., & Van Der Klaauw, W. (2001). Identification and estimation of treatment effects with a regression-discontinuity design. *Econometrica, 69*(1), 201-209.

Hatch, T. (1998). The differences in theory that matter in the practice of school improvement. *American Educational Research Journal, 35*(1), 3-32.

Howes, C., Vu, J. A., & Jeon, H. (2008). Formal education, credential or both: Early childhood program classroom practices. *Early Education and Development, 19*(3), 479-504.

Invernizzi, M., Meier, J., & Juel, C. (2003). *Phonological awareness literacy screening (K PALS and PALS 1-3)*. Charlottesville, VA: Curry Schools of Education, University of Virginia Press.

Invernizzi, M., Meier, J., Swank, L., Juel, C. (2004). *PALS technical reference (K PALS and PALS 1-3)*. Charlottesville, VA: Curry Schools of Education, University of Virginia Press.

Jenkins, J. R. (2003, December). *Candidate Measures for Screening At-risk Students*. Paper presented at the National Research Center on Learning Disabilities Responsiveness To Intervention Symposium, Kansas City, MO. Retrieved May 15, 2008, from http://www.nrcld.org/symposium2003/jenkins/index.html.

Jenkins, J. R., Hudson, R. F., & Johnson, E. S. (2007). Screening for at-risk readers in a response to intervention framework. *School Psychology Review, 36*(4), 582-600.

Johnson, S. M. (2002). The politics of researching comprehensive school reform efforts. *Peabody Journal of Education, 77*(4), 176-188.

Joyce, B., & Showers, B. (1995). *Student achievement through staff development.* White Plains, NY. Longman.

Juel, C. (1988). Learning to read and write: A longitudinal study of 54 children from first through fourth grades. *Journal of Educational Psychology, 80*(4), 437-447.

Juel, C. (1991). Cross-age tutoring between student athletes and at-risk children. *The Reading Teacher, 45*(3), 178-186.

Justice, L. M., Invernizzi, M., Geller, K., Sullivan, A. K., & Welsch, J. (2004). Descriptive development performance of at-risk preschoolers on early literacy tasks. *Reading Psychology, 26*(1), 1-25.

Kavale, K. A., Hirshoren, A., & Forness, S. R. (1998). Meta-analytic validation of the Dunn and Dunn model of learning-style preferences. *Learning Disabilities Research and Practice, 13*(2), 75-80.

Klein L., & Knitzer, J. (2007, January). *Promoting Effective Early Learning: What Every Policymaker and Educator Should Know.* New York: Columbia University, Mailman School of Public Health.

Langenberg, D. N., & Associates. (2000). *Report of the National Reading Panel: Teaching students to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups.* Bethesda, MD: National Institute of Child Health and Human Development, National Institutes of Health.

Leana, C. R., & Pil, F. K. (May-June 2006). Social Capital and organizational performance: Evidence from urban public schools. *Organizational Science, 17*(3), 353-366.

Learning First Alliance. (2000). *Every child reading: A professional development guide.* Alexandria, VA: ASCD.

Lee, E., McNally, D. L., Zuckerman, I. H. (2004). Evaluation of a physician-focused educational intervention on Medicaid children with asthma. *Annals of Pharmacotherapy, 38*(6), 961–966.

Lee, D. S., & Mas, A. (2008, July). *Long-run Impacts of Unions on Firms: New Evidence from Financial Markets, 1969-1999.* Unpublished Working Paper, Princeton University. Presented at the National Bureau of Economic Research Summer Institute.

Leggett, D., & Hoyle, S. (1987). Peer coaching: One district's experience using teachers as staff developers. *The Journal of Staff Development. 8*(1), 16-21.

Leake, M., & Lesik, S. A. (2007). Do remedial English programs impact first-year success in college? An illustration of the regression-discontinuity design. *International Journal of Research and Method in Education, 30*(1), 89 – 99.

Lesik, S. A. (2006). Applying the regression-discontinuity design to infer casuality with non-random assignment. *Review of Higher Education, 30*, 1-19.

LeTendre, M. J. (1991). The continuing evolution of a federal role in compensatory education. *Educational Evaluation and Policy Analysis, 13*(4), 328–334.

Little, M. E., & Houston, D. (2003). Research into practice through professional development. *Remedial and Special Education, 24*(2), 75-87.

