EFFECTS OF A SUPPLEMENTAL READING INTERVENTION PACKAGE ON THE READING SKILLS OF ENGLISH SPEAKERS AND ENGLISH LANGUAGE LEARNERS IN THREE URBAN ELEMENTARY SCHOOLS: A FOLLOW-UP INVESTIGATION

DISSERTATION

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

By

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* * * * *

The Ohio State University
2007

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ABSTRACT

This study investigated the effectiveness of a supplemental early reading intervention package on the segmentation, blending and oral reading fluency skills of 23 urban first-grade students, including English Language Learners (ELLs), who continued to be at reading risk after receiving intensive phonological awareness training the previous year in kindergarten (i.e., ERI-Treatment Group). Additionally, the study examined the growth rates of 15 first-grade students, who reached benchmark status at the end of the previous year’s kindergarten intervention (i.e., ERI-Comparison Group), as well as the growth rates of 23 first-grade comparison students, identified the previous year in kindergarten with few or no markers of reading risk (i.e., Comparison Group). Six instructional assistants received a six-hour training package to deliver the intervention to the ERI-Treatment Group across three urban high poverty schools. Pre- and posttest standardized measures (WJ-III; CTOPP) and tri-weekly progress monitoring data were collected to evaluate student progress. Supplemental intervention was delivered 4-5 times per week for 20 to 30 minutes each session over a period of 57 to 88 sessions. Treatment integrity checks were collected frequently during random school visits. Measures of social validity were collected to evaluate direct consumers’ satisfaction about the goals,
procedures and outcomes of the treatment. Data were analyzed with regression models, contrasts, and repeated measures mixed-effects modeling.

Results showed that the ERI-Treatment group made substantial gains in phonological awareness and alphabetic understanding skills. Fewer gains were found in oral reading fluency and comprehension, especially for ELLs. The ERI-Comparison Group not only maintained treatment gains from the previous year’s intervention, but also performed comparably to the levels of their initially higher performing peers (Comparison Group). These findings highlight the importance of intensive phonological awareness training and its potentially lasting effects to reduce the reading risk of extremely vulnerable students. They also underscore the need to provide ongoing intensive support, depending on students’ responsiveness to intervention.
Dedicated to my Yiannis

for all those reasons he only knows…
ACKNOWLEDGMENTS

I truly appreciate the mentoring, support, and intellectual guidance I received from people in my doctoral program here at The Ohio State University. Foremost, I thank heartily my mentor, Dr. Gwendolyn Cartledge, for allowing me to enter into her research team and for leading the way in serving best urban minority learners. By her example, she taught me to set high standards for my work, and pursue my goals with integrity, hard work, and perseverance. She was a gracious mentor and I was honored to work with her throughout my doctoral program.

Thank you, Dr. Gliem, for teaching me the foundations of statistical analyses and group research designs. I am grateful for the numerous discussions we had over my data analysis. Your patience, willingness, and kindness were always there! Many thanks to Dr. Gardner for giving his valuable time and support to serve on this committee.

I would not have been able to conduct this study without the active participation and efforts of the school paraprofessionals and students of the three elementary schools. Thank you teachers and students for permitting me to “invade” into your daily school routine. Thanks to Lenwood Gibson and Crystal McLean for being good instructors to our needy students and for always being there to help out with the collection of massive data throughout the study. Thanks to Amanda Yurick for setting up the way to continue with this large project.
It would have been impossible to complete this doctoral program and dissertation study without the love and support of my family and friends back in Cyprus. Mom and dad you are the best because you purposefully invested on your children by sacrificing your personal needs. There are no words to capture the magnitude of your personal struggles to raise three children, who almost look like triples! Panayiota and Demetra, you have indeed shown me how to maintain balance during my intensive and challenging years of my program study. To all those close friends (Maria, Christiana, Marina, Andri, Aristi, Konstantia), who I miss dearly, thank you for staying in touch and keeping me in your prayers and thoughts.

This last section is devoted to the most important person in my life, my husband. You were and have been an unfailing source of energy, thought, stability, love, and tremendous patience. You put up with my stressful moments and showed me love when I did not even deserve it.
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FIELDS OF STUDY

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CHAPTER 1
INTRODUCTION

Reading failure in America is a national epidemic that has been infesting the educational and social system of this country for a long time. Evidence of the magnitude of this critical issue is found in national reading report cards. According to the latest reading report card of the National Assessment of Educational Progress (NAEP), 36% of U.S. fourth-grade students read below basic level and have little or no mastery of the educational skills and content, which are required to perform work at grade level (NCES, 2005). Examining the spread of this epidemic across the country, the data show, for example, 22% in Massachusetts, 50% in California, and 67% in the District of Columbia of students are reading below basic level. Almost 20% of the nation’s children face severe reading difficulties prior to third grade, which means that more than 10 million children in America are struggling to read (National Reading Panel, 2000).

The consequences of failing to establish early reading skills are striking. In her longitudinal study, Juel (1988) found that poor readers in first grade had 0.87 probability of remaining poor readers in fourth grade while good readers in first grade had 0.88 probability of remaining good readers. Poor long-term school outcomes were also documented by the Shaywitzs and their colleagues (1992; 1999), in a series of research longitudinal studies investigating a representative cohort of 445 students from
kindergarten through Grade 9 in Connecticut. Among other findings, these researchers concluded that shortly after a child’s school entry, the reading achievement of initially poor readers changed very little relative to their counterparts. That is, poor readers seemed to follow similar growth patterns over time with the average or superior readers. However, the sobering finding was that they were never able to catch up in the development of reading skills by the end of Grade 9, even after receiving special education services.

The snowballing of reading skill deficits results in negative social outcomes. When Lyon was appointed as the chief of the National Institute of Child Health and Human Development (NICHD), he wisely placed the issue of underachievement and low educational outcomes within a social framework. In his hearings to various committees to Congress, Lyon argued convincingly that reading difficulties were a public health issue and urged for immediate action (Hearing on reading and literacy initiatives, 1998; Hearing on measuring success: Using assessments and accountability, 2001; Lyon, 2002). He contended that when students do not understand the alphabetic code, then they are not able to break it, read and write, and as a consequence their self-esteem is lowered, and their opportunities for postschool education and meaningful employment are minimized.

Reading difficulties and their negative outcomes are evident across ethnic groups. Nonetheless, this issue is more prevalent and persistent among low-income minority groups in urban settings. This subset of students in urban high-poverty schools is at most risk for reading failure (Foorman & Moats, 2004).
Before school entry

- Low family socioeconomic status (SES)
- Cultural and linguistic family background
- Poor academic skills
- Poor social skills
- Large families
- Parents’ lack of academic and social skills
- Divorced or single parent families

Upon school entry

- Inexperienced teachers with unclear rules
- Ineffective instructions
- Inconsistent class management
- Low school expectations
- Limited school resources and funding
- Excessive or exclusive use of punitive methods (e.g. suspensions, expulsions)

School outcomes

- Academic failure in class
- Behavioral problems
- Low scores in statewide and district wide standardized tests.
- Failure in meeting state standards.
- Increase of Achievement Gap

Entrance in Special Education

- Low teachers’ expectations
- Low quality curriculum
- Low quality and inadequate instruction
- Isolation from peers

Dropping out or Graduating with lack of basic academic skills

Figure 1.1 Hypothetical pathway model of academic failure for students in urban schools
As Figure 1.1 depicts, a number of environmental risk factors (e.g., low family SES background, nutrition, prenatal and postnatal care, teacher instruction, instructional methods) impede urban students’ effort in learning how to read. Researchers note that students of minority and/or low socioeconomic status enter school with significant weaknesses in oral language and prereading skills (Hart & Risley, 1995; Torgesen, 2002). This means that their vocabulary knowledge and verbal ability are limited; they have less experience with complicated grammar syntax, and limited background knowledge. All these skills are vital and prerequisites for reading comprehension by end of Grade 3 (Torgesen, 2004; Whitehurst & Lonigan, 1998). On top of these deficits, minority students are also impaired in phonological/phonemic awareness, the auditory skill to hear and manipulate sounds. If these students do not receive a broader range of instructional and intensive support upon school entry, their reading problems will increase and continue to spiral.

Two of the largest minority groups that have been shown to be at risk for school failure, with high probabilities for special education referrals and disproportionate representation in special education, are African-American and Hispanic students (Donovan & Cross, 2002). For these groups, the percentages of fourth-grade students reading below basic level in 2005 were 48% and 44%, respectively (NCES, 2005). Between-group comparisons of Grade 4 Caucasian students and each minority group have shown that the achievement gap from 1992 to 2005 has not decreased substantially. For instance, the gap between Caucasian and Hispanic students decreased only by one scale score point; thus, resulting to a 26-point
difference in 2005. Similarly, the score gap between Caucasian and African-American fourth-grade students decreased from 32 to 29 points. Data from the recent National Assessment of Educational Progress about minority students should signal educational researchers and practitioners two alarming messages. First, the reading scores of Grade 4 urban minority students are abysmally low. Second, it is surprising that during these 13 years, the achievement gap has not decreased significantly despite the nationwide focus given on scientific reading research. This highlights the need for redirecting and intensifying the research focus on children from low-SES urban backgrounds since they need the best instruction at the earliest point of time (Lyon & Fletcher, 2001).

Adding to the complexity and challenge in meeting the diverse reading deficits of urban minority students is the increasingly growing number of non-English student populations (a.k.a., English language learners [ELLs]) in the public schools. Interestingly, limited focus has been given to this population in the disproportionality literature, which has failed to examine ELLs as an intact group (Artiles, Rueda, Salazar, & Higareda, 2005). Also, many school districts do not routinely identify these students as a distinct subgroup. Nevertheless, federal data of 2004 indicate that 51% of ELLs (i.e., students who spoke English with difficulty at home) failed to complete high school (National Center for Education Statistics, 2004). ELLs have the highest dropout rate, high levels of poverty, lowest achievement scores, and large mobility rates (McCardle et al., 2005). They are the fastest growing subgroup among public school populations with an annual increase of approximately 10%. In 1979, there were
6 million ELL students; by 1999 the numerical figure reached 14 million (August & Shanahan, 2006a). Although these students enrich the multicultural and diverse climate of public schools in their own unique way, their presence increases the challenging task of not only teaching them how to read in English but also understand how the linguistic demands of a second language interfere with the reading acquisition process of English.

Recognizing the significance of the negative academic and social outcomes of ELLs, the U.S. Department of Education charged a 13-member panel of experts in reading, language, bilingualism, research methods, and education to review quantitative and qualitative research studies on the development of literacy in ELL students (August & Shanahan, 2006b). The research goals and findings of the National Literacy Panel (NLP) are described later in this chapter.

The importance of establishing strong reading skills for English-speaking as well as ELLs combined with the negative long-term consequences of reading failure have led researchers from across different fields (e.g., psychology, bilingual education, neuroscience, special education) in joining forces for: (a) understanding the critical components of the reading process, and (b) determining ways for preventing reading failure among these groups (Coyne, Kame’enui, & Simmons, 2001).

What do we know about reading?

Learning how to read is hard. As Sally Shaywitz (2005) describes it “… [reading is] an extraordinary ability, peculiarly human and yet distinctly unnatural” (p.3). And due to the complexity in learning how to read, it clearly requires teachers
with expertise. Moats (1999) was right when she made the analogy that reading is a rocket science. Given that teaching young children how to read requires expert teachers, what do such teachers need to know? Lyon and Chhabra (2004) provide two guidelines: (a) Understand the development of the reading process from the early preschool years of a child’s life to the time of formal schooling. It is critically important for teachers to realize that the quantity and quality of instructional stimuli received during those early preschool years (i.e., before school entry) profoundly influence the trajectory of youngsters on language acquisition skills. This could not have been truer for low-income, urban minority students who enter school with inadequate language development and thus are being constantly challenged in breaking the alphabetic code in primary grades. (b) Knowing that a significantly large portion of the student population enters school ill-equipped with language tools, is important for an expert teacher to be able to identify ways for preventing reading failure. Of course, both of these recommendations are supported by empirical evidence.

**Development of reading process**

The first recommendation by Lyon and Chhabra (2004) has already been given extensive empirical investigation for more than two decades. Studies conducted by NICHD researchers identified the critical components of normal reading development (Adams, 1994; Lyon, 2001; Foorman, 2003). Specifically, scientists found that young readers needed first to develop the ability to hear and manipulate sounds (i.e., phonemes) prior to making sense of printed symbols (i.e., letters and letter combinations). Identification and manipulation of spoken sounds refer to phonological
and phonemic awareness. Phonological awareness is a broader category and includes awareness of the larger and smaller parts of spoken language (Simmons & Kame’enui, 1998; Carnine, Silbert, Kame’enui, & Tarver, 2004; Moats, 2000). Larger parts of speech are words, syllables and smaller parts are rimes, onsets, blending and segmenting. Phonemic awareness is a subcategory of phonological awareness and it is focused only on identifying and manipulating distinct sounds (phonemes) within words. In this particular study, the primary variable of interest was phonemic awareness. Along with developing phonological/phonemic awareness, beginning readers need to learn to connect those manipulable sounds with their respective printed forms (i.e., phonics). This skill is termed alphabetical principle. Torgesen (2004) describes that poor readers in fourth grade show clear visible deficits in phonological awareness and alphabetic understanding skills from kindergarten and first grade. Specifically, struggling readers in primary grades have weak abilities in hearing, distinguishing and blending individual sounds and matching those sounds to print. Consequently, poor readers find it difficult to decode unknown words.

Both early beginning skills, phonological/phonemic awareness and alphabetic principle, are necessary but not sufficient for children to become good readers. Young learners need frequent opportunities for practicing these skills and thus, developing reading fluency (i.e., speed and accuracy) along with vocabulary knowledge and text comprehension strategies. Students with weak phonological/phonemic and decoding deficits find it hard, even boring, to read for pleasure. Torgesen (2002) further explains that problems with reading fluency result not only from decoding weakness
but also from the inability to identify words “by sight.” Limited exposure and practice in learning sight words hinders the reading accuracy, thus causing slow growth of fluent word-recognition skills. Coupled with the decoding deficits, poor readers have limited vocabulary capacity, which in turn increases the missed opportunities to develop comprehension strategies. Acquiring all five components (phonemic awareness, alphabetical principle, fluency, and vocabulary knowledge and text comprehension strategies) is a proof for being a good reader. By contrast, deficits in any of the above areas hinder students’ reading development.

To further extend the knowledge on what critical components should be included in effective reading instruction, the federal government charged a 14-member committee in identifying and documenting reading components of effective reading instruction. The outcomes of the National Reading Panel [NRP] (2000) report were the epicenter of the No Child Left Behind Act [NCLB] (2001) and the recently authorized Special Education public legislation, the Individuals with Disabilities Education Improvement Act of 2004 (IDEA, 2004). The panel was also asked to provide recommendations on which of these instructional practices can be readily utilized in classroom settings. Because of the enormous body of published research literature in reading, the panel elected to examine five major topic areas with sound methodological basis. The topic areas were: alphabetics, fluency, comprehension, teacher preparation, and technology. A subgroup committee was established for each topic and investigated the respective literature with the application of specific rigorous review standards.
The panel determined a priori that the criteria followed for judging studies would be in alignment with those used to examine the effectiveness and efficacy of interventions in psychological and medical research. Unfortunately, the screening process revealed that from a huge body of literature only a small portion met those rigorous standards. Such evidence was an indication that reading education research had not been using such standards on a consistent basis. Below is a brief summary of the NRP’s meta-analysis findings on two out of five topic areas. The two chosen topics are the most relevant in this study.

(a) *Alphabetics:* pertain to phonemic awareness (PA) and phonics instruction.

Training students in PA encompasses explicit and systematic manipulation of phonemes (i.e., sounds). The PA training significantly improves students’ reading more than instruction that excludes any focus on PA. Phonics instruction focuses on teaching students how to link phonemes with letters in order to form letter-sound relationships. Of note, NRP members found that studies which provided PA training to students as early as in preschool resulted in the greatest statistically significant effect sizes (d=2.37).

(b) *Fluency:* focuses on accurate, fast reading with expression. Two approaches were identified by the NRP: guided oral reading and independent silent reading. The former includes guidance from teachers or other adults during oral repeated readings. Such procedures have been found to have significant positive impact on word recognition, fluency, and comprehension. The independent silent reading has not been found to be an effective approach for
increasing student fluency. Although there were a number of correlational studies indicating a positive relationship between reading and fluency, vocabulary and comprehension, there were not any true experimental studies demonstrating causal relationships. And of course, correlation does not entail causation.

The NRP (2000) report brought significant changes to the educational system and impacted subsequent federal legislation on reading and special education areas (see NCLB, 2001; IDEA, 2004) for all students, minority and non-minority, in America. Six years later after the NRP report, another federal report was published, examining particularly the development of literacy of ELLs. As noted previously, 13 members with expertise on the topic, selected by the US Department of Education, formed the National Literacy Panel (NLP) and were asked to study research studies related to the literacy of ELLs. The panel formulated five major topics for research investigation: (a) development of literacy, (b) cross-linguistic relationships, (c) sociocultural contexts and literacy development, (d) instruction and professional development, and (e) student assessment. Setting up rigorous standard criteria for evaluation research studies, the panel experts were seeking a direct causal linkage of student outcomes and independent variables under study. Thus, experimental and/or quasi-experimental data were required. Seven literature searches conducted from July 2001 to April 2003 identified 1,800 titles, which were actually reduced to 970 studies upon meeting the panel’s criteria. These studies comprised the database of the NLP; however, only 293 were used in the NLP’s report (August & Shanahan, 2006b).
Despite the significant dearth of research investigations in this area, the NLP summarized six major findings:

1. ELLs are benefited from instruction (reading and writing) that provides “substantial coverage” to the NRP’s ideas: phonemic awareness, phonics, fluency, vocabulary, and text comprehension. The panel contends that these big ideas in reading have a positive impact on the literacy development of ELL students. However, in addition to covering these ideas during classroom time, the panel also recommends the provision of making instructional accommodations to ELLs so as to be benefited maximally from the English literacy instruction.

2. ELLs are benefited from instruction that gives emphasis on oral English proficiency. Instruction focused only on NRP’s ideas is not sufficient for teaching ELL students how to read and write in English. Panel experts note that teachers who do not spend time teaching ELLs oral proficiency, these students lack in text-level skills (i.e., comprehension and writing) compared to their Non-ELL peers.

3. Taking advantage of ELLs oral proficiency and literacy in their native language can facilitate development of English literacy. Panel experts suggest that ELL students can transfer literacy skills from their native to the second language by lower- and higher-order vocabulary skills (e.g., cognates, which are words that have similar spellings and meanings in two languages).
4. Development of English literacy is influenced by a multitude of individual factors such as age, general language proficiency, English language proficiency, cognitive skills, and similarities and differences between English language and ELL’s native language.

5. Limited assessments in English exist for measuring strengths and weaknesses of ELL students. NLP members recommend that ELL students should be assessed in both their native as well as their second language for more valid conclusions of their performance.

6. Little empirical evidence exists in assessing the impact of sociocultural factors (e.g., immigration status, parent and family influences, district/state/federal policies, language status) on the development of English literacy of ELLs. Nonetheless, panel researchers suggest that home language experiences can have a positive impact on literacy achievement.

In sum, federal reports and age-long research investigations have documented what are the critical components especially in early beginning reading for developing English literacy among ELL and Non-ELL students. The focus of reading scientists and practitioners has been to tap into this knowledge and prevent reading failure among America’s children.

_Preventing Reading Failure_

Waiting for students to fail academically by Grade 4 and then be sent to special education for remediation presents a number of problems. The most salient are the following: (a) students have already experienced delay in the development of their
reading skills which affects their vocabulary growth, b) timing of remediating reading
problems may be too late since struggling readers have already lost their enthusiasm
and motivation to learn to read, after consecutive years of reading failure, and (c)
quality of instruction is usually inadequate, unsystematic and general, (Lyon &
Fletcher, 2001; Torgesen, 2002). An alternative solution that has received rigorous
empirical support in reading research is early identification and intervention.
Advances to early identification have been supported by converging evidence that
points to a phonological basis as the underlying cause of most reading difficulties
(Wagner, et al. 1997; Simmons & Kame’enui, 1998; Shaywitz, et al., 1999; Shaywitz,
2005). Identifying at-risk students for reading problems early coupled with the
provision of systematic and explicit reading instruction decreases the number of
students with risk status later on (Lyon & Chhabra, 2004).

Two major quantitative meta-analyses were carried out to investigate the
effects of phonological/phonemic training on student reading outcomes. In their meta-
analysis, Bus and van IJzendoorn (1999) found that the training effects of phonemic
awareness produced statistically significant medium to large effect sizes (d=0.73).
Particularly, they found that training effects on measures of phonemic awareness and
reading skills produced greater outcomes for students in the preschool rather than for
students in kindergarten or later primary grades. These researchers concluded that “an
early start with phonemic training tends to facilitate the process of learning to read”
(p.142). Two years later, Ehri and her colleagues (2001), being part of the alphabetics
team of the NRP, reported the findings of their quantitative work. After reviewing 52
controlled studies, Ehri et al. found that the effects of phonemic awareness training on phonemic awareness, spelling, and reading measures produced medium to large effect sizes. Furthermore, these researchers concluded that the largest effect sizes on phonemic awareness and reading outcomes were noted for students in preschool (d=2.37) while the greatest effect sizes on spelling outcomes were evident for kindergarten students. Instruction that lasted from 5 to 18 hours produced the largest statistically significant effect sizes on all three dependent measures. Despite large effect sizes produced for the suggested intervention duration, Ehri et al. cautioned that it was premature to draw conclusions about how long instruction in PA should last in order to be effective. Duration of intervention depends on a number of factors such as the goals of instruction, how many different PA skills are taught, whether letters are included, what students already know about PA before intervention, what type of provision is made for facilitating the transfer to reading and spelling, and whether students present special education needs. Ehri and colleagues concluded that “teaching phonological awareness is a means rather than an end. PA is taught not for its own sake but rather for its value in helping children understand and use the alphabetic system to read and write” (p. 279).

There is sufficient evidence to conclude that phonological processing deficits are the hallmark of poor readers. In fact, poor phonological processing skills are a common characteristic between low-achieving readers and students identified with learning disabilities (LD). This commonality became a contributing factor in re-conceptualizing the identification of students with LD (Ysseldyke, Algozzine, Shinn,
& McGue, 1982). With the recent re-authorization of IDEA (2004), local educational authorities have an alternative option to traditional assessment practice for identifying students with LD. The new method has been called Response to Intervention (RTI) (Gresham, 2001; 2002). The proposed LD identification method, RTI, has received greater dimensionality in educational systems. Interestingly, researchers view RTI as a multi-tiered, dynamic model for preventing reading failure among young students. Chapter 2 provides extensive review of the literature on how RTI can be a valid instructional approach for preventing reading failure in at-risk young learners.

Additionally, predictive studies have demonstrated that individual differences in phonological processing, as measured by phonological awareness and rapid naming, reliably differentiate good readers from poor readers and account for unique influence on the acquisition of beginning reading skills (Wagner et al., 1997; Vellutino et al., 1996). These findings support the feasibility of screening young students as early as in kindergarten and provide early reading interventions to those at risk for reading failure. Despite the fact that early identification of at-risk students in fall has resulted in more false positives (i.e., mistakenly identifying students who are not at risk) than in winter or spring, it allows school personnel to intervene at the beginning of the school year rather than late.

According to Simmons and colleagues (2003b), providing early preventative interventions is based on four assumptions: (a) the condition of early reading risk and reading disabilities are identifiable, (b) early reading deficits are preventable, (c) there is sufficient beginning reading technology that can be immediately applied in schools,
and (d) the effects of prevention maintain over time beyond intensive interventions. As noted previously, extensive empirical evidence supports assumptions (a) and (c). Nonetheless, in order to determine that early reading deficits are preventable and treatment gains maintain over time, systematic longitudinal follow-up studies need to be designed, conducted, and provide further evidence of the long-term effects of preventative early reading interventions.

Purpose of the Study

This research study examined the responsiveness to intervention of a follow-up sample of first-grade urban students who had received up to a four-month supplemental early reading intervention (i.e., ERI) in kindergarten (i.e., Year 1). Specifically, the study had three primary goals:

(a) to examine whether urban treatment resisters (i.e., students who continued to be at risk after receiving kindergarten intervention) would reduce their risk status by receiving an additional “dosage” of intensive, explicit early reading intervention for a longer period of time in Grade 1 (hereafter, ERI-Treatment group).

(b) To examine whether urban treatment responders (i.e., students who were at benchmark after receiving kindergarten intervention) would maintain their kindergarten intervention gains and thus, experience an “inoculation effect” in Grade 1 (hereafter, ERI-Comparison group) (O’Connor, 2000; Coyne, Kame’enui, Simmons, & Harn, 2004).
(c) To examine and compare the performance and growth of an urban
Comparison group, who had been targeted in kindergarten due to its minimal
reading risk markers. This group (hereafter, Comparison) was compared with
the ERI-Treatment and ERI-Comparison groups.

More importantly, this study examined the three goals in relation to student
language status. That is, the study targeted both English speaking (i.e., Non ELLs) and
English language learners (i.e., ELLs). Dearth of longitudinal studies exists with
treatment responders (see Coyne, et al., 2004; Vellutino et al., 1996) as well as with
treatment resisters. Providing answers to the above goals would also provide empirical
evidence of the efficacy, and effectiveness of secondary interventions, nested in the
theoretical multi-tiered school paradigm, Response-To-Intervention (RTI).

Research Questions

1. Based on the amount of improvement (i.e., gain scores) as measured by five
standardized reading variables [Phonological Awareness Composite (PAC),
Rapid Naming Composite (RNC), Letter-Word Identification (LWID), Word
Attack (WA), Passage Comprehension (PC)]\(^1\), is the change (Δ-delta) gain
score different between: (a) ERI-Treatment and ERI-Comparison groups? (b)
ERI-Treatment and Comparison groups? (c) Comparison and ERI-Comparison
groups?

\(^1\) See further description and operational definitions of the five variables of interest in Chapter 3
2. How much variance in gain scores as measured by each of five reading variables (PAC, RNC, LWID, WA, PC) can be explained by group membership (i.e., ERI-Treatment, ERI-Comparison, Comparison) and language status (ELLs, Non ELLs)?

3. Based on the amount of improvement (i.e., gain scores) as measured by five standardized reading variables (PAC, RNC, LWID, WA, PC), is the change (Δ-delta) gain score different between: (a) ELLs and Non ELLs within the ERI-Treatment group?, (b) ELLs and Non ELLs within the ERI-Comparison group?

4. What is the rate of improvement over tri-weekly reading and phonemic measures [Phoneme Segmentation Fluency (PSF), Nonsense Word Fluency (NWF), Oral Reading Fluency (ORF)]\(^2\) for students in the ERI-Treatment group, the ERI-Comparison group, and the Comparison group?

5. As a measure of social validity, to what extent will instructors and ERI-Treatment students view the supplemental instruction as beneficial?

\[\text{\textsuperscript{2}}\text{ See further description and operational definitions of the three variables of interest in Chapter 3} \]
CHAPTER 2

LITERATURE REVIEW

This chapter presents a review of the literature on: (a) the theoretical Response-To-Intervention (RTI) paradigm and its impact on students at risk for reading failure. Specifically, its definition, characteristics, and multi-level preventive instruction are presented. (b) Critical components of secondary kindergarten reading interventions with suggested accommodations for English language learners (ELLs), and (c) the long-term effects of early reading interventions as they are related to treatment resisters and treatment responders. For each of the three literature sections, references pertaining to English language learners are made.

Response-To-Intervention Paradigm

Response-to-Intervention (RTI) is a paradigm shift for special education because it has brought a number of conceptual and practical changes among general and special educators (Chamberlain, 2006). Kame‘enui (2007) contends that the newly identified term and construct of RTI needs clarification and historical perspective with respect to its primary goals, objectives, utility and educational applications. As an educational approach, RTI is still in its infancy and a lot of empirical investigations are currently being conducted for establishing its construct validity and reliability.
Definition of RTI

When the term was originally introduced in the special education field (Gresham, 2001), the primacy in this definition was assigned to the individual as the focus of intervention. Its definition was centered on how to improve an individual student’s responding to instruction. According to Gresham (2002), RTI is the change in student behavior as a function of a validated intervention implemented with integrity. An underlying assumption existing in this definition is the idea of behavioral momentum. Student response strength is a momentum that changes after an external force (i.e., intervention) is implemented. When an effective intervention is applied, then a substantial increase in the student’s momentum (i.e., responsiveness) is expected. If the student’s academic performance does not change in response to a validated intervention implemented with integrity, then that might be evidence of a learning disability (LD). Gresham’s suggested definition, though, centers only on prevention at the individualized level.

As the pressure for accountability and improving student academic and behavioral problems increased (see NCLB, 2001), the need for developing and implementing a large-scale preventative approach increased. Consequently, RTI has become a multi-tiered service delivery system that encompasses layered levels of evidence-based instruction (National Research Center on Learning Disabilities [NRCLD], 2005).

Despite the fact that researchers in the special education community may view RTI as a multi-tiered prevention-based model, the term has only an abridged
interpretation in the IDEA (2004). The only reference made to the RTI construct in the IDEA is the following:

In determining whether a child has a specific learning disability, a local educational agency *may use a process that determines if the child responds to scientific, research-based intervention* (emphasis added) as a part of the evaluation procedures described in paragraphs (2) and (3).

Obviously, no reference to multi-layered instruction is even implied in the special education federal legislation. On the contrary, what actually seems to be proposed in IDEA (2004) is an RTI procedure that *may* be utilized as an alternative method for identifying students with learning disabilities (LD). This type of legislative language has been described as permissive in the sense that it allows states and school districts to use either or both RTI and the traditional discrepancy method for identifying students with LD (Zirkel, 2006; Batsche et al., 2006). On the other hand, though, it can also be argued that the law presumably rejects the LD term and construct that was introduced more than four decades ago (Kame’enui, 2007).

Despite the lack of a clear, precise, and direct legislative status for RTI, educational researchers and other practitioners have focused on preventing school failure by investigating the effectiveness of the RTI approach as a multi-tiered preventative model. Advantages of RTI are earlier identification of students at risk for reading difficulties, stronger focus on prevention, and assessment is directly linked to student outcomes and academic programming (L.Fuchs & Fuchs, 2007; Vaughn & Fuchs, 2003). Therefore, this chapter reviews the literature on how this new paradigm
has been investigated primarily as a multi-layered model for preventing reading failure among ELLs and Non ELLs.

A Framework for Prevention-based Multi-tiered RTI

RTI has been proposed as a valuable multi-tiered framework for its hypothesized utility in enhancing the learning of all students and in identifying early enough at-risk students for school failure. Good (2007) defines RTI as “an approach for maximizing student learning and progress through formative, sensitive measurement of effects of instruction and using the data to improve the fit of the instructional support to the needs of the child” (p. 3). Fuchs and Fuchs (2007) contend that the premise behind RTI is that students are classified as LD when they are non-responsive to a well-validated intervention. The logic of this premise is based on the efforts used to distinguish students who are truly LD and students who are simply low-achievers due to inadequate and strong instruction. With RTI, by providing strong classroom instruction as well as additional interventions, students who will respond poorly to good instruction while the majority of their peers achieve, might be considered as LD. RTI focuses on prevention for all students that have been screened to be at risk from the early school years and its assessment procedures allow researchers and practitioners to gather evidence of the possible presence of a LD disability.

More specifically, the RTI model operates on a multi-leveled instructional model. Students’ learning needs are assessed at the beginning of the school year and addressed with an evidence-based curriculum in general education classrooms. Some
of the students respond satisfactorily to the general classroom instruction while others have difficulties meeting academic expectations. For those students reading success is not easy unless they receive additional appropriate instruction in order to maintain their classroom status. The earlier these at-risk students are identified, the higher the possibility that they become successful in their academic development (Mellard, 2004; Torgesen, 2004; Lyon & Fletcher, 2001).

The prevention-based RTI framework reminds us what Coyne, Kame’enui and Simmons (2001) had named as a systems-wide approach to beginning reading instruction. As mentioned in Chapter 1, reading is indeed an unnatural, complex process that demands highly expert teachers (Lyon, 2001). It is exactly due to its complexity, peculiarity, and difficulty that the individual classroom teacher would need continuous and constant support systems in approaching and teaching all her students, including the ones at risk for reading failure. For this reason, Coyne and his colleagues suggested that “we must work at a school-wide level to help individual schools build the capacity to support the adoption and sustained use of research validated practices while continuing to acknowledge and honor their unique and characteristic differences” (p. 69). According to Coyne et al., building a successful systems-wide approach to reading depends on three major areas:

(1) Establishing long-term reading goals and short clearly measurable performance criteria

(2) Identifying at-risk learners early on and monitoring their reading performance on a frequent basis
(3) Developing a broad spectrum of reading interventions for the full range of learners.

Core Features of RTI

The National Research Center on Learning Disabilities (NRCLD, 2005) established by the OSEP to conduct original research on investigating the effectiveness of RTI (Fuchs, Deshler, & Reschly, 2004) has documented eight core features of RTI. Although there are variations of RTI models, the following characteristics should be integrated in a strong RTI model:

1. *Empirically validated classroom instruction:* using a classroom curriculum that is supported through rigorous research will probably reduce the number of students needing additional interventions. However, how well and to what extent classroom instruction is implemented influences student outcomes with respect to increasing student academic achievement and reducing the number of students needing secondary interventions.

2. *Monitoring integrity of classroom instruction:* prior to targeting students for additional intervention, school personnel must provide evidence of the integrity of classroom instruction. Integrity should encompass both quantitative and qualitative components. For evaluating the consistency and quality of classroom instruction, a checklist may be developed with all the steps of instruction. Additional ways to assess quality include comparing student achievement between classrooms at the same grade level or calculating classroom slopes based on students’ performance (Case et al., 2003).
3. *Designing and implementing student evaluations:* an essential component tied to classroom instruction is the assessment toolkit. School personnel should use valid and reliable instruments that are aligned to their curriculum objectives.

4. *Universal screening:* having established academic and behavioral criteria, schools should screen students for any deficits in these two areas. The purpose of screening is to identify students that may need supplemental support for improving their performance.

5. *Continuous progress monitoring:* school personnel should monitor student progress frequently with the use of curriculum-based measurement (CBM). Progress monitoring is critical for keeping track of the performance of students who have been screened as at risk for behavior and/or academic difficulties. If the students’ performance does not improve with classroom instruction, then teachers should need to consider the following feature.

6. *Secondary and tertiary research-based interventions:* are implemented by paraprofessionals, or experienced teachers to provide remedial instruction to students who have been nonresponsive to general classroom instruction. Likewise, supplemental interventions should be empirically validated. Interventions may either be specifically designed for the needs of target students or follow a standardized treatment protocol.

7. *Progress monitoring during interventions:* in order to determine if secondary interventions are effective for at-risk students, teachers need to continue monitoring their students’ progress on a more frequent basis than the assessments conducted for the rest of the classroom students.
8. Monitoring integrity of secondary interventions: assessing whether intervention was implemented as intended, an observational checklist is developed and used during the integrity evaluation of intervention.

The underlying assumption in these core elements of RTI is that all students can be taught effectively (Batsche et al., 2006). Prevention of reading failure is adequately addressed in the RTI paradigm by: (a) insuring that classroom instruction in K-3 grades is delivered with integrity and emphasis is given on word-level and reading comprehension skills; (b) a screening assessment system is in place for identifying children who fall behind in early reading growth, even after a skillfully and balanced whole classroom instruction had been delivered; and (c) providing these at-risk students with reading instruction that is more intensive, more explicit, and more supportive than what can be provided in a whole classroom (Torgesen, 2002). Note that the driving force in teacher decision making at each step of the multi-tiered model is the data.

Examples of multi-tiered prevention-based RTI models

Examples of RTI models have been implemented in the schools and vary in the numbers of tiers used, screening procedures for early identification followed, and nature of preventative interventions implemented (L. Fuchs & Fuchs, 2007).

Project BRIDE (Bursuck et al., 2004) was a four-year model demonstration project conducted in three urban elementary schools and implemented an RTI model with emphasis on the following: explicit and direct instruction of alphabetics delivered in three-tiered teaching approach, data-based decision making, and professional
development. Researchers investigated three major questions: (a) the percentage of
students needing Tier 1, Tier 2, and Tier 3 instruction in these schools, (b) comparing
Tiers 2 and 3 with Tier 1 students, and (c) comparing the above multi-tiered teaching
approach implemented in the PRIDE schools with another teaching approach
implemented in a control school. Dependent measures were student scores on the
Dynamic Indicators Basic Early Literacy Skills (DIBELS) measures (e.g., nonsense
word fluency, phoneme segmentation fluency, oral reading fluency).

In Year 1, researchers targeted only the kindergarten students and provided a
three-tiered support. These students were followed in Grade 1 through Grade 3. In
essence, the researchers in their four-year longitudinal study provided a systematic
intensive three-tiered instruction to the Year 1’s kindergarten cohort. Each year,
PRIDE’s three-tiered approach had the following characteristics: (a) Tier 1 was whole
classroom reading instruction based on either the Open Court (Adams et al., 2000) or
the Harcourt (Beck et al., 2005) reading program. Classroom teachers delivered
instruction with the use of additional enhancements (e.g., advance organizers, choral
responding, perky pace, etc.); (b) Tier 2 consisted of small-group (2-8 students) daily
instruction of those students who had failed to meet criteria on the DIBELS
assessment measures. Depending upon student grade level, instruction varied from 10
minutes (in kindergarten) to 30 minutes (in Grades 1 and 2); and (c) Tier 3 was an
intensive 30-minute instructional session that utilized a different reading program, the
Reading Mastery (Engelmann, 1995a). Students entered this tier after they had failed
to show progress and reach criteria in the other two tiers. Tier 3 was delivered by Title
1 and special education teachers in a pull-out one-to-one or small-group format.
Two critical features of the project PRIDE were the ongoing professional development and the data-based decision making. Both of them are fundamental in the effective implementation of the RTI model (Haager, Klingner, & Vaughn, 2007; Haager & Windmüller, 2001). For the ongoing professional development, PRIDE researchers provided a series of after-school workshops as well as summer institutes to introduce various teaching and assessment strategies. Treatment integrity checks were conducted and performance-based feedback was delivered to teachers and paraprofessionals. Additionally, demonstration teaching was delivered either at the beginning of or during instruction. Data-based decision making allowed school personnel and researchers to place students in different tiers based upon their performance on monthly or bimonthly assessments. PRIDE outcomes showed that of the 90 students who received the multi-tiered teaching approach in kindergarten and Grade 1, 53% (43) of them achieved satisfactory performance based on Tier 1 instruction, 17% (15) of them received Tier 1 and 2 instruction, and 30% (27) were in need of Tier 3 intensive instruction. Comparing these students with another comparison school, researchers found that at the end of Grade 1 there was only 5.9% of students at risk on NWF measure compared to 24.7% evident in the comparison school. At the end of Grade 2, 35.6% of students were still at risk on ORF while the percentage figure almost doubled (63%) for the comparison group. Additional effect size analyses comparing Tiers 1 and 2 showed that students in the latter group had higher standardized growth than Tier 1 on NWF and PSF measures but failed to reduce the gap on the PSF and ORF. Nonetheless, Tier 2 group met benchmarks on PSF and NWF but not on ORF by the end of Grade 2. Effect size comparisons
between Tier 1 and 3 students revealed that on all three measures (PSF, NWF, ORF) Tier 3 students showed lower effects sizes. Bursuck and colleagues concluded that “students can make progress in small ability groups if the instruction is well designed and carefully delivered” (p. 310).

