FOLLOW-UP STUDY OF THE EFFECTS OF A SUPPLEMENTAL EARLY READING INTERVENTION ON THE READING SKILLS OF URBAN AT-RISK PRIMARY LEARNERS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in the Graduate School of The Ohio State University

By

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ABSTRACT

This study represents the third year of a three-year investigation of the effects of kindergarten literacy intervention on the reading risk of urban learners. The 41 available second-grade participants included African Americans (44%), European Americans (14%), and English language learners (ELLs) (22%). All of the participants were from low socioeconomic backgrounds and qualified for free or reduced lunch. The three groups consisted of 13 students who had received one year of supplementary early literacy intervention, 14 students who had received two years of supplementary early literacy intervention, and 14 comparison students who did not receive supplementary intervention. During Year 3 none of the three groups received supplemental instruction. This year was devoted to follow-up assessments of the students’ reading performance one to two years following intervention. All participants were progressively monitored on oral reading fluency and comprehension as measured by the DIBELS. Additionally, the three groups were compared pre- and posttest on the Woodcock Johnson-III and the CTOPP. Thus, the purpose of this year of follow-up was to determine the relative second-grade reading status of students relative to the amount of treatment they received. A secondary interest was to assess the relative performance of some especially high-risk subgroups such as ELLs and African American males.
Data were analyzed with regression models, contrasts, growth curves, and repeated measures mixed-effects modeling. Results showed that the strong responders (One-Year ERI Treatment students) maintained gains made from the intervention and performed higher than their initially higher performing comparison peers (Comparison group) on all measures assessed. The treatment resistors (Two-Year ERI Treatment students) continued to make progress through second grade, but the gains were not large enough to close the reading gap. Many of the Comparison students, who were initially at low or no risk in kindergarten, were found to have lost ground, and were at risk for reading failure. Some of the ELLs showed similar reading performance to their Non-ELL peers and continued to maintain the reading gains made through the end of second grade. The African American males were found to be reading at approximately one grade level lower than their same age peers and the achievement gap continued to widen with time. The findings highlight the importance of early literacy intervention, progressive monitoring, and continued supplementary instruction to prevent and minimize reading risk.
DEDICATION

Dedicated to Anisha and Prachi,
my two daughters,
for all your love and patience with me
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CHAPTER 1

INTRODUCTION

Importance of Reading

Reading plays a pivotal role in and out of school and has a cumulative long-term impact on an individual’s success. The snowball effect of reading deficits leads to a series of negative social and academic outcomes including special education risk. Felton and Pepper (1995) concluded that students who do not meet benchmark reading scores by third grade find it almost impossible to close these achievement gaps. Other researchers have made similar arguments (e.g., Coyne, Kame‘enui, & Simmons, 2001). Although the importance of reading success and interventions have gained national attention in recent years (Keogh, 2004; NCES, 2001; Sweet, 2004), a large number of students are still not benefiting from effective instruction and early intervention (Bursuck et al., 2004). Therefore, early literacy intervention is critical and can serve to prevent reading failure and corresponding special education risk. Longitudinal studies of reading interventions can provide unique and powerful information about the lasting effects of an early intervention (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002; Keogh).
Reading Profiles of U.S. Students

Underachievement in reading is a persistent and well documented problem in the United States. Reading problems exist among school children as well as throughout the entire society. Data provided by Whitehurst (2003) indicate that more than 90 million adults lack a foundation in basic literacy skills needed to function in society, which contributes to a loss of over 200 billion dollars in annual income. The reading abilities of 4th, 8th, and 12th graders in public schools have been assessed by the National Assessment of Educational Progress (NAEP) since 1992. Data indicate that approximately one-third of our nation’s fourth-grade students are performing below basic achievement levels in reading. According to the Nation’s Report Card, in the year 2007, 33% of fourth graders read at or above Proficient, and 67% of fourth graders read at or above Basic level (see Figure 1.1). According to the National Assessment Statistics, Basic level requires a minimum scale score of 208 in grade 4 and denotes partial mastery of prerequisite knowledge and skills required for a given grade. Proficient level requires a minimum scale score of 238 in grade 4 and represents solid academic performance with competency over challenging subject matter.

Definition of Reading Risk

Reading is a complex skill comprised of several smaller components. According to the National Reading Panel (2000), these include the development of phonemic awareness, phonics, fluency, vocabulary, and comprehension. Indeed the end goal of reading is comprehension. But one cannot surpass the foundational skills of decoding and alphabetic principle before one gets to the automaticity with and comprehension of text read. For beginning readers the focus of reading instruction is on the development of
alphabetic principle and word knowledge. When students are successfully able to “crack the code,” they will be able to move on to fluency, automaticity, vocabulary development, and comprehension (Chall, 1996). Bursuck and Damer (2007) define “any student who requires extra support to learn how to read” (p.3) as at risk for reading problems. These students will not learn to read unless there is a systematic, supportive approach in place. Reading risk or failure can also be defined as an impaired or lower than expected age/grade level of development of one or more of the component skills that comprise the mechanism of reading.

Factors Associated with Reading Risk

There are several complex factors that may put children at a higher risk for reading failure. Children who may be at an increased risk for reading problems include children from low socioeconomic backgrounds, students with minimal parental support, English language learners, children with specific learning disabilities, as well as students with behavior disorders, urban students, and some ethnic minorities.

Socioeconomic Status

Children who are reared under impoverished circumstances are more likely to be at risk for reading failure, due in part to inadequate preschool and literacy experiences, which are important risk factors. Hart and Risley (1995), for example, conducted a study following 42 families for 2 ½ years observing the factors that influence language acquisition. The economic status of a family was one of the factors that impacted the language development of children. The number of language experiences varied greatly. In an average hour, the typical child in a high SES family heard 2153 words, whereas a child in a low SES family heard a third fewer, only 616 words. With 45% of the total
school population being eligible for free/reduced-price school lunch (NAEP, 2007), the impact of socioeconomic status of students on reading cannot be ignored. In some areas the poverty rates are reported to be higher. For example, Candisky (2007) reports that two thirds of the entire Columbus, Ohio, school population is at or below the poverty level. According to the Nation’s Report Card (NCES, 2005), grade 4 students who were eligible to receive free or reduced school lunch received a lower average reading scale score of 203 in comparison to the national average of 220 (see Figure 1.1). Good, Gruba, and Kaminski (2001) report students from high poverty urban areas to have failure rates in reading as high as 70%. These figures are disturbing, especially when one considers the fact that students who are already at the greatest risk for academic failure (i.e., economically disadvantaged students) typically receive the least amount of instruction and practice as they progress through school (Hall, Delquadri, Greenwood, & Thurston, 1982; Kamps et al., 1989). On an encouraging note, however, Mathes, Fuchs, Fuchs, Henley, and Sanders (1994) reported that when low-achieving, at-risk students do receive effective reading instruction, they tend to experience greater success in their remaining school years.

Language Status

Current demographic changes include the rapid growth of an increasingly diverse student population (Cartledge & Kourea, 2008) with greater social, economic, and academic needs. While taking a look at the nation’s demographics, between the year 1979 and 2005, the number of school-age children (ages 5 through 17) who spoke a language other than English at home rose from 3.8 to 10.6 million. This equates to a 9% to 20% increase of English language learners (ELLs) in the school-age population (The
Condition of Education, 2007). These students are at a higher risk of having difficulty with the English language (Nations Report Card, 2005; U.S. Department of Education, 2003). For example, among school-age children who spoke a non-English language at home, the total number who spoke English with difficulty increased from 1.3 million (3 percent of all 5- to 17-year-olds) to 2.9 million (6 percent), between the years 1979 to 2000, as reported by national statistics (NCES, 2007). These children enter schools with a smaller repertoire of English words in comparison to their typical English-speaking peers, which places them at an academic disadvantage at the beginning of their schooling.

According to the national statistics, ELLs in fourth grade were reported to be reading with average scale scores of 188 (in comparison to the national average of 220). Specifically in 2007 (NCES, 2007), only 30% of ELLs were reading at or above Basic and 7% were reading at or above Proficient, which is less than half of the national average of 67% and 33%, respectively (see Figure 1.1). When looking at individual ethnic groups of fourth graders in the Nation’s Report Card (2007), it was found that all ethnic minorities were reading below their White counterparts (scale scores of 231). Specific average scores for individual groups were 200 for American Indian/Alaskan Native students, 203 for Black students, and 204 for Hispanic students. Only the Asian/Pacific Islander students scored higher than the national average (220) with scale scores of 232 points (NCES, 2007) (see Figure 1.1). As seen, Native American students had the poorest reading scores followed by Black and Hispanic students. No data were reported specifically for Somalian students, an increasing population in many of our American classrooms.
Presence of Disabilities

National statistics indicate that students with disabilities are found to be reading at an average scale score of 190 (in comparison to the national average of 220). Specifically, in Year 2007 (NCES, 2007) only 36% of students with disabilities were reading at or above Basic and 13% were reading at or above Proficient in comparison to the national average of 67% and 33% respectively (see Figure 1.1). The U.S. Department of Education provides data indicating Hispanic students to be overrepresented in learning disability categories (Arnold, 2003). Harry and Klingner (2006) report complex issues of culture and quality schooling to be contributors to the disproportionate representation of African American students in the emotional disturbance category. Once placed in a special education category, students are not only subject to the stigma of a label but are often further excluded and hence fail to make much academic and reading progress.

School Factors

Some additional factors that can precipitate reading risk may include poor instruction and schooling for some children. Higher pupil-teacher ratios, lower amounts of funds spent per student, inadequate resources, high teacher and student mobility, and increased use of punitive disciplinary practices are additional determinants that may compound the risk of reading failure. According to the Nations Report Card (NCES, 2007), student/teacher ratios tend to be higher in public schools with larger enrollments than in public schools with smaller enrollments. For example, in the year 2004, one teacher had 6.8 more students, on an average, in a school with an enrollment of 1500 students, than an elementary school teacher in a school with enrollments below 300.
When children do not receive adequate support at school to foster literacy growth they are more susceptible to fall behind in their reading, academic, and social skills.

_Urban students_. According to the Nations Report Card (NAEP, 2007), urban students have consistently scored lower in reading than their suburban and rural peers (see Figure 1.2). It is evident from this figure that the urban scale scores are lower than national averages for each and every group (excluding White students). The discrepancy is most prominent for urban students with disabilities (178), followed by urban ELLs (183), urban Hispanics (199), urban African Americans (199), and low SES (200). A similar trend is noticed in the percentages of students who are performing at or above Basic and Proficient levels. Due to the increasingly small numbers of Native American students, urban statistics for this minority were not provided in the Nations Report Card (2007). However, a look at their national performance (scale scores of 200) may indicate that these students, if present in urban areas, would perform at low reading levels.

According to a report from the 2007 Urban District Assessment, African American and Hispanic students are found to disproportionately populate urban classrooms. Specifically, Black and Hispanic students made up about 37 percent of fourth-graders in the nation, but between 55 and 93 percent of the fourth-graders in urban settings. The teacher-to-student ratio in a typical first grade classroom in a large urban district would be approximately 29 to 1 (NAEP, 2007). Under such circumstances there is a great likelihood that students with the poorest reading skills will not get the needed instruction to become proficient readers. As the text becomes increasingly difficult, these students are more likely to be subject to failure and have difficulty catching up in subsequent grades (Francis, Shaywitz, Steubing, Fletcher, & Shaywitz, 1996; Juel, 1988).
It is reported that on average, urban public schools are more likely to serve low income students, who are more likely to watch television excessively and less likely to have access to gifted and talented programs (U.S. Department of Education, 2005). Urban educators are found to report growing challenges of their students to be poverty, limited English proficiency, family instability, poor health, and student behavior problems (including absenteeism, classroom discipline, weapon possession, and student pregnancy). It is not surprising that researchers report more than half of urban fourth-grade students not having the reading skills necessary to perform grade-level work (Musti-Rao & Cartledge, 2007) with urban African American and Hispanic learners nearing 70 percent (Bursuck & Damer, 2007). The complex interaction of some or many of these roadblocks at various times makes reading and academic success a daunting challenge for many educators and also places urban students at a higher risk for reading risk and/failure.
Note: 1. Colored dotted lines represent national averages for each set of data
2. The top set of bars represents the reading proficiency scale scores for the various groups
3. The lower bars denote the percentage of students at or above basic or proficient reading levels

Figure 1.1: Average reading scale scores and achievement-level results, grade 4 public schools, by student group, Year 2007 (Adapted from Nations Report Card, 2007)
Ethnic/Racial Minorities

Upon closer examination it is found that some students are more prone to be at-risk for reading difficulties. The students with greatest reading risk are found to be American Indian (scale score of 200), Black (scale score of 203), and Hispanic (scale score of 204). Within various ethnic minorities only Asian/Pacific Islander students surpassed the national reading average with scale scores of 232 (as compared to 220). Closer examination of the Nation’s Report Card (2007) indicates that within Black students, males are among the poorest readers and also performing at a lower scale than their female counterparts. Specifically Black females were reported to acquire scale scores of 208 in comparison to 199 for Black males. Several researchers (e.g., Coutinho & Oswald, 2005; Skiba, Michael, Nardo, & Peterson, 2002; Skiba, Poloni-Staudinger, Gallini, Simmons, & Feggins-Azziz, 2006) report African American males being subject to disproportionate number of punitive disciplinary and exclusionary practices in schools. Academic failure combined with not-so-positive interactions in school place this minority population at an extremely high risk for reading and special education risk.

The complex interactions of these various debilitating factors threaten to weaken the educational outcomes for at-risk students (Arroyo & Rhoad, 1999; Snow, Burns, & Griffin, 1998; Wagner & Cameto, 2004; Washington, 2001). Hence there is an urgency to pay immediate attention (Coyne, Zipoli, & Ruby, 2006; Foorman, Francis, Fletcher, Schatschneider, 1998; Kame’enui, Good, & Ham, 2005) to minimize and counteract the at-risk-prone status of these students by providing explicit, systematic core reading instruction and early supplemental secondary interventions.
Figure 1.2: Average reading scale scores and achievement-level results, grade 4 urban public schools in comparison to national averages, by student group, Year 2007 (Adapted from Nations Report Card, 2007)
Poor Outcomes Resulting from Reading Risk/Failure

When students are unable to read at grade level they enter a vicious cycle of negative interactions that only make them fall further behind their peers and place them at added danger for other compounding risks. The consequences of reading failure include risk for behavior problems, increased chances of being referred for special education services, truancy, dropping out of school, unemployment, lower quality of life, delinquency, and incarceration (National Institute for Literacy, 1998).

*Increased Special Education Referrals*

Donovan and Cross (2002) report African American and Hispanic students to be two of the largest minority groups that exhibit the highest risk for special education referrals as well as disproportionate representation in special education. Other researchers (e.g., Ortiz et al., 2006; Valenzuela et al., 2006) have also found that a large number of children from low socio-economic backgrounds in addition to children from racial/ethnic minorities evidence special risk factors with lower achievement as well as higher special education placements. One of the primary reasons for special education referral is due to reading failure. Additionally, these students, particularly males and minority students (excluding Asians and Pacific islanders), disproportionately experience suspensions and expulsions from the classroom (Skiba, Poloni-Staudinger, Gallini, Simmons, & Feggins-Azzis, 2006; Skiba, Michael, Nardo, & Peterson, 2002). These reactive and punitive practices reduce opportunities for learning and typically further exacerbate behavior as well as learning problems (Cartledge, Gibson, & Singh, 2007; Verdugo, 2002).
**Comorbidity**

Many students who are performing below grade level in reading are often found to engage in disruptive behaviors to escape from the learning environment, frequently removed to non-instructional settings such as in-school suspension. Students who show early deficits in reading are at higher risk for comorbid disorders, including behavior disorders (BD; Coie & Jacobs, 1993; Lane et al., 2002) and conduct disorders. Kellam, Mayer, Rebok, and Hawkins (1998) reported poor academic achievement to be predictive of psychiatric distress and depressive disorders among vulnerable children. The authors questioned whether aggressive behavior results from the child’s failure to master the teacher’s demand to learn, or if poor achievement was the consequence of aggressive behaviors. Several other researchers have proposed directional hypotheses regarding the causal relationship between behavior problems and academic underachievement (Hinshaw, 1992; Bower, 1995). Some propose that poor reading skills lead to externalizing problem behaviors in order to escape from the aversive condition. On the other hand, problem behaviors lead to academic underachievement. Overall, both patterns are incompatible with each other and are continually influencing one another (Hinshaw).

**Increase in Dropout Rates**

Students who show early signs of reading difficulties often are faced with a succession of failures and negative interactions, possibly leading to overall school failure and early leaving (Cartledge & Lo, 2006; Yurick, 2006). Dropping out of high school is in turn related to a number of negative outcomes. According to the U.S. Census Bureau Report (2006) the average income per year of persons (ages 18 through 65) who had not completed high school was approximately $20,000 in the year 2005. By comparison, the
average income of persons of similar age who completed their high school degrees, including General Education Development (GED) certificates, was nearly $29,700 per annum. Statistics from the U.S. Department of Labor (2006) indicate that dropouts are less likely to be in the labor force than those individuals with a high school credential. Additionally, in terms of health, dropouts older than age 24 tend to report poorer health than adults who are not dropouts, irrespective of income (U.S. Department of Education, 2004).

*Higher Risk for Involvement in Crime*

Finally, dropouts also make up disproportionately a higher percentage of the nation’s prison and death row inmates. Estimates from data available indicate that approximately 30% of federal inmates, 40% of state prison inmates, and 50% of persons on death row are high school dropouts (U.S. Department of Justice, 2000; 2002). In 2005, the dropout rate for students living in low-income families was approximately six times greater than the rate of their peers from high-income families (8.9% compared with 1.5%) according to the recent updated from NCES (2007). Many school dropouts get involved in crime and overall have a lower quality of life. Therefore, dropping out of school continues to be an issue of national concern because of its links with lower employment opportunities, assistance receipt, higher rates of substance use, as well as incarceration. Subpopulations that are especially vulnerable to dropout from high school include: racial and ethnic minorities, English-language learners, high poverty students, and students with poor reading skills (NCES, 2005).

Being unable to read can result in a series of negative outcomes that are detrimental to the individual as well as our society. Hence directing the emphasis for
at-risk students to intensive reading instruction is critical as this may potentially prevent and minimize troublesome behaviors that are detrimental to academic achievement and later life success. Children who are unable to read and do not receive explicit interventions for the same get trapped into a vicious chain of unfortunate events that may lead to dismal outcomes. Helping these children to read in a timely manner may be a very big step in reducing special education risk and preventing a marginalized existence.

Early Intervention and Prevention of Reading Failure

Children are typically identified as having learning disabilities (LD) at fifth grade (Fuchs & Fuchs, 2007), since at this point it becomes increasingly difficult for struggling readers to catch up with the increasing complexity of the text. However, with the reauthorization of the Individuals with Disabilities Education Act (IDEA, 2004), children are now required to have access to evidence-based instructional strategies before they can be identified as having special education risk. Therefore, the core educational programs provided by schools need to address the individual needs of children based upon the five critical components identified by the National Reading Panel (NRP, 2000). In addition to this, schools need to have in place a system of continuous progress monitoring so that students who are at risk for reading failure (but may previously not have been labeled as reading disabled) are identified early, and have early access to explicit secondary interventions (Coyne, Zipoli, & Ruby, 2006) to overcome the challenge of constantly struggling to catch up with their more successful peers. The authors describe the cumulative effects of establishing or failing to establish reading skills at a very young age. These gaps formulate early in a child’s school life and widen with time, making them
more resistant to change (Good, Simmons, & Smith, 1998). Several studies have
documented that the use of explicit, intensive, systematic, and supportive interventions
centered on phonemic or phonological awareness can minimize reading risk (Simmons,
2006; Vaughn et al., 2006). Other researchers (e.g., Berninger et al., 2002; Coyne,
Kame‘enui, Simmons, & Harn, 2004; Gunn, Smolkowski, Biglan, Black, & Blair, 2005;
Linan-Thompson, Vaughn, Prater, & Cirino, 2006; O’Connor, 2000; Vellutino et al.,
1996, 2003) have conducted longitudinal studies to examine the lasting-effects of early
reading interventions after the supplemental instruction has been terminated. Therefore,
early intervention at the preschool and kindergarten levels is highly recommended as a
“boost” or “inoculation” to reduce reading and special education risk for all children
(Fuch & Fuchs, 2006).

Purpose of the Study

The purpose of the study was to determine if supplemental phonological
awareness training would reduce the reading risk status of urban elementary students.
The goal, in particular, was to examine the lasting effects of a supplemental phonemic
awareness intervention program (ERI) on the reading performance of at-risk
kindergarten/first-grade urban students one and two years following intervention. An
additional goal was to assess how intervention students compared to their low-risk peers
who did not receive the ERI intervention.

This study represents the third year of a three-year investigation of the effects of
early literacy intervention on the reading risk of urban learners. In year one, 61 urban
kindergarten children were assessed on the DIBELS and determined to have markers of
reading risk. An additional 32 comparison kindergarten children with little or no risk
were designated as comparison peers. The targeted at-risk students received supplementary small group phonemic/phonological awareness instruction using the Early Reading Intervention (Simmons & Kame’enui, 2003). See Yurick (2006). Students who met benchmark on the DIBELS at the end of the first year of intervention were considered strong responders (One-Year ERI Treatment Group). These students were monitored in first grade but received no supplementary instruction. Students who failed to reach benchmark the first year received an additional year of supplementary small group instruction with the ERI (Two-Year ERI Treatment Group). The 20-minute lessons for these students also included a five-minute strategy on oral reading fluency. See Kourea (2007). The third group, the Comparison students, received only the classroom instruction, no additional small group instruction. None of the groups received supplementary small group instruction in second grade from the research team, the year of the current study. This year was devoted to follow-up assessments of the students’ reading performance one to two years following intervention. Specifically, the researchers progressively monitored the students’ oral reading fluency and comprehension as measured by the DIBELS. Additionally, the three groups were compared pre- and posttest on the Woodcock-Johnson III (WJ-III; Woodcock, McGrew, & Mather, 2001) and the Comprehensive Test of Phonological Processing (CTOPP; Wagner, Torgesen, & Rashotte, 1999). Thus, the purpose of this year of follow-up was to examine the second-grade reading status of treatment responders, treatment resistors, and comparison students who received no special intervention. A secondary interest was to assess the relative performance of some especially high-risk subgroups such as English language learners (ELLs) and African American males.
Research Questions

1. Based upon the amount of improvement (i.e., gain scores) as measured by each of the six reading variables [Letter Word Identification (LWID), Word Attack (WA), Passage Comprehension (PC), Phonological Awareness Composite (PAC), Phonological Memory Composite (PMC), Rapid Naming Composite (RNC)], is the change (Δ-delta) gain score different between
   (a) 2-Year ERI Treatment Group and 1-Year ERI Treatment Group?
   (b) 2-Year ERI Treatment Group and Comparison Group?
   (c) 1-Year ERI Treatment Group and Comparison Group?

2. How much variance in gain scores (Δ-delta) as measured by each of the six reading variables [Letter Word Identification (LWID), Word Attack (WA), Passage Comprehension (PC), Phonological Awareness Composite (PAC), Phonological Memory Composite (PMC), Rapid Naming Composite (RNC)] can be explained by ethnic/language and gender differences (i.e., ELLs and African American males)?

3. How do the three groups (2-Year ERI Treatment Group, 1-Year ERI Treatment Group, and Comparison Group) compare in their performance on progress monitoring scores for Oral Reading Fluency (ORF) and Passage Retell (PR) as measured by DIBELS?

4. How do the students compare in their performance on progress monitoring scores for Oral Reading Fluency (ORF) and Passage Retell (PR) as measured by DIBELS according to ethnic/language and gender differences (i.e., ELLs and African American males)?
5. What proportion of students will improve their DIBELS Benchmark recommendations, with respect to individual group status (2-Year ERI Treatment Group, 1-Year ERI Treatment Group, and Comparison Group)?

6. What proportion of students will improve their DIBELS Benchmark recommendations, with respect to ethnic/language and gender differences (i.e., ELLs and African American males)?
This chapter presents a literature review on (a) early intervention and prevention of reading failure; (b) Response to Intervention (RTI) paradigm; (c) importance of ongoing assessment of student progress through Curriculum Based Measures (CBM); (d) delivery of instruction; (e) early reading intervention and prevention of secondary disabilities; and (h) existing longitudinal research studies with beginning reading intervention. The focus is placed on early reading intervention and prevention of reading risk. The Individuals with Disabilities Education Improvement Act of 2004 (IDEA, 2004) specifies that up to 15% of funds can be allocated for prevention purposes. With the increasing emphasis on preventing learning difficulties and reducing student failure, the current challenge is to make prevention at the general education classroom levels successful for all children (Foorman, 2007).

Early Intervention and Prevention of Reading Failure

For several years children with learning disabilities must “wait-to-fail” before they receive intervention. Identification of learning disabilities (LD) typically occurs at fifth grade (Fuchs & Fuchs, 2007), since the major procedure for identifying children
involves documenting the discrepancy between IQ and achievement National Joint Committee on Learning Disabilities (NJCLD; Bradley, Danielson, & Doolittle, 2007). However, with the reauthorization of the Individuals with Disabilities Education Improvement Act (IDEA, 2004), states are now allowed to use Response to Intervention (RTI) for identifying learning disabilities.

The findings of the National Reading Panel (NRP, 2000) have had a profound impact on NCLB and IDEA 2004 (Sweet, 2004). The reading initiatives in NCLB, Reading First, and Early Reading First were based upon the NRP report. According to IDEA 2004 as well as NCLB, school districts and local schools are now required to incorporate systematic, explicit instruction in phonemic awareness, phonics skills, fluency, vocabulary instruction, and comprehension strategies in order to improve the academic performance of students with and without disabilities. In particular, it is recommended that students who are at-risk for learning disabilities be given early reading intervention to prevent future academic problems. The IDEA of 2004 provides an extremely important provision that up to 15% of funds can be used for prevention (Foorman, 2007; IDEA, 2004). According to Torgesen et al. (2001), the “wait-to-fail” approach might be too late and costly to remediate reading problems. The new approach seeks to eliminate poor instruction and contextual variables as possible causes for academic deficits and supports effective instruction and closely links intervention and assessment outcomes.
Response to Intervention (RTI) Paradigm

The premise behind Response to Intervention (RTI) is that students must first receive “scientific and research based intervention” followed by continuous and rigorous assessment. Then, if students’ responses to validated intervention are dramatically inferior to those of their peers, the inference of learning disabilities (LD) can be made. RTI helps differentiate between inadequate instruction versus disability, two possible explanations for the child’s low achievement (Bradley, Danielson, & Doolittle, 2007). Since most children do respond to validated interventions, RTI additionally serves as a measure to prevent diagnoses of disabilities. Some other benefits of RTI include early identification, equal educational opportunity for all students, a greater emphasis on prevention, and supplementary instruction without the stigmatizing effects of a disability label (Brown-Chidsey, 2007). In addition, Cummings, Atkins, Alison, and Cole (2008) point out that RTI assists schools in meeting adequate yearly progress, focuses on collaboration between all school professionals, and provides for formative assessment data gathered to document the match between student needs and instruction. Thus, RTI reduces the likelihood that poorly taught or untaught students are misidentified as disabled (Fuchs et al., 2007; Kame’enui, 2007).

The Multi-tiered RTI Model

With the passage of the NCLB Act, multi-tiered instructional models have been developed for children who are at-risk or have special needs. In general, this kind of instruction provides layers of intervention to meet the needs of individual students. The intensity of instructional support increased during each successive tier to those students
who are designated as “at-risk” students or when these students exhibit academic unresponsiveness in the previous tiers (Stecker, 2007; Vaughn, Bos, & Schumm, 2007).

**Tier 1 - Primary Intervention**

Tier 1 includes *high quality core instruction*, through which *all* students in the general education classrooms receive high-quality, research-based, and systematic instruction through the “universal” core program to achieve expected goals. All students are screened through valid curriculum based measures (CBM) and struggling students are more closely monitored for adequate progress. Children whose levels of performance and/or rates of progress are dramatically below those of their peers are designated “at-risk” for poor reading outcomes and possible reading deficits. Such children move to the next tier of intervention in the RTI process (Davis, Lindo, & Compton, 2007; Fuchs & Fuchs, 2007).

**Tier 2 - Secondary Intervention**

Tier 2 includes *high quality supplemental instruction* to those students who need more targeted instruction. Despite receiving preventive services in Tier 1, as many as 20% to 30% of students will require supplemental instruction, depending on the effectiveness of Tier 1 instruction (Vaughn & Roberts, 2007). Students who are still at risk for academic problems receive more targeted instruction to help close the gap between their current performance and expected performance. This intervention may be provided in the general education setting or in pull-out situations. Emphasis is placed on critical elements through highly focused, explicit, scientifically based reading instruction, with students in smaller homogenous groups. Students who make insufficient progress in
Tier 2 are considered for formal special education assessment and may receive services in Tier 3.

**Tier 3 - Tertiary Intervention**

Tier 3 provides students with more *intensive*, evidence-based interventions within a range of special education settings. This tier of intervention is based upon individual student needs. Instruction may be delivered on a one-on-one basis or to very small groups of homogenous students, and the intervention may be implemented for a longer period of time. Tier 3 instruction targets specific individual needs because these students have demonstrated unresponsiveness through poor patterns of growth to high-quality instruction in the general education classroom (Tier I) or more focused supplemental (Tier 2) instruction. The special education services in Tier 3 include (a) instruction planned according to student needs, (b) development of measurable annual goals, (c) progress-monitoring data used to inform instructional decision making, and (d) instruction delivered by trained special educators (Stecker, 2007). Continuous progress monitoring data are used for decision making purposes. The data obtained can be used to make decisions about the success of the instruction and to decide when additional instruction is needed. Conversely, when intensive instruction is no longer needed because the student has responded well to the instruction, the student may be moved back to a previous tier of intervention. Therefore, progress monitoring data support the flexibility within the RTI model based upon individual student needs through the course of time.
Figure 2.1: Three instructional levels within multitiered instructional programming for all learners (adapted from Hoover & Patton, 2008)

Hoover and Patton (2008) provide an example of how the multi-tiered system works in the area of reading (see Figure 2.1). According to these authors and other researchers, approximately 80% of all learners are successful with the high quality core instruction, 15-20% are estimated to need targeted supplemental instruction, and 5-10% students will require high quality intensive instruction (Adelman & Taylor, 1998; Sugai, Horner, & Gresham, 2002; Vaughn, Linan-Thompson, & Hickman, 2003; Winston, 2006; 25
Yell, 2004). Fuchs and Fuchs (2007) recommend the use of universal screening accompanied with at least five weeks of weekly progress monitoring to determine if students are at-risk for learning disabilities. In the three-tiered model, formal referral for special education would take place only after supplemental instruction in Tier 2 had been demonstrated to be unsuccessful in meeting the students’ needs. Irrespective of the model used, the general idea is the schoolwide/classwide prevention for all students, followed by a backup intervention for those students who are failing, backed up with the ultimate additional more intensive interventions available for those students who need them. The field of reading development needs to have the least intrusive to more intrusive methods in order to cater to the needs of all students. With schoolwide preventive programs, the hope is that an increased number of students will be prevented from developing reading difficulties early on, thus making the process more cost effective.

_Responders and non-responders._ After students identified for reading risk have received intervention they are assessed to see the impact of the instruction. Those students who make expected gains are said to _respond to instruction_, and are expected to continue to make progress when adequate effective instruction is provided in the general education classroom. Students who make minimal gains or do not meet benchmark even after receiving high quality, research-validated adequate instruction are described as “treatment resisters” (Torgesen, 2004) or “difficult-to-remediate” (Vellutino et al., 1996; 2003), or “non-respondents” or “non-responders” (Fuchs & Fuchs, 2007). Several researchers estimate that these students range from 5% to 10% per intervention sample (Haager, Klingner, & Vaughn, 2007; O’Connor, 2000; Vaughn, Linan-Thompson, &
Hickman-Davis, 2003; Vaughn, Wanzek, Woodruff, & Linan-Thompson, 2007). Several authors contend that a majority of unresponsive students have phonological awareness deficits (Al Otaiba & Fuchs, 2002; Hatcher & Hulme, 1999; McCardle, Scarbrough, & Catts, 2001; O’Connor). It is important to keep track of the performance of all students in order to make instructional decisions. Data obtained from assessment of student progress can inform educators if the interventions are working, whether any changes need to be made, as well as to “catch” those students who were initially “not at-risk’ early on, before they fall further behind their peers and remediation becomes more difficult and expensive.

Importance of Ongoing Assessment of Student Progress

In order to develop effective instructional methods and design programs that are responsive to students’ individual needs, it is critically important to monitor and assess student performance on an ongoing basis. Assessment provides the basis to (a) screen students who require additional resources, without which long-term failure may occur; (b) diagnose profiles of strengths and weaknesses in order to tailor the nature of the instructional program; and (c) monitor the ongoing progress of academic competence of the students to determine the benefits of the instructional program, and also to provide formative feedback to make necessary changes (Garcia, 2007). Frequent and appropriate use of progress monitoring can lead to increased academic achievement in all students (Deno, 2003; Yell, Katsiyannas, & Shiner, 2006).

Assessment Instruments

There are several kinds of assessment instruments that can be used to monitor student progress. Informal Reading Inventories, Running Records, and Curriculum-Based
Measurements (CBM) are a few progress monitoring tools. For progress monitoring assessment to be effective, target skills should be assessed directly (McLouglin & Lewis, 2008) and measurement should be made frequently so that needed instructional changes can be made quickly. This section is limited to the description of CBM because this was the kind of tool used to assess student progress at intervals of two or three weeks during the study. CBM measures provides repeated and systematic sampling of student performance across time, a specific goal of this study.

*Curriculum-Based Measurements (CBM).* Curriculum-Based Measurements (CBM) were developed based on the idea that special educators could use repeated measurement data to inform the effectiveness of their instruction and guide decision-making for delivering effective instruction (Deno, Fuchs, Marston, & Shin, 2001). Deno (2003) described the best practices in CBM and identified the empirical support for these practices. These are a specific set of standard procedures that are reliable and valid time-efficient measures (Fuchs, Fuchs, & Compton, 2004) that take approximately 1-3 minutes per sample. In reading, students are asked to read aloud a text for a minute and an observer counts and records the number of correctly and incorrectly pronounced words. Student performance is repeatedly and systematically sampled across time, with task difficulty held constant, yet using novel examples to measure student proficiency. Student performance can be compared to normative peer samples represented by a reference line in the performance graph.

The ease with which the use of CBM can be learned by professionals, paraprofessionals, and parents is another important consideration. Some of the recent
applications of CBM include (a) improving individual instructional programs; (b) predicting performance on important criteria; (c) enhancing teacher instructional planning; (d) developing norms; (e) increasing ease of communication; (f) screening to identify students academically at risk; (g) evaluating classroom prereferral interventions; (h) reducing bias in assessment; (i) offering alternative special education identification procedures; (j) assessing English Language Learners; and (k) predicting success in early childhood education. Progress monitoring of students’ performance requires on-going assessments to collect information on students through each stage of the intervention, and also modify instruction based on the student’s performance. Curriculum-Based Measurements such as Correct Words per Minute (CWPM; Shinn, 1989) and the Dynamic Indicators of Basic Literacy Skills (DIBELS, Good & Kaminski, 2002) are examples of assessment instruments that are cost-effective, not time-consuming, and easy-to-administer. Overall, it is important that teachers make time to document and monitor student progress on a continuous basis in order to obtain success from any effective instructional method. Progress monitoring requires CBM to be collected frequently on a weekly or monthly basis, student scores to be graphed, and a slope derived from the graphed scores to quantify reading improvement. Then the teacher uses the information obtained to inform instruction according to the needs of individual students. The convenient use of an instructional program with built-in progress monitoring probes helps set students up to succeed on a daily basis and monitor their progress. Therefore, such a program is more likely to result in positive academic and social outcomes.
Closer examination of some of the evidence-based reading programs indicates that many of these programs have in-built, consistent progress monitoring probes, incorporated within the reading program itself (Carnine, Silbert, Kame’enui, & Tarver, 2004). As these assessment probes are systematically interspersed within the program itself, it easier for instructors to monitor student progress and use this information to make any necessary modifications in their instruction. Students, particularly struggling readers, can be especially motivated with being able to monitor and chart their time-reading-checkouts (Scott & Shearer-Lingo, 2002). Motivation and an increased self-esteem are encouraging benefits for these struggling readers, as they come in more frequent contact with success with reading.

Delivery of Instruction

The method in which instruction is delivered plays an important role in the effectiveness of the instruction. Instruction needs to be explicit (Bursuck & Damer, 2007), intensive (Torgesen et al., 2001), systematic (Moats, 2001), and supportive (Foorman & Torgesen, 2001) to maximize learning. Several authors (e.g., Foorman, Breier, & Fletcher, 2003; Torgesen et al.) argue that early intervention – in kindergarten and Grades 1 and 2 – is more effective than interventions later on. This is because the delay in the intervention demands a more intense and longer duration of intervention in order for no child to be left behind.

Explicit Instruction

For students who are at risk for reading failure, the elements of effective instruction need to be made more direct, explicit, intensive, and supportive in small
groups (Bursuck & Damer, 2007; Foorman & Torgesen, 2001). Several researchers have shown that students’ word reading abilities increase as the instruction becomes more explicit (Brown & Felton, 1990; Connor, Morrison, & Katch, 2004; Foorman, Francis, Fletcher, Schatschneider, 1998; Foorman & Torgesen). New concepts are always introduced by the teacher first showing them how to perform the skills and then supporting students’ learning until independence. When a student makes mistakes, the teacher follows the systematic error correction procedures so as to prevent them from practicing errors, as well as to ensure that students know how to perform the skill correctly the next time they are called to do it. Bursuck and Damer (2007) describe explicit instruction to include (a) clear instructional outcomes; (b) understandable and clear directions and explanations; (c) appropriate modeling, guided practice, and independent practice as part of the teaching process; and (d) consistent, clear corrective feedback on students’ successes as well as errors. While some students may be able to learn how to read through almost any mode of instruction, there is a large number of students, especially those at-risk for reading problems, who need to be explicitly and directly taught how to read in order for them to get it (Carnine et al., 2004; Foorman & Torgesen).