Linn, R. L., & Gronlund, N. E. (1998). *Measurement and assessment in teaching.* Columbus, OH: Merrill.

Lyon, G. R. (1995). Toward a definition of dyslexia. *Annals of Dyslexia, 45*(3), 3-27.

Lyon, G. R., Fletcher, J. M., Fuchs, L. S., & Chhabra, V. (2000). Learning Disabilities. In E. Mash and R. Barkley (Eds.) *Treatment of childhood disorders (2nd ed.).* New York: Guilford.

Lyon, G. R. (2001). Measuring Success: Using assessments and accountability to raise student achievement. In *The National Right to Read Foundation:* March 8, 2001. Subcommittee on Education Reform Committee on Education and the Workforce, U.S. House of Representatives, Washington, DC.

Matsuma, L. C., Slater, S. C., Wolf, M. K., Crosson, A., Levison, A., Peterson, M., Resnick, L. (2006). *Using the Instructional Quality Assessment Toolkit to Investigate the Quality of Reading Comprehension Assignments* (CSE Technical Report #669). Los Angeles: University of California, National Center for Research on Evaluation, Standards, and Student Testing.

McGill-Franzen, A., & Allington, R. L. (1991). The gridlock of low-achievement: Perspectives on practice and policy. *Remedial and Special Education, 12*(3), 20–30.

Moats, L. C. (1999). *Teaching reading is rocket science: What expert teachers of reading should know and be able to do.* Washington, DC: American Federation of Teachers.

Moats, L. C. (2001, October). *A Blueprint for Professional Development for Teachers of Reading and Writing: Knowledge, Skills, and Learning Activities.* Presentation at the Symposium on the National Reading Panel Report and Teacher Presentation. Los Angeles, CA.

Moxley, D. E., & Taylor, R. T. (2006). *Literacy coaching: A handbook for school leaders.* Thousand Oaks, CA: Corbin Press.

Myers, J. (1992). The social contexts of school and personal literacy. *Reading Research Quarterly, 27*(4), 297-332.

National Assessment of Educational Progress (1994). *Report card for the nation and the states.* National Center for Education Statistics. Washington, DC: U.S. Department of Education.

National Assessment of Educational Progress (1998). *Report card for the nation and the states.* National Center for Education Statistics. Washington, DC: U.S. Department of Education.

National Assessment of Educational Progress (2003). *Report card for the nation and the states.* National Center for Education Statistics. Washington, DC: U.S. Department of Education.

National Bureau of Economic Research. (2009, February). *Regression Discontinuity Designs in Economics.* (Issue Brief No. 14723). Cambridge, MA.

National Center for Reading First Technical Assistance. (2005). *Leading for reading success: Reading First coaches.* Portsmouth, NH: RMC Research Corporation.

National Educational Goals Panel. (1999). *The national education goals report: Building a nation of learners, 1999.* Washington, DC: U.S. Government Printing Office.

National Institute for Literacy. (2003). *Put reading first: The research building blocks for teaching children to read, 2nd ed.* Washington, DC: Office of Educational Research and Improvement.

National Reading Panel. (2000). *Report of the National Reading Panel: Teaching children to read: An evidence based assessment of the scientific research on reading and its implications for reading instruction.*. Bethesda, MD: National Reading Panel, National Institute of Child Health and Human Development.

Neuman, W. L. (2000). *Social research methods: Qualitative and quantitative approaches.* USA: Allyn & Bacon.

Neuman, S. B., & Dickinson, D. K. (2001). *Handbook of early literacy research.* New York: Guilford Press.

North Central Regional Educational Laboratory. (2004b). *Reading coaches and professional development.* Naperville, IL.

O'Connor, R. (2000). Increasing the intensity of intervention in kindergarten and first grade. *Learning Disabilities Research and Practice, 15*(1), 43-54.

Oldfather, P. (1991). Students' perceptions of their own reasons and purposes for being or not being involved in learning activities: A qualitative study of student motivation (Doctoral dissertation, The Claremont Graduate School, 1991). *Dissertation Abstracts International, 52,* 853A.

PALS and Reading First (2002, January). http://pals.virginia.edu/ReadingFirstpdf.

Pearson, P. D. (1999). Essay book reviews: A historically based review of preventing reading difficulties in young children. *Reading Research Quarterly, 34*(2), 231-246.