Marston, Muyskens, Lau, & Canter (2003) describe a three-stage RTI model called, Problem-Solving Model (PSM) established in Minneapolis public schools since 1994. In *stage 1* the classroom teacher using schoolwide screening data identifies students at risk and makes instructional changes in her classroom. If the teacher determines that interventions were not successful, she moves to the next stage. *Stage 2* includes the participation of an intervention assistant team, which reviews the student’s data, suggests additional instructional modifications and examines periodically the student’s progress. If instructional efforts have not resulted in increasing the student’s performance, then the team proceeds to *stage 3*. The student is referred for special education and due process is initiated. A comprehensive evaluation is conducted with parent consent. Marston et al. note that multiple sources of data are taken into account for special education eligibility such as a student’s progress in previous stages, observations from the student’s learning environments, data from norm-referenced tools that provide information about the student’s learning rate, problem-solving and adaptive skills. Prior to determining eligibility, the impact of cultural, linguistic or socioeconomic factors is also investigated. Students, who are determined for eligibility, receive a noncategorical classification known as “students needing alternative programming (SNAP), which includes both LD and mild mental impairment categories. In their study, Marston and his colleagues reported results in
the areas of child count, student achievement, referral and eligibility. However, results were of descriptive nature (e.g., percentages of referrals, number of SNAP students) and therefore no cause and effect relationships could be concluded for the effectiveness of PSM on any of the areas reported. Finally, Marston et al. acknowledged that PSM procedures were complex and subjective during the decision-making process. Realizing such an important limitation in PSM would presumably intrigue proponents of PSM to assess the treatment integrity component rigorously. However, no data were reported about this element in their study.

In both studies (Marston et al., 2003; Bursuck et al., 2004) the multi-tiered RTI was examined. Nonetheless, due to the complexity and range of factors that play into in such a model, no causal-effect relationships were reported. Report of descriptive statistics provided a positive picture of the promising effectiveness of Tiers 2 and 3 interventions but further research investigations should look into the inferential side of this model. It is imperative to demonstrate empirically a functional relationship between multi-tiered instruction and student outcomes. While research studies are probably being conducted around the country as we write, the importance is to control for any extraneous variables by manipulating the independent variable convincingly in order to see any impact on student achievement.

*RTI: The “R” in “RTI”*

Multi-tiered RTI has been implemented on a school-wide basis in various versions (Mellard, 2004; D. Fuchs, Mock, Morgan, & Young, 2003). Fuchs and Fuchs (2006) explain that there are two identifiable groups with distinct views on RTI and
classification procedures. The first group (Grimes, 2002) considers a four- or three-leveled RTI approach, whereby educational services are proportional to the magnitude of student’s needs. That is, as the student’s academic deficits increase, more services are brought in for improving the student’s learning growth. If a student remains nonresponsive after intensive services, then LD eligibility is considered. This group of practitioners regards RTI synonymous to a problem-solving model (e.g., see Marston et al.’ study above). Conversely, the second group, composed of early reading researchers (D. Fuchs & Fuchs, 2005), promotes fewer RTI tiers (i.e., 2-3) and the LD classification process is considered after strong experimental evidence is presented.

Reschly (2005) acknowledges that there is an agreement among professionals that the first and last tiers should represent the general and special education instructions, respectively. However, the tiers between the end points are still a matter of debate. Interestingly, confusion increases after secondary intervention has been shown to be insufficient for the student’s needs. Compton (2006) argues that for operationalizing an RTI model, the field of LD should consider five critical issues: who should get the intervention, what the components of the intervention are, when and how long should secondary interventions occur, and who should be responsible for the delivery of the intervention. Providing answers to these questions will open the way to a better conceptualization and measurement of nonresponsiveness (aka treatment resisters). For further discussion of treatment resisters of secondary interventions follows in the last part of this chapter.
**RTI: The “I” in RTI**

Although there is no universally accepted multi-tiered RTI framework, many researchers and professionals support the three-tier system (National Joint Committee on Learning Disabilities, [NJCLD] 2005). A general consensus exists across the field whereby as students move across the tiers, the nature of the academic intervention changes and the intensity of the services increase. Vaughn and Fuchs (2003) distinguish between two major types of intervention: general education instruction and secondary intensive intervention. The former is delivered in the general education classroom and if it is insufficient to the learner’s needs, then secondary intensive intervention is provided. Nevertheless, differences exist among professionals and researchers with respect to the type of secondary intensive intervention delivered. One camp supports a problem-solving approach while the second group is in favor of a standard treatment.

Regarding the intensity of intervention, Fuchs and Fuchs (2006) contend that intensity is increased by: (a) using a more explicit, systematic, teacher-centered intervention, (b) teaching more frequently and longer, (d) creating homogenous, small groups, and (e) having more experienced teachers delivering the interventions. The prevention focus in the multi-tiered RTI is twofold: (a) to prevent students from developing learning difficulties, and (b) to reduce those cases who have already been identified with LD (Kame’enui, Good, & Harn, 2005).
Tiers of “I” in RTI

Tier 1- Core Classroom Instruction

Tier 1 is the primary level of prevention and it denotes the general education (or core) classroom instruction delivered to all students. Making core classroom instruction as effective as possible not only minimizes the number of students needing additional intervention but also reduces the overidentification of student risk status (Foorman, Carlson, & Santi, 2007; Simeonsson, 1994). Nonetheless, primary prevention instruction should meet the needs of 70-80% of learners (Vaughn, Wanzek, Woodruff, & Linan-Thompson, 2007). At this level, the general education teacher instructs her students using a scientifically-based core reading curriculum. Consensus federal documents pinpoint that the components of effective reading instruction are phonological awareness, phonics, fluency in word recognition and text processing, vocabulary knowledge, writing, spelling and text comprehension (NRP, 2000; Snow, Burns, & Griffin, 1998). A core curriculum that builds in its content these components might presumably be considered as scientifically based. Nevertheless, does using a scientifically-based core reading curriculum bring about desired student outcomes across different student populations? Two primary issues should be taken into consideration prior to concluding about the appropriateness and utility of specific scientifically-based core reading curricula in primary grades. First, educators should evaluate the empirical evidence and clear organization of their core reading curriculum. Teachers can do that by using a document called “A Consumer’s Guide to Evaluating a Core Reading Program Grades K-3: A Critical Element Analysis.” This document was a product of a technical assistance center (a.k.a. Institute for the Development of
Educational Achievement [IDEA]) in Oregon funded by the U.S. Department of Education and directed by Simmons and Kame’enui (2003a). The purpose of this center was to evaluate the scientific-basis of already existent core reading curricula. When using this guide, educators evaluate a core reading curriculum based on its experimental basis and relevance to the demographic characteristics of students who would be taught with this curriculum. Then, educators can review content elements of the curriculum related to its scope and sequence, skills introduced within and across a series of lessons, and so forth.

Second, Foorman’s (2007) assertion “what instructional activities are appropriate for this student at this phase of his or her reading development to maximize achievement outcomes?” (p. 26) deserves merit. Foorman contends that student outcomes are impacted by school-level, teacher-level and student-level effects and the interaction among these variables. Simply stated, a core reading curriculum that has shown gains for suburban students should not be assumed to be equally effective for students in urban settings or vise-versa.

Despite the variability in curriculum design and specificity of core beginning reading curricula, research has shown us consistently that when explicit, direct code-based classroom instruction is implemented, then students, and especially at-risk ELL and Non-ELL ones, demonstrate significant growth gains in their word-identification reading skills (Torgesen, et al., 1999; Angiulli, Siegel, & Maggi, 2004). For instance, a study by Foorman et al. (1998) examined the effects of three core reading curricula programs on the word-identification, decoding, and comprehension skills of 285 first- and second-grade Title 1 urban students. The ethnicity of the sample consisted of 60%
African American, 20% Hispanic, and 20% White students. Majority (61%) of participants were males. All students represented the lowest 18% of the school district’s performance. Students were assigned in three levels of the independent variable: (a) one group received an explicit code-based core reading curriculum called Open Court. Its focus was on alphabetic principle, phonological awareness and literature activities, (b) the second group received an embedded-code program with emphasis on phonological awareness and spelling patterns along with shared writing and reading activities, and (c) the third student group received an implicit-code program with emphasis on whole-language activities such as classroom interactions developed in a print-rich literature-based classroom environment with learning centers and portfolios. Analysis of variance and growth curve analyses (hierarchical linear modeling) showed that students receiving direct code instruction improved in word reading at a faster rate and had higher word-recognition skills than those receiving implicit instruction. No statistically significant group differences were found in spelling or vocabulary measures. Foorman and her colleagues concluded that “This shows not only that problems with phonological processing are related to poor reading skills in these culturally and linguistically diverse children, but that greater changes in phonological processing skills and word-reading ability occurred when these children were provided a curriculum that included explicit instruction in the alphabetic principle” (p. 51).

Despite the existing empirical evidence for the effectiveness of phonological awareness instruction on the beginning reading skills of primary grade-level English speaking students, a dearth of research exists for the effectiveness of such instruction
on ELLs. Particularly, little has been known about the developmental patterns ELLs follow in learning English as a second language. In the literature on bilingualism, learning two languages can be viewed as an obstacle or a facilitator of the development of reading skills in a second language (Francis, Lesaux, & August, 2006).

With this framework in mind, Lesaux and Siegel (2003) conducted a study that investigated the development of reading for students with limited to no English proficiency. This study targeted 978 students of which 790 were Non ELLs and 188 ELLs in both kindergarten and Grade 2. The study examined the effects of phonological awareness (in Kindergarten) and phonics instruction (in Grade 1) on the reading, spelling, phonological processing, and memory of ELLs and Non ELLs. All students were screened in the fall of kindergarten based on the reading subtest of the Wide Range Achievement Test 3 (WRAT3). Students falling at or below the 25th percentile were classified as at risk. Screening results showed that 236 Non ELLs and 60 ELLs were identified as at risk. The total ELL sample (n=188) spoke 33 different languages. The predominant ones, however, were Cantonese, Mandarin, Korean, Spanish, Persian, Polish, and Farsi. Student sample was drawn from a large Canadian school district. Core classroom kindergarten instruction included explicit phonological awareness activities delivered in small groups with both ELLs and Non ELLs grouped together according to their PA ability. Activities included explicit emphasis on letter-sound correspondence. Instruction continued in Grade 1. Students’ progress was measured at the end of Grade 2. A series of factorial 2x2 ANOVAs and regression analyses were run examining within-subjects and between-subject factors. Results at the end of kindergarten showed that by Grade 2 the performance of ELLs was
significantly better than that of their Non-ELL peers on word-identification subtest, the rapid naming task of WRMT-R, the WRAT3 spelling subtest, real word spelling, non-word spelling, the one-minute pseudoword reading task, the one-minute word reading task, and the WRAT3 arithmetic subtest. Also, risk classification results showed that in kindergarten 23.8% Non ELLs were at risk while 37.2% ELLs were at risk. By the end of Grade 2, there was only 4.2% at risk Non ELLs and 3.72% ELLs. Lesaux and Siegel (2003) concluded that the acquisition of letter-sound correspondence in English for early reading is dependent on factors such as instruction and individual differences as opposed to fluency and oral language proficiency with English.

Additional studies that implemented an explicit phonological awareness training program for both ELLs and Non ELLs drew similar conclusions. In fact, Angiulli, Siegel and Maggi (2004) found that at-risk kindergarten ELLs at the lowest and highest ends of the SES range improved more than their Non-ELL peers, after receiving “literacy-intensive program.” Such evidence strengthens the powerful effects of phonological awareness training and eliminates the negative influences of SES on word-reading development.

At the beginning of the year the classroom teacher along with special education and/or other instructional assistants screen students on behavioral and academic criteria with the use of valid and reliable assessment measures. Screening results will indicate which students are at risk for developing academic and/or behavioral problems, and receive Tier 2 intervention. However, there is no common
screening practice on how students are selected for additional intervention and what type of intervention they should receive.

For instance, Vellutino, Scanlon, Small, and Fanuele (2006) identified the lowest-achieving 30% of kindergarteners based on tests of phonological awareness and letter-naming knowledge to receive secondary standard intervention. Interestingly, D. Fuchs, Fuchs, & Compton (2004) followed a unique assessment approach. Integrating a progress monitoring system in their screening procedures, they were successful in targeting a small subset of students. Specifically, researchers screened all first and second graders on CBM reading measures across 20 classes. Thirty percent of first graders and 40 percent of second graders were identified with low performance. At-risk students receiving validated general classroom reading instruction were monitored on a weekly basis on word attack skills. Decision to receive supplemental instruction was based on the dual discrepancy criterion. That is, at-risk students who were at least a half standard deviation below their reference group on reading measures were assigned to receive more intensive tutoring. Thirteen percent of first graders and 10 percent of second graders were provided with additional instruction.

Vaughn and Fuchs (2003) suggest that prior to providing any supplemental intervention to at-risk students, it is imperative to assess the effectiveness and quality of the general classroom instructional environment. This can be achieved by conducting classwide assessment to determine the overall rate of responsiveness for the class. To assess the quality of instruction, the class mean rate is compared to the mean of other classes in the same school, or even in the same district. If the class mean is low, then changes are made within the general education environment to increase
the quality of instruction. After establishing a qualitative instructional environment, school personnel identify students whose level of performance and rate of improvement are dramatically below of their classmates. Identifying students’ nonresponsive to the general education classroom instruction requires a progress monitoring system, similar to D. Fuchs et al.’s (2004) method incorporated in their study. This subset of at-risk students is monitored closely for a fixed time frame (e.g., 8 weeks) using brief CBM tools. If their progress continues to present a severe discrepancy from the rest of the class, then additional instruction is provided either in or out of the general classroom (D. Fuchs, & Fuchs, 2005; L. Fuchs & Fuchs, 2007).

Tier 2 – Secondary Intervention

Tier 2 is the secondary level of prevention, whereby small-group intensive, explicit instruction, in addition to core classroom instruction, is delivered. It is estimated that 20% to 30% of those students receiving good evidence-based classroom instruction will not respond to it and therefore, additional intensive intervention is warranted for them (Vaughn & Roberts, 2007). The aim of secondary preventative interventions is to support and strengthen the skills being taught in Tier 1 instruction by providing at-risk learners an additional daily 30-minute intensive reading intervention in small groups (Vaughn et al., 2007). Secondary interventions deal with students that already have shown evidence of risk status and reading problems. Therefore, the focus of secondary interventions is strictly on increasing instructional supports and instructional intensity.
Supplemental instruction may either follow a standard treatment protocol or it can be specifically designed by school personnel (i.e., problem-solving approach) to meet the students’ individual deficits. L. Fuchs and Fuchs (2007) recommend that the first type should be used when teachers need to teach new academic skills to their at-risk learners while the problem-solving method is implemented for skills that students already have acquired but need an increase in their skill performance. According to these researchers, the latter approach should be used for targeting behavioral problems. No matter which approach is followed, Vaughn and Roberts (2007) suggest that “when selecting or developing secondary interventions, it is critical to remember that the goal is that students will “catch up” with their peers after secondary intervention…” (p. 42). Thus, an effective secondary reading intervention should be highly directed and instructionally aligned to the reading skill deficits of at-risk learners. For instance, a first-grade student that presents deficits in phonological awareness and decoding skills receives Tier 2 intervention on reading comprehension, then such secondary intervention will be a mismatch to student’s skill deficits and will produce limited growth to students’ actual phonological awareness and decoding needs.

Furthermore, secondary interventions should contain elements of effective whole classroom instruction such as brisk pace, active student responding, immediate positive feedback, and systematic error-correction procedure (Bursuck et al., 2004; Foorman, Breier, & Fletcher, 2003). Progress monitoring and treatment integrity continue to be an integral part of Tier 2. In fact, students’ progress is monitored more
frequently than in Tier 1 in order to determine students’ responsiveness to a more intensive academic intervention (D. Fuchs, & Fuchs, 2005).

Reading growth in Tier 2 interventions is maximized when students at risk for reading difficulties receive both strong whole classroom instruction and more intensive, explicit, and supportive secondary intervention (Torgesen, 2002). It can be hypothesized that there is strong negative correlation between the effectiveness and quality of core reading instruction and the number of students needing Tier-2 intervention. The stronger and more effective the core reading curriculum and its implementation are, the fewer students will need secondary interventions.

Students who have demonstrated stable responding in Tier 2 are returned to Tier 1 and their progress is continued to be monitored closely. Students, who have not shown sufficient progress at this level, receive more intensive individualized instruction (see Tier 3). However, there is no clear consensus on how long nonresponsive students should continue receiving secondary intervention prior to moving to the next level of support or better yet how response to Tier 2 interventions is classified (O’ Connor & Klingner, 2007).

A growth of research investigations has flourished over the last decade examining the effectiveness of secondary interventions with at-risk ELL (Vaughn et al., 2006; Leafstedt, Richards, & Gerber, 2004; Gerber et al., 2004; Quiroga et al., 2002; Gunn, Biglan, Smolkowski, & Ary, 2000; Gunn, Smolkowski, Biglan, & Black, 2002; Haager & Windmueller, 2001; Linan-Thompson & Hickman-Davis, 2002; Denton, Anthony, Parker, & Hasbrouck, 2004) and Non ELLs (Abbott, Walton, & Greenwood, 2002; Simmons, et al., 2003a; Kamps & Greenwood, 2005; Scanlon et al.,
2005). Specifically, despite the controversy among researchers on bilingualism and foreign language learning regarding the best instructional approach to be followed for teaching English to students whose primary language was other than that (Gersten, 2006; Gersten & Baker, 2000), there has been an overwhelming increased focus on reading instruction for ELLs. McCardle and Chhabra, (2006) justify the research attention to (a) the increased trend of ELL student populations in public schools (see also Chapter 1), and (b) the research focus on evidence-based instructional approaches on reading and the need to apply those to both ELLs and Non ELLs. Evidence of this research dialogue and attention given to scientific reading research on ELLs is the numerous research studies (see above) conducted and peer-reviewed journals publishing special series on the subject matter (e.g., Learning Disabilities Research & Practice Journal, volume 19 no.4, 2004; Elementary School Journal volume107 no.2, 2006).

A common debate among reading researchers and researchers in bilingualism is whether ELLs can profit from English early reading interventions when their oral language skills are low (August & Shanahan, 2006a). To shed light to this debate and examine the effectiveness of English intervention on the development of oracy and literacy skills of ELLs in both English and Spanish, Vaughn and her colleagues (2006) conducted a controlled randomized study. The researchers screened 216 first-grade students from four urban schools 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. The rationale for testing students in both languages was to eliminate the possibility of students’ reading
difficulties with print materials being due to possible reading or language disabilities but actually due to lack of exposure to the English language. Students were determined to be at risk if their score was below the 25th percentile of the LWID and were not able to read more than one word in the reading list. Of the 216 students, 48 were placed at risk and were randomly assigned to one of two experimental conditions: (a) early reading intervention or (c) control condition. Students were coming from a border large urban district with 48% to 99% of 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 school population being qualified for it. Immediately prior and after intervention, researchers administered the following measures in 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 finally, (d) oral reading fluency probes from the DIBELS.

The intervention was matched to the language of the core reading instruction (i.e., in English), as mandated by the state. Components of the intervention included small-group explicit instruction on phonological awareness, alphabetic principle, vocabulary development, comprehension strategies, and connected text fluency. Vaughn et al. (2006) used a reading curriculum based on principles of direct instruction approach (Carnine, Silbert, Kame’enui, & Tarver, 2004). Treatment fidelity checks were conducted three times over the course of the project collecting both quantitative as well as qualitative integrity data. Data analyses included
descriptive statistics (effect sizes, means, standard deviations), univariate analyses, and confidence interval estimates. Results showed that the treatment group outperformed control group on English measures such as letter naming, phonological awareness, and other language skills. Additionally, gains were made in Spanish language but they were fewer and less strong than the ones evident in English. Authors noted that the strongest differences favored the treatment group. Of note, researchers pointed out that the ELL treatment group made higher gains on reading comprehension measures than their ELL control group. Researchers claimed that this difference could be attributed to the story tell strategy component of the intervention.

In another study with ELLs, Gunn and colleagues (2000) randomly assigned their at-risk learners to one of two groups: (a) supplemental reading intervention or (b) control group. Gunn et al. had two major research goals: (a) to examine the effectiveness of this intervention on the phonological awareness and decoding skills of both ELLs and Non ELLs, and (b) to investigate the extent to which such intervention contributes to the growth of higher-order skills (e.g., oral reading fluency, comprehension, vocabulary). Student sample was 256 students from K-2 grades. The majority (55%) was males. Students with ELL background were of Hispanic origin. Thus, 62% were ELLs and 38% were Non ELLs. Researchers did not specify the exact ethnicity of the Non ELLs.

Students received intervention for two consecutive years. Three waves of data were collected: pretest, posttest at the end of Year 1 and posttest at the end of Year 2. Dependent measures included DIBELS subtests (e.g., phoneme segmentation, rapid letter naming, phoneme onset fluency, oral reading fluency), and subtests from the...
Woodcock-Johnson Tests of Achievement (e.g., LWID, word attack, passage comprehension, and reading vocabulary). Supplemental reading intervention for K-2 target students included explicit instruction based on the *Reading Mastery* direct instruction curriculum (Engelmann, 1995a). The intervention was delivered 30 minutes on a daily basis. Data analyses included factorial 2x2 ANOVAs and multiple regression modeling. Results showed that the treatment group performed better than the control group on decoding, fluency, vocabulary and comprehension measures by the end of the study. A subset of the treatment group (ELLs) was examined separately and it was found that gains on their words per minute were higher than the controls. No statistically significant gains on other reading outcomes were reported for this group and the power was actually too low to detect any differences (i.e., sample size was only 19 students). No interaction effects between language status and group participation were found to be significant, indicating that the ELL treatment students benefited from the program as much as their Non-ELL treatment peers. Additionally, researchers found no significant interaction effects between treatment group and gender or grade, meaning that the supplemental intervention was effective in all grades and gender groups (females and males). Despite the fact that no direct treatment effects were evident on the oral reading fluency measure, Gunn et al.’s study made predictions that the growth evident on the decoding and phonological awareness skills would help treatment students improve their oral reading fluency and reading comprehension. Researchers suggest that “longer term interventions may be necessary for preventing reading failure and helping lower performing students catch up to their typically achieving peers” (p. 100).
A different research study examined the efficacy of early reading intervention on beginning reading skills of Non ELLs (Simmons et al., 2003a). Simmons and her colleagues designed and implemented a seven-month study that examined the effects of three different kindergarten reading intervention programs that varied in instructional emphasis and specificity on the phonological awareness and letter knowledge of at-risk students. A sample of 96 kindergarten students across seven elementary schools was targeted based on the low performance (i.e., below 20 percentile) on phonological awareness and letter knowledge subtests. Students, then, were randomly assigned to one of three experimental conditions. All three experimental conditions focused on developing phonological awareness (PA) and alphabetic understanding (AU) in an explicit and systematic instructional delivery. Interventions varied instructional emphasis (i.e., type and number of skills addressed) and instructional specificity (i.e., controlling the selection of examples presented, sequence of the skills, type of feedback and student opportunities for active student responding).

All target students received the core classroom instruction. In addition, they received the intervention on a daily basis, five times per week, for 30 minutes. All three conditions included instruction that was explicit and systematic. The three experimental conditions were as follows: (a) Code emphasis (CE) condition with high specificity. A 15-minute of explicit and systematic instruction on selected PA, AU, and word reading was delivered. It also included a 15-minute further development of the above skills integrated into writing and spelling activities. (b) Code and comprehension emphasis (CCE) condition with high specificity. Students in this
condition received 5 minutes of instruction on selected PA, AU, and word reading activities. Then, an additional 15-minute section focused on literature development, repeated reading, explicit vocabulary instruction and explicit story grammar and retell instruction. (c) Commercial program [“Sounds and Letters” module from the Open Court Reading (Adams et al., 2000)] was code-based with a moderate degree of specificity. Students in this condition received a total of 30 minutes instruction on a range of PA, AU, and word reading activities. They also received writing instruction. Results showed that students who received code emphasis intervention attained significantly higher rates of growth and higher absolute levels of performance than the students in the other two groups (Simmons & Kame’enui, 2003b; Harn, Kame’enui, & Simmons, 2007).

In sum, the three experimental studies previously have in common the implementation of secondary intensive explicit interventions in English with ELL and/or Non ELLs. All studies were controlled randomized studies, thus allowing for causal-effect reasoning and inferences about the effectiveness of the treatment on student outcomes. Although all studies implemented preventative-based instructional approaches, only Simmons et al.’s (2003) study focused on kindergarten level exclusively. Gunn et al.’s (2000) study examined the efficacy of their treatment on three grade levels (K-2) while the study by Vaughn and her colleagues targeted first graders. It is important to point out that if we are to reduce the reading risks for ELL and Non ELLs, then an evidence-based early reading intervention should be provided at the earliest point of the at-risk students’ life (Foorman, 2003; Adams, 1994). In fact, other researchers support the idea of starting preventative instructional support prior to
kindergarten (Vellutino et al., 2006; Coleman, Buysse, & Neitzel, 2006). Additionally, all studies demonstrated that performance gains of at-risk learners resulted from receiving a highly code-based, explicit, and systematic intervention. It is evident that utilizing an early reading intervention with these critical components produces reliable outcomes. However, although the overall effects of such interventions are certainly positive and encouraging, in every research investigation there is usually a number of students who do not respond to Tier 2 interventions. These students have been named as “treatment resisters” (Torgesen, 2004) or “non-respondents” (L. Fuchs & Fuchs, 2007) or “difficult-to-remediate” (Vellutino et al., 1996). None of the studies described above reported the percentage of their treatment resisters but according to others it is estimated that these students range from 5% to 10% per grade level (Vaughn et al., 2007; Haager et al., 2007). This group of resisting students is, of course, in need of the tertiary level of prevention.

Tier 3-Tertiary Interventions

Upon entering Tier 3, students have already shown persistent difficulties mastering academic skills and concepts delivered to the previous two tiers. The focus of Tier 3 is the tertiary level of prevention, whereby the degree and complications of reading problems should be reduced as much as possible (Harn, Kame‘enui, & Simmons, 2007). Therefore, tertiary instruction should be of high intensity, high specificity, and of longer treatment duration. Intensity can be defined by treatment duration and group size (Stecker, 2007). Students can receive one-to-one or small-group instruction for 50-minute (or longer) daily sessions (Vaughn & Roberts, 2007).
As of this present time, no consensus exists among educational researchers regarding the nature of Tier 3 level intervention. One school of thought argues that this level should be special education and that any attempts for designing more than three tiers within the RTI creates further confusion and false assumptions about the utility and appropriateness of special education (L. Fuchs & Fuchs, 2007; Stecker, 2007). The other school of thought, however, suggests that Tier 3 should be another step that provides further intensified and longer treatment duration for those students who have shown to be non-responsive to instructional strategies in Tiers 1 and 2 (Sharon et al., 2007; Sharon & Roberts, 2007). Regardless of the exact nature of this tertiary level of prevention, educators should monitor the progress of Tier 3 students more frequently and closely. Progress monitoring data are studied on a systematic basis and possible changes in the instruction are deemed to be necessary in case student performance lowers.

The following section presents the components identified through rigorous research to be critical for increasing ELL and Non-ELL student outcomes during Tier 2 interventions. Along with these essential elements, a number of proposed accommodations are outlined for instructing ELLs in their second-language. As NLP concluded providing an explicit code-based instruction to ELLs is not always sufficient. Accommodations are necessary for facilitating the learning process of ELLs (August & Shanahan, 2006b).
Critical Components of Secondary Kindergarten Reading Interventions

Substantial and convergent empirical evidence has been published on beginning reading and preventing reading difficulties (Adams, 1994; NRP, 2000; Coyne, Kame´enui, & Carnine, 2007; Snow et al., 1998). The knowledge base on reading instruction and reading disabilities has shown that comprehensive reading instruction for all students, especially for at-risk young learners, must incorporate the five big ideas in beginning reading: phonological awareness, alphabetics, fluency, vocabulary, and comprehension (Coyne, Kame´enui, & Simmons, 2001). Nonetheless, knowing the content of instruction is not sufficient to bring about the desired achievement outcomes among struggling readers. Effective delivery of instruction and its critical components play a crucial role in virtually all areas of academic learning.

Torgesen (2002; 2004) describes an effective intervention for at-risk learners to be explicit, intensive, and supportive. Note, though, that these critical components could be characterizing not just simply Tier 2 interventions but also all layers of instruction. As described earlier, research showed that implementing an explicit code-based reading instruction in Tier 1 benefits all students, but mostly the at-risk ones (Foorman et al., 1998). Students that have already “cracked” the code and are reading above their grade level will continue to read despite explicit or incidental teaching. However, students who are still trying to make sense of the printed symbols and matching those prints with their sounds, Moats (1999) pointed out that these students will “… never learn unless they are taught in an organized, systematic, efficient way by a knowledgeable teacher using a well-designed instructional approach” (p. 7).
In preventative multi-layered instructional model, such as the RTI, the level of information, instructional supports, specialized services, and resources vary depending upon students’ response to each layer of instruction. Below is a summarized list of critical features of instruction for students at risk for reading difficulties. It is important to note here that at-risk learners are defined as those students with skill deficits in phonological awareness and alphabetic understanding. If these students do not receive instruction that incorporates the following critical features, then the students are destined to become poor readers with great decoding difficulties, limited oral reading fluency and comprehension abilities, as well as narrow vocabulary knowledge.

1. **Explicit Instruction.** At-risk students receive clear, distinct, direct instructional stimuli that enable them to make connections easily between letters and sounds and practice those relationships in a carefully designed sequencing. As Torgesen (2004) describes “explicit instruction is instruction that does not leave anything to chance and does not make assumptions about skills and knowledge that children will acquire on their own” (p. 6). Evidence of the effectiveness of such type of explicit instruction has been documented extensively in numerous studies (Foorman et al., 1998, Torgesen, et al., 1999; Simmons et al., 2003a; Vaughn et al., 2006). In a recent research synthesis by Vaughn, Gersten, and Chard (2000), it was found that controlling the task difficulty by presenting exemplars in a sequential order explained common variance in student achievement outcomes. This finding suggests that when allowing students to practice easier tasks and slowly and systematically
progress to more difficult ones over time increases their academic success (Coyne, Zipoli, & Ruby, 2006).

2. *Comprehensive Instruction.* All five big ideas should be addressed in a comprehensive instructional program. However, depending upon the at-risk students’ skill deficits, big ideas need to be prioritized in a way that the most relevant to students’ needs are taught first in an intensive and systematic manner for a longer period of time. Therefore, students that have deficits in phonological awareness, then they should receive greater dosages of this area and then slowly integrate this skill to activities that target fluency, vocabulary and comprehension (Foorman & Torgesen, 2001).

3. *Intensive Instruction.* At-risk students require more learning trials per day compared to the number of practice opportunities given to average peers. The reasoning is that by increasing the learning trials, students would build fluency and automaticity in their skills, thus accelerate their growth of learning and reach their grade level status. Intensifying secondary instruction for at-risk students can take two forms: (a) increasing the instructional time of intervention, or (b) providing one-to-one or small group instruction (Torgesen, 2002). However, NRP (2000) concluded that one-to-one interventions are not more effective than small-group interventions.

4. *Incorporating principles of instructional and curricular design.* Secondary interventions should meet the principles of instructional design with emphasis on prioritized content, meaningful and research-supported scope and sequencing of skill introduction, review and practice (Harn et al., 2007;
Kame’enui & Simmons, 1990). Of course, the principles of curriculum content and design are not effective if their instructional delivery is not in synchrony with an explicit, intensive, comprehensive type of instruction.

Instructional accommodations for English Language Learners

According to the recommendations of the National Literacy Panel (NLP) on developing literacy in ELLs, second-language literacy instruction should focus on the same curricular and instructional components as first-language literacy instruction (August, & Shanahan, 2006b). Of course, such recommendation has received extensive empirical support with a series of studies that incorporated explicit, intensive, comprehensive core and secondary teachings and resulted in word reading gains among ELLs (see Lesaux & Siegel, 2003, Vaughn et al., 2006; Gunn et al., 2000). However, the differences in the second-language oral proficiency require educators to design and implement instructional accommodations for adjusting for these differences and, thus, meeting the instructional needs of ELLs. Unfortunately, the NLP concludes that “the research has provided a sketchy picture of what some of these adjustments might be” (p. 16). The incomplete picture of instructional accommodations as well as teaching English as a second language have received limited focus presumably because they have been controversial topics (McCardle, & Chhabra, 2006), and they are related with extreme diverse student populations. The existence of diverse and various minority languages in American public schools may have reduced the possibility in developing and designing standard accommodations for students from diverse backgrounds. That is, it can be speculated that different
adjustments might be deemed necessary for a child whose first language is either on alphabetic (e.g., Spanish) or non-alphabetic system (e.g., Mandarin). Despite the dearth of existing research-based interventions, a number of adjustments can be used during explicit, intensive instruction (August & Shanahan, 2006b; Cartledge, Kourea, Klett, & Cooper, 2007). It should be noted, however, that these recommendations are not data-driven and further research is necessary to demonstrate their effectiveness.

1. Use of auditory, verbal and non-verbal cues for signaling ELLs the correct response. English verbal cues (e.g., word “sound”) can be paired with the non-verbal signal (e.g., pointing to the ear).

2. Use of scripted curriculum for controlling language. Reading lessons should be scripted so that teachers do not fall into the trap providing redundant verbal or non-verbal instructional information in English that would increase the anxiety and confusion among ELLs. A good scripted lesson plan is carefully designed so that target objectives and skills are presented in a stepwise, clear and meaningful sequencing.

3. Incorporate various modes of active student responding by allowing students to make verbal and written responses in each instructional antecedent.

4. Including a systematic vocabulary component so that the gap between English oral proficiency and reading skills can be bridged in ELLs. According to the NLP, despite the fact that ELLs demonstrate significant gains in reading intervention programs, their literacy skills (i.e., comprehension and writing) in English are lower compared to Non ELLs.
The literacy gap in skills is attributed to the limited knowledge of English oracy. A vocabulary piece carefully designed and embedded in secondary interventions may reduce that literacy gap.

5. Use of cognates for helping ELLs transferring knowledge from their native language to English. For instance, ELLs that have already been taught how to read and write in their native language may use their first language knowledge in identifying words with similar spelling and meaning in both languages (e.g., “one, two, three” in English and “uno, dos, tres” in Spanish have same topography and functionality). Such strategy helps ELLs in reading comprehension in both languages. However, Lesaux (2004) cautions teachers of the possibility of false cognates which are words of same topography but their functional form (i.e., semantic) is different.

The remaining chapter describes longitudinal studies conducted for examining the long-term effects of secondary kindergarten interventions. On one hand it is imperative to provide evidence of the short-term outcomes of preventative Tier 2 interventions. However, it is of outmost interest to examine their longitudinal effectiveness for reducing the reading risk status of young learners.

Long-Term Effects of Secondary Kindergarten Reading Intervention

When attempting to measure the long-term effects of a secondary kindergarten phonological awareness (PA) intervention, it is important to examine the progress of both students who were successful and students who were not successful at the end of
preventative intervention (Blachman, 1997). Within the RTI realm, responsiveness to intervention has been measured in four ways by a number of research teams (L. Fuchs & Fuchs, 2007; Torgesen, 2004).

1. Researchers from the University of Oregon look at student status at the end of preventative intervention by using a criterion-referenced benchmark to determine the impact of intervention on student’s long-term success. Thus, they suggest using curriculum-based measurement (see DIBELS in Good & Kaminski, 2002).

2. Researchers from the Florida State University look at student status at the end of intervention by using an absolute level of performance to determine the successful reading skills of students in early elementary years. Specifically, Torgesen (2004) adopted the 30th percentile, which is the low end of the average range. Students that read above it are considered to be not at risk for reading failure.

3. Researchers from the State University of New York at Albany use the slope of improvement during intervention rather than at the end of it. For instance, Vellutino et al. (1996) used rank ordering the slopes of improvement for students who received preventative intervention. Students that are not at risk are the ones, whose slope falls above the median of rank-ordered slopes.

4. Researchers from Vanderbilt University compounded the slope of improvement with student status at the end of intervention to determine the responsiveness to intervention (L. Fuchs & Fuchs, 2007). Students are deemed to be not at risk if their slope of improvement and their final status is within
one standard deviation below group mean or any standard deviation above the mean.

Acknowledging the inconsistency and the confusion among researchers in defining responsiveness to intervention, Compton (2006) suggests that no matter what approach is followed to operationally define responsiveness future research directions should consider this variable within the context of instructional environment. Compton’s suggestion parallels Lyon’s (in Lyon & Moats, 1997) insightful comment made about the complexities inherent in reading intervention research and measurement: “Which instructional reading approach or method, or combination of approaches or methods, provided in which setting or combination of settings, under which student-teacher ratio conditions and teacher-student interactions, provided for what period of time and by which type of teacher, have the greatest impact on well-defined elements of reading behavior and reading-related behaviors, for which children, for how long, and for what reasons?” (p. 579).