Vadasy, Sanders, and Peyton (2006) conducted a two-year longitudinal study to evaluate the effectiveness of an explicit code-oriented supplemental intervention for kindergarten students at risk for reading failure. Students at the bottom (13th percentile) in phonemic and alphabetic skills were selected for intervention in December of kindergarten in schools serving large numbers of students at risk for reading difficulties.
Participants’ demographics included minorities (73%), low SES (59%), special education (22%), Title 1 (33%), and students with limited English proficiency (17%). Students in the treatment condition received explicit intervention through trained paraeducators on phonemic skills and alphabetic instruction. Instruction was provided for 30-minute individual tutoring sessions, four days per week, for 18 weeks, to a total of 27.4 hours of supplemental instruction. Pretest-posttest score differences and calculated means and standard deviations indicated higher gains for treatment students in comparison to control students. Treatment students had significantly higher linear growth rates in phonemic awareness and alphabetic knowledge during the kindergarten treatment as seen from the growth curves obtained from repeated measures analysis. Using percentile as performance criteria, the researchers examined the proportion of students who fell below the 30th percentile at posttest on each measure. The performance of the control group at posttest measures was also of interest. For Word Attack, there were significantly more students below 30th percentile in the control group (n=10; 32%) compared to the treatment group (n=3; 8%). Similarly, for Word Identification, 47% of treatment students and 74% of controls remained below the 30th percentile, at posttest. In the follow-up year it was noticed that treatment students maintained gains made through the explicit instruction received in kindergarten throughout first grade with significantly higher end-of-year performance on measures of reading accuracy and reading efficiency.

Carnine et al. (2004) also emphasize that explicit instruction is essential for students to make the associations students need for both skill acquisition and generalization. Other researchers say that explicit and systematic instruction is
particularly important to promote efficient growth for children who experience initial failure in reading or for those who lack sufficient background knowledge and foundational skills (Adams, 1990; Foorman, Francis, Fletcher, Schnatschneider & Mehta, 1998; Lane, 2007; Mercer, Lane, Jordan, Allsopp, & Eisele, 1996; National Reading Panel, 2000; Snow et al., 1998.) Other researchers also contend that decoding and comprehension both are taught most effectively through systematic and explicit instruction (Carnine et al., 2004; National Institute of Child Health and Human Development, 2000). Therefore, one can conclude that instruction needs to be taught in the most explicit manner to make it most time, effort, and cost effective.

**Intensive Instruction**

It is critical that at-risk students receive intensive instruction (Foorman, 2001; 2007). Intensity of instruction can be achieved by increasing the total time spent in instruction or by working with at-risk students individually or in small groups (Musti-Rao, 2005; Yurick, 2006). Cavanaugh, Kim, Wanzek, and Vaughn (2004) define *intensity* as the length of intervention, reported in minutes, and the *duration* as the length of the intervention, typically reported in weeks or total hours. Some researchers suggest that that up to 70% of the reading period is spent passively listening to the teacher and very little time is spent actively engaged in reading (Foorman, Goldenberg, Carlson, Saunders, & Pollard-Durodola, 2004). Others say that poor instruction in urban classrooms is characterized by students having few opportunities to respond to the material taught (Arreaga-Mayer & Greenwood, 1986). Those students who struggle with reading are more likely to avoid in reading or responding in class due to repeated failures and the
aversiveness of task difficulty. In a synthesis of interventions done with reading for students with learning disabilities and emotional/behavioral disorders, researchers found that data consistently demonstrated that students spent too much time waiting to be taught, completing worksheets, and doing their independent work (Vaughn, Levy, Coleman, & Bos, 2002). The authors add that wasting time on instruction that is not focused on intensive and explicit instruction must be minimized, particularly in special education settings. The *quality* and *quantity* of instruction are both essential for students who are behind or at-risk.

The following studies examined the effect of intensity of instruction as measured by instructional time on student reading outcomes. In the first study, Harn, Linan-Thompson, and Roberts (2008) compared the outcomes of first-grade students who had received either Tier 2 or Tier 3 interventions after being identified as being at risk for reading difficulties. The researchers examined the effect of intensifying instructional time from 30 to 60 minutes to students at the beginning of first grade. In the less intense intervention, students received 30 minutes of intervention for 25 weeks in first grade, whereas students in the intense instruction received just double the instructional time (i.e., 60 minutes). The 54 participants received intervention in small homogenous groups of 4 to 5 participants. The content of the instruction focused on word analysis, fluency, passage reading, and comprehension. Assessment measures included DIBELS (NWF and ORF subtests) and WRMT-R (Word Attack, Passage Comprehension, and Letter Word Identification) subtests. Results indicated that students in the more intensive intervention outperformed students in the less intensive intervention on all outcome measures, except
passage comprehension. This is an important factor to consider when allocation of resources. The greatest differences were noticed in the Oral Reading Fluency (ORF) component. Some salient features of the intervention include early identification of at-risk status, provision of explicit instruction in small groups, and addition to the instructional time devoted to reading within the classroom. The significantly greater growth in oral reading fluency for students who received the more intense instruction is noteworthy, fluency instruction being an important component often ignored with young learners (Torgesen 2005). These findings of greater reading growth for students who received the double instruction time longer intervention are similar to those obtained by Wanzek and Vaughn (2008). These researchers also examined the role of time on student instruction. Students in two successive cohorts received Tier 2 interventions in either a single dose (30-minute per session) or a double dose (60-minute per session) in the spring of first grade. They also identified a control group of students. Similar to the Harn et al. (2008) study, the students who received additional instruction outperformed the control students.

In another study, Simmons et al. (2007) examined the effects of three instructional interventions which differed along the dimensions of time and design of instruction specificity. The participants were 116 kindergarteners from seven elementary schools. All students were screened using the DIBELS Letter Naming Fluency (LNF) and Onset Recognition Fluency (OnRF) and the Peabody Picture Vocabulary Test (PPVT-R; Dunn & Dunn, 1981). Participants were primarily European American (83.93%) and also included some Hispanic (13.39%) and African American (1.73%) students in the study. A
pretest-posttest experimental design with students being randomly assigned to the three levels of intervention was used. Students received 108 thirty-minute sessions of instruction provided in small groups of 3-5 students. The three types of instruction were (a) 30 minutes of highly specific code-based instruction; (b) 15 minutes of highly specific code-based instruction plus 15 minutes of non-code-based instruction; and (c) 30 minutes of moderate specific instruction. At the end of the study, participants were assessed using several measures which included the Yopp-Singer Test of Phoneme Segmentation (Yopp, 1995), DIBELS Onset Recognition Fluency (OnRF), DIBELS Phoneme Segmentation Fluency (PSF), DIBELS Nonsense Word Fluency (NWF), and WRMT-R Word Identification subtest (Woodcock, 1987). Upon posttest, it was noticed that Kindergarteners with the lowest levels of alphabetic skills benefited more from the 30 minutes of highly specified intervention in comparison to the other two interventions. The second 15 minutes of instruction served to reinforce and extend students’ knowledge of and fluency with alphabetic skills learned. According to the researchers, this additional instruction and practice was found to translate into significant and meaningful differences in student performance, especially for the students placed at most risk. The authors concluded that optimal reading growth and prevention of reading disabilities requires intense instruction that is carefully designed in addition to starting interventions early in a child’s life (Simmons et al.). Even though increasing instructional time can be considered as an effective method of increasing the intensity of intervention, there are some researchers who suggest the need to break up the intervention time for young students
into shorter, more frequent sessions (Wanzek & Vaughn, 2008). Others suggest that reduction in group size is important (Elbaum, Vaughn, Hughes, & Moody, 2000).

At-risk students benefit from an efficient learning environment where the maximum amount of learning is possible in the shortest possible time, through the fewest resources. Through the use of an effective research-based program students are provided with multiple opportunities to practice new skills taught. In such programs, students have to successfully breach a set mastery criterion, as per program requirements, before they are permitted to move to the next new skill in the program sequence. In addition to this, students who are at risk for reading failure need to be fully engaged in the instruction provided by ensuring high rates of academic responding, extensive practice, and immediate feedback (Heward, 2003; 2009) in addition to providing intensive instruction.

**Systematic Instruction**

As Louisa Moats (1999) describes it, “reading is a rocket science” that needs to be taught in a systematic and well-designed manner. Direct code instruction can be characterized by the use of controlled vocabulary texts, in which students are directly taught skills that they need practice in. Skills to be taught are carefully selected and logically arranged in an instructional sequence using language and demonstrations that can be understood by all children. Teacher presentation techniques foster a high degree of interaction between the teacher and student, ensuring that students receive adequate practice and review so that they can develop high levels of accuracy and fluency. Students are not taught a new skill until they have reached the mastery criterion for a skill previously taught. Conclusions from the National Reading Panel also suggest that
systematic instruction of phonics has been helpful in improving the reading skills of many students, including children from low socioeconomic levels (NRP, 2000).

Supportive Instruction

The National Research Council Report (1998) suggests that an ongoing effort of continued intensive reading support is required to ward off reading risks. This is known as supportive instruction. Supportive instruction allows students to practice newly acquired reading skills and maintain their “no longer at-risk” status. In other words, children at-risk for reading deficits, not only require highly explicit and systematic instruction to eliminate at-risk status, but also need ongoing supportive instruction to continue to acquire and maintain more advanced reading skills. If the “insulin” effect of supportive instruction is discontinued, they are once again vulnerable to develop reading deficits (Coyne, Kame’enui, Simmons, & Harn, 2004). Once older, impaired readers have fallen behind their peers, it is more difficult and expensive to normalize these students.

The school’s core reading program should focus on the five key areas emphasized by the National Reading Panel Report (2000). Not only is it important to provide early intervention, but consistent ongoing assessment of student progress is essential to ensure that students are making adequate progress, and not falling behind. Based upon the information obtained from these assessment measures, struggling readers should be provided supportive instruction in order to combat reading difficulties in a timely manner, before the difficulties snowball into long-term reading deficits as the students fall further behind their peers (Carnine, Silbert, Kame’enui, & Tarver, 2004).
Project PRIDE (Bursuck et al., 2004) was a successful intervention project that incorporated similar delivery of instruction with young learners. Kindergarten students were screened for risk at three different schools and provided some level of intervention based on those screening results. These students were followed during the following three years and were assessed on a monthly or bi-monthly basis. Based on the data obtained, decisions were made as to which students should enter or exit the interventions. In the current study, similarly, in Year 1, one group of students was initially provided intervention based upon their needs. In Year 2, treatment students were again assessed at the beginning of the year and those students who had made benchmark on the DIBELS were no longer provided intervention, but consistently monitored, whereas those students who still were at-risk were continued with the phonological treatment intervention. In Year 3, no intervention was provided, but all accessible target and comparison students were closely assessed and monitored to see performance and progress and note if at-risk students had been able to close the reading gap. Throughout Years 1, 2, and 3 all children continued to receive supportive instruction from the school’s core reading instruction program. In this manner, children were provided review and practice opportunities of skills newly developed. The flexibility in selecting students for intervention and the use of data-based determinations should prevent school personnel from becoming overburdened with the number of students entering the intervention. Additionally, through consistent evaluation some changes to the intervention may be warranted, as needed.
When schools incorporate the characteristics discussed earlier into their core reading program and intervention strategies, struggling readers often become more effective readers. Literature supports the use of direct, explicit, intensive, and supportive instruction at the individual, school, or classroom level to enhance student learning. Several individual studies have found promising results. However, this type of effective early intervention needs to be adopted across schools and districts on a broader scale to address the large epidemic of reading failure in our schools.

Early Reading Intervention and Prevention of Secondary Disabilities

Early intervention can sometimes act as a “jump-start” (O’Connor, 2000; p.43). Carefully delivered instruction is often sufficient to remediate, within a certain span of time, the phonological and alphabetic deficits of a significant percentage of children who are initially identified as at-risk for reading deficits. This early intervention becomes more cost-effective because it minimizes further intensive and expensive secondary interventions. Students who are identified early on to be at-risk for reading failure, and do respond to the early, explicit, intensive, and systematic intervention can sometimes ward off reading difficulties in the forthcoming years. Early intervention, if properly delivered, can act as a “vaccination” (Coyne at al., 2004, p. 91) that helps inoculate at-risk children against the later occurrence of reading failure. Several researchers have reported impressive results from various intervention studies where young children at risk for reading disabilities were provided with carefully designed and delivered instruction (Foorman, Francis, Fletcher, Schatschneider, & Mehta, 1998; Simmons, Kame’enui,
A few of the studies will be described briefly in this section.

Foorman et al. (1998) examined the role of instruction in learning to read and preventing reading failure in at-risk children. Participants were first and second graders (n=285) receiving Title 1 services in an urban district and attended 8 elementary schools. The ethnic composition of the participants was 60% African American, 20% Hispanic, and 20% White. During the 90-minute daily language arts period, students were instructed in one of three kinds of classroom reading programs: (a) direct instruction in letter-sound correspondences in decodable text; (b) less direct instruction in systematic spelling patterns in connected texts; and (c) indirect, incidental instruction in the alphabetic code in embedded connected text. Changes in vocabulary, phonological processing, and word-reading skills were assessed periodically to estimate student reading growth. The Peabody Picture Vocabulary Test-Revised (PPVT-R; Dunn & Dunn, 1981), Torgesen-Wagner Battery (Wagner, Torgesen, & Rashotte, 1994), Wechsler Intelligence Scale for Children-Revised (Wechsler, 1974), and the Woodcock Johnson-Revised (Woodcock & Johnson, 1989) were some of the assessment batteries used. Findings indicated that children receiving direct code instruction improved at a faster rate, approaching the national average on decoding and passage comprehension skills and had higher word-recognition skills than those students receiving implicit code instruction.

Vaughn and her colleagues (2006) conducted a controlled randomized study in both English and Spanish to examine if ELLs could benefit from early reading
interventions. Participants were from a large urban district with 48% to 99% of the kindergarten and first grade student population having a Spanish-speaking background. All four schools participated in the free or reduced lunch program with 85% to 100% of their students qualifying for it. A total of 216 first-grade students from four urban schools were screened on two measures: (a) the Letter-Word Identification subtest of the Woodcock Language Proficiency Battery-Revised (WLPB-R) and (b) words from a word-reading list in both English and Spanish. Students were classified as “at risk” if their score was below the 25th percentile of the LWID and if they were unable to read more than one word in the reading list. Of the total students, 48 were placed at risk and randomly assigned to one of two experimental conditions: (a) early reading intervention or (c) control condition. Pre- and posttest measures included the following assessments in both English and Spanish: (a) Comprehensive Test of Phonological Processing (CTOPP), (b) letter naming and sound identification, (c) subtests from the WLPB-R (e.g., word attack, passage comprehension, listening comprehension, picture vocabulary, verbal analogies), and (d) oral reading fluency probes from the DIBELS.

Components of the intervention included small-group explicit instruction on phonological awareness, alphabetic principle, vocabulary development, comprehension strategies, and connected text fluency. The researchers used a reading curriculum based on principles of the direct instruction approach (Carnine, Silbert, Kame’enui, & Tarver, 2004). Findings showed that the treatment group outperformed the control group on English measures such as letter naming, phonological awareness, and other language skills. Gains made in Spanish language were fewer and less strong than the ones evident
in English. The authors noted that the strongest differences favored the treatment group. Specifically, the ELL treatment group made greater gains on reading comprehension measures than their ELL control group.

Schneider, Kuspert, Roth, Vise, and Marx (1997) report the results from two studies using a phonological training package in Kindergarten. In Study 1, the treatment group consisted of 205 students from 11 kindergarten classes. The control group was comprised of 166 kindergarteners from 12 different kindergarten classrooms. Treatment students were provided a daily 15-20 minute phonological training during kindergarten. All participants were pre- and posttested on reading skills. In Study 2, the training was similar, but the period of intervention was for a shorter period of time. Reading and spelling skills were assessed at the end of grade 1 and 2, respectively. Both studies revealed that early training of phonological awareness yielded substantial reading gains in all participants. Another implication of the study was that the reading gains were directly correlated to the quality and amount of phonological awareness intervention received by the students in both the studies. Early reading intervention in addition to the school’s regular reading program can be expensive; so schools need to consider cost-effectiveness by providing early intervention services only as long as needed. Findings from this two-year study indicated that some beginning at-risk readers need intervention of a brief duration, while others need more sustained interventions. Therefore, consistent progress monitoring of students through validated assessment measures are necessary to inform educators of when to withdraw, or continue sustained intervention supports. The
use of this information and subsequent provision of required interventions intercepts the reading gap in the most time-and cost-effective manner before it becomes insurmountable.

Summary. In the above reviewed studies, a large number of students who received early adequate reading skills through intervention at a very young age were able to benefit from the rich-get-richer phenomenon that Stanovich (1986) described as Matthew effects. Some students may need longer periods of intensive, systematic, explicit instruction in areas of deficits to close the reading gap, whereas other students may be faster responders to the intervention, and may not need these services after a certain period of time. It is critical to examine the subsequent reading progress of students who participate in early reading intervention to see if these students who “caught up” during the intervention are able to continue making acceptable progress after the intervention is discontinued, and “stay caught up.” Hence careful progress monitoring of these students through research-based assessment measures is essential to monitor if the students are continuing to hold on, or whether they have dropped initial short-term reading gains. The Vaughn et al. (2006) study points out that if we are to reduce the reading risks for ELLs, then these students should be provided with explicit, evidence-based early reading interventions at the earliest point of the at-risk students’ life, as emphasized by other researchers (e.g., Foorman, 2007; Adams, 1990). In fact, some researchers support the idea of starting preventative instructional support prior to kindergarten (e.g., Vellutino et al., 2003; Coleman, Buysse, & Neitzel, 2006). Both the Foorman et al. (1998) and Schneider et al. (1997) studies indicate that those students who received intervention
early on were able to ward off reading deficits in later years, making the provision of early identification and timely remediation of reading risks of paramount importance.

Longitudinal Research Studies with Beginning Reading Intervention

There are a limited number of longitudinal studies to assess the long-term effects of reading interventions. There were no documented longitudinal studies found with urban elementary students, similar to those in this study. However, this section describes some longitudinal studies with early reading interventions designed to determine lasting effects. Table 2.1 summarizes these follow-up research studies that were selected based upon their relevance to the current study. The first five studies were conducted with English speaking students and the last two studies examined the long-term effects of reading interventions with English language learners (ELLs).

Studies Performed with English Speaking Students

Gunn and colleagues (2005) examined the longitudinal effectiveness of a supplemental early reading intervention on several reading behaviors over a four-year period in four Oregon communities. The participants included 148 students: 80 students demonstrated risk on reading skills only, and 68 students were at risk for reading and behavior problems. Students were assessed at the beginning of Kindergarten and also in the spring for four years. Reading skills were evaluated using the Woodcock Johnson Tests of Achievement (Woodcock, McGrew, & Mather, 2001) Word Attack and Word Identification subtests as well as an oral reading fluency test. Behavior was assessed using the Walker-McConnell Test of Social Skills (Walker & McConnell, 1988).
Students received the interventions for 50 minutes three days per week using *Reading Mastery* (Englemann & Brunner, 1995) for participants in Kindergarten, first, or second grade, or *Corrective Reading* (Englemann, Carnine, & Johnson, 1999), for participants in third or fourth grade. The intervention time was divided among phonics, word reading, spelling, and repeated readings to build oral reading fluency. Additional time was spent with Latino students who needed extra instruction with English vocabulary.

Improvements in all three measures were demonstrated for treatment students. Two years following intervention, differences were still evident by condition for Word Identification, Word Attack, and Oral Reading Fluency. Additionally, the students with reading and behavior problems showed greater gains than their matched controls, suggesting that students with both reading and behavior problems can benefit from supplemental reading instruction. In an earlier study performed with ELLs, Gunn and colleagues (2000) randomly assigned 256 at risk students (ELLs = 62%; Non ELLs = 38%) from K-2 grades to one of two groups: (a) supplemental reading intervention, or (b) control group. Students in the treatment group received the supplemental reading intervention for 30 minutes on a daily basis using the *Reading Mastery* direct instruction curriculum (Engelmann, 1995). One year after the intervention ended, children in the supplemental reading instruction still showed greater improvement in word attack and oral reading fluency than the comparison students.
In another study, Coyne, Kame’enui, Simmons, and Harn (2001; 2004) examined the first-grade reading progress of children who had participated in an intensive reading intervention in kindergarten. Specifically, the study investigated experimentally whether kindergarten intervention could prevent first-grade reading difficulties, or produce an “inoculation effect” for some children with research-validated classroom instruction.

Students identified at-risk for reading difficulties were provided a 7-month beginning reading intervention in kindergarten and had achieved criterion levels by the end of the intervention on measures of phonological awareness and alphabetic knowledge. In first grade these 59 students were randomly assigned to one of the two types of first-grade reading instruction: (a) code-based classroom instruction and a supplemental maintenance intervention, or (b) only code-based classroom instruction. At the end of first grade a comparison was made of the absolute levels of achievement made by the participants. Findings indicated that between 75% and 100% of students in both conditions demonstrated growth comparable to their typically achieving peers. Closer examination of the data analyses indicated that treatment students made more growth than the normative sample in grade one. The authors concluded that strong responders to early intervention in kindergarten can experience an “inoculation effect” through the middle of first grade, provided they continue to receive evidence-based classroom reading instruction even after the intervention has been withdrawn.

Berninger et al. (2002) conducted a follow-up study with 128 second-grade students who had received a 24-lesson reading intervention over a period of four months in first grade. In year 2, they examined whether the faster responders from grade one maintained their gains in second grade. They also studied whether the slower responders,
who were still below grade level in reading achievement at the end of first grade, could make gains when the intervention was sustained over time. At the end of first grade, half of the 128 participants performed at or above grade level and the other continued to perform below grade level. The “faster responders” were significantly higher than the “slower responders” on all reading skills assessed at the end of the first grade. Individual growth curves indicated that substantially more of the “faster responders” than “slower responders” showed significant individual growth.

During the follow up in the second year, not all 128 students were available, and the sample size reduced to 44 “faster responders” (out of 64) and 48 “slower responders” (out of 64). During year two, the “slower responders” continued to receive 20-minute individual reading intervention for approximately 24 sessions. However, the “faster responders” who had met grade level, were no longer provided with additional intervention, but were continuously monitored throughout the study period as a comparison group in the second grade. Findings indicated that the faster responding at-risk readers maintained their relative gains throughout the second grade. These students also tended to have relatively better developed reading comprehension. Upon closer examination, it was found that the “slower responders” continued to make progress during the second year of tutoring. The findings from this study point to two important conclusions. First, with intervention of sustained duration, many at-risk readers will continue to make progress, even though the response may be at a slower rate. Additionally strong responders to intervention can continue to maintain their reading gains even one year after the intervention has been terminated.
Vellutino and colleagues (1996; 2003) conducted a longitudinal study investigating the characteristics of kindergarten students who were resistant to reading intervention through first, second, and third grades. The researchers identified a sample of 118 first-grade students from 1,284 students across 17 schools. The lowest-achieving 30% of the students was selected based on (a) teacher nomination, (b) performance below 15th percentile on either word identification or word attack of the WRMT-R test, and (c) score above 90 on WISC-R. These participants were randomly assigned to treatment (n=76) and non-treatment groups (n=42). The teachers also identified a control group of 65 kindergarteners who were reading at grade level.

The at-risk students received 15 weeks of one-to-one tutoring on a daily basis for 30-minute sessions. Phonological awareness, decoding, sight words, comprehension, and reading of connected text were the foci of tutoring sessions. Students received this intervention from mid-first grade to mid-second grade based upon the child’s individual progress. Those students who responded to the intervention and no longer needed or received the intervention were placed in “No-Longer-at-Risk” groups and were continued to be monitored. At the end of each year of the study the researchers analyzed the data obtained using MANOVA, growth curve modeling, and linear regressions. Student growth in reading was measured by scores obtained from the word attack and word identification subtests of WRMT-R.

Based on the research findings, Vellutino et al. identified student response to intervention to four groups: “very low growth,” “limited growth,” “good growth,” and “very good growth.” The authors called the 33% students in the very low growth and limited growth group “difficult-to-remediate.” The remaining sixty-seven percent of
students responded to tutoring showing good to very good growth and no longer required intervention. The authors concluded that providing early intervention for at-risk kindergartners is a useful means of preventing long-term reading difficulties. The access to early intervention was also helpful in distinguishing between kindergarten children who needed only a slight “boost” in order to meet grade level expectations (and were no longer at risk) and more severely impaired children who would continue to need remedial services in first grade and perhaps beyond. One most important finding from the follow-up research was that the children in the “No-Longer-at-Risk” groups performed solidly in the average or above average ranges on all of the reading achievement measures administered at the end of first, second, and third grade. With the observations from this study, the authors suggested that early and long-term literacy difficulties can be prevented in most children at risk for such difficulties, if they are identified at the beginning of kindergarten, if not sooner, and also if appropriate intervention to establish strong literacy skills are undertaken at the outset.

In another longitudinal study, Simmons et al. (2008) evaluated the response of intervention and stability of reading performance of 41 at-risk kindergarten children from kindergarten through third grade. At the fall of each year, all kindergarteners were assessed and those who fell below the 30th percentile on criterion measures received small-group supplemental intervention. Participant demographics included Title 1 students (100%), low SES (63%), European-American (84%), male (66%), and African-American (2%). In kindergarten 117 students were identified, with 71 at the end of first grade, 60 at the end of second grade, and 41 at the end of third grade. Analyses were conducted on the 41 available cohort students who participated in all 4 years of the study.
Students who met beginning-of-year benchmarks were discontinued from supplemental intervention but were assessed in fall and spring. Interventions focused on phonemic awareness, phonemic decoding, work reading, progressing to fluency, and text reading. On an average, students received 30 to 45 minutes of small-group instruction (with 3 to 5 students), for five days a week. Results of WRMT-R subtests (Woodcock, 1987) and DIBELS measures were used to examine whether student status changed relative to students who performed at the 30th percentile at pretest. Descriptive statistics indicated that the mean scores for at-risk students who received intervention exceeded the 30th percentile on all measures. Specifically, gains were significant in their performance on DIBELS PSF (45th percentile), NWF (63rd percentile), and WRMT-R (50th percentile).

In each year, more students were classified as “out of risk.” At the end of third grade, the probability of being “out of risk” increased to 95.1%, whereas the probability of being classified as “at risk” (performance below the 30th percentile) was reduced to 4.9%. Similar trends were obtained across all three measures. The small-group, code-based instruction had successfully altered the reading trajectories of students at-risk for reading difficulties and helped them attain a reading performance similar to that of their peers who were not at risk.

Studies Conducted with English Language Learners (ELLs)

There is growing body of reading research conducted with English language learners. Linan-Thompson, Vaughn, Prater, and Cirino (2006) examined if positive initial response to intervention made by Hispanic first-grade students could be maintained through second grade. Participants in the two-year study were from 11 schools and received either a Spanish or English intervention. All first-grade students, in each of the
schools, were screened at the beginning of the school year using two subtests in both Spanish and English: (a) the letter Word Identification (LWID) subtest from the Woodcock Language Proficiency Battery – Revised (WLPB-R), and (b) a word list generated from K-3 instructional cumulative vocabulary. Students who scored below the 25th percentile for the first grade on the LWID subtest and those unable to read more than one of the sample words were selected for intervention. The final at-risk student sample (n=103) included 64 participants from the Spanish instruction schools and 39 participants from the English instruction schools.

In schools with Spanish intervention, the 64 at-risk students were randomly assigned to either treatment (n=31) or control (n=33) condition. In schools with English intervention, the 39 at-risk students were randomly assigned to treatment (n=22) or control (n=17) condition. The researchers investigated: (a) the number of students who met minimum criteria on first grade but were at risk again at the end of second grade, and (b) the number of students who were still at risk at the end of first grade and continued to be at risk at the end of second grade. The first-grade supplemental comprehensive interventions included activities matched to the core reading program and they were delivered daily for 50 minutes each session over a seven-month period. Students in the comparison condition received the school’s existing instructional program for struggling readers.

At the end of first grade, 3% of the students were found to be at risk (i.e., non-responders) while nobody was at risk at the end of Grade 2. On the other hand, 30% of comparison students were at risk at the end of Grade 1, and 8% were at risk at the end of Grade 2. Two English intervention students (9%) were found to be at risk at the end of
Grade 1 and one student (6%) was found to be at risk at the end of Grade 2. On the other hand, 59% of comparison students were found to be at risk at the end of Grade 1 and 55% of them at risk at the end of Grade 2. These control group students, who had initially met criteria at the end of first grade, no longer maintained criteria at the end of second grade and were steadily losing ground. It can be speculated that, in terms of referral for special education, students who received only classroom instruction would be more likely to be referred for special education services than students who received the needed explicit, comprehensive, and year-long supplemental interventions as provided in this study.

In an earlier longitudinal study, Lesaux and Siegel (2003) followed 978 students from Kindergarten through second grade in a Canadian school district of 30 schools. The participants included 188 ELL and 790 non-ELL students. All students were pretested in the fall of kindergarten using the Wide Range Achievement Test 3 (WRAT3; Wilkinson, 1993) and grouped as “at-risk” (n=296) and “not at-risk” (n=866) for reading failure. A small group phonological awareness instructional program was provided for at-risk students in kindergarten. The groups included both ELL and non-ELL students based on comparable phonological awareness abilities. The 20-minute intervention was provided 3-4 days a week. Students who continued to exhibit risk in first grade received a phonics intervention program. Upon posttest at the end of grade 2, only seven ELL students were classified as reading disabled whereas 33 non-ELL students were reading disabled. Findings from the study indicated that, for the most part, ELL students with risk status in Kindergarten caught up to or surpassed their non-ELL counterparts on reading measures by the end of second grade. The results of the study provide evidence that the development of early reading skills in ELL students is very similar to that of the
development in non-ELL students, and phonological awareness instruction can be provided to ELL students in the English language. Once again, the early identification and provision of explicit instruction for children with reading risk was beneficial for both ELLs and native English language speakers.

Summary. Overall, each of these studies reported positive long-term gains from early interventions with at-risk students. Students maintained lasting effects of the early reading intervention even two years following intervention on the Word Identification, Word Attack, and Oral Reading Fluency components in the Gunn et al. (2005) study. In the Coyne et al. (2004) study, the kindergarten intervention had acted as a “vaccination” to help inoculate the at-risk children against later reading failure. Findings from the Berninger et al. (2002) study indicated that the faster responding at-risk readers maintained their relative gains throughout the second grade, whereas the slower responders continued to make progress during the second year of intervention. Vellutino and colleagues (1996; 2003) concluded that either kindergarten intervention alone or kindergarten and first grade intervention combined can prevent long-term reading difficulties in the majority of children identified as at risk for such difficulties at the beginning of kindergarten, since the “No Longer at Risk” groups continued to maintain the reading gains they had made through the end of grade three. Simmons and colleagues (2008) found that each year more students were classified as “out of risk”, whereas the probability of being classified as “at risk” diminished with time. Lesaux & Siegel (2003) found that as a result of receiving early intervention by the end of the second year the ESL children had caught up and were outperforming non-ESL peers who initially were not at-risk for reading failure. Similarly, Linan-Thompson et al. (2006) found that ELL
intervention students had reduced their at-risk status. An interesting finding was that many of the control comparison students, on the other hand, had fallen further behind the treatment students and had increased their risk status at the end of second grade. Overall, these studies imply that a large number of these students who were identified early, and responded to the early, explicit, intensive, and systematic intervention did benefit from this early intervention. On the other hand, there is some evidence that a portion of students who were originally deemed not at risk, systematically fell further and further behind their presumptively “less skilled” peers.
<table>
<thead>
<tr>
<th>Research Study</th>
<th>Participant Demographics</th>
<th>Intervention Details</th>
<th>Treatment Effectiveness</th>
<th>Follow-up Observations</th>
</tr>
</thead>
</table>
*Corrective Reading* – Grade 3 & 4  
Pullout instruction; 50 minutes; 3 days per week  
Duration: Year1 – 6 to 7 months  
Year2 – 9 months | Treatment groups - higher gains than control  
Latino students benefited more than English speaking peers  
No significant difference between students with reading deficits only & students with reading + behavior problems | Two years later – differences still significantly evident for LWID, WA, & ORF for treatment students |
| Coyne, et al. (2004)   | N= 59 Grade K-1 C=49; H=9; AA=1 Middle SES | In Kindergarten only - Phonemic awareness, word reading, spelling  
Daily; 30-minute sessions  
Small group instruction  
Duration: 7 months | Treatment students caught up with control students  
Treatment students made more growth than normative sample at the beginning of Grade 1 | Strong responders experienced inoculation effect through middle of first grade |
| Berninger et al. (2002) | N= 128 Grade 1&2 AA 2%; H 8%; A 2%; NA 4%  
| Year1 (Gr-1) – 24 lessons  
Year2 (Gr-2) – 20-minute; one-on-one instruction; slower responders  
Duration: 24 sessions comparison group - faster responders | Faster responders (50%) – growth curves indicated significant individual growth; higher reading comprehension  
Slower responders (50%) – below grade level, after Year1; but made gradual progress in Year2 | Faster responders maintained relative gains through second grade  
Slower responders continued to make progress in Year2 |

Table 2.1: Longitudinal studies that examined beginning reading interventions with at-risk learners
<table>
<thead>
<tr>
<th>Research Study</th>
<th>Participant Demographics</th>
<th>Intervention Details</th>
<th>Treatment Effectiveness</th>
<th>Follow-up Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vellutino et al. (1996, 2003)</td>
<td>N=118 Grades K – 3 Mostly C Middle SES IQ &gt; 90</td>
<td>K – 15 weeks of one-to-one tutoring; Daily; 30-minute sessions Grade 1– at-risk tutored; Grade 1– 3\textcolor{red}{\text{à}} “No Longer at Risk” monitored</td>
<td>33% students \textcolor{red}{\text{à}} (very low growth &amp; limited growth; “difficult-to-remediate”) 67% responded \textcolor{red}{\text{à}} (good to very good growth; no longer required intervention)</td>
<td>At end of Grades 1,2, &amp; 3 \textcolor{red}{\text{à}} “No Longer at Risk” groups performed in average or above average ranges on all reading achievement measures</td>
</tr>
<tr>
<td>Simmons et al. (2008)</td>
<td>N=41 Grades K-3 Male =27; H=6; EA=34; AA=1; Low SES=63% Title 1= 100%</td>
<td>Kindergarten to Grade 3 \textcolor{red}{\text{à}} students below 30\textsuperscript{th} percentile received intervention; 30 to 45 min; small groups; 5 X a week; until out of “at-risk” status</td>
<td>Year 1 to 3 \textcolor{red}{\text{à}} each year students increased “out of risk” status \textcolor{red}{\text{à}} decreased “at risk” status; Students who met benchmark \textcolor{red}{\text{à}} no longer provided intervention; but were assessed</td>
<td>Gains sustained over time, even till end of grade 3 Each year \textcolor{red}{\text{à}} out of risk status increased; e. g. WA\textcolor{red}{\text{à}}95.1% =out of risk &amp; 4.9% = at risk; LWID\textcolor{red}{\text{à}}85.4% = out of risk &amp; 14.6% = at risk</td>
</tr>
<tr>
<td>Lesaux &amp; Siegel (2003)</td>
<td>N=978 Grades K &amp; I ELL=188 non-ELL=790</td>
<td>Kindergarten – phonological awareness training Grade 1 – phonics instruction</td>
<td>Grade 1 – ELL children showed lower performance than L1 children Grade 2 – ELL children performed better than L1 children</td>
<td>By Grade 2 \textcolor{red}{\text{à}} ELL children had caught up and outperformed non-ELL peers who were initially not at-risk for reading failure</td>
</tr>
<tr>
<td>Linnan-Thompson et al. (2006)</td>
<td>N=75 Grades 1 – 2 All ELLs; H Low SES</td>
<td>Year 1 – (Kindergarten) Daily; 50-minute sessions Small group instruction Duration: 7 months Year 2 – no intervention</td>
<td>In both Grades 1 &amp; 2 \textcolor{red}{\text{à}} Treatment students (both Spanish and English speaking) made higher gains than control students</td>
<td>End of Grade 2 \textcolor{red}{\text{à}} Spanish Intervention students (0% at risk); Comparison \textcolor{red}{\text{à}} 8% at risk – English intervention students (6% at risk); Comparison \textcolor{red}{\text{à}} 55% at risk</td>
</tr>
</tbody>
</table>
Conclusion

In the last decade or so, several researchers have contended that the provision of early reading intervention to students who are at risk for reading failure can result in the reduction of reading risk as well as other disabilities. However, the delivery of intervention needs to be explicit, systematic, intensive, and supportive. Those students who respond to intervention need consistent added support from the classroom instruction and monitoring of ongoing progress to ensure. Examining the lasting effects of an intervention becomes increasingly important as at-risk students face the tyranny of time (Kame’enui, 1993). Given that diverse urban elementary students, from impoverished backgrounds, are more highly prone to reading and special education risk, the significance of early intervention longitudinal studies that help counteract these detrimental factors with this population cannot be overstated.
CHAPTER 3

METHOD

This chapter describes the methodological procedures used in this study. Specifically, a description of the following components is included: participants; settings; primary researcher and secondary observers; definitions and measurement of the primary and secondary dependent variables; general procedures of the study which include pretest, progress monitoring, and posttest; materials; study design; data analysis; and measurement of social validity.

Participants

The participants in this study were a follow-up sample from two previous research studies conducted in 2005-2006 (Yurick, 2006) (hereafter Year 1) and 2006-2007 (Kourea, 2007) (hereafter Year 2). The Year 1 and Year 2 samples were selected from three urban elementary schools. However, in the current study (Year 3), the student sample was obtained only from two of these schools, due to closing of one of the schools. The three-year longitudinal student samples had been a convenience one. The project target population was K-5 elementary-aged students in a large Midwestern urban school district consisting of approximately 56,873 students comprised of approximately 62%
African Americans, 29% Caucasians, 11% English language learners (ELLs) and 15% students with disabilities (ODE, 2007). However, the accessible population was 145 students from seven kindergarten classrooms in three urban elementary schools in this large school district.

The student sample of 93 kindergarten students was screened from the accessible population in Year 1 of the study. The students were screened with the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) (Good & Kaminski, 2002) and two subtests of the Woodcock-Johnson Test of Achievement (WJ-III; Woodcock, McGrew, & Mather, 2001). Sixty-one students who were at risk for early reading deficits received supplemental instruction in phonemic/phonological awareness (i.e., Early Reading Intervention; ERI; Simmons & Kame’enui, 2003) and 32 students who were identified with little or no risk were selected for the Comparison group.