Progress of Educational Reform (1996, April). *Goals 2000: Reforming education to improve student achievement.* Retrieved March 23, 2009, from http://www.ed.gov/pubs/G2KReforming/g2ch3.html.

Pressley, M. (2001, December). *Effective Beginning Reading Instruction.* Paper

presented at the annual meeting of the National Reading Conference, San Antonio,

TX.

Pressley, M., Billman, A. K., Perry, K. H., Refitt, K. E., & Reynolds, J. M. (2007).

Shaping literacy achievement: Research we have, research we need. New York:

Guilford Press.

Rock, T. C., & Wilson, C. (2005). Improving teaching through lesson study. *Teacher

Education Quarterly, 32*(1), 77-92.

Schiller, E. (2001). *Study of state and local implementation and impact of the

Individuals with Disabilities Education Act.* Bethesda, MD: Houghton-Mifflin.

Schwartz, R. B., & Robinson, M. A. (2000). Senate Committee on Health, Education,

Labor, and Pensions. (1999). *Educating the disadvantaged.* Washington, DC:

Congress of the U.S. (ERIC No. ED 441 930).

Simmons, D., Kameenui, E., Harn, B., & Chard, D. (2002). *Closing the Gap and Beating

the Odds with Instruction: A Two-year Study of the Bottom 25%.* Paper presented at

the Council for Exceptional Children, New Orleans, LA.

Simmons, D. C., & Kameenui, E. J. (2003, March). *A consumer's guide to evaluating

core reading program grades K-3: A critical elements analysis.* Eugene, OR:

Institute for the Development of Educational Achievement, College of Education,

University of Oregon.

Slavin, R. E., Karwiet, E. L., & Wasik, B. A. (1994). *Preventing reading failure:

Research, policy, and practice.* Boston, MA: Allyn & Bacon.

Snow, C., Burns, M. S., & Griffin, P. (1998). *Preventing reading difficulties in young children.* Washington, DC: National Academy Press.

Stahl, S. A., & Miller, P. D. (1989). Whole language and language experience approaches for beginning reading: Quantitative research synthesis. *Review of Educational Research, 59*(1), 87-116.

Stallman, A. C., & Pearson, P. D. (1990). Formal measures of early literacy. In L. M. Morrow & J. K. Smith (Eds.), *Assessment for Instruction in Early Literacy* (pp. 7-44). Englewood Cliffs, NJ: Prentice Hall.

Stiggins, R. J. (1995). Assessment literacy for the 21st century. *Phi Delta Kappan, 77* (3), 238-245.

Taylor, B. M., Pearson, P. D., Peterson, D. S., & Rodriguez, M. C. (2005). The *CIERA* school change framework: An evidence-based approach to professional development and school reading improvement. *Reading Research Quarterly, 40*(1), 40-69.

Tashakkori, A., & Teddlie, C. (2003). *Handbook of mixed methods in social and behavioral research.* Thousand Oaks: Sage.

Thistlewaite, D. L., & Campbell, D. T. (1960). Regression-discontinuity analysis: An alternative to the ex post facto experiment. *Journal of Educational Psychology, 51*(6), 309-317.

Tittle, C., & Hill, R. (1967). Attitude, measurement, and prediction of behavior: An evaluation of conditions and measurement techniques. *Sociometry, 30*(2), 199-213.

Torgesen, J. K., Wagner, R. K., & Rashotte, C. A. (1994). Longitudinal studies of phonological processing and reading. *Journal of Learning Disabilities, 27*(5), 276-286.

Torgeson, J. K., Wagner, R. K., Rashotte, C. A., Rose, E., Lindamood, P., Conway, J., & Garvan, C. (1999). Preventing reading failure in young children with phonological processing disabilities: Group and individual responses to instruction. *Journal of Educational Psychology, 91*(2), 579-594.

Torgeson, J., Myers, D., Schirm, A., Stuart, E., Vartivarian, S., Mansfield, W., Stancavage, F., Durno, D., Javorsky, R., Haan, C. (2006). *Closing the reading gap: First year findings from a randomized trial of four reading interventions for Striving Readers.* Washington, DC: Corporation for the Advancement of Policy Evaluation.

Trochim, W. (1982). Methodologically based discrepancies in compensatory education evaluations. *Evaluation Review, 6*(4), 443-480.