The following section (see Table 2.1) reviews follow-up research studies that were identified because of their relevance to the current research investigation. The central goal of all these studies is to investigate the effectiveness of phonological awareness training on students determined to be either “treatment resisters” and/or “treatment respondents” by the end of the study. These studies varied widely in their research focus and methodologies.
Follow-up Research Studies of Early Beginning Intervention


Vellutino et al. conducted a longitudinal study investigating the characteristics of treatment resisters to reading intervention. Out of 1,284 students across 17 schools, a sample of 118 first-grade students was identified based on: (a) teacher nomination, (b) below 15th percentile on either word attack or word identification of WRMT-R, and (c) score above 90 on WISC-R. A broad range of dependent measures were administered from cognitive to linguistic measures. Participants were randomly assigned to one of two groups: (a) tutored (n=76), or (b) non-tutored (n=42). Additionally, teachers identified a pool of 65 normal readers that served as a control group. At-risk students received one-to-one tutoring on a daily basis for 30 minutes sessions for a minimum of 15 weeks. Tutoring sessions focused on phonological awareness, decoding, sight words, comprehension, and reading of connected text. Data analyses included MANOVA, growth curve modeling, and linear regressions. Growth in reading was measured by scores obtained from the word attack and word identification subtests of WRMT-R. Thus, Vellutino et al. created four groups of treatment responsiveness: very low growth, limited growth, good growth, very good growth. Statistically significant differences were found between the first and last group at each point of time after tutoring had begun. Sixty-seven percent of students responded to tutoring showing good to very good growth. No statistically significant differences were found between these students and the normal readers group.
<table>
<thead>
<tr>
<th>Article</th>
<th>Demographics</th>
<th>Treatment</th>
<th>Evidence of Treatment Effectiveness</th>
<th>Percentage of Unresponsive Students</th>
<th>Characteristics of Unresponsive Students</th>
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</thead>
<tbody>
<tr>
<td>Vellutino et al. (1996)</td>
<td>N=76, K-1</td>
<td>PA, reading, writing, one-to-one, daily 30-minute sessions per week</td>
<td>Treatment students showed higher growth rates on blending, segmenting than controls</td>
<td>33% unresponsive to segmenting and blending</td>
<td>Scores &lt; 30th percentile</td>
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<td></td>
<td>Majority C</td>
<td>Duration: 1-2 semesters (&gt;15 weeks) Total= 35-40 hours</td>
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<td>Deficits in phonological processing, visual-verbal learning, syntactic awareness</td>
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<td></td>
<td>Middle SES</td>
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<td>O’ Connor (2000)</td>
<td>N=59, K-1</td>
<td>Multi-layered PA, decoding, text reading, spelling One-to-one (Layer 2)</td>
<td>Treatment students showed statistically significant differences in blending, segmenting, and standardized measures</td>
<td>10.1% unresponsive to decoding, text reading</td>
<td>Standard score &lt; 86</td>
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<td></td>
<td>Majority AA</td>
<td>three 12-min sessions per week</td>
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<td>word attack and word identification</td>
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<td></td>
<td>Low SES</td>
<td>Duration: 10 weeks</td>
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<td>3:5 small groups (Layer 3) four 30-min sessions per week</td>
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<td>Duration= 14 weeks</td>
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<td></td>
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<td>One-to-one (Layer 4) four 15-min sessions per week</td>
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<td></td>
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<td>Duration= 4 weeks</td>
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<tr>
<td>Coyne et al. (2004)</td>
<td>N=60, Grade 1</td>
<td>PA, writing, word reading, writing, spelling Small groups</td>
<td>Treatment students did not differ significantly from the controls; thus, showing evidence of kindergarten inoculation effects</td>
<td>N/A</td>
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<tr>
<td></td>
<td>49 C</td>
<td>Daily 30-minute sessions per week</td>
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<td>9 H</td>
<td>Duration: 7 months</td>
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<td>1 AA</td>
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<td>Middle SES</td>
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<tr>
<td>Linan-Thompson et al. (2006)</td>
<td>N= 75</td>
<td>Activities matched to core reading curriculum Small groups</td>
<td>Spanish intervention students and English intervention students made higher gains than ELL controls</td>
<td>Grade 1: 3% from Spanish interventions, and 9% from English interventions</td>
<td>Standard Score &lt; 85 on word attack or passage comprehension of WRMT-R</td>
</tr>
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<td></td>
<td>Grade 1-2</td>
<td>Daily 50-minute sessions per week</td>
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<td></td>
<td>All ELLs H</td>
<td>Duration: 7 months</td>
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<td></td>
<td>Low SES</td>
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Table 2.1 Follow-up studies that examined at-risk student responsiveness to intervention
On the contrary, 33% (25) of target students remained below the 30th percentile on the WA and WI subtests of the WRMT. These children were called “difficult-to-remediate.”

Examining differences between the lowest and the highest group (i.e., very good growth) on each measure, it was found that the lowest group had lowest scores on phonological processing measures (i.e., phoneme segmentation, rapid automatized naming, phonological encoding). These scores had been also lower prior to intervention. Additional differences in the growth of the two groups were attributed to syntactic awareness, counting, visual-verbal learning, and number identification. Authors concluded that phonological deficits limit the working memory needed for reading development and thus growth of reading.

*O’Connor (2000)*

O’Connor (2000) examined a total of 146 kindergarteners from three urban, low socioeconomic school settings, of which the majority was African American children and the remainder being Caucasian. Students were screened in early literacy measures (e.g., vocabulary, letter identification, rapid naming of animals, rhyme production, syllable deletion, phonological blending and segmentation, etc.) at the beginning of kindergarten and 40% (i.e., 59) of them were identified to be at risk for LD. At-risk status was obtained if students: (a) scored 86 standard points below the mean on WJ combined letter identification and dictation subtests, (b) named less than 15 letters in a minute, and (c) segmented less than 4 segment sounds in 10 three-sound words. From October through January of that year, the 59 students received only core classroom
instruction based on the *Ladders to Literacy* program. Students were tested in January again and based on the same screening cut-off points, 44 (30%) students were defined as still at risk. After requesting the teacher’s cooperation and parent permission for providing Tier 2 intensive intervention, only 17% (i.e., 25) of these students were able to participate. Supplementary kindergarten intervention was delivered on one-to-one basis, three 12-minute sessions per week over a ten-week period. Intervention was similar to core instruction activities such as blending and segmenting with first and last sounds as well as letter-sound correspondences. Nonetheless, intensity and instructional specificity of Layer 2 intervention changed to skills that students were having difficulties with. MANOVA results showed statistically significant differences in scores between students receiving only core classroom instruction and students receiving both Tier 1 and Tier 2 intervention. By the end of secondary intervention only 12 students remained still at risk.

O’Connor followed these students in Grade 1. In October she identified a total of 30 at-risk first graders. Attrition due to the lack of teacher and parents’ cooperation allowed the researcher to work with only 20 at-risk students, of which 12 had participated in the previous one-to-one secondary intervention. The remaining 8 students had regressed, possibly due to the naturalistic, discovery learning approach incorporated in the first-grade classroom. Consequently, at-risk students started receiving in November 30-minute small-group instruction four times per week over 14 weeks. First-grade intervention focused primarily on 15-minute activities on decoding and blending two to three-sound words, with the difficulty increasing to words with
consonant blends and vowel combinations. The rest of the session focused on reading books that included the target letter sounds and patterns.

Results of the MANOVA showed again statistically significant differences between treatment students and students being at risk in Grade 1 but not receiving intervention. However, 6 out of 20 treatment students were found to be still at-risk. Their deficits reflected an inability to segment or blend three-sound words or read fluently. As far as the rest of the treatment students (i.e., 14) presented strong gains in fluency, blending and segmenting.

Such findings prompted O’Connor and her team to provide additional interventions for these students to maintain adequate growth in literacy. Delivery of one-to-one intervention for four 15-minute sessions per week over a four-week period resulted in minimal progress of the at-risk first graders. Despite the increased instructional emphasis and specificity on decoding, spelling, and reading words, all six poor readers were classified with high-incidence disabilities by the end of second grade. O’Connor concluded that “children could make strong growth and still fall below the average band in literacy if their skills were very low to start with or if they grew at a slower rate in between the layers of intervention” (p. 51).


Coyne et al. purported in examining the progress of 59 strong responders first-grade students, who had received kindergarten intervention the previous year. Specifically, researchers examined whether first-grade students would maintain kindergarten treatment gains, thus experiencing an “inoculation effect,” or would
regress and having an “insulin effect.” At the beginning of kindergarten, 112 students were screened on measures of phonological awareness and alphabetic principle and were placed at the at-risk category. Students were randomly assigned to three levels of the treatment. Each level varied in instructional emphasis and specificity. Students received 30-minute daily explicit code-based instruction for a seven-month period. Posttests showed that all students made gains but the highest gains and most growth rates were evident for those participating in the explicit code-based instruction.

At the beginning of first grade, previous kindergarten participants (n=80) were screened on two DIBELS measures: nonsense word fluency (NWF) and phoneme segmentation fluency (PSF). Those who segmented at least 35 sounds on the PSF and identified 20 letter sounds on the NWF were determined to be low risk. The total number of strong responders was 60 students, of which 49 were Caucasian, 9 Hispanic, and 1 African American. Students were matched based on the NWF scores and then were randomly assigned to one of two levels of experimental conditions: (a) core classroom instruction with code emphasis, or (b) supplemental maintenance intervention based on the Write Well program. Both conditions addressed explicitly phonological awareness, decoding, word reading, and text reading activities. Dependent measures were DIBELS PSF, NWF, ORF, word attack, word identification, and passage comprehension of the WRMT-R. Data analyses of ANCOVA showed no statistically significant different group effects for any dependent measure. Such evidence revealed that the supplemental maintenance intervention did not increase student growth in addition to benefits obtained by classroom instruction. Since no differences were evident between the two groups, researchers combined them into one
and compared their performance to national and local normative samples. Results again showed that strong responders, as a group, were above average in word attack and word identification but average on passage comprehension. Nonetheless, researchers noted that weaker performance was evident on ORF and passage comprehension measures when comparing with normative and local samples. Coyne and colleagues concluded that their strong responders experienced an inoculation effect with “high-quality, code-based first-grade classroom reading instruction through February of first grade on a range of reading measures in comparison to local and national normative samples” (p. 100).


Linan-Thompson et al. 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. Participants were targeted from 11 schools and received either Spanish or English intervention. The study’s sample composed of 100% Hispanic of which half of them was females. Students were determined to be at risk if they scored below the 25th percentile on the LWID subtest and read less than one word on a predetermined word list. In schools with Spanish intervention, 64 at-risk students were randomly assigned to either treatment (n=31) or control (n=33) condition. In schools with English intervention, 39 at-risk students were randomly assigned to treatment (n=22) or control (n=17) condition. Dependent measures
included subtests from WLPB-R: LWID, WA, and PC administered both in English and in Spanish.

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. At the end of Grade 1 and Grade 2, students were found to be at risk (i.e., non-responders) if their standard scores on WA or PC were less than 85. Results showed that 3% of Spanish intervention students were at risk at the end of Grade 1 while nobody was at risk at the end of Grade 2. In contrast, 30% of comparison students were at risk at the end of Grade 1, and 8% were at risk at the end of Grade 2. English intervention students had 9% (2) of them being at risk at the end of Grade 1 and 6% (1) of them found to be at risk at the end of Grade 2. On the other hand, 59% of comparison students were at risk at Grade 1 and 55% of them at risk at the end of Grade 2. Unlike to O'Connor’s and Coyne et al.’s studies, no fluency-based measures were used in this study for assessing student performance. On this matter, researchers contend “fluency is among the most difficult aspect of reading to influence through intervention so the use of fluency measures in addition to the untimed measures might have yielded different results” (p. 397). Nonetheless, researchers concluded that ELLs at risk for reading disabilities when given explicit, systematic, intensive intervention make substantive gains that distinguish them from control students.

Summary of Follow-up Research Studies

All four studies (Vellutino et al., 1996; O’Connor, 2000; Coyne et al., 2004; Linan-Thompson et al., 2006) reported overall positive effects of phonological
awareness training along with other reading activities (e.g., spelling, writing, word reading, and connected text reading) on early beginning reading skills of at-risk learners. For the most part, all studies used basic standardized measures of word attack, word identification, and reading comprehension. O’Connor’s study did not include the comprehension measure but she systematically employed time-based blending and segmentation measures. That was the case in the Coyne et al.’s study, too. Interestingly, no fluency-based measures were incorporated in Linan-Thompson et al.’s study, in which all their sample consisted of ELLs. Future research should incorporate the fluency-based measures with this population as these measures are strong indicators of student language proficiency in English (Kaminski, Good, & Whalen, 2006). Vellutino et al.’s study was the only one that administered the broadest range of cognitive and linguistic measures. It is speculated that such a variety of measures might be cumbersome and time-consuming for educational researchers and educators to employ when they want only to examine the growth of at-risk students over time.

O’Connor’s and Coyne et al.’s studies were comparable based on the nature of treatment but not based on treatment intensity and instructional specificity. Both studies employed phoneme segmentation, blending, writing, spelling, word reading and connected text reading. However, O’Connor’s study was designed explicitly to give direct focus on those skill deficits that her at-risk participants were lacking. Coyne et al’s study was designed “as a less intensive continuation of the kindergarten intervention and included similar attention to research-validated instructional design principles” (p. 96). Along with these two studies, Vellutino et al.’s treatment also gave
emphasis on reading connected text. In fact, 15 minutes in each session were spent on reading fluency in O'Connor’s, Coyne et al.’s and Vellutino et al.’s studies. It is evident that the fluency component weighted half of the instructional time in each of these studies.

Although the overall general purpose of all these four studies was to investigate the effectiveness of supplemental explicit early reading, their underlying research questions varied. Two studies (e.g., Vellutino et al., 2006; Coyne et al., 2004) examined the progress of strong responders to explicit, intensive intervention the following year. Additionally, these two studies showed that their at-risk students made good growth at the end of an intensive intervention. However, the majority of the sample in each of these studies was Caucasian students. Future research needs to examine the long-term effects of phonological awareness intervention on the beginning reading skills of students from low SES minority urban backgrounds.

In O’Connor’s and Vellutino et al.’s studies the progress of non-responders to kindergarten intervention was examined. Since O’Connor focused only on the non-responders by increasing the treatment intensity and instructional specificity in Grade 1, no results for the progress of her strong responders to Layer 2 kindergarten intervention were reported. In Linan-Thompson et al.’s study, the responsiveness to intervention of at-risk ELLs was examined only for one year, in which treatment was delivered. Thus, the need to examine the long-term effects of explicit, intensive phonological awareness training on the reading skills of ELLs is imperative.
Conclusion

Over this past decade, researchers have determined that an evidence-based early reading instructional program is characterized by its explicitness, intensiveness, and systematic strategies incorporated in it (Simmons et al., 2003). When such type of early reading instructional program is presented to students, then it acts like a “jump-start” (O’Connor, 2000, p. 43). The majority of the students become responsive to the intervention, while others require more intensive, longer period of instruction to reach their benchmark status. The immediate effects of early reading intervention have been documented extensively for Non-ELL as well as ELL populations. What is critical to be examined in this field is the long-term effects of early reading interventions for urban learners, ELLs and Non ELLs. To the author’s knowledge, no longitudinal studies have been reported on examining the effectiveness of secondary interventions with both urban student populations. Their dearth of research is evident but their need is great.
CHAPTER 3

METHOD

This chapter describes the methodological procedures implemented throughout the course of the study. Specifically, a description of the following components is presented: participants and settings; primary researcher and second observers; definition and measurement of primary and secondary dependent variables; definition and measurement of independent variable; general procedures including pretest, training, placement testing, intervention procedures, and posttest; experimental design; data analysis; and measurement of social validity.

Participants

The participants were a follow-up sample from a previous research study conducted in 2005-06 (hereafter Year 1) (Yurick, 2006). The sample had been selected from three urban elementary schools. The two-year longitudinal student sample had been a convenience one because the principals of these schools had expressed interest in participating. The target population of the project consisted of K-5 elementary-aged students of a large Midwestern urban school district consisting of 25,704 students in 75 elementary K-5 schools. However, the accessible population was 145 students from
seven kindergarten classrooms in three urban elementary schools of this large school district.

The selection and screening procedures followed in Year 1 for identifying the at-risk sample from the accessible population had been described in more detail elsewhere (see Yurick, 2006). During Year 1, 93 kindergarten students were screened based on the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) (Good & Kaminski, 2002) and two subtests of the Woodcock-Johnson Tests of Achievement (WJ-III) (Woodcock, McGrew, & Mather, 2001). Sixty-one students received supplemental phonological awareness training (i.e., ERI treatment group) due to at-risk early reading deficits and 32 students were targeted for comparison reasons since they had presented limited to none reading deficits (i.e., comparison group). Four of the comparison students showed some-risk status at the beginning of the project in Year 1. By the end of the first year, it was determined that two of them were false negatives (i.e., wrongly identified for not receiving treatment). The ERI treatment group consisted of two large subsets: 23 students who spoke English as their second language (i.e., ELLs) and 38 students who were native English speakers (i.e., Non ELLs).

Selection Criteria and Student Group Assignment

Due to mortality and retention issues, the sample of the current study (Year 2) decreased to 61 students (38 treatment and 23 comparison) in Grade 1 (see Table 3.1). In Year 2, the 38 treatment students were assigned to different experimental conditions based on their performance on the spring DIBELS benchmark assessment of Year 1.
Spring DIBELS Benchmark assessment in Year 1. At the end of Year 1, kindergarten students had been assessed on three standardized DIBELS subtests: (a) Letter Naming Fluency (LNF), (b) Phoneme Segmentation Fluency (PSF), and (c) Nonsense Word Fluency (NWF). Students, who had met the benchmark goals on the above subtests (i.e., 40 or more correct letter names per minute on the LNF, 35 or more correct segment sounds per minute on the PSF, and 25 or more correct letter sounds per minute on the NWF), were determined to be of low risk. Conversely, students that had failed to meet those benchmark goals were determined to be at risk or possess some risk and therefore, additional secondary intervention was necessary for them.

Based on the spring DIBELS Benchmark assessment results, the 38 treatment students were assigned to one of the following experimental conditions at the beginning of Year 2:

(1) 15 out of 38 treatment students, who had reached their spring DIBELS benchmark status and hence had been of low risk by the end of Year 1, became a comparison group (hereafter ERI-Comparison group) in Year 2. Consequently, no additional intensive intervention was provided to them except from the core classroom instruction. As specified in Chapter 1, the purpose of investigating the performance of the ERI-Comparison group was to determine whether students who had received intensive intervention during kindergarten and reached their grade level at the end of that year would still be able to maintain those treatment gains without any supplemental instructional support during first grade, thus experiencing an “inoculation effect” (Coyne, et al., 2004).
(2) 23 out 38 treatment students, who had been found to be still at or with some risk by the end of Year 1, were provided additional instructional support in Year 2 (hereafter, *ERI-Treatment group*). The purpose of examining the performance of the ERI-Treatment group was to determine the degree of their responsiveness to additional dose of intensive intervention in the subsequent year. Specifically, the experimenter aimed to examine how their growth of learning would be compared to the growth of the rest of the sample.

Additionally, a third experimental group (*n* = 23) was formed in Year 2. This group was composed of students that had served in Year’s 1 comparison group due to limited to none early reading deficits and now were placed again in the same group (i.e., *Comparison*) during Year 2. It should be noted that due to the large attrition rate (34.4%) within the comparison group, two additional first-grade students were included in the sample. In order to maintain the homogeneity of the comparison group, the additional students were selected based on two criteria: (a) average reading performance on pretest standardized measures in Year 2, and (b) receiving same classroom instruction the previous year. The purpose of investigating the performance of the Comparison group was to compare their rate and performance level with the rest of the groups.

*Parental consent.* Parent permission was requested for students in the ERI-Treatment group. Specifically, a letter (see Appendix A) and a consent form (see Appendix B) were sent to the parents of the ERI-Treatment group. Parents of students who were English-Language Learners were sent a letter and consent form written in their own native language (see Appendices C through F). During the first initiation for requesting parent consent, four signed consent forms were returned. A second request for
parent permission was initiated by the school personnel. As a result, two more signed consent forms were returned to the researchers. A third and final request to parents was conducted again by the school personnel. Two additional consent forms were returned for a total of eight complete forms. Students, whose parents did not sign and return the form, were still included in the study after principal’s permission.

<table>
<thead>
<tr>
<th>Schools</th>
<th>Year 1 (2005-06)</th>
<th>Year 2 (2006-07)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ERI</td>
<td>Comparison</td>
</tr>
<tr>
<td>School 1</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>School 2</td>
<td>29</td>
<td>16</td>
</tr>
<tr>
<td>School 3</td>
<td>22</td>
<td>9</td>
</tr>
<tr>
<td># of students per level of independent variable</td>
<td>61</td>
<td>32</td>
</tr>
<tr>
<td>Total</td>
<td>93</td>
<td></td>
</tr>
</tbody>
</table>

*Table 3.1* Student assignment per level of independent variable within each school for Years 1 and 2

Based on the selection criteria for group assignment utilized in Year 2, below is a description of each of the participating groups (see Table 3.2).

*ERI-Treatment group.* It consisted of 23 students who received supplemental intervention for an additional year due to their low performance on the Spring DIBELS benchmark assessments the previous year. Of the 23 students, 73.9% (17) were males and
26.1% (6) females. African-American students accounted for 17.4% (4), 43.5% (10) were European American, 13% (3) Hispanic, 17.4% (4) Somali, and 8.7% (2) were Multiracial. Student ages ranged from five years and eleven months to six years and eleven months. There were 30.4% (7) ELLs of which 21.7% (5) were males and 8.7% (2) females. On Year 1’s Spring DIBELS Benchmark assessment 14 (60.9%) needed intensive intervention while 39.1% (9) needed strategic intervention.

<table>
<thead>
<tr>
<th>Level of Independent Variablea</th>
<th>ERI-Treatment (n=23)</th>
<th>ERI-Comparison (n=15)</th>
<th>Comparison (n=23)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age rangeb</strong></td>
<td>5-11 to 6-11</td>
<td>6-0 to 6-11</td>
<td>6-2 to 7-0</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>26.1% (6)</td>
<td>60% (9)</td>
<td>34.8% (8)</td>
</tr>
<tr>
<td>Males</td>
<td>73.9% (17)</td>
<td>40% (6)</td>
<td>65.2% (15)</td>
</tr>
<tr>
<td><strong>English-Language Learnersc</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>30.4% (7)</td>
<td>33.3% (5)</td>
<td>21.7% (5)</td>
</tr>
<tr>
<td>Males</td>
<td>8.7% (2)</td>
<td>20% (3)</td>
<td>8.7% (2)</td>
</tr>
<tr>
<td><strong>Ethnicity/Race</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>17.4% (4)</td>
<td>53.3% (8)</td>
<td>52.2% (12)</td>
</tr>
<tr>
<td>European American</td>
<td>43.5% (10)</td>
<td>13.3% (2)</td>
<td>30.4% (7)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>13% (3)</td>
<td>--</td>
<td>13% (3)</td>
</tr>
<tr>
<td>Somali</td>
<td>17.4% (4)</td>
<td>26.7% (4)</td>
<td>4.3% (1)</td>
</tr>
<tr>
<td>Asian</td>
<td>--</td>
<td>6.7% (1)</td>
<td>--</td>
</tr>
<tr>
<td>Multiracial</td>
<td>8.7% (2)</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td><strong>Students receiving free or reduced lunch (SES)</strong></td>
<td>86.9% (20)</td>
<td>93.3% (14)</td>
<td>100% (23)</td>
</tr>
</tbody>
</table>

*Table 3.2 (continued)*

*Table 3.2 Descriptive information for each study group per gender, language, ethnicity/race, SES, Spring DIBELS risk status of Year 1, and pretest performance in Year 2*

---

*a* Group assignment based on the Spring DIBELS Benchmark assessment of Year 1

*b* Student age range shown in years/months as calculated at the beginning of the study (September 26, 2006)

*c* English-language learner status as identified by each school
Table 3.2 (continued)

<table>
<thead>
<tr>
<th>Level of Independent Variable</th>
<th>ERI-Treatment (n=23)</th>
<th>ERI-Comparison (n=15)</th>
<th>Comparison (n=23)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spring DIBELS risk status</strong>&lt;sup&gt;d&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At risk/intensive</td>
<td>60.9% (14)</td>
<td>-----</td>
<td>13% (3)</td>
</tr>
<tr>
<td>Some risk/strategic</td>
<td>39.1% (9)</td>
<td>-----</td>
<td>30.4% (7)</td>
</tr>
<tr>
<td>Low risk/benchmark</td>
<td>-----</td>
<td>100% (15)</td>
<td>56.5% (13)</td>
</tr>
</tbody>
</table>

**Pretest Measures**<sup>e</sup>

**WJ-III**<sup>f</sup>

1. Letter-Word Identification 15.3 ± 4.4 22.33 ± 5.7 22.52 ± 5.58
2. Word Attack 3.22 ± 1.6 4.8 ± 2.62 6.04 ± 3.08
3. Passage Comprehension 5.39 ± 2.8 8.73 ± 4.28 8.35 ± 3.61

**CTOPP**<sup>g</sup>

1. Phonological Awareness 83.71 ± 11.13 94.86 ± 9.22 95.04 ± 18.53
   Composite Score (PACS)
2. Rapid Naming Composite 85.83 ± 11.95 94.53 ± 11.06 94.35 ± 10.01
   Score (RNCS)

---

<sup>d</sup> Student DIBELS risk status as determined in May 2006.
<sup>e</sup> Pretest measures administered from September 26<sup>th</sup> through September 29<sup>th</sup>, 2006
<sup>f</sup> Woodcock-Johnson Tests of Achievement- III. Student data are reported in mean raw scores and standard deviations for each subtest (M±SD).
<sup>g</sup> Comprehensive Test of Phonological Processing (Version for ages 5 and 6 years old). Student data are reported in mean composite scores and standard deviations for each composite category. Phonological Awareness Composite Score is the sum of standard scores of three subtests: Elision, Blending, and Sound Matching. Rapid Naming Composite Score is the sum of standard scores of two subtests: Rapid Color Naming and Rapid Object Naming
ERI-Treatment students had a mean raw score performance of 15.3 with 4.4 standard deviation points on the letter-word identification subtest of the Woodcock-Johnson Tests of Achievement (WJ-III). On the additional subtests of the WJ-III, students achieved a mean raw score of 3.22 with 1.6 standard deviation points on the word attack, and a mean raw score of 5.39 with 2.8 standard deviation points on the passage comprehension. Finally, on the Comprehensive Test of Phonological Processing (CTOPP) (Wagner, Torgesen, & Rashotte, 1999) the ERI-Treatment group obtained a pretest mean composite score of 83.71 points with 11.13 standard deviation points on the phonological awareness composite and a mean composite score of 85.83 with 11.95 standard deviation points on the rapid naming composite.

**ERI-Comparison group.** It consisted of 15 students who were monitored for their benchmark status obtained the previous year after receiving supplemental instruction. Of the 15 students, 40% (6) were males and 60% (9) females. African-American students accounted for 53.3% (8), 13.3% (2) were European American, 26.7% (4) Somali, and 6.7% (1) Asian. Student age ranged from six years to six years and eleven months. Approximately 93% (14) of the students were receiving free or reduced lunch. There were 33.3% (5) students with an ELL status. Out of these 5, 20% (3) were females and 13.3% (2) males. On the Spring DIBELS Benchmark assessment of Year 1, all students were low risk. As a group, students obtained a mean raw score performance of 22.3 with 5.7 standard deviation points on the letter-word identification, 4.8 raw score points with 2.6 standard deviations on the word attack, and a mean raw score of 8.73 with 4.28 standard deviation points on the passage comprehension subtest of the WJ-III. Finally, pretest outcomes on the CTOPP showed that the ERI-Comparison group obtained a
pretest mean composite score of 94.86 points with 9.22 standard deviation points on the phonological awareness composite and a mean composite score of 94.53 with 11.06 standard deviation points on the rapid naming composite.

Comparison group. Twenty-three students who had not received any supplemental intervention in Year 1 were targeted for comparison reasons. Of the 23 students, 65.2% (15) were males and 34.8% (8) females. African-American students accounted for 52.2% (12), 30.4% (7) were European American, 13% (3) Hispanic, and 4.3% (1) Somali. Student age ranged from six years and two months to seven years. All students in this group were receiving free or reduced lunch. There were 21.7% (5) of students who were ELLs. Out of these 5, 13% (3) were males and 8.7% (2) females. According to the Spring DIBELS Benchmark outcomes in Year 1, 56.5% (13) of this group was found to be low risk while the remaining portion of students was at risk (13%) and some risk (30.4%). As a group, students obtained a mean raw score of 22.52 with 5.58 standard deviation points on the letter-word identification, 6.04 raw score points with 3.08 standard deviations on the word attack, and a mean raw score of 8.35 with 3.61 standard deviation points on the passage comprehension subtest of the WJ-III. Finally, pretest outcomes on the CTOPP showed that the Comparison group obtained a pretest mean composite score of 95.04 points with 18.53 standard deviation points on the phonological awareness composite and a mean composite score of 94.35 with 10.01 standard deviation points on the rapid naming composite.

Instructional Assistants

Six instructional assistants (IAs) were trained to deliver the treatment protocol. Four of them were school personnel and two were graduate students employed as
graduate assistants (GA) on this project. IA’s agreed to provide supplemental instruction to the ERI-treatment group by receiving a participation letter (Appendix G) and signing a consent form (Appendix H). Additionally, all IAs were asked to complete an information sheet about their age, educational background and teaching experience (Appendix I). Table 3.3 presents their descriptive information.

**Dena.** Dena was an African-American female in School 1. Dena participated in previous research investigations on supplemental early reading intervention during the previous two years and agreed to participate in this study for the third consecutive year. Dena was within the range of 41-45 years old with a high school diploma. She had ten years of teaching experience with the Head Start program and at the time of the study worked as an instructional assistant in a large Midwestern urban school district. Her teaching experience involved working with students from pre K through Grade 1 from urban and suburban areas. Particularly, Dena reported that she had three years of teaching experience working with ELLs from Somali and Hispanic backgrounds. She also managed her own childcare center from home for two-year-old children.

**Randi.** Randi was a European-American female in School 1. Randi was involved in this project as part of the collaboration between the Midwestern urban school district and a community service organization. Randi was within the range of 20-25 years old with a Bachelor’s degree in human development and a minor in social policy granted from Cornell University. She had two years of teaching experience with urban students and one year of experience with a suburban student population. Her teaching experience involved working with students from pre K through Grade 6.
Sara. Sara was a European-American female employed as a paraprofessional in School 2 with the primary responsibilities of the school library. She was also assigned by the school principal to be an instructional assistant in this study. Sara was within the range of 36-40 years old with an Associate Degree in social services earned from a local community college. She had more than seven years of teaching experience with urban K-5 students. Sara’s teaching experience included library education for elementary-aged students, one-to-one tutoring for students in Grades 3 through 4 as part of an after-school church program, and educational living skills programming for adults with mental retardation and/or developmental disabilities. Sara reported that she had seven years of experience teaching ELLs from Somali and Hispanic backgrounds. She also provided reading assistance for students in a special education classroom for three years.

Claire. Claire was an African-American female working as a graduate assistant in School 2. Claire was within the range of 20-25 years old with a Bachelor’s degree and a K-12 Special Education teaching licensure from the Winston Salem State University. She had five years of teaching experience with students from pre-K through Grade 12. Her teaching experience involved tutoring in special education and general education classrooms.
<table>
<thead>
<tr>
<th>Name</th>
<th>School</th>
<th>IA</th>
<th>Age range</th>
<th>Race</th>
<th>Gender</th>
<th>Highest academic degree</th>
<th>Years</th>
<th>Grades</th>
<th>Special Education</th>
<th>ELL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dena</td>
<td>1</td>
<td>S.P.</td>
<td>41-45</td>
<td>AA</td>
<td>Female</td>
<td>H.S.</td>
<td>10</td>
<td>Pre K – 1</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Randi</td>
<td>1</td>
<td>S.P.</td>
<td>20-25</td>
<td>EA</td>
<td>Female</td>
<td>B.S.</td>
<td>3</td>
<td>Pre K – 6</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Sara</td>
<td>2</td>
<td>S.P.</td>
<td>36-40</td>
<td>EA</td>
<td>Female</td>
<td>A.A.</td>
<td>7</td>
<td>K-5</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Claire</td>
<td>2</td>
<td>GA</td>
<td>20-25</td>
<td>AA</td>
<td>Female</td>
<td>B.S.</td>
<td>5</td>
<td>Pre K -12</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>LeShawn</td>
<td>2/3</td>
<td>GA</td>
<td>31-35</td>
<td>AA</td>
<td>Male</td>
<td>M.S.</td>
<td>3</td>
<td>6-12</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Martha</td>
<td>3</td>
<td>S.P.</td>
<td>46-50</td>
<td>EA</td>
<td>Female</td>
<td>B.A.</td>
<td>4</td>
<td>K-5</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

IA: Instructional Assistant providing intervention as part of being a member of school personnel (SP) or having graduate assistantship (GA)
AA: African American, EA: European American
H.S: High School degree, AA: Associate degree, B.S.: Bachelor’s of Science, B.A.: Bachelor’s of Arts, M.S.: Master’s of Science
Years of teaching experience included any tutoring, internships, part-time instructional assistance provided to students within and/or outside of school settings
Teaching experience with special education student population included mild to severe disabilities
Teaching experience with English Language Learners (ELLs) involved working with students that have English as their second language

Table 3.3 Descriptive characteristics of instructional assistants per school, age range, race, gender, academic degree, and teaching experience
LeShawn. LeShawn was an African-American male working as a graduate assistant in Schools 2 and 3. LeShawn was within the range of 31-35 years old with a Master’s degree in Applied Behavior Analysis from the Northeastern University. He had three years of experience teaching students from Grade 6-12. His teaching experience included individual tutoring with students with mental retardation and/or developmental disabilities within self-contained schools for students with special needs.

Martha. Martha was European-American female in School 3, where she was a Title I instructional aide. Martha was within the range of 46-50 years old with a Bachelor’s degree in Education from Anderson University. She had four years of teaching experience with urban K-5 students. Martha taught ELLs of Hispanic background for four years.

Settings

This study was conducted in three urban elementary schools within a large Midwestern school district consisting of 56,151 students, including 4,776 (8.5%) ELLs and 8,726 (15.5%) students with disabilities. The district had 128 school buildings. Below is a description of the demographic and academic characteristics of each participating school (see Table 3.4).

School 1

School 1 was designated as an alternative literature-based school that incorporated a special “Book Arts” program for grades one through five. It also had participated in a federally funded model schools program designed to reduce the disciplinary and special education referrals for African-American males. The current study is an outgrowth of that funding. The total enrollment in School 1 was 222 students from preschool through
Grade 5 during the 2006-07. There were 121 males (54.5%) and 101 females (45.5%). The majority of students were African American (68%), with 24.8% (55) European Americans, 4.5% (10) Hispanics, and 2.7% (6) Multiracial students. More than half of the total student enrollment (64.8%) received free or reduced lunch. There were 50 (22.5%) special education students.

The study targeted 30.7% (12) of the 39 students in Grade 1. Twenty-three (59%) of first graders were males and 16 (41%) females. Twenty-seven (69%) of the students were African American, 9 (23.1%) were European American, 2 (5.1%) Hispanic, and 1 (2.6%) Multiracial. Five (12.8%) students received special education services and 27 (69.2%) received free or reduced lunch.

The first-grade students were taught reading according to a reading curriculum developed by the local school district called *Literacy Across Columbus Elementary Schools* (LACES). The curriculum was designed to incorporate the state academic content standards, suggestions of the NRP report (2000), and the five components of effective reading instruction mandated by the NCLB (2001): phonics, phonemic awareness, fluency, vocabulary and comprehension.

Additionally, first-grade students participated twice per week in a university-community partnership tutoring program, termed “Help One Student to Succeed” (*HOSTS Learning*), whose goal was to improve reading readiness skills of low performing first-grade students so that they would be reading at grade level by grade four. Volunteers from a variety of places (e.g., neighborhood residents, university students, and so forth) provided mentoring and academic intervention to these students. Each student had a three-pocket folder that provided materials and activities on the students’
instructional level. In Pocket 1, the children worked with a large variety of books to develop knowledge about how stories worked and to develop an appreciation and love of reading. In Pocket 2, student worked with letter-sound correspondence activities in order to build a foundation for reading and writing. In Pocket 3, activities were structured to support the first-grade skills that had not been mastered by the individual child.

*Instructional setting in School 1.* Three ERI-Treatment students were assigned to two instructional groups and received supplemental instruction by two IAs (Dena and Randi). Dena worked with two students in a small office room that was used by the HOSTS teacher. Dena and her students sat around a semi-circled table of a 2.5-foot radius, Dena sat at the center of the table with the students sitting on the outer edge facing her. Randi taught the third student in the hallway of the second floor. She initially taught the student in a basement hallway near the school’s lavatories, but due to noise and frequent disruptions she moved to a hallway on another floor where distractions were minimized. Randi taught at a squared table (3’ by 3’) nearby the stairs. Intervention sessions took place four times per week from 11:20am until 11:50am for both instructors.

*Assessment setting in School 1.* Pre and posttest assessments as well as frequent progress monitoring of target students were administered outside the first-grade classrooms. A semi-circled three-foot table was placed against the wall between the two first-grade classrooms. The experimenter and students were sitting across from each other but less than two feet in distance so that the experimenter could hear the verbal responses produced by each student. Testing usually took place from 2:00pm to 3:30pm. Noise levels varied at different points of time but did not interfere significantly with the assessment procedures. Whenever there was a class of students walking or standing less
than three feet from the testing area, the experimenter paused the assessments until the students left.

<table>
<thead>
<tr>
<th></th>
<th>School 1</th>
<th>School 2</th>
<th>School 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of school</strong></td>
<td>Literature-based</td>
<td>Reading First</td>
<td>Reading First</td>
</tr>
<tr>
<td></td>
<td>Pre K-5</td>
<td>Pre K-5</td>
<td>Pre K-5</td>
</tr>
<tr>
<td><strong>Reading Curriculum</strong></td>
<td>LACES</td>
<td>Harcourt Trophies</td>
<td>Harcourt Trophies</td>
</tr>
<tr>
<td><strong>Student population</strong></td>
<td>222</td>
<td>331</td>
<td>145</td>
</tr>
<tr>
<td><strong>Students per gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>45.5% (101)</td>
<td>44.4% (147)</td>
<td>40.7% (59)</td>
</tr>
<tr>
<td>Males</td>
<td>54.5% (121)</td>
<td>55.6% (184)</td>
<td>59.3% (86)</td>
</tr>
<tr>
<td><strong>Students per race</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA</td>
<td>68% (151)</td>
<td>61.02% (202)</td>
<td>39.3% (57)</td>
</tr>
<tr>
<td>EA</td>
<td>24.8% (55)</td>
<td>32.33% (107)</td>
<td>34.5% (50)</td>
</tr>
<tr>
<td>H</td>
<td>4.5% (10)</td>
<td>2.72% (9)</td>
<td>18.6% (27)</td>
</tr>
<tr>
<td>A</td>
<td>-----</td>
<td>0.91% (3)</td>
<td>2.7% (4)</td>
</tr>
<tr>
<td>NA</td>
<td>-----</td>
<td>0.3% (1)</td>
<td>0.7% (1)</td>
</tr>
<tr>
<td>M</td>
<td>2.7% (6)</td>
<td>2.72% (9)</td>
<td>4.2% (6)</td>
</tr>
<tr>
<td><strong>ELLs</strong></td>
<td>None</td>
<td>17.2% (57)</td>
<td>35.8% (52)</td>
</tr>
<tr>
<td><strong>Special Education</strong></td>
<td>22.5% (50)</td>
<td>16% (53)</td>
<td>14.5% (21)</td>
</tr>
<tr>
<td><strong>students</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free or reduced lunch</td>
<td>64.8% (144)</td>
<td>98.2% (325)</td>
<td>91.7% (133)</td>
</tr>
</tbody>
</table>

---


Table 3.4 Demographic and academic characteristics of participating schools
School 2

This school was a Reading First school, meaning that it received federal and state funding to address the reading skill deficits of its low-performing low-income students in K-3 grades. The Reading First competitive federal grant program was created by the NCLB (2001) and targeted high poverty schools in that needed assistance in improving academic achievement and helping students become ready to read by the end of Grade 3. According to the regulations of the Reading First Initiative, School 2 was required to use instructional materials that were based on Scientifically-Based Reading Research (SBRR) and assessment procedures that would allow frequent and systematic progress monitoring of student learning. Hence, School 2 incorporated the Harcourt Trophies Reading series (Beck, Farr, & Strickland, 2005).