In Year 2 the student sample declined to 61 students (38 treatment and 23 comparison). In Year 2 the treatment group was further divided into students who met benchmark at the end of the first year (One-Year ERI Treatment; n= 15) and students who failed to meet benchmark (Two-year ERI Treatment; n=23). The Two-Year ERI Treatment group continued with phonemic/phonological training (i.e., ERI) the second year. Each training period was supplemented with five-minute segments of oral reading fluency instruction. The One-Year ERI Treatment and comparison groups received no supplemental instruction but their progress was continuously monitored along with that of the Two-Year ERI Treatment group. For all thee groups the researchers assessed levels of reading performance and growth rates.
In Year 3 (current study) the available sample of students from the previous two years declined even further (n=41) due to school closings and pupil mobility. The second-grade follow-up groups consisted of 13 One-Year ERI Treatment students, 14 Two-Year ERI Treatment students, and 14 Comparison students. During Year 3 none of the three groups received supplemental instruction. The researchers conducted follow-up assessments to determine the lasting effects of the early reading intervention.

*Parental consent.* Parent permission was requested for all participants in the study. Specifically, a letter (see Appendix A) and a consent form (see Appendix B) were sent home to the parents of the students. Parents of the students who were English-Language Learners (ELLs) were sent the documents written in their own Native language (see Appendix C and D).

Based on the criteria of student assignments used in Year 3, a description of each participation group is presented in Table 3.2 (see Table 3.2).
<table>
<thead>
<tr>
<th>Schools</th>
<th>Year 1 (2005-06)</th>
<th>Year 2 (2006-07)</th>
<th>Year 3 (2007-08)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ERI – Treatment</td>
<td>ERI – Treatment</td>
<td>2-Year Treatment</td>
</tr>
<tr>
<td></td>
<td>ERI – Comparison</td>
<td>ERI – Comparison</td>
<td>ERI – Comparison</td>
</tr>
<tr>
<td>School 1</td>
<td>10</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>School 2</td>
<td>29</td>
<td>16</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>School 3</td>
<td>22</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td># of students per level of independent variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School 1</td>
<td>61</td>
<td>32</td>
<td>23</td>
</tr>
<tr>
<td>School 2</td>
<td>23</td>
<td>15</td>
<td>23</td>
</tr>
<tr>
<td>School 3</td>
<td>23</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>93</td>
<td>61</td>
<td>41</td>
</tr>
</tbody>
</table>

Table 3.1: Student assignment per level of independent variable within each school for Years 1, 2, and 3
<table>
<thead>
<tr>
<th></th>
<th>2-Year ERI Group (n=14)</th>
<th>1-Year ERI Group (n=13)</th>
<th>Comparison Group (n=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age range</strong>1</td>
<td>7-2 to 7-9</td>
<td>7-1 to 8-0</td>
<td>7-3 to 8-1</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>3 (21.4 %)</td>
<td>9 (69.2 %)</td>
<td>6 (42.9 %)</td>
</tr>
<tr>
<td>Males</td>
<td>11 (78.6 %)</td>
<td>4 (30.8 %)</td>
<td>8 (57.1 %)</td>
</tr>
<tr>
<td><strong>English-Language Learners2</strong></td>
<td>3 (21.4 %)</td>
<td>5 (38.5 %)</td>
<td>1 (7.1 %)</td>
</tr>
<tr>
<td>Females</td>
<td>1 (7.1 %)</td>
<td>3 (23.1 %)</td>
<td>1 (7.1 %)</td>
</tr>
<tr>
<td>Males</td>
<td>2 (14.2 %)</td>
<td>2 (15.4 %)</td>
<td>0 (0 %)</td>
</tr>
<tr>
<td><strong>Ethnicity/Race3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>3 (21.4 %)</td>
<td>6 (46.2 %)</td>
<td>9 (64.3 %)</td>
</tr>
<tr>
<td>European American</td>
<td>8 (57.1 %)</td>
<td>2 (15.4 %)</td>
<td>4 (28.6 %)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0 (0 %)</td>
<td>0 (0 %)</td>
<td>0 (0 %)</td>
</tr>
<tr>
<td>Somalian</td>
<td>3 (21.4 %)</td>
<td>4 (30.8 %)</td>
<td>1 (7.1 %)</td>
</tr>
<tr>
<td>Asian</td>
<td>0 (0 %)</td>
<td>1 (7.7 %)</td>
<td>0 (0 %)</td>
</tr>
<tr>
<td>Multiracial</td>
<td>0 (0 %)</td>
<td>0 (0 %)</td>
<td>0 (0 %)</td>
</tr>
<tr>
<td><strong>Students receiving</strong></td>
<td>14 (100%)</td>
<td>13 (100%)</td>
<td>13 (92.9 %)</td>
</tr>
<tr>
<td>free/reduced lunch (SES)4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3.2: Descriptive information for each study group per age, gender, language, ethnicity/race, SES, and pretest performance in Year 3

1 Student age range shown in years/months as calculated at the beginning of the study (October 17, 2007)
2 English-Language Learner status as identified by each school
3 Ethnicity/Race as identified by each school
4 Students receiving free/reduced lunch (SES) status as identified by each school
Table 3.2 continued

<table>
<thead>
<tr>
<th>Pretest Measures^5</th>
<th>WJ-III^6</th>
<th>CTOPP^7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Letter-Word ID (LWID)</td>
<td>Word Attack (WA)</td>
</tr>
<tr>
<td>1.</td>
<td>20.50 ± 7.05</td>
<td>7.0 ± 2.77</td>
</tr>
<tr>
<td></td>
<td>34.46 ± 8.27</td>
<td>11.69 ± 6.42</td>
</tr>
<tr>
<td>2.</td>
<td>32.79 ± 6.61</td>
<td>11.71 ± 4.70</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Phonological Awareness Composite Score (PAC)</th>
<th>Phonological Memory Composite Score (PMC)</th>
<th>Rapid Naming Composite Score (RNC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>87.50 ± 9.72</td>
<td>90.36 ± 9.36</td>
<td>82.71 ± 18.89</td>
</tr>
<tr>
<td></td>
<td>91.23 ± 6.30</td>
<td>94.00 ± 10.02</td>
<td>103.00 ± 12.00</td>
</tr>
<tr>
<td>2.</td>
<td>94.64 ± 6.46</td>
<td>97.21 ± 10.81</td>
<td>105.57 ± 10.65</td>
</tr>
</tbody>
</table>

^5 Pretest measures administered from October 17 through October 18, 2007
^6 Woodcock-Johnson Test of Achievement – III. Student data are reported in mean raw scores and standard deviations for each student (M±SD)
^7 Comprehensive Test of Phonological Processing (version for ages 7- through 24-years). Student data are reported in mean composite scores and standard deviations for each composite category.
Two-Year ERI Treatment group. The Two-Year ERI Treatment group consisted of 14 students who had received supplemental instruction in Year 1 and Year 2 due to their low performance in reading as measured by the DIBELS spring benchmark assessments of the previous year. Of the 14 students, 11 (78.6 %) were males and 3 (21.4 %) were females. Three (21.4%) students in this group were African American, eight (57.1%) were Caucasian, and three (21.4%) were Somalian. Students’ ages ranged from seven years and two months to seven years and nine months. All of the students in this group qualified for free or reduced lunch.

The mean pretest scores for Two-Year ERI Treatment students on the WJ-III and Comprehensive Test of Phonological Processing (CTOPP; Wagner, Torgesen, & Rashotte, 1999) are given in Table 3.2. At the beginning of Year 3, Two-Year ERI Treatment students had mean scores below their treatment and non-treatment peers on every subtest for both instruments.

One-Year ERI Treatment group. The One-Year ERI Treatment group consisted of 13 students who had received supplemental instruction in Year 1. Upon examination of performance scores obtained in the DIBELS spring ’06 benchmark assessments, these students had made benchmark through the phonological awareness training instruction received in Year 1 and therefore did not receive any supplemental ERI instruction in Year 2 or Year 3. Of the 13 students, 4 (30.8 %) were males and 9 (69.2 %) were females. Six (46.2 %) students in this group were African American, two (15.4 %) were Caucasian, and four (30.8 %) were Somalian. Students’ ages ranged from seven years and two months to eight years. All of the students in this group qualified for free or reduced lunch.
The mean pretest scores for One-Year ERI Treatment students on the WJ-III and Comprehensive Test of Phonological Processing (CTOPP; Wagner, Torgesen, & Rashotte, 1999) are given in Table 3.2. At the beginning of Year 3, One-Year ERI Treatment students had mean scores slightly lower than their Comparison peers on every subtest except the for both instruments, except the LWID subtest. All pretest scores for the One-year ERI Treatment students were higher than their Two-Year ERI Treatment peers.

**Comparison Group.** Fourteen students who had not received any supplemental ERI intervention in Year 1 and Year 2 were targeted for comparison reasons in the Comparison group. These students were the available follow-up sample from the previous year (Year 2) group. At the beginning of the study (Year 1) these students had been assessed using the spring DIBELS benchmark assessment, and had been found to be low or no risk for reading failure. It is important to note that students were not randomly selected nor assigned and the control students were not comparable to the treatment students because individual students with early indicators of reading deficits were asked to participate in the treatment group. Of the 14 students, 8 (57.1 %) were males and 6 (42.9 %) were females. Nine (64.3 %) students in this group were African American, four (28.6 %) were Caucasian, and one (7.1 %) was Somalian. Students’ ages ranged from seven three months to seven years and eleven months. Thirteen (92.9%) of the students in this group qualified for free or reduced lunch.

The mean pretest scores for Comparison students on the WJ-III and Comprehensive Test of Phonological Processing (CTOPP; Wagner, Torgesen, & Rashotte, 1999) are given in Table 3.2. At the beginning of Year 3, Comparison students
had the highest mean scores compared to their One-Year ERI and Two-Year ERI peers on every subtest for both instruments, except the WJ-III LWID subtest. All pretest scores for the Comparison students were higher than their Two-Year ERI Treatment peers.

Settings

The Year 3 follow-up study was conducted in two urban elementary schools within a large Midwestern School district that consisted of 56,873 students including approximately 62% African Americans, 29% Caucasians, 11% ELLs, and 15% students with disabilities (ODE, 2007). A description of the demographic and academic characteristics of each participating school is described below (see Table 3.3).

School 1

School 1 was called a Literature-Based Alternative School with students from grades pre-kindergarten through five. The school used the LACES (Literacy Across Columbus Elementary Schools) reading program for their reading curriculum. LACES is a district-designed reading program based on data from students in the district, the recommendations of the National Reading Panel, and the Ohio Academic Content Standards for reading and language arts. This reading program incorporates instruction on phonemic awareness, phonics, word study, fluency, writing, spelling, and comprehension. The LACES instruction was implemented every morning from 9:30 to 11:30 a.m.

Every Tuesday and Thursday, HOSTS, a university-community partnership tutoring program, took place for approximately 30 minutes. Students were paired with a tutor from the community who read to the students with the purpose of fostering an
appreciation of reading and helping to address reading deficiencies. A total of 200 adults who were given release time from their employers volunteered their time for this program. The target student population in grade 2 was comprised of a total of 32 students in two classrooms. Most of these students were African American (n=23) with six Caucasians, two from Latino American backgrounds, and one multiracial student. None of the students received ESL or special education services.

Assessment setting in School 1. Pre and posttest measures as well as tri-weekly progress monitoring of the target students were administered in the hallways outside the second grade classrooms. A table was placed against the wall with three chairs. The researcher and one student sat across from each other, within a two-foot range, so that the researcher could see and hear the responses produced by the student. Testing usually took place between 9:15 a.m. to 11:45 a.m. Noise levels and passersby varied at different points of time, but did not significantly interfere with the testing procedures.

School 2

School 2 was a Reading First school and received federal and state funding to address the needs of low-performing and low-income students in kindergarten through grade 3. The Reading First federal grant targeted high poverty schools that needed support in improving the academic performance of their low-income students so that they would be better equipped with reading skills by the end of grade 3 (NCLB, 2001). School 2 incorporated the Harcourt Trophies Reading Series (Beck, Farr, & Strickland, 2003) and was required to use Scientifically Based Reading Research (SBRR) with frequent progress monitoring assessments of student learning. The target student population in grade 2 consisted of a total of 66 students in three classrooms. Twenty-nine of the
students were African-American students (39.4 %), 21 were Caucasians (31.8 %) one student was Latino, 10 (15.2 %) were Somalian, one (0.15 %) was Asian, and 3 ((0.45%) were multiracial. Four of the students received special education services and 13 students had ESL classes.

Students in the second grade received 90-minute whole-classroom instruction using the Trophies Reading curriculum, according to the requirements of the Reading First schools. This instruction took place every morning between 9:30 and 11:00 a.m. Out of the participants in this study, six students received pull-out reading instruction for 30 to 35 minutes each day by a reading intervention specialist. These students were provided additional reading intervention based upon the benchmark scores. Those students who were intensive, as per the DIBELS benchmarks continued to receive the Oral Reading Fluency (ORF) progress monitoring probes every two weeks. However, once a student met benchmark, the progress monitoring sessions were discontinued. Three of the participants were being assessed for possible options of full-time special education services, but were not identified as special education students during the course of the study. The ELL students in the study received approximately 45 minutes of reading intervention during their reading time in the morning by an ESL tutor.

Assessment setting in School 2. Pre and posttest measures as well as tri-weekly progress monitoring of the target students was administered in quiet, separate tutoring rooms that were between the classrooms. A round table was placed at the centre of the room with three chairs. The researcher and one student sat across from each other, within a two-foot range, so that the researcher could see and hear the responses produced by the student. Testing usually took place between 9:15 a.m. to 11:45 a.m. After obtaining
consent from the school, two of the students were given the posttest assessment in their individual homes, since these children were absent from school the entire last week.

<table>
<thead>
<tr>
<th>Type of School</th>
<th>School 1</th>
<th>School 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Curriculum</td>
<td>Literature-Based</td>
<td>Reading First</td>
</tr>
<tr>
<td></td>
<td>Pre K-5</td>
<td>Pre K-5</td>
</tr>
<tr>
<td>Total Student</td>
<td>234</td>
<td>327</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Students per gender</th>
<th>School 1</th>
<th>School 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females</td>
<td>49.35 % (116)</td>
<td>46.2 % (151)</td>
</tr>
<tr>
<td>Males</td>
<td>50.64 % (118)</td>
<td>53.8 % (176)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Students per racial/ethnic group</th>
<th>School 1</th>
<th>School 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>68.24 % (159)</td>
<td>47.1 % (154)</td>
</tr>
<tr>
<td>European American</td>
<td>23.17 % (54)</td>
<td>31.8 % (104)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>5.15 % (12)</td>
<td>2.8 % (9)</td>
</tr>
<tr>
<td>Somalian</td>
<td>0% (0)</td>
<td>14.1 % (46)</td>
</tr>
<tr>
<td>Asian</td>
<td>0.43 % (1)</td>
<td>1.6 % (5)</td>
</tr>
<tr>
<td>Native American</td>
<td>0.43 % (1)</td>
<td>0 % (0)</td>
</tr>
<tr>
<td>Multiracial</td>
<td>2.57 % (6)</td>
<td>2.8 % (9)</td>
</tr>
<tr>
<td>ELLs</td>
<td>4.72 % (11)</td>
<td>18.3 % (60)</td>
</tr>
<tr>
<td>Special Education</td>
<td>21.45 % (51)</td>
<td>8.6 % (28)</td>
</tr>
<tr>
<td>Free or reduced lunch</td>
<td>74.67 % (174)</td>
<td>95% (310)</td>
</tr>
</tbody>
</table>

Table 3.3: Demographic and academic characteristics of participating schools in Year 3
Primary Researcher and Secondary Observers

The researcher was a doctoral candidate in the Special Education/Applied Behavior Analysis program at The Ohio State University. She had earned her bachelor’s degree in Science with a specialization in Genetics and Applied Plant Physiology from Sri Sathya Sai University of Higher Learning in India. She then worked as a general education teacher in a private school in Nepal for eight years. Responsibilities included teaching all subjects to third, fourth, and fifth graders and biology to eighth and ninth graders. She also taught Art to high school students. From 2000-2002 the researcher served as Assistant Program Coordinator of the Teacher Training Program at Rato Bangala in Kathmandu, Nepal. Responsibilities included developing school curricula and training materials, teacher supervision, and training of teachers from all over Nepal. In searching more academic training the researcher entered The Ohio State University on a Fulbright Scholarship and completed her master’s degree in education for children with hearing impairments in 2005. The same year, she began the doctoral program in the Special Education/Applied Behavior Analysis program at The Ohio State University. She has been a graduate teaching associate in the program teaching introductory courses in special education including field placements to undergraduate students. During the 2006-2007 she facilitated the training and implementation of a decoding reading intervention program to intermediate students who were at risk for reading failure.

Two secondary observers, who were doctoral students in the Special Education/Applied Behavior Analysis program at The Ohio State University, participated in this study and aided in data collection and interobserver agreement. The first student was a second-year student with previous experience of behavior analysis in a clinical
setting with children with developmental disabilities. The second observer was a first year doctoral student with previous experience of classroom teaching for students with disabilities. She also served as a secondary observer for implementer integrity.

Definition and Measurement of Dependent Measures

The study included two sets of dependent measures, the primary and secondary measures. The primary dependent measures included the pretest and posttest scores on (a) three subtests of the Woodcock-Johnson Test of Achievement (WJ-III; Woodcock et al., 2001), and (b) three composites from the Comprehensive Test of Phonological Processing (CTOPP; Wagner et al., 1999).

The secondary dependent measure was the tri-weekly administration of the progress monitoring probes from DIBELS (Good & Kaminski, 2002) on Oral Reading Fluency (ORF) and Retell Fluency (RTF) composites. A detailed description of each of the dependent measures follows.

Primary Dependent Measures – Pretest/Posttest Assessments

Woodcock-Johnson-III Tests of Achievement (WJ-III). The Woodcock-Johnson III Tests of Achievement (WJ-III; Woodcock, McGrew, & Mather, 2001) is a standardized assessment battery used to measure the reading and cognitive skills of children. This test documents reliability levels of .80 or higher across most of the subtests (Schrank, McGrew, & Woodcock, 2001). In order to avoid practice effects, two different forms of the test were administered to all participants at the beginning (i.e., October ’08 as pretest) and the end (i.e., May ’08 as posttest) of the study. Both the forms accompanied the assessment protocol. Students were taken to the assessment setting area, in the hall
outside the classroom or tutoring room, and administered the test individually. The students were told that they were going to be asked some questions, some of which may be easy and others may be hard, but they were asked to try their best.

*Letter-Word Identification (LWID).* The Letter-Word Identification (LWID) subtest measured the examinee’s letter and word recognition. This subtest included 79 test items and the examinee was required to continue responding until he or she answered six consecutive test items incorrectly and reached the ceiling. The test items became progressively difficult as the examinee responded correctly to the previous items. For example, the examinee was initially asked to name alphabet letters like “A,” “D,” or “G,” followed by small words like “dog,” “in” etc., and finally by longer, complex words like “because,” “systematic” etc. The examinee’s final score was the number of total correct responses until the ceiling was reached. The median reliability of this subtest for ages 5 through 19 is 0.94.

*Word Attack (WA).* The Word Attack (WA) subtest contained 30 items and measured the examinee’s skill in applying letter sound knowledge to nonsense words. The first three items required the subject to identify singular letter sounds (e.g. what is the sound of these letters, “k,” “n,” “b” etc.) For the remainder of the items the examinee was required to read-aloud letter-sound combinations, representing nonwords such as /tiff/ and /zoop/. The ceiling of the subtest was reached when the examinee answered six consecutive test items incorrectly. The examinee’s final score was the number of total correct responses until the ceiling was reached. This subtest has a median reliability of 0.87 for ages 5 through 19.
Passage Comprehension (PC). The Passage Comprehension (PC) subtest measured the examinee’s ability to match a symbol with the actual picture of the object (e.g. matching the word symbol “cat” with the actual picture of a cat) then single words were replaced by sentences with missing words, accompanied by pictures, and the examinee had to guess which word could be used to fill in the blank spaces. Finally the difficulty of the test items was increased by removing the pictures and increasing the passage length, the vocabulary level, and complexity of the grammar and syntax of the passage. This subtest included a total of 47 test items and the examinee was required to reach the ceiling (i.e. six consecutive incorrect responses) for the subtest to be discontinued. The examinee’s final score was the total number of correct responses up to the ceiling. The median reliability for the Passage Comprehension (PC) subtest is 0.88 for ages 5 through 19.

Comprehensive Test of Phonological Processing (CTOPP)

The CTOPP consisted of two versions: one developed for individuals in kindergarten and first grade (5- and 6-year olds) which included seven core tests, and another developed for individuals 7 through 24 years. The researcher used the second version in this particular study, which contained six core subtests and six supplemental tests. Specifically, only the six core subtests (Elision, Blending Words, Memory for Digits, Rapid Digit Naming, Nonword Repetition, and Rapid Letter Naming) that measured the Phonological Awareness, Phonological Memory, and Rapid Naming constructs, were used in this study. Each construct was measured by combining specific core subtests as recommended by the testing protocol.
Phonological Awareness Composite (PAC). Phonological awareness can be described as an individual’s awareness of and access to the sound structure of the oral language (Wagner et al., 1999). This composite score was comprised of the standard scores of two subtests for ages 7 through 24: Elision and Blending Words. Specifically, the composite score was obtained by adding the subtest standard scores and then converting the sum to a composite score (i.e., a standard score with a M=100 and SD=15) by using a conversion table that accompanied the test battery. The test reliability for the Phonological Awareness Composite (PAC) within the age range of 7 through 24 is 0.90. Below is a description of the two core subtests that made up the Phonological Awareness Composite (PAC).

(a) Elision. The Elision subtest was comprised of 20 items and measured the extent to which a student can say a word, and then say what remains after dropping out designated sounds. For example, the examinee was instructed, “Say bold.” After the student repeated “bold,” the examinee was told, “Now say bold without saying /b/.” The correct response was “old.” The student was presented with three practice items. Corrective feedback was provided to the examinee for test items #1 through #3. If the examinee responded incorrectly to all the practice items then the administration of the subtest was discontinued. However, if the examinee responded correctly to one of the practice items, the test administration was begun with test item #1. The test was stopped after the student reached the ceiling (i.e., three consecutive incorrect responses). The student’s final score on this subtest was the total number of correct responses up to the ceiling. The test-retest reliability is 0.89 for ages 7 through 24.
(a) **Blending Words.** This 20-item subtest measured the student’s ability to combine sounds to form words. The examinee was asked to listen to a series of audio-recorded separate sounds, which came with the testing protocol, and then was asked to combine the sounds together to make whole words. For example, the examinee was instructed, “What word do these sounds make: t-oi?” The correct response was “toy.” The student was presented with three practice items. Corrective feedback was provided to the examinee for practice items and for test items #1 through #3. If the examinee responded incorrectly to all the practice items then the administration of the subtest was discontinued. However, if the examinee responded correctly to one of the practice items, the test administration was begun with test item #1. The test was stopped after the student reached the ceiling (i.e., three consecutive incorrect responses). The student’s final score on this subtest was the total number of correct responses up to the ceiling. The test-retest reliability is 0.84 for ages 7 through 24.

**Phonological Memory Composite (PMC).** The Phonological Memory Composite (PMC) represents the examinee’s ability to code information phonologically for temporary storage in the short-term or working memory (Wagner et al., 1999). This composite score comprised the standard scores of two subtests for persons 7- through 24-years of age: Memory for Digits and Nonword Repetition. Specifically, the composite score was derived by adding the subtest standard scores and then converting the sum to a composite score (i.e., a standard score with a M=100 and SD=15) by using a conversion table that accompanied the test battery. The test-retest reliability is 0.80 for ages 7
through 24. Below is a description of the two core subtests that comprised Phonological Memory Composite (PMC).

(a) Memory for Digits. This 21-item subtest measured the student’s ability to repeat a series of numbers ranging in length from two to eight digits. The student was asked to listen to a series of audio-recorded digits, which accompanied the test protocol, and was then asked to repeat the numbers in the same order in which they had been heard. Testing was discontinued and no score was recorded if the examinee could not correctly respond to at least one practice item. The examinee was prompted to go to the next test if he or she hesitated for more than two seconds on an item. The test was stopped after the student reached the ceiling (i.e., three consecutive incorrect responses). The student’s final score on this subtest was the total number of correct responses up to the ceiling. The test-retest reliability is 0.81 for ages 7 through 24.

(b) Nonword Repetition. This 18-item subtest measured the extent to which an individual can repeat nonwords that range on length from three to 15 sounds. The examinee was asked to listen to audio-recorded made-up words and was then asked to repeat the word exactly as he or she had heard it. For example, the examinee heard the recorded sounds “nigong,” to which the correct response was “nigong.” Corrective feedback was provided to the examinee for practice items and for the first three test items only. Testing was discontinued and no score was recorded if the examinee could not correctly respond to at least one practice item. The examinee was prompted to go to the next test if he or she hesitated for more than two seconds on an item. The test
was stopped after the student reached the ceiling (i.e., three consecutive incorrect responses). The student received a zero for each nonword that was produced with missing sounds, additional sounds, or sounds out of order. The student’s final score on this subtest was the total number of correct responses up to the ceiling. The test-retest reliability is 0.78 for ages 7 through 24.

*Rapid Naming Composite (RNC).* This composite score comprised the standard scores of two subtests for persons 7- through 24-years of age: Rapid Digit Naming and Rapid Letter Naming. Specifically, the composite score was obtained by adding the subtest standard scores and then converting the sum to a composite score (i.e. a standard score with a M=100 and SD=15) by using a conversion table that accompanied the test battery. The test-retest reliability is 0.70 to 0.92 for ages 7 through 24 and the internal consistency reliability exceed 0.80. Below is a description of the two core subtests that comprised Rapid Naming Composite (RNC).

(a) *Rapid Digit Naming.* This 72-item subtest measured the speed with which an individual could name the numbers on two pages. The Picture Book, which accompanied the test manual, contained two different pages for this subtest, each with four rows and nine columns of randomly arranged numbers. The examinee was instructed to start naming the numbers on the top row, until all the numbers had been named. Testing was discontinued and no score was recorded if the examinee could not name all the digits correctly after error correction during the practice session. There were no ceilings in this subtest and feedback was provided to the student for the practice item but not for the test items. If the examinee hesitated for more than two seconds on a number, it
was marked as incorrect and the examiner pointed to the next item and said, “Go on.” Incorrect responses (numbers skipped or incorrectly named) were marked with a slash through each number named incorrectly. If the examinee skipped a line, the first number on the skipped line was recorded as incorrect, and the examinee was redirected to the correct line. Upon completion, the time was recorded in seconds, and the number of errors made. If the examinee had made more than four errors on Form A, then Form B was not presented to the examinee. The score for this subtest was the number of seconds taken by the examinee to name all of the numbers in Form A and Form B of the test protocol. The test-retest reliability is 0.90 for ages 7 through 24.

(b) Rapid Letter Naming. This 72-item subtest measured the speed with which an individual could name the letters on two pages. The Picture Book, which accompanied the test manual, contained two different pages for this subtest, each with four rows and nine columns of randomly arranged letters. The examinee was instructed to start naming the letters on the top row, until all the letters had been named. Testing was discontinued and no score was recorded if the examinee could not name all the letters correctly after error correction during the practice session. There were no ceilings in this subtest and feedback was provided to the student for the practice item but not for the test items. If the examinee hesitated for more than two seconds on a letter, it was marked as incorrect and the examiner pointed to the next item and said, “Go on.” Incorrect responses (letters skipped or incorrectly named) were marked with a slash through each letter named incorrectly. If the examinee skipped a
line, the first letter on the skipped line was recorded as incorrect, and the examinee was redirected to the correct line. Upon completion, the time was recorded in seconds, and the number of errors made. If the examinee had made more than four errors on Form A, then Form B was not presented to the examinee. The score for this subtest was the number of seconds taken by the examinee to name all of the letters in Form A and Form B of the test protocol. The test-retest reliability is 0.86 for ages 7 through 24.

*DIBELS Benchmark Assessments.* The DIBELS benchmark assessments should be administered three times per year in order to monitor student progress and respond to intervention. Based on reading scores obtained students are categorized as, at benchmark (with no risk), strategic (with limited intervention necessary) intensive (substantial intervention necessary). DIBELS benchmark assessments at various grades consist of between two and four subtests, which change throughout the year according to developmental reading targets. For Grade 2, the autumn benchmark assessment covers (a) Nonsense Word Fluency (NWF), and (b) Oral Reading Fluency (ORF). The winter and spring benchmark assessments consist only of the Oral Reading Fluency (ORF). All second grade students from the two participating schools were screened with the DIBELS assessments and benchmark scores were entered into the DIBELS database, which provided intervention recommendations. However, in the Year 3 study, only data for the Oral Reading Fluency (ORF) benchmark was used to inform student reading-risk status, given that the winter and spring benchmark consist only of the Oral Reading Fluency.
**DIBELS benchmark ORF assessment probes.** Three benchmark assessment probes were collected in the Oral Reading Fluency (ORF) subtest during the school year. The first benchmark was administered at the beginning of the school year (Fall ’07), middle of the year (Winter ’07), and end of the year (Spring ’08). The students in second grade had to read at least 44 correct words per minute to be at benchmark for fall, at least 68 correct words per minute to be at benchmark for winter, and at least 90 correct words per minute to be at benchmark for spring (see Table 3.4). Based upon the scores obtained individual students were identified to be “At Risk,” “Some Risk,” or “Low Risk” for reading failure. Test-retest and alternate form reliability on this measure is consistently over 0.90 and criterion-related validity is similarly high (0.91).

<table>
<thead>
<tr>
<th></th>
<th>Begining of Year</th>
<th>Middle of Year</th>
<th>End of Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Month 1 – 3</td>
<td>Month 4 – 6</td>
<td>Month 7 – 10</td>
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<tr>
<td><strong>Scores</strong></td>
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<tr>
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<td>At risk</td>
<td>At risk</td>
<td>At risk</td>
</tr>
<tr>
<td>26 &lt;= ORF &lt; 44</td>
<td>Some risk</td>
<td>Some risk</td>
<td>Some risk</td>
</tr>
<tr>
<td>ORF &gt;= 44</td>
<td>Low risk</td>
<td>Low risk</td>
<td>Low risk</td>
</tr>
<tr>
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<td>=Intensive</td>
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<tr>
<td></td>
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<td>=Strategic</td>
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</tr>
<tr>
<td></td>
<td>=At Benchmark</td>
<td>=At Benchmark</td>
<td>=At Benchmark</td>
</tr>
</tbody>
</table>

Table 3.4: Second Grade DIBELS Benchmark goals and indicators of risk with three assessment periods per year
Secondary Dependent Measures – DIBELS Progress Monitoring Probes

The Dynamic Indicators of Basic Early Literacy Skills (DIBELS) are a set of standardized, individually administered measures of early literacy development. They are designed to be short (one minute) fluency measures used to consistently monitor the development of pre-reading and early reading skills that inform a recommendation for the level of intervention services the student may need.

Oral Reading Fluency (ORF). This subtest measures the student’s ability to read connected text quickly and accurately. The test-retest reliability for students ranged from 0.92 to 0.97. The ORF subtest has 20 alternate progress monitoring probes. During each probe, the student was provided with a passage and was asked to read the passage as best possible in one-minute timing. Words omitted, substituted, and more than three-second hesitations were recorded as miscues. Words self-corrected within three seconds are scored as accurate. The total number of words read minus the miscues equaled to the number of correct words read per minute or the oral reading fluency rate. DIBELS Oral Reading Fluency (ORF) administration and scoring guidelines are available on the DIBELS website (http://dibels.uoregon.edu) as well as in Appendix K. A sample progress monitoring probe along with the corresponding page from the student assessment booklet can be found in Appendix I and J respectively.

Retell Fluency (RTF). Retell Fluency (RTF) is intended to provide a reading comprehension check. In general, oral reading fluency provides one of the best measures of reading competence, including comprehension, for children in first through third grades (Good & Kaminski, 2006). The purpose of the RTF measure is to identify children whose comprehension is not consistent with their fluency. Accordingly, if a child’s retell
is about 50% of his or her oral reading fluency score, this oral reading fluency score provides a good overall indication of reading proficiency, including comprehension. But, for children who are reading over 40 words per minute and whose retell score is 25% or less of their oral reading fluency, their oral reading fluency score may not be providing a good indication of their overall reading proficiency. There may be a comprehension concern that is not represented by their fluency, if their retell is 15 or less. The students were administered the Retell component only if they were able to read 10 words or more in the ORF subtest. The student is timed for one minute and the total number of words produced by the student in the retell is recorded by marking a line through the numbers as the student is responding. The first time the student did not say anything, he or she was prompted by the examiner, “Try to tell me everything you can.” But the prompt could be used only once. Minor repetitions, redundancies, irrelevancies, and inaccuracies were counted, so long as the student was not going off track. DIBELS Passage Retell (PR) administration and scoring guidelines are available on the DIBELS official website (http://dibels.uoregon.edu) as well as in Appendix K. A sample page from the student assessment booklet can be found in Appendix J.

Measurement of Procedural Integrity

Procedural integrity is also known as integrity reliability (Gresham, Gansle, & Noell, 1993) and refers to the degree to which the methods of assessment were implemented as intended (Gresham, MacMillan, Beebe-Frankenberger, & Bocian, 2000). This study was a follow up study to measure the long-term effects, if any, for students who had received a treatment package in the previous years. An additional goal was to compare the reading performance of these students to a group of similar students who
were initially at low or no risk in kindergarten and did not receive the additional intervention package. Hence accurate and correct implementation of assessment measures decided is critical in order to be able to draw any conclusions from the assessment data obtained.

In this study procedural integrity was measured on the pre and posttest measures as well as on the tri-weekly progress monitoring probes. The oral reading fluency integrity checklist included ten steps as measured by a check mark in the box marked “Fine” and “Needs Practice” next to the step. Similarly, the Retell checklist has 5 steps. These integrity checklists were downloaded from the DIBELS website (http://dibels.uoregon.edu) and a sample of this checklist is included in Appendix (see Appendix L). The data recorder was observed at least for 35% of the data collection sessions.

Interobserver Agreement on Dependent Measures

The interobserver agreement for assessment measures including the progress monitoring probes were randomly measured on 38% of assessment sessions with 100% accuracy. Secondary observers were trained on the use of the assessment protocols for pretest, posttest, and progress monitoring measures. The primary investigator digitally recorded the data as per the assessment given within the set time frames. The second observer independently listened to audio recorded assessment responses and the percentage of exact agreement was calculated. During the pre- and posttest assessments, the secondary observer was physically present, and both the observers collected data at the same time.
Materials

A number of materials were used during the data collection measures during pretest, posttest and tri-weekly progress monitoring probes.

*Stop-watch*

The one-minute sessions for progress monitoring were timed using a stopwatch. A stopwatch was set for one minute for each ORF probe. The primary researcher began the observation once the stopwatch was started and concluded the observation when the minute had elapsed. If an interruption occurred (e.g., school announcements, loud bell etc.), the assessment was paused and restarted.

*Student reading materials*

The materials required to be presented to the student during testing were downloaded from the official DIBELS website (http://dibels.uoregon.edu). Each student was presented with the passage to be read during the timed assessments. A sample passage presented to the student is included in Appendix I.

*Individual student assessment booklets*

Each target student had an individual assessment booklet and the administrator recorded the scores of the subtests in as unobtrusive manner as possible. The assessment booklet sheets were downloaded from the official DIBELS website. A sample booklet is included in Appendix J.

*Voice Recorder*

Student responses were audio recorded using a digital voice recorder at the time of the assessments. The recorder physically measured one-and-half inch by three-inches and was placed in as unobtrusive a manner as possible. Students asked questions about it
the first time when it was used, and appeared to ignore it thereafter. The permanent product obtained was listened to by the secondary observers in order to obtain inter-observer agreement (IOA) data.

General Procedures

This section describes in detail the procedures followed throughout the study in Year 3: pretest steps, grouping of students, training of secondary observers, progress monitoring sessions, and posttest steps (see Figure 3.1).

Assessment Conditions

Pretest. Three subtests from the WJ-III Tests of Achievement (Letter Word Identification; Word Attack; and Passage Comprehension) and six subtests from the CTOPP standardized assessment (Elision; Blending; Memory for Digits; Nonword Repetition; Rapid Digit Naming; and Rapid Letter Naming) were administered. These subtests have been described in detail earlier in this chapter. The phonological awareness, alphabetic principle, and word reading skill knowledge of each participant were identified using these pretest measures.

Grouping of students. The 41 accessible students were assigned to the three groups (Two-Year ERI Treatment, One-Year ERI Treatment, and Comparison) based upon the period of treatment they had received in the previous years. Details of each group have been described previously in this chapter (see Figure 3.1).

Training of secondary observers. Secondary observers were trained on the use of the assessment protocols for pretest, posttest, and progress monitoring measures. The secondary observers were provided copies of the guidelines for the assessment based upon the examiner’s manual that accompanied the assessment batteries or from the
official website (http://dibels.uoregon.edu). They were asked to read these details prior to the training session. During the training session, data recording and scoring methods were explained and discussed by the primary researcher. This was followed by a few practice sample sessions and examples of controversial issues were discussed and resolved with reference to the testing protocol guidelines.

*Progress monitoring sessions.* Only one subtest of the DIBELS progress monitoring probes (Good & Kaminski, 2002) was used to monitor and assess student reading progress and performance. Specifically the Oral Reading Fluency (ORF) passages with the Passage Retell (PR) component were used in Year 3. These ORF probes have been described in detail previously in this chapter. Initially the probes were administered on a tri-weekly basis, as in Year 2. However, starting probe six, these assessments were given every two weeks to be able to more closely monitor student progress and performance.