Trochim, W. (2006). *The research methods knowledge base.* Retrieved September 2, 2009, from http://www.socialresearchmethods.net/kb/quasird.htm.

Truesdale, W. T. (2003). The implementation of peer coaching on the transferability of staff development to classroom practice in two selected Chicago schools. *Dissertation Abstracts International, 64*(11), 3932. (UMI No. 3112485).

U.S. Department of Education. Office of Educational Research and Improvement. National Center for Education Statistics. *The NAEP 1998 reading report card for the nation and the states.* Washington, DC: 1999.

U.S. Department of Education. (2000). *Mapping out the national assessment of Title One: Interim report.* http://www.ed.gov.

U.S. Department of Education. (2002). *No Child Left Behind.* http://www.nochildleftbehind.gov.

U.S. Department of Education. (2002). *Guidance for the Reading First program.*

Washington, DC: Office of Elementary and Secondary Education.

U.S. Department of Education. (2004). *Individuals with Disabilities Education Act.*

Washington, DC: Office of Special Education Research and Evaluation.

U.S. Department of Education. (2007). *Reading First implementation report: Interim*

report. Washington, DC: Office of Planning, Evaluation, and Policy Development.

U.S. Department of Education. (2008). *Reading First implementation report: Final*

report. Washington, DC: Office of Planning, Evaluation, and Policy Development.

Van Der Klaauw, W. (2002). Estimating the effect of financial aid offers on college

enrollment: A regression-discontinuity approach. *International Economic Review,*

43(4), 1249-1287.

Van Der Klaauw, W. (2008). *Regression-discontinuity analysis: A review.* Unpublished

manuscript, Federal Reserve Bank: New York.

Vaughan, S. (2000). The underlying message in LD intervention research: Findings

from research syntheses. *Exceptional Children, 67*(1), 99-114.

Vaughn, S. (2000, December). *How Many Tiers are Needed for Response to Intervention*

to Achieve Acceptable Prevention Outcomes. Paper presented at the National

Research Center on Learning Disabilities Responsiveness-To-Intervention

Symposium, Kansas City, MO.

Vaughan, S., Gersten, R., & Chard, D. (2000). The underlying message in LD

intervention research: Findings from research syntheses. *Exceptional Children, 67*(1),

99-114.

Vaughn, S., Linan-Thompson, S., & Hickman-Davis, P. (2003). Response to instruction

    as a means of identifying students with reading/learning disabilities. *Exceptional*

    Children, 69(4), 391-409.

Vaughn, S., Wanzek, J., & Fletcher, J. M. (2007). Multiple tiers of intervention: A

    framework for prevention and identification of students with reading/learning

    disabilities. In B. M. Taylor & J. Ysseldyke (Eds.), *Educational Interventions for*

    Struggling Readers (pp. 173-196). New York: Teacher's College Press.

Virginia Department of Education. (2003). *Virginia's Reading First Program: Every*

    minute counts. Commonwealth of Virginia, Richmond, VA: Department of

    Education.

Virginia Department of Education. (2005). Superintendent's Memo. Adequate Yearly

    Progress (*AYP*) for School Year 2005-2006.

Walpole, S., & McKenna, M. C. (2004). *The literacy coach's handbook: A guide to*

    research-based practice. New York: Guilford.

VITA

Leslie Ford Lippard graduated from E. C. Glass High School in Lynchburg, Virginia in June 1966 and entered the University of North Carolina in the fall. She graduated from the University of North Carolina in May 1971 with a Bachelor of Arts degree in Early Childhood Education. In May 1982, she graduated from Lynchburg College with a Masters in Guidance and Counseling. She began teaching in Norfolk Public Schools in September 1990 and teaching experiences have included working in primary classrooms and serving as a Breakthrough to Literacy Facilitator, focusing on Kindergarten reading and writing curriculum, instruction, and professional development at the district level. She completed the Reading Specialist Certification at Old Dominion University in May 2001. She served as a reading specialist and Reading First coach in Norfolk Public Schools and has worked as an Adjunct Instructor in Reading at Old Dominion University. In December 2010 she completed her PhD at Old Dominion University, with a concentration in Literacy Leadership. She currently serves as a kindergarten teacher in Norfolk, Virginia and resides in Virginia Beach, Virginia.