The total enrollment was 331 students from preschool through Grade 5 during the 2006-07. Male students accounted for 55.6% (184) and 44.4% (147) were females. The majority of students were African American (61.02%), with 32.33% (107) European American, 2.72% (9) Hispanic, 0.91% (3) Asian, 0.3% (1) Native American, and 2.72% (9) Multiracial. School 2 also served 17.2% (57) ELLs. Almost all students (98.2%) received free or reduced lunch. Special education services were provided to 16% (53) students.

The study targeted 52.2% (35) students in Grade 1. The total number of students in first grade was 67. More than half of the first graders were males 53.7% and 46.3% (31) females. Racially, the first grade consisted of 59.7% (40) African American, 31.3% (21) European American, 1.5% (1) Hispanic, 1.5% (1) Asian, 1.5% (1) Native American, and 4.5% (3) Multiracial students. All but one student (98.5%) received free or reduced
lunch. Finally, there were 13.4% (9) first-grade students who received special education services and 19.4% (13) ELLs.

Students in first grade received 90-minute of whole classroom reading instruction based on the Trophies (Beck, Farr, & Strickland, 2005) reading program. In Grade 1, this reading curriculum provided explicit instruction, modeling, practice and application activities on areas such as phonological awareness, decoding/phonics, decoding/structural analysis, decoding strategies, word recognition, fluency, vocabulary and consent development, comprehension and text analysis, writing, and so forth. Table 3.5 presents a summary of reading objectives targeted for each reading category.

A daily Trophies lesson included four parts: oral language, word work, reading, and language arts. During oral language, the teacher would read a story and ask students to be ready to answer questions. Specific words from the story were selected for phonological awareness activities. Students were asked to identify rhyming words, words with same initial sounds, etc. During word work period, the teacher would model the new target sound (e.g., short vowel /a/). Students would build words that included the target letter sound and then changed specific letters (e.g., “at” becomes “cat”, “cat” becomes “can”). Additionally, students would spell specific target words (at, hat, cat, can, cap, tap, map, mad) and read high frequency words (e.g., a, the). In the third part of the lesson, the reading period, students would be separated into smaller groups and work on these activities: self-selected reading, practice pages, cross curricular centers, and journal writing. While students would be working in each of the above activities, the teacher would work with one a group of students at a time reading a decodable book that included the target sound. Students would complete independently a worksheet based on
their reading level. The Trophies program included independent practice instructional materials for four reading levels: below-level, on-level, advanced, and materials for ELLs. Finally, during the Language Arts period, students would be involved in the writing process and learn about grammatical phenomena. The teacher would model complete sentences and have students use them to describe pictures from transparencies. Lessons would end with students reading a book of their choice silently.

*Instructional setting in School 2.* Thirteen students from the ERI-Treatment group received supplemental small group instruction by three IAs (Sara, Claire, LeShawn) in School 2. Sara initially worked with four and then afterwards with three at-risk students in the library or in a small office room used by the pre-K instructional assistants. Instruction was delivered five times per week from 11:30am to 12:00pm. On Mondays, Wednesdays, and Fridays instruction took place in the library while during the remaining days, students received instruction in the small office room because the HOSTS program was taking place in the library. The second IA, Claire, worked with six target students in a small room that served as book storage. Instruction took place around a small hexagon table with the IA sitting across from the students. Students received instruction in groups of ones or twos for 20 minutes each group. Finally, LeShawn worked with three students in a quiet tutoring room from 12:00pm to 12:30pm five days a week. He and the students sat around a 6’ by 2’ rectangular table with the IA sitting across the group.

*Assessment setting in School 2.* All testing took place in two separate quiet rooms. Depending upon the availability of the rooms, the experimenter used either a small office room that belonged to the resource teacher, who generously gave permission to use it for testing, or an empty classroom that was used as a tutoring room. Testing usually took
place from 9:15am to 10:00am and from 11:30am to 2:30pm. The experimenter and students sat across from each other, but less than two feet in distance so that the experimenter could hear the verbal responses produced by each student. A semi-circled with 2.5-foot radius table was placed in the small office room while a 6’ by 3’ rectangular table was used in the tutoring room.

<table>
<thead>
<tr>
<th>Target reading areas</th>
<th>Sample of reading objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonological Awareness</td>
<td>• Count and track sounds in a syllable, syllables in words, and words in sentences</td>
</tr>
<tr>
<td></td>
<td>• Identify and segment beginning, middle, and last sounds in spoken words</td>
</tr>
<tr>
<td></td>
<td>• Distinguish between long and short vowels</td>
</tr>
<tr>
<td></td>
<td>• Manipulate sounds in words by adding, deleting, substituting sounds</td>
</tr>
<tr>
<td>Decoding: Phonic Analysis</td>
<td>• Identify single consonants, blends, and digraphs at the beginning, middle, and last positions</td>
</tr>
<tr>
<td></td>
<td>• Identify short and long vowels, digraphs, r-controlled, variant, schwa</td>
</tr>
<tr>
<td></td>
<td>• Blend vowel-consonant sounds to read syllables or words</td>
</tr>
<tr>
<td>Decoding: Structural Analysis</td>
<td>• Identify compound words, abbreviations, and contractions</td>
</tr>
<tr>
<td></td>
<td>• Identify inflectional changes in plurals, verb tenses, possessives</td>
</tr>
<tr>
<td></td>
<td>• Read phonograms, word families, and onset rimes</td>
</tr>
<tr>
<td>Word recognition</td>
<td>• Recognize one-syllable and high-frequency words</td>
</tr>
<tr>
<td></td>
<td>• Identify common irregular sight words</td>
</tr>
<tr>
<td>Fluency</td>
<td>• Read aloud in a natural manner</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>• Classify and categorize words/concepts</td>
</tr>
<tr>
<td></td>
<td>• Identify antonyms, synonyms</td>
</tr>
<tr>
<td>Comprehension and Text Analysis</td>
<td>• Ask/answer questions</td>
</tr>
<tr>
<td></td>
<td>• State main idea</td>
</tr>
<tr>
<td></td>
<td>• Locate information</td>
</tr>
</tbody>
</table>

*Table 3.5 Target reading areas and skills addressed in the Trophies reading program*
School 3

School 3 was also a Reading First school and received federal and state funding to target the reading deficits of its low-performing K-3 student population. As part of the requirements of the Reading First Initiative and the school district, School 3 incorporated the Harcourt Trophies reading program (Beck et al., 2005), which was considered to be a research-based instructional curriculum.

The total enrollment was 145 students from preschool through Grade 5 during the 2006-07 school year. Male students accounted for 59.3% (86) and 40.7% (59) were females. Student ethnic/racial groups consisted of 57 (39.3%) African Americans, 50 (34.5%) European Americans, 27 (18.6%) Hispanics, 4 (2.7%) Asians, 1 (0.7%) Native Americans, and 6 (4.2%) Multiracials. More than one third of the total population was ELLs (i.e., 35.8%). Almost all students (91.7%) received free or reduced lunch. Twenty-one (14.5%) students received special education services.

The study targeted 14 (45.1%) students in Grade 1. The total number of students in first grade was 31. First-grade males were 64.5% (20) and 35.5% (11) were females. In first grade, there were 22.5% (7) African-American, 35.5% (11) European-American, 22.5% (7) Hispanic, 6.5% (2) Asian, and 13% (4) Multiracial students. All but three students (90.3%) received free or reduced lunch. Finally, 5 (16.1%) students received special education services and 12 (38.7%) were ELLs.

According to the federal and state requirements of Reading First schools, students in first grade received 90-minute uninterrupted whole classroom reading instruction based on the Trophies reading curriculum. Description of the Trophies program was presented previously under School 2.
Instructional setting in School 3. Martha and LeShawn taught the 7 ERI-Treatment students in two instructional groups. Both groups were taught in the same classroom setting but at different times. LeShawn worked with four target students four times a week from 11:00am to 11:30am. Instruction took place in an empty classroom that was used for individual tutoring and music classes. However, during intervention time the room was made available only for the two instructional groups. LeShawn and the students sat around a circled table with a five-foot diameter. Martha worked with three target students five times a week. Except for Wednesdays, instruction took place from 3:10pm to 3:40pm. On Wednesdays, instruction usually occurred from 1:45pm to 2:15pm. The IA and students sat at a 5’by 2’ rectangular table with the IA facing the three students.

Assessment setting in School 3. All pre/post testing as well as progress monitoring took place in two separate quiet rooms. Depending upon the availability of the rooms, the experimenter used either the conference room, which was next to the office, or the empty classroom that was utilized as an instructional setting for the target students. Testing usually took place from 12:45pm to 1:20pm. The experimenter and students sat across from each other, but less than two feet in distance so that the experimenter could hear the verbal responses produced by each student. An approximately 12’ by 6’ rectangular table was used in the conference room while a 5’by 2’ rectangular table was placed in the tutoring room.

Experimenter and Secondary Observers

The experimenter was a doctoral candidate in Special Education/Applied Behavior Analysis program at The Ohio State University. She earned her bachelor’s
degree in Elementary Education with a specialization in Special Education from the University of Cyprus in Lefkosia, Cyprus in 2001. Afterwards, she worked as a general education teacher in a public elementary school of a rural school district for two years (2001-2003). Responsibilities included teaching all core subjects to students at the second-grade level as well as electives (e.g., music, arts, science, social studies, religion studies) to students at first-grade through fifth-grade level. The year of 2001 was a landmark for the General Education and Special Education systems in Cyprus because it was at the beginning of this year that the Public Law of Inclusive Education was officially implemented. With that framework in mind, during her second year of teaching, she collaborated with a Special Education faculty professor from the University of Cyprus and conducted a qualitative study, which investigated the attitudes of students without disabilities toward their peers with disabilities at that particular school setting (Kourea & Phtiaka, 2003). Two major conclusions from this study showed that (a) certain teaching strategies needed to be implemented in order to teach students with and without disabilities social behaviors that would emphasize acceptance, respect, and equality, and (b) inclusive effective instructional practices needed to be incorporated that enhanced the active participation of all students in a mainstream classroom. In seeking more academic training in these areas, the experimenter entered graduate school at The Ohio State University and completed a master’s degree in Mild to Moderate disabilities in 2004. The following year, she entered the doctoral program in special education/applied behavior analysis. She has been conducting and/or assisting with the implementation of academic and behavioral interventions in School 1, which was the site of a model demonstration grant project.
since 2002. During the 2005-2006 and 2006-2007 academic years, she assisted in implementing academic interventions within two additional elementary schools.

Two secondary observers took part of this study and facilitated the data collection process throughout the course of the study. The first observer was a doctoral student in the Special Education/Applied Behavior Analysis program of The Ohio State University. His previous teaching experience involved working with students with moderate to severe disabilities in mainstream settings utilizing behavior management principles. The second observer was a master’s student in Special Education at The Ohio State University. Her previous teaching experience involved working with mild-to-moderate students in school settings.

Definition and Measurement of Dependent Variables

Two sets of dependent measures were collected throughout the course of the study. The first set was the primary dependent variables, which included pre/post scores on the following: (a) three subtests from the Woodcock- Johnson Tests of Achievement- III (WJ-III) (Woodcock et al., 2001), and (b) two composites from the Comprehensive Test of Phonological Processing (CTOPP) (Wagner et al., 1999).

The other set of dependent measures was the secondary dependent variables collected on a tri-weekly basis throughout the course of the study. Three DIBELS progress monitoring subtests (Good & Kaminski, 2002) were administered: Phoneme Segmentation Fluency (PSF), Nonsense Word Fluency (NWF), and Oral Reading Fluency (ORF). A detailed description of each of the dependent measures follows:
Primary Dependent Measures – Pretest/posttest assessments

Woodcock-Johnson III Tests of Achievement (WJ-III)

Two different forms were administered at the beginning (i.e., September) and end (i.e., May) of the study in order to avoid any practice effects.

Letter-Word Identification (LWID). This subtest measured the student’s letter and word knowledge. The LWID subtest included 76 test items and the student was required to reach a certain ceiling for discontinuing the test. The items became increasingly difficult as the student gave correct responses to previous items. For instance, the student was asked initially to name letters such as A, D, G, then read small words such as to, dog, in and later on read words such as because, systematic, homogenization. The student’s final score was the total number of correct test items up to the ceiling. The ceiling was reached after student responded incorrectly to six consecutive test items. The median reliability for ages 5 to 19 is 0.91.

Word Attack (WA). This 32-item subtest measured the student’s ability to recognize and pronounce different combinations of letter-sound correspondence. The student was required to read incorrectly six consecutive items (i.e., ceiling) before discontinuing the test. The initial items required the student to say the sounds in some single letters (e.g., “what is the sound of these letters? k, n”). The remaining items required the participant to read aloud letter-sound combinations, which represent non-words such as tiff, yosh, shamble, and so forth. The student’s final score was the total number of correct responses up to the ceiling. The median reliability for ages 5 to 19 is 0.87.
Passage Comprehension (PC). This subtest measured the student’s ability to match a symbol with an actual picture of the object (e.g., matching the symbol of the cat with the actual picture of a cat) as well as reading sentences and identifying the missing word (e.g., I go to bed __ night). The subtest included a total of 47 items and the student was required to reach six consecutive incorrect responses (i.e., ceiling) for discontinuing the test. The difficulty of test items was increased by removing pictures and increasing the passage length, the level of vocabulary, and the complexity of the passage’s syntax and grammar. The student’s final score was the total number of correct responses up to the ceiling. The median reliability for ages 5 – 19 is 0.83.

Comprehensive Test of Phonological Processing (CTOPP)

The CTOPP consists of two test versions. The experimenter used only the first version, which was developed for individuals in kindergarten and first grade and included seven core subtests. However, in this particular study only five core subtests (elision, blending, sound matching, rapid color naming, rapid object naming) were administered as they were measuring constructs (phonological awareness, and rapid naming) directly relevant to this research investigation. Each construct was measured by combining specific core subtests. Specifically, elision, blending, and sound matching were the core subtests for the Phonological Awareness Composite. The rapid color naming and rapid object naming were the core subtests for the Rapid Naming composite. The experimenter chose to report the composite scores as opposed to the core subtest scores because the first ones were the most reliable scores for measuring the two target constructs.
Composites were highly reliable because each composite comprised two or three representative subtests rather than only one.

*Phonological Awareness Composite (PAC).* As noted previously, this composite score comprised the standard scores of three subtests: elision, blending, and sound matching. Particularly, the composite score was derived by adding the subtest standard scores and converting the sum to a composite score (i.e., a standard score with a $M=100$ and $SD=15$) using a table for conversions. The test-retest reliability for the PAC composite within the 5 to 7 age range is 0.79 and the internal consistency reliability is 0.96. Below is description of the three core subtests that comprised the PAC:

(a) *Elision.* This 20-item subtest measured the student’s ability to say a part of a word after removing designated sounds. The student was presented with three practice items and was asked to listen to a compound word and then say that word after removing one part of it (e.g., *say toothbrush without saying* *tooth*). If the student got at least one practice item correct, then he was presented with three test compound-word items (e.g., *say airplane without saying* *plane*). During practice time and the administration of the first three test items, the student received corrective feedback. If he got at least one test item correct, then the student would proceed to the remaining test items, which were single words. The student was required to listen to a word and then repeat it after removing a specific sound (e.g., Examiner: *Say* *cup.* Examinee: *cup.* Examiner: *Now, say* *cup without saying* */k/.* Examinee: *up*). The test was terminated after the student would reach the ceiling (i.e., three consecutive incorrect responses). The student’s final score was the total number of correct
responses up to the ceiling. The test-retest reliability is 0.82 for ages 5 through 7 years and the internal consistency reliability is 0.89.

(b) Blending. This 20-item subtest measured the student’s ability to listen to particular sounds and blend them to form words. The student was presented with three practice items and she was required to listen to a series of separated sounds and then combine the sounds to make whole words (e.g., Examiner: What word do these sounds make? /t/ /oi/. Examinee: toy). If the student got at least one practice item correct, then she was presented with 3 test items. During the practice and the first three test items, the student received corrective feedback. The student would continue to the remaining test items if she obtained at least one test item correctly. The ceiling for this subtest was three consecutive incorrect responses. The student’s final score was the total number of correct responses up to the ceiling. The test-retest reliability is 0.73 for ages 5 through 7 years and the internal consistency reliability is 0.84.

(c) Sound matching. This two-part subtest measured the student’s ability to match the first and last sound with a series of pictures. In Part I, the participant was presented with practice and test items and was asked to identify the first sound in pictures. Specifically, the student was introduced to three practice items, whereby the examiner said a word, paused, and then said three other words while pointing to pictures depicting all four words. (e.g., Examiner: this is sock. Examiner also pointed to the picture of sock. Then examiner said: Which of these three pictures starts with the /s/ sound like sock? Examiner paused and then said: Pot, lip, or sun?). If the student responded correctly to
at least one practice item, then he would proceed to the test items of Part I. Feedback was given on all practice items and the first three test items only. The student moved on to Part II only if he did not meet the ceiling in Part I, which was missing a total of 4 out of 7 test items in a row. If the ceiling was reached, then the subtest was discontinued and Part II was not administered. During Part II, the student was presented with 3 practice items, whereby he was instructed to identify the last sound in the pictures. (e.g., Examiner: this is can. Examiner also pointed to the picture of can. Then examiner said: Which of these three pictures ends with the /n/ sound like can? Examiner paused and then said: Pot, lip, or sun?). If he responded correctly to at least one practice item, he was presented with 10 test items. Feedback was given on all practice items and the first three test items only. Part II was discontinued if the student reached the ceiling (i.e., 4 out of 7 incorrect responses in a row). In order to determine the ceiling in Part II, student’s responses on Part I were considered in concluding whether the ceiling was reached. For instance, if the student made 2 out of 10 incorrect responses on Part I and then two additional miscues at the beginning of Part II, then the latter part was ended because the student reached his ceiling (i.e., 4 out of 7 incorrect responses in a row). The student’s final score was the total number of correct responses up to the ceiling. The test-retest reliability for this test is 0.83 for ages 5 through 7 years and the internal consistency reliability is 0.85.

Rapid Naming Composite (RNC). This composite score comprised the standard scores of two subtests: rapid color naming and rapid object naming. The composite score
was derived by adding the subtest standard scores and converting the sum to a composite score (i.e., a standard score with a M=100 and SD=15) by using a conversions table. The test-retest reliability for the RNC composite within the 5 through 7 age range is 0.70 and the internal consistency reliability is 0.88. Below is a description of the two core subtests that comprised RNC:

(a) *Rapid Color Naming*. This 72-item subtest measured the student’s speed to name different colored blocks printed on two pages. The student was presented with a practice page and was asked to name the six randomly assigned colored blocks as fast as he could (e.g., red, blue, yellow, green, black, brown). If the child made an error, corrective feedback was given and the student was asked to repeat the colors again. If no mistakes were made during the second rapid color naming trial, the student was presented with the first testing page. The child was instructed to name the colors on each row as quickly as he could. If the student made less than 5 errors on the first form, she was given a second testing page, whereby she repeated the same task. The student’s final score was the total number of seconds taken to name all of the colored blocks on both forms. If the child made 5 or more errors on either form, then the subtest was not scored. The test-retest reliability is 0.87 for ages 5 through 7 years and the internal consistency reliability is 0.82.

(b) *Rapid object naming*. This 72-item subtest measured the speed with which the child could name a series of objects on two test forms. First, the student was presented with six randomly assigned practice items (i.e., pencil, star, fish, chair, boat, key). If the child made an error, corrective feedback was given
and the student was asked to name the objects again. If no mistakes were made during the second object naming trial, then the student was presented with the first testing page. The child had to name the objects in each row as fast as she could. If the child made less than 5 errors, the second form was presented. In this form, the student was asked to perform the same task again. If the child made 5 or more errors on either testing form, then the subtest was not scored. The student’s final score was the number of seconds taken to name the objects in both forms. The test-retest reliability for this test is 0.85 for ages 5 through 7 years and the internal consistency reliability is 0.79.

Secondary Dependent Measures- DIBELS Progress Monitoring probes

Phoneme Segmentation Fluency (PSF). This subtest measured the student’s ability to segment three- and four-phoneme words into their respective individual sounds fluently. The PSF was administered orally. The examiner said a word to the student, and the student was required to identify the segment sounds in that word (e.g., Examiner: Say the sounds in mop. Examinee: /m/ /o/ /p/). Each correct segment sound was given one point. For instance, in the presence of the word stimulus cat, the student gave three distinct segment sounds (i.e., /c/ /a/ /t/). Then, the student would receive three points. If the student responded as /c/ /at/, then he would earn only 2 points as he produced only two distinct segment sounds. If the child repeated the whole word (i.e., /cat/), then no points were given. Students were not penalized for articulation or speech problems or adding any schwa (/u/) sounds to consonants. The student’s final score was the number of correct segment sounds produced within one-minute timing. As mentioned previously,
students had to score at least 35 correct segment sounds per minute to meet their benchmark status by the end of Grade 1. This test had over 20 alternate progress monitoring probes. The two-week alternate form reliability is 0.88 at the end of kindergarten.

**Nonsense Word Fluency (NWF).** This subtest measured the student’s ability to identify letter-sound correspondence in three-sound CVC words as well as blend those letter-sounds to read CVC words. The examiner presented a page with randomly ordered CVC and VC nonsense words and the student was required to individually say the sounds in each nonsense word or read the whole word (e.g., *not, feg, lop*, etc). The student’s final score was the number of correct letter-sounds produced in one-minute timing. Students had to score at least 50 correct letter-sounds per minute to be at benchmark by the end of Grade 1. This test has over 20 alternate progress monitoring probes. The one-month alternate-form reliability is 0.83 in the middle of first grade.

**Oral Reading Fluency (ORF).** This subtest measured the student’s ability to read connected text accurately and quickly. The student was presented with a passage and she was asked to read the passage as best as she could in one-minute timing. Words omitted, substituted, and more than three-second hesitations were recorded as miscues. The student’s final score was the number of correct words read per minute. Students had to read at least 40 correct words per minute to be at benchmark by the end of Grade 1. The ORF subtest has 20 alternate progress monitoring probes. The test-retest reliability for elementary-aged students ranged from 0.92 to 0.97 (Appendix J).
Definition and Measurement of the Independent Variable

In this study, the supplemental reading small group intervention was composed of: (a) activities from the *Scott Foresman Early Reading Intervention* reading program (ERI) (Simmons & Kame’enui, 2003b), and (b) an experimenter-constructed fluency building activity. Each of these intervention components are described in more detail below.

*Scott Foresman Early Reading Intervention (ERI).* The ERI reading program is a commercial curriculum with strong code emphasis and high level of specificity necessary for improving the phonological awareness skill deficits of students at the bottom first quartile of a kindergarten and/or first-grade classroom. This program was based on a five-year longitudinal research study, known as *Project Optimize* (Simmons et al., 2003a; 2003b) and has been found to produce powerful outcomes on the phonological awareness and alphabetic principle skills of at-risk students. Hence, the ERI program was selected in this investigation due to its explicitness, intensity and systematization in curriculum content and instructional delivery of critical beginning reading skills.

Table 3.6 presents an overview of the scope and sequence of the ERI program. The program contains 126 lessons, divided into four major parts: (a) Part 1 targets 11 phonemes (9 consonants and 2 short vowels) and beginning phonological awareness skills (first and last phoneme isolation); (b) Part 2 teaches 5 new phonemes (3 consonants and 2 short vowels), reviews previous skills and teaches phoneme segmentation with initial and final sounds; (b) Part 3 introduces 6 new phonemes (5 consonants and 1 short vowel), emphasizes blending skill by reading simple VC and CVC words as well as some irregular ones, and teaches initial stop and continuous sounds; (d) Part 4 presents 4 new
phonemes (consonants), reviews previous blending and segmentation skills with simple words and introduces reading sentences and VCC and CVCC words.

<table>
<thead>
<tr>
<th>Part / Range of lessons</th>
<th>Target Reading Areas</th>
<th>Target Phonemes</th>
<th>Target Reading Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Lessons 1-42)</td>
<td>Learning letters and sounds</td>
<td>/m/, /p/, /f/, /c/, /t/, /s/, /d/, /l/, /a/, /o/, /r/</td>
<td>Identify initial sound, Identify final sound</td>
</tr>
<tr>
<td>2 (Lessons 43-72)</td>
<td>Segmenting, blending, and integrating</td>
<td>/b/, /i/, /n/, /g/, /u/</td>
<td>Identify initial and final sound, Segment first and final sounds in words</td>
</tr>
<tr>
<td>3 (Lessons 73-96)</td>
<td>Reading words</td>
<td>/j/, /w/, /e/, /z/, /h/, /y/</td>
<td>Identify initial continuous sounds, Identify initial stop sounds, Read simple VC and CVC words (e.g., in, not, us, sad), Read irregular words (e.g., the)</td>
</tr>
<tr>
<td>4 (Lessons 97-126)</td>
<td>Reading sentences and short storybooks</td>
<td>/k/, /v/, /ks/, /kw/</td>
<td>Identify initial continuous and stop sounds, Read VC, CVC, VCC, CVCC and irregular words, Read simple sentences</td>
</tr>
</tbody>
</table>

Total # of phonemes presented: 26 (21 consonants and 5 short vowels)

*Table 3.6 Target reading areas and skills in the ERI program*
The components of the ERI program are: (a) four teacher guide books that include the 126 scripted lessons, (b) 4 teacher resource packages that provide supplemental pictures, and/or cards for each lesson, (c) student activity books per learning unit, (d) assessment handbook, which includes the placement test, progress monitoring checklists, and exit mastery tests, (e) 10 Diz student storybooks, (f) 6 Diz take-home storybooks, (g) Diz the dinosaur puppet, (h) manipulatives such as picture cards, alphabet cards, letter and word cards, letter tiles, game boards, write-on/wipe-off cards, two- and three-square strips, and student reading books. All instructional components arrive in a large kit that has the shape of a small house.

A critical piece accompanying this program is its comprehensive assessment procedures. Students are tested before receiving ERI instruction, are assessed continuously during instruction, and are given a final evaluation for determining mastery on all target skills of the program. Before the ERI instruction, a placement test is administered to prospective students in order to determine their current letter naming and sound knowledge and their best fit in the program. Depending upon their final placement score, students enter the program in one out of five lesson entry points (entry 1: instruction begins from lesson 1, entry 2: lesson 43, entry 3: lesson 61, entry 4: lesson 73, and entry 5: lesson 97). After students are placed in the program, instructors can use progress-monitoring tests and student checklists to monitor student progress throughout the course of the ERI instruction. Student checklists are specific to a set of six lessons (i.e., instructional cycle) and target new reading skills and review previous learned skills. Instructors may use these checklists either on a daily basis or at the end of Day 3 and Day 6 of the instructional cycle. There are four progress monitoring tests, which assess
the content of each part of the program. Depending upon the student’s final score on this test, the student can either accelerate through the next part of the program or be retaught specific lessons from the previous part. Finally, after completing all four parts of the ERI students are given an exit test, which assesses their letter naming and sound knowledge and proficiency in segmentation and word reading. All ERI tests are scripted and explicit and found in the assessment handbook.

A typical ERI lesson includes 6 to 8 activities, lasting from 20 to 30 minutes. Each lesson is divided into two sections. The first section is focused on activities centered on phonological awareness and alphabetic understanding. The second section integrates the above skills into writing and spelling activities. All ERI lessons present instructional directions in a clear and organized manner. Specifically, a lesson overview page precedes the activities of each lesson. This page gives a summary of the number and type of activities, the instructional materials and time needed for each activity. At the top of the overview page, there is a list of new target reading skills, new sounds presented and old sounds reviewed. The ERI curriculum activities are delivered through the model-lead-test approach. That is, the instructor models first the target skill, the students and the instructor practice the skill together, and then students perform the skill independently. When students give an incorrect responses, instructors follow a scripted error-correction procedure.

The format of ERI lessons is user-friendly and designed to present curriculum content in a succinct, prescribed manner. Specifically, each activity entails three columns. The first column outlines the step sequence, the second column (i.e., “To Do” column) directs the instructor on what she/he needs to do during each step of the activity, and the
last column (i.e., “To Say” column) contains the scripted instructions given to students. A sample ERI lesson from Part 3 includes the following activities: Activity 1 introduces the new target letter sound j/j/, whereby students say its name and sound and trace the letter three times. Activity 2 integrates the target sound /j/ in a first-sound isolation practice. Students are presented a series of pictures and are asked to isolate the initial sound /j/ in the pictures. Activity 3 tests students’ knowledge of letter sounds. This is a fluency-building activity, where students identify stop and continuous sounds. Activity 4 is a critical activity because students are taught to segment, blend and read words by using their fingers and later on, word cards. Teaching students to use their fingers and point to each distinct segment sound as they hear it requires often times physical direct prompting and more individual turns in order to ensure that all students are able to distinguish the sounds in a word. In addition to segmenting a word with fingers, students are presented with word cards and are asked to read them slowly by sounding out each letter sound and then read the word fast to blend all the sounds together. Activity 5 requires students to trace and write the target letter sound j and review writing other letters. Activity 6 prepares students to spell some words for the next activity. Students are given three-square strips and are asked to identify the sounds and name the letters in a word by pointing to each square and using letter tiles. Finally, activity 7 presents a word maze and students are required to go through the maze by spelling some words. When the instructor presents the word, students are asked to segment it with their fingers and then write each letter sound on their paper (for a complete and detailed presentation of this sample lesson, see Appendix K).
Experimenter-Constructed Fluency Activity. This activity was developed and incorporated into the supplemental reading intervention. The purpose of constructing this activity was twofold: (a) to provide target students with frequent opportunities to read connected text for 2-3 minutes, and (b) to help students practice their fluency skills from the beginning of the year since the ERI program did not present scheduled fluency practice until students reached Part 4 of the program. Most of the ERI-Treatment students began the ERI program on Part 3, which emphasized only word reading. Consequently, it was imperative for students to read words in connected text early in advance.

The fluency activity was scripted and it consisted of four parts: (a) sight-word practice: students were presented and practiced 2-3 target sight words that were included in their passage, (b) teacher reading and guided practice: teacher was reading the passage in a slower than normal pace while students were following with their fingers. During the first and second day of reading, the teacher would read the story first and then provide guided practice to students to read with her. On the third reading day, the guided practice was omitted and more time was given to the next part. (c) Partner reading: students worked with an assigned partner, took turns reading one sentence at a time, and fixed their partner’s mistakes. (d) Testing: the teacher randomly selected a student for one-minute fluency testing. At the end of the one-minute timing, the instructor recorded on a data sheet the student’s score. This activity usually lasted 5 to 7 minutes. Sometimes, due to time constraints in the instruction, the last part of the activity was not conducted and the instructional assistants had to test students the following day. However, all students had to be tested at least two times prior to moving to a new story. Decodable and non-decodable passages, each ranging from 40-80 words, were incorporated in the
supplemental reading instruction. Depending on student’s mastery level, each story was used for 3 to 5 consecutive sessions (Appendix L).

As noted previously, an ERI lesson was designed to last approximately up to 30 minutes. However, due to time limitations imposed by the participating schools, the ERI lesson activities were reduced to 20-25 minutes in order to accommodate the additional fluency activity. The total intervention period lasted 30-35 minutes except from a group of six ERI-Treatment students, who were part of a single-subject research investigation. These students received a total of 20-25 minutes of intervention. However, time variation was not found to be a confounding factor among the ERI-Treatment group because within-group comparisons of the ERI-Treatment students showed that the six students made comparable gains to the rest of their peers.

Due to time restrictions in delivering the supplemental intervention, the IAs made the following adjustments during each lesson: (a) maintain high pace of instruction with well-organized instructional materials, (b) reduce the amount of time allocated to the spelling activity. Specifically, students worked on this activity for 3-4 minutes as opposed to 6-8 minutes suggested by the authors of the ERI curriculum, and (c) reduce the amount of time spent on game activities. Spending less time on the spelling and game activities did not invalidate the effectiveness and integrity of the ERI program as well as minimize student improvement because of the way the program had been developed. That is, curriculum content was presented in a spiral and cumulative manner and each target skill was reviewed in consecutive sessions. Hence, students may have received less time on turn taking during game activities and less time on tracing letters and writing words during an ERI lesson, but students were able to review the same skills again in
subsequent lessons. Students received treatment from early October until late April. The treatment duration was long enough for students to receive adequate amount of spelling and game activities.

Measurement of Treatment Integrity

Treatment integrity also known as treatment fidelity, integrity reliability, or procedural integrity refers to the degree to which the independent variable is implemented as intended (Gresham, Gansle, & Noell, 1993; Gresham, MacMillan, Beebe-Frankenberger, & Bocian, 2000). Assessing the degree to which the IAs were following the treatment protocol was critical to the internal validity as well as external validity of this study. If any changes to the dependent variables occur, and there is no empirical evidence to support the implementation of the treatment, then any conclusions drawn about the effectiveness of the supplemental intervention would be questionable. That is, the experimenter would not be able to demonstrate convincingly that the behavior change occurred due to the accurate manipulated changes of treatment. If the experimenter is not able to document convincingly a functional relationship between the independent and dependent variables, and does not provide detailed description of the treatment procedures, then any attempts to generalize treatment outcomes could fail.

In this study, treatment integrity was measured on two dimensions: number of steps completed (quantitative dimension) and how well each step was completed (qualitative dimension). In order to build upon Year’s 1 investigation, the experimenter revised the integrity checklist used by Yurick (2006) by incorporating smaller, specific treatment steps. Specifically, in Year’s 1 checklist, some items were double-barreled.
That is, they described more than one teacher behaviors (e.g., “Models the skill, provides practice before individually assessing student on skill”) and as a result it was difficult to record accurately each item. During this study, each teacher component was broken down into smaller observable steps in order to measure treatment implementation in a more precise manner (e.g., “Models the skill,” “Provides guided practice on target skill,” “Assesses students individually on target skill”). The integrity checklist included a total of 9 steps assessed on a three-point ordinal scale of measurement (0= none, 1=rarely, 2= mostly, 3=always). Each IA was observed at least once per week and his possible score ranged from 0 – 27 points (Appendix M).

Materials

A number of materials were utilized during the intervention procedures:

ERI kit. Each IA was given an ERI instructional package with all the necessary components for delivering the ERI lessons.

Fluency-building activity. A scripted laminated activity printed on an 8.5” by 11” card stock paper was provided to all IAs. The components of this activity were described previously (Appendix L).

Index cards. A set of white blank 3” by 5” flashcards was used for practicing target sight words during the fluency activity.

Student reading stories. A set of 24 student reading stories was prepared and given to the IAs for use during the fluency-building activity. These stories were typed in 16-font size for student usage. Text difficulty ranged from middle of kindergarten level to end of first-grade level. As students progressed from one story to another, the passage
difficulty and amount of non-decodable words increased. Student reading stories were taken from the ERI storybooks (Simmons and Kame’enui, 2003) and Direct Instruction curricula (Engelmann, 1995a; 1995b) (see samples of stories in Appendix N).

*Teacher reading stories.* A set of 24 reading stories was prepared for the IAs. Teacher copies included the exact content as in student stories. In addition, teacher stories were word-numbered and included at the top of the page the target sight words to be practiced during each session (Appendix O).

*Fluency data recording sheets.* Every four stories were accompanied with a data recording sheet, in which the IAs had to record the number of correct words students read in one minute and the number of miscues made. For maintaining consistency in recording across the IAs, a set of scoring rules was provided at the end of each data sheet (Appendix P).

*Stopwatch.* Each IA received a digital kitchen timer for recording the duration of the ERI instruction as well as testing students during the fluency activity.

*Starcard.* A 10-by-2 rectangular grid was developed to be used as a starcard. During the supplemental instruction, IAs were reinforcing tangibly appropriate student responding on their starcards. Each IA had set up his own reinforcement criterion for exchanging the number of stars to a tangible reward (Appendix Q).

*Reinforcers.* A variety of tangible rewards was provided to students such as pencils, erasers, candies, game cards, cookies, etc.

*Weekly log.* A 6 by 6 table was created for IAs to record the date, number of groups, lesson number, starting and ending time (minutes and seconds), and duration of each instructional session (Appendix R).
General Procedures

This section describes in detail the experimental procedures followed throughout the implementation of the study: training of IAs, pretest steps, grouping ERI-Treatment students, intervention procedures, and posttest steps.

Training of Instructional Assistants

Three two-hour training sessions were conducted from September 18 to September 21, 2006 at School 1. All but two IAs attended the six-hour training. Individual training sessions were provided to Martha from School 3 and Claire from School 2 later on. Table 3.7 presents the specific objectives for each training session.

<table>
<thead>
<tr>
<th>Training session objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session 1</td>
</tr>
<tr>
<td>(September 18)</td>
</tr>
<tr>
<td>- Identify the five big ideas in beginning reading</td>
</tr>
<tr>
<td>- Learn the four components of effective instruction</td>
</tr>
<tr>
<td>- Name components of the ERI program</td>
</tr>
<tr>
<td>- Practice specific letter sounds</td>
</tr>
<tr>
<td>Session 2</td>
</tr>
<tr>
<td>(September 19)</td>
</tr>
<tr>
<td>- Learn integrity steps of ERI instruction</td>
</tr>
<tr>
<td>- Practice ERI instructional activities in small groups</td>
</tr>
<tr>
<td>- Evaluate examples and non-examples of ERI instruction using integrity checklist</td>
</tr>
<tr>
<td>- Identify components of the fluency-building activity</td>
</tr>
<tr>
<td>- Practice fluency activity with a partner</td>
</tr>
<tr>
<td>Session 3</td>
</tr>
<tr>
<td>(September 21)</td>
</tr>
<tr>
<td>- Identify components of the ERI placement test</td>
</tr>
<tr>
<td>- Practice administering the ERI placement test</td>
</tr>
<tr>
<td>- Connect the ERI instruction to DIBELS assessments</td>
</tr>
<tr>
<td>- Present ERI activities to the rest of the participants</td>
</tr>
</tbody>
</table>

*Table 3.7 Training objectives and sequence*
Each of the participants in the training received a training package that included:
(a) a training information booklet, (b) handout with components of ERI, (c) treatment integrity checklist, (d) non-example instructional scenarios, (e) student starcards, (f) sample of ERI lesson activities, (g) the scripted fluency activity with its components (i.e., script, passage, data-recording sheet), (h) administration guidelines for the ERI placement test, (i) ERI placement test, (j) an entire ERI lesson (e.g., lesson 24 or 45), (k) DIBELS benchmark goals, and (l) DIBELS assessments.