*Posttest.* The same assessment procedures that had been implemented during the pretest were also followed at the end of the study in the spring of 2008 (see Figure 3.1).
Experimental Design

The Year 3 study was a follow-up study and there was no manipulation of any independent variables. The primary dependent variables (WJ-III subtests: Letter Word Identification, Word Attack, & Passage Comprehension; CTOPP composites: Phonemic Awareness, Phonological Memory, & Rapid Naming) were measured at the beginning and end of the study. The secondary dependent variables (DIBELS progress monitoring probes on Oral Reading Fluency and Passage Retell) were assessed throughout the study, at intervals of two or three weeks.
Figure 3.1 Experimental conditions followed for longitudinal study with at-risk students in years 1, 2, and 3

Year 1 -- Kindergarten

**PRETEST '05**
1. Fall DIBELS Benchmark *
2. WJ-III

**POSTTEST '06**
1. Spring DIBELS Benchmark **
2. WJ-III

Comparison group n=32

Year 2 – First Grade

**PRETEST '06**
1. Fall DIBELS Benchmark **
2. WJ-III
3. CTOPP

**POSTTEST '07**
1. Fall DIBELS Benchmark***
2. WJ-III
3. CTOPP

Comparison group n=23

Year 3 -- Second Grade

**PRETEST '07**
1. Fall DIBELS Benchmark***
2. WJ-III
3. CTOPP

1-Year ERI Treatment group n=13

**POSTTEST '08**
1. Fall DIBELS Benchmark
2. WJ-III
3. CTOPP

2-Year ERI Treatment group n=14

---

* Assigning participants to the level of ERI treatment based on the Fall DIBELS of 2005

**Assigning 2006 Tx participants to the level of ERI treatment based on the Spring DIBELS of 2007

***Assigning 2007 participants to the three groups based on the number of years of ERI treatment from previous years.
Data Analysis

The research questions in this study examine the long-term effects of participation in the ERI intervention program for a period of either one year (kindergarten only), two years (Kindergarten and First Grade), and no participation in the intervention. In addition to this, the performance of ELLs and African American Males (AA Males) in comparison to the other participants across all three groups was examined.

The first goal of the data analysis was to describe the data with respect to measures of variability. This was obtained through calculation of means, standard deviations, and the effect sizes for the primary (WJ-III and CTOPP) and secondary (DIBELS ORF and Retell) dependent measures. An Analysis of Covariance (ANCOVA) was used to measure the difference between the three groups in pre- and posttest data.

The second goal of the data analysis was to explain the variation in the data through the development of particular statistical models. Multiple regression analysis and repeated measures mixed-effects models were used to achieve this goal. The following two sections on the analysis of primary dependent measures and the analysis of secondary dependent measures give a more in-depth overview of these models developed for the specific purposes. However, it should be kept in mind that students were not randomly assigned to the three groups at any point since the target population was a convenience sample. Hence, any generalizations can only be made to this sample and not to the target population. Therefore, a covariate was included in the data analysis procedures to account for learning gains or losses between end of Year 2 and beginning of Year 3.
Analysis of Primary Dependent Measures

The two primary dependent measures included the subtests of the WJ-III Tests and the CTOPP composite scores for Phonological Awareness Composite (PAC) and Rapid Naming Composite (RNC). Additionally, the effects of the individual group status, language, and ethnic differences on DIBELS intervention recommendation status was investigated.

Data for the WJ–III and CTOPP outcomes were analyzed by calculating means, standard deviations and effect sizes for the dependent variables through 2-sample t-tests. These were used to determine if the difference in reading gains was significant. The following formula was used to calculate effect sizes, in order to describe the practical significance of the results:

\[
d = \frac{\text{Mean gain score difference}}{s_{\text{pooled}}}
\]

The following pooled standard deviation was used when the sample sizes of the two groups being compared were not equal:

\[
s_{\text{pooled}} = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2 + \ldots + (n_N - 1)s_N^2}{n_1 + n_2 + \ldots + n_N - N}}
\]

(3.1)

When the sample sizes of the two groups being compared were equal the pooled standard deviation used was the following:

\[
s_{\text{pooled}} = \sqrt{\frac{(n - 1)s_1^2 + (n - 1)s_2^2 + \ldots + (n - 1)s_N^2}{n_1 + n_2 + \ldots + n_N - N}}
\]

(3.2)
The regression model built had the following equation:

$$Y' = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_1 X_2 + \varepsilon$$  \hspace{1cm} (3.3)

Where:

- $Y'$ is the response variable
- $b_0$ is the intercept
- $b_1 \cdots b_3$ are regression coefficients
- $X_1$ is group membership
- $X_2$ is the summer break covariate
- $X_1 \times X_2$ is the interaction between group membership and summer break
- $\varepsilon$ is the residuals, which are assumed to have a constant variation and normal distribution

The second goal of the analysis was to examine the particular differences among the participants. Multiple regression analysis is a type of general linear modeling in which multiple independent variables are regressed on a singular dependent variable (Cohen, Cohen, West, & Aiken, 2003; Hair, Anderson, Tatham, & Black, 1998). This type of statistical analysis is used to explain the variance observed in the dependent variable through the linear relationship of the independent variables. The following multiple linear regression models were built to meet this goal:
1) Multiple Linear Regression to model Woodcock Johnson gain scores for students in the individual groups (Two-Year ERI Treatment, One-Year ERI Treatment, & Comparison)

Model 1a: Effects of group participation in the amount of variance explained in Letter-Word Identification (LWID) gain scores

\[
LWID_i' = b_0 + b_1 (Two \text{ – Year ERI Treatment})_i + b_2 (One \text{ – Year ERI Treatment})_i + b_3 (Summer break_{LWID})_i + b_4 (Two \text{ – Year ERI Treatment})_i (Summer break_{LWID})_i + b_5 (One \text{ – Year ERI Treatment})_i (Summer break_{LWID})_i + \varepsilon_i
\]  

(3.4)

Model 1b: Effects of group participation in the amount of variance explained in Word Attack (WA) gain scores

\[
WA_i' = b_0 + b_1 (Two \text{ – Year ERI Treatment})_i + b_2 (One \text{ – Year ERI Treatment})_i + b_3 (Summer break_{WA})_i + b_4 (Two \text{ – Year ERI Treatment})_i (Summer break_{WA})_i + b_5 (One \text{ – Year ERI Treatment})_i (Summer break_{WA})_i + \varepsilon_i
\]  

(3.5)

Model 1c: Effects of group participation in the amount of variance explained in Passage Comprehension (PC) gain scores

\[
PC_i' = b_0 + b_1 (Two \text{ – Year ERI Treatment})_i + b_2 (One \text{ – Year ERI Treatment})_i + b_3 (Summer break_{PC})_i + b_4 (Two \text{ – Year ERI Treatment})_i (Summer break_{PC})_i + b_5 (One \text{ – Year ERI Treatment})_i (Summer break_{PC})_i + \varepsilon_i
\]  

(3.6)
2) **Multiple Linear Regression to model CTOPP gain scores for students in the individual groups (ERI 2-Year Treatment, ERI 1-Year Treatment, & Comparison)**

Model 2a: Effects of group participation in the amount of variance explained in Phonological Awareness Composite (PAC) gain scores

\[ PAC_i' = b_0 + b_1(Two - Year ERI Treatment) + b_2(One - Year ERI Treatment) + b_3(Summer break_{PAC})_i + b_4(Two - Year ERI Treatment)_i(Summer break_{PAC})_i + b_5(One - Year ERI Treatment)_i(Summer break_{PAC})_i + \varepsilon_i \]  

(3.7)

Model 2b: Effects of group participation in the amount of variance explained in Phonological Memory Composite (PMC) gain scores

\[ PMC_i' = b_0 + b_1(Two - Year ERI Treatment)_i + b_2(One - Year ERI Treatment)_i + b_3(Summer break_{PMC})_i + b_4(Two - Year ERI Treatment)_i(Summer break_{PMC})_i + b_5(One - Year ERI Treatment)_i(Summer break_{PMC})_i + \varepsilon_i \]  

(3.8)

Model 2c: Effects of group participation in the amount of variance explained in Rapid Naming Composite (RNC) gain scores

\[ RNC_i' = b_0 + b_1(Two - Year ERI Treatment)_i + b_2(One - Year ERI Treatment)_i + b_3(Summer break_{RNC})_i + b_4(Two - Year ERI Treatment)_i(Summer break_{RNC})_i + b_5(One - Year ERI Treatment)_i(Summer break_{RNC})_i + \varepsilon_i \]  

(3.9)
3) Multiple Linear Regression to model Woodcock Johnson gain scores for ELL students across all three groups

Model 3a: Effects of ELL status in the amount of variance explained in Letter-Word Identification (LWID) gain scores

\[ LWID_i' = b_0 + b_1(ELL)_i + b_2(\text{Summer break}_{LWID})_i + b_3(ELL)_i(\text{Summer break}_{LWID})_i + \epsilon_i \]  \hspace{1cm} (3.10)

Model 3b: Effects of ELL status in the amount of variance explained in Word Attack (WA) gain scores

\[ WA_i' = b_0 + b_1(ELL)_i + b_2(\text{Summer break}_{WA})_i + b_3(ELL)_i(\text{Summer break}_{WA})_i + \epsilon_i \]  \hspace{1cm} (3.11)

Model 3c: Effects of ELL status in the amount of variance explained in Passage Comprehension (PC) gain scores

\[ PC_i' = b_0 + b_1(ELL)_i + b_2(\text{Summer break}_{PC})_i + b_3(ELL)_i(\text{Summer break}_{PC})_i + \epsilon_i \]  \hspace{1cm} (3.12)
4) Multiple Linear Regression to model CTOPP gain scores for ELL students across all three groups

Model 4a: Effects of ELL status in the amount of variance explained in Phonological Awareness Composite (PAC) gain scores

\[ PAC_i' = b_0 + b_1(ELL)_i + b_2(Summer\ break_{PAC})_i + b_3(ELL)_i(Summer\ break_{PAC})_i + \varepsilon_i \]  

(3.13)

Model 4b: Effects of ELL status in the amount of variance explained in Phonological Memory Composite (PMC) gain scores

\[ PMC_i' = b_0 + b_1(ELL)_i + b_2(Summer\ break_{PMC})_i + b_3(ELL)_i(Summer\ break_{PMC})_i + \varepsilon_i \]  

(3.14)

Model 4c: Effects of ELL status in the amount of variance explained in Rapid Naming Composite (RNC) gain scores

\[ RNC_i' = b_0 + b_1(ELL)_i + b_2(Summer\ break_{RNC})_i + b_3(ELL)_i(Summer\ break_{RNC})_i + \varepsilon_i \]  

(3.15)
5) Multiple Linear Regression to model Woodcock Johnson gain scores for African American Males (AA Males) across all three groups

Model 5a: Effects of AA Male status in the amount of variance explained in Letter-Word Identification (LWID) gain scores

\[ LWID_i' = b_0 + b_1(AA \text{ Male})_i + b_2(Summer \text{ break}_{LWID})_i + b_3(AA \text{ Male})_i(Summer \text{ break}_{LWID})_i + \varepsilon_i \]  
(3.16)

Model 5b: Effects of AA Male status in the amount of variance explained in Word Attack (WA) gain scores

\[ WA_i' = b_0 + b_1(AA \text{ Male})_i + b_2(Summer \text{ break}_{WA})_i + b_3(AA \text{ Male})_i(Summer \text{ break}_{WA})_i + \varepsilon_i \]  
(3.17)

Model 5c: Effects of AA Male status in the amount of variance explained in Passage Comprehension (PC) gain scores

\[ PC_i' = b_0 + b_1(AA \text{ Male})_i + b_2(Summer \text{ break}_{PC})_i + b_3(AA \text{ Male})_i(Summer \text{ break}_{PC})_i + \varepsilon_i \]  
(3.18)
6) Multiple Linear Regression to model CTOPP gain scores for African American Males across all three groups

Model 6a: Effects of AA Male status in the amount of variance explained in Phonological Awareness Composite (PAC) gain scores

\[ \text{PAC}_i' = b_0 + b_1(AA \text{ Male})_i + b_2(\text{Summer break}_{\text{PAC}})_i + b_3(AA \text{ Male})_i(\text{Summer break}_{\text{PAC}})_i + \varepsilon_i \]  

(3.19)

Model 6b: Effects of AA Male status in the amount of variance explained in Phonological Memory Composite (PMC) gain scores

\[ \text{PMC}_i' = b_0 + b_1(AA \text{ Male})_i + b_2(\text{Summer break}_{\text{PMC}})_i + b_3(AA \text{ Male})_i(\text{Summer break}_{\text{PMC}})_i + \varepsilon_i \]  

(3.20)

Model 6c: Effects of AA Male status in the amount of variance explained in Rapid Naming Composite (RNC) gain scores

\[ \text{RNC}_i' = b_0 + b_1(AA \text{ Male})_i + b_2(\text{Summer break}_{\text{RNC}})_i + b_3(AA \text{ Male})_i(\text{Summer break}_{\text{RNC}})_i + \varepsilon_i \]  

(3.21)

Analysis of DIBELS Benchmark Scores

The students were tested on the DIBELS Oral Reading Fluency Benchmarks three times during the school year. This data was charted and graphed into pie charts and was visually analyzed making comparisons to whether students had met their DIBELS recommendations. The comparisons were made between the three groups (One-Year ERI
Treatment group, Two-Year ERI Treatment group, and Comparison group) and also across the three groups specific to language and ethnic differences (e.g., ELLs compared to non-ELLs and AA Males compared to the other students).

Analysis of Secondary Dependent Measures

In order to examine the effects of group membership on students’ growth of learning (i.e., rate of improvement) as measured by continuous data collected over time a repeated measures mixed-effects model (Kleinbaum, Kupper, Muller, & Nizam, 1998) was built. This type of analysis is known as hierarchical linear modeling (Raudenbush & Bryk, 2002; Gersten et al., 2005; Gunn et al., 2005) in the social sciences. The repeated measures mixed-effects analysis is also known as multilevel linear modeling, or random coefficients analysis, random-coefficient regression models, or covariance components models (Singer & Willett, 2003). The repeated measures model is a linear mixed model within the group of general linear models (GLM) (e.g., ANOVA, regression). With the use of GLM models there needs to be a continuous dependent variable. This variable is assumed to have a normal distribution of error since each unit (i.e., individual participant) is continuously assessed at several different time points. The repeated measures study is also desirable if the number of the participants is low. This model also allows for the elimination of variability due to individual differences (Gravetter & Wallnau, 2007). The removal of individual differences from the analysis becomes an advantage in which individual differences exist among the participants being studied, as in this study. The repeated-measures design is more sensitive in detecting a treatment effect because the individual differences have been partitioned out of the analysis.
The focus of this study was to follow up the long term maintenance of gains, if any, for accessible students that had been part of an experimental study in the previous two years. Repeated measures mixed-effects models are suitable for such longitudinal studies where the same assessment is performed more than two times. This statistical model has repeated measures because each observation unit (i.e., individual participant) was assessed at 13 different time points. DIBELS progress monitoring data were collected every three weeks for the first five probes of the study. Starting probe six, data were collected every two weeks. The first five data points were evenly spaced (every three weeks) and the remaining eight data points were again evenly spaced (every two weeks) for all the individual participants. Overall there were a total of 13 assessment probes over the course of this study. The assumption was that the 13 responses on each individual participant were correlated with each other because of the individual effects that persist from one assessment time point to another. Since there was a repeated number of correlated measures the repeated measures mixed-effects model was deemed as the best statistical analysis method to analyze and examine the correlation of these data.

Using the mixed-effects model individual as well as group growth over time was measured on two response variables: Oral Reading Fluency (ORF) and Passage Retell (PR). The data were analyzed with SPSS MIXED (SPSS, n.d.) statistical software. Linear mixed models can also be used with repeated measures data, including situations in which there are different numbers of repeated measurements, different intervals for different cases, or both. Unlike standard methods, linear mixed models use all data and are able to give a more accurate analysis.
For this study, the repeated measures mixed-effects model examined a two-level analysis: (a) Level 1 included repeated assessments nested within individuals, and (b) Level 2 individuals nested within groups condition. Level 1 included random factors such as individual student’s slope, and individual student intercept. By assigning these variables as random factors at level 1, the experimenter assumed their coefficients varied randomly across level 2, (i.e., across group condition). In other words, it was assumed that each student progressed at a different rate over the course of the study. Level 2 involved fixed factors, which were the main variables of interest (e.g., group membership and the effect of time). For example, when observing the ORF, in this study, the group effect variable had three categories: Two-Year ERI-Treatment group, One-Year ERI Treatment group, and Comparison groups, which were coded as “1,” “2,” and “3,” respectively. The Comparison group served as the baseline group, and therefore the slope of the Comparison group was compared to the slopes of the other two groups.

In this study, the repeated measures mixed-effects model was represented by two sets of equations. The Level-1 linear equation models within-subject assessment sessions and represents the change in the performance of each student at time “i” as a function of “time.”

\[
Y_{ij} = \beta_{0j} + \beta_{1j} (Time)_{ij} + r_{ij}, \tag{3.22}
\]

where \( Y_{ij} , \beta_{0j} , \beta_{1j} , r_{ij} \) represent the dependent variable, the intercept of the expected change trajectory, the slope (i.e., rate of change) of the student’s expected change trajectory, and the random measurement error for each assessment session \( i \) within each
individual $j$. In other words, the intercept ($\beta_{0j}$) and the slope ($\beta_{1j}$) are individual growth parameters and the random error (i.e., residuals) is the difference between the expected and the observed values for the $j$th student over time. It is assumed that this random effect is normally distributed with a mean of zero and variance $\sigma^2$, i.e., $r_j \sim N(0, \sigma^2)$.

Based on the data of this study, the subscript $i$ represents the assessment session that ranged from 1 through 13. The subscript $j$ refers to the individual student, which ranged from 1 through 41.

Level-2 linear regression model represents the students nested in groups. The two equations for this model represent the between-subject intercept ($\beta_{0j}$) and the slope ($\beta_{1j}$). Using these equations the goal was to investigate how the intercept and slope were changing for each student when the student was examined when nested within his/her group.

\[
\beta_{0j} = \gamma_{00} + \gamma_{01}(Group_j = 0) + \gamma_{02}(Group_j = 1) + u_{0j} \quad (3.23)
\]

\[
\beta_{1j} = \gamma_{10} + \gamma_{11}(Group_j = 0) + \gamma_{12}(Group_j = 1) + u_{1j} \quad (3.24)
\]

where

$\gamma_{00}$ is the average of level-1 intercepts, $\beta_{0j}$ for individuals in the Comparison group

$\gamma_{01}$ is the average difference (slope) in level-1 intercepts, $\beta_{0j}$, for individuals in the Two-Year ERI Treatment group

$\gamma_{02}$ is the average difference (slope) in level-1 intercepts, $\beta_{0j}$, for individuals in the One-Year ERI Treatment group
\( \gamma_{10} \) is the average of level-1 slopes, \( \beta_{ij} \), for individuals in the Comparison group

\( \gamma_{11} \) is the average difference of level-1 slopes, \( \beta_{ij} \), for individuals in the Two-Year ERI Treatment group

\( \gamma_{12} \) is the average difference (slope) in level-1 slopes, \( \beta_{ij} \), for individuals in the One-Year ERI Treatment group

\( u_{0j} \) is the unique effect of student \( j \) on group intercept that can not be explained by level-2 predictors

\( u_{1j} \) is the unique effect of student \( j \) on group slope holding other level-2 predictors constant

\( (Group_j) = 1 \) if individual \( j \) is in the Two-Year ERI Treatment group and 0 otherwise

\( (Group_j) = 1 \) if individual \( j \) is in the One-Year ERI Treatment group and 0 otherwise

Substituting Equations 3.23 and 3.24 into the equation 3.22, the final equation that was obtained contained both the random and fixed effects and can be written as the following:

\[
Y_{ij} = \gamma_{00} + \gamma_{01}(Group_j = 1) + \gamma_{02}(Group_j = 2) + \gamma_{10}(Time)_{ij} + \gamma_{11}(Group_j = 1)(Time)_{ij} + \gamma_{12}(Group_j = 2)(Time)_{ij} + [u_{0j} + u_{1j}(Time)_{ij} + r_{ij}]
\]  

\( (3.25) \)

In the Equation 3.25, the first set of brackets represents six fixed factors: the intercept \( (\gamma_{00}) \), the group effect for the Two-Year ERI Treatment students \( [\gamma_{01}(Group_j = 1)] \) and the One-Year ERI Treatment Group \( [\gamma_{02}(Group_j = 2)] \) the time...
effect \( \gamma_{10} (Time)_{ij} \), and the interaction of group by time for Two-Year ERI Treatment students \( \gamma_{11} (Group_j = 1) (Time)_{ij} \) and One-Year ERI Treatment students \( \gamma_{12} (Group_j = 2) (Time)_{ij} \). The Comparison group served as a baseline group and hence no specific effects were included for this group in this equation.

In this equation, the fixed effects of group participation (i.e., Two-Year ERI-Treatment, One-Year ERI Treatment, and Comparison group) on student outcomes is termed as group effect. Time effect refers to the average slope for Comparison group over time, and group by time interaction fixed effects refer to the rate of change of Two-Year ERI Treatment group or the One-Year ERI Treatment group’s slope when compared to the slope of the Comparison group with progress in time. The three random factors: the student effect \( u_{0j} \), the interaction effects between the \( j \)th student and time \( u_{ij} (Time)_{ij} \), and the residuals \( r_{ij} \) are included in the second set of brackets.

The repeated measures analyses were performed separately on the two outcome variables (ORF and Passage Retell). Therefore, for the three groups, two separate repeated measures mixed-effects models were run to investigate the group growth of students on each dependent variable. Additional models were run for each of the dependent variables to examine ELL status as well as progress of AA Males in comparison to the performance other students in the study.

When observing the ORF and Retell for the ELL status the variable had two categories: ELL students and Non-ELL students, which were coded as “1” and “2” respectively. In this model the Non-ELL students served as the reference group. The
slope of the ELL students was compared to that of the Non-ELLs. Fixed factors included
the regression slope, which is the same for each group, when the interaction between
group and time is found to be statistically non-significant. Similar coding was set when
comparisons were made to examine the performance of AA Males relative to the other
students in the study.

Model A. Effects of fixed and random factors on student growth on Oral Reading

Fluency (ORF)

\[
ORF_{ij} = \gamma_{00} + \gamma_{01}(Group_j = 1) + \gamma_{02}(Group_j = 2) + \gamma_{10}(Time)_{ij} + \gamma_{11}(Group_j = 1)(Time)_{ij} + \gamma_{12}(Group_j = 2)(Time)_{ij} + [u_{0j} + u_{ij}(Time)_{ij} + r_{ij}]
\]

where, \(u_{0j} \sim N(0, 163.42), u_{ij}(Time)_{ij} \sim N(0, 3.45), r_{ij} \sim N(0, 46.40)\)

Model B. Effects of fixed and random factors on student growth on Passage Retell

(PR)

\[
RETELL_{ij} = \gamma_{00} + \gamma_{01}(Group_j = 1) + \gamma_{02}(Group_j = 2) + \gamma_{10}(Time)_{ij} + \gamma_{11}(Group_j = 1)(Time)_{ij} + \gamma_{12}(Group_j = 2)(Time)_{ij} + [u_{0j} + u_{ij}(Time)_{ij} + r_{ij}]
\]

where, \(u_{0j} \sim N(0, 163.42), u_{ij}(Time)_{ij} \sim N(0, 3.45), r_{ij} \sim N(0, 46.40)\)

**Effect Size**

Effect Size (ES) is a measure of the strength of the relationship between two
variables, or the practical significance of an effect. Cohen’s \(d\), one of the common
methods of calculating the effect size, was used in this study. This method utilizes the
pooled standard deviation of groups compared. Here “d” is defined as the difference between two means divided by the pooled standard deviation for those means. It is important to see how robust the effect size (ES) is in order to consider the effect of significance. Cohen (1988) indicates that an ES of 0.2 may be considered small. An ES of 0.5 is moderate and ES of 0.8 and higher is large. In this study, effect sizes of participation in the individual groups (2-Year ERI Treatment, 1-Year ERI Treatment, and Comparison) as well as for language and ethnic status (e.g., ELLs compared to non-ELLs and AA Males compared to the other students) were calculated separately.
CHAPTER 4

RESULTS

This chapter describes the outcomes of the study. Specifically the results of the study are reported in two sections: (a) analysis of the primary dependent measures, and (b) analysis of the secondary dependent measures.

Analysis of Primary Dependent Measures

This section of the chapter provides the analysis of the six pre- and posttest outcome measures: Letter-Word Identification (LWID), Word Attack (WA), Passage Comprehension (PC), Phonological Awareness Composite (PAC), Phonological Memory Composite (PMC), and Rapid Naming Composite (RNC). The analysis was focused upon three observations: (a) to examine if the change scores ($\Delta$) was different among the three groups based upon the above six dependent measures, (b) to examine if the change scores ($\Delta$) was different across the three groups for ELL and Non-ELLs based upon the above six dependent measures, and (c) to examine if the change scores ($\Delta$) was different across the three groups for African American Male (AA Male) and Non-African American Male (Non-AA Male) students based upon the above six dependent measures. In addition to this, outcomes of the DIBELS Benchmark scores for Oral Reading Fluency (ORF) administered three times during the school year are also reported with the same foci.
Comparisons of the Three Groups

Tables 4.1 and 4.5 present contrast coefficients, pooled standard deviations, and the effect sizes for three standardized subtests of the WJ-III test and the three major composites of the CTOPP test for the three groups. Contrast coefficients provide a comparison measure of two groups based upon each outcome variable, indicating if there is any difference in reading performance between the groups. Results are individually presented making comparisons between the three groups for each of the six primary dependent measures.

*WJ-III Letter-Word Identification (LWID)*. Results from the WJ-III Letter-Word Identification (LWID) subtest revealed that the Two-Year ERI-Treatment group gained on average 2.86 and 5.43 points more than the One-Year ERI Treatment and Comparison groups, respectively. The effect size of the first difference was large (d = 1.37) while the magnitude of the difference between Two-Year ERI Treatment and Comparison was larger (d = 2.95). Additionally, the One-Year ERI group gained on average 2.57 points more than the Comparison group; this difference produced a large effect size (d = 1.69) (see Table 4.1).
<table>
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<th>Contrast Coefficient</th>
<th>$SD_p$</th>
<th>Effect Size (d)</th>
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<td>2-Year ERI Treatment and 1-Year ERI Treatment Groups?</td>
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<td>2-Year ERI Treatment and Comparison Groups?</td>
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<tr>
<td>Comparison and 1-Year ERI Treatment Groups?</td>
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<td>Comparison and 1-Year ERI Treatment Groups?</td>
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</tr>
</tbody>
</table>

*Note. A negative (−) sign on contrast coefficients denotes that the gain difference is in favor of the latter group in each comparison pair.*

Table 4.1: Contrast coefficients, pooled standard deviations, and effect sizes for WJ-III Letter-Word Identification, Word Attack, and Passage Comprehension gain scores
Next, the GLM regression model was used to examine the variance in gain scores (Δ) on Letter Word Identification (LWID) dependent variable. This SPSS ANCOVA method examined the effects of one predictor (group participation), interactions between predictors, and the covariate, on one response variable (LWID). Results from the model indicate that the $R^2$ was 0.25., indicating that 25% of the variance explained in the LWID gain score could be explained by group membership. The unstandardized beta coefficient for the Two-Year ERI Treatment group was 3.70, meaning that students who belonged to this group gained 3.70 points more than the Comparison students. The unstandardized beta coefficient for the One-Year ERI Treatment group was lower (2.12), meaning that students who belonged to this group gained 2.12 points more than the Comparison students (see Table 4.2). The regression coefficient for summer break was - 0.42. This indicates that when all other factors are kept constant, if the summer-break covariate increased by 1.00 point, there would be a decrease of 0.42 points in the LWID gain score for all students.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Beta Coefficients</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>7.26</td>
<td>1.25</td>
</tr>
<tr>
<td>Group Participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-Year ERI Treatment</td>
<td>3.70</td>
<td>1.84</td>
</tr>
<tr>
<td>One-Year ERI Treatment</td>
<td>2.12</td>
<td>1.74</td>
</tr>
<tr>
<td>Covariate: Summer Break - LWID</td>
<td>-0.42</td>
<td>0.17</td>
</tr>
</tbody>
</table>

$R^2 = 0.31$ (Adjusted = 0.25)

Table 4.2: Unstandardized beta coefficients and standard errors of the effects of group participation on WJ-III Letter-Word Identification (LWID) gain scores
Results from the WJ-III Word Attack (WA) subtest showed that the Two-Year ERI Treatment group gained on average 1.74 and 8.00 points more than the One-Year ERI Treatment and Comparison groups, respectively. The effect size of the first difference was large (d = 0.85) and the magnitude of the difference between the Two-Year ERI Treatment and Comparison group was very large (d = 4.71). The One-Year ERI Treatment group gained on average 6.26 points more than the Comparison group and the magnitude of this difference was also very large (d = 3.40) (see Table 4.1).

Next, the GLM regression model was used to examine the variance in gain scores (Δ) on WA dependent variable. This SPSS ANCOVA method examined the effects of one predictor (group participation), interactions between predictors, and the covariate, on one response variable (WA). Results from the model indicate that the R² was 0.56., indicating that 56% of the variance explained in the WA gain score could be explained by group membership. The unstandardized beta coefficient for the Two-Year ERI Treatment group was 6.92, meaning that students who belonged to this group gained 6.92 points more than the Comparison students. The unstandardized beta coefficient for the One-Year ERI Treatment group was lower (4.43), meaning that students who belonged to this group gained 4.43 points more than the Comparison students (see Table 4.3). The regression coefficient for summer break was - 0.84. This indicates that when all other factors are kept constant, if the summer break covariate increased by 1.00 point, there would be a decrease of 0.84 in the WA gain score.
<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>2.96</td>
<td>1.05</td>
</tr>
<tr>
<td>Group Participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-Year ERI Treatment</td>
<td>6.92</td>
<td>1.49</td>
</tr>
<tr>
<td>One-Year ERI Treatment</td>
<td>4.43</td>
<td>1.55</td>
</tr>
<tr>
<td>Covariate: Summer Break - WA</td>
<td>-0.84</td>
<td>0.18</td>
</tr>
</tbody>
</table>

R² = 0.59 (Adjusted = 0.56)

Table 4.3: Unstandardized beta coefficients and standard errors of the effects of group participation on WJ-III Word Attack (WA) gain scores

_WJ-III Passage Comprehension (PC)._ Results from the WJ-III Passage Comprehension subtest showed that the One-Year ERI Treatment group gained on average 4.70 points more than the Two-Year ERI Treatment group. The effect size of this difference was large (d = 3.47). Similarly, the Comparison group on average gained 1.00 points more than the Two-Year ERI Treatment group. The magnitude of this difference was also large (d = 0.86). Additionally, the One-Year ERI Treatment group gained on average 3.70 points more than the Comparison group with a large effect size (d = 3.80) (see Table 4.1).

Next, the GLM regression model was used to examine the variance in gain scores (Δ) on Passage Comprehension (PC) dependent variable. This SPSS ANCOVA method examined the effects of one predictor (group participation), interactions between predictors, and the covariate, on one response variable (PC). Results from the model indicate that the R² was 0.29, indicating that 29% of the variance explained in the PC gain
score could be explained by group membership. The unstandardized beta coefficient for the Two-Year ERI Treatment group was -1.30, meaning that students who belonged to this group gained 1.30 points less than the Comparison students. The unstandardized beta coefficient for the One-Year ERI Treatment group was 3.43, meaning that students who belonged to this group gained 3.43 points more than the Comparison students (see Table 4.4). The regression coefficient for summer break was -0.20. This indicates that when all other factors are kept constant, if the summer break covariate increased by 1.00 point, there would be a decrease of 0.20 points in the PC gain score.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Beta Coefficients</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>4.23</td>
<td>0.82</td>
</tr>
<tr>
<td>Group Participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-Year ERI Treatment</td>
<td>-1.30</td>
<td>1.17</td>
</tr>
<tr>
<td>One-Year ERI Treatment</td>
<td>3.43</td>
<td>1.19</td>
</tr>
<tr>
<td>Covariate: Summer Break - PC</td>
<td>-0.20</td>
<td>0.15</td>
</tr>
</tbody>
</table>

R² = 0.34  (Adjusted = 0.29)

Table 4.4: Unstandardized beta coefficients and standard errors of the effects of group participation on WJ-III Passage Comprehension (PC) gain scores

CTOPP Phonological Awareness Composite (PAC). The difference in pre- and posttest scores was calculated to obtain the gains. Based upon the gain scores obtained on the Phonological Awareness Composite (PAC) a set of contrasts were run in order to examine mean differences between the three groups. Results showed that the One-Year ERI Treatment group gained on average 7.54 points more than the Two-Year ERI
Treatment group and the effect size for this difference was found to be large (d = 1.70). On the other hand, the Two-Year ERI treatment group gained on an average 14.64 more points than the Comparison group. The magnitude of this difference was found to be large (d = 2.88). Additionally, the One-Year ERI Treatment group gained on average 22.19 points more than the Comparison group and the magnitude of this difference was found to be very large (d = 4.34) (see Table 4.5). The performance levels for three groups based upon PAC posttest composite scores are provided in Table 4.9.

Next, the GLM regression model was used to examine the variance in gain scores (Δ) on Phonological Awareness Composite (PAC) dependent variable. This SPSS ANCOVA method examined the effects of one predictor (group participation), interactions between predictors, and the covariate, on one response variable (PAC). Results from the model indicate that the $R^2$ was 0.40, indicating that 40% of the variance explained in the PAC gain score could be explained by group membership. The unstandardized beta coefficient for the Two-Year ERI Treatment group was 10.48, meaning that students, who belonged to this group gained 10.48 points more than the Comparison students. The unstandardized beta coefficient for the One-Year ERI Treatment group was 19.81, meaning that students, who belonged to this group, gained 19.81 points more than the Comparison students (see Table 4.6). The regression coefficient for summer break was -0.63. This indicates that when all other factors are kept constant, if the summer-break covariate increased by 1.00 point, there would be a decrease of 0.63 points in the PAC gain score for all students.
<table>
<thead>
<tr>
<th></th>
<th>Contrast</th>
<th>Contrast Coefficient</th>
<th>SDp</th>
<th>Effect Size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(Is change score different between...)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phonological Awareness Composite (PAC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2-Year ERI Treatment and 1-Year ERI Treatment Groups?</strong></td>
<td></td>
<td>-7.54</td>
<td>4.44</td>
<td>1.70</td>
</tr>
<tr>
<td><strong>2-Year ERI Treatment and Comparison Groups?</strong></td>
<td></td>
<td>14.64</td>
<td>5.09</td>
<td>2.88</td>
</tr>
<tr>
<td><strong>Comparison and 1-Year ERI Treatment Groups?</strong></td>
<td></td>
<td>-22.19</td>
<td>5.11</td>
<td>4.34</td>
</tr>
<tr>
<td>Phonological Memory Composite (PMC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2-Year ERI Treatment and 1-Year ERI Treatment Groups?</strong></td>
<td></td>
<td>-9.45</td>
<td>4.22</td>
<td>2.24</td>
</tr>
<tr>
<td><strong>2-Year ERI Treatment and Comparison Groups?</strong></td>
<td></td>
<td>13.07</td>
<td>4.89</td>
<td>2.67</td>
</tr>
<tr>
<td><strong>Comparison and 1-Year ERI Treatment Groups?</strong></td>
<td></td>
<td>-22.52</td>
<td>5.43</td>
<td>4.15</td>
</tr>
<tr>
<td>Rapid Naming Composite (RNC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2-Year ERI Treatment and 1-Year ERI Treatment Groups?</strong></td>
<td></td>
<td>0.11</td>
<td>5.56</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>2-Year ERI Treatment and Comparison Groups?</strong></td>
<td></td>
<td>10.64</td>
<td>4.32</td>
<td>2.46</td>
</tr>
<tr>
<td><strong>Comparison and 1-Year ERI Treatment Groups?</strong></td>
<td></td>
<td>-10.53</td>
<td>4.14</td>
<td>2.54</td>
</tr>
</tbody>
</table>

*Note*. A negative (-) sign on contrast coefficients denotes that the gain difference is in favor of the latter group in each comparison pair.

Table 4.5: Contrast coefficients, pooled standard deviations, and effect sizes for CTOPP Phonological Awareness, Phonological Memory, and Rapid Naming composite gain scores.
<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-1.72</td>
<td>3.34</td>
</tr>
<tr>
<td>Group Participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-Year ERI Treatment</td>
<td>10.48</td>
<td>4.87</td>
</tr>
<tr>
<td>One-Year ERI Treatment</td>
<td>19.81</td>
<td>4.74</td>
</tr>
<tr>
<td>Covariate: Summer Break - PAC</td>
<td>-0.63</td>
<td>0.26</td>
</tr>
</tbody>
</table>

$R^2 = 0.45$ (Adjusted = 0.40)

Table 4.6: Unstandardized beta coefficients and standard errors of the effects of group participation on CTOPP Phonological Awareness Composite (PAC) gain scores

*CTOPP Phonological Memory Composite (PMC)*. Results from the CTOPP Phonological Memory Composite (PMC) indicated that the One-Year ERI Treatment group gained on average 9.45 points more than the Two-Year ERI Treatment group and the effect size of this difference was large ($d = 2.24$). On the other hand, the Two-year ERI Treatment group gained 13.07 points more than the Comparison group. The magnitude of this difference was large ($d = 2.67$). Additionally, the One-Year ERI Treatment group gained on average 22.52 points more than the Comparison group with a very large effect size ($d = 4.15$) (see Table 4.5). The performance levels for three groups based upon PMC posttest composite scores are provided in Table 4.9.

Next, the GLM regression model was used to examine the variance in gain scores ($\Delta$) on Phonological Memory Composite (PMC) dependent variable. This SPSS ANCOVA method examined the effects of one predictor (group participation),
interactions between predictors, and the covariate, on one response variable (PMC).

Results from the model indicate that the $R^2$ was 0.32, indicating that 32% of the variance explained in the PMC gain score could be explained by group membership. The unstandardized beta coefficient for the Two-Year ERI Treatment group was 13.07, meaning that students who belonged to this group gained 13.07 points more than the Comparison students (see Table 4.7). Since this subtest was not administered in Year 2, there was no summer covariate taken into the regression equation.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Beta Coefficients</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-1.29</td>
<td>3.40</td>
</tr>
<tr>
<td>Group Participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-Year ERI Treatment</td>
<td>13.07</td>
<td>4.82</td>
</tr>
<tr>
<td>One-Year ERI Treatment</td>
<td>22.52</td>
<td>4.91</td>
</tr>
</tbody>
</table>

$R^2 = 0.36$ (Adjusted = 0.32)

Table 4.7: Unstandardized beta coefficients and standard errors of the effects of group participation on CTOPP Phonological Memory Composite (PMC) gain scores

**CTOPP Rapid Naming Composite (RNC).** Results from the CTOPP Rapid Naming Composite (RNC) revealed that the Two-Year ERI Treatment group gained on average 0.11 and 10.64 points more than the One-Year ERI Treatment group and Comparison groups, respectively. The effect size of the difference was negligible ($d = 0.02$) but the magnitude of the second difference was large ($d = 2.46$). Additionally, the One-year ERI Treatment group gained on average 10.53 points more than the
Comparison group and the effect size was large ($d = 2.54$) (see Table 4.5). The performance levels for three groups based upon RNC posttest composite scores are provided in Table 4.9.

Next, the GLM regression model was used to examine the variance in gain scores ($\Delta$) on Rapid Naming Composite (RNC) dependent variable. This SPSS ANCOVA method examined the effects of one predictor (group participation), interactions between predictors, and the covariate, on one response variable (RNC). Results from the model indicate that the $R^2$ was 0.11, indicating that 11% of the variance explained in the RNC gain score could be explained by group membership. The unstandardized beta coefficient for the Two-Year ERI Treatment group was 10.64, meaning that students who belonged to this group gained 10.64 points more than the Comparison students (see Table 4.8). Since this subtest was not administered in Year 2, there was no summer covariate taken into the regression equation.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Beta</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>- 4.07</td>
<td>3.29</td>
</tr>
<tr>
<td>Group Participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-Year ERI Treatment</td>
<td>10.64</td>
<td>4.65</td>
</tr>
<tr>
<td>One-Year ERI Treatment</td>
<td>10.53</td>
<td>4.74</td>
</tr>
</tbody>
</table>

$R^2 = 0.15$ (Adjusted = 0.11)

Table 4.8: Unstandardized beta coefficients and standard errors of the effects of group participation on CTOPP Rapid Naming Composite (RNC) gain scores.
<table>
<thead>
<tr>
<th>Performance Level</th>
<th>Two-Year ERI Treatment</th>
<th>One-Year ERI Treatment</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n)</td>
<td>≈%</td>
<td>(n)</td>
</tr>
<tr>
<td>PACS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Superior</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Superior</td>
<td>2</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>Above Average</td>
<td>1</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Average</td>
<td>10</td>
<td>71</td>
<td>3</td>
</tr>
<tr>
<td>Below Average</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Poor</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Very Poor</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Two-Year ERI Treatment</th>
<th>One-Year ERI Treatment</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMCS</td>
<td>(n)</td>
<td>≈%</td>
<td>(n)</td>
</tr>
<tr>
<td>Very Superior</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Superior</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Above Average</td>
<td>2</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>Average</td>
<td>12</td>
<td>86</td>
<td>1</td>
</tr>
<tr>
<td>Below Average</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Poor</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Very Poor</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Two-Year ERI Treatment</th>
<th>One-Year ERI Treatment</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>RNCS</td>
<td>(n)</td>
<td>≈%</td>
<td>(n)</td>
</tr>
<tr>
<td>Very Superior</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Superior</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Above Average</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Average</td>
<td>7</td>
<td>50</td>
<td>6</td>
</tr>
<tr>
<td>Below Average</td>
<td>4</td>
<td>29</td>
<td>1</td>
</tr>
<tr>
<td>Poor</td>
<td>3</td>
<td>21</td>
<td>0</td>
</tr>
<tr>
<td>Very Poor</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Composite scores of 35<69= “Very Poor”; 70<79= “Poor”; 80<89= “Below Average”; 90<110= “Average”; 111<120= “Above Average”; 121<130= “Superior”; 131<165= “Very Superior” (Adapted from Wagner et al., 1999)

Table 4.9: Performance levels for three groups based upon CTOPP posttest composite scores
Comparisons between ELLs and Non-ELLs across the Three Groups

Tables 4.10 and 4.14 present contrast coefficients, pooled standard deviations, and the effect sizes for the three standardized subtests of the WJ-III test and the three major composites of the CTOPP test for comparisons between ELLs and Non-ELLs across the three groups. Contrast coefficients provide a comparison measure of two groups based upon each outcome variable, indicating if there is any difference in reading performance between the groups. Results are individually presented making comparisons between ELLs and Non-ELLs for each of the six primary dependent measures.

*WJ-III Letter-Word Identification (LWID).* Results from the WJ-III Letter-Word Identification (LWID) subtest showed that the ELLs gained on average 1.16 points more than the Non-ELLs across the three groups. The effect size of this difference was large (d = 1.24) (see Table 4.10).

<table>
<thead>
<tr>
<th>Subtest</th>
<th>Contrast Coefficient</th>
<th>SDp</th>
<th>Effect Size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letter Word Identification (LWID) subtest</td>
<td>ELLs and Non-ELLs across groups?</td>
<td>1.16</td>
<td>1.98</td>
</tr>
<tr>
<td>Word Attack (WA) subtest</td>
<td>ELLs and Non-ELLs across groups?</td>
<td>0.41</td>
<td>1.38</td>
</tr>
<tr>
<td>Passage Comprehension (PC) subtest</td>
<td>ELLs and Non-ELLs across groups?</td>
<td>2.75</td>
<td>2.21</td>
</tr>
</tbody>
</table>

*Note.* A negative (-) sign on contrast coefficients denotes that the gain difference is in favor of the latter group in each comparison pair.

Table 4.10: Contrast coefficients, pooled standard deviations, and effect sizes for WJ-III Letter-Word Identification, Word Attack, and Passage Comprehension gain scores based on language status

120
The GLM regression model was used to examine the variance in gain scores (Δ) on Letter Word Identification (LWID) dependent variable. This SPSS ANCOVA method examined the effects of one predictor (ELL status), interactions between predictors, and the covariate, on one response variable (LWID). Results from the model indicate that the $R^2$ was 0.20, indicating that 20% of the variance explained in the LWID gain score could be explained by group membership. The unstandardized beta coefficient for the ELLs was 1.07, meaning that students, who belonged to this group gained 1.07 points more than the Non-ELLs (see Table 4.11). The regression coefficient for summer break was -0.54. This indicates that when all other factors are kept constant, if the summer-break covariate increased by 1.00 point, there would be a decrease of 0.54 points in the LWID gain score for all students.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Beta</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>8.99</td>
<td>0.82</td>
</tr>
<tr>
<td>Group Participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELLs</td>
<td>1.07</td>
<td>1.76</td>
</tr>
<tr>
<td>Covariate: Summer Break - LWID</td>
<td>-0.54</td>
<td>0.16</td>
</tr>
</tbody>
</table>

$R^2 = 0.24$  (Adjusted = 0.20)

Table 4.11: Unstandardized beta coefficients and standard errors of the effects of language status on WJ-III Letter-Word Identification (LWID) gain scores
Results from the WJ-III Word Attack (WA) subtest showed that the ELLs gained on average 2.75 points more than the Non-ELLs across the three groups. The effect size of this difference was large (d = 1.24) (see Table 4.10).

The GLM regression model was used to examine the variance in gain scores (Δ) on WA dependent variable. This SPSS ANCOVA method examined the effects of one predictor (ELL status), interactions between predictors, and the covariate, on one response variable (WA). Results from the model indicate that the R² was 0.37, indicating that 0.37% of the variance explained in the WA gain score could be explained by group membership. The unstandardized beta coefficient for the ELLs was 3.00, meaning that students who belonged to this group gained 3.00 points more than the Non-ELLs (see Table 4.12). The regression coefficient for summer break was - 0.99. This indicates that when all other factors are kept constant, if the summer-break covariate increased by 1.00 point, there would be a decrease of 0.99 points in the LWID gain score for all students.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Beta</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>6.00</td>
<td>0.83</td>
</tr>
<tr>
<td>Group Participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELLs</td>
<td>3.00</td>
<td>1.77</td>
</tr>
<tr>
<td>Covariate: Summer Break - WA</td>
<td>-0.99</td>
<td>0.21</td>
</tr>
</tbody>
</table>

R² = 0.40  (Adjusted = 0.37)

Table 4.12: Unstandardized beta coefficients and standard errors of the effects of language status on WJ-III Word Attack (WA) gain scores
Results from the WJ-III Passage Comprehension (PC) subtest showed that the ELLs gained on average 0.41 points more than the Non-ELLs across the three groups. The effect size of this difference was small (d = 0.30) (see Table 4.10).

The GLM regression model was used to examine the variance in gain scores (Δ) on Passage Comprehension (PC) dependent variable. This SPSS ANCOVA method examined the effects of one predictor (ELL status), interactions between predictors, and the covariate, on one response variable (PC). Results from the model indicate that the $R^2$ was 0.004, indicating that 0.4% of the variance explained in the PC gain score could be explained by group membership. The unstandardized beta coefficient for the ELLs was 0.79, meaning that students, who belonged to this group gained 0.79 points more than the Non-ELLs (see Table 4.13). The regression coefficient for summer break was -0.24. This indicates that when all other factors are kept constant, if the summer-break covariate increased by 1.00 point, there would be a decrease of 0.24 points in the PC gain score for all students.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Beta Coefficients</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>4.69</td>
<td>0.64</td>
</tr>
<tr>
<td>Group Participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELLs</td>
<td>0.79</td>
<td>1.40</td>
</tr>
<tr>
<td>Covariate: Summer Break - PC</td>
<td>-0.24</td>
<td>0.18</td>
</tr>
</tbody>
</table>

$R^2 = 0.05$ (Adjusted = 0.004)

Table 4.13: Unstandardized beta coefficients and standard errors of the effects of language status on WJ-III Passage Comprehension (PC) gain scores
Results from the CTOPP Phonological Awareness Composite (PAC) revealed that the ELLs gained on average 12.22 points more than the Non-ELLs across the three groups. The effect size of this difference was large (d = 2.18). The Phonological Awareness Composite (PAC) is comprised of the two subtests: Elision (EL) and Blending Words (BW). When looking at these subtests individually, it was noted that the ELLs on average gained 1.52 and 2.59 points more than the Non-ELLs on the Elision (EL) and Blending Words (BW) subtests respectively. The effect size for these differences were large (d = 1.71 and 2.26 respectively) (see Table 4.14).
<table>
<thead>
<tr>
<th>Contrasting Group</th>
<th>Phonological Awareness Composite (PAC)</th>
<th>Elision (EL) subtest</th>
<th>Blending Words (BW) subtest</th>
<th>Phonological Memory Composite (PMC)</th>
<th>Memory for Digits (MD) subtest</th>
<th>Nonword Repetition (NR) subtest</th>
<th>Rapid Naming Composite (RNC)</th>
<th>Rapid Digit Naming (RD) subtest</th>
<th>Rapid Letter Naming (RL) subtest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contrast</td>
<td>12.22</td>
<td>1.52</td>
<td>2.59</td>
<td>15.39</td>
<td>1.30</td>
<td>3.79</td>
<td>11.51</td>
<td>1.09</td>
<td>1.29</td>
</tr>
<tr>
<td>SDp</td>
<td>5.61</td>
<td>0.89</td>
<td>1.15</td>
<td>5.39</td>
<td>0.98</td>
<td>0.94</td>
<td>4.62</td>
<td>0.76</td>
<td>0.67</td>
</tr>
<tr>
<td>Effect Size (d)</td>
<td>2.18</td>
<td>1.71</td>
<td>2.26</td>
<td>2.86</td>
<td>1.32</td>
<td>4.04</td>
<td>2.49</td>
<td>1.45</td>
<td>1.91</td>
</tr>
</tbody>
</table>

Note. A negative (-) sign on contrast coefficients denotes that the gain difference is in favor of the latter group in each comparison pair.

Table 4.14: Contrast coefficients, pooled standard deviations, and effect sizes for WJ-III Letter-Word Identification, Word Attack, and Passage Comprehension gain scores based on language status.

The GLM regression model was used to examine the variance in gain scores ($\Delta$) on Phonological Awareness Composite (PAC) dependent variable. This SPSS ANCOVA method examined the effects of one predictor (ELL status), interactions between predictors, and the covariate, on one response variable (PAC). Results from the model.
indicate that the $R^2$ was 0.29, indicating that 29% of the variance explained in the PAC gain score could be explained by group membership. The unstandardized beta coefficient for the ELLs was 13.94, meaning that students who belonged to this group gained 13.94 points more than the Non-ELLs (see Table 4.15). The regression coefficient for summer break was -0.92. This indicates that when all other factors are kept constant, if the summer-break covariate increased by 1.00 point, there would be a decrease of 0.92 points in the PAC gain score for all students.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Beta</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.03</td>
<td>3.03</td>
</tr>
<tr>
<td>Group Participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELLs</td>
<td>13.94</td>
<td>4.98</td>
</tr>
<tr>
<td>Covariate: Summer Break - PAC</td>
<td>-0.92</td>
<td>0.27</td>
</tr>
</tbody>
</table>

$R^2 = 0.32$ (Adjusted = 0.29)

Table 4.15: Unstandardized beta coefficients and standard errors of the effects of language status on CTOPP Phonological Awareness Composite (PAC) gain scores

CTOPP Phonological Memory Composite (PMC). Results from the CTOPP Phonological Memory Composite (PMC) indicated that the ELLs gained on average 15.39 points more than the Non-ELLs. The effect size of this difference was large ($d = 2.86$). The Phonological Memory Composite (PMC) is comprised of the two subtests: Memory for Digits (MD) and Nonword (NR) Repetition. When looking at these subtests individually, it was noted that the ELLs on average gained 1.30 and 3.79 points
more than the Non-ELLs on the Memory for Digits (MD) and Nonword Repetition (NR) subtests respectively; however, the effect sizes were large (d = 1.32 and 4.04 respectively) (see Table 4.14).

The GLM regression model was used to examine the variance in gain scores (Δ) on Phonological Memory Composite (PMC) dependent variable. This SPSS ANCOVA method examined the effects of one predictor (ELL status), interactions between predictors, and the covariate, on one response variable (PMC). Results from the model indicate that the R² was 0.15, indicating that 15% of the variance explained in the PMC gain score could be explained by group membership. The unstandardized beta coefficient for the ELLs was 15.40, meaning that students who belonged to this group gained 15.40 points more than the Non-ELLs (see Table 4.16).

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>6.94</td>
<td>2.53</td>
</tr>
<tr>
<td>Group Participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELLs</td>
<td>15.40</td>
<td>5.39</td>
</tr>
</tbody>
</table>

R² = 0.17 (Adjusted = 0.15)

Table 4.16: Unstandardized beta coefficients and standard errors of the effects of language status on CTOPP Phonological Memory Composite (PMC) gain scores

CTOPP Rapid Naming Composite (RNC). Results from the CTOPP Rapid Naming Composite (RNC) revealed that the ELLs gained on average 11.51 points more than the Non-ELLs. The effect size of this difference was large (d = 2.49). The Rapid Naming Composite (RNC) is comprised of the two subtests: Rapid Digit Naming (RD)
and Rapid Letter Naming (RL). When looking at these subtests individually, it was noted that the ELLs on average gained 1.09 and 1.29 points more than the Non-ELLs on the Rapid Digit Naming (RD) and Rapid Letter Naming (RN) subtests respectively; the magnitude of these differences were large (d = 1.45 and 1.91 respectively) (see Table 4.14).

The GLM regression model was used to examine the variance in gain scores (Δ) on Rapid Naming Composite (RNC) dependent variable. This SPSS ANCOVA method examined the effects of one predictor (ELL status), interactions between predictors, and the covariate, on one response variable (RNC). Results from the model indicate that the $R^2$ was 0.12, indicating that 12% of the variance explained in the RNC gain score could be explained by group membership. The unstandardized beta coefficient for the ELLs was 11.51, meaning that students, who belonged to this group gained 11.51 points more than the Non-ELLs (see Table 4.17).

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Beta</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.38</td>
<td>2.17</td>
</tr>
<tr>
<td>Group Participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELLs</td>
<td>11.51</td>
<td>4.62</td>
</tr>
</tbody>
</table>

$R^2 = 0.14$ (Adjusted = 0.12)

Table 4.17: Unstandardized beta coefficients and standard errors of the effects of language status on CTOPP Rapid Naming Composite (RNC) gain scores
Comparisons between AA Males and Non-AA Males across the Three Groups Based on the Amount of Improvement

Tables 4.18 and 4.22 present contrast coefficients, pooled standard deviations, and the effect sizes for three standardized subtests of the WJ-III assessment and the three major composites of the CTOPP assessment for comparisons between AA Males and Non-AA Males across the three groups. Contrast coefficients provide a comparison measure of two groups based upon each outcome variable, indicating if there is any difference in reading performance between the groups. Results are individually presented making comparisons between AA Males and Non-AA Males for each of the six primary dependent measures.

WJ-III Letter-Word Identification (LWID). Results from the WJ-III Letter-Word Identification (LWID) subtest showed that the African American male students gained on average 1.46 points more than the Non-African American male students across the three groups. The effect size of this difference was medium (d = 0.77). Within the African American students itself, even though the females were reading a higher number of words per minute, the AA Males gained 1.91 more words on an average than the females. The effect size for this difference was medium (d = 0.53) (see Table 4.18).
<table>
<thead>
<tr>
<th>Subtest</th>
<th>Comparison</th>
<th>Contrast Coefficient</th>
<th>SD_p</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Letter Word Identification (LWID) subtest</strong></td>
<td>AA Males and Non-AA Males?</td>
<td>1.46</td>
<td>1.90</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td>AA Males and AA Females?</td>
<td>1.91</td>
<td>3.61</td>
<td>0.53</td>
</tr>
<tr>
<td><strong>Word Attack (WA) subtest</strong></td>
<td>AA Males and Non-AA Males?</td>
<td>-3.27</td>
<td>2.11</td>
<td>1.55</td>
</tr>
<tr>
<td></td>
<td>AA Males and AA Females?</td>
<td>-4.83</td>
<td>3.50</td>
<td>1.38</td>
</tr>
<tr>
<td><strong>Passage Comprehension (PC) subtest</strong></td>
<td>AA Males and Non-AA Males?</td>
<td>-2.25</td>
<td>1.28</td>
<td>1.76</td>
</tr>
<tr>
<td></td>
<td>AA Males and AA Females?</td>
<td>-3.37</td>
<td>1.75</td>
<td>1.93</td>
</tr>
</tbody>
</table>

*Note. A negative (-) sign on contrast coefficients denotes that the gain difference is in favor of the latter group in each comparison pair.*

Table 4.18: Contrast coefficients, pooled standard deviations, and effect sizes for WJ-III Letter-Word Identification, Word Attack, and Passage Comprehension gain scores.
Next, the GLM regression model was used to examine the variance in gain scores (Δ) on Letter Word Identification (LWID) dependent variable. This SPSS ANCOVA method examined the effects of one predictor (AA Male status), interactions between predictors, and the covariate, on one response variable (LWID). Results from the model indicate that the $R^2$ was 0.19, indicating that 0.19% of the variance explained in the LWID gain score could be explained by group membership. The unstandardized beta coefficient for the AA Males was 0.44, meaning that students who belonged to this group gained 0.44 points more than the Non-AA Males students. On the other hand, the unstandardized beta coefficient for the AA Females was 2.19, meaning that AA Female students gained 2.19 points more than the AA Males students (see Table 4.19). The regression coefficient for summer break was -0.53. This indicates that when all other factors are kept constant, if the summer-break covariate increased by 1.00 point, there would be a decrease of 0.53 points in the LWID gain score for all students.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Beta</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>9.12</td>
<td>0.85</td>
</tr>
<tr>
<td>Group Participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA Males</td>
<td>0.44</td>
<td>1.73</td>
</tr>
<tr>
<td>AA Females</td>
<td>2.19</td>
<td>3.17</td>
</tr>
<tr>
<td>Covariate: Summer Break - LWID</td>
<td>- 0.53</td>
<td>0.16</td>
</tr>
</tbody>
</table>

$R^2 = 0.23$ (Adjusted $= 0.19$)

Table 4.19: Unstandardized beta coefficients and standard errors of the effects of ethnic status on WJ-III Letter-Word Identification (LWID) gain scores
*WJ-III Word Attack (WA).* Results from the WJ-III Word Attack (WA) subtest showed that the Non-AA Male students gained on average 3.27 points more than the African American male students across the three groups. The effect size of this difference was large (d = 1.55). Within the African American students itself, the females on an average gained 4.83 more points than the AA males with a large effect size (d = 1.38) (see Table 4.18).

The GLM regression model was used to examine the variance in gain scores (Δ) on WA dependent variable. This SPSS ANCOVA method examined the effects of one predictor (AA Male status), interactions between predictors, and the covariate, on one response variable (WA). Results from the model indicate that the R² was 0.36, indicating that 36% of the variance explained in the WA gain score could be explained by group membership. The unstandardized beta coefficient for the AA Males was -2.49, meaning that students who belonged to this group gained 2.49 points less than the Non-AA Male students. On the other hand, the unstandardized beta coefficient for the AA Females was 2.78, meaning that AA Female students gained 2.78 points more than the AA Male students (see Table 4.20). The regression coefficient for summer break was -0.96. This indicates that when all other factors are kept constant, if the summer-break covariate increased by 1.00 point, there would be a decrease of 0.96 points in the WA gain score for all students.
Table 4.20: Unstandardized beta coefficients and standard errors of the effects of ethnic status on WJ-III Word Attack (WA) gain scores

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Beta</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>7.28</td>
<td>0.86</td>
</tr>
<tr>
<td>Group Participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA Males</td>
<td>-2.49</td>
<td>1.73</td>
</tr>
<tr>
<td>AA Females</td>
<td>2.78</td>
<td>2.91</td>
</tr>
<tr>
<td>Covariate: Summer Break - WA</td>
<td>-0.96</td>
<td>0.21</td>
</tr>
</tbody>
</table>

$R^2 = 0.39$ (Adjusted = 0.36)

WJ-III Passage Comprehension (PC). Results from the WJ-III Passage Comprehension (PC) subtest showed that the Non-AA Male students gained on average 2.25 points more than the African American male students across the three groups. The effect size of this difference was large ($d = 1.76$). Within the African American students itself, the females gained on an average 3.37 more points than the AA Males with a a large effect size ($d = 1.93$) (see Table 4.18).

The GLM regression model was used to examine the variance in gain scores ($\Delta$) on Passage Comprehension (PC) dependent variable. This SPSS ANCOVA method examined the effects of one predictor (AA Male status), interactions between predictors, and the covariate, on one response variable (PC). Results from the model indicate that the $R^2$ was 0.074, indicating that 7.4% of the variance explained in the PC gain score could be explained by group membership. The unstandardized beta coefficient for the AA
Males was -2.40, meaning that students who belonged to this group gained 2.40 points fewer than the Non-AA Male students. On the other hand, the unstandardized beta coefficient for the AA Females was 3.35, meaning that AA Female students gained 3.35 points more than the AA Male students (see Table 4.21). The regression coefficient for summer break was -0.24. This indicates that when all other factors are kept constant, if the summer-break covariate increased by 1.00 point, there would be a decrease of 0.24 points in the PC gain score for all students.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Beta</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>5.45</td>
<td>0.62</td>
</tr>
<tr>
<td>Group Participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA Males</td>
<td>-2.40</td>
<td>1.27</td>
</tr>
<tr>
<td>AA Females</td>
<td>3.35</td>
<td>1.78</td>
</tr>
<tr>
<td>Covariate: Summer Break - PC</td>
<td>-0.24</td>
<td>0.71</td>
</tr>
</tbody>
</table>

\[R^2 = 0.12 \ (Adjusted = 0.074)\]

Table 4.21: Unstandardized beta coefficients and standard errors of the effects of ethnic status on WJ-III Passage Comprehension (PC) gain scores

**CTOPP Phonological Awareness Composite (PAC).** Results from the CTOPP Phonological Awareness Composite (PAC) revealed that the AA males gained on average 8.95 points less than the non AA male students across the groups. The effect size of this difference was large \((d = 1.61)\). The Phonological Awareness Composite (PAC) is comprised of the two subtests: Elision (EL) and Blending Words (BW). When looking at
these subtests individually, it was noted that the Non-AA Males on average gained 1.28 and 1.39 points more than the AA Male students on the Elision (EL) and Blending Words (BW) subtests respectively; both the effect sizes were large (d = 1.48 and 1.21 respectively). Within the African American students itself, the females on an average gained 1.03 and 2.16 more points than the AA males on the Elision and Blending Words subtests respectively. Both the effect sizes of these differences were large (d = 0.75 and 1.12 respectively) (see Table 4.22).

Next, the GLM regression model was used to examine the variance in gain scores (Δ) on Phonological Awareness Composite (PAC) dependent variable. This SPSS ANCOVA method examined the effects of one predictor (AA Male status), interactions between predictors, and the covariate, on one response variable (PAC). Results from the model indicate that the R² was 0.71, indicating that 71% of the variance explained in the PAC gain score could be explained by group membership. The unstandardized beta coefficient for the AA Males was -6.45, meaning that students who belonged to this group gained 6.45 points less than the Non-AA Males students. On the other hand, the unstandardized beta coefficient for the AA Females was 0.77, meaning that AA Female students gained 0.77 points more than the AA Males students (see Table 4.23). The regression coefficient for summer break was -0.79. This indicates that when all other factors are kept constant, if the summer-break covariate increased by 1.00 point, there would be a decrease of 0.79 points in the PAC gain score for all students.
<table>
<thead>
<tr>
<th>Test</th>
<th>AA Males and Non-AA Males across groups?</th>
<th>Contrast Coefficient</th>
<th>SD_p</th>
<th>Effect Size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phonological Awareness Composite (PAC)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA Males and Non-AA Males across groups?</td>
<td>8.95</td>
<td>5.55</td>
<td>1.61</td>
<td></td>
</tr>
<tr>
<td>AA Males and AA Females across groups?</td>
<td>9.73</td>
<td>9.17</td>
<td>1.06</td>
<td></td>
</tr>
<tr>
<td>Elision (EL) subtest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA Males and Non-AA Males across groups?</td>
<td>1.28</td>
<td>0.87</td>
<td>1.48</td>
<td></td>
</tr>
<tr>
<td>AA Males and AA Females across groups?</td>
<td>-1.03</td>
<td>1.37</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>Blending Words (BW) subtest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA Males and Non-AA Males across groups?</td>
<td>1.39</td>
<td>1.15</td>
<td>1.21</td>
<td></td>
</tr>
<tr>
<td>AA Males and AA Females across groups?</td>
<td>-2.16</td>
<td>1.93</td>
<td>1.12</td>
<td></td>
</tr>
<tr>
<td><strong>Phonological Memory Composite (PMC)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA Males and Non-AA Males across groups?</td>
<td>-6.50</td>
<td>5.62</td>
<td>1.16</td>
<td></td>
</tr>
<tr>
<td>AA Males and AA Females across groups?</td>
<td>-1.89</td>
<td>9.53</td>
<td>0.19</td>
<td></td>
</tr>
<tr>
<td>Memory for Digits (MD) subtest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA Males and Non-AA Males across groups?</td>
<td>-0.68</td>
<td>0.96</td>
<td>0.71</td>
<td></td>
</tr>
<tr>
<td>AA Males and AA Females across groups?</td>
<td>-0.49</td>
<td>1.63</td>
<td>0.29</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* A negative (-) sign on contrast coefficients denotes that the gain difference is in favor of the latter group in each comparison pair.

Table 4.22: Contrast coefficients, pooled standard deviations, and effect sizes for CTOPP Phonological Awareness, Phonological Memory, and Rapid Naming Composite gain scores and individual subtests based upon ethnic status.
Table 4.22 continued

<table>
<thead>
<tr>
<th>Subtest</th>
<th>AA Males and Non-AA Males across groups?</th>
<th>AA Males and AA Females across groups?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonword Repetition (NR) subtest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA Males and Non-AA Males across groups?</td>
<td>- 1.51</td>
<td>1.05</td>
</tr>
<tr>
<td>AA Males and AA Females across groups?</td>
<td>- 1.43</td>
<td>1.43</td>
</tr>
<tr>
<td>Rapid Naming Composite (RNC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA Males and Non-AA Males across groups?</td>
<td>- 5.43</td>
<td>4.72</td>
</tr>
<tr>
<td>AA Males and AA Females across groups?</td>
<td>- 3.34</td>
<td>4.35</td>
</tr>
<tr>
<td>Rapid Digit Naming (RD) subtest</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>- 0.72</td>
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Note. A negative (-) sign on contrast coefficients denotes that the gain difference is in favor of the latter group in each comparison pair.
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\[ R^2 = 0.21 \quad (Adjusted = 0.71) \]

Table 4.23: Unstandardized beta coefficients and standard errors of the effects of ethnic status on CTOPP Phonological Awareness Composite (PAC) gain scores

*CTOPP Phonological Memory Composite (PMC).* Results from the CTOPP Phonological Memory Composite (PMC) revealed that the AA Males gained on average 6.50 points less than the Non-AA Male students. The effect size of this difference was large \( (d = 1.16) \). The AA Females gained on an average 1.89 more points than the AA Males on this composite. The Phonological Memory Composite (PMC) is comprised of the two subtests: Memory for Digits (MD) and Nonword Repetition (NR). When looking at these subtests individually, it was noted that the Non-AA Males on average gained 0.68 and 1.51 points more than the AA Male students on the Memory for Digits (MD) and Nonword Repetition (NR) subtests respectively with large effect sizes for both differences \( (d = 0.71 \text{ and } 1.44 \text{ respectively}) \). Within the African American students itself, the females made 0.49 and 1.43 more points on an average than the AA Males for the
MD and NR subtests respectively. The effect sizes of the first difference were small 
(d = 0.29) and large for the second difference (d = 1.00) (see Table 4.22).

Next, the GLM regression model was used to examine the variance in gain scores 
(Δ) on Phonological Memory Composite (PMC) dependent variable. This SPSS 
ANCOVA method examined the effects of one response variable (PMC), one predictor 
(AA Male status), interactions between predictors and the covariate. Results from the 
model indicate that the R² was 0.008, indicating that 0.8% of the variance explained in 
the PMC gain score could be explained by group membership. The unstandardized beta 
coefficient for the AA Males was - 6.50, meaning that students who belonged to this 
group gained 6.50 points less than the Non-AA Males students. On the other hand, the 
unstandardized beta coefficient for the AA Females was 1.89, meaning that AA Female 
students gained 1.89 points more than the AA Males students (see Table 4.24).

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\[ R^2 = 0.33 \quad \text{(Adjusted} = 0.008) \]

Note: No summer covariate presented since the PMC was not administered in Year 2 Posttest

Table 4.24: Unstandardized beta coefficients and standard errors of the effects of ethnic 
status on CTOPP Phonological Memory Composite (PMC) gain scores
CTOPP Rapid Naming Composite (RNC). Results from the CTOPP Rapid Naming Composite (RNC) revealed that the AA Males gained on average 0.72 points less than the Non-AA Male students. The effect size of this difference was large (d = 0.98). Within the African American students, the females gained an average of 3.34 points more than the AA Males with a large effect size (d = 0.77). The Rapid Naming Composite (RNC) is made up of the two subtests: Rapid Digit Naming (RD) and Rapid Letter Naming (RN). When looking at these subtests individually, it was noted that the Non-AA Males on average gained 0.72 and 0.58 points more than the AA Male students on the Rapid Digit Naming (RD) and Rapid Letter Naming (RN) subtests respectively, with large effect sizes (d = 0.98 and 0.86 respectively). Within the African American students itself, the females gained on an average 0.69 and 0.43 points more than the males. The effect sizes of these differences were large (d = 0.83) and medium (d = 0.52) (see Table 4.22).

The GLM regression model was used to examine the variance in gain scores (Δ) on Rapid Naming Composite (RNC) dependent variable. This SPSS ANCOVA method examined the effects of one predictor (AA Male status), interactions between predictors, and the covariate, on one response variable (RNC). Results from the model indicate that the R² was 0.008, indicating that 0.8% of the variance explained in the RNC gain score could be explained by group membership. The unstandardized beta coefficient for the AA Males was -5.43, meaning that students, who belonged to this group gained 5.43 points less than the Non-AA Males students. On the other hand, the unstandardized beta coefficient for the AA Females was 3.34, meaning that AA Female students gained 3.34 points more than the AA Males students (see Table 4.25).
Predictors Unstandardized Beta SE

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<td>AA Females</td>
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<td>4.35</td>
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$R^2 = 0.03$ (Adjusted = 0.008)

Note: No summer covariate presented since the PMC was not administered in Year 2 Posttest

Table 4.25: Unstandardized beta coefficients and standard errors of the effects of ethnic status on CTOPP Rapid Naming Composite (RNC) gain scores

DIBELS Benchmark Assessments

This section describes the results of the DIBELS spring benchmark assessments for each group along with the number and percentage of students who improved their recommendation status, stayed the same, or regressed. The results are reported through comparisons made between the three groups and also across the three groups specific to language and ethnic differences.

Comparisons of the Three Groups Based upon the DIBELS Benchmark Scores for Oral Reading Fluency (ORF)

Two-Year ERI Treatment group. When looking at the students in the Two-Year ERI Treatment group in fall 2007, 13 (92.86%) needed intensive intervention, one (7.14%) was strategic, and none of the Two-Year ERI Treatment students were at benchmark. In winter, 13 (92.86%) of the students continued to need intensive
intervention, none of the students were strategic, and one (7.14%) moved to benchmark. At the end of the study in spring 2008, 12 (85.71%) students needed intensive intervention, one was strategic, and one (7.14%) was at benchmark. See Figure 4.1 to compare proportional recommendations in fall, winter, and spring. In the spring this change for the Two-Year ERI Treatment group represented an improvement for 2 (14.28%) of the students, while there was no change for 12 (85.72%) of them.

![Figure 4.1: Proportion of Two-Year ERI students with intensive, strategic, and benchmark intervention recommendations in fall, winter, and spring of Year 3](image)

One-Year ERI Treatment group. In fall 2007, the One-Year ERI Treatment group had 4 (30.77%) at intensive, 2 (15.38%) at strategic, and 7 (53.85%) at benchmark. In winter, 5 (38.47%) students needed intensive intervention, none were at strategic, and 8 (61.54%) were at benchmark. At the end of the study in spring 2008, 2 (15.38%) of the students needed intensive, 3 (23.08%) were at strategic and 8 (61.54%) were at benchmark. See Figures 4.2 to compare proportional recommendations in fall, winter, and spring. In the spring this change represented an improvement for 2 (15.39%) of the students, and 11 (84.61%) remained the same.
Comparison group. An examination of the Comparison group in fall 2007, 4 (28.57%) needed intensive intervention, 5 (35.71%) were strategic, and 5 (35.71%) of the Comparison students were at benchmark. In winter, 5 (35.71%) of the students needed intensive intervention, 4 (28.57%) were strategic, and 5 (35.71%) were at benchmark. At the end of the study in the spring, the number of the students who needed intensive intervention had increased to 7 (50%), 2 (14.28%) were strategic, and 5 (35.71%) were at benchmark. See Figure 4.3 to compare proportional recommendations in fall, winter, and spring. In the spring none of the Comparison students improved, eleven (78.57%) remained the same, and three (21.43%) regressed.
Comparisons between ELLs and Non-ELLs on DIBELS Benchmark Scores for Oral Reading Fluency (ORF) across the Three Groups

When looking at ELLs in fall 2007, four (44.44%) needed intensive intervention, 2 (22.22%) were strategic, and 3 (33.33%) of ELLs were at benchmark. In winter, 6 (66.66%) of ELLs continued to need intensive intervention, none of the ELLs were strategic, and 3 (33.33%) moved to benchmark. At the end of the study in spring 2008, 3 (33.33%) ELLs needed intensive intervention, 2 (22.22%) were strategic, and 4 (44.44%) were at benchmark. See Figure 4.4 to compare proportional recommendations for ELLs in fall, winter, and spring. In the spring this change for the ELLs represents an improvement for one (11.11%) of the students, 8 (88.88%) remained the same, and none of the ELLs regressed.

When looking at Non-ELLs in fall 2007, 17 (53.12%) needed intensive intervention, 6 (18.75%) were strategic, and 9 (28.13%) of the ELLs were at benchmark. In winter, 17 (53.12%) of the students continued to need intensive intervention, 4
(12.5%) of the students were strategic, and 11 (34.38%) moved to benchmark. At the end of the study in spring 2008, 18 (56.25%) students needed intensive intervention, 4 (12.5%) were strategic, and 10 (31.25%) were at benchmark. See Figure 4.4 to compare proportional recommendations in fall, winter, and spring. In the spring for Non-ELLS this change represents an improvement for one (3.12%) student, thirty (93.75%) remained the same, and one (3.12%) regressed.

Figure 4.4: Proportion of ELLs across the three groups with intensive, strategic, and benchmark intervention recommendations in fall, winter, and spring of Year 3

Comparisons between AA Males and Non-AA Males on DIBELS Benchmark Scores for Oral Reading Fluency (ORF) across the Three Groups

African American Males across the three groups. When looking at the African American males across the three groups in fall 2007, 6 (60.0%) needed intensive intervention, 3 (30.0%) were strategic, and one (10.0%) was at benchmark. In winter, 5
(50.0%) of the students needed intensive intervention, 3 (30.0%) were strategic, and 2 (20.0%) were at benchmark. At the end of the study in spring 2008, 5 (50%) of the students needed intensive intervention, 4 (40%) were at strategic, and only one (10%) was at benchmark. In the spring this change for AA Males represents an improvement for one (10%) of the students and 9 (90%) showed no change. For Non-AA Males this represents an improvement for 2 (7.56%) of the students, 28 (89.22%) remained the same, and one (3.22%) regressed. See Figure 4. 5 to compare proportional recommendations in fall, winter, and spring.

In fall 2007, 15 (46.80%) of the Non-AA Males needed intensive intervention, 6 (18.7%) were strategic, and 11 (34.30%) were at benchmark. In winter, 18 (56.25%) of the Non-AA Males needed intensive intervention, 2 (6.25%) were strategic, and 12 (37.55%) were at benchmark. At the end of the study in spring 2008, 17 (53.10%) of the students needed intensive intervention, 2 (6.25%) were at strategic, and 13 (40.60%) were at benchmark. In the spring this change for Non-AA Males this represents an improvement for 2 (7.56%) of the students, 28 (89.22%) remained the same, and one (3.22%) regressed. See Figure 4. 6 to compare proportional recommendations in fall, winter, and spring.
African American male and female students across the three groups. When making comparisons between the performance of the African American males and female students across the three groups in fall 2007 it was found that AA Females were found to be reading at a higher level than the AA Males. Specifically, in the fall, no AA Females needed intensive intervention, one (14.29%) was strategic, and 6 (85.71%) were at benchmark. In winter, one (14.29%) of the AA Female students needed intensive intervention, none were strategic, and 6 (85.71%) were at benchmark. At the end of the study in spring 2008, one (14.29%) of the AA Female students needed intensive intervention, none were strategic, and 6 (85.71%) were at benchmark. In the spring this change for AA Females represents an improvement for none of the students, 6 (85.71%) remained the same, and one (14.29%) regressed. See Figure 4.6 to compare proportional recommendations in fall, winter, and spring.