The trainer emphasized in all training sessions the opportunity for participants to practice intervention activities and ask questions about the academic content and treatment procedures. It was critical that all participants were able to implement the treatment independently.

*Training Session 1.* During this session, participants were presented with the theoretical framework and empirical evidence supporting this study. Definitions and distinction among certain reading terms used in beginning reading and also found in the ERI curriculum were explained (e.g., phonological awareness, alphabetic principle, reading fluency, phonemes versus phonics). A significant portion of the training time was allocated on the four components of effective instruction. Participants were introduced to the concepts of active student responding, error correction, instructional pacing, and positive reinforcement. Specific group activities were designed in order for participants to differentiate between active student responding and on-task behaviors, positive reinforcement and bribery. Session 1 ended with the presentation of the components of the ERI program, description of an ERI lesson outline, and a video model demonstration. At the end of the video model demonstration participants were asked to evaluate it based
on the components of effective instruction. The final activity included a short practice of certain letter sounds. Finally, participants were asked to spend time identifying certain ERI instructional materials that were going to be used the following session.

*Training Session 2.* The experimenter introduced the concept of treatment integrity and the steps necessary for implementing the supplemental intervention accurately. Each step of the treatment integrity checklist was described in detail and participants were asked to use the checklist to evaluate three instructional activities modeled by the experimenter. At the end of the model demonstration, participants were asked to share their evaluations. The second step in Session 2 required participants to get into pairs and practice the three instructional activities modeled by the experimenter. After practicing all activities, the participants formed groups of three. Each member in the group was assigned only one of the three roles: teacher, student, and observer. The observer’s role was to use the treatment integrity checklist and assess the teacher’s performance. At the end of the group activity, participants shared again their thoughts with the other groups. The third step was the presentation of non-examples. The experimenter modeled four instructional scenarios and participants were asked to evaluate the instruction based on the following criteria: opportunities to respond, pacing, error correction, and reinforcement. At the end of each scenario, participants identified the instructional problem and provided ideas for correcting it. During the fourth step, participants viewed two video clips of previous IAs delivering the ERI program. Participants used their integrity checklist and evaluated the IA’s instructional performance. Session 2 ended with the presentation and practice of the fluency-building
activity. Participants were asked to read and practice the ERI lesson found in their folders and get ready to present to the group at the following training session.

Training Session 3. This session focused on assessment procedures and presentation of ERI lesson activities by the participants. Although the experimenter aimed to have all participants demonstrate certain ERI activities in front of the group, time limitations did not permit it. First, the procedures for administering the ERI placement test and interpreting the assessment results were described. Three student cases were presented and participants were asked to determine the students’ lesson entry point to the program. The first example was modeled by the experimenter, the second example was conducted by the experimenter and the group, and the last case was performed independently by the participants. Immediate feedback was provided by the way of praise or immediate error correction was underscored. The next step in session 3 was the presentation and practice of two major DIBELS assessments: the phoneme segmentation fluency and the nonsense word fluency. Although the IAs involved in this research investigation were not going to administer the DIBELS subtests later on, it was considered important to present the assessment skills, which ERI-treatment students would be required to acquire during the supplemental intervention. Finally, some of the participants were selected randomly to present one activity from the assigned ERI lesson. At the end of each presentation, the rest of the group members were asked to evaluate his/her instructional performance using their treatment integrity checklist. Positive and corrective feedback was given.
**Figure 3.1** Experimental conditions followed for investigating the responsiveness to intervention of at-risk students in Years 1 and 2
Experimental Conditions

Figure 3.1 gives an overview of the experimental conditions followed for both years of this longitudinal project. Students that had received treatment in Year 1 were assigned to one of the following experimental conditions: (a) ERI- Treatment, or (b) ERI-Comparison. Students that had received no treatment in Year 1 were assigned to the third experimental condition, the Comparison group. After assigning the 61 target students in the three experimental conditions, students were given the pretest measures.

Pretest. Three subtests from the WJ-III Tests of Achievement and five subtests from CTOPP standardized assessment were administered. These subtests were described in detail previously in this chapter. The purpose of the pretest was to identify the current phonological awareness, alphabetical principle, and word reading skill knowledge of participants. Since neither randomization nor Year 2’s pretest measures could be used for assigning students into the levels of the independent variable, in order to account for any previous learning experiences, a covariate was created and incorporated in the data analysis. This covariate measured any learning experiences students did or did not acquire during the time between the end of Year 1’s treatment and the beginning of Year 2’s treatment.

Placement Test. Twenty-three students from the ERI-Treatment group were administered the ERI placement test in order to identify the lesson entry point, in which they would be receiving intervention. The ERI placement tests were administered by the IAs. Once the ERI placement tests were completed, the experimenter obtained the results and assigned the target students to their respective instructional groups. Table 3.8 presents the instructional groups assigned to each IA in each school. According to the
placement test outcomes, 4 ERI-Treatment students received intervention starting from lesson 1, 10 students were placed on lesson 43, 5 students on Lesson 61, and 4 students on Lesson 73.

<table>
<thead>
<tr>
<th>School</th>
<th>Entry 1 (Lesson 1)a</th>
<th>Entry 2: (Lesson 43)</th>
<th>Entry 3: (Lesson 61)</th>
<th>Entry 4: (Lesson 73)</th>
<th>Entry 5: (Lesson 97)</th>
</tr>
</thead>
<tbody>
<tr>
<td>School 1</td>
<td>1b (Randel)c</td>
<td>2 (Dena)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School 2</td>
<td>4 (Sara)</td>
<td>3 (LeShawn)</td>
<td>2 (Claire)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 (Claire)</td>
<td>2 (Claire)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School 3</td>
<td>4 (LeShawn)</td>
<td>3 (Martha)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Total # of students per entry level | 4 | 10 | 5 | 4 |

*a Lesson number in parenthesis indicates the lesson in which assigned students started receiving the ERI intervention
b Number indicates the frequency of students under each lesson entry point
c Name in parenthesis indicates the IA who delivered the ERI instruction

Table 3.8 Instructional groups within each school and ERI lesson entry point

Intervention Procedures. All instructional groups started receiving supplemental small-group reading intervention on October 9, 2006. Intervention was delivered 4 to 5 times per week for 25 to 30 minutes each session. At the end of each session, IAs were required to document the date, intervention duration and lesson number on their weekly ERI log. The experimenter collected the ERI logs at the end of each week. The purpose of the ERI logs was to monitor the frequency and the consistency of the instruction provided to the ERI-Treatment group. Furthermore, the experimenter was making random school visits at least twice per week for monitoring and evaluating the integrity of the ERI instruction. During the visits, the experimenter was making ten-minute
observations on a randomly selected part of the lesson. While observing the instruction, the experimenter did not interfere unless assistance was asked by the IA. At the end of the observation, the experimenter completed the treatment integrity checklist. Every three weeks the experimenter administered the DIBELS progress monitoring probes of three dependent measures (PSF, ORF, NWF) on all 61 students. Tri-weekly progress monitoring data purported in giving a more in-depth analysis of the growth of each experimental group.

It should be noted that one of the IAs in School 3 was not originally Martha. A different IA was assigned by the principal and trained by the experimenter at the beginning of Year 2’s investigation. However, at the beginning of November, the experimenter was informed that this IA would not be able to implement the intervention consistently throughout the year due to the IA’s commitment to other school responsibilities. As a result, a different IA (i.e., Martha) was assigned and trained in the middle of November to teach the three students.

At the end of the first quarter, informal observations and progress monitoring data showed that Sara’s instructional group in School 2 made noticeable improvement. For this reason, the ERI placement test was re-administered to all four members. Placement results showed that three students needed to be moved to the next lesson entry point (lesson 43), thus forming Group A, while one student remained on the previous entry point (Group B). This student received supplemental instruction three times a week individually and two times per week with Group A. Toward the end of the study, one of the students in Group A moved to another nearby school due to specialized services offered in the new school for his vision needs. It was decided that the student would
continue receiving the intervention until the end of the study. Visual analysis of the performance of the latter student as well as the student in Group B showed that individual instruction was not a confounding factor in the internal validity of the study. That is, progress monitoring data showed that the trend of student performance did not change significantly after receiving individualized instruction or a different IA.

Posttest. The same assessment procedures implemented in the pretest were also followed at the end of the study.

Experimental design

A quasi-experimental design was applied in this research investigation since no randomization was possible. Specifically, a non-equivalent group design was utilized with the following format, whereas \( O_1 = \) pretest, \( O_2 = \) posttest, and \( X = \) supplemental reading intervention (Cook & Campbell, 1979).

\[
\begin{align*}
\text{ERI-Treatment:} & \quad O_1 \quad X \quad O_2 \\
\text{ERI-Comparison:} & \quad O_1 \quad O_2 \\
\text{Comparison:} & \quad O_1 \quad O_2
\end{align*}
\]

Data Analysis

There were two main goals in this data analysis: (a) to describe the data with respect to measures of variability and central tendency, and (b) explain the variation in the data through the development of certain statistical models. A researcher develops statistical models in order to gain an understanding and knowledge about the general population. A statistical model is said to have a good fit when it is able to describe the general target population with the least amount of error (i.e., difference between observed
and predicted values). Note, however, that in order to do this the researcher must have already randomly selected his sample from the target population and/or randomly assigned the sample to different levels of the independent variable. In this particular study, however, such action was not possible. The target sample was a follow-up convenient sample. Therefore, any generalizations about the outcomes can only be made to the sample.

The first goal of the data analysis was achieved by calculating means, standard deviations and effect sizes for the dependent variables. Among the family of effect sizes formulae, the experimenter used the following formula to describe the practical significance of the results:

\[ d = \frac{Mean \ gain \ score \ difference}{s_{pooled}} \]  \hspace{1cm} (3.1)

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

\[ s_{pooled} = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2 + \ldots + (n_N - 1)s_N^2}{n_1 + n_2 + \ldots + n_N - N}} = \sqrt{\frac{\sum_{i=1}^{N} (n_i - 1)s_i^2}{\sum_{i=1}^{N} (n_i - 1)}} \]  \hspace{1cm} (3.2)

Conversely, when the sample size of the two groups was equal the pooled standard deviation used was the following (Dunst, Hamby, & Trivette, 2004):

\[ s_{pooled} = \sqrt{\frac{(n-1)s_1^2 + (n-1)s_2^2 + \ldots + (n-1)s_N^2}{n_1 + n_2 + \ldots + n_N - N}} = \sqrt{\frac{\sum_{i=1}^{N} s_i^2}{N}} \]  \hspace{1cm} (3.3)

Despite the risk taken in defining operationally terms in power analysis, Cohen suggested that effects sizes could be interpreted as “small” (d=0.2), “medium” (d=0.5), and “large”
(d=0.8) (Cohen, 1988). This scale will be used for interpreting the effect sizes in this study.

The second goal of this data analysis was achieved by building general linear models (GLM) (e.g., regression, and repeated measures mixed-effects models). The following two sections, analysis of primary dependent measures, and analysis of secondary dependent measures, give a more thorough overview of these statistical models.

*Analysis of Primary Dependent Measures*

A number of GLM regression models were built in order to examine the amount of change among the three groups (i.e., ERI Treatment, ERI Comparison, and Comparison) as well as the relationship between the variance explained in the dependent measure and group membership and language status. For this purpose, the SPSS ANCOVA statistical technique was used to build a regression model that included one response variable, two categorical predictors (i.e., group membership, and ELL), interactions between predictors, and a covariate.

Prior to moving to the testing of regression models, there were a number of assumptions that had to be examined in order to conclude that the models were valid. These assumptions were:

1. Residual normality. The residuals for each response variable were plotted on a histogram. It was found that residuals resembled observations from a normal distribution (M=0).
2. Homogeneity of error variance. A normal probability plot was designed and it was found that residuals were plotted close to the diagonal line. Also, residuals were plotted against predicted values. The points were scattered randomly around a horizontal line.

3. No multicollinearity. Predictors were correlated with each other and non-significant negligible associations ($r = -0.084$) were evident. Predictors were also correlated with the covariate. No perfect collinearity was found.

4. No autocorrelation of residuals.

5. No measurement error. Dependent variables were measured using instruments with high internal-consistency and/or test-retest reliability (e.g., $r = 0.78$).

The only assumption that could not be met was the representativeness of sample. As noted before, randomization was not an option in this study and therefore no definite conclusions can be made about the independence of observations. A full regression model was built which included two predictors, one covariate, and one-, two-, and three-way interactions. The model included the following components:

The regression model that was built had the following format:

$$Y' = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_1X_2 + b_5 X_1X_3 + b_6 X_2X_3 + b_7 X_1X_2X_3 + \epsilon \quad (3.4)$$

Where:

- $Y'$ is the response variable
- $b_0$ is the intercept
- $b_1...b_7$ are regression coefficients
$X_1$ is group membership

$X_2$ is ELL status

$X_3$ is the summer break covariate

$X_1 \times X_2$ is the interaction between group membership and ELL status

$X_2 \times X_3$ is the interaction between ELL status and summer break

$X_1 \times X_2 \times X_3$ is a three-way interaction between group membership, ELL status, and summer break

$\epsilon$ is residuals, which are assumed to be normally distributed and have a constant variance

The coding of the main predictors was as follows: “Group membership” had values ranged from 1 through 3: 1=Comparison, 2=ERI-Comparison and 3=ERI-Treatment group. The “ELL status” variable was dichotomous: 0=Non ELLs and 1=ELLs

The specific models that were constructed were the following:

Model 1. Effects of group participation and language status in the amount of variance explained in the Phonological Awareness Composite gain scores

$$PACS_i = b_0 + b_1 (\text{Comparison})_i + b_2 (\text{ERI Comparison})_i + b_3 (\text{Non ELL})_i$$

$$+ b_4 (\text{Comparison})_i (\text{Non ELL})_i + b_5 (\text{ERI Comparison})_i (\text{Non ELL})_i + \epsilon_i$$ (3.5)

Model 2. Effects of group participation and language status in the amount of variance explained in the Rapid Naming Composite gain scores

$$RNCS_i = b_0 + b_1 (\text{Comparison})_i + b_2 (\text{ERI Comparison})_i + b_3 (\text{Non ELL})_i$$

$$+ b_4 (\text{Comparison})_i (\text{Non ELL})_i + b_5 (\text{ERI Comparison})_i (\text{Non ELL})_i + \epsilon_i$$ (3.6)
Model 3: Effects of group participation and language status in the amount of variance explained in the Letter-Word Identification (LWID) gain scores

\[ LWID_i = b_0 + b_1 (Comparison)_i + b_2 (ERI Comparison)_i + b_3 (Non ELL)_i + b_4 (Summer Break_{LWID})_i + b_5 (Comparison)_i (Non ELL)_i + b_6 (ERI Comparison)_i (Non ELL)_i + b_7 (Comparison)_i (Summer Break_{LWID})_i + b_8 (ERI Comparison)_i (Summer Break_{LWID})_i + b_9 (Comparison)_i (Non ELL)_i (Summer Break_{LWID})_i + b_{10} (Comparison)_i (Non ELL)_i (Summer Break_{LWID})_i + b_{11} (ERI Comparison)_i (Non ELL)_i (Summer Break_{LWID})_i + \epsilon_i \] (3.7)

Model 4: Effects of group participation and language status in the amount of variance explained in the Word Attack (WA) gain scores

\[ WA_i = b_0 + b_1 (Comparison)_i + b_2 (ERI Comparison)_i + b_3 (Non ELL)_i + b_4 (Summer Break_{WA})_i + b_5 (Comparison)_i (Non ELL)_i + b_6 (ERI Comparison)_i (Non ELL)_i + b_7 (Comparison)_i (Summer Break_{WA})_i + b_8 (ERI Comparison)_i (Summer Break_{WA})_i + b_9 (Comparison)_i (Non ELL)_i (Summer Break_{WA})_i + b_{10} (Comparison)_i (Non ELL)_i (Summer Break_{WA})_i + b_{11} (ERI Comparison)_i (Non ELL)_i (Summer Break_{WA})_i + \epsilon_i \] (3.8)

Model 5: Effects of group participation and language status in the amount of variance explained in the Passage Comprehension (PC) gain scores

\[ PC_i = b_0 + b_1 (Comparison)_i + b_2 (ERI Comparison)_i + b_3 (Non ELL)_i + b_4 (Comparison)_i (Non ELL)_i + b_5 (ERI Comparison)_i (Non ELL)_i + \epsilon_i \] (3.9)

In addition to each full regression model, simple linear regression analyses were conducted that isolated only the group participation variable. The purpose of targeting only this variable was to examine the amount of variance explained in each of the dependent measures above by participating in the treatment during this year. For this reason, the group participation variable was coded differently from the one used in the
full regression models. The coding of the group participation variable was dichotomous: 0=No-treatment and 1=Treatment 2007 group. The data were analyzed using the SPSS linear regression technique.

These linear regression analyses had the following format:

\[ Y_i' = b_0 + b_1 X_{ii} + \varepsilon_i \]  \hspace{1cm} (3.10)

Furthermore, a number of contrasts were developed in order to answer research questions about differences in change scores among groups. To this end, a set of mean comparisons among groups was made. Two predictor variables, group membership and ELL were coded as such that they needed to sum up to zero. For instance, the following steps were taken to answer the research question “Based on the amount of improvement on PC is the change (\(\Delta\)-delta) score different between ERI-Treatment and ERI-Comparison groups?”

1. Define the positive and negative parts of the contrast:

   \(\Delta\) score = (ERI-Treatment) - (ERI Comparison)

   A positive (+) \(\Delta\) score would indicate that the ERI-Treatment had higher mean performance than the ERI-Comparison. A negative (-) \(\Delta\) score would show that the ERI-Comparison had a higher group mean.

2. Define the variables in the statistical software to be compared:

   “Trtgroup” vs. “trtgroup* ESL”

3. Code these variables so that their sum adds to zero.
Analysis of Secondary Dependent Measures

A repeated measures mixed-effects model was built to investigate the effects of group membership on students’ growth of learning (i.e., rate of improvement) as measured by continuous data collected every three weeks over the course of this study (Kleinbaum, Kupper, Muller, & Nizam, 1998). The repeated measures model is a linear mixed model that belongs in the family of general linear models (GLM) (e.g., ANOVA, ANCOVA, regression). GLM models require a continuous dependent variable, which is assumed to have a normal error distribution, and a continuous and/or categorical independent variable.

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). In the social sciences, this analysis is known as hierarchical linear modeling (Raudenbush & Bryk, 2002; Gersten et al., 2005; Gunn et al., 2005). Repeated measures mixed-effects models are suitable for longitudinal studies and the primary focus of this research study was to follow up students that had been part of an experimental study the previous year.

This statistical model has repeated measures because each observation unit (i.e., student) was measured at 8 different time points. Each time point was approximately evenly spaced across tri-weekly intervals. It was expected that the 8 responses on each student were correlated with each other due to individual effects that persist from one time point to another. Such repeated correlated measures necessitated a statistical analysis that accounted for such correlation of observations.
Consequently, a mixed-effects model was utilized to examine the individual and
group growth over the course of the study on three response variables: Phoneme
segmentation fluency, nonsense word fluency, and oral reading fluency. The data were
analyzed with SPSS MIXED (SPSS, n.d.). Another flexible statistical program suitable
for fitting multilevel models with more detail is SAS PROC MIXED (see Singer, 1998).

For this study, the mixed-effects model examined a two-level analysis: (a) Level 1
included repeated assessments nested within individuals, and (b) Level 2 individuals
nested within experimental condition. Level 1 included random factors such as individual
student’s slope, and individual student intercept. Designating these variables as random
factors at level 1, the experimenter assumed their coefficients varied randomly across
level 2. Simply stated, the experimenter assumed that each student progressed at a
different rate over the course of the study. Level 2 entailed fixed factors, which were the
main variables of interest (e.g., group membership and time effect). Such fixed factors
are categorical variables where all possible category values are measured. For instance, in
this study, the group effect variable was composed of three categories: ERI-Treatment
group, ERI-Comparison, and Comparison groups, which were coded as “0,” “1,” and “2,”
respectively. The latter group served as the baseline group, whereby its slope was
compared to the slopes of the other two groups. Fixed factors are different with varying
intercepts for each group (Garson, n.d.). The regression slope is the same for each group
when the interaction between group and time is found to be statistically non-significant.

The repeated measures mixed-effects model can be represented by two sets of
equations, one that models within-subject assessment sessions, and one that models
students within groups. Level-1 linear regression equation represents the trajectory of each student as a function of time

$$Y_{ij} = \beta_{0j} + \beta_{1j}(\text{Time})_{ij} + r_{ij}, \quad (3.11)$$

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., $r_{ij} \sim N(0, \sigma^2)$.

Based on the data of this study, the subscript $i$ represents the assessment session that ranged from 1 through 8. The subscript $j$ refers to the individual student, which ranged from 1 through 61.

Level-2 linear regression model is composed of two equations that represent the students nested in groups. Specifically, the level-2 equations represent the between-subject intercept ($\beta_{0j}$) and slope ($\beta_{1j}$). With these equations the experimenter aimed at investigating how the intercept and slope were changing for each student when nested within his/her group.

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{Group}_j = 0) + \gamma_{02}(\text{Group}_j = 1) + u_{0j}, \quad (3.12)$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}(\text{Group}_j = 0) + \gamma_{12}(\text{Group}_j = 1) + u_{1j} \quad (3.13)$$

where
\( \gamma_{00} \) is the average of level-1 intercepts, \( \beta_{0j} \) for individuals with a level-2 predictor value of 0.

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

\( \gamma_{02} \) is the average difference (slope) in level-1 intercepts, \( \beta_{0j} \), for individuals in the ERI-Comparison group.

\( \gamma_{10} \) is the average of level-1 slopes, \( \beta_{1j} \), for individuals with a level-2 predictor value of 0.

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

\( \gamma_{12} \) is the average difference (slope) in level-1 slopes, \( \beta_{1j} \), for individuals in the ERI-Comparison 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.

\( (Group_j = 0) \) is the ERI-Treatment group, where 1 is individual \( j \) is in this group and 0 otherwise.

\( (Group_j = 1) \) is the ERI-Comparison group, where 1 is individual \( j \) in this group and 0 otherwise.

Substituting Equations 3.12 and 3.13 into the 3.14 and rearranging the terms, the final equation obtained, including both random and fixed effects, is the following:

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

(3.14)

In the Equation 3.14, the first set of brackets represents six fixed factors: the intercept (\( \gamma_{00} \)), the group effect for the ERI-Treatment students [\( \gamma_{01}(Group_j = 0) \)] and the ERI Comparisons [\( \gamma_{02}(Group_j = 1) \)], the time effect [\( \gamma_{10}(Time)_{ij} \)], and the interaction
of group by time for ERI-Treatment students \( \gamma_{11}(Group_j = 0)(Time)_j \) and ERI
Comparisons \( \gamma_{12}(Group_j = 1)(Time)_j \). No specific effects must be included for the
Comparison group since this group served as the baseline group. Treating one of the three
groups as the baseline allows the researcher to make between-group comparisons.

Group effect refers to the fixed effects of group participation (i.e., ERI-Treatment,
ERI-Comparison, and Comparison groups) on student outcomes. Time effect pertains to
the average slope for Comparison group over time, and group by time interaction fixed
effects refer to the rate of change of ERI-Treatment’s or ERI-Comparison’s group slope
compared to the Comparison group as time progresses. The second set of brackets
includes three random factors: the student effect \( u_{0j} \), the interaction effects between the
\( j \)th student and time \( u_{ij}(Time)_j \), and the residuals \( r_j \). All random effects were
assumed to have a normal distribution with a mean of zero and certain constant variance.

As noted previously, repeated measures analyses were performed separately on
three outcome variables. Therefore, three repeated measures mixed-effects models were
run to investigate the group growth of students on each dependent variable.

Model 1. Effects of fixed and random factors on student growth on PSF

\[
PSF_{ij} = \left[ \gamma_{00} + \gamma_{01}(Group_j = 0) + \gamma_{02}(Group_j = 1) + \gamma_{10}(Time)_j \\
+ \gamma_{11}(Group_j = 0)(Time)_j + \gamma_{12}(Group_j = 1)(Time)_j \right] + \left[ u_{0j} + u_{ij}(Time)_j + r_j \right]
\]

where, \( u_{0j} \sim N(0, 68.25) \), \( u_{ij}(Time)_j \sim N(0, 0.008) \), \( r_j \sim N(0, 50.04) \)

Model 2. Effects of fixed and random factors on student growth on NWF
\[ NWF_{ij} = \left[ \gamma_{00} + \gamma_{01}(\text{Group}_j = 0) + \gamma_{02}(\text{Group}_j = 1) + \gamma_{10}(\text{Time})_{ij} + \gamma_{11}(\text{Time})_{ij}^2 + \gamma_{12}(\text{Group}_j = 0)(\text{Time})_{ij} + \gamma_{13}(\text{Group}_j = 1)(\text{Time})_{ij} \right] (3.16) + \left[ u_{0j} + u_{1j}(\text{Time})_{ij} + r_{ij} \right]. \]

where, \( u_{0j} \sim N(0, 296.50), u_{ij}(\text{Time})_{ij} \sim N(0, 3.90), r_{ij} \sim N(0, 78.09) \)

Model 3. Effects of fixed and random factors on student growth on ORF

\[ ORF_{ij} = \left[ \gamma_{00} + \gamma_{01}(\text{Group}_j = 0) + \gamma_{02}(\text{Group}_j = 1) + \gamma_{10}(\text{Time})_{ij} + \gamma_{11}(\text{Time})_{ij}^2 + \gamma_{12}(\text{Group}_j = 0)(\text{Time})_{ij} + \gamma_{13}(\text{Group}_j = 1)(\text{Time})_{ij} \right] (3.17) + \left[ u_{0j} + u_{1j}(\text{Time})_{ij} + r_{ij} \right]. \]

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

Measurement of Social Validity

When conducting school-based interventions, it is imperative to assess the social significance of intervention goals, the social acceptability of intervention procedures, and the social importance of intervention outcomes (Lane & Beebe-Frankenberger, 2004). Pre- and post-acceptability forms were administered to respective consumers (i.e., instructional assistants) to assess the degree of their acceptance to the goals and procedures of this reading project. A social acceptability instrument was adapted from the Treatment Evaluation Inventory-Short Form (TEI-SF) developed by Kelley, Heffer, Gresham, and Elliott (1989). These researchers modified Kazdin’s Treatment Evaluation Inventory (TEI) by producing a shorter form. The revised form, the Treatment Evaluation Inventory-Short Form, was tested through three experiments and Kelly et al. found that
the internal consistency reliability was high. Its coefficient alpha estimate was 0.85 indicating that the instrument was internally consistent and valid.

Both pre and post acceptability forms included the 9 items from the TEI-SF. The items were on a 5-point Likert scale, with 1 equaling strongly disagree and 5 equaling strongly agree. All 9 items measured consumers’ satisfaction to the goals, procedures, and future treatment outcomes. Participants’ scores could range from 9 to 45, with higher scores representing greater acceptance of the treatment. According to Kelley and her colleagues a total TEI-SF score of 27 would show a moderate acceptability of treatment.

The pre-acceptability form was given at the end of the training (i.e., end of September) and the post-acceptability form was administered during the first week of May. The first form also included three additional items, for a total of 12. These three questionnaire items measured participants’ satisfaction to the 6-hour training conducted prior to the beginning of the study (Appendix S). The post-acceptability form included 10 items, 9 items from the TEI-SF and one additional item, which measured participants’ intention to recommend this program to others in the future. The 10-item checklist was assessed on the 5-point Likert scale as previously (Appendix T).

At the end of the study, student opinions were assessed through an interview format. The instrument tool used was an adaptation from the Children’s Social Validity Interview (CSVI; Lane, & Beebe-Frankenberger, 2004). Questionnaire items included 6 items on a 3-point ordinal scale of measurement (“not much,” “a little,” “a lot”), 4 questions on a nominal scale (“Yes” or “No”) and one open-ended question. The
interview items measured students’ acceptability to the intervention procedures and degree to which they reportedly use the newly acquired reading skills (Appendix U).
CHAPTER 4

RESULTS

This chapter presents the outcomes of the study in four sections: (a) analysis of the primary dependent measures, (b) analysis of the secondary dependent measures, (c) descriptive statistics of the integrity of instruction across the six IAs, and (d) responses of the consumers (i.e., IAs and ERI-Treatment students) on social validity questionnaires.

Analysis of Primary Dependent Variables

This section presents the analysis of five pre- and posttest outcome measures: Phonological Awareness Composite, Rapid Naming Composite, Letter-Word Identification, Word Attack, and Passage Comprehension. The analysis had three foci: (a) to examine whether the change score ($\Delta$) was different among certain pairs of experimental groups based on the amount of improvement evident on the five measures, (b) to determine the relationship between variance explained in gain scores and group membership and language status, and (c) to investigate if the change score ($\Delta$) was different between ELL and Non-ELL students in ERI-Treatment and ERI-Comparison groups.
Comparisons of Experimental Groups Based on the Amount of Improvement

Tables 4.1 and 4.2 present contrast coefficients, pooled standard deviations, and effect sizes for two major composites of the CTOPP test and three standardized subtests of the WJ-III. Contrast coefficients provide a comparison measure of two groups based on the outcome variable. They answer a research hypothesis (i.e., “is there a difference between Group A and Group ?”). Results are presented for each dependent measure separately.

Phonological Awareness Composite (PAC). Based on the gain scores obtained on the PAC a set of contrasts were run in order to examine mean differences between experimental groups. Results showed that the ERI-Treatment group gained on average 10.08 and 8.12 points more than the ERI-Comparison and Comparison groups, respectively. Effect sizes were found to be large ($d=1.42$, $d=1.05$). Additionally, the Comparison group gained on average 1.96 points more than the ERI-Comparison group. The magnitude of this difference, however, was found to be small ($d=0.24$).

Rapid Naming Composite (RNC). Results from this CTOPP composite revealed that the ERI-Treatment group gained on average 0.75 points more than the ERI-Comparison group. The effect size of this difference was negligible ($d=0.07$). On the other hand, the Comparison group on average gained 3.23 points more than the ERI-Treatment group. The magnitude of this difference was small ($d=0.35$). Additionally, the Comparison group gained on average 3.98 points more than the ERI-Comparison; however, the effect size was small ($d=0.41$).
**Phonological Awareness Composite**

<table>
<thead>
<tr>
<th>Contrast</th>
<th>Contrast Coefficient</th>
<th>SDp</th>
<th>Effect size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERI-Treatment and ERI-Comparison groups?</td>
<td>10.08</td>
<td>7.12</td>
<td>1.42</td>
</tr>
<tr>
<td>ERI-Treatment and Comparison groups?</td>
<td>8.12</td>
<td>7.74</td>
<td>1.05</td>
</tr>
<tr>
<td>Comparison and ERI-Comparison groups?</td>
<td>1.96</td>
<td>8.29</td>
<td>0.24</td>
</tr>
</tbody>
</table>

**Rapid Naming Composite**

<table>
<thead>
<tr>
<th>Contrast</th>
<th>Contrast Coefficient</th>
<th>SDp</th>
<th>Effect size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERI-Treatment and ERI-Comparison groups?</td>
<td>0.75</td>
<td>10.02</td>
<td>0.07</td>
</tr>
<tr>
<td>ERI-Treatment and Comparison groups?</td>
<td>-3.23</td>
<td>9.21</td>
<td>-0.35</td>
</tr>
<tr>
<td>Comparison and ERI-Comparison groups?</td>
<td>3.98</td>
<td>9.80</td>
<td>0.41</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 4.1 Contrast coefficients, pooled standard deviations, and effect sizes for CTOPP Phonological Awareness and Rapid Naming composite gain scores*

*Letter-Word Identification (LWID).* Results from this subtest revealed that the ERI-Treatment group gained on average 1.15 and 4.05 points more than the ERI-Comparison and Comparison groups, respectively. The effect size of the first difference was small (d=0.25) while the magnitude of the difference between ERI Treatment and Comparison was large (d=0.95). Additionally, the ERI-Comparison group gained on average 2.89 points more than the Comparison; this difference produced a medium effect size (d=0.67) (see Table 4.2).

*Word Attack (WA).* Results from the WA subtest showed that the ERI-Comparison group gained on average 1.90 points more than the ERI-Treatment group. The effect size of this difference was medium (d=0.64). On the other hand, ERI-
Treatment group gained on average 0.77 points more than the Comparison. The magnitude of this difference was small (d=0.29). The ERI-Comparison group gained on average 2.68 points more than the Comparison group; the effect size was large (d=0.89).

*Passage Comprehension (PC).* Results from this WJ-III subtest showed that the ERI-Comparison group gained on average 1.33 points more than the ERI-Treatment group. The effect size of this difference was small (d=0.29). Similarly, the Comparison group on average gained 1.17 points more than the ERI-Treatment group. The magnitude of this difference was also small (d=0.28). Additionally, the ERI-Comparison group gained on average 0.16 points more than the Comparison; however, the effect size was negligible (d=0.04).

<table>
<thead>
<tr>
<th>Contrast (Is change score different between…)</th>
<th>Contrast Coefficient</th>
<th>SDp</th>
<th>Effect size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Letter-Word Identification</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ERI-Treatment and ERI-Comparison groups?</td>
<td>1.15</td>
<td>4.65</td>
<td>0.25</td>
</tr>
<tr>
<td>ERI-Treatment and Comparison groups?</td>
<td>4.05</td>
<td>4.26</td>
<td>0.95</td>
</tr>
<tr>
<td>Comparison and ERI-Comparison groups?</td>
<td>-2.89</td>
<td>4.34</td>
<td>-0.67</td>
</tr>
<tr>
<td><strong>Word Attack</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ERI-Treatment and ERI-Comparison groups?</td>
<td>-1.90</td>
<td>2.98</td>
<td>-0.64</td>
</tr>
<tr>
<td>ERI-Treatment and Comparison groups?</td>
<td>0.77</td>
<td>2.67</td>
<td>0.29</td>
</tr>
<tr>
<td>Comparison and ERI-Comparison groups?</td>
<td>-2.68</td>
<td>3.00</td>
<td>-0.89</td>
</tr>
<tr>
<td><strong>Passage Comprehension</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ERI-Treatment and ERI-Comparison groups?</td>
<td>-1.33</td>
<td>4.66</td>
<td>-0.29</td>
</tr>
<tr>
<td>ERI-Treatment and Comparison groups?</td>
<td>-1.17</td>
<td>4.25</td>
<td>-0.28</td>
</tr>
<tr>
<td>Comparison and ERI-Comparison groups?</td>
<td>-0.16</td>
<td>4.13</td>
<td>-0.04</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 4.2* Contrast coefficients, pooled standard deviations, and effect sizes for WJ-III Letter-Word Identification, Word Attack, and Passage Comprehension gain scores
Relationship between variance explained in gain scores and group membership and language status

The relationship between amount of variance explained in gain scores and predictors was analyzed in two ways: (a) developing full regression models that included two main predictors (group membership, ELL status), one covariate, and one-, two-, and three-way interactions of these predictors, and (b) developing simple linear regression models that included only one predictor, participating in the treatment 2007 or not. Results are presented for each dependent measure with both types of regression analyses (full models and simple linear models).

Phonological Awareness Composite (PAC)

The first full model investigated the effects of group participation and language status in the amount of variance explained in the PAC gain scores. Descriptive data on the PAC (see Table 4.3) showed that the group with the highest mean gain score (M=12.04) was the ERI-Treatment (N=23) with 7.61 standard deviations. The Comparison (N=23) and the ERI-Comparison (N=15) groups obtained gain score means of 3.65 and 4.00 with 8.88 and 7.54 standard deviations, respectively.

<table>
<thead>
<tr>
<th>Main predictors</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group participation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comparison</td>
<td>23</td>
<td>3.65</td>
<td>8.88</td>
</tr>
<tr>
<td>ERI-Comparison</td>
<td>15</td>
<td>4.00</td>
<td>7.54</td>
</tr>
<tr>
<td>ERI-Treatment</td>
<td>23</td>
<td>12.04</td>
<td>7.61</td>
</tr>
<tr>
<td>ELL status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-ELL</td>
<td>44</td>
<td>5.50</td>
<td>7.40</td>
</tr>
<tr>
<td>ELLs</td>
<td>17</td>
<td>10.53</td>
<td>11.50</td>
</tr>
</tbody>
</table>

Table 4.3 Means and standard deviations on CTOPP Phonological Awareness Composite gain scores across group participation and language status
Results in Table 4.4 show that the full regression model had a coefficient of determination ($R^2$) 0.31, indicating that 31% of variance in the PAC gain scores could be accounted for by the specified predictors of this model. The betas for the Comparison and ERI-Comparison groups were -8.91 and -15.51, meaning that the ELL Comparison and ELL ERI-Comparison groups improved by 8.91 and 15.51 points, respectively, less on average than the ELL ERI-Treatment group. The beta for Non-ELLs was -8.15, indicating that Non-ELL students in the ERI-Treatment group improved by 8.15 points less on average than ELL ERI-Treatment students. Interaction between ERI-Comparison and Non-ELL students showed a beta of 10.85, meaning that Non-ELL ERI-Comparison students improved by 10.85 points more on average than ELL ERI-Comparison students.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Beta Coefficients</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>17.71</td>
<td>2.92</td>
</tr>
<tr>
<td>Group participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELL Comparison</td>
<td>-8.91</td>
<td>4.53</td>
</tr>
<tr>
<td>ELL ERI-Comparison</td>
<td>-15.51</td>
<td>4.53</td>
</tr>
<tr>
<td>ELL status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-ELL ERI-Treatment</td>
<td>-8.15</td>
<td>3.50</td>
</tr>
<tr>
<td>Comparison x Non-ELLS</td>
<td>1.57</td>
<td>5.25</td>
</tr>
<tr>
<td>ERI-Comparison x Non-ELLS</td>
<td>10.85</td>
<td>5.50</td>
</tr>
</tbody>
</table>

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

*Table 4.4 Unstandardized beta coefficients and standard errors of the effects of group participation and language status on CTOPP Phonological Awareness Composite gain scores*
The first simple linear model examined the effects of only one predictor, the treatment participation, in the amount of variance explained in the PAC gain scores. Results showed that the $R^2$ was 0.20, indicating that 20% of variance explained in the PAC gain score could be explained by receiving treatment this year. The unstandardized beta coefficient for the treatment group was 8.25, meaning that students, who had received the ERI treatment this year, gained 8.25 points more on the PAC than the rest of the comparison students.

*Rapid Naming Composite (RNC)*

The second full model examined the effects of group participation and language status in the amount of variance explained in the RNC gain scores. Table 4.5 presents the means and standard deviations of students based on group participation as well as language status. The group with the highest mean gain score (M=5.09) was the Comparison (N=23) with 9.37 standard deviations. The ERI-Comparison (N=14) and the ERI-Treatment (N=21) groups obtained mean gain scores of 4.07 and 3.14 with 11.01 and 9.22 standard deviations, respectively.

<table>
<thead>
<tr>
<th>Main predictors</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group participation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comparison</td>
<td>23</td>
<td>5.09</td>
<td>9.37</td>
</tr>
<tr>
<td>ERI-Comparison</td>
<td>14</td>
<td>4.07</td>
<td>11.01</td>
</tr>
<tr>
<td>ERI-Treatment</td>
<td>21</td>
<td>3.14</td>
<td>9.22</td>
</tr>
<tr>
<td><strong>ELL status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-ELL</td>
<td>43</td>
<td>3.70</td>
<td>9.72</td>
</tr>
<tr>
<td>ELLs</td>
<td>15</td>
<td>5.40</td>
<td>9.43</td>
</tr>
</tbody>
</table>

*Table 4.5* Means and standard deviations on CTOPP Rapid Naming Composite gain scores across group participation and language status
Results from Table 4.6 show that the full regression model had a coefficient of determination ($R^2$) 0.07, indicating that 7% of variance in the RNC gain scores could be accounted for by the specified predictors of this model. The betas for the Comparison and ERI-Comparison groups were 5.40 and -5.40, meaning that the ELL Comparison students improved on average by 5.40 points more than the ELL ERI Treatment group. Conversely, the ELL ERI-Comparison group improved by -5.40 fewer points on average than the ELL ERI-Treatment group. The beta for Non-ELLS was -2.96, indicating that Non-ELL students in the ERI-Treatment group improved by 2.96 fewer points on average than the ELL ERI-Treatment group. Interaction between ELL ERI-Comparison and Non-ELL ERI Comparison students showed a beta of 9.29, meaning that Non-ELL ERI-Comparison students improved by 9.29 points more on average than did ELL ERI-Comparison students.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Beta</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>5.40</td>
<td>4.31</td>
</tr>
<tr>
<td>Group participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELL Comparison</td>
<td>5.40</td>
<td>6.10</td>
</tr>
<tr>
<td>ELL ERI-Comparison</td>
<td>-5.40</td>
<td>6.10</td>
</tr>
<tr>
<td>ELL status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-ELL ERI-Treatment</td>
<td>-2.96</td>
<td>4.94</td>
</tr>
<tr>
<td>Comparison x Non-ELLLs</td>
<td>-4.33</td>
<td>6.94</td>
</tr>
<tr>
<td>ERI-Comparison x Non-ELLLs</td>
<td>9.29</td>
<td>7.37</td>
</tr>
</tbody>
</table>

$R^2 = 0.07$ (Adjusted $R^2 = -0.01$)

*Table 4.6 Unstandardized beta coefficients and standard errors of the effects of group participation and language status on CTOPP Rapid Naming Composite gain scores*
The second simple linear model examined the effects of only one predictor, the treatment participation, in the amount of variance explained in the RNC gain scores. Results showed that the $R^2$ was 0.006, indicating that 0.6% of variance explained in the RNC gain score could be explained by receiving treatment this year. The unstandardized beta coefficient for the treatment group was -1.56, meaning that students, who did not receive the ERI treatment this year (i.e., ERI-Comparison and Comparison groups), gained 1.56 points more on the RNC than the ERI-Treatment students.

Letter-Word Identification (LWID)

The third full regression model examined the effects of group participation and language status in the amount of variance explained in the LWID gain scores. Descriptive data on the LWID (see Table 4.7) showed that the group with the highest mean gain score (M=10.35) was the ERI-Treatment (N=23) with 4.48 standard deviations. The Comparison (N=23) and the ERI-Comparison (N=15) groups obtained mean gain scores of 10.27 and 8.19 with 4.77 and 3.94 standard deviations, respectively.

<table>
<thead>
<tr>
<th>Main predictors</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group participation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comparison</td>
<td>23</td>
<td>8.19</td>
<td>3.94</td>
</tr>
<tr>
<td>ERI-Comparison</td>
<td>15</td>
<td>10.27</td>
<td>4.77</td>
</tr>
<tr>
<td>ERI-Treatment</td>
<td>23</td>
<td>10.35</td>
<td>4.48</td>
</tr>
<tr>
<td>ELL status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-ELL</td>
<td>44</td>
<td>9.30</td>
<td>4.75</td>
</tr>
<tr>
<td>ELLs</td>
<td>17</td>
<td>10.25</td>
<td>3.41</td>
</tr>
</tbody>
</table>

Table 4.7 Means and standard deviations on WJ-III Letter-Word Identification gain scores across group participation and language status
After adjusting for levels of forgetting, results from Table 4.8 show that the full regression model had a coefficient of determination ($R^2$) 0.24, indicating that 24% of variance in the LWID gain scores could be accounted for by the specified predictors of this model. The betas for the Comparison and ERI-Comparison groups were -4.47 and 0.63, meaning that ELL ERI-Comparison group improved on average by 0.63 points more than the ELL ERI-Treatment group. On the other hand, the ELL Comparison students improved by 4.47 fewer points on the LWID than the ELL ERI-Treatment group. The regression coefficient for summer break was -0.08, showing that the ERI-Treatment group improved by 0.08 fewer points than in summer break. The beta for Non-ELLS was 0.70, indicating that Non-ELL ERI-Treatment students improved by 0.70 points more on average than ELL ERI-Treatment ones. Interaction between Non-ELL ERI-Comparison and ELL ERI-Comparison students showed a beta of -3.58, meaning that Non-ELL ERI-Comparison students improved on average by 3.58 fewer points than ELL ERI-Comparisons.
### Table 4.8

Unstandardized beta coefficients and standard errors of the effects of group participation and language status on WJ-III Letter-Word Identification gain scores

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Beta</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>11.22</td>
<td>2.20</td>
</tr>
<tr>
<td>Group participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELL Comparison</td>
<td>-4.47</td>
<td>4.22</td>
</tr>
<tr>
<td>ELL ERI-Comparison</td>
<td>0.63</td>
<td>3.23</td>
</tr>
<tr>
<td>ELL status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-ELL ERI-Treatment</td>
<td>0.70</td>
<td>2.61</td>
</tr>
<tr>
<td>Covariate: Summer break-LW</td>
<td>-0.08</td>
<td>0.58</td>
</tr>
<tr>
<td>ERI-Comparison x Non-ELLS</td>
<td>-3.58</td>
<td>3.79</td>
</tr>
</tbody>
</table>

R² = 0.24 (Adjusted R²= 0.06)

The third simple linear model examined the effects of only one predictor, the treatment participation, in the amount of variance explained in the LWID gain scores. Results showed that the R² was 0.09, indicating that 9% of variance explained in the LWID gain score could be explained by receiving treatment this year. The unstandardized beta coefficient for the treatment group was 2.87, meaning that students, who had received the ERI treatment this year, gained 2.87 points more on the LWID than the rest of the comparison students.

**Word Attack (WA)**

The fourth full model examined the effects of group participation and language status in the amount of variance explained in the WA gain scores. Descriptive data on
the WA from Table 4.9 showed that the group with the highest gain score mean (M=7.87) was the ERI-Comparison (N=15) with 3.31 standard deviations. The Comparison (N=23) and the ERI-Treatment (N=23) groups obtained gain score means of 4.76 and 5.26 with 2.68 and 2.61 standard deviations, respectively.

<table>
<thead>
<tr>
<th>Main predictors</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group participation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comparison</td>
<td>23</td>
<td>4.76</td>
<td>2.68</td>
</tr>
<tr>
<td>ERI-Comparison</td>
<td>15</td>
<td>7.87</td>
<td>3.31</td>
</tr>
<tr>
<td>ERI-Treatment</td>
<td>23</td>
<td>5.26</td>
<td>2.61</td>
</tr>
<tr>
<td><strong>ELL status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-ELL</td>
<td>44</td>
<td>5.70</td>
<td>3.09</td>
</tr>
<tr>
<td>ELLs</td>
<td>17</td>
<td>5.88</td>
<td>3.03</td>
</tr>
</tbody>
</table>

Table 4.9 Means and standard deviations on WJ-III Word Attack gain scores across group participation and language status

After adjusting for levels of forgetting, results from Table 4.10 show that the full regression model had a coefficient of determination (R²) 0.24, indicating that 24% of variance in the WA gain scores could be accounted for by the specified predictors of this model. The betas for the Comparison and ERI-Comparison groups were -0.91 and 2.33, indicating that the ELL Comparison students improved by 0.91 fewer points than did the ELL ERI-Treatment students. On the other hand, the ELL ERI-Comparisons improved on average by 2.33 points more than their ELL ERI-Treatment peers. The regression coefficient for summer break was 0.15, showing that the ERI-Treatment group gained 0.15 points more during school year than in summer break. The beta for
Non ELLs was -0.14, indicating that Non-ELL ERI-Treatment students improved by 0.14 fewer points on average than ELL ERI-Treatment ones. Interaction between ELL ERI-Comparison and Non-ELL ERI-Comparison students showed a beta of –0.84, meaning that Non-ELL ERI-Comparison students improved on average by 0.84 fewer points than ELL ERI-Comparison students.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Beta Coefficients</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>5.61</td>
<td>1.15</td>
</tr>
<tr>
<td>Group participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELL Comparison</td>
<td>-0.91</td>
<td>2.64</td>
</tr>
<tr>
<td>ELL ERI-Comparison</td>
<td>2.33</td>
<td>1.82</td>
</tr>
<tr>
<td>ELL status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-ELL ERI-Treatment</td>
<td>-0.14</td>
<td>1.48</td>
</tr>
<tr>
<td>Covariate: Summer break -WA</td>
<td>0.15</td>
<td>1.08</td>
</tr>
<tr>
<td>Comparison x Non-ELLs</td>
<td>0.28</td>
<td>2.92</td>
</tr>
<tr>
<td>ERI-Comparison x Non-ELLs</td>
<td>-0.84</td>
<td>2.31</td>
</tr>
</tbody>
</table>

\[ R^2 = 0.24 \text{ (Adjusted } R^2 = 0.06) \]

*Table 4.10* Unstandardized beta coefficients and standard errors of the effects of group participation and language status on WJ-III Word Attack gain scores

The fourth simple linear model examined the effects of only one predictor, the treatment participation, in the amount of variance explained in the WA gain scores. Results showed that the \( R^2 \) was 0.06, indicating that 6% of variance explained in the WA gain score could be explained by receiving treatment this year. The unstandardized beta coefficient for the treatment group was -1.17, meaning that students, who did not
receive the ERI treatment this year, gained 1.17 points more on the WA than the ERI-Treatment students.

Passage Comprehension (PC)

The fifth full model examined the effects of group participation and language status in the amount of variance explained in the PC gain scores. Descriptive data on the PC (see Table 4.11) showed that the group with the highest gain score mean (M=8.96) was the Comparison (N=23) with 4.02 standard deviations. The ERI-Comparison (N=15) and the ERI-Treatment (N=23) groups obtained gain score means of 8.27 and 7.22 with 4.51 and 4.72 standard deviations, respectively.

<table>
<thead>
<tr>
<th>Main predictors</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group participation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comparison</td>
<td>23</td>
<td>8.96</td>
<td>4.02</td>
</tr>
<tr>
<td>ERI-Comparison</td>
<td>15</td>
<td>8.27</td>
<td>4.51</td>
</tr>
<tr>
<td>ERI-Treatment</td>
<td>23</td>
<td>7.22</td>
<td>4.72</td>
</tr>
<tr>
<td>ELL status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-ELL</td>
<td>44</td>
<td>8.89</td>
<td>4.41</td>
</tr>
<tr>
<td>ELLs</td>
<td>17</td>
<td>6.18</td>
<td>3.89</td>
</tr>
</tbody>
</table>

Table 4.11 Means and standard deviations on WJ-III Passage Comprehension gain scores across group participation and language status

Results from Table 4.12 show that the full regression model had a coefficient of determination ($R^2$) 0.11, indicating that 11% of variance in the PC gain scores could be accounted for by the specified predictors of this model. The betas for the Comparison and ERI-Comparison groups were 0.57 and 1.97, meaning that ELL Comparison and
ELL ERI-Comparison groups improved on average by 0.57 and 1.97 points more than the ELL ERI-Treatment group. The beta for Non-ELLs was 2.57, indicating that Non-ELL ERI-Treatment students improved by 2.57 points more on average than ELL ERI-Treatment ones. Interaction between ERI-Comparison and Non-ELL students showed a beta of -1.27, meaning that Non-ELL ERI-Comparison students improved on average by 1.27 fewer points than the ELL ERI-Comparison students.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Beta Coefficients</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>5.42</td>
<td>1.64</td>
</tr>
<tr>
<td>Group participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELL Comparison</td>
<td>0.57</td>
<td>2.54</td>
</tr>
<tr>
<td>ELL ERI-Comparison</td>
<td>1.97</td>
<td>2.54</td>
</tr>
<tr>
<td>ELL status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-ELL ERI-Treatment</td>
<td>2.57</td>
<td>1.97</td>
</tr>
<tr>
<td>Comparison x Non-ELLs</td>
<td>1.20</td>
<td>2.95</td>
</tr>
<tr>
<td>ERI-Comparison x Non-ELLs</td>
<td>-1.27</td>
<td>3.09</td>
</tr>
</tbody>
</table>

\[ R^2 = 0.11 \text{ (Adjusted } R^2 = 0.02) \]

*Table 4.12* Unstandardized beta coefficients and standard errors of the effects of group participation and language status on WJ-III Passage Comprehension gain scores

The fifth simple linear model examined the effects of only one predictor, the treatment participation, in the amount of variance explained in the PC gain scores. Results showed that the \( R^2 \) was 0.02, indicating that 2% of variance explained in the PC gain score could be explained by receiving treatment this year. The unstandardized beta
Coefficient for the treatment group was -1.46, meaning that students, who did not receive the ERI treatment this year, gained 1.46 points more on the PC than the ERI-Treatment students.

Comparisons between ELLs and Non ELLs Based on the Amount of Improvement

Further contrasts were conducted within the ERI-Treatment and ERI-Comparison groups in order to examine whether the change score (Δ-delta) was different between ELL and Non-ELL students in each experimental group (see Tables 4.13 and 4.14).

Phonological Awareness Composite (PAC). Results from this CTOPP subtest showed that within the ERI-Comparison group, the Non-ELL students on average gained 2.70 points more than the ELL students. The effect size was found to be small large (d=0.35). Conversely, within the ERI-Treatment group, ELL students gained on average 8.15 points more than their Non-ELL peers. The magnitude of their standardized difference was large (d=1.21) (see Table 4.13).

Rapid Naming Composite (RNC). Results from this subtest indicated that within the ERI-Comparison group, the Non-ELL students on average gained 6.33 points more than the ELL students. The effect size was found to be medium (d=0.58). Conversely, within the ERI-Treatment group, ELL students gained on average 2.96 points more than their Non-ELL peers. The magnitude of their standardized difference was small (d=0.32).
<table>
<thead>
<tr>
<th></th>
<th>Contrast Coefficient</th>
<th>SDp</th>
<th>Effect size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phonological Awareness Composite</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-ELL and ELLs within the ERI-Comparison group?</td>
<td>2.70</td>
<td>7.70</td>
<td>0.35</td>
</tr>
<tr>
<td>Non-ELLs and ELLs within the ERI-Treatment group?</td>
<td>-8.15</td>
<td>6.73</td>
<td>-1.21</td>
</tr>
<tr>
<td><strong>Rapid Naming Composite</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-ELL and ELLs within the ERI-Comparison group?</td>
<td>6.33</td>
<td>10.98</td>
<td>0.58</td>
</tr>
<tr>
<td>Non-ELLs and ELLs within the ERI-Treatment group?</td>
<td>-2.96</td>
<td>9.36</td>
<td>-0.32</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 4.13* Contrast coefficients, pooled standard deviations, and effect sizes for CTOPP Phonological Awareness and Rapid Naming composite gain scores for ELL and Non-ELL students in the ERI-Treatment and ERI-Comparison groups

*Letter Word Identification (LWID).* Table 4.14 presents the results for the WJ-III subtests. Results showed that within the ERI-Comparison group, the ELLs on average gained 2.88 points more than their Non-ELL peers. The effect size was found to be medium (d=0.60). Conversely, within the ERI-Treatment group, Non-ELLs gained on average 0.70 points more than the ELLs. The magnitude of their standardized difference was small (d=0.15).
**Word Attack (WA).** Results from this subtest indicated that within the ERI-Comparison group, the ELLs on average gained 0.90 points more than the Non-ELLs. The effect size was found to be small (d=0.29). Similarly, within the ERI-Treatment group, ELLs gained on average 0.14 points more than their Non-ELL peers. The magnitude of their standardized difference was found to be negligible (d=0.05).

**Passage Comprehension (PC).** Results from this subtest indicated that within the ERI-Comparison group, the Non-ELLs on average gained 1.30 points more than the ELLs. The effect size was found to be small (d=0.28). On contrast, within the ERI-Treatment group, Non-ELLs gained on average 2.57 points more than their ELL peers. The magnitude of their standardized difference was medium (d=0.55).

<table>
<thead>
<tr>
<th></th>
<th>Contrast Coefficient</th>
<th>SDp</th>
<th>Effect size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Letter-Word Identification</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-ELL and ELLs within the ERI-Comparison group</td>
<td>-2.88</td>
<td>4.85</td>
<td>-0.60</td>
</tr>
<tr>
<td>Non-ELLs and ELLs within the ERI-Treatment group?</td>
<td>0.70</td>
<td>4.53</td>
<td>0.15</td>
</tr>
<tr>
<td><strong>Word Attack</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-ELL and ELLs within the ERI-Comparison group</td>
<td>-0.99</td>
<td>3.43</td>
<td>-0.29</td>
</tr>
<tr>
<td>Non-ELLs and ELLs within the ERI-Treatment group?</td>
<td>-0.14</td>
<td>2.67</td>
<td>-0.05</td>
</tr>
<tr>
<td><strong>Passage Comprehension</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-ELL and ELLs within the ERI-Comparison group</td>
<td>1.30</td>
<td>4.63</td>
<td>0.28</td>
</tr>
<tr>
<td>Non-ELLs and ELLs within the ERI-Treatment group?</td>
<td>2.57</td>
<td>4.68</td>
<td>0.55</td>
</tr>
</tbody>
</table>

*Table 4.14* Contrast coefficients, pooled standard deviations, and effect sizes for WJ-III Letter-Word Identification, Word Attack, and Passage Comprehension gain scores for ELL and Non-ELL students in the ERI-Treatment and ERI-Comparison groups
Analysis of Secondary Dependent Variables

With the secondary data set collected on a tri-weekly basis, the experimenter purported in examining the growth of learning of target students in the ERI-Treatment group, ERI-Comparison group, and Comparison group. To this end, as described in Chapter 3, a repeated measures mixed-effects model was developed, which included fixed and random factors. The effects of these factors were examined on three response variables: phoneme segmentation fluency, nonsense word fluency, and oral reading fluency. The presentation of results begins with a descriptive analysis and then continues with results from the repeated measures mixed-effects model for each outcome variable. It should be noted that no random selection or random assignment was possible in this study and thus, t-statistics and p-values are not reported.

**DIBELS Phoneme Segmentation Fluency (PSF)**

Tables 4.15, 4.16, and Figure 4.1 present a descriptive analysis of the performance of students on the DIBELS PSF over the eight time-assessment intervals. Three weeks after intervention was implemented, the experimenter administered the first progress monitoring probe (T₁). Results showed that students in the ERI-Treatment group had a group mean of 32.04 correct segment sounds per minute with 14.16 standard deviations. ERI-Comparison and Comparison students showed higher group mean performance and lower between-group variability in their scores. Specifically, group mean scores of 36.47 and 39.78 with standard deviations of 12.35 and 7.15 were obtained for ERI-Comparison and Comparison students, respectively. By the end of T₈, ERI-Treatment students minimized the group mean difference with the Comparison
group from 7.74 correct sounds per minute to 1 sound. Likewise, group mean
difference between ERI-Treatment and ERI-Comparison group was reduced from 4.43
correct segment sounds to 1.83. Change in group mean differences over time is also
depicted in Figure 4.1.

<table>
<thead>
<tr>
<th>Time Assessment Intervals</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERI-Treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>32.04</td>
<td>27.91</td>
<td>36.61</td>
<td>37.04</td>
<td>44.91</td>
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<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>ERI-Comparison</td>
<td></td>
<td></td>
<td></td>
<td></td>
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Table 4.15 Means and standard deviations on DIBELS Phoneme Segmentation Fluency for all groups from T1 through T8

Table 4.16 provides a more detailed descriptive analysis of the sample based on the students’ language status and experimental condition. Within-group comparisons show that the mean difference on the PSF subtest between Non ELLs and ELLs in the ERI-Treatment group was reduced from T1 to T8. Specifically, the mean
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*Table 4.16* Means and standard deviations on DIBELS Phoneme Segmentation Fluency for ELL and Non-ELL students from T₁ through T₈
difference was reduced from 8.89 correct sounds to 5.52 sounds. On the other hand, the variability difference increased from 5.12 standard deviations to 9.50. At T₁ ELL ERI-Comparison students had a 6.8-mean difference compared to their Non-ELL peers. However, by the end of the study, Non-ELL ERI-Treatment students obtained a higher mean performance (M=53.90), which led to a mean difference of 1.1 sounds compared to their ELL counterparts. Similar patterns of responding were evident for the subgroups in the Comparison group. At T₁ ELL Comparison students had a 0.53-mean difference with their Non-ELL peers. However, by the end of the study, Non-ELL Comparison students obtained a higher mean performance (M=53.00), which led to a mean difference of 1.4 sounds with their ELL peers.

Figure 4.1 Group mean performance on the DIBELS Phoneme Segmentation Fluency of all groups over time
Next, Table 4.17 and Figure 4.2 present the results from the repeated measures mixed-effects model on student growth on DIBELS PSF. The first statistical model investigated the effects of fixed and random factors on student growth on PSF from T₁ through T₈. Based on the statistical analysis results (see Table 4.17), the following model was obtained:

\[
PSF_{ij} = \left[ 35.15 - 9.44 (ERI \text{ Treatment})_j - 2.44 (ERI \text{ Comparison})_j \\
+ 2.22 (Time)_j + 0.94 (ERI \text{ Treatment})_j (Time)_j \\
+ 0.78 (ERI \text{ Comparison})_j (Time)_j \right] + \left[ 68.25 + 0.008_{ij} (Time)_j + 50.04 \right]
\]

The above equation and Table 4.17 shows that on average the intercept of ERI-Treatment students was by 9.44 segment sounds lower than the intercept of Comparison students (i.e., 35.15). The average difference of intercept for the ERI-Comparison group was by 2.44 segment sounds lower than the Comparison group. These results suggest that at time T₁ (i.e., the beginning of the supplemental intervention period) the Comparison group had a higher average than both ERI groups.

Group by time interaction fixed effects pertained to the growth rate of each experimental group (i.e., ERI-Comparison, ERI-Treatment) compared to the average slope of the Comparison group over time. Specifically, the growth rate for ERI-Treatment students from T₁ through T₈ on the PSF subtest was on average 0.94 segment sounds per time interval higher than the average rate of Comparison group (2.22). Likewise, the growth of ERI-Comparison group improved on average by 0.78 segment sounds per period more than the rate of the Comparison group. This suggests that the ERI-Treatment group had the highest slope (3.16) of learning on PSF subtest compared to the other two groups (see Figure 4.2).
Examining the random effects, a wide variation was evident among students in initial ability, but there was little variation in the growth rate of students within groups over time. The student random effect estimate of 68.25 indicates that students differed from the mean initial score within their groups by an average of $8.26 (=\sqrt{68.25})$ segment sounds. For the student by time (interaction) random effect, it was found that the variance of student growth rate within groups was 0.008, suggesting that the growth rate of students within each group was on average homogeneous. The estimated variance of the residual, 50.04, suggests that after accounting for group effects and individual random effects, the model is in error by approximately 7.07 segment sounds on average.

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*Table 4.17* Mixed-effects model estimates on DIBELS Phoneme Segmentation Fluency
Tables 4.18, 4.19, and Figure 4.3 present the means and standard deviations of the performance of target students on the DIBELS NWF over the eight time-assessment intervals. Three weeks after intervention was implemented, results showed that on T\textsubscript{1} students in the ERI-Treatment group had a group mean of 24.26 correct letter sounds per minute with 13.26 standard deviations. ERI-Comparison and Comparison students showed higher group mean performance and greater between-group variability in their scores. Specifically, group mean scores of 43.40 and 39.83 with standard deviations of 20.17 and 18.55 were obtained for ERI-Comparison and Comparison students, respectively. By the end of T\textsubscript{8}, the group mean difference between ERI-Treatment and
ERI-Comparison students increased from 19.14 letter sounds to 22.23 letter sounds. Also, the group mean difference between the ERI-Treatment and Comparison groups increased from 15.57 to 18.83 letter sounds. Change in group mean differences over time is also depicted in Figure 4.3.

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Table 4.18 Means and standard deviations on DIBELS Nonsense Word Fluency for all groups from T₁ through T₈

Table 4.19 shows the means and standard deviations of the student performance on the NWF according to students’ language status and experimental condition. Within-
group comparisons show that the mean difference on this subtest between Non ELLs and ELLs in the ERI-Treatment group increased from T1 to T8, with the first group showing higher mean performance, but their variability difference was reduced. Specifically, the group mean difference increased from 9.20 correct letter sounds to 10.74 sounds. On the other hand, the variability difference decreased from 2.18 standard deviations to 0.52, suggesting that the spread of the scores was similar for the two subgroups. However, different patterns of responding were evident with the ERI-Comparison and Comparison groups with the ELL subgroups in both cases presenting higher mean performance at the end of the study. Within-group comparisons between Non ELLs and ELLs in the ERI-Comparison group showed that the latter subgroup presented a higher mean score (M=51.40) on T1 compared to their Non-ELL peers. The initial mean difference of 12 points was reduced to 3.2 points by T8. Conversely, within-group comparisons between Non ELLs and ELLs for the Comparison group showed that on T1 both subgroups had approximately a similar group mean (mean difference was only 0.03). But, on T8 ELLs presented a higher average group performance (M=76.60), which led to a mean difference of 12.43 letter sounds over their Non-ELL peers.
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*Table 4.19* Means and standard deviations on DIBELS Nonsense Word Fluency for ELL and Non-ELL groups from T₁ through T₈.
Next, Table 4.20 and Figure 4.4 present the results from the repeated measures mixed-effects model on NWF. The second statistical model investigated the effects of fixed and random factors on student growth on NWF from T1 through T8. Hence, based on the statistical analysis results (see Table 4.20), the following model was obtained:

$$ NWF_{ij} = \left[ 41.54 - 19.29 (ERI \text{ Treatment})_j + 0.23 (ERI \text{ Comparison})_j ight. \\
+ 3.73 (Time)_{ij} - 0.22 (ERI \text{ Treatment})_j (Time)_{ij} \\
- 0.11 (ERI \text{ Comparison})_j (Time)_{ij} + \left[ 296.50 + 3.90 (Time)_{ij} + 78.09 \right] $$

The above equation and Table 4.20 show that on average the intercept of ERI-Treatment students was 19.29 letter sounds lower than the intercept of Comparison students (i.e., 41.54). The average difference of intercept for the ERI-Comparison group was 0.23 letter-sounds greater than the Comparison group. These results suggest
that at T1 of intervention, the ERI-Comparison group had a higher average intercept (i.e., 41.77) than the Comparison group. Furthermore, as expected, the Comparison group (i.e., 41.54) had a higher average intercept than the ERI Treatment (i.e., 22.25).

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 ERI-Treatment students from T1 through T8 on the NWF was on average 0.22 letter sounds per time interval lower than the average rate of the Comparison group (3.73). Likewise, the growth of ERI-Comparison group was lower on average by 0.11 letter sounds per period than the rate of the Comparison group. This suggests that the Comparison group had the highest slope (3.73) of learning on NWF subtest compared to the other two groups (see Figure 4.4).

Examining the random effects, a wide variation was noted among students in initial ability, but there was little variation in the growth rate of students within groups over time. The student random effect estimate of 296.50 indicates that students differed from the mean initial score within their groups by an average of 17.21 letter sounds. For the student by time random effect, it was found that the variance of student growth rate within groups was 3.90, suggesting that the growth rate of students within each group was on average homogeneous. The estimated variance of the residual, 78.09, suggests that after accounting for group fixed effects and individual random effects, the model is in error by approximately 8.83 letter sounds on average.
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*Table 4.20 Mixed-effects model estimates for DIBELS Nonsense Word Fluency*

*Figure 4.4 Growth curves for Nonsense Word Fluency for all groups over time*
DIBELS Oral Reading Fluency (ORF)

Tables 4.21, 4.22, and Figure 4.5 present the means and standard deviations of student performance on the DIBELS ORF subtest over the eight time intervals. On T₁, results showed that students in the ERI-Treatment group had a group mean of 9.63 correct words per minute with 5.88 standard deviations. The ERI-Comparison and Comparison students showed higher group mean performance and between-group variability in their scores. Particularly, group mean scores of 25.27 and 25.13 with standard deviations of 18.32 and 17.82 were obtained for ERI-Comparison and Comparison students, respectively. By the end of T₈, the group mean difference between ERI-Treatment and Comparison groups increased from 15.50 to 22.69 points, with the latter group showing higher performance. Additionally, group mean difference between ERI-Treatment and ERI-Comparison group increased from 15.64 to 22.78. Change in group mean differences over time is also depicted in Figure 4.5.

Table 4.22 shows the means and standard deviations of the student performance on the DIBELS ORF according to students’ language status and experimental condition. Within-group comparisons show that the mean difference on this subtest between Non ELLs and ELLs in the ERI-Treatment group decreased from T₁ to T₈, with the first group showing higher mean performance, but their variability difference increased. Specifically, the group mean difference between Non ELLs and ELLs in the treatment condition decreased from 6.56 to 5.63 points on the ORF subtest. On the other hand, the variability difference increased from 2.16 to 4.78 standard deviations. However, different patterns of responding are evident for the ERI-Comparison and Comparison groups, in which the ELL subgroups in both cases presented higher mean performances.
at the beginning and end of the study. Within-group comparisons between Non-ELL and ELL students in the ERI-Comparison showed that the latter group presented a higher mean score (M=26.60) on T₁ compared to their Non-ELL counterparts. The initial mean difference of 2 points increased to 6.1 points by T₈ with the ELL students showing higher group mean (M=44.80) on the ORF.

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</tbody>
</table>

*Table 4.21* Means and standard deviations on DIBELS Oral Reading Fluency for all groups from T₁ through T₈.
<table>
<thead>
<tr>
<th>Group participation</th>
<th>Non-ELLs</th>
<th>ELL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T₁</td>
<td>T₂</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ERI-Treatment</td>
<td>11.36</td>
<td>10.07</td>
</tr>
<tr>
<td>M</td>
<td>4.80</td>
<td>6.80</td>
</tr>
<tr>
<td>SD</td>
<td>5.65</td>
<td>3.10</td>
</tr>
<tr>
<td>N</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>ERI-Comparison</td>
<td>24.60</td>
<td>21.20</td>
</tr>
<tr>
<td>M</td>
<td>26.60</td>
<td>29.00</td>
</tr>
<tr>
<td>SD</td>
<td>17.40</td>
<td>19.13</td>
</tr>
<tr>
<td>N</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Comparison</td>
<td>24.28</td>
<td>20.17</td>
</tr>
<tr>
<td>M</td>
<td>28.20</td>
<td>33.20</td>
</tr>
<tr>
<td>SD</td>
<td>16.41</td>
<td>11.58</td>
</tr>
<tr>
<td>N</td>
<td>18</td>
<td>18</td>
</tr>
</tbody>
</table>

*Table 4.22* Means and standard deviations on DIBELS Oral Reading Fluency for ELL and Non-ELL groups from T₁ through T₈
Similarly, within-group comparisons between Non ELLs and ELLs for the Comparison group showed that on T₁ the latter group had a higher group mean score (M=28.20) than the Non-ELL students (M=24.28). On T₈ ELL students increased the group mean difference from 3.92 to 16.60 points.

**Figure 4.5** Group mean performance on DIBELS Oral Reading Fluency of all groups over time

Next, Table 4.23 and Figure 4.6 present the results from the repeated measures mixed-effects model on DIBELS ORF. The third statistical model investigated the effects of fixed and random factors on student growth on ORF from T₁ through T₈. It should be noted that another term for quadratic growth \((Time)²_i\) was added in this analysis in order to adequately model the underlying data. Hence, based on the statistical analysis results (see Table 4.23), the following model was obtained:

\[
\text{ORF}_{ij} = 19.86 - 12.56(\text{ERI Treatment})_j + 0.48(\text{ERI Comparison})_j + 1.76(Time)_{ij} + 0.14(Time)²_{ij} - 1.17(\text{ERI Treatment})_j (Time)_{ij} + 0.30(\text{ERI Comparison})_j (Time)_{ij} + [163.48 + 3.45(Time)_{ij} + 45.97]
\]
The above equation and Table 4.23 show that on average the intercept of ERI-Treatment students was by 12.56 correct words per minute (wpm) lower than the intercept of Comparison students (i.e., 19.86). The average difference of intercept for the ERI-Comparison group was by 0.48 correct wpm higher than the Comparison group. These results suggest that at T₁ of intervention, the ERI-Comparison group had a higher average intercept (i.e., 20.34) than the Comparison group. Furthermore, as expected, the Comparison group had a higher average intercept than the ERI-Treatment (i.e., 7.3).

Group by time 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 ERI-Treatment students from T₁ through T₈ on the ORF was on average by 1.17 correct wpm per assessment interval lower than the average rate of the Comparison group (1.76). On the contrary, the growth of the ERI-Comparison group was on average higher by 0.30 correct wpm per period than the rate of the Comparison group. This suggests that the ERI-Comparison group had the highest slope (2.06) of learning on ORF subtest compared to the other two groups (see Figure 4.6).

Examining the random effects, a wide variation was noted among students in initial ability, but there was little variation in the growth rate of students within groups over time. The student random effect estimate of 163.48 indicates that students differed from the mean initial score within their groups by an average of 12.78 correct wpm. For the student by time random effect, it was found that the variance of student growth rate within groups was 3.45, suggesting that the growth rate of students within each group was on average homogeneous. The estimated variance of the residual, 45.97, suggests
that after accounting for group fixed effects and individual random effects, the model is in error by approximately 6.78 correct wpm on average.

<table>
<thead>
<tr>
<th>Effect</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>19.86</td>
</tr>
<tr>
<td>Grouping Variable</td>
<td></td>
</tr>
<tr>
<td>ERI-Treatment</td>
<td>-12.56</td>
</tr>
<tr>
<td>ERI-Comparison</td>
<td>0.48</td>
</tr>
<tr>
<td>Time</td>
<td>1.76</td>
</tr>
<tr>
<td>Quadratic effect (Time²)</td>
<td>0.14</td>
</tr>
<tr>
<td>Grouping x Time</td>
<td></td>
</tr>
<tr>
<td>ERI-Treatment x Time</td>
<td>-1.17</td>
</tr>
<tr>
<td>ERI-Comparison x Time</td>
<td>0.30</td>
</tr>
<tr>
<td>Random</td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>45.97</td>
</tr>
<tr>
<td>Student</td>
<td>163.48</td>
</tr>
<tr>
<td>Student x Time</td>
<td>3.45</td>
</tr>
</tbody>
</table>

Table 4.23 Mixed-effects model estimates for DIBELS Oral Reading Fluency

Figure 4.6 Growth curves for DIBELS Oral Reading Fluency of all groups over time
Descriptive Instructional Characteristics of Instructional Assistants

This section describes the instructional characteristics of all IAs compared to student gains. Specifically, integrity results of the instruction of each IA, their frequency of instruction and duration of instructional time are presented. As discussed in Chapter 3, integrity was measured on two dimensions: quantitative and qualitative, providing a combined score ranging from 0-27 possible points.

Dena. A total of 20 observations were made during Dena’s instruction in School 1 and showed that her mean integrity score was 24.7 (91%) with a range of 21 to 27. Her trend line showed on average an increase of 0.07 points across instructional sessions (see Figure 4.7). This indicates that the level of her quality of instruction was high and constant over time. It should be pointed out that Dena was the most experienced IA in this study as she had participated in two previous research studies delivering the same treatment protocol.

![Figure 4.7 Dena’s integrity score performance](image)

\[ y = 0.0707x + 23.958 \]
Dena delivered the instruction 80% of the time (64 out of 80 sessions) with a total duration of 1966 minutes (33h, 16min). She worked with two ERI-Treatment students, who showed mean gain scores of 8.5 (range 6 to 11), 5, and 15.5 (range 54 to 65) on the LWID, WA, and PC subtests of the WJ-III respectively. Students also presented a mean increase of 9.5 (range 4 to 15) standard scores on the PAC and a mean increase of 10.5 (range 6 to 15) on the RNC.

Randi. A total of 18 observations were made during Randi’s instruction in School 1 and showed that her mean integrity score was 21.1 (78%) with a range of 11 to 26. As Figure 4.8 depicts, her trend line showed an average increase of 0.28 points across instructional sessions. This indicates that the level of her integrity of instruction was average to high with a decline from the end of January (session 11) until the end of March (session 14). During that period (21 sessions), instruction was delivered inconsistently. That is, Randi was absent 11 times.

![Figure 4.8 Randi’s treatment integrity score performance](image)
Randi delivered the instruction 71% of the time (69 out of 97 sessions) with a total duration of 1977 minutes (33h, 35min). She worked with one ERI-Treatment student, who showed mean gain scores of 9, 5, and 5 on the LWID, WA, and PC subtests of the WJ-III respectively. The student also improved on average by 11 standard scores on the PAC and 6 on the RNC.

*Sara.* A total of 18 observations were made during Sara’s instruction in School 2. Integrity checks showed that her group mean integrity score was 23.8 (80%) with a range of 22.8 to 25.8. Her trend line showed on average a decrease of 0.08 points across instructional sessions. As Figure 4.3 depicts, her integrity of instruction was relatively high during observations 1 through 16 and had a decrease during the last two sessions. Her low integrity performance on the last two sessions decreased her overall integrity trend line.

*Figure 4.9* Sara’s treatment integrity score performance
Sara delivered the instruction across her two groups on an average of 62.3% of the time (53 out of 85 sessions) with a mean duration of 1737 minutes (29h, 36min). It should be noted that Sara’s frequency of instruction was more consistent from October throughout December (75%, 36 out of 48 sessions) compared to her frequency later on (45.9%, 17 out 37 sessions). Her ERI-Treatment students showed mean gain scores of 7.25 (range 3 to 11), 3.5 (range 1 to 9), and 3 (range -2 to 5) on the LWID, WA, and PC subtests of the WJ-III respectively. Students also improved on average by 20.5 standard scores (range 11 to 26) on the PAC and 12 (range -6 to 18) on the RNC.

Claire. A total of 23 observations were made during Claire’s instruction in School 2. Integrity checks showed that her mean integrity score was 23.7 (87.8%) with a range of 22.4 to 23.7 points. Her trend line showed on average an increase of 0.17 points across instructional sessions (see Figure 4.10).

![Figure 4.10 Claire’s treatment integrity score performance](image)

Claire delivered the instruction to all three instructional groups on an average of 73.4% of the time (65 out of 89 sessions) with a mean duration of 1381 minutes (23h,
Her ERI-Treatment students showed mean gain scores of 8.16 (range 3 to 14), 5.83 (range 4 to 8), and 5.5 (range 1 to 12) on the LWID, WA, and PC subtests of the WJ-III respectively. Students also improved on average by 10.5 (range 0 to 23) standard score points on the PAC and 5.5 (range -12 to 15) on the RNC.

**LeShawn.** A total of 22 observations were made during LeShawn’s instruction in School 2 and showed that his mean integrity score was 23.1 (86%) with a range of 13 to 26. His trend line showed an average increase of 0.04 points over time (see Figure 4.11).

He delivered the instruction 80.7% of the time (88 out of 109 sessions) with a total duration of 2754 minutes (46h, 30min). He worked with three ERI-Treatment students, who showed mean gain scores of 13 (range 11 to 17), 5.6 (range 2 to 7), and 7 (range 6 to 8) on the LWID, WA, and PC subtests of the WJ-III, respectively. Students also improved on average by 15 (range 6 to 24) standard scores on the PAC and 2 standard scores (range 0 to 6) on the RNC.

![Graph](image)

*Figure 4.11* LeShawn’s treatment integrity score performance
LeShawn also worked with another instruction group in School 3. A total of 14 observations were made during his instruction and showed that his mean integrity score was 23.4 (87%) with a range of 19 to 26 (see Figure 4.12).

![INTEGRITY OF INSTRUCTION vs. OBSERVATIONAL SESSIONS](image)

**Figure 4.12** LeShawn’s treatment integrity score performance

LeShawn delivered the instruction 82.4% of the time (80 out of 97 sessions) with a total duration of 2417 minutes (40h, 28min). He worked with four ERI-Treatment students, who showed mean gain scores of 13 (range 8 to 19), 5.5 (range 2 to 10), and 8 (range 4 to 12) on the LWID, WA, and PC subtests of the WJ-III, respectively. Students also presented on average an increase of 7.25 (range 0 to 13) standard score points on the PAC and 6.75 (range 0 to 15) on the RNC.

**Martha.** A total of 20 observations were made during Martha’s instruction in School 3. Integrity checks showed that her mean integrity score was 20.86 (77%) with a range of 15 to 25 points. Her trend line showed an average increase of 0.30 points over time (see Figure 4.13). Martha delivered the instruction 67.8% of the time (57 out of 84 sessions) with a total duration of 1507 minutes (25h, 11min). She worked with three
ERI-Treatment students, who showed mean gain scores of 14.3 (range 10 to 18), 6 (range 3 to 10), and 10.6 points (range 6 to 16) on the LWID, WA, and PC subtests of the WJ-III, respectively. Students presented a mean increase of 9.3 (range 4 to 15) and 4 (range 3 to 6) standard score points on the PAC and RNC, respectively.

It should be noted that this IA started working with students at the end of November, after students had already received 15 sessions of intervention by another IA. As it was mentioned in Chapter 3, a different IA was assigned by the principal to work with the three students. However, her school responsibilities could not free her to provide the supplemental intervention to students. During the 15-session period, the previous IA had worked with the students 60% of the time (15 out of 25 sessions) for a total duration of 474 minutes (8h, 30min).

Table 4.24 presents a more detailed picture of the IA’s quality of instruction. In short, the total mean integrity of instruction of all IAs was above average (range 20.86 to 24.7). Dena presented the highest and Martha the lowest level of treatment integrity.
Examining more closely Martha’s instruction, one can notice that there was lack of consistency in implementing two instructional steps: following the scripted lesson, and providing scripted error-correction. On the other hand, Dena was consistent in delivering the treatment protocol with integrity. On average, the only step that she would either miss or not follow precisely was providing reinforcement to students. Her pacing was brisk, managing to implement all activities within the allocated instructional time. Conversely, the rest of the IAs presented lower integrity scores on this step.

<table>
<thead>
<tr>
<th>Treatment integrity steps&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Dena</th>
<th>Randi</th>
<th>Sara&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Claire&lt;sup&gt;b&lt;/sup&gt;</th>
<th>LeShawn&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Martha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Follows script</td>
<td>2.95</td>
<td>2.61</td>
<td>2.81</td>
<td>2.72</td>
<td>2.80</td>
<td>1.50</td>
</tr>
<tr>
<td>2. Models the skill</td>
<td>2.95</td>
<td>2.50</td>
<td>2.83</td>
<td>2.83</td>
<td>2.84</td>
<td>2.43</td>
</tr>
<tr>
<td>3. Provides guided practice</td>
<td>2.70</td>
<td>2.39</td>
<td>2.54</td>
<td>2.58</td>
<td>2.30</td>
<td>2.43</td>
</tr>
<tr>
<td>4. Assesses students individually</td>
<td>3.00</td>
<td>2.33</td>
<td>2.72</td>
<td>2.66</td>
<td>2.49</td>
<td>2.64</td>
</tr>
<tr>
<td>5. Uses manipulatives</td>
<td>2.85</td>
<td>2.83</td>
<td>2.97</td>
<td>2.71</td>
<td>2.71</td>
<td>2.43</td>
</tr>
<tr>
<td>6. Provides immediate feedback</td>
<td>2.75</td>
<td>2.28</td>
<td>2.32</td>
<td>2.65</td>
<td>2.77</td>
<td>2.43</td>
</tr>
<tr>
<td>7. Uses brisk pace</td>
<td>2.90</td>
<td>1.67</td>
<td>2.59</td>
<td>2.34</td>
<td>2.36</td>
<td>2.50</td>
</tr>
<tr>
<td>8. Follows scripted error-correction</td>
<td>2.75</td>
<td>2.33</td>
<td>2.28</td>
<td>2.50</td>
<td>2.67</td>
<td>1.79</td>
</tr>
<tr>
<td>9. Delivers reinforcement</td>
<td>1.85</td>
<td>2.11</td>
<td>2.70</td>
<td>2.65</td>
<td>2.32</td>
<td>2.71</td>
</tr>
<tr>
<td>Total Integrity mean</td>
<td>24.7</td>
<td>21.06</td>
<td>23.77</td>
<td>23.66</td>
<td>23.26</td>
<td>20.86</td>
</tr>
</tbody>
</table>

Integrity mean % | 91% | 78% | 88% | 88% | 86% | 77%

<sup>a</sup> Integrity was measured on a 3-point scale: 0=none, 1=rarely, 2=mostly, and 3=always

<sup>b</sup> Number of instructional groups for Sara, Claire, and LeShawn was 3, 4, and 2, respectively. Therefore, their grand mean treatment integrity scores are presented not only across sessions but also across groups.

Table 4.24 Mean analysis of treatment integrity steps per IA
Consumer Responses on the Measurement of Social Validity

Measuring consumer satisfaction in applied research is significant for assessing the magnitude and future implications of behavior change (Wolf, 1978; Cooper, Heron, & Heward, 2007). Despite the fact that opinions expressed by direct consumers of a behavior change program are difficult to be assessed for their validity, it is important that applied researchers assess the social relevance of their interventions. Direct consumers of this behavior change study were the six IAs and the 23 ERI-Treatment students. Below is a description of their responses to social validity assessment.

**Instructional Assistants (IAs)**

Social acceptability forms were administered to all IAs at the beginning and end of the study. Both forms included items taken from a 9-item clinical research instrument developed by Kelly, Heffer, Gresham, and Elliott (1989). All 9 items were incorporated in the pre- and post-acceptability forms. The items were on a 5-point Likert scale with 1 equaling strongly disagree and 5 equaling strongly agree. Participants’ scores could range from 9 to 45, with higher scores representing greater acceptance of the treatment. According to Kelley and her colleagues a total TEI-SF score of 27 would show a moderate acceptability of treatment.

All IAs completed and returned the pre-acceptability instrument; however, all but one IA returned the post-acceptability instrument. Table 4.25 presents pre and post acceptability results for six IAs. Three out of five IAs improved their acceptability score by at least 5.71 percent points while two others presented 2 to 5 percent points decrease. Nonetheless, decrease in their acceptability score did not substantially lower their overall acceptability rate. All IAs except one presented above average
acceptability of the intervention goals, procedures, and outcomes. On the other hand, Martha, the only non-respondent of the post acceptability form, showed a low acceptance rate toward this intervention on the pre-acceptability form. As it is evident from Table 4.24, Martha presented the lowest mean percentage of treatment integrity 77%.

<table>
<thead>
<tr>
<th></th>
<th>Pre-acceptability score</th>
<th>Post-acceptability score</th>
<th>Percentage of change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dena</td>
<td>27</td>
<td>33</td>
<td>+22.22%</td>
</tr>
<tr>
<td>Randi</td>
<td>31</td>
<td>33</td>
<td>+6.45%</td>
</tr>
<tr>
<td>Sara</td>
<td>34</td>
<td>33</td>
<td>-2.94%</td>
</tr>
<tr>
<td>Claire</td>
<td>35</td>
<td>37</td>
<td>+5.71%</td>
</tr>
<tr>
<td>LeShawn</td>
<td>39</td>
<td>37</td>
<td>-5.12%</td>
</tr>
<tr>
<td>Martha</td>
<td>18</td>
<td>----</td>
<td>----</td>
</tr>
</tbody>
</table>

\(a\) Pre-acceptability form was administered on September 19, 2006  
\(b\) Post-acceptability form was administered between April 2, 2007 to May 9, 2007

Table 4.25 Pre- and post-acceptability scores of IAs

A positive, moderate association was found \((r = .457)\) between pre-acceptability scores and total mean integrity scores. Two possible factors that may have influenced the size of the coefficient were the very small sample size \((n = 6)\) and the shape of the two distributions. Both distributions were negatively skewed but their kurtosis differed. A leptokurtic \((\text{kurtosis }= 1.063)\) distribution and a platykurtic distribution \((\text{kurtosis }= -1.710)\) were found for the pre-acceptability scores and the mean integrity scores, respectively.
Analyzing further the responses of the six IAs on the pre- and post-acceptability forms, Table 4.26 and Figures 4.14 and 4.15 provide an overview of the variability and central tendency of their responding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Pre-Acceptability (n = 6)</th>
<th>Post-Acceptability (n = 5)</th>
<th>% of change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mode</td>
<td>Mean</td>
</tr>
<tr>
<td>1. I find this intervention to be an acceptable way of dealing with students’ reading difficulties.</td>
<td>3.67</td>
<td>3</td>
<td>4.00</td>
</tr>
<tr>
<td>2. I would be willing to use this procedure if I had to improve a student’s reading difficulties.</td>
<td>3.33</td>
<td>3</td>
<td>4.40</td>
</tr>
<tr>
<td>3. I believe that it would be acceptable to use this intervention without students’ consent.</td>
<td>3.83</td>
<td>4</td>
<td>3.60</td>
</tr>
<tr>
<td>4. I like the procedures used in this intervention.</td>
<td>3.17</td>
<td>4</td>
<td>4.20</td>
</tr>
<tr>
<td>5. I believe this intervention is likely to be effective.</td>
<td>3.67</td>
<td>4</td>
<td>4.50</td>
</tr>
<tr>
<td>6. I believe the student will experience discomfort during the intervention.</td>
<td>1.83</td>
<td>1</td>
<td>1.20</td>
</tr>
<tr>
<td>7. I believe this intervention is likely to result in permanent improvement.</td>
<td>3.50</td>
<td>3</td>
<td>4.00</td>
</tr>
<tr>
<td>8. I believe it would be acceptable to use this intervention with students who can not choose interventions for themselves.</td>
<td>4.00</td>
<td>3</td>
<td>4.40</td>
</tr>
<tr>
<td>9. Overall, I have a positive reaction to this intervention.</td>
<td>3.67</td>
<td>4</td>
<td>4.40</td>
</tr>
</tbody>
</table>

*A 5-point Likert scale was used 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree*

Table 4.26 Means and modes for pre- and post-acceptability forms
Specifically, on Table 4.26, participants on average increased their percentage of acceptability rate on eight statements by at least 6.67 percent points. Prior to the start of the study half of the IAs were indecisive in determining whether this supplemental intervention was an acceptable way of dealing with students’ reading difficulties. By the end of the study, 80% (4) of them agreed to strongly agree to the appropriateness of the intervention for targeting students’ learning problems. Likewise, half of them at the beginning of the study were either neutral or disagreed in using the particular intervention for improving students’ reading difficulties. At the end of the study all IAs rated agree to strongly agree that they would be willing to use this intervention with students with reading problems.

Similar responding was obtained on statement 3 at the beginning and end of the study. More than 60% of the IAs agreed to strongly agreed that this intervention could be implemented without asking for students’ consent while two participants either disagreed or were indecisive about it at the end of the study. Next, only half of the IAs agreed to liking the procedures at the beginning of the study while all of them agreed to strongly agreed to it by the end of the study. On statement 5, approximately 67% of IAs agreed to strongly agreed that this intervention was likely to be effective. However, higher levels of positive responding (80%) were obtained for this statement at the end of the study.

The next statement was worded in a negative way. The purpose of including such negatively-stated items in questionnaire designs is to reduce the likelihood of getting a response set, where participants record continuously the same value (Bradburn, Sudman, & Wansink, 2004). Having both positively- and negatively-worded statements
allow the researchers to obtain more reliable answers on their subject matter. As it is evident from Figure 4.14 variability in IA’s responding on statement 6 was reduced by the end of the study. That is, 66.7% of IAs disagreed to strongly disagree that students would experience discomfort during intervention. But, all of them at the end of the study disagreed to strongly disagree with such statement. Furthermore, half of the participants were either indecisive or disagreed that the supplemental intervention would result in students’ permanent improvement. By the end of the study, 80% of them responded agree to strongly agree to it.

Approximately two participants (33.3%) were indecisive as to whether it would have been acceptable to use the intervention with students who could not choose interventions for themselves. Nonetheless, by the end of the study, all participants agreed to strongly agree that it would have acceptable to use such type of intervention for students who could not choose interventions for themselves. Finally, the percentage of IAs who had positive reaction to this intervention increased from 66.7 to 100 by the end of the study (Figure 4.15).
Figure 4.14  Distribution of the IA’s responses across the nine social validity statements
Figure 4.15  Distribution of the IA’s responses across the nine social validity statements

On the post-acceptability form, the IAs were given additional space to provide any thoughts about the intervention. Two IAs gave the following comments “I enjoy using this program as part of the intervention I provide for our first-grade and kindergarten students” (Dena). “I (have) seen a great deal of improvement with the students from my group. I am very pleased with this program” (Sara).
**ERI-Treatment Students**

Twenty-three students were interviewed individually by the experimenter and one graduate assistant. Students were asked a total of 14 questions. Six of the questions were on a 3-point ordinal scale of measurement (1=not much, 2=a little, 3=a lot). Table 4.27 and Figure 4.16 reveal that the majority of the students responded positively to the supplemental small-group intervention. Student mean responses across the six scale-typed questions ranged from 2.78 to 2.96 with 3 being the most frequent value provided by students. Specifically, 91.30% (21) of students liked being in this special tutoring, 82.61% (19) liked spending time with their assigned IA, and all but one student (95.65%) reported that they liked earning prizes and candies. Interestingly, 86.96% (20) of students said that they liked learning about sounds and letters, and reading stories; however, all except one student said that they learned things that would help them become good readers (95.65%).

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>Mean</th>
<th>Responses</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questionnaire Items</td>
<td>(n=23)</td>
<td>Mean</td>
<td>Minimum</td>
</tr>
<tr>
<td>1. Did you like being in this special tutoring?</td>
<td>2.87</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2. Did you like spending time with ___?</td>
<td>2.78</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>3. Did you like earning prizes?</td>
<td>2.96</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4. Did you like learning about sounds and letters?</td>
<td>2.83</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>5. Did you like reading stories with ___?</td>
<td>2.87</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6. Did you learn things that will help you be a good reader?</td>
<td>2.96</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

*a A three-point ordinal scale of measurement was used: 1= Not much, 2= A little, 3= A lot

Table 4.27 Student responses on six social validity items by mean, mode, and dispersion
Next, a set of seven questions measured on a nominal scale of measurement (0=No, 1=Yes) were presented to students. Table 4.28 and Figure 4.17 indicate that students felt that the supplemental intervention was beneficial for them. Student mean responses across the seven dichotomous-typed questions ranged from 0.43 to 1.00 with 1 being the most frequent value given by students. Specifically, all students felt that they learned all their sounds and letters when working with their assigned IA and all used them in their tutoring. According to the group, the majority (82.61%) used the
letters/sounds/words in class, a smaller percentage (60.87%) of students used them at home, and only 43.48% used the letters/sounds/words with other students.

**Figure 4.17** Percentage of student responses on seven social validity questionnaire items

<table>
<thead>
<tr>
<th>Questionnaire Items* (n=23)</th>
<th>Mean</th>
<th>Responses</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Do you feel you learned all your sounds and letters when working with ____?</td>
<td>1.00</td>
<td>n/a</td>
<td>1</td>
</tr>
<tr>
<td>8. Do you use the letters/sounds/words in the tutoring?</td>
<td>1.00</td>
<td>n/a</td>
<td>1</td>
</tr>
<tr>
<td>8a. Do you use the letters/sounds/words in class?</td>
<td>.83</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>8b. Do you use the letters/sounds/words at home?</td>
<td>.61</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>8c. Do you use the letters/sounds/words with other kids?</td>
<td>.43</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>9. Do you feel you learned important things?</td>
<td>1.00</td>
<td>n/a</td>
<td>1</td>
</tr>
<tr>
<td>10. Do you wish you would have worked with ____ for another week?</td>
<td>.91</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

* A three-point ordinal scale of measurement was used: 1= Not much, 2= A little, 3= A lot

**Table 4.28** Student responses on seven social validity items by mean, mode, and dispersion
All students felt that they learned important things in the tutoring. When asked to name two important things they learned, 82.6% of students reported that they learned how to read words, sentences, and books. The next most common response (26%) was that they learned how to write letters and words. Other responses included how to spell words (13%), say sounds (13%), sound out letters (4.3%), use letter tiles to make words (4.3%), name letters (4.3%), learned how to listen to the teacher (8.7%), and how to play games (4.3%). Finally, all but one student (91.3%) wished that they would have worked with their IA for another week.

The interview with each of the students ended with the experimenter asking an open-ended question. The question aimed at encouraging students to give their final thoughts on the supplemental reading intervention. A number of students said that they liked specific tutoring activities such as “fixing teacher’s mistakes,” “telling what the missing letter in a word is,” “playing games with letter cards,” “sounding out words in a story,” “playing board games with reading words and rolling the dice,” “being today’s reader in the group,” and “reading books about Diz the dinosaur.” Others liked the tutoring because they acquired some skills such as writing, spelling, sounding-out words. One student commented that “I learned fun things, like how to read like a big reader. It’s fun to read dizzy words!” Other students liked the program because of their assigned IA. One student said “Ms R. is nice. She never bosses us around. I love getting treats!” Another student commented “I love it because it is fun and I love tutoring. You get prizes because you be good. She is a good teacher and I like it because she is nice.” Others indicated that they liked getting prizes and candies. One student, in particular,
said “It was fun! I like getting candies and pencils so I can write.” And finally, others liked the tutoring because they liked spending time with their group.
CHAPTER 5

DISCUSSION

This study investigated the effectiveness of a supplemental early reading intervention package on the beginning reading skills of 23 ELL and Non-ELL poor responders to Year 1’s intervention (i.e., ERI-Treatment). Additionally, the study examined the growth rates of 15 strong responders to Year 1’s intervention (i.e., ERI Comparison) as well as the growth rates of 23 comparison students, who had also been included in the previous research study (i.e., Comparison). Six instructional assistants (four paraprofessionals and two graduate associates) were provided a six-hour training in delivering the intervention to the 23 ERI-Treatment students located in three urban high-poverty schools. All 61 students in the sample were administered subtests from two major standardized tests (WJ-III and CTOPP) in October and May. The ERI-Treatment students were assigned to instructional groups based upon their placement score. Thus, instructional groups were homogenous according to similar phonemic awareness and alphabetic understanding abilities. Supplemental intervention was delivered 4 to 5 times per week for 20 to 30 minutes each session over a period of 57 to 88 sessions. Furthermore, the progress of the student sample was monitored on a tri-weekly basis on three measures: phoneme segmentation fluency, nonsense word fluency, and oral reading fluency. Integrity of supplemental instruction was monitored
1 to 2 times per week during random visits made by the experimenter. Measures of social validity were taken to evaluate the direct consumers’ social satisfaction about the goals, procedures and outcomes of the treatment. Data were analyzed with regression models, contrasts, and repeated measures mixed-effects modeling.

This chapter discusses the results of the study with respect to the five research questions propounded in Chapter 1. Limitations, implications for practice, and directions for future research are also discussed. The chapter concludes with a summary of the study.

Research Question One

*Based on the amount of improvement (i.e., gain scores) as measured by five standardized reading variables (PAC, RNC, LWID, WA, PC), is the change (Δ-delta) gain score different between: (a) ERI-Treatment and ERI-Comparison groups? (b) ERI-Treatment and Comparison groups? (c) Comparison and ERI-Comparison groups?*

*CTOPP Phonological Awareness Composite*

Results from contrast comparisons on the *Phonological Awareness Composite (PAC)* showed that the amount of improvement of the ERI-Treatment group was higher than the progress shown by each of the other two groups (i.e., ERI-Comparison and Comparison). Reflective of the magnitude of the group differences were the large effect sizes evident (i.e., $d=1.42$ for ERI-Treatment and ERI-Comparison; $d=1.05$ for ERI-Treatment and Comparison). This more than 8-point gain score difference on the PAC measure signifies the effectiveness of explicit secondary intervention provided to
the ERI-Treatment group. This finding is consistent with previous research on early reading intervention demonstrating that explicit, intensive intervention with high emphasis on phonological awareness produces the strongest growth in phonological awareness measures (Foorman et al., 1998; Simmons et al., 2003a; Simmons et al., 2003b; Torgesen et al., 1999). Comparing the amount of improvement of the Comparison group over the ERI-Comparison, we see a less than two-point difference favoring the first group. Nonetheless, the magnitude of this difference is small (d=0.24), indicating that there is basically a more than 85% overlap in the distributions of the two groups. This means that both groups made similar progress on phonological awareness during core classroom instruction. The growth evident by both comparison groups on this measure speaks to the type of core literacy instruction supporting the learning of these groups. The ERI-Comparison group not only had succeeded in moving out of the risk status in kindergarten but also continued in Grade 1 to demonstrate consistent progress on phonological awareness by simply receiving core code-based classroom instruction. This finding resembles those 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.

CTOPP Rapid Naming Composite

Results from the contrast comparisons on the Rapid Naming Composite (RNC) showed minimum gains across all three groups. Specifically, contrasts indicated that the amount of improvement of the ERI-Treatment group over the ERI-Comparison
was less than one-point difference with a negligible effect size (d=0.07). On the other hand, though, the mean gain score obtained by the Comparison group was higher than the ERI-Treatment group and a small size effect was found. Examining the gain score difference between the Comparison and ERI-Comparison groups, we see that the first group showed a 9-point gain greater than the latter one. Nonetheless, the significance of this difference was very small. These results showed that all three groups did not present large gains on the RNC in order to be detectable and clinically significant.

Further analysis of the students’ standardized performance showed that 91% of ERI-Treatment students performed at an average or below average level during pre- and posttesting. During the pretest, 80% of ERI-Comparisons performed at an average or below average level while 73% of them remained at those levels at posttest. Finally, 83% of Comparison students performed at an average or below average level during pretest, while 74% of them remained at these levels at posttest. Of note, the Comparison group, which had been targeted in kindergarten due to its minimal reading deficits in kindergarten, showed that more than half of them were performing at an average or below average level on the rapid naming tasks in Grade 1. According to Wagner, Torgesen, and Rashotte (1999) rapid naming tasks are predictive of reading fluency. Students who perform well on the first tasks are more likely to do well on reading fluency assessments. The small effect sizes of gain score differences for the three groups suggest that students across all three groups showed minimal progress on oral reading fluency. Although oral reading fluency has been found to be the best predictor of overall reading capacity (Fuchs et al., 2001), unfortunately little focus was
placed possibly on oral reading fluency during core classroom instruction across these
three urban school settings.

**WJ-III Letter-Word Identification**

Results from the contrast comparisons on the *Letter-Word Identification (LWID)* measure showed that the amount of improvement made by the ERI-Treatment group was higher than the improvement obtained by each of the other two groups (i.e., ERI-Comparison and Comparison). A small effect size (d=0.25) was detected for the difference between ERI-Treatment and ERI-Comparison group while a large effect size (d=0.95) was evident for the difference between the ERI-Treatment and the Comparison students. It is evident that an additional year of preventative secondary intervention improved the word-identification skills of the ERI-Treatment students. O’Connor (2000) also found that multi-layered explicit intervention helped improve the blending, segmenting and word-recognition skills of kindergarten treatment resisters. Examining for differences between Comparison and ERI-Comparison groups, it was found that the latter group showed higher gains and the magnitude of this difference was medium. In short, the results on LWID denote that the ERI-Treatment group improved its word-recognition skills more than the other two groups. Likewise, the strong responders to kindergarten intervention (i.e., ERI-Comparison group) continued presenting greater improvement than the Comparison group during core classroom instruction.
Results from the contrast comparisons on the Word Attack (WA) measure seem to contradict findings from the PAC measure. That is, on the WA, the ERI-Comparison demonstrated greater improvement than the ERI-Treatment. That difference was of medium effect size. On the other hand, the ERI-Treatment group showed slight larger growth than the Comparison group. As noted previously, the results on PAC showed that the ERI-Treatment group made greater gains than its comparison peers. However, these findings are not incompatible with the ones on the PAC measure if they are to be interpreted within the scope and content of each assessment. The PAC measure is a composite of three reliable subtests (i.e., blending, elision, first/last sound identification). Each subtest was administered separately and assessed a different aspect of phonological awareness. The sum of the three subtests represented a reliable and accurate composite of the students’ strengths in each distinct skill as measured by three distinct tests. With the WA subtest, the phonological/phonemic awareness skill was assessed on a broader dimension as it required students to perform two skills (segmentation and blending) simultaneously by “sounding out” and then reading a nonsense word. Additionally, on the WA assessment, students were required to read a number of nonsense words composed of combinations of graphemes or diphthongs. These combinations had not been presented during the intervention with the ERI-Treatment students. Therefore, it can be argued that the PAC is the most representative measure of students’ phonological awareness skills simply because the skills assessed by PAC had been taught directly and explicitly during intervention.
Results from the contrast comparisons on the Passage Comprehension (PC) measure revealed that the ERI-Comparison as well as the Comparison group showed more improvement than the ERI-Treatment group. The magnitude of difference for each group was small. However, differences between the first two groups (ERI – Comparison and Comparison) were negligible, indicating that both groups demonstrated similar growth on passage comprehension. Given the oral reading fluency performance recorded on a tri-weekly basis (see research question four), the previous findings are not surprising. Fuchs and her colleagues (2001) found that there is a very strong positive association ($r=0.91$) between oral reading fluency and comprehension. Thus, students who are fluent readers are expected to demonstrate higher levels of comprehension than students who have started to learn how to “sound out” words and read slowly. What is remarkable, however, is that strong responders to kindergarten intervention (ERI-Comparisons) continued to perform at levels equivalent with their comparison group peers, who initially were identified with few or no beginning reading deficits. This finding is 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.

Summary of Findings for Research Question One

Contrast comparisons showed that the ERI-Treatment group, who had been identified as treatment resisters to kindergarten code-based intervention, made the highest gains on the phonological awareness and alphabetic understanding measures.
by the end of Grade 1. However, fewer gains were evident on comprehension and fluency measures. The ERI-Comparison group, who had responded strongly to kindergarten phonological awareness training, performed at levels equivalent to the Comparison group on measures of comprehension and fluency.

Research Question Two

How much variance in gain scores as measured by each of five reading variables (PAC, RNC, LWID, WA, PC) can be explained by group membership (i.e., ERI-Treatment, ERI-Comparison, Comparison) and language status (ELL, Non ELL)?

A number of regression models were run to explain the amount of variance in gains scores by group membership and language status. Findings for this question pertain to comparisons between ELLs in the ERI-Treatment group and ELLs in the other two comparison groups. Intervention data results revealed that ELLs in the ERI-Treatment group made higher gains in measures of phonological awareness and alphabetic understanding compared to their ELL peers in the other two groups (i.e., ERI-Comparison and Comparison group). This finding suggests that a second year of intensive, longer phonological awareness training with above average integrity resulted in increased student outcomes in basic literacy skills.

Specifically, a full regression model with a number of fixed predictors (group membership, language status, interactions of the two terms) accounted for 31% of variance in student outcomes on the Phonological Awareness Composite (PAC). Note, though, that the percentage of this variance is associated with more than one predictor, thus making it difficult to draw conclusions about the direct effects of secondary
preventative intervention on the PAC gains of the ELL treatment group. However, it can be speculated that a significant amount of the variance could be attributed to participating in the ELL ERI-Treatment group. That is, examining the regression coefficients of the model, it is evident that the ELL ERI-Treatment group by far showed greater improvement on the PAC measure in contrast to their ELL peers in the other two groups (ERI-Comparison and Comparison). In addition to demonstrating higher gains in the PAC, it was also found that the ELL treatment group reached similar levels of performance as their ELL comparison peers. This is a remarkable finding given the ambiguity among researchers as to what we should do about treatment resisters after they failed to meet benchmarks to kindergarten interventions (O’Connor & Klingner, 2007). This finding supports the view that an additional shot of highly specific phonological awareness training delivered for a longer period of time produced substantial gains and levels of posttest performance for the ELL treatment students comparable to their low-risk ELL peers, who had received only core classroom instruction. In response to researcher inquiries of the most effective methods to give ELLs access to academic opportunities similar to the ones English native speakers have while learning English (e.g., August & Hakuta, 1997), it is clear that intensive phonological awareness training with a high degree of specificity can well serve this purpose (Lesaux & Siegel, 2003).

Regressing word attack (WA), which is another indicator of student’s phonological/phonemic awareness and alphabetic understanding, on a number of predictors, showed that a 24% of the variance accounted for student outcomes, after adjusting for levels of forgetting. Results from this regression model are somewhat
mixed about the amount of improvement of ELL ERI-Treatment students. Although
the regression coefficient (i.e., -0.91) showed that the ELL ERI-Treatment group
made more improvement than the ELL Comparison group, such evidence is not
replicated with the ELL ERI-Comparison group, whose regression coefficient (2.33)
denoted that the latter group made more improvement. It can be speculated that the
ELL ERI-Comparison group, after receiving an intensive, explicit phonological
awareness intervention in kindergarten and demonstrating mastery of basic literacy
skills (e.g., letter-sound correspondence, segmentation) as evidenced by reaching the
performance benchmark criterion, continued in Grade 1 to make more progress in the
classroom instruction compared to their ELL ERI-Treatment. These results give
support to the meta-analysis findings of the National Literacy Panel (August, &
Shanahan, 2006b), which concluded that a phonological awareness training in the
context of a literacy-balanced core instruction has a positive influence on the second-
language literacy development of ELLs. What possible factors might explain the gain
score difference between ELL strong responders (i.e. ELL ERI Comparisons) and ELL
treatment resisters (i.e., ELL ERI Treatment) is the degree of their oral language
proficiency. Anecdotal observations showed that the ELL ERI Comparisons had a
higher level of English proficiency compared to their ELL ERI-Treatment peers. They
were able to verbalize their thoughts more clearly and use more sophisticated English
vocabulary than the latter group. Future research steps should gauge the impact of
second-language literacy proficiency on ELLs’ phonological awareness and alphabetic
understanding skills. As of now, lack of research exists in these areas.
Results from regression analyses on the Rapid Naming Composite (RNC), and Passage Comprehension (PC) revealed that a smaller amount of variance was explained in student outcomes for each of these reading measures compared to PAC and WA ones. With the exception of the LWID measure explaining a higher percentage of variance (i.e., 24%), the other two models produced lesser amounts of variance (i.e., RNC=7%; PC=11%). Findings of RNC and PC models replicate exactly the reading patterns found in contrast comparisons. It is evident that the ELLs in both comparison groups made more growth as well as reached a higher end-of-the-year level in passage comprehension than the ELLs in the ERI-Treatment group. The results are not surprising given evidence from tri-weekly progress monitoring data (see research question four), in which the ERI-Comparison and Comparison students had higher oral reading fluency performance throughout the year in Grade 1.

While the ELL Comparison students seemed to acquire greater gains on the RNC than the ELL ERI-Treatment students; this was not the case for the ELL ERI-Comparison, which made less progress than the ELL ERI-Treatment group. These findings were consistent again with the contrast comparisons. Note that although the ELL ERI-Treatment group showed more improvement than the ELL Comparison, this outcome does not signify that the two groups performed at the same level. On the contrary, posttest performance on the RNC evidenced that the ELLs in ERI-Comparison and Comparison groups were only a few points below the standard mean of the RNC’s normal distribution whereas the ELLs in the ERI Treatment were one whole standard deviation below the mean. This finding has two major implications. First, all three ELL groups performed below the standard mean,
indicating that reading fluency, which is highly correlated with rapid naming tasks, was not addressed as explicitly as would be expected in core classroom instruction (Coyne et al., 2004). Second, the amount of time planned for the fluency activity in the intervention was found to be insufficient (see limitations section) for demonstrating student progress in ERI-Treatment group. Hence, future steps should examine interventions with a high degree of specificity in oral reading fluency.

Finally, after regressing the LWID on a number of predictors, it was found that the model explained 24% of variance in student outcomes. Consistent with reading patterns found in the contrast comparisons, the regression coefficient (-4.47) showed that the ELL ERI-Treatment made more growth than the ELL Comparison students. This finding is encouraging given that treatment resisters to early reading intervention usually demonstrate deficits in word-recognition skills (Blachman, 1997). Note, however, that the growth exhibited by the ELL ERI-Treatment group was not sufficient to reach levels of performance similar to the other ELL comparison groups. Additional intensive instruction focused on explicit vocabulary instruction could possibly continue reducing this gap. Such component would presumably increase not only the students’ sight word repertoire but also improve their text-level skills.

Summary of Findings for Research Question Two

Regression analyses showed that the ELL ERI-Treatment group presented higher amount of improvement in phonological awareness measures and word-identification measures compared to ELLs in ERI-Comparison and Comparison groups. Interestingly, the ELLs in both comparison groups showed greater
improvement on fluency and comprehension measures than the ELLs in the ERI Treatment. It can be speculated that the limited oral language proficiency of ELL ERI-Treatment students might have hindered the improvement on comprehension measure. Additionally, improvement on letter-word identification was evident for the ELL treatment group but it was not sufficient to reach the performance levels of ELLs in ERI-Comparison and Comparison groups.

Research Question Three

Based on the amount of improvement (i.e., gain scores) as measured by five standardized reading variables (PAC, RNC, LWID, WA, and PC), is the change (Δ-delta) gain score different between: (a) ELL and Non-ELL students within the ERI-Treatment group? (b) ELL and Non-ELL students within the ERI-Comparison group?

Additional contrast comparisons were conducted for examining within-group language comparisons of ERI-Treatment and ERI-Comparison groups. Within the ERI-Treatment group, ELLs demonstrated stronger growth than their Non-ELL peers on the PAC measure. The large magnitude of difference between the subgroups (e.g., d = 1.21) seems to indicate that the ELLs benefited more than the Non ELLs. However, ELLs began the study at much lower levels of phonological awareness; thus achieved more gains after receiving an intensive PA intervention. Conversely, within the ERI-Comparison group, the Non ELLs seemed to show greater gains. However, the magnitude of difference between the two groups was small, suggesting that no substantial differences existed between ELLs and Non ELLs in the ERI-Comparison group.
For the RNC, there is evidence of growth difference between ELLs and Non ELLs within the ERI-Comparison group, with higher gains for the latter group. The magnitude of this difference was of medium size. On the other hand, no substantial gain differences were evident between ELL and Non ELLs within the ERI-Treatment group, suggesting that the two groups had comparable levels of performance on the RNC.

For the LWID, a difference in growth between ELLs and Non ELLs within the ERI-Comparison group was detected, favoring the ELLs. The magnitude of the difference was found to be of medium size. By contrast, no substantial differences were denoted between ELLs and Non ELLs within the ERI-Treatment group.

For the WA, no substantial within-group differences were evident for the ERI-Comparison and ERI-Treatment groups, indicating that the ELLs and Non ELLs had comparable patterns of reading performance in the word-attack skills. Finally, for the PC, no significant within-group differences were denoted for the ERI-Comparison group. However, the Non ELL ERI-Treatment students demonstrated stronger growth in the PC subtest compared to the ELL peers. The difference was of medium size. Such finding can presumably be attributed to the different levels of oral language proficiency between the two groups. The National Literacy Panel reported that for text-level skills, such as reading comprehension, ELLs rarely approach the levels achieved by their Non-ELL peers (August & Shanahan, 2006b). Further research should focus on the design of intervention strategies focalizing on higher-order skills. Overall, these findings are supportive of recent research investigations, suggesting that ELLs follow similar patterns of development in word-level skills given the delivery of
research-based phonological awareness training in the context of a comprehensive
code-based core instruction (Lesaux & Siegel, 2003).