Conversely, in the fall, 6 (60.0%) AA Males needed intensive intervention, 3 (30%) were strategic, and one (10%) of the AA Male students was at benchmark. In winter, 5 (50%) AA Male students needed intensive intervention, 3 (30%) were strategic,
and 2 (20%) of the students were at benchmark. At the end of the study in spring 2008, 5 (50%) of the AA Male students needed intensive intervention, 4 (40%) received a strategic intervention recommendation, and one (10%) of the students was at benchmark. In the spring this change for AA Males represents an improvement for one (10%) of the students and 9 (90%) showed no change. See Figure 4.6 to compare proportional recommendations in fall, winter, and spring.
Figure 4.6: Proportion of African American Male, Female, and other students across the three groups with intensive, strategic, and benchmark intervention recommendations in fall, winter, and spring of Year 3
Analysis of the Secondary Dependent Measures

The secondary dependent measures in this study were the thirteen progress monitoring probes taken at tri- and bi-weekly intervals. The first five probes were taken every three weeks followed by bi-weekly assessments for the next 8 probes. As described in Chapter 3, a repeated measures mixed-effects model was developed to analyze the secondary dependent variables. This model contained both fixed and random factors. The effects of these factors were examined on two response variables: Oral Reading Fluency (ORF) and Passage Retell (PR). The analysis of these data is presented in two parts. The first part is a descriptive analysis of comparisons made between the three groups, followed by comparisons made across the three groups based on language, ethnicity, and gender status. This is followed by results reported from the repeated measures mixed-effects model for both Oral Reading Fluency (ORF) and Passage Retell (PR) variables. When using the model to compare the growth of the three groups, they were individually coded from 1 through 3 as follows: Two-Year ERI Treatment Group = “1”; One-Year ERI Treatment Group = “2”; and Comparison group = “3”. Therefore, the Comparison group was used as the reference group, and the relative growth of each of the other two groups was compared to the Comparison group. Additional comparisons were made across the three groups based on language, ethnicity, and gender status, specific to ELLs and African American Males.

*DIBELS Oral Reading Fluency (ORF) Comparisons of the Three Groups*

Table 4.26 and Figure 4.7 provide the means and standard deviations of student performance on the DIBELS Oral Reading Fluency (ORF) based upon the three groups. The thirteen probes or time intervals are represented by \( T_1 \) through \( T_{13} \). On \( T_1 \) it is
noticed that students in the Two-Year ERI Treatment group had a group mean of 17.6 correct words per minute with standard deviations of 10.2. The students in the One-Year ERI Treatment group (M = 71.9) and Comparison group (M = 56.9) had higher mean performances and also showed larger between group variability. These large standard deviations were noticed because some of the students in each of these groups were strong readers (e.g. with 135 corrects per minute) in comparison to a few weaker students (e.g. with 12 corrects per minute). Specifically in T1 the group mean difference between Two-Year ERI Treatment group and the One-Year ERI Treatment group was 54.2 and the difference between Two-Year ERI Treatment group and the Comparison group was 39.2. The One-Year ERI Treatment group and the Comparison group both started off with higher group means than the Two-Year ERI Treatment group.

All three groups show a steady increase from T1 through T4, with all three groups showing a drop in T5. When closely examining probes T6 through T9 all three groups made gains in the group means with the One-Year ERI treatment group making the highest gains. Each of the three groups show a slight drop in T10 and T11. On T13 it is noticed that students in the Two-Year ERI Treatment group had a group mean of 46.07 correct words per minute with standard deviations of 25.9. The students in the One-Year ERI Treatment group (M = 131.2 and SD = 60.1) and Comparison group (M = 65.2 and SD = 26.7) had higher mean performances. Once again, on probe T13 these large standard deviations were noticed for the One-Year ERI Treatment group because of the ORF variability among students within this group (e.g., in the One-Year ERI Treatment group a strong reader had 238 corrects per minute in comparison to a weaker student with 19 corrects per minute). By the end of T13, the group mean difference between Two-Year
ERI Treatment and the One-Year ERI Treatment group increased from 54.2 to 84.1 points, with the latter showing higher performance. Additionally, by T13 the group mean difference between the Two-Year ERI treatment and the Comparison group decreased from 39.2 to 19.1 points with the latter showing higher performance (see Table 4.26). Additionally, by T13 the group mean difference between the One-Year ERI treatment and the Comparison group was much larger and had increased from 14.9 to 65.9 points with the former showing higher performance. The change in group mean differences across the thirteen probes is also shown graphically in Figure 4.7.
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Table 4.26: Means and standard deviations on DIBELS Oral Reading Fluency (ORF) for all groups from T₁ through T₁₂
Figure 4.7: Group mean performance on DIBELS Oral Reading Fluency (ORF) of all groups over time

Next, Table 4.27 and Figure 4.8 present the results from the repeated measures mixed-effects model. The statistical model investigated the effects of fixed and random factors on student growth on Oral Reading Fluency from T1 through T13. Based on the statistical analysis results (see Table 4.27), the following model was obtained:

\[
ORF_{ij} = 60.65 - 48.9 \times (Two - Year ERI Treatment)_j \\
+ 1.67 \times (Two - Year ERI Treatment)_j + 0.65 \times (Time)_j - 0.017 \times (Time)_j^2 \\
+ 1.15 \times (Two - Year ERI Treatment)_j \times (Time)_{ij} \\
+ 2.36 \times (One - Year ERI Treatment)_j \times (Time)_{ij}
\] (4.1)
The above equation and Table 4.27 show that on average the intercept of Two-Year ERI Treatment students was 48.90 correct words per minute lower than the intercept of Comparison students (i.e., 60.65). The average difference of intercept for One-Year ERI Treatment group was 1.67 correct words per minute higher than the Comparison group. These results suggest that the Two-Year ERI Treatment students at time 0 (the beginning of the Year 3 study) had lower averages than the Comparison group. The One-Year ERI Treatment group had a higher average at time zero than both the Comparison group and the Two-Year ERI Treatment group.

Group by time interaction fixed effects pertained to the growth rate of each experimental group compared to the average slope of the Comparison group over time. Specifically, the growth rate for Two-ERI Treatment students from T1 through T13 on the Oral Reading Fluency subtest was on average 1.15 correct words per minute (wpm) per period higher than the average rate of Comparison group (0.65). Likewise, the growth of One-Year ERI Treatment group improved on average by 2.36 correct wpm per period more than the rate of the Comparison group (0.65). This suggests that the One-Year ERI Treatment group had the steepest slope (3.01) of learning on Oral Reading Fluency subtest followed by the Two-Year ERI Treatment group slope (1.8) compared to the Comparison group.

When looking at the random effects, it is noticed that there is a wide variation (756.95) among students in initial ability, but little variation in the growth rate of students within groups over time (0.55). The student random effect estimate of 756.95 indicates that students differed from the mean initial score within their groups by an average of
27.51 ($=\sqrt{756.95}$) correct words per minute. For the student by time interaction random effect, it was found that the variance of student growth rate within the three groups was 0.55, suggesting that the growth rate of students within each group was on average homogeneous. The estimated variance of the residual, 168.33, suggests that after accounting for group effects and individual random effects, the model is in error by approximately 12.97 correct words per minute on average.

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Table 4.27: Mixed-effects model estimates for Oral Reading Fluency (ORF) for all three groups
Figure 4.8: Growth curves for DIBELS Oral Reading Fluency (ORF) of all groups over time

_DIBELS Passage Retell (PR) Comparisons of the Three Groups_

Tables 4.28 and Figure 4.9 provide the means and standard deviations of student performance on the DIBELS Passage Retell (PR) based upon the three groups. The thirteen probes or time intervals are represented by T₁ through T₁₃. On T₁ it is noticed that students in the Two-Year ERI Treatment group had a group mean of 3.7 words retold per minute with standard deviations of 2.6. The students in the One-Year ERI Treatment group (M = 8.3) and Comparison group (M = 8.5) had higher mean performances and also showed larger between group variability (SD = 5.8 and 4.9 respectively). These large standard deviations were noticed because some of the students in each of these groups
retold more words (e.g. with 22 words per minute) in comparison to students with fewer words retold (e.g. with 2 words per minute). Specifically in T1 the group mean difference between Two-Year ERI Treatment group and the One-Year ERI Treatment group was 4.60 and the difference between Two-Year ERI Treatment group and the Comparison group was 4.79.

The One-Year ERI Treatment group and the Comparison group both started off with higher group means than the Two-Year ERI Treatment group. All three groups show a slight gain from T1 through T4, with the One-Year ERI Treatment group showing a drop in T5. When closely examining probes T6 through T7, all three groups made gains in the group means with the One-Year ERI treatment group making the highest gains. On T13 it is noticed that students in the Two-Year ERI Treatment group had a group mean of 26.5 words per minute with standard deviations of 17.0. The students in the One-Year ERI Treatment group (M = 47.4 and SD = 17.6) had higher mean performance than students in the Comparison group (M = 27.5 and SD = 9.1). Once again, on probe T13 the large standard deviations were noticed for the One-Year ERI Treatment group (SD = 17.6) and Two-Year ERI Treatment group (SD = 17.0) because of the ORF variability between students within each group. For in the One-Year ERI Treatment and Two-Year ERI Treatment groups a strong reader retold 76.0 and 78.0 words per minute in comparison to a lower retell of 10.0 and 12.0 words per minute, respectively. By the end of T13, the group mean difference between Two-Year ERI Treatment and the One-Year ERI Treatment group increased from 4.6 to 20.8 points, with the latter showing higher performance. However, by T13 the group mean difference between the Two-Year ERI
treatment and the Comparison group was very small and decreased from 4.7 to 0.9 points with the latter showing slightly higher performance. Additionally, by $T_{13}$ the group mean difference between the One-Year ERI treatment and the Comparison group was larger and had increased from 0.19 to 19.6 points with the former showing higher performance. The change in group mean differences across the thirteen probes is also shown graphically in Figure 4.9.
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Table 4.28: Means and standard deviations on DIBELS Passage Retell (PR) for all groups from T₁ through T₁₃
Next, the results from the repeated measures mixed-effects model are presented in Table 4.29 and Figure 4.10. The statistical model investigated the effects of fixed and random factors on student growth on passage Retell (PR) from $T_1$ through $T_{13}$. When using the model to compare the Passage Retell growth of the three groups, they were individually coded from 1 through 3 as follows: Two-Year ERI Treatment Group = “1”; One-Year ERI Treatment Group = “2”; and Comparison group = “3”. Therefore, the Comparison group was used as the reference group, and the relative growth in Passage Retell (PR) of each of the other two groups was compared to that of the Comparison group. Based on the statistical analysis results (see Table 4.29), the following model was obtained:
The above equation and Table 4.29 show that on average the intercept of Two-Year ERI Treatment students was 4.95 correct words per minute lower than the intercept of Comparison students (i.e., 4.00). The average difference of intercept for One-Year ERI Treatment group was 5.41 correct words per minute lower than the Comparison group (i.e. 4.00). These results suggest that both Two-Year ERI Treatment and One-Year ERI Treatment students at time 0 (the beginning of Year 3 study) had lower averages than the Comparison group.

Group by time interaction fixed effects pertained to the growth rate of each experimental group compared to the average slope of the Comparison group over time. Specifically, the growth rate for Two-ERI Treatment students from T1 through T13 on the Passage Retell (PR) subtest was on average 0.03 retell words per period lower than the average rate of Comparison group (1.15). Likewise, the growth of One-Year ERI Treatment group improved on average by 0.84 retell words per period more than the rate of the Comparison group. This suggests that the One-Year ERI-Treatment group had the steepest slope (1.99) of learning on Passage Retell subtest followed by the Comparison (1.15) and the Two-Year ERI Treatment (1.12) groups.

When examining at the random effects, it is noticed that there was no variation (0.00) among students in initial ability, but there was an increase in variation (0.28) in the
The growth rate of students within groups over time. For the student by time interaction random effect, it was found that the variance of student growth rate within the three groups was 0.28, suggesting that the growth rate of students within each group was on average homogeneous. The estimated variance of the residual, 70.69, suggests that after accounting for group effects and individual random effects, the model is in error by approximately $8.41 (= \sqrt{70.69})$ correct words per minute on average.

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Table 4.29: Mixed-effects model estimates for DIBELS Passage Retell (PR) for all groups
Tables 4.30 and Figure 4.11 present the means and standard deviations of student performance on the DIBELS ORF subtest over the thirteen time intervals, according to the students English language (ELL) status. At probe T1, ELLs had a group mean performance of 48.1 correct words per minute with standard deviations of 36.9 points. The Non-ELLs showed similar performance with a group mean of 48.3 points and standard deviations of 37.3. Specifically in T1, the group mean difference between ELLs and Non-ELLs was very small (0.2). On probes T2, T3, and T4, both groups of students
are found to improve their performance. Both groups showed small increases from T1 through T4, followed by a significant drop in T5, with ELLs (M = 52.2) performing slightly higher than Non-ELLs (M = 47.5). Starting probe T6 both ELL and Non-ELL groups made sharp gains. Although both groups were increasing their mean scores, upon closer examination, it is noticed that the ELLs were consistently making higher gains than the Non-ELLs. On probes T10 and T11, both groups show slight drops in performance, followed by increases in means on probes T12 and T13. By the end of T13, the group mean difference between ELLs and the Non-ELLs increased from 0.2 to 18.3 points, with the former showing higher performance (see Table 4.7). The change in mean differences between the ELL and Non-ELLs across the three groups from probe T1 through T13 is also shown graphically in Figure 4.11.

The growth of ELLs and Non-ELLs across the thirteen probes was also compared using the repeated measures mixed-effects model. The statistical model investigated the effects of fixed and random factors on student growth on passage Retell (PR) from T1 through T13. When using the model to compare the growth of students, the ELLs and Non-ELLs were individually coded as “1” and “2” respectively, with Non-ELLs as the reference group. In other words, the growth in Passage Retell of each of the other two groups was compared to that of the Comparison group.
Table 4.30: Means and standard deviations on DIBELS Oral Reading Fluency (ORF) for ELLs and Non-ELLs across all groups from $T_1$ through $T_{13}$

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Table 4.30: Means and standard deviations on DIBELS Oral Reading Fluency (ORF) for ELLs and Non-ELLs across all groups from $T_1$ through $T_{13}$
Figure 4.11: Group mean performance on DIBELS Oral Reading Fluency (ORF) for ELLs and Non-ELLs across all groups over time

Based on the statistical analysis results (see Table 4.31), the following model was obtained:

\[
ORF_{ij} = 45.82 - 6.07 (ELL)_j + 1.63 (Time)_{ij} - 0.02 (Time)_{ij}^2 + 0.73 (ELL)_j (Time)_{ij}
\]  (4.3)

The above equation and Table 4.31 show that on average the intercept of ELLs was 6.07 correct words per minute lower than the intercept of the Non-ELLs (i.e., 45.82). This result suggests that at time 0 (the beginning of Year 3 study) the ELLs had lower averages than the Non-ELLs across the three groups.
Group by time interaction fixed effects pertained to the growth rate of the ELLs compared to the average slope of the Non-ELLs over time. Specifically, the growth rate for ELLs from T₁ through T₁₃ on the ORF subtest was on average 0.73 correct words per minute (wpm) per period higher than the average rate of Non-ELLs across the three groups (1.63). This suggests that the ELLs had the higher slope (2.36) of learning on the ORF subtest compared to Non-ELLs (1.63).

Examining the random effects, much variation is noted among students in initial ability (1285.23), but there was a decrease in variation (1.38) in the growth rate of students within groups over time. The student random effect estimate of 1285.23 indicates that students differed from the mean initial score within their groups by an average of 35.85 (\(=\sqrt{1285.23}\)) correct words per minute. For the student by time interaction random effect, it was found that the variance of student growth rate within the two groups was 1.38, suggesting that there was not much average difference in the growth rate of students within each group. The estimated variance of the residual, 168.72, suggests that after accounting for group effects and individual random effects, the model is in error by approximately 12.99 correct words per minute on average.
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Table 4.31: Mixed-effects model estimates for DIBELS Oral Reading Fluency (ORF) for ELLs and Non-ELLs across all groups
Figure 4.12: Growth curves for DIBELS Oral Reading Fluency (ORF) for ELLs and Non-ELLs across all groups over time

**DIBELS Passage Retell (PR) Comparisons between ELLs and Non-ELLs across the Three Groups**

Tables 4.32 and Figure 4.13 provide the means and standard deviations of student performance on the DIBELS Passage Retell (PR) based upon ELL status. The thirteen probes or time intervals are represented by $T_1$ through $T_{13}$. On $T_1$ it is noticed that ELLs had a group mean of 5.2 retell words per minute with standard deviations of 4.2. Similarly, the Non-ELLs had a higher group mean of 7.2 with between student variability of 4.2. Specifically in $T_1$ the group mean difference between ELLs and Non-ELLs was
2.0 points. Both groups showed similar performance with small increases from T₁ through T₅. Starting probe T₆ both ELL and Non-ELL groups made sharp gains with higher variability in between group variability for both groups as well. Starting probes T₉ through T₁₃, the ELLs were consistently making slightly higher gains than the Non-ELLs. By T₁₃ it is noticed that ELLs had increased their group mean to 38.7 retold words with standard deviations of 22.2. The Non-ELLs had a lower group mean of 32.0 retell with standard deviations of 16.1. Once again, on probe T₁₃ the large standard deviations were noticed for the ELLs because of the Passage Retell variability between students within this group (e.g., among the ELLs a strong reader had 65 retell words in comparison to a weaker student with 12 words retold). By the end of T₁₃, the group mean difference between ELLs and the Non-ELLs increased from 2.0 to 6.7 points, with the former showing higher performance (see Table 4.12). The change in mean differences between the ELL and Non-ELLs across the three groups from probe T₁ through T₁₃ is also shown graphically in Figure 4.13.
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Table 4.32: Means and standard deviations on DIBELS Passage Retell (PR) for ELLs and Non-ELLS across all groups from T1 through T13.
Next, the results from the repeated measures mixed-effects model are presented. The first statistical model investigated the effects of fixed and random factors on student growth on Passage Retell from T1 through T13. Based on the statistical analysis results (see Table 4.33), the following model was obtained:

\[ RETELL_{ij} = 1.87 - 5.83 (ELL)_{i} + 1.33 (Time)_{ij} - 0.005 (Time)^2_{ij} + 0.35 (ELL)_{i} (Time)_{ij} \]  

The above equation and Table 4.33 show that on average the intercept of ELLs was 5.83 retell words lower than the intercept of Non-ELLS (i.e., 1.33). This result
indicates that the ELLs at time 0 (the beginning of the study in Year 3) had lower averages than the Non-ELLs across the three groups.

Group by time interaction fixed effects pertained to the growth rate of ELLs compared to the average slope of the Non-ELLs over time. Specifically, the growth rate for ELLs from T₁ through T₁₃ on the Passage Retell (PR) subtest was on average 0.35 retell words per period higher than the average rate of the Non-ELLs across the three groups (1.33). This suggests that the ELLs had the steeper slope (1.68) of learning on Passage Retell subtest compared to the Non-ELLs across the three groups (1.33).

When looking at the random effects, it is noticed that there is no variation among students in initial ability (0.00), but a slight increase in the variation (0.40) in the growth rate of students within groups over time. For the student by time interaction random effect, it was found that the variance of student growth rate within the three groups was 0.40, suggesting that the growth rate of students within each group was on average homogeneous. The estimated variance of the residual, 70.45, suggests that after accounting for group effects and individual random effects, the model is in error by approximately 8.39 correct words per minute on average.
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Table 4.33: Mixed-effects model estimates for DIBELS Passage Retell (PR) for ELLs and Non-ELLS across all groups
DIBELS Oral Reading Fluency (ORF) Comparisons between AA Males and Non-AA Males across the Three Groups

Tables 4.34 and Figure 4.15 present the means and standard deviations of student performance on the DIBELS ORF subtest over the thirteen time intervals, comparing the performance of AA males across the three groups to the other students. The first five probes were administered every three weeks and the following eight probes were given at two-week intervals. On probe T₁, AA Males had a group mean performance of 39.5 correct words per minute in comparison to the higher mean of 51.09 for the other students in the study. The standard deviations for AA Males (22.7) were lower than that for the
other students (40.2). On the other hand, AA females showed higher reading performance with group means of 88.2 and also had large within group variability of 37.0 points.

Both AA Males and Non-AA Males made increases in group means from probes T1 through T4, followed by a drop for all students in probe T5. This was followed by leveled performances in probes T6, T7, and T8 for all groups. On T9 performance for ORF group means for all groups spiked and then dropped in T10 and T11. By probe T13, the difference in group means between AA Males and other students increased from 11.6 to 23.6 correct words per minute, with AA Males showing lower performance.

When looking at the difference in ORF performance between AA Males and AA Females, it was noticed that the AA Females continued to show higher ORF reading performance than the AA Male students. By probe T13, the difference in the ORF means between AA Males and AA Females had increased from 48.7 to 77.0 correct words per minute. Additionally, the between-group variability in their scores for probe T13 had increased from 14.3 to 36.3 points. Changes in group mean differences over time are also depicted in Figure 4.15.
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<th>T₃</th>
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<th>T₉</th>
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Table 4.34: Means and standard deviations on DIBELS Oral Reading Fluency (ORF) for AA Males, AA Females and other students across all groups from T₁ through T₁₃
Next, the Table 4.35 and Figure 4.16 present the results from the repeated measures mixed-effects model for the Oral Reading Fluency (ORF) of the students based upon AA Male status. The statistical model investigated the effects of fixed and random factors on student growth on ORF from T₁ through T₁₃. Based on the statistical analysis results (see Table 4.35), the following model was obtained:

\[
\text{ORF}_{ij} = 46.23 - 7.17 (AA \text{ Males})_j + 1.92 (Time)_{ij} - 0.02 (Time)^2_{ij} - 0.55 (AA \text{ Males})_j (Time)_{ij}
\]  

(4.5)
The above equation and Table 4.35 show that on average the intercept of AA Male students was 7.17 correct words per minute lower than the intercept of the Non-AA Males (i.e., 46.23). These results suggest that the AA Male students at time 0 (the beginning of Year 3 study) had lower averages than their counterparts.

Group by time interaction fixed effects pertained to the growth rate of AA Males compared to the average slope of the Non-AA Males over time. Specifically, the growth rate for AA Male students from T₁ through T₁₃ on the Oral Reading Fluency subtest was on average 0.55 correct words per minute (wpm) per period lower than the average rate of Non-AA Male students (1.92). This suggests that the AA Male students had the lower slope (1.37) of learning on Oral Reading Fluency subtest compared to the Non-AA Male students in the study.

When looking at the random effects, it is noticed that there is a wide variation among students in initial ability (1275.54), but little variation in the growth rate of students within groups over time (1.41). The student random effect estimate of 1275.54 indicates that students differed from the mean initial score within their groups by an average of $(35.71 = \sqrt{1275.54})$ correct words per minute. For the student by time interaction random effect, it was found that the variance of student growth rate within the two groups was 1.41, suggesting that the growth rate of students within each group was on average quite homogeneous. The estimated variance of the residual, 168.79, suggests that after accounting for group effects and individual random effects, the model is in error by approximately 12.99 correct words per minute on average.
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<td>Student x Time</td>
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</table>

Table 4.35: Mixed-effects model estimates for DIBELS Oral Reading Fluency (ORF) for AA Males, AA Females, and other students across all three groups
Passage Retell was steepest for the One-Year ERI Treatment group (1.99), followed by the Comparison group (1.15), and the Two-Year ERI Treatment group (1.12).

Summary of Findings for Research Question Three

The growth rate in ORF were highest for the One-Year ERI Treatment students, followed by the gains made by the Two-Year ERI Treatment students and then the Comparison group. The growth rate in Retell were highest for the One-Year ERI Treatment students, followed by the gains made by the Comparison students and then the Two-Year ERI Treatment group. The stronger responders (One-Year ERI Treatment students) continued to maintain relative gains, even after the kindergarten intervention had been terminated for two years. These gains were similar to those made by other researchers (e.g., Berninger et al., 2002; Coyne et al., 2004; Gunn et al., 2005; Simmons et al., 2008). The poorer responders (Two-Year ERI Treatment students) continued to make gradual progress, similar to students in the Berninger et al. (2002) study, but did not meet grade levels due to their slow gains. A disconcerting finding was that many of the Comparison students increased their at-risk status with time, making them more susceptible to reading failure and special education risk.

Research Question Four

How do the students compare in their performance on progress monitoring scores for Oral Reading Fluency (ORF) and Passage Retell (PR) as measured by DIBELS according to ethnic/language and gender differences (i.e., ELLs and African American males)?
the other students in the study. On the other hand, AA females showed higher retell performance with group means of 10.7 and also had large within group variability of 7.0 points.

Both AA Males and Non-AA Males made slight increases in group means from probes T1 through T5. This was followed by a rise in means for all group performances in probes T6 through T13. By probe T13, AA Male students were exhibiting lower mean performances than the Non-AA Males in the study across the three groups.

When looking at the difference in ORF performance between AA Males and AA Females, it was noticed that the AA Females continued to show higher ORF reading performance than the AA Male students. By probe T13, the difference in the ORF means between AA Males and AA Females had increased from 2.3 to 13.6 correct words per minute. Additionally, the between-group variability in their scores for probe T13 had increased from 7.0 to 15.5 points. Changes in group mean differences for AA Males, Non-AA Males, and AA Females over time are also depicted in Figure 4.17.
Table 4.36: Means and standard deviations on DIBELS Passage Retell (PR) for AA Males, AA Females, and other students across all groups from T<sub>1</sub> through T<sub>13</sub>

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<tr>
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Table 4.36: Means and standard deviations on DIBELS Passage Retell (PR) for AA Males, AA Females, and other students across all groups from T<sub>1</sub> through T<sub>13</sub>
Next, the results from the repeated measures mixed-effects model are presented. The first statistical model investigated the effects of fixed and random factors on student growth on Passage Retell from $T_1$ through $T_{13}$. Based on the statistical analysis results (see Table 4.37), the following model was obtained:

$$RETELL_{ij} = 0.03 + 2.27 \ (AA \ Males)_j + 1.43 \ (Time)_{ij} - 0.005 \ (Time)^2_{ij} - 0.13 \ (AA \ Males)_j \ (Time)_{ij}$$

(4.6)

The above equation and Table 4.37 show that on average the intercept of AA Male students was 2.27 retell words higher than the intercept of the Non-AA Males (0.03) across the three groups. This indicates that the AA Male students at time 0 (the
beginning of Year 3 study) had higher averages than the Non-AA Males across the three groups.

Group by time interaction fixed effects pertained to the growth rate of AA Males compared to the average slope of the Non-AA Males across the three groups over time. Specifically, the growth rate for AA Male students from T₁ through T₁₃ on the Passage Retell subtest was on average 0.13 Retell words per period lower than the average rate of Non-AA Males (1.44). This suggests that the AA Males across the three groups had the less steep slope (1.31) of learning on Passage Retell subtest compared to their Non-AA Male counterparts.

When looking at the random effects, it is noticed that there is no variation among students in initial ability (0.00), but an increase in variation in the growth rate of students within groups over time (0.40). For the student by time interaction random effect, it was found that the variance of student growth rate within the three groups was 0.40, suggesting that the growth rate of students within each group was on average quite homogeneous. The estimated variance of the residual, 71.60, suggests that after accounting for group effects and individual random effects, the model is in error by approximately 8.46 correct words per minute on average.
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Table 4.37: Mixed-effects model estimates for DIBELS Passage Retell (PR) for AA Males and Non-AA Males across all groups

Figure 4.18: Growth curves for DIBELS Passage Retell (PR) for AA Males and Non-AA Males across all groups over time
**DIBELS Oral Reading Fluency (ORF) Comparisons between AA Males and AA Females across the Three Groups**

The means and standard deviations with effect sizes were not calculated to examine the variance in growth for the DIBELS ORF and Passage RETELL components. However, the repeated measures mixed analysis was conducted using the African American students as a filter from all the students in the study. The equation formulated to examine the growth in ORF for AA Females compared to that of AA Males was as follows:

\[
ORF_{ij} = 38.31 + 46.56 (AA Females)_j + 1.51 (Time)_j - 0.022 (Time)_j^2 + 1.09 (AA Females)_j (Time)_{ij} \tag{4.7}
\]

For the Oral Reading Fluency (ORF) measure, the above equation and Table 4.38 show that on average the intercept of AA Female students was 46.55 correct words per minute higher than the intercept of the AA Males (i.e., 38.31). These results suggest that the AA Male students at time 0 (the beginning of Year 3 study) had lower averages than their AA Female counterparts.

Group by time interaction fixed effects pertained to the growth rate of AA Females compared to the average slope of the AA Males over time. Specifically, the growth rate for AA Female students from T₁ through T₁₃ on the Oral Reading Fluency subtest was on average 1.09 correct words per minute (wpm) per period higher than the average rate of AA Male students (1.51). This suggests that the AA Females had the steeper slope (1.92) of learning on the ORF subtest compared to the AA Male students.
When looking at the random effects, it is noticed that there is a wide variation (696.57) among students in initial ability, but drop in variation in the growth rate of students within groups over time (2.33). The student random effect estimate of 696.57 indicates that students differed from the mean initial score within their groups by an average of 26.39 (≈ \sqrt{696.57} \) correct words per minute. For the student by time interaction random effect, it was found that the variance of student growth rate within AA males and AA Females was 2.33, suggesting that the growth rate of students within each group was on average different. The estimated variance of the residual, 236.98, suggests that after accounting for group effects and individual random effects, the model is in error by approximately 15.39 correct words per minute on average.

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Table 4.38: Mixed-effects model estimates for DIBELS Oral Reading Fluency (ORF) for AA Females and AA Males across all groups
The equation formulated to examine the growth in Passage Retell (PR) for AA Females compared to that of AA Males was as follows:

\[
RETELL_{ij} = 1.94 + 0.45 (AA Females)_j + 1.38 (Time)_{ij} - 0.007 (Time)_{ij}^2 \\
+ 0.54 (AA Females)_j (Time)_{ij}
\]  

The above equation and Table 4.39 show that on average the intercept of AA Female students was 0.45 correct words per minute higher than the intercept of the AA Males (1.94) across the three groups. This indicates that the AA Female students at time 0 (the beginning of Year 3 study) had higher averages than the AA Males across the three groups.

Group by time interaction fixed effects pertained to the growth rate of AA Females compared to the average slope of the AA Males across the three groups over time. Specifically, the growth rate for AA Female students from T1 through T13 on the Passage Retell subtest was on average 0.54 Retell words per period higher than the average rate of AA Males (1.38). This suggests that the AA Females across the three groups had the higher slope (1.92) of learning on Passage Retell subtest compared to their AA Male counterparts (0.54).

When looking at the random effects, it is noticed that there is no variation among students in initial ability (0.00), but an increase in variation in the growth rate of students within groups over time (0.30). For the student by time interaction random effect, it was found that the variance of student growth rate within the three groups was 0.30, suggesting that the growth rate of students within each group was on average quite homogeneous. The estimated variance of the residual, 87.94, suggests that after
accounting for group effects and individual random effects, the model is in error by approximately 9.38 correct words per minute on average.

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<td>Student x Time</td>
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</table>

Table 4.39: Mixed-effects model estimates for DIBELS Passage Retell (PR) for AA Females and AA Males across all groups
CHAPTER 5

DISCUSSION

This study examined the long-term effectiveness of a supplemental phonological awareness reading intervention of the early reading skills of students who had received two years of the ERI reading intervention (i.e., Two-Year ERI Treatment group). Additionally, the study investigated the growth rates of 13 strong responders to Year 1’s reading intervention (i.e., One-Year ERI Treatment group), as well as the growth rate of 14 comparison students who were identified as having no or low reading risk markers in kindergarten (i.e., Comparison group).

All 41 available participants in the sample were administered subtests from two major standardized tests (WJ-III and CTOPP) at the beginning and end of the year long study. In addition to this, all students were given the DIBELS ORF Benchmark assessments at the beginning, middle, and end of the school year. The students were assigned to these three groups based upon their previous year (Year 2). This year (i.e., Year 3), none of the 41 second-grade participants received supplemental ERI intervention in addition to core classroom instruction. Furthermore, the reading progress of the students was monitored on a tri- or bi-weekly basis on two measures of the DIBELS
progress monitoring assessments: the ORF and Passage Retell subtests. Data obtained from the assessment measures were analyzed using visual analyses, regression models, contrasts, growth curves, and repeated measures mixed-effects modeling.

This chapter discusses the results of the study in regard to the six research questions proposed in Chapter One. Limitations, implications for practice, and directions for future research are also discussed. This is followed by conclusive remarks that summarize the study.

**Research Question One**

*Based upon the amount of improvement (i.e. gain scores) as measured by each of the six reading variables [Letter Word Identification (LWID), Word Attack (WA), Passage Comprehension (PC), Phonological Awareness Composite (PAC), Phonological Memory Composite (PMC), Rapid Naming Composite (RNC)], is the change (Δ - delta) gain score different between*

(a) 2-Year ERI Treatment Group and 1-Year ERI Treatment Group?

(b) 2-Year ERI Treatment Group and Comparison Group?

(c) 1-Year ERI Treatment Group and Comparison Group?

First the results for each variable with respect to group comparisons are discussed, followed by a summary of the findings.

**WJ-III Letter-Word Identification (LWID)**

The results from the contrast comparisons on the *Letter-Word Identification (LWID)* subtest indicated that the improvement made by the Two-Year ERI Treatment group was greater than the gains made by each of the other two groups (i.e. One-Year
ERI Treatment and Comparison). A large effect size (d = 1.37) was evident of the
difference between the Two-Year ERI Treatment and One-Year ERI Treatment students.
The difference between the Two-year ERI Treatment and Comparison group was even
larger (d=2.95). Comparing the difference between the Comparison and One-Year ERI
Treatment students, it was noticed that the latter students showed higher gains, with a
moderate effect size for this difference (d= 0.69). In other words, the Two-Year ERI
Treatment group improved its word recognition skills more than the other two groups.
Similarly, the One-Year ERI Treatment group (i.e. the strong responders to the
kindergarten ERI treatment) continued to perform at higher levels than their Comparison
group peers, who initially were identified with minimal or no beginning reading risk (in
Year 1). These findings are consistent with those obtained by Simmons et al. (2008)
where each year students increased their “out of risk status” and decreased their “at-risk”
status as measured by the LWID subtest. Similarly, Gunn et al. (2005) also found
differences in LWID still significantly evident for treatment students two years after the
intervention had been provided.

WJ-III Word Attack (WA)

Results from the contrast comparisons on the Word Attack (WA) measures
indicate that the Two-Year ERI Treatment students made the greatest amount of
improvement than the gains made by each of the other two groups (i.e. One-Year ERI
Treatment and Comparison). Large effect sizes were detected for the difference between
both the Two-Year ERI Treatment and the One-Year ERI Treatment (d = 0.85) and the
Two-Year ERI Treatment and Comparison group (d = 4.71). Examining differences
between Comparison and One-Year ERI Treatment students, it was found that the latter
group showed greater gains, with large magnitudes of the difference (d = 3.40). In short,
the results from the WA subtest denote that the Two-Year ERI Treatment improved in its
word attack skills more than the other two groups. These findings parallel those obtained
by Simmons et al. (2008) where gains were sustained over time, even until the end of
grade three. Each year, the number of students who moved “out of risk” as measured by
the WA subtest increased, while the number of “at risk” students dropped
correspondingly.

**WJ-III Passage Comprehension (PC)**

Results from the contrast comparisons revealed that the One-Year ERI Treatment
group showed more improvement than both the Comparison and Two-Year ERI
Treatment groups, with large magnitude of the differences (d = 3.80 and 3.47
respectively). When looking at the *DIBELS ORF* progress monitoring scores of the One-
Year ERI Treatment, these students were also found to have high oral reading fluency
followed by that of the Comparison group and the Two-Year ERI Treatment group. As
pointed out by several researchers (e.g., Fuchs, Fuchs, Hosp, & Jenkins, 2001; Pikulski &
Chard, 2005; Pinell, et al., 1995; Rasinski & Hoffman, 2003) there is a significant
relationship between oral reading fluency and reading comprehension. Fuchs et al. found
a strong correlation between oral reading fluency and performance on the Reading
Comprehension subtest of the Stanford Achievement Tests; however, the student sample
included older students with reading disabilities. The One-Year ERI Treatment students
performed better than the Comparison students who were initially at no or low risk for
reading failure in Year 1. The lowest performance in Passage Comprehension skills of the Two-Year ERI Treatment students (i.e., “slow responders”) indicated that these students needed additional secondary or tertiary intensive instruction to develop better comprehension skills to close the gap between their non-risk peers.

CTOPP – Phonological Awareness Composite (PAC)

Results from the contrast comparisons on the Phonological Awareness Composite (PAC) indicated that the One-Year ERI Treatment made greater gains than the progress made by the Two-Year ERI Treatment and Comparison groups. The magnitude of the difference between the Two-Year ERI Treatment and Comparison groups was large (d = 2.88). Similarly, the effect sizes were large for the other group differences (i.e., d = 1.70 for Two-Year ERI Treatment and One-Year ERI Treatment; d = 4.30 for Comparison and One-Year ERI Treatment). The more than 22-point gain score difference between the One-Year ERI Treatment and Comparison groups on the PAC subtest signifies that the fast responders had maintained high phonological awareness gains two years after the ERI treatment had been stopped. Additionally, these students had surpassed the improvement of the Comparison group, who were initially (in Year 1) at low or no reading risk. This finding resembles those obtained by Coyne and colleagues (2004) and Gunn et al. (2005). When examining the contrasts between the Two-Year ERI Treatment and Comparison students, the former showed a higher gain score difference of more than 14 points. The magnitude of the group differences were evident from the large effect size (d = 2.88). The Two-Year ERI Treatment group continued to make some steady progress
in Year 3. These findings are consistent with those obtained by Berninger et al. (2002) where the 50% “slower responders” made gradual progress in Year 2.

**CTOPP – Phonological Memory Composite (PMC)**

Results from the contrast comparisons on the *Phonological Memory Composite* (PMC) measure show that the amount of improvement made by the One-Year ERI Treatment group was greater than the improvement obtained by each of the other two groups (i.e., Two-Year ERI Treatment and Comparison). The 22-point greater gains made by the One-Year ERI Treatment compared to the Comparison group indicate that the One-Year ERI Treatment students continued to thrive with the core classroom instruction without additional intervention. According to Wagner, Torgesen, and Rashotte (1999), the PMC score represents a student’s ability to code information phonologically for temporary storage in short-term memory. The authors state that a deficit in this area is more likely to impair decoding of new words, as well as listening and reading comprehension of more complex sentences. The One-Year ERI Treatment group also had greatest gains for the CTOPP – Phonological Composite scores and WJ-III Passage Comprehension scores compared to the other two groups.

The Two-Year ERI Treatment students made higher gains (more than 13 points) than the Comparison group, with a large effect size (d = 2.67) of the magnitude of the difference. This finding contrasts those found by Torgesen et al. (1999) and Vellutino et al. (1996; 2006) where most non-responders were distinguished by poor phonological memory skills. The lower gain scores obtained by the Comparison students are parallel to those reported by Vellutino et al. (2006). These researchers found that the majority of
students who received some form of kindergarten intervention generally performed better than control children who did not receive any kindergarten instruction in emergent literacy skills.

**CTOPP – Rapid Naming Composite**

Results from the contrast of Rapid Naming Composite measure indicated that the Two-Year ERI Treatment group gained on average 10.64 points more than the Comparison group; the magnitude of this difference was large ($d = 2.46$). This finding is contrary to that reported by Al Otaiba and Fuchs (2002) in their review of literature on the characteristics of slow or non-responders to early literacy interventions. It can be speculated that this was because the students in the comparison group were systematically declining in reading skills while the Two-year ERI Treatment group continued to make progress. Several other researchers (e.g., Berninger et al., 1999; Schneider et al., 1997; Torgesen & Davis, 1996; Torgesen et al., 1999; Uhry & Shepherd, 1997; Vellutino et al., 1996; 2003) found that treatment resisters showed characteristics of poor rapid naming skills. It should be noted that Schneider et al. (1999) found a relationship between rapid naming and treatment responsiveness for students with average phonological awareness. Conversely, Hatcher and Hulme (1999) did not find a connection between rapid naming and treatment unresponsiveness (although these students did exhibit poor phonological awareness skills). The One-Year ERI Treatment group gained on average 10.53 points more than the Comparison group, with a large effect size ($d = 2.54$).
Summary of Findings for Research Question One

This question examined whether the change (Δ - delta) gain scores for each of the six dependent measures were different among the three groups, based upon the number of years of ERI treatment (i.e., two, one, and zero years) received by the students. The One-Year ERI Treatment students made the greatest gains in Phonological Awareness Composite, Phonological Memory Composite, and Passage Comprehension scores. Although the Two-Year ERI Treatment students made the greatest gains in Rapid Naming Composite, the One-Year ERI Treatment students also made comparable gains with a difference of only 0.11 points on average. The Two-Year ERI Treatment students also made greatest gains in Letter Word Identification and Word Attack subtests, followed by the One-Year ERI Treatment students, with large effect sizes. The Comparison group, on the other hand, made the least gains on all measures except for the Passage Comprehension subtest. For example 43% of the Comparison students performed at “below average” levels (compared to 8% One-Year ERI Treatment students) on CTOPP PAC posttest measures. It should be noted that these students were selected as Comparison students in Year 1 of this longitudinal study because they depicted low or no reading risk markers at the beginning of kindergarten. These findings are similar to those of Linan-Thompson et al. (2006) where the control students showed lower performance than all treatment students in both grades one and two. Even though the control group met criteria at the end of grade one, they did not necessarily meet criteria at the end of second grade. Linan-Thompson and colleagues concluded that students who received only classroom instruction without supplemental pullout reading
intervention would be more likely to be referred for special education than students who received an explicit, comprehensive, year-long supplemental instruction.

Research Question Two

*How much variance in gain scores (Δ - delta) as measured by each of the six reading variables [Letter Word Identification (LWID), Word Attack (WA), Passage Comprehension (PC), Phonological Awareness Composite (PAC), Phonological Memory Composite (PMC), Rapid Naming Composite (RNC)] can be explained by ethnic/language and gender differences (i.e., ELLs and African American males)?*

The findings for this question are discussed in two parts: the first part relates to ELL status and the second to the performance of African American Male students in the study.

**ELL Status**

Contrasts from the regression model indicated that the ELL students across all three groups made greater gains on all three WJ-III subtests (LWID, WA, and PC) as well as CTOPP measures (PAC, PMC and RNC) with the magnitude of the differences being large. However, these results could have been slightly elevated due to the higher performance scores of a few of the ELL students who were outliers. Additionally, the numbers of ELL students were not evenly divided amongst the three groups. The students in the three groups were also not homogenous. However, there were similar patterns of outliers and differences noted within the remaining non-ELL students as well. Therefore, any conclusions from these findings should be made with caution. It should be noted that
9 of the 11 ELL students in this study received 45 minutes of reading instruction in a resource room tutored by an ESL teacher. Students were pulled out as a group during the last 45 minutes of their reading-block time from their regular classrooms.

Overall, the majority of the ELLs in this study continued to maintain reading gains made through one or two years of the explicit supplemental ERI intervention and thrive in the classroom with core reading instruction. These findings are similar to those found by Lesaux and Seigel (2003). In grade one, the ELL students showed lower performance than English speaking students. But with an additional year of intervention at the end of Grade Two, the ELLs had caught up and outperformed their non-ELL peers who were initially not at risk for reading failure.

The higher gain scores of the ELL students is encouraging because 8 of the total 9 ELLs were students who were at risk for reading failure in kindergarten and only one ELL student belonged to the Comparison group with no or low initial at-risk status. Five of these eight students had moved into the One-Year ERI Treatment group and continued to maintain reading gains made through the kindergarten intervention two years after the treatment had been withdrawn. The remaining three students in the Two-Year ERI Treatment group continued to be at risk for reading failure and would require longer periods of explicit and intensive intervention to close their reading gap. The additional “shot” of the explicit ERI intervention for a period of two years (for three ELL students) and for a period of one year (for five ELL students) produced substantial gains in reading performance for these students comparable to their Non-ELL peers. These findings support those obtained by Gunn et al. (2005) as well as Lesaux and Siegel (2003), who
contend that intensive phonological awareness training with a high level of specificity can enable ELL students to improve their English reading skills.

**AA Male Status**

Results from the contrasts between AA Males and Non-AA Male students across the three groups indicate that the AA Male students made greater gains than the other students in the Letter Word Identification subtest. The magnitude of this difference was quite large (d = 0.77). On the other hand, the AA Males made lower gains than the other students on the Word Attack and Passage Comprehension subtests, with large effect sizes (e.g., d = 1.55 for WA; d = 1.76 for PC). AA Female students made greater gains than their AA male counterparts on each of the three (LWID, WA, and PC) subtests. When examining the CTOPP scores, it was found that AA male students made fewer gains than their same age peers on all three composites (PAC, PMC, and RNC) with large effect sizes (e.g., d = 0.77 for PAC; d = 1.55 for PMC; and d = 1.76 for RNC) for the magnitude of these differences. When looking at the AA males and AA females across the three groups, it was observed that the AA female students made greater gains on all three CTOPP composites with small effect sizes of the differences.

**Summary of Findings for Research Question Two**

Overall, ELL students made greater gains than the Non-ELL students on all measures of the WJ-III and CTOPP assessments. Although these findings are encouraging, any definitive conclusions should be drawn with caution. The large standard deviations in performance with some outliers may have impacted the mean scores. The AA Males in this study made fewer gains than the other students on all measures of the
CTOPP and WJ-III except for the LWID subtest. For example, closer examination of the CTOPP composite scores at posttest measures indicated that 40% of AA Males performed below average on the Phonological Awareness Composite measure (compared to 13% of Non-AA males). On the Phonological Memory Composite 20% AA Males exhibited below average performance (compared to 13% of non AA Males). The AA Females, on the other hand, made greater gains than their AA Male counterparts. These findings support the existent research that AA males continue to be one of the most risk prone for reading failure and resultant special education risk.

Research Question Three

*How do the three groups (2-Year ERI Treatment Group, 1-Year ERI Treatment Group, and Comparison Group) compare in their performance on progress monitoring scores for Oral Reading Fluency (ORF) and Passage Retell (PR) as measured by DIBELS?*

The growth of learning of target students in the Two-Year ERI Treatment, One-Year ERI Treatment, and Comparison groups was examined on two response variables: DIBELS Oral Reading Fluency and Passage Retell. Data were analyzed through descriptive analyses, growth curves, and the repeated measure mixed-effects model.

*DIBELS Oral Reading Fluency (ORF)*

All three groups differed in their group means, with the One-Year ERI Treatment group showing the highest ORF means, followed by the Comparison group. All three groups showed small increases from probe T1 through T4. However, at probe T5 there was a drop in ORF for all three groups. Specifically, there was approximately a 12-point drop
for both the Two-Year ERI Treatment and Comparison groups. There was also a 23-point drop for the One-Year ERI Treatment students. Upon closer examination of possible contributing factors, it was noticed that the probe passage content may have had an impact on the decline in scores for all students. This particular passage, “The Wind has a Job to Do,” was non-fiction and included words like “wind chime,” “moisture,” “blossom,” and “pollen” that may have been unfamiliar. These factors may have contributed to the lower reading performance across a majority of the students. A corresponding decline in the Passage Retell variable was also noticed for the One-Year ERI Treatment and Two-Year ERI Treatment students.

Starting probe T_{6} through T_{10}, all three groups made steady gains, with the One-Year ERI Treatment group showing greatest progress. At probe T_{11} there was a dip in the scores for all groups, followed by gains in the next probe. Results from the mixed-effects model indicated that the One-Year ERI Treatment group had the highest slope (3.01) of learning on Oral Reading Fluency subtest followed by the Two-Year ERI Treatment group slope (1.80) compared to that of the Comparison group (0.65).

It also should be noted that the students showed a lot of variation in the growth rate initially. However, with time, their growth performance became homogenous on an average. The remarkable performance of the One-Year ERI Treatment students adds to the literature that at-risk students can benefit from an explicit, early reading intervention (e.g. Bursuck et al., 2004; O’Connor, 2000; Vellutino et al., 1996; 2003). The Two-Year ERI Treatment students continued to make gains over time; however, their slope was not steep enough for them to meet benchmark at the end of the study. This suggests that these
students would have needed additional intensive intervention for longer periods to close the gaps. This finding is in keeping with similar results from previous intervention studies (e.g., Foorman, Brier, & Fletcher, 2003; Torgesen, 2004; Vellutino et al., 1996; 2006) that suggest that some impaired readers will require continued and protracted interventions to eventually catch up. Even after two years of intervention, “difficult to remediate” readers are often unable to maintain the considerable gains they make. The performance of the Comparison students, who were at no or low risk for reading at the beginning of kindergarten, is very disturbing. Even though these students started out higher than the Two-Year ERI Treatment students, they were unable to meet ORF benchmark levels (90 wpm) in the spring. In fact, the gap between the performance of these students and that of the One-Year ERI Treatment group (who were initially at risk for reading failure) had considerably widened at probe T₁₃.

DIBELS Passage Retell (PR)

The trends in DIBELS Passage Retell (PR) performance of all three groups were very similar to those described for the ORF measures. However, the drop in group means at probe T₅ and T₁₁ were not noticed for the Comparison students. This may be explained by the possible higher background knowledge and text familiarity of Comparison students who were initially not at risk in this study. However, no definitive conclusions can be made about this relation. It should also be noted that the Comparison and One-Year ERI Treatment students started off with very similar group means at T₁. By probe T₁₃, however, the difference between the Comparison and One-Year ERI Treatment students had greatly widened, with the latter showing higher performance. The slopes for
Passage Retell was steepest for the One-Year ERI Treatment group (1.99), followed by the Comparison group (1.15), and the Two-Year ERI Treatment group (1.12).

**Summary of Findings for Research Question Three**

The growth rate in ORF were highest for the One-Year ERI Treatment students, followed by the gains made by the Two-Year ERI Treatment students and then the Comparison group. The growth rate in Retell were highest for the One-Year ERI Treatment students, followed by the gains made by the Comparison students and then the Two-Year ERI Treatment group. The stronger responders (One-Year ERI Treatment students) continued to maintain relative gains, even after the kindergarten intervention had been terminated for two years. These gains were similar to those made by other researchers (e.g., Berninger et al., 2002; Coyne et al., 2004; Gunn et al., 2005; Simmons et al., 2008). The poorer responders (Two-Year ERI Treatment students) continued to make gradual progress, similar to students in the Berninger et al. (2002) study, but did not meet grade levels due to their slow gains. A disconcerting finding was that many of the Comparison students increased their at-risk status with time, making them more susceptible to reading failure and special education risk.

**Research Question Four**

*How do the students compare in their performance on progress monitoring scores for Oral Reading Fluency (ORF) and Passage Retell (PR) as measured by DIBELS according to ethnic/language and gender differences (i.e., ELLs and African American males)?*
Results from the average ORF group means indicated that both ELLs and Non-ELLs showed similar performance. The smaller initial gains were followed by sharp rises for both groups with the ELLs performing higher than the Non-ELLs at probe $T_{13}$. Results from the mixed-effects model indicate that at the beginning of Year 3 study the ELLs had lower averages than the Non-ELL students across the three groups. However, with time, the growth rate for ELL students from $T_1$ through $T_{13}$ on the Oral Reading Fluency (ORF) subtest was on average 0.73 correct words per minute (wpm) per period higher than the average rate of Non-ELL students across the three groups (1.63). This suggests that the ELL students had the higher slope (2.36) of learning on Oral Reading Fluency (ORF) subtest compared to Non-ELL students (1.63). Very similar trends were noticed for Passage Retell for both groups. Even though the ELLS were found to exhibit comparable or higher performance than their Non-ELL peers, the large standard deviations within the groups need to be discussed. For example, within the ELLs, there was one Vietnamese girl who read 181 words per minute on probe $T_{13}$, compared to another Somalian student who read 23 wpm. These large variations, with the small number of ELL participants, may have elevated the scores for the ELL students. However, it should be noted that within the Non-ELLS, there was a student who read 19 wpm compared to another who read 238 wpm on probe $T_{13}$.

One of the ethnic groups most vulnerable for reading deficits and special education risk is African American Males (Lo & Cartledge, 2007; Skiba et al., 2002; 2006). Therefore, the performances of these students were examined and compared to those of the other students in the study. Additional comparisons were made with African
American females across the groups. When examining the relative performance of AA males with the rest of the students across the three groups, it was found that AA males exhibited a lower ORF reading performance than the other students. Trends for both ORF and Passage Retell were similar to those discussed in question one and two, with significant drops at probe T5. There also was a noticeable drop in means at probe T10 and T11 for both groups. The AA females showed parallel trends across all probes, but were found to be reading at higher averages than their AA male counterparts. These findings are similar to those supported by existing research. However, the large difference in this study between the males and females also could be impacted by the small number of participants. Additionally, as randomization of groups was not possible or ethical in this study, the findings cannot be generalized beyond the participants in the study.

Summary of Findings for Research Question Four

The ELL students were found to exhibit similar or higher performance than the non-ELLs on both measures of the DIBELS progress monitoring measures used. However, the large standard deviations within each group, the lack of homogeneity across the three groups, and the uneven number of ELL students across the groups may have altered the scores for either of these groups. Therefore, even though the superior performance of some ELL students is encouraging, the findings from this comparison cannot be conclusive. When examining the performance of AA Males in particular, results indicate that the AA Males in this study performed lower than the other students. It should be noted that the AA Males started off lower than the other students and continued to perform at lower rates. In addition to this, the gap between the AA Males
and the other students gradually widened with time, supporting the “rich get richer and
the poor get poorer” effects described by Stanovich (1986). This day-by-day “lagging
behind” would place the already at-risk AA Males at a more severely vulnerable position
for reading failure and subsequent negative outcomes.

Research Question Five

What proportion of students will improve their DIBELS Benchmark recommendations,
with respect to individual group status (2-Year ERI Treatment Group, 1-Year ERI
Treatment Group, and Comparison Group)?

All students were assessed for DIBELS ORF Benchmark status at the beginning,
middle, and end of the school year. In fall, 22.77% of the One-Year ERI Treatment
students were at “intensive” status. This percentage increased to 38.4% in winter, but
decreased to almost half (15.38%) in spring 2008. When looking at winter benchmark
scores, it can be assumed that 23.08% of “intensive” students improved their
recommendation status to “strategic,” leaving the percentage of “intensive” students at
15.3%. When looking at the percentage of students at “benchmark” level, it was found
that the initial 53.85% increased to 61.54% in winter as well as in spring.

The Two-Year ERI Treatment students had a large portion (92.86%) of
“intensive” students in fall as well as winter. In fall, 7.14% of the students were
“strategic” and improved their DIBELS recommendation to “benchmark” in winter. In
spring, an additional 7.14% of “intensive” students improved their status to “strategic,”
placing the “intensive” students at a lower percentage of 85.71%. Even though a small
number of students met benchmark status, there is an overall improvement in the reading levels of the Two-Year ERI Treatment group.

Examining the Comparison students in fall, winter, and spring, the number of “benchmark” students stayed the same (35.71%). However, the progress of the remaining students is concerning. The “strategic” students were at 35.71% in fall, but dropped to 28.57% and 14.28% in winter and spring respectively. As a result, the numbers of “intensive” students steadily increased from 28.57% to 35.71% in the middle and end of the school year, respectively. In spring 2008, even though the percentage of “benchmark” students stayed the same, the percentage of “intensive” students almost doubled, whereas the number of “strategic” students dwindled to half.

Summary of Findings for Research Question Five

For the One-Year ERI Treatment students, the change in DIBELS ORF recommendations represent an improvement for 15.39% of students, while 84.61% remained the same, and 0% regressed. The change in status for Two-Year ERI Treatment students represents an improvement for 14.28%, while 85.72% stayed the same, and 0% regressed. Conversely, of the Comparison students, 0% improved, 78.57% stayed the same, and 21.43% regressed. A large portion of the Two-Year ERI Treatment students remained at “intensive” status, exhibiting high risk. This parallels existing findings that emphasize the need for more intensive interventions to catch up with their more able reading peers (Vellutino et al., 1996; 2006). A large portion of the One-Year ERI Treatment students maintained their reading levels and 15.39% improved their status. What is remarkable is that 0% of these students regressed. These students had benefited
from the one year of early intervention received in kindergarten and moved out of risk status. Furthermore, a large portion of these students were able to maintain gains made and successfully thrive in the classroom with the “inoculation” effect of the “initial shot” of the early intervention (Coyne et al., 2004). The decline in the performance of the Comparison group is highly troubling. These students were initially at no or low risk for reading failure and continued to receive only core classroom instruction. Anecdotal observations by the researcher reveal that two of these students were repeatedly “caught misbehaving” and punished for exhibiting challenging behaviors in the classroom. Close examinations of progress monitoring scores of these students showed a corresponding steady decline. It can be speculated that the aversiveness or difficulty of the classroom task related to the maladaptive behavior or vice versa, as reported by some researchers (Coie & Krehbiel, 1984; Hinshaw, 1992; Kellam et al., 1998). Students who exhibit deficits in reading are at higher risk for secondary or comorbid disorders, particularly behavior disorders (BD; Coie & Jacobs, 1993; Lane, 1999; Lane et al., 2002; 2007; Walker, Colvin, & Ramsey, 1995). The need for early reading intervention and prevention of reading difficulties is hence crucial for young struggling readers.
Research Question Six

What proportion of students will improve their DIBELS Benchmark recommendations, with respect to ethnic/language and gender differences (i.e., ELLs and African American males)?

First, the comparisons between ELLs and Non-ELLs will be discussed, followed by the performance of AA Males compared to the other students in the study.

When comparing the performance on the DIBELS Benchmark scores, it is noticed that ELLs showed greater improvement than the Non-ELLs. In spring, the change represents an improvement of 11.11% for ELLs (compared to 3.12% for Non-ELLs); 88.88% of ELLs remained the same (compared to 93.75% of Non-ELLs who remained the same); and 0% of ELLs regressed (compared to 3.12% of Non-ELLs who regressed). However, these percentages may have been misleading due to a few outliers in both groups. Within the ELLs, there was one student who read 131 words per minute on the spring ORF Benchmark assessment, compared to another student who read 21 wpm. These large variations, with the small number of ELL participants, may have elevated the scores for the ELL students. Similarly, within the Non-ELLs, there was a student who read 186 wpm compared to another who read 18 wpm during the spring benchmark assessment. The lack of homogenous groups, the uneven number of ELL students across the groups, and the large standard deviations within each group may have altered the scores for either of these groups. Therefore, even though the superior performance of some ELL students is encouraging, the findings from this comparison cannot be conclusive.
When comparing the AA male students’ performance on the DIBELS, Benchmarks to all other students in the studies, it was found that 10% of AA males improved their recommendations (as compared to 7.56% for Non-AA males); 90% of AA males remained the same (as compared to 89.2% of Non-AA males); and 0% of AA males regressed (as compared to 3.22% of Non-AA males). At first glance this gives the impression that AA Males performed better than the rest of the students. However, a closer examination of actual performance scores indicated that the performance of AA Males was relatively lower than that of their counterparts. In fall, 60% of AA Males were “intensive” compared to 46% of Non-AA males being “intensive.” In fall, only 10% of AA males were at “benchmark” status, compared to the larger number of 34.3% of Non-AA Males. Similarly, in fall, 30% of AA Males were “strategic” compared to the 34% of Non-AA Males. It should also be noted that the AA Males showed lower performance than the rest of the students at the beginning of the year in fall 2007. Female AA students, on the other hand, exhibited an overall significantly higher reading performance than the AA Males in this study. The small number of available participants in Year 3 of this longitudinal study and a few students who were showing either very-high or very-low performance may have impacted these findings.

Summary for Findings for Research Question Six

Results from the study indicated that ELLs showed greater improvement than the Non-ELL students upon comparison of performance on the DIBELS Benchmark scores. Yet the large standard deviations within both ELLs and Non-ELLs, along with the lack of homogenous groups, and an uneven number of ELL students across the groups may have
influenced the group mean scores. Therefore, even though the superior performance of some ELL students is encouraging, the findings from this comparison must be interpreted with caution.

It was found that AA Male students improved their benchmark recommendation scores slightly. The relative lower initial performance of AA Males, with a large portion at “intensive” status, placed these students at a lower initial level than the rest of the students. This gap to start with contributed to placing them at greater reading risk than their peers. Therefore, despite slight improvements in benchmark recommendations, the majority of the AA Male students were not able to catch up with their peers and move out of the at-risk status, making them more vulnerable to academic failure and special education risk.

Limitations

The limitations of the study are described in this section. However, despite the limitations described, the findings of the study are promising for young at-risk urban learners.

Student Attrition

The participants were a follow-up sample from the previous two years. During Year 1 and 2, students were selected from three different schools. However, in Year 3 (this study) one of the schools closed. Furthermore, there was more attrition of students from the previous years. This placed the number of available participants at 41 (compared to 93 and 61 in Years 1 and 2, respectively). With the smaller sample size, the number of
students according to ethnic and language differences were reduced to very small numbers, with unequal distributions across each of the groups.

*Lack of Randomization*

Random selection or randomization was not an option due to the follow-up nature of this study. Students had been placed in the three groups based upon the duration of the ERI treatment in the previous years. All students were progressively monitored and no additional ERI intervention was provided to any of the students this year. Hence, inferences or comparisons were limited to the descriptive and corelational level of the analyses. This limited the ability to generalize findings to the population under investigation.

*Large Standard Deviations within Each Group*

Close examination of individual performance of students in each group indicate there were some outliers within each group. Initial contemplations were to discard the data for these outliers. However, with the already reduced number of available participants, it was decided to retain the data for these students. Due to the performance of these outliers and resultant large standard deviations the average mean scores for could have been elevated or depressed, resulting in possible faulty assumptions.

*Differences in Instruction*

The participants in this study were distributed across several second grade classrooms across both the schools. Specifically, in School 1, students were placed in three different classrooms and in two different classrooms in School 2. Therefore, it is not possible to attribute variance among the groups to differences in teacher instruction. It
may be argued that ELL students in this received the 45 minutes of small group instruction in a separate classroom by an ESL teacher. It should also be noted that the performance of the ELLs parallels that of the non-ELLs. The strong responders (One-year ERI Treatment students) in particular exhibited stronger gains in Year 3 in comparison to Years 1 and 2 of this longitudinal study. Therefore it may be argued that the same factors were operating for both ELL as well as non-ELLs.

*Lack of Assessment of English Language Proficiency for ELL students*

The performance of the 9 (~20%) English language learners (ELLs) in the study was closely examined. Eight out of the nine ELLs were Somalian students. However, the English language proficiency of the ELL students was not assessed at the beginning of the study. This factor may have impacted the results obtained in the study. Incorporating the initial language proficiency of the students as a factor in conjunction with the primary and secondary variables into the statistical analysis may have presented a more accurate picture of the results for this population.

*Possibility of Practice Effects*

One may argue that repeated measures may be compromised by practice effects during longitudinal studies. In this study these effects were minimized by the use of different testing forms for the WJ-III at the beginning and end of the study. Each assessment probe for the DIBELS progress monitoring was also different. However, the CTOPP assessment battery for ages 7 through 19 contained only one test measure form. Hence the same form was presented both at pre- and post to the student. Although the time lapse between pre- and posttest was quite long, the practice effects may have been a
confounding variable for this posttest assessment measure. School 2 was a *Reading First* school. Most of the students who received “*intensive*” recommendations on the DIBELS Benchmark assessments were additionally monitored by school personnel until they were out of the “*intensive*” recommendations, (although the majority of these students did not receive supplementary interventions for their poor reading performance). It is possible that at some point these students may have read a DIBELS probe passage with both the researcher and school personnel. Anecdotal observations indicated that most of the time points did not overlap. Additionally, most of these students were able to read minimum wpm on these probes since they were the most severely impaired readers. Even though it is most unlikely, the possibility of practice effects being a confounding variable to the findings from the study cannot be ignored.

**Implications for Practice**

*Importance of Conducting Longitudinal Studies*

One cannot deny the significance of conducting longitudinal research in the effects of treatments or interventions over time (Koegh, 2004). It is important to examine the subsequent progress of students who take part in beginning reading interventions to determine if students who closed their reading gaps initially were able to continue to make acceptable progress after the intervention has been withdrawn and “*remain caught up.*” Although one may argue the importance of follow-up studies, there are several problems and limitations in conducting the same. One of the main issues is student attrition, rendering the collection of data on every study member at every time point is
often impossible. Nevertheless, the data obtained from longitudinal studies can provide significant and powerful evidence about the lasting effects of an intervention (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002), and important implications for future practice.

Continuous Assessment of Student Progress

Continuous assessment measures can serve as valid and reliable predictors of later reading achievement. Curriculum Based Measurements (CBM; Deno, 1985) are assessment methods that permit modeling of student progress to monitor responsiveness to instruction. Teachers and administrators can compare students’ performance to performance benchmarks where students would be expected to perform. In this study the DIBELS Oral Reading Fluency progress monitoring probes were administered 13 times to all participants. Data obtained indicated that all students exhibited lower reading performance on probe T5 for both ORF and Passage Retell measures. The scores from this T5 probe could have been misleading of student performance had this been the single test administered to the students. The multiple subsequent probes administered following probe T5 gave a more accurate indication of student performance. Progress monitoring assessments, like the ones used in this study, are dynamic because they are sensitive to small but meaningful gains in student improvement over time. Since assessments are brief, educators can administer them more frequently to use them as formative feedback to measure student growth. An added critical benefit would be the identification of students who were losing ground (like some of the Comparison students in this study),
and provision of intervention in a timely manner, before deficits became intractable and too difficult to remediate.

Significance of Tiered Intervention

Several researchers (e.g., O’Connor, 2000; Torgesen et al., 2006; Vellutino et al., 1996) have provided layered instruction based upon the needs of individual students. Students were provided intensive supplemental instruction to increase the amount of time for reading instruction and reducing the instructional group size. Across these studies, findings indicated that at-risk students made significant gains, leaving fewer students at risk over time. In this study, students in the One-Year ERI Treatment group not only had succeeded in moving out of the risk status in kindergarten, but also continued in Grade 2 to demonstrate consistent progress on phonological awareness by simply receiving core code-based classroom instruction. This is similar to the findings obtained by Coyne and his colleagues (2004), who concluded that strong responders to kindergarten intervention can experience an inoculation effect in Grade 1 with code-based classroom reading instruction. These findings are also consistent with Vellutino et al.’s study (1996), suggesting that at-risk readers who receive individual code-based tutoring early can subsequently demonstrate good to very good reading skills, making the early access to secondary interventions more economical. The weak responders (Two-Year ERI Treatment students) were found to be making gradual progress in this study, but their gains were not sufficient for them to perform at a rate commensurate with their non-risk peers. Therefore, these students may have been part of the 5-7% of students who would still require additional support or tertiary intervention (i.e., special education). The gated
system of tiered instruction allows for children to exit the intervention when they are no longer at risk, and also to qualify other students for additional interventions as necessary.

*Emphasis on Early Intervention to Prevent Secondary Disabilities*

Findings from this study imply that early and long-term literacy difficulties can be prevented or at least minimized if students are identified at the beginning of kindergarten and if interventions provided facilitate the establishment of early literacy skills at the outset. However, should intervention only be provided to students who are already identified as having “special education” risk? In order to prevent students from receiving the stigmatizing effects of a disability label it is crucial to emphasize continuous progress monitoring of students within the primary and secondary intervention of the RTI model.

*Access to Consistent Supportive Classroom Instruction*

The explicit instruction received by at-risk students should be delivered in the context of a balanced reading program so that all reading skills continue to develop. When the core classroom instruction includes well known instructional principles such as systematically sequencing tasks, providing multiple opportunities to practice phoneme level skills such as blending and segmenting, the alignment between the intervention received and the classroom instruction can provide support and strengthen student performance (O’Connor, 2000; Torgesen et al., 2001). With the support, students are better able to maintain reading skills learned through the secondary interventions they have received. In this study, it can be assumed that the access to consistent supportive classroom instruction helped a large number of students exhibit durable gains made in the previous years.
Need for Ongoing Supportive Instruction for “Poor Responders”

Although the Two-Year ERI students continued to make gains, the slope of their growth was not steep enough for them to meet grade levels. The results from the Year 2 study (Kourea, 2007) report that at the end of Year 2 these students had improved their phonological awareness skills and reached comparable performance levels to that of the other two groups. However, when looking at their oral reading fluency progress this year, it was observed that their overall performance was below grade level. The intervention received in the previous years may have acted as an “insulin effect” (Coyne et al., 2004; p. 91). These students not only required the highly explicit and systematic intervention in both grades 1 and 2 to gain initial access to the reading skills, but also required ongoing, additional, intensive intervention and support in order to continue to progress at a growth rate proportionate to that of their non-risk peers. A few of the One-Year ERI Treatment students (who had graduated out of the at-risk status at the end of Year 1 of this longitudinal study) were also found to be exhibiting below grade level reading performance. Towards the end of grade two the highest ORF score obtained by one student, in particular, was 24 wpm (compared to the spring benchmark score of 90 wpm), placing him at a very high risk. The spring ORF DIBELS Benchmark recommendations for the One-Year ERI students placed 61.54% at “benchmark” status, 23.08% “strategic” and 15.38% “intensive.” Despite their remarkable initial response to the kindergarten intervention, some of these students were unable to stay “caught up” without the ongoing, additional, intensive intervention and support.
**English Language Learners**

Even though the ELLs in this study were not provided supplemental intervention in Year 3, they did receive the ERI treatment in the previous years. Therefore, the follow-up findings indicate that ELLs at risk for reading failure who were provided with explicit, systematic, and intensive interventions made substantive gains that distinguished many of them from the Comparison students, and left these students less at risk for referral to special education.

The gains made by the ELLS in Year 1 and 2 of the longitudinal study do indicate that ELLs can benefit from English-language early reading interventions. However, conclusions drawn from the comparisons made this year should be made with caution due to the presence of a few outliers within ELLs as well as Non-ELLs. The reduced number of participants, in addition to the large standard deviations in performance scores within groups may have influenced the group means. However, it should also be noted that the performance of the ELLs parallels that of the non-ELLs, particularly for the *strong responders* who exhibited stronger gains in Year 3 in comparison to Years 1 and 2 of this longitudinal study.

**African American Males**

The African American males (AA Males) in this study were found to be reading at approximately one grade level lower than their same age peers. Close examination of their growth curves show the gap gradually widening between them and their counterparts (see Figure 4.16). Even though these students continued to exhibit some reading growth, the gains were not large enough so that the achievement gap between AA
males and their same age peers continued to widen with time. This supports existent findings of African American males to be most vulnerable for reading and special education risk.

Directions for Future Research

The sample of participants in this study was drawn from one school district in one geographic location with a limited participant sample. Additionally, students in the sample were not randomly assigned, but were a convenience sample. Hence the sample may not be representative of the general population of primary children at risk for reading problems. It is possible that the findings may not generalize to other students in other geographical regions and diverse populations. Future research should replicate these findings across different contexts and with other diverse populations including specific at-risk populations such as students with emotional and behavior disorders. The performance scores obtained could be compared to normative scores to see how this population fared relative to the larger population.

The findings from this study indicated that the strong responders showed durable gains to the kindergarten intervention two years after the intervention had been discontinued. The poorer responders continued to make gains. However the growth was not sufficient to close the reading gap. A large number of the Comparison students, who were initially at no or low reading risk, lost ground placing many of them at reading risk. Future studies may focus upon a more in-depth analysis of relative absolute gains made by students each year, to see if these absolute gains were increasing or decreasing with
time. This would indicate if the kindergarten intervention acted as an “inoculation effect” or “insulin effect” for each participant with time.

There is a steady increase in the ELL school population. A growing body of research with ELLs has focused upon Hispanic students. Future studies may examine the effects of explicit reading interventions on non-Hispanic students such as Somalian children to address the needs of these students, since more and more of these students make up the ELL population in classrooms each day.

The benefits of early intervention to ward off reading disabilities and special education risk in later grades cannot be denied. But how early is early enough? Do we want to wait until kindergarten or is this too late for some students? Conducting similar studies with pre-kindergarten children should be a future focus.

Summary

This study investigated the long-term effectiveness of a supplemental phonological awareness intervention package on reading skills of urban learners. In Year 1, a total of 93 kindergartners were screened for markers of reading risk with the DIBELS assessment measures. Of these students, 61 were found to be at medium or high risk for reading failure and were placed in the ERI treatment group. The remaining 32 students who presented some or no risk for reading failure were placed in the comparison group. The at-risk students received small group supplementary phonemic awareness instruction (i.e., Early Reading Intervention; ERI; Simmons & Kame‘enui, 2003). At the end of kindergarten, all students were assessed and those students who had met the benchmark
were no longer provided intervention in the second year of the study. In Year 2, students who did not meet the benchmark at the end of kindergarten received an additional year of supplementary small group instruction with the ERI program. These students also received a short, five-minute fluency building instruction. Those students who had met reading benchmarks did not receive any supplemental intervention, but were assessed and monitored along with the other students for progress. The third group continued to be the Comparison group and did not receive any supplemental reading instruction. All three groups were monitored using the DIBELS (NWF, PSF, and ORF) probes on a tri-weekly basis. At the end of Year 2, students were again assessed with the same pretest measures.

In the current study (Year 3), none of the students received any supplemental ERI reading intervention. All available students were pre- and posttested using the WJ-III (e.g., LWID, WA, and PC subtests) and CTOPP (e.g., Phonological Awareness Composite, Rapid Naming Composite, and Phonological Memory Composite) measures. Additionally, students were assessed in fall, winter, and spring of the school year using DIBELS Benchmark assessments to measure reading status. Student reading progress was also monitored every two to three weeks, using DIBELS Oral Reading Fluency and passage Retell measures. The focus of Year 3, (this study), was to monitor and compare the reading status of those students who had received two years of ERI Intervention (Two-Year ERI Treatment students), one year of ERI intervention with fluency component (One-Year ERI treatment students), and Comparison students who were initially not at risk for reading failure. The relative performances of certain high-risk subgroups amidst
participants in the study (e.g., English Language Learners and African American males) were also closely examined.

Linear regression modeling, contrasts, repeated measure, mixed-effects models, and growth curves were used to examine differences in reading performance. Results revealed that the One-Year ERI Treatment students (kindergarten “treatment responders”) exhibited the highest reading performance and absolute gains on all measures assessed with large effect sizes for the magnitudes of these differences. At the end of grade two, two years after the supplemental ERI intervention had been terminated, most of these students continued to “thrive” with only core classroom reading instruction and maintain reading gains they had acquired through the explicit phonological awareness kindergarten instruction.

The 13 “poor-responders” in the Two-year ERI Treatment group continued to make small but steady improvement in reading gains, as measured by absolute gain scores and growth curves. However, though scores indicated that these students had made some progress, it can be recommended that these students would require additional intensive intervention to close the reading gap with their peers. Some of these “non-responders” may also need tertiary intervention through special education services.

The performance of the 14 comparison students also calls for attention. It is important to keep in mind that these students initially presented low or no markers of reading risk at the beginning of kindergarten (Year 1). However, by the end of Year 3, several of these students were found to have lost ground, and were at risk for reading failure. Closer observations of absolute gains and growth curves from progress
monitoring data indicate that many of these students were making minimal progress. The DIBELS Benchmark scores indicate that a large portion of the comparison students had actually regressed in reading skills.

In this study, the reading performance of certain at-risk populations (i.e., ELLs and African American Males) was also closely examined. A large number of the ELLs responded to the ERI intervention and continued to maintain the reading gains made through the end of second grade. Growth curve analysis indicates that many of these students showed similar reading performance to their Non-ELL peers. This finding supports the idea that ELLs can be taught to read in the English language, through an explicit phonemic awareness reading program, provided that the classroom instruction helps supplement the reading skills learned. The African American males were found to be reading at approximately one grade level lower than their same age peers. Close examination of their growth curves portray the gap gradually widening between them and their counterparts. Even though these students continued to exhibit some reading growth, the gains were smaller and the achievement gap continued to widen with time. This supports existing findings of African American males to be most vulnerable for reading and special education risk.

Reading is a basic skill that every child who enters school needs for success. Failure to learn to read at the basic level can produce a ripple effect of low achievement in other academic areas as well (Lane, Little, Redding-Rhodes, Phillips, & Welsh, 2007). Students at risk for reading disabilities often face the “tyranny of time” (Kame’enui, 1993): the overwhelming challenge of constantly struggling to catch up to their more
successful peers, who continue to acquire skills at an increasingly rapid rate. By focusing on continuous assessment of students, followed by provision of the needed interventions, teachers can leverage time in a positive manner by working intensively to intercept the reading gap before it becomes overwhelming and insurmountable. Therefore, the encouraging findings from this study are promising to minimize reading risk and subsequent negative outcomes early on in a child’s life.
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APPENDIX A

PARENT PARTICIPATION LETTER IN EDUCATIONAL RESEARCH (ENGLISH)
September 28, 2007

Dear Parent:

I am a professor in the College of Education at The Ohio State University. My graduate students and I will be conducting a research project in your child's school. We wish to see if teaching early literacy skills such as identifying reading sounds and letters will prevent reading problems in later grades.