**Summary of Findings for Research Question Three**

Contrast comparisons between ELLs and Non ELLs within ERI-Treatment and
ERI-Comparison groups showed that the ELLs and Non ELLs, for the most part, had
similar patterns of responding on the dependent measures. Within the ERI-Treatment
group, ELLs showed greater improvement than Non ELLs in phonological awareness
composite. On the other hand, the Non ELLs made more gains than ELLs in
comprehension measure. Within the ERI-Comparison group, ELLs improved more
than the Non ELLs in the word-identification measure while Non ELLs presented
higher gains on the rapid naming composite.

**Research Question Four**

*What is the rate of improvement over tri-weekly reading and phonological measures
(PSF, NWF, ORF) for students in the ERI-Treatment group, the ERI-Comparison
group, and the Comparison group?*

As seen in Figure 4.2, the ERI-Treatment group presented the highest growth
rate (3.16) per assessment period on the DIBELS Phoneme Segmentation Fluency
(PSF) test. As a group, the ERI-Treatment students met the spring performance
benchmark criterion much earlier in the year. Specifically, at Time 4 (i.e., beginning
of January) students demonstrated mastery of segmentation skills by producing more
than 35 correct segment sounds and continued to increase their growth over time. Such
evidence strongly argues that an additional dosage of explicit phonological awareness
training enabled treatment resisters to kindergarten intervention to establish mastery in segmentation by the middle of Grade 1. With robust growth rate over time, the ERI-Treatment group succeeded in bridging the initial gap at the beginning of the year and performed at comparable PSF levels with the other two groups at Time 8. These findings are consistent with findings from the contrast comparisons and regression analysis of the PAC.

Results from the NWF showed that both the ERI-Comparison and the Comparison groups demonstrated comparable growth over time. As seen in Figure 4.4, the growth rate of the ERI-Comparison group is slightly lower per assessment period but that difference (0.11) between the two groups is negligible. Given the performance on Time 8, both groups finished at the end of Grade 1 at equal levels of performance. On the other hand, the ERI-Treatment group had a higher growth rate than the ERI-Comparison group. Despite the fact that, the ERI-Treatment group reached the spring benchmark on the NWF, its growth rate was not strong enough to reduce the gap with the other two comparison groups.

Finally, results from the repeated measures mixed-effects model on the ORF demonstrated that the ERI-Comparison group had the highest growth rate (2.06) per assessment period. As seen in Figure 4.6, at the beginning of Grade 1 the ERI-Comparison group started at similar levels of responding with the Comparison but over time the group showed the highest growth. This finding is remarkable considering that the ERI-Comparison students had been identified as at risk at the beginning of kindergarten and received early reading kindergarten intervention. Their strong fluency growth in Grade 1 confirms O’Connor’s (2000) assertion that
kindergarten interventions may serve as “jump start” for those children who enter kindergarten with risk markers in early literacy skills. Providing a specially designed kindergarten intervention helps educators improve the prognosis for reading acquisition. Despite the fact that the ERI-Treatment group received an additional year of intervention for longer period of time, the group demonstrated the least growth rate per assessment period on ORF. A possible explanation for this outcome is the limited amount of time given on the fluency activity within the intervention package as well as the lower levels of word-recognition. As described in Chapter 3, the intervention consisted of six to eight phonological awareness activities taken from a empirically-validated program (Simmons & Kame’enui, 2003a), and an experimenter-constructed fluency activity. More time was weighted for the first part of the intervention since students were lacking in basic literacy skills. Researchers document consistently that the distinguishing feature of poor readers is phonological awareness deficits (Torgesen, 2002, 2004; Vellutino et al., 1006; Scanlon et al., 2005). Thus, by increasing the amount of time on phonological awareness skills, it was expected that the ERI-Treatment group would reach proficiency in this area. As noted above, mastery in these skills was evident in the middle of January. Greater improvement in oral reading fluency might have been achieved for the ERI Treatment group if at that point the researcher had increased the fluency and word reading activities and reduce the amount of time allocated to phonological awareness. Thus, the low performance of the ERI-Treatment group indicates a continued need for intensive, highly specified intervention on oral reading fluency.
Summary of Findings for Research Question Four

The ERI-Treatment group presented the highest growth rate on the PSF, thus reaching the spring DIBELS benchmark status by the middle of the year and performing at comparable levels with the rest of the two comparison groups by the end of the study. On the other hand, the ERI-Comparison group showed comparable growth rate with the Comparison group on NWF over time. The ERI-Treatment group demonstrated smaller growth rate on NWF; however, the group reached the spring DIBELS benchmark status by the end of the study. Lastly, the ERI-Comparison group obtained the highest growth rate on the ORF, thus reaching the spring DIBELS benchmark status. The ERI-Treatment group presented lesser growth on ORF, thus needing additional highly specified intervention on word-identification and fluency-building activities.

Research Question Five

As a measure of social validity, to what extent will instructors and ERI-Treatment students view the supplemental instruction as beneficial?

Six instructional assistants (four paraprofessionals and two graduate assistants) delivered the secondary intervention to 23 ERI-Treatment students. As Table 4.25 indicates, the post acceptability score on treatment goals, intervention procedures, and outcomes was above average for all but one instructor (i.e., Martha). The majority of instructors found the secondary intervention to be an acceptable way of dealing with students’ reading difficulties and they reported that they had a positive reaction to it. Martha did not return her post-acceptability responses, but her pre-acceptability score was low. Possible reasons for her low pre-intervention score were presumably due to
different philosophical and pedagogical ideas stemming from her teacher preparation training on how to teach at-risk young learners in urban settings. Anecdotal observations during the individual training with the experimenter Martha often times interrupted the training procedures to argue against the explicit and direct instructional procedures outlined in the treatment protocol. She expressed dissatisfaction about the pedagogical ideas underpinning the supplemental reading intervention and she suggested that a discovery-learning approach was more appropriate for these students. It has been suggested that an interventionist with low degree of acceptability would also present lower adherence to the treatment protocol (Wolf, 1978). That was true for Martha since she was the only instructor with the lowest integrity score (i.e., 77%). She had great difficulty implementing two specific components with high quality: following the scripted lesson and providing scripted-error correction to students.

All but one student liked this special tutoring. When asked to give a reason for not liking this program, the student responded that he liked his instructor but not coming to school to learn. Overall, ELLs and Non ELLs expressed satisfaction and 91.3% of them wished they had worked with their instructor for another week. The overwhelming positive responses given by students speak to the effectiveness of the instructional design and delivery of the intervention. The intervention package was designed with high rates of active student responding, immediate and positive corrective feedback and guidance. Additionally, the overall above average levels of integrity undoubtedly contributed to the students’ skill development and receptivity to the instruction.
Limitations

A number of limitations were presented throughout the course of this study and warrant further discussion.

Duration of instruction

In spite of the fact that ERI-Treatment students received phonological awareness and fluency intervention earlier in Year 2 (i.e., October) than in Year 1 (i.e., January), thus being able to receive a greater dose of treatment, the duration of instructional sessions was limited for all planned activities. The reason being is that intervention consisted of phonological awareness and alphabetic principle activities from the ERI curriculum plus an experimenter-constructed fluency activity. According to the developers of ERI (Simmons & Kame’enui, 2003a), a scripted ERI lesson requires 30 minutes of intensive well-organized instruction to teach 6 to 8 phonological awareness and alphabetic principle activities. Due to the critical importance of providing students with opportunities to read connected text and practice sight words in first grade, which were not emphasized in the ERI curriculum at the beginning of the intervention, re-allocation of instructional time had to be made. The experimenter asked the IAs to spend less time on activities focusing on board games and warm-up spelling sheets, so that they could teach the fluency activity, too. Anecdotal observations showed that the fluency activity did not always receive sufficient time due to time constraints. Even when fluency was introduced, IAs had to either skip the sight-word practice or shorten the paired repeated reading component, where students were practicing reading the story with their partners. Thus, first-grade
students sometimes were receiving less practice time on the fluency activity. Having sufficient time for reading fluency was very critical for these students. Other research studies involving at-risk first graders allocated half of their instructional time (i.e., 15 out of 30 minutes) on the reading fluency activity (Vellutino et al., 1996; O’Connor, 2000). In this study, only five minutes were permitted.

*Instructional Emphasis and Specificity*

Based on the growth curve modeling results, ERI-Treatment students evidenced the highest growth rate on the phoneme segmentation fluency (PSF) subtest. As discussed previously, this outcome was not surprising since 76% to 83% of each instructional session was devoted on ERI activities targeting phonological/phonemic awareness skills. The ERI curriculum is a research-based program purposefully designed with clear instructional emphasis (i.e., type and number of target skills addressed) and a certain degree of specificity (i.e., controlled example selection, sequence and scheduling of skills, scripted error-correction procedure) (Harn et al., 2007; Simmons et al., 2003b). Nonetheless, intervention outcomes also showed that students’ scores on oral reading fluency was still below benchmark status. One explanation of such outcome could be attributed to limitations in the instructional emphasis and specificity of the intervention package. Had ERI-Treatment students received more instructional time on oral reading fluency practice and sight word activities, the findings might have resulted in greater oral reading fluency. O’Connor (2000) delivered four-layered instruction to at-risk students based on their skill deficits. Similar approach could have been followed in this study, whereby target students
could have received a more intensive instruction on fluency and word reading activities later on.

Consistency with treatment implementation

During instructional delivery the instructional assistants were asked to complete a weekly log recording their date of instruction, lesson number taught and beginning/ending time of instruction. Since IAs were not being observed daily, it is possible that their data might not have been always accurate. Anecdotal observations showed that IAs did not always complete the log carefully. For instance, during one random visit to School 2, the experimenter was ready to observe Sara’s instructional session. Due to personal health issues, Sara had to cancel it. When she returned her log to the experimenter at the end of the week, she accidentally reported that she had instructed that date. In another random visit to School 2, the experimenter waited for Claire to deliver her instruction. However, she did not show up at that specific time. When the experimenter received her weekly log, she reported that she had taught that time. Note, however, that these data were used only as descriptive information for each IA, and not as predictors in the regression models.

In addition to problems related to describing treatment duration accurately, problems also appeared with the frequency of instructional implementation. Based on the instructors’ weekly logs and experimenter’s informal observational notes, the frequency of treatment was low for three IAs. Specifically, Sara, Martha and Claire instructed less than 73% of time. Harn and her colleagues (2007) contend that “students needing third-tier interventions require more reading instructional time than
their peers to catch up...By making instructional support services fully available to support reading instruction, schools have every opportunity to determine how small-group instruction can be most efficiently and effectively accomplished” (p.180).

School principals expressed their support to this program verbally and non-verbally. However, it was difficult to estimate the degree to which they actually followed through with their commitment to early reading intervention. It would have been ideal that ERI-Treatment students had received instruction during all scheduled instructional sessions. Nonetheless, based on the amount of instruction they actually received, target ELLs and Non ELLs showed strong gains in early basic reading skills. We can only speculate how much stronger their skills would have been if the IA’s had taught to the maximum level.

Assessment of Oral Language Proficiency

Approximately 28% of the overall sample consisted of ELLs. An interesting finding resulting from the regression analyses was that the Non ELLs outperformed their ELL counterparts on measures of higher-order skills (e.g., passage comprehension). According to the National Literacy Panel (August, & Shanahan, 2006), for ELLs oral language proficiency plays a critical role in the acquisition of skilled reading in English. By oral language proficiency, the panel defined it as specific aspects of oral language such as phonology, vocabulary, morphology, grammar, comprehension and expression skills. Coupled with the NLP’s meta-analysis findings that ELLs, although they can demonstrate mastery of word-recognition (i.e., decoding and orthographic) skills, do not perform at levels equal to those of their Non-
ELL peers on text-level skills (e.g., reading comprehension, writing). Furthermore, the NLP acknowledges that limited research exists about the effects of ELLs’ English language oral proficiency on word-level skills. In order to explore this relationship as well as acquire more in-depth understanding of the comprehension performance of ELLs in this study, an oral language proficiency battery could have been administered. For instance, the Bilingual Verbal Ability Tests (BVAT; Munoz-Sandoval, Cummins, Alvarado, & Ruef, 2005) measures ELL’s verbal abilities on three subtests: (a) Picture Vocabulary, (b) oral vocabulary (synonyms and antonyms), and (c) verbal analogies. This norm-referenced test provides “an instructional zone index,” according to which students are placed at one of five levels of English language proficiency (from Negligible through Very Limited, Limited, Fluent to Advanced). From a statistical and research analysis perspective, the BVAT allows researchers to use it in conjunction with the WJ-III Tests of Achievement for comparisons.

Randomized Sample

Students participating in this study were a follow-up sample from a previous investigation. Random selection or randomization was not an option in both studies primarily due to the ethical considerations underlying the nature, intensity, educational and social significance of target behavior. Students, who had been determined as treatment resisters at the end of last year’s investigation as measured by performance benchmark criterion, were in need of additional treatment dosage to develop and strengthen their early basic reading skills. Conversely, those students, who had met the performance benchmark level, were monitored systematically this year.
It is true that the lack of randomization prevents us from making inferences about the effectiveness of this year’s early reading intervention to the general population. It is also true that the absence of a true control group prevents us from making causal connections between kindergarten treatment effects and positive satisfactory growth in reading measures at the end of first grade. Although a comparison group had been targeted and followed through in both years, this group consisted of students who had showed little or no early beginning risk markers at the beginning of kindergarten. Thus, any group comparisons are limited to the descriptive and correlational level of analysis. Nonetheless, growth curve modeling showed that the ERI-Comparison group followed similar growth learning patterns with the comparison group on PSF and NWF measures in Grade 1. In fact, their growth rate on the ultimate indicator of reading capacity, ORF, was greater than the comparisons. Stated differently, the high percentage of ERI Comparisons who were able to overcome the trajectory of reading failure as predicted by their initial kindergarten risk status, argues strongly for the preventative role of early reading intervention.

Furthermore, closer examination of the performance of ERI-Treatment students this year showed that they have mastered their phonological/phonemic awareness skills. Abundant research evidence has shown us that the earmark of reading disabilities is deficits in PA. That is, students with phonological awareness weaknesses are more likely to remain poor readers, and thus will be classified with reading disabilities. Our treatment students, though, have demonstrated otherwise. Their strong gains in PA suggest that they are less likely to develop reading disabilities; however, PA is necessary, but, not sufficient, for becoming good readers.
Further intensive reading intervention is required for ERI-Treatment students in the areas of word-recognition and fluency.

Implications for practice

Findings from this follow-up study provide a number of implications for refining and improving the current state of educational practice. The effectiveness and quality of intervention students receive in kindergarten will very likely impact their long-term reading outcomes. Likewise, the type of core post-intervention instruction delivered in subsequent years, starting from Grade 1, will also be conducive to the maintenance of kindergarten intervention improvement and continuous reading progress to higher-order skills. According to the National Reading Panel (2000), beginning reading interventions that produced the largest effect sizes included: (a) inclusion of phonological awareness and alphabetic understanding activities, (b) emphasis on blending and segmentation skills, and (c) systematic practice of decoding skills.

If these curriculum elements are addressed explicitly and systematically not only in kindergarten intervention but also in core post-intervention instruction, then strong responders to kindergarten intervention will likely maintain their treatment gains. As far as treatment resisters to kindergarten intervention, the core post-intervention instruction would still be insufficient for their learning needs and thus, further highly specified and intensified intervention is required. Factors that contribute to the effectiveness of kindergarten intervention also contribute to the effectiveness of additional intervention in Grade 1 or post-intervention instruction. These factors
include instructional emphasis and specificity, treatment implementation (i.e., quality and quantity), and intensity of instruction.

*Strong Responders of Kindergarten Early Reading Intervention*

First, the follow-up data of this study for strong responders (i.e., ELLs and Non ELLs) to kindergarten early reading intervention favorably support the promising effectiveness of such instructional practice. Despite the fact that no causal relationship between kindergarten intervention and positive first-grade outcomes can be claimed, the steady increase of reading performance of strong responders in Grade 1 (Wagner et al., 1997; Blachman, 1997) was evident. Strong responders, who had received up to four months of kindergarten intervention and met end-of-the-year benchmarks in kindergarten, maintained their benchmark status by simply receiving core post-intervention instruction in Grade 1. Research indicates that core post-intervention instruction can be described on a spectrum with least to maximum instructional support and intensity (Coyne et al., 2004).

At the lower end of the range, core post-intervention instruction is incompatible to curriculum content characteristics and instructional specificity of kindergarten intervention. In this case, strong responders to kindergarten intervention enter first-grade classroom and receive a literature-based, discovery-learning instruction compared to the explicit, code-based, kindergarten intervention. These students are highly likely to regress and require additional intensive intervention in Grade 1 (see O’Connor, 2000).
At the middle of the spectrum, core post-intervention instruction is aligned with kindergarten intervention by providing instruction with similar instructional emphasis and curriculum content to kindergarten intervention. That was the case in this study with our strong responders. Students received a comprehensive core instruction with explicit code-based emphasis. Students were able to practice their beginning reading skills in a classroom environment that was supportive and aligned to the curriculum characteristics of kindergarten intervention. The curriculum used in the three schools differed. Schools 2 and 3 incorporated the *Harcourt Trophies reading program* (Beck, Farr, & Strickland, 2005) and School 1 had the *LACES*. Both core programs were code-based and shared some degree of explicitness to teaching beginning reading skills.

At the higher end of the spectrum, strong responders not only receive a core instruction that shares similar curriculum content and skills to kindergarten intervention but also a supplemental intervention is provided to them. A supplemental intervention of minimum intensity can take the form of maintenance intervention that provides students with opportunities to practice and review their overall beginning reading skills (Coyne et al., 2004). A supplemental intervention of high intensity is required immediately when the strong responders are found to regress even after receiving a code-based core post-intervention instruction. Figures 4.2, 4.4, and 4.6 indicate that the ERI-Comparison group is above its spring benchmark level status. Nonetheless, their performance on Figure 4.6 shows that their oral reading fluency is slightly above the designated benchmark criterion. Systematic progress monitoring
would allow teachers to monitor student status and provide highly intensive intervention on fluency.

A remarkable implication of the promising effectiveness of kindergarten intervention aligned with code-based core post-intervention instruction in Grade 1 is the reading improvement of ELLs. In this study, 30% of ERI-Comparison students consisted of ELLs who succeeded in maintaining proficiency in their English beginning reading skills by only receiving core classroom instruction. Such evidence provides further support to those educators and researchers who contend that ELLs respond to code-based literacy instruction in a manner similar to their Non-ELL peers (Lesaux & Siegel, 2003; Vaughn et al., 2006). What is more, the early identification and kindergarten intervention model is equally effective for students whose English oracy is limited.

*Treatment Resisters of Kindergarten Reading Intervention*

In a literature review examining 23 studies, Al Otaiba and Fuchs (2002) summarized the characteristics of students who are not responsive to early reading intervention provided either in kindergarten or in first grade. They found that among other features treatment resisters are usually the ones that present deficits in phonological awareness, rapid naming, and possessed certain demographic characteristics. Stated differently, treatment resisters have decoding and oral reading fluency deficits. Students that come from low-socioeconomic background and/or low level of English proficiency are more likely to be identified as treatment resisters. These were characteristics typical of our ERI-Treatment group, which had not
responded to kindergarten intervention and had remained at the at-risk or some risk status by the end of kindergarten. After receiving phonological awareness plus fluency training in Grade 1, their growth rates improved on phonological awareness measures but not on fluency. As discussed previously, the amount of time spent on fluency was very limited. Hence, highly specified and well-organized intensive interventions seem to be the next educational step for increasing oral reading fluency, the most critical index of reading competence.

According to the NRP (2000), the following critical features should be part of an effective fluency intervention: (a) repeated readings, (b) overlap of shared words, (c) increase amounts of oral reading practice, (d) immediate corrective feedback, and (e) brief instructional periods. Even though the fluency activity included most of these features, more oral reading practice and overlap of shared words between phonological awareness activities and reading passages should have existed. Additionally, providing students with a visual cue of their performance goal and allowing them to monitor and graph their performance may have strengthened the effectiveness of the fluency activity. In sum, the fluency practice activity the resisters received may not have optimized the critical features shown to increase oral reading fluency. Additional layers of instruction are required for these students.

Multi-layered Instruction

O’Connor’s (2000) study provides a good example of how systematic, multi-layered intensive interventions result in decreasing the number of treatment resisters over time. This author, after providing three layers of highly intensive small-group or
one-to-one interventions to at-risk students from kindergarten through end of first grade, showed that the number of students reduced from 59 to 6 students. These six poor readers had been diagnosed with LD, MMR and SED at the end of Grade 2. Further empirical support of multi-layered instruction is provided by Vellutino et al.’s (1996) study, in which 74 at-risk first-grade students received 15 weeks of one-to-one tutoring on phonological awareness, spelling and reading fluency. Those who were found to be still at risk (i.e., score below the 40th percentile on basic skills cluster) were given up to ten weeks of additional tutoring at the beginning of Grade 2. The number of students who showed very limited growth at the end of Grade 2 was 19. Nonetheless, there was another small subset of 18 students, who showed limited growth, indicating that they are likely to have reading difficulties later on.

Multi-layered instruction embedded in the RTI framework allows educators to identify at-risk learners earlier and implement with integrity different layers of instruction that vary in intensity, duration, and structure. The end goal for educators should be to minimize student risk status as early as possible and, thus, reduce the number of students who would need specialized services throughout their school years.

*Treatment Consistency*

A final consideration derived from the findings of this study and demands careful consideration is the consistency of treatment. Two of the paraprofessionals assigned by their school principals to deliver the intensive instruction to the most at-risk first graders presented low frequency rates (i.e., below 67%) in their instruction. Despite the fact that the degree to which they were implementing the intervention
maintained qualitatively and quantitatively was average to above average, the consistency with which they implemented the intervention was below average.

Maintaining treatment consistency in secondary interventions is of ultimate importance. Protecting the intervention time for at-risk primary-aged learners also speaks to the priority set up by each individual school, its administrators, and its teachers. Bringing about changes in student outcomes in a multi-tiered model implemented in urban elementary schools requires collective effort, internal and external support. It also requires strong leaders that put preventative interventions for primary grades among the highest goals in their agenda. Unfortunately, making it a common tactic requires change of attitudes and persistent efforts at district-wide level.

Directions for Future Research

Given the positive findings of the study and the large amount of data collected, there are a number of research questions that arise and possible avenues for future programming. First, this follow-up study focused primarily on the analysis of gain scores and growth rates of participants. With this type of analysis, the experimenter was able to answer the question “How much have target students improved by the end of Grade 1, given initial performance in October?” However, this kind of analysis precludes an examination of students’ absolute levels of reading achievement. As discussed in Chapter 2, different criteria of success have been followed for classifying response within the RTI framework (L.Fuchs & Fuchs, 2007). According to Torgesen (2000) taking into account growth in word reading is not sufficient in determining a student’s successful reading level. To do so, we need to view student reading
achievement from a different perspective. Future analysis could take into 
consideration student posttest reading performance and compare it with local and 
national normative samples (Coyne et al., 2004). Taking Torgesen’s recommendation, 
a standard of greater than 30th percentile would be a reasonable and realistic 
benchmark for evaluating our intervention success. Thus, student scores on 
standardized reading measures could be compared to a national normative sample of 
similar aged students. Such analysis would provide us with an indication whether our 
sample falls above the predetermined benchmark standard (i.e., more than 30th 
percentile). Additionally, comparing student standard scores to a local normative 
sample would help us to determine how our participants are doing compared to other 
children within the same school district. The latter analysis is of valuable practical 
significance for urban school settings as it would provide concrete evidence of early 
reading intervention success to teachers and school administrators.

Second, further research analysis could examine those first-grade pretest 
and/or kindergarten variables that help significantly predict the end-of-the-year 
performance of target students on reading fluency. That is, if the experimenter wanted 
to determine which initial early beginning reading skills either at the beginning of first 
grade or kindergarten helped predict target students’ end-of-first-grade’s performance 
on certain measures (e.g., fluency), then a series of multiple regression models could 
be utilized in answering such research interests.

Third, next research steps should look into developing interventions with high 
instructional emphasis and specificity on skillful word reading. More than 20 years of 
research in reading has concluded repeatedly and reliably that the most single
contributing factor, which describes struggling readers learning to read, is lack of skilled word identification (Torgesen, 2000). Reading researchers contend that skillful word identification ability consists of two fundamental subskills: (a) strong decoding skills and (b) strong orthographic (i.e., spelling) skills. The first subskill helps good readers to decipher an unknown word by using their phonemic cues that they have already learned, and the latter skill enables good readers to recognize words “by sight.” Results of this study showed that the majority of ERI-Treatment students would benefit from further intensive and highly specified word-recognition practice by addressing the following elements at minimum: (a) increasing their grapheme-phoneme knowledge, (b) expanding orthographic patterns (e.g., spelling patterns, sight words), and (c) reading words accurately and fluently.

Fourth, given the low passage comprehension scores obtained by ELL ERI-Treatment students in this study, future research could investigate the effects of early reading interventions that incorporate oral language activities on ELLs’ word-level (e.g., word identification, word attack), text-level (passage comprehension) and oral language proficiency (e.g., verbal analogies) skills. Vaughn and her colleagues (2006) found that their treatment ELL group presented higher language composite scores than their control ELL peers. The authors speculated that this increase might have resulted in helping students achieve higher performance on passage comprehension. In short, future avenues should take into account ELL’s language proficiency and address it in early reading interventions. Such interventions could be expanded by adding extensive and various explicit vocabulary instructions in the form of small-group instruction or a peer-tutoring format.
Fifth, future research focus should examine the long-term effects of early reading intervention on ELLs and Non ELLs at longer follow-up periods. For those who continue to remain strong responders to kindergarten reading interventions, their performance on fluency should be closely monitored. Fluency is the best index of overall reading competence (Fuchs et al., 2001). In this study, although our strong responders exceeded the fluency DIBELS benchmark (i.e., 40 cwpm), they seem to be closer to the lower end of the goal rather than surpassing it with comfort. For instance, if someone would use the first-grade reading benchmarks from the Direct Instruction (DI) teachers (Carnine, Silbert, Kame’enui, & Tarver, 2004), then our strong responders would not have met their fluency criterion. With DI, they would have to score more than 60 cwpm. Thus, it is imperative to monitor the fluency performance of this subset in the subsequent years in order to make more conclusive statements about the overall effectiveness of kindergarten early reading interventions.

Regarding treatment resisters, future research should continue examining the effectiveness of explicit comprehensive reading interventions on at-risk students’ basic reading skills. However, how much (i.e., intensity) and how long (i.e., duration) should researchers continue providing interventions until non-responsiveness has been documented reliably? Currently, there has not been consensual agreement to this question. O’Connor and Klingner (2007) suggest that “responsiveness to student response can decrease the proportion of students who still need help” (p. 48). With that idea in mind combined with Torgesen’s (2000) point that treatment resisters lack in decoding and word-identification skills, the next research steps should focus on
developing highly specified and intensive interventions addressing these two major skill areas for students in Grades 2 and 3.

Summary

This study investigated the effects of a follow-up early reading intervention delivered in Grade 1 to a group of 23 ELLs and Non ELLs, found to be treatment resisters to kindergarten intervention. Additionally, the study monitored the progress of 15 strong responders to kindergarten intervention as well as 23 comparison students who had been targeted in the study due to their minimal early literacy deficits in kindergarten. The study asked a variety of research questions pertaining to the growth of the three groups on pre/posttest measures as well as progress monitoring probes. Specifically, the study asked if the amount of improvement differed among the three groups on five pre- and posttest measures (LWID, WA, PC, PAC, RNC) by the end of Grade 1. A second research focus was to investigate how much variance in student outcomes can by explained by a number of predictors, namely group participation and language status. A third major focus was to measure the growth rate of the three groups on a more systematic basis throughout Grade 1.

Contrast comparisons, regression modeling, and repeated measures mixed-effects models were run to give answers to the posed research questions. Results revealed that the additional dosage of early reading intervention package improved the phonological awareness skills of treatment resisters, allowing them to reach comparable performance levels to the other two groups; however, fewer gains were evident in fluency and passage comprehension measures. Interestingly, the ELLs of the treatment group developed similar patterns of development in reading measures
with their Non-ELL peers. However, the lack of oral English proficiency should be addressed in the future for exploring further difference in comprehension between ELLs and Non ELLs.

Students, who were strong responders to kindergarten intervention, not only maintained their treatment gains but also showed stronger growth in word-reading and fluency measures compared to the group of students who had initially shown to be of low risk in kindergarten. Findings of the progress of the ERI-Comparison group suggest that the kindergarten intervention may well serve as a jump start and a code-based core post-intervention instruction allows students to progress remarkably later on. The outcomes of this follow-up study provide encouraging evidence that “hard-to-teach” students can be taught how to read with explicit, intensive, and systematic instruction that comply with the general principles of effective instruction.
LIST OF REFERENCES


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APPENDICES
APPENDIX A

PARENT PARTICIPATION LETTER IN EDUCATIONAL RESEARCH

(IN ENGLISH)
September 29, 2006

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. We intend to use the assessment information to design strategies that will help your child to be more successful in managing his/her school performance.

We hope these strategies will help your child to be successful in school and prevent the need for special remedial programs. The children will be taught these pre-reading and reading skills in small groups each day during a special period for intensive instruction. These sessions will be for approximately 25 minutes each day. Your child will not lose any of the regular classroom reading instruction. The school’s instructional assistant or one of my graduate students will teach your child. Your child’s classroom teacher will be closely involved in the assessment, instruction and ongoing monitoring of your child’s progress.

Your child participated in this project last year and we are continuing this year to either instruct or monitor your child’s performance in first grade. We will review your child’s school records, and closely monitor your child’s academic performance. Prior to instruction, your child will be assessed on overall reading performance and scores on pre-reading sound and letters. We expect these assessments to take less than 10 minutes per child. We also hope to track your child’s performance next year to make sure this instruction is successful for your child. 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.

Both at the middle and before the end of the school year, we will ask parents to complete a questionnaire on how effective you feel this project was on your child’s academic performance. We expect the questionnaire to take about 10 minutes to complete. We will also interview your child to determine how your child feels about the learning activities. This informal interview will take approximately 15 minutes to complete and it will not take away any of your child’s academic learning time.
This is a multiyear study so it is possible that we might want to continue these activities next year with your child. If so, we will again request your permission for your child to participate.

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,

Gwendolyn Cartledge, Ph.D.
Professor
APPENDIX B

PARENT CONSENT FORM FOR PARTICIPATION IN EDUCATIONAL RESEARCH (IN ENGLISH)
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:  ___________________________________

Signed:  ___________________________________ (Participant)

Signed:  ___________________________________ (Principal Investigator or his/her authorized representative)

Signed:  ___________________________________ (Person authorized to consent for participant, if required)

Witness:  ___________________________________ (When required)
APPENDIX C

PARENT PARTICIPATION LETTER IN EDUCATIONAL RESEARCH

(IN SPANISH)
Septiembre 28 del 2006

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 síntase libre de contactarme en el (614) 292-7629. Gracias por su atención y cooperación.

Sinceramente,

Gwendolyn Cartledge, Ph.D.
Profesora
APPENDIX D

PARENT CONSENT FORM FOR PARTICIPATION IN EDUCATIONAL RESEARCH (IN SPANISH)
CONSENTIMIENTO PARA LA PARTICIPACIÓN EN INVESTIGACIÓN
SOCIAL Y DEL COMPORTAMIENTO

Título del protocolo: “Mejorando el Triunfo Escolar para el Estudiante Urbano”

Número del protocolo: Pendiente

Investigador(a) Principal: Gwendolyn Cartledge

Consiento a la participación de mi hijo(a) en la investigación siendo conducida por Dra. Gwendolyn Cartledge del colegio The Ohio State University junto a sus asistentes y socios(as).

Los investigadores me han explicado el propósito del estudio, los procedimientos que han de ser seguidos, y el tiempo que ha de tomar. Entiendo los beneficios posibles de la participación de mi hijo(a), si alguno.

Sé que mi hijo(a) puede escoger no participar sin penalidad alguna a mí o mi hijo(a). Si estoy de acuerdo a participar, puedo remover mi hijo(a) en cualquier momento, y no habrá penalidad.

Consiento al uso de la siguiente información del expediente de mi hijo(a) y expediente académico: asistencia, plan educativo individualizado (si alguno), reportes médicos (si alguno), puntaje de pruebas del salón de clases, y evaluaciones estandarizadas.

He tenido la oportunidad de hacer preguntas y obtener respuestas a mis preguntas. Puedo contactar los investigadores en el (614) 292-7629. Si tengo preguntas en cuanto a mis derechos como participante de la investigación, puedo llamar la Oficina de Protección de Riesgos de la Investigación (Office of Research Risks Protection) en el (614) 688-4792.

He leído esta forma. La he firmado libre y voluntariamente. Una copia se me ha sido entregada.

Imprima el nombre del participante:
_________________________________________________________
Fecha: __________________________ Firmado por: ________________________________

Firmado por: _____________________ Firmado por: ________________________________
(Investigador(a) Principal o su representante autorizado(a))

(Firmado por: _____________________ Firmado por: ________________________________
Persona autorizada a dar consentimiento por el/la participante, si requerido)

Testigo: _____________________________
(Cuando requerido)
APPENDIX E

PARENT PARTICIPATION LETTER IN EDUCATIONAL RESEARCH

(IN SOMALI)
Waalidka qiimaha leh

Waxaa aan ahay professor kulliyada waxbarashada ee Ohio State University. Ardayda qalin jabineysa iyo anigaba waxaan sameeyneynaa mashruuc baaris ah oo ilmahaaga dugsigisa ah. Waxaan rabi laheyn in aan aragno hadii isticmaalka manhajka barashadiisa ay noqoto lagama maarmaan xirfada akhriska, khaas ahaan barida ku dhawaaqida xarfaha iyo muhimada alphabetada, waxey keeni doontaa horumar dhinaca cilmiga ah iyo hagaajinta dugliga. Xoog saaridda mashruuceanu waa hagaajinta dhibaha akhrinta ardayga ku jira xanaanada iyo fasalka koowaad. Waxaan isticmaali doonaa kahortag ku saleesannan manhajka akhrinta taasoo siinaysa baridda meelaha furaha u ah bilowga akhrinta. Waxaan rajeyneynaya in ay xeeladahaas ka hor tegi doonan guuldardo akhrinta ah iyo ilmaha oo laga caawiyiyo dugliga in ay aad ugu guuleystaan cilmiga iyo bulshadabaa. Ilmaaga macallinkiisa fasalka iyo gargaariisababa waxay aad u dhxgeli doonan sameynta mashruuca, barida iyo indha indheynanta ilmahaaga waxqabadkiisa xagga xirfadda akhriska. Ilmahaaga lagama saari doono fasalka waxbarashadiisa kamana dhumeysiga wakhtigii waxbarashada.


Waxaanu dib u fiirineynaa diwaanka ilmahaaga dugsigis, waxaana sameeyn doonaa qiimeyn xilliyeed lagu indha indheyn doono guud ahaan ilmahaaga waxbarashadiisa. Haddii ay suurto gal tahay, waxaanu ka heleeynaa ilmahaaga macallinkiiisa ama gobolka meesha lagu keydiyo dhibaha intixaanadka. Warbixintaas la uuruhiyey oo dhan oo ku saabsan ilmahaaga waxey noqoneysaa sir. Ma ogaa karto cid kale aan ka aheynbaarayaasha oo isticmaali doona, si kastaba ilmahaaga lama aqoonsanayo.
Labada xilli bartamaha iyo inta uusan sannad dugsiyeedka dhamaanin,waxaan waalidka weydiin doonaa in ay soo dhameystiraan su’aalaha sida aa u dareentay ama uu wax tar u yahay mashruucaan fulintiisa xag bulsho ama xag tacliimeedba. Waxaan rajeeyneeynaa in su’aalaha lagu dhameystiri doono ilaa 10 daqiqadood. Waxaan kale oo wareysi la yeelan doonaa ilmahaaga in uu go’aansado sidii uu u dareemay habka maamulka dabeecada.Wareeysigaan aan rasmiga aheyn waxey qaadanaysaa in lagu dhameystiri qiyaastii 10 daqiqadood lagamana qaadi doono ilmahaaga waqtigiisa waxbarashadda.

Kani waa sannad waxbarasho badan leh waxaa suurtagal ah oo aan rabnaa in aan u sii wadno howlahaan sannadka dambe ilmahaaga, haddii ay si socoto waxaan markale kaa cotsaneynaa ruqsad uu ilmahaaga kaga qeyb galo.

Waxaan ku weydiineynaa ruqsadaada sidaas darteed waxaa laga yaabaa in aa isticmaalno warbixinta ilmahaaga manhajiisa.Waxaan kale oo aan ku weydiineynaa ruqsad in aan ilmahaaga ku darno ka qaadista sawiro iyo video fasalkeena dhexdiisa. Ruqsada waa hadaad rabtit ee qasab ma aha go’aanka in uusan ka qeyb qaadana wax ay yeeleeyso ma jirto sidii loola dhaqmi jiray iyo darajadiisaba.. Miyaad ogolaaneeysaa, fadlan ogow waad dooran kartaa in aad kala baxdo ruqsadaada saacadaad rabto intuu mashruuca socdo. Hadaad heyso su’aalo, fadlan waxaad igala soo xiriiri kartaa 292-7629. Waad ku mahadsantahay feejignaantaada iyo sida aad noola shaqeysay.

Daacadnimo ah

Gwendolyn Cartledge, Ph.D
Professor
APPENDIX F

PARENT CONSENT FORM FOR PARTICIPATION IN EDUCATIONAL RESEARCH (IN SOMALI)
September 28, 2006

Ogolaanshaha ka qeybqaadashada bulshada iyo baarista dabeecadahooda.


Habka tirada: Laalan (Wali)

Baare maamule: Dr. 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
shaqsiiyeed (Hadii ey jirto) Warbixin caafimad(Hadii ey jirto) dhicbaha intixaanah fasalka dhexdiisay ah, iyo qiyaasta qiimeynooda.


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

Qor magaca ka qeybqataha: __________________________________________________

Taariiqda saxiixay: ______________________________________

Ka qeybqaate

Maamulaha (baaritaanka asaga/eyada wakiilka amarbixiyaha) saxiixay:

_____________________________________

(Amarbixiyihii ogoladay ka qeybqaadashada, hadii loo baahday)

Marqaati: ________________________________

(hadii loo baahdo)
APPENDIX G

TEACHER PARTICIPATION LETTER IN EDUCATIONAL RESEARCH
September 29, 2006

Hubbard, Lincoln Park, & Medary Elementary Schools
Columbus Public Schools
Columbus, Ohio 43215/43207/43202

Dear Teacher/Instructional Assistant:