Your child has been participating in this project since kindergarten, and we are continuing this year to monitor your child’s performance in second grade. Your child will not lose any of the regular classroom reading instruction. We will review your child’s school records, and closely monitor your child’s academic performance. Your child will be assessed on overall reading performance and scores on certain reading skills. We expect the pre- and posttest assessments to occur at the beginning and end of the school year and to take less than 10 minutes each time. We also plan to monitor your child’s performance on these skills every three weeks. These assessments will take approximately 5 or 6 minutes. All information collected about your child will be confidential. No one other than the researchers will use this information and your child
will not be identified in any way to others. Your child’s classroom teacher will be closely involved in the assessment and ongoing monitoring of your child’s progress.

This is the end of a multiyear study and we greatly appreciate your past cooperation with this project. We feel that this information is extremely useful in helping us learn some of the best ways to help young people become good readers. We feel that the instruction provided over the past two years has been most helpful for your child. The assessment that we conduct this year will help us to learn if the children retain this progress over time.

We are requesting your permission so that we might use your child’s academic performance as data in this study. Permission is purely voluntary and the decision not to permit this access will not affect the way your child will be treated or graded at school. Should you consent, please know that you can choose to withdraw your permission at any time during this project. If you have questions, please feel free to contact me at 292-7629.

Thank you for your attention and cooperation.

Sincerely,

[SIGNATURE HERE]

Gwendolyn Cartledge, Ph.D.
Professor
APPENDIX B

PARENT CONSENT FORM FOR PARTICIPATION IN EDUCATIONAL RESEARCH (ENGLISH)
September 28, 2007

CONSENT FOR PARTICIPATION IN SOCIAL AND BEHAVIORAL RESEARCH

Protocol title: “Improving the School Success for Urban Learners.”
Protocol number: Pending
Principal Investigator: Gwendolyn Cartledge

I consent to my child’s participation in research being conducted by Dr. Gwendolyn Cartledge of The Ohio State University and her assistants and associates.

The investigators have explained the purpose of the study, the procedures that will be followed, and the amount of time it will take. I understand the possible benefits, if any, of my child’s participation.

I know that my child can choose not to participate without penalty to me and/or my child. If I agree to participate, I can withdraw my child from the study at any time, and there will be no penalty.

I consent to the use of videotapes and photographs. I understand that these pictures will only be used to demonstrate classroom teaching practices. My child will not be identified by name and my child will be depicted in these tapes in positive ways.
I consent to the use of the following information from my child’s school records and academic records: attendance, individualized education plan (if any), medical reports (if any), classroom test scores, and benchmark evaluations.

I have had a chance to ask questions and to obtain answers to my questions. I can contact the investigators at (614) 292-7629. If I have questions about my rights as a research participant, I can call the Office of Research Risks Protection at (614) 688-4792.

I have read this form. I sign it freely and voluntarily. A copy has been given to me.

Print the name of the participant: ____________________________________________

Date: ___________________________ Signed: ________________________________

_________________________________________ (Participant)

Signed: ___________________________ Signed: _____________________________

_________________________________________ (Principal Investigator or his/her authorized representative)

(Person authorized to consent for participant, if required)

Witness: ___________________________

(When required)
APPENDIX C

PARENT PARTICIPATION LETTER IN EDUCATIONAL RESEARCH (SOMALIAN)
Waalidka qaaliga ah:

Waxaan ahay barfasoor ka dhiga kulliyadda waxbarashada ee jaamacadda Ohio (Ohio State University). Aniga iyo qaar ka mid ah ardeydeyda waxaan ka wadnaa mashruuc daraasad ah iskuula uu dhigto cunugaagu.

Waxaan derseynaa bal caruurta markey da’doodo aad u yar tahay haddii lagu bilaabo baridda hikaadda iyo dhawaqa xaruufta inay ka caawin karto xagga akhriska sanadaha kale ee iskuulka.

Cunugaagu wuxuu qayb ka ahay daraasadan ilaa iyo xilligii xannaanada(kindergarden),waxaana dooneynaa inaan sii wadno ilaa uu ka dhameeyo fasalka labaad ee dugsiga hoose.

Inta daraasadu socoto;
.Cunugaagu lumin mayo xiisadihiisa waxbarasho.

.Waxaan eegaynaa heerkiisa waxbarasho iyo horumarka uu sameeyo.

.Waxaan qiimeyneynaa xirfaddiisa iyo heerka akhriskiisa.

.Waxaan qiimeyneynaa isbedelka heerkiisa waxbarasho bilowga iyo dhamaadka sanad dugsyeedka waqtiguna ka badan maayo toban(10)daqiiqo

.Saddexdii todobaadba marbaan kormeer qiimeyn ah ku sameeyneynaa ,waqtiguna ka badan mayo shan ilaa lix daqiiqo

.Macluumaadka laga soo ururiyo cunugaaga waxay noqonayaan qarsoodi

.Cid aan ahayn cidda daraasadda wadda mooyee cid kale arki mayso daraasadda

.Macallinka cunugaaga mar walba wuu ka warhaynayaa tallaabo kasta oon qaadno
Sanadkani waa dhammaadkii daraasadda, aad baad ugu mahadsan tahay wada shaqeyntaada. Waxaan dareensanahay macluumaadkaan inay naga caawin doonto sidii aan uga caawin lahayn caruurta yaryar inay noqdaan kuwo aad ugu wanaagsan akhriska.

Waxaan filaynaa labadaan sano habka waxbarasho ee aan u dajiney cunugaaga inay tahay miduu ku faa’iidey Qiimeyn ta aan sanadkan samayneyno waxay naga caawineysaa inaan bal inaan wax ka ogaano in ardeygu sii waday horumarkiisa waxbarasho

Waxaan kaa codsaneynaa inaad noo ogolaato xogta heerka waxbarasho ee cunugaaga inaan tusaale ahaan u isticmaalno. Ogolaashuhu qasab ma aha ee waa ikhtiyaar, diidmadaaduna waxba u dhimi mayso sida loola dhaqmo cunugaaga.
Ogoow mar walba waad ka noqon kartaa ogolaanshaaaga xilliga daraasaddu ay socoto.

Haddii aad wax su’aal ah qabto fadlan igla soo xiriir taleefankan: 292-7629

Aad baad ugu mahadsan tahay wada shaqayntaada

[SIGNATURE HERE]

Gwendolyn Cartledge Ph.D.

Professor
APPENDIX D

PARENT CONSENT FORM FOR PARTICIPATION IN EDUCATIONAL RESEARCH (SOMALIAN)
September 28, 2007

Ogolaanshaha ka qeybqaadashada bulshada iyo baarista dabeecadahooda.


Habka tirada: Laalan(Wali)

Baare maamule: Gwendolyn Cartledge

Waxaan u ogolaaday ilmaheyga baaritaankii ey sameysay Dr. Gwendolyn Cartledge oo ka socota Ohio State University kalkaaliyaasheeda iyo dadka la xiriira.

Baareyaasha waxey fasireyn ujeedada wax barashada, habkaan wuxuu socondoona waqti. Waxaan fahmay faa’iidooyinka laga helikaro haduu ilmaheyga ka qeybqaato.


Waxaan ogolaaday in la isticmaalo videotapes iyo masawiro waxaan ogahay in masawiradaas loo isticmaali doono oo kali ah fasalka wax lagu barayo. Ilmaheyga lama aqoonsan doono magac ahaaan.. Ilmaheyga wuxuu uga muuqan doona cajalada si hubaal ah.

Waxaan ogolaaday isticmaalka warbixintaan soo socota oo ka imaaneysa diiwaanka dugsiga ilmaheyga iyo diiwaanka manhajka, xaadirinta, qorsha tacliin
shaqsiyeeed(Hadii ey jirto,) Warbixin caafimad(Hadii ey jirto) dhibcaha imtixaanka fasalka dhexdiisa ah, iyo qiyaasta qiimeyntooda.

Waxaan aqriye warqadaan. Waxaan u sixiixay si xuriyad ah waxaana la iga siiyey copy.

Qor magaca ka qeybqaataha: ____________________________________________

Taariiqda saxiixay: ________________________________________________

Ka qeybqaate

Maamulaha (baaritaanka asaga/ayada wakiilka amarbixiyaha.) saxiixay:

____________________________________________________________________

(Amarbixiyihii ogolaaday ka qeybqaadashada, hadii loo baahday)

Marqaati: ____________________________________________

(Hadii loo baahdo)
APPENDIX E

PARENT PARTICIPATION LETTER IN EDUCATIONAL RESEARCH (SPANISH)
28 de Septiembre del 2007

Estimado Padre,

Soy profesora de el colegio de educación en la universidad de Ohio Sate. Mis estudiantes graduados y yo vamos a conducir una investigación en la escuela de su hijo. Deseamos ver si enseñar habilidades tempranas de la instrucción como identificar sonidos de la lectura y de letras previene problemas de lectura en grados mas avanzados.

Su hijo, ha estado participando en esta investigación desde jardín de infantes, y vamos a continuar este año a supervisar el funcionamiento de su hijo en el segundo grado. Su hijo no va a perder ninguna de las instrucciones de lectura en su clase regular. Vamos a revisar los documentos de su hijo y supervisar el funcionamiento académico de su hijo. Vamos a determinar el funcionamiento total de la lectura y de ciertas habilidades de la lectura de su hijo. Esperamos conducir las pruebas antes y después de evaluacion, al principio y al fin del año, estas pruebas durarán 5 a 6 minutos. La información que se obtenga acerca de su hijo es confidencial, solamente los investigadores van a usar esta información y su hijo no va ser identificado de otra manera. La maestra de su hijo va a asistir en la evaluación de esta investigación y supervisar el progreso de su hijo.
Esta es la última parte de esta investigación que a durado varios años y le agradecemos su participación de los anos anteriores. Nosotros creemos que la información que obtenemos es extremadamente importante para ayudar a aprender, las mejores maneras para ayudar a jovenes a ser buenos lectores. Nosotros creemos que las instrucciones dadas sobre los dos años, a ayudado a su hijo. La evaluaccion que conduciomos este año nos va a ayudar a aprender si los niños han retendio este progreso durante el tiempo.

Nosotros le estamos pidiendo permiso para poder usar la información académica de su hijo, como datos de esta investigación. Su permiso es voluntario, y su desición de no permitir acceso, de la información académica de su hijo no le va a afectar la manera de ser tratado o evaluado academicamente. Si obtenemos su permiso, tenga asegurado, que usted puede retirar el permiso en cualquier momento durante la investigación. Si tiene preguntas, no dude en llamarme al 292-7629. Gracias por su atencion y cooperacion.

Attentamente,

[SIGNATURE HERE]

Gwendolyn Cartledge, Ph.D.
Professor
APPENDIX F

PARENT CONSENT FORM FOR PARTICIPATION IN EDUCATIONAL RESEARCH (SPANISH)
Septiembre 28 del 2007

Estimado padre/madre:

Yo soy una profesora en el colegio de educación en la universidad “The Ohio State University.” Mis estudiantes de escuela graduada y yo estaremos conduciendo un proyecto de investigación en la escuela de su hijo(a). Desearíamos ver si el uso de instrucción académica en destrezas esenciales de lectura, particularmente instrucción en conocimiento de la fonética y principios alfabéticos, traerá mejorías en ambos logros académicos y ajustes escolares. El foco de nuestro proyecto es el mejorar los puntajes de estudiantes en el jardín de niños y primer grado. Estaremos usando un plan de estudios de lectura basado en prevención que provee instrucción en algunas áreas clave del principio de lectura.

Esperamos que estas estrategias prevendrán repruebo en lectura y ayudarán a los niños a ser más triunfantes académica y socialmente en la escuela. El maestro(a) del salón de su hijo(a) y asistente de instrucción estarán envueltos muy de cerca en la conducción del proyecto, enseñando y monitorizando el funcionamiento de su hijo(a) en destrezas de
lectura. Su hijo(a) no será removido(a) de ninguna instrucción en el salón de clases y no perderá ningún tiempo académico.

También estamos pidiendo permiso para fotografiar/grabar en video el salón de clase de su hijo(a). El propósito de estas fotos es el demostrar estrategias de manejar conducta y enseñanza usadas por el/la maestro(a) de su hijo(a). No serán usadas para identificar a su hijo(a) en ninguna manera. Las cintas serán usadas en nuestros seminarios para enseñar otros(as) maestros(as) como implementar estas estrategias. Necesitamos demostrar el uso de estas estrategias en salones de clases en la actualidad. Si usted no consiente a las fotografías, colocaremos a su hijo(a) fuera del alcance de la cámara, pero su hijo(a) permanecerá en el salón de clases y continuará con las actividades educativas del salón de clases.

Revisaremos los expedientes escolares de su hijo(a), y conduciremos pruebas periódicas para monitorizar su funcionamiento por el curso del estudio. Si están disponibles, obtendremos los puntajes de pruebas del distrito por medio del maestro(a) de su hijo(a). Toda la información coleccionada acerca de su hijo(a) será confidencial. Nadie aparte de los investigadores usarán esta información y su hijo(a) no será identificado(a) en ninguna manera a otros.

A mediados y final del año escolar pediremos que padres completen un cuestionario acerca de cuán efectivo usted siente que este proyecto fue en el funcionamiento social y
académico de su hijo(a). Puede esperar que el cuestionario tome como 10 minutos para completar. También entrevistaremos su hijo(a) para determinar cómo su hijo(a) se siente acerca del procedimiento de manejo de conducta. Esta entrevista informal tomará aproximadamente 10 minutos y no quitará ningún tiempo académico de su hijo(a). Este es un estudio de múltiples años así que será posible que deseemos continuar estas actividades el próximo año con su hijo(a). Si es así, nuevamente pediremos su permiso para la participación de su hijo(a).

Estamos pidiendo su permiso para usar los datos de funcionamiento académico de su hijo(a). También estamos pidiendo permiso para incluir su hijo(a) en cintas de video o fotografías. El permiso es puramente voluntario y la decisión de no permitir este acceso no afectará la manera en que su hijo(a) es tratado(a) o calificado(a) en la escuela. Si usted consiente, por favor sepa que usted puede escoger declinar su permiso en cualquier momento durante este proyecto. Si usted tiene preguntas, por favor siéntase libre de contactarme en el (614) 292-7629. Gracias por su atención y cooperación.

Sinceramente,

Gwendolyn Cartledge, Ph.D.
Profesora
APPENDIX G

DIBELS ORAL READING FLUENCY SAMPLE - STUDENT MATERIAL
The Wind Has a Job to Do

I learned that the wind is important for more than flying kites or making our wind chime make music. Without the wind, our world wouldn’t have any people, food, or animals. Wind moves the heat from the sun all around the planet. Without the wind, about half of the earth would be too hot for any living thing. Most of the rest of the earth would be too cold. In fact, most of our country would be under ice.

Wind is useful to all living things. It brings moisture up from the oceans into the air. Then the wind blows the moisture around. The moisture falls as rain, dew, or snow and ice.

Many plants and trees depend on the wind. The wind helps them spread their seeds to new places. Wind also blows pollen around so trees, grass, and grains can ripen. Without the wind, farmers couldn’t grow corn or wheat. Bees help the wind spread pollen. Their job is to fly from blossom to blossom with pollen on their feet and wings.

You can see for yourself how the wind spreads seeds. The next time you see a yellow dandelion that has turned into a white puffball, blow it. Or, if you find a maple tree seed with wings that looks like a helicopter, throw it. You’ll see all of the seeds go flying and you will be helping the wind do its job.
**ORF Progress Monitoring 16**

**Going to the Movies at Home**

I love going to the movies. My favorite place to go to a 13
movie is not at the theater, though. My family doesn’t like to go 26
to the theater. Mom says we have to plan ahead so we don’t miss 40
the first part of the movie. Dad says we have to hunt for a 54
parking place. My big brother says if we are late we have to take 68
the worst seats. My sister says it’s too noisy. 77

The favorite place for my family to see movies is at home. 88
We don’t have to find a parking place. We have the best seats in 103
the house, our big soft couch. We can even lie on the floor on 117
pillows if we want to. We don’t even have to wear shoes. 129

We can watch a movie anytime we want. Even our dog. 140
Boots, can watch the movies with us. Sometimes I can invite my 152
friend or my cousin over. The popcorn is free at home and we 166
can have all the seconds we want. 172

Sometimes Mom and Dad let me pick out the movie with 183
their help. We go to the video store and rent it for the night or the 199
weekend. On special nights Mom and Dad let me rent two 216
movies. Dad makes the popcorn and we all get comfortable in 222
the family room. I love going to the movies. 230

Total words: _____ — errors: _____ = words correct: _____

Retell:___________________________ORF Total:___________________________

| 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 |
| 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 |
| 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 |
| 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 |

Retell Total:___________________________

**ORF Progress Monitoring 5**

**The Wind Has a Job to Do**

I learned that the wind is important for more than flying kites 12
or making our wind chime make music. Without the wind, our 23
world wouldn’t have any people, food, or animals. Wind moves 33
the heat from the sun all around the planet. Without the wind, 45
about half of the earth would be too hot for any living thing. 58
Most of the rest of the earth would be too cold. In fact, most of 73
our country would be under ice. 79

Wind is useful to all living things. It brings moisture up from 91
the oceans into the air. Then the wind blows the moisture 102
around. The moisture falls as rain, dew, or snow and ice. 113

Many plants and trees depend on the wind. The wind helps 124
them spread their seeds to new places. Wind also blows pollen 135
around so trees, grass, and grains can ripen. Without the wind, 146
farmers couldn’t grow corn or wheat. Bees help the wind spread 157
pollen. Their job is to fly from blossom to blossom with pollen 169
on their feet and wings. 174

You can see for yourself how the wind spreads seeds. The 183
next time you see a yellow dandelion that has turned into a white 199
puffball, blow it. Or, if you find a maple tree seed with wings 211
that looks like a helicopter, throw it. You’ll see all of the seeds 224
go flying and you will be helping the wind do its job. 236

Total words: _____ — errors: _____ = words correct: _____

Retell:___________________________ORF Total:___________________________

| 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 |
| 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 |
| 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 |
| 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 |

Retell Total:___________________________

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DIBELS™ Oral Reading Fluency and Retell Fluency
Dynamic Indicators of Basic Early Literacy Skills™ 6th Ed.
University of Oregon

Directions for Administration and Scoring

**Target Age Range**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Preschool</th>
<th>Kindergarten</th>
<th>First Grade</th>
<th>Second Grade</th>
<th>Third Grade</th>
</tr>
</thead>
</table>

DIBELS Oral Reading Fluency is intended for most children from mid first grade through third grade. The benchmark goals are 40 in spring of first grade, 90 in spring of second grade, and 110 in the spring of third grade. Students may need intensive instructional support if they score below 10 in spring of first grade, below 50 in spring of second grade, and below 70 in spring of third grade.

**Description**

DIBELS™ Oral Reading Fluency (DORF) is a standardized, individually administered test of accuracy and fluency with connected text. The DORF passages and procedures are based on the program of research and development of Curriculum-Based Measurement of reading by Stan Deno and colleagues at the University of Minnesota and using the procedures described in Shinn (1989). A version of CBM Reading also has been published as The Test of Reading Fluency (TORF) (Children’s Educational Services, 1987). DORF is a standardized set of passages and administration procedures designed to (a) identify children who may need additional instructional support, and (b) monitor progress toward instructional goals. The passages are calibrated for the goal level of reading for each grade level. Student performance is measured by having students read a passage aloud for one minute. Words omitted, substituted, and hesitations of more than three seconds are scored as errors. Words self-corrected within three seconds are scored as accurate. The number of correct words per minute from the passage is the oral reading fluency rate.

A series of studies has confirmed the technical adequacy of CBM Reading procedures in general. Test-retest reliabilities for elementary students ranged from .92 to .97; alternate-form reliability of different reading passages drawn from the same level ranged from .89 to .94 (Tindal, Marston, & Deno, 1983). Criterion-related validity studied in eight separate studies in the 1980s reported coefficients ranging from .52 - .91 (Good & Jefferson, 1998).

DIBELS™ Retell Fluency (RTF) is intended to provide a comprehension check for the DORF assessment. In general, oral reading fluency provides one of the best measures of reading competence, including comprehension, for children in first through third grades. The purpose of the RTF measure is to (a) prevent inadvertently learning or practicing a mistrue, (b) identify children whose comprehension is not consistent with their fluency, (c) provide an explicit

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Revised: 7/28/01

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linkage to the core components in the NRP report, and (d) increase the face validity of the DORF.

(1) The misuse that we want to prevent is that speed-reading without attending to meaning is either desirable or the intent of the oral reading fluency measure. With a prompted retell, children will be less likely to conclude that simply reading as fast as they can is the desired behavior, and teachers will be less likely to imply that simply reading as fast as they can is desired.

(2) Teachers frequently are concerned about children who read fluently and do not comprehend. My read of the data is that this pattern is infrequent, but may apply to some children. It seems to me this procedure may identify those children without increasing unduly the amount of time spent in the assessment.

(3) The National Reading Panel (2000) report is clear on the core components of early reading, and DIBELS maps explicitly onto the first three. Retell Fluency is included to provide a brief measure that corresponds directly to the comprehension core component. The current oral reading fluency measure corresponds about as well as anything to reading comprehension. Retell Fluency provides an additional, explicit score that corresponds to the National Reading Panel core components.

(4) A primary concern teachers have about oral reading fluency is the face validity of the measure. Incorporation of an explicit comprehension check may help teachers feel increasingly comfortable with oral reading fluency.

Guidelines for Interpreting Retell Fluency. Preliminary evidence indicates that the Retell Fluency measures correlates with measures of oral reading fluency about .59. It appears children’s retell scores may be typically about 50% of their oral reading fluency score, and that it is unusual for children reading more than 40 words per minute to have a retell score 25% or less than their oral reading fluency score. So, a rough rule of thumb may be that, for children whose retell is about 50% of their oral reading fluency score, their oral reading fluency score provides a good overall indication of their reading proficiency, including comprehension. But, for children who are reading over 40 words per minute and whose retell score is 25% or less of their oral reading fluency, their oral reading fluency score alone may not be providing a good indication of their overall reading proficiency. For example, a child reading 60 words correct in one minute would be expected to use about 30 words in their retell of the passage. If their retell is about 30, then their oral reading fluency of 60 is providing a good indication of their reading skills. If their retell is 15 or less, then there may be a comprehension concern that is not represented by their fluency.

Materials: Student copy of passage; examiner copy, clipboard, stopwatch; colored scoring pen.

Directions for Administration – Part 1: Oral Reading Fluency

1. Place the reading passage in front of the student.

2. Place the examiner copy on clipboard and position so that the student cannot see what you record.

3. Say these specific directions to the student:

   Please read this (point) out loud. If you get stuck, I will tell you the word so you can keep reading. When I say, “stop” I may ask you to tell me about
what you read, so do your best reading. Start here (point to the first word of the passage). Begin.

4. Start your stopwatch when the student says the first word of the passage. The title is not counted. If the student fails to say the first word after 3 seconds, tell them the word and mark it as incorrect, then start your stopwatch.

5. The maximum time for each word is 3 seconds. If the student does not provide the word within 3 seconds, say the word and mark the word as incorrect.

6. Follow along on the examiner copy of the probe. Put a slash (/) over words read incorrectly.

7. At the end of 1 minute, place a bracket ([ ]) after the last word provided by the student, stop and reset the stopwatch, and say

Stop. (remove the passage)

**Directions for Administration – Part 2: Retell**

8. If the student reads 10 or more words correct, administer Part 2: Retell. Say,

Please tell me all about what you just read. Try to tell me everything you can. Begin.

9. Start your stopwatch after you say “begin”.

10. Count the number of words the child produces in his or her retell by moving your pen through the numbers as the student is responding. Try to record accurately the number of words in the student’s response. Put a circle around the total number of words in the student’s response.

   Example: If the student says “The bird had a nest. There was a mommy bird.” Move your pen through the numbers as the student responds and circle the total words.

   ![Counting numbers](image)

11. The first time the student does not say anything for 3 seconds, say “Try to tell me everything you can.” This prompt can be used only once.

12. After the first prompt, if the student does not say anything or gets off track for 5 seconds, circle the total number of words in the student’s retell and say, “Stop.”

13. At the end of 1 minute, circle the total number of words in the student’s retell and say, “Stop.”

**Directions for Scoring – Part 1: Oral Reading Fluency**

1. Score reading passages immediately after administration.

2. Discontinue Rule. If the student does not read any words correctly in the first row of the first passage, discontinue the task and record a score of 0 on the front cover.

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3. Record the total number of words read correctly on the bottom of the scoring sheet for each passage.

4. If the student reads fewer than 10 words correct on the first passage, record their score on the front cover and do not administer passages 2 and 3.

5. If the student reads 3 passages, record their middle score on the front cover. For example, if the student gets scores of 27, 36, and 25, record a score of 27 on the front cover. If they read only 1 passage, have them read the middle (second) passage.

6. Hesitate or struggle with words. If a student hesitates or struggles with a word for 3 seconds, tell the student the word and mark the word as incorrect. If necessary, indicate for the student to continue with the next word.

<table>
<thead>
<tr>
<th>Passage</th>
<th>Student Says</th>
<th>Scoring Procedure</th>
<th>Correct Words / Total Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have a goldfish.</td>
<td>“I have a … (3 seconds)”</td>
<td>I have a goldfish.</td>
<td>3 / 4</td>
</tr>
</tbody>
</table>

7. Hyphenated words. Hyphenated words count as two words if both parts can stand alone as individual words. Hyphenated words count as one word if either part cannot stand alone as an individual word.

<table>
<thead>
<tr>
<th>Passage</th>
<th>Number of Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>I gave Ben a red yo-yo.</td>
<td>6</td>
</tr>
<tr>
<td>We did push-ups, pull-ups, and sit-ups.</td>
<td>9</td>
</tr>
</tbody>
</table>

8. Numerals. Numerals must be read correctly in the context of the sentence.

<table>
<thead>
<tr>
<th>Passage</th>
<th>Student Says</th>
<th>Scoring Procedure</th>
<th>Correct Words / Total Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>My father is 36.</td>
<td>“My father is thirty-six.”</td>
<td>My father is 36.</td>
<td>4 / 4</td>
</tr>
<tr>
<td>My father is 36.</td>
<td>“My father is three six.”</td>
<td>My father is 36.</td>
<td>3 / 4</td>
</tr>
<tr>
<td>I am 6 years old.</td>
<td>“I am six years old.”</td>
<td>I am 6 years old.</td>
<td>5 / 5</td>
</tr>
</tbody>
</table>

9. Mispronounced words. A word is scored as correct if it is pronounced correctly in the context of the sentence. If the word is mispronounced in the context, it is scored as an error.

<table>
<thead>
<tr>
<th>Passage</th>
<th>Student Says</th>
<th>Scoring Procedure</th>
<th>Correct Words / Total Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was a live fish.</td>
<td>“It was a liv fish.” (i.e., short i)</td>
<td>It was a live fish.</td>
<td>3 / 4</td>
</tr>
<tr>
<td>I ate too much.</td>
<td>“I eat too much.”</td>
<td>I ate too much.</td>
<td>3 / 4</td>
</tr>
</tbody>
</table>
10. **Self Corrections.** A word is scored as correct if it is initially mispronounced but the student self corrects within 3 seconds. Mark SC above the word and score as correct.

<table>
<thead>
<tr>
<th>Passage</th>
<th>Student Says</th>
<th>Scoring Procedure</th>
<th>Correct Words / Total Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was a live fish.</td>
<td>“It was a liv ... live fish.” (i.e., self-corrects to long i within 3 sec.)</td>
<td>SC fish.</td>
<td>4 / 4</td>
</tr>
</tbody>
</table>

11. **Repeated Words.** Words that are repeated are not scored as incorrect and are ignored in scoring.

<table>
<thead>
<tr>
<th>Passage</th>
<th>Student Says</th>
<th>Scoring Procedure</th>
<th>Correct Words / Total Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have a goldfish.</td>
<td>“I have a ... I have a goldfish.”</td>
<td>I have a goldfish.</td>
<td>4 / 4</td>
</tr>
</tbody>
</table>

12. **Articulation and dialect.** The student is not penalized for imperfect pronunciation due to dialect, articulation, or second language interference. For example, if the student consistently says /th/ for /s/, and reads “rest” as “rethl,” he or she should be given credit for a correct word. This is a professional judgment and should be based on the student’s responses and any prior knowledge of his/her speech patterns.

<table>
<thead>
<tr>
<th>Passage</th>
<th>Student Says</th>
<th>Scoring Procedure</th>
<th>Correct Words / Total Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is time for a rest.</td>
<td>“It is time for a rethl.” (articulation)</td>
<td>It is time for a rest.</td>
<td>6 / 6</td>
</tr>
<tr>
<td>We took the short cut.</td>
<td>“We took the shot cut.” (dialect)</td>
<td>We took the short cut.</td>
<td>5 / 5</td>
</tr>
</tbody>
</table>

13. **Inserted words.** Inserted words are ignored and not counted as errors. The student also does not get additional credit for inserted words. If the student frequently inserts extra words, note the pattern at the bottom of the scoring page.

<table>
<thead>
<tr>
<th>Passage</th>
<th>Student Says</th>
<th>Scoring Procedure</th>
<th>Correct Words / Total Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is time for a rest.</td>
<td>“It is time for a long rest.”</td>
<td>It is time for a rest.</td>
<td>6 / 6</td>
</tr>
<tr>
<td>I ate too much.</td>
<td>“I ate way too much.”</td>
<td>I ate too much.</td>
<td>4 / 4</td>
</tr>
</tbody>
</table>
14. Omitted words. Omitted words are scored as incorrect.

<table>
<thead>
<tr>
<th>Passage</th>
<th>Student Says</th>
<th>Scoring Procedure</th>
<th>Correct Words / Total Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is time for a rest.</td>
<td>“It is time for rest.”</td>
<td>It is time for rest.</td>
<td>5 /6</td>
</tr>
<tr>
<td>I ate too much.</td>
<td>“I ate much.”</td>
<td>I ate too much.</td>
<td>3 /4</td>
</tr>
</tbody>
</table>

15. Word Order. All words that are read correctly but in the wrong order are scored as incorrect.

<table>
<thead>
<tr>
<th>Passage</th>
<th>Student Says</th>
<th>Scoring Procedure</th>
<th>Correct Words / Total Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>The ice cream man comes.</td>
<td>“The cream ice man comes.”</td>
<td>The ice cream man comes.</td>
<td>3 /5</td>
</tr>
<tr>
<td>I ate too much.</td>
<td>“I too ate much.”</td>
<td>I ate too much.</td>
<td>2 /4</td>
</tr>
</tbody>
</table>

16. Abbreviations. Abbreviations should be read in the way you would normally pronounce the abbreviation in conversation. For example, TV could be read as “teevie” or “television” but Mr. would be read as “mister.”

<table>
<thead>
<tr>
<th>Passage</th>
<th>Student Says</th>
<th>Scoring Procedure</th>
<th>Correct Words / Total Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>May I watch TV?</td>
<td>“May I watch teevie?”</td>
<td>May I watch TV?</td>
<td>4 /4</td>
</tr>
<tr>
<td>May I watch TV?</td>
<td>“May I watch television?”</td>
<td>May I watch TV?</td>
<td>4 /4</td>
</tr>
<tr>
<td>My teacher is Mr.</td>
<td>“My teacher is mister”</td>
<td>My teacher is Mr.</td>
<td>5 /5</td>
</tr>
<tr>
<td>Smith.</td>
<td>Smith.”</td>
<td>Smith.</td>
<td>4 /5</td>
</tr>
<tr>
<td>My teacher is Mr.</td>
<td>“My teacher is ‘m’ ‘r”</td>
<td>My teacher is Mr.</td>
<td>5 /5</td>
</tr>
<tr>
<td>Smith.</td>
<td>Smith.”</td>
<td>Smith.</td>
<td>4 /5</td>
</tr>
</tbody>
</table>

Directions for Scoring – Part 2: Retell Fluency

1. Score retell while the child is responding. Circle total number of words immediately after examiner says, “Stop.”

2. Number of retell words. Count the number of words the child retells that illustrate their understanding of the passage.

3. Exclamations are not counted. Only actual words are counted. If the child inserts mazes or other sounds, inserted sounds are not counted.

<table>
<thead>
<tr>
<th>Passage</th>
<th>Student Says</th>
</tr>
</thead>
<tbody>
<tr>
<td>I love going to the library downtown.</td>
<td>They uhh they are going to the uhh library.</td>
</tr>
<tr>
<td>There are so many books. There is a big room in the library that is just for kids. I can reach all the books by myself.</td>
<td>It is uhh downtown. uhh There’s a room.</td>
</tr>
</tbody>
</table>

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4. **Count contractions as one word.** For example, if the child uses "She's," or "We'll" they would only count as one word.

<table>
<thead>
<tr>
<th>Passage</th>
<th>Student Says</th>
</tr>
</thead>
<tbody>
<tr>
<td>I love going to the library downtown.</td>
<td>They're going to the library. It's downtown.</td>
</tr>
<tr>
<td>There are so many books. There is a big room in the library that is just for kids.</td>
<td>There's a room.</td>
</tr>
<tr>
<td>I can reach all the books by myself.</td>
<td></td>
</tr>
</tbody>
</table>

5. **Songs or recitations are not included.** If the child recites the ABC's or tells a song or poem, even if relevant to the retell, the recitation, song, or poem is not counted.

<table>
<thead>
<tr>
<th>Passage</th>
<th>Student Says</th>
</tr>
</thead>
<tbody>
<tr>
<td>I love going to the library downtown.</td>
<td>They're going to the library. The books have letters like, A B C D E F G H I J K L M N O P Q R S T U V W X Y Z.</td>
</tr>
<tr>
<td>There are so many books. There is a big room in the library that is just for kids.</td>
<td>I can reach all the books by myself.</td>
</tr>
</tbody>
</table>

6. **Minor repetitions, redundancies, irrelevancies, and inaccuracies are counted.** The crucial judgment is whether the student is retelling the passage or has gotten off track on another story or topic. In this example, the child (a) goes from "they" to "I", (b) changes "love" to "like," (c) changes the order of events, (d) repeats "library," (e) confuses "room" and "books," and (f) confuses "reach" and "read." However, their retell is fundamentally on track, and all words would count.

<table>
<thead>
<tr>
<th>Passage</th>
<th>Student Says</th>
</tr>
</thead>
<tbody>
<tr>
<td>I love going to the library downtown.</td>
<td>They're going to the library. The library is downtown. I like the library. They have books just for kids. I can read them myself.</td>
</tr>
<tr>
<td>There are so many books. There is a big room in the library that is just for kids.</td>
<td></td>
</tr>
</tbody>
</table>

7. **Rote repetitions of words or phrases are not counted.**

<table>
<thead>
<tr>
<th>Passage</th>
<th>Student Says</th>
</tr>
</thead>
<tbody>
<tr>
<td>I love going to the library downtown.</td>
<td>They're going to the library. They're going to the library. (sing-song voice)</td>
</tr>
<tr>
<td>There are so many books. There is a big room in the library that is just for kids.</td>
<td>I can reach all the books by myself.</td>
</tr>
</tbody>
</table>

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8. **Repeating their retell is not counted.** Especially when children are prompted to “try to tell me everything you can” they may simply repeat what they have already provided.

<table>
<thead>
<tr>
<th>Passage</th>
<th>Student Says</th>
</tr>
</thead>
<tbody>
<tr>
<td>I love going to the library downtown. There are so many books. There is a big room in the library that is just for kids. I can reach all the books by myself.</td>
<td>They’re going to the library. Lots of books. [prompt] They’re going to the library. Books.</td>
</tr>
</tbody>
</table>

9. **Stories or irrelevancies that are off track are not counted.** Children may start telling something from their own experience that is vaguely related to the passage. Such stories are not counted.

<table>
<thead>
<tr>
<th>Passage</th>
<th>Student Says</th>
</tr>
</thead>
<tbody>
<tr>
<td>I love going to the library downtown. There are so many books. There is a big room in the library that is just for kids. I can reach all the books by myself.</td>
<td>They’re going to the library. They have lots of books. My mom took me to the library. We got Dr. Seuss and Willy Wonka. They are my favorite books.</td>
</tr>
</tbody>
</table>
APPENDIX J

ASSESSMENT INTEGRITY CHECKLIST – DIBELS ORAL READING FLUENCY & PASSAGE RETELL
DIBELS™ Oral Reading Fluency Assessment Integrity Checklist

Directions: As the observer, please observe setup and directions, time and score the test with the examiner, check examiner’s accuracy in following procedures, and decide if examiner passes or needs more practice.

<table>
<thead>
<tr>
<th>Box</th>
<th>Needs Practice</th>
<th>✓ box to indicate Fine or Needs Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Performs standardized directions verbatim:&lt;br&gt; <em>Please read this out loud. If you get stuck, I will tell you the word so you can keep reading. When I say, “stop” I may ask you to tell me about what you read, so do your best reading. Start here. Begin.</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Holds clipboard and stopwatch so child cannot see what (s)he records.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Starts stopwatch after child says the first word of the passage.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. For first word, waits 3 seconds for child to read the word. After 3 seconds, says the correct word, starts the stopwatch, and scores the first word as incorrect.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. For all words, if child hesitates or struggles with a word for 3 seconds, says the correct word and scores the word as incorrect.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Puts a slash through words read incorrectly.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. Follows discontinuance rule if child does not get any words correct in first five words.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. At the end of 1 minute, places a bracket (e.g., ) after the last word provided and says “Stop.”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. Records the number of correct words.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10. Shadow score oral reading fluency with the examiner. Is he/she within 2 points on the final score?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11. Performs retell standardized directions verbatim:&lt;br&gt; <em>Please tell me all about what you just read. Try to tell me everything you can. Begin.</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12. If the student does not say anything for 3 seconds, say “Try to tell me everything you can.” This prompt can be used only once.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13. If the student does not say anything or gets off track for 5 seconds, circle the total number of words in the student’s retell and say, “Stop.”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14. At the end of 1 minute, circle the total number of words in the student’s retell and say, “Stop.”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15. Shadow score the retell with the examiner. Is he/she within 2 points on the final score?</td>
<td></td>
</tr>
</tbody>
</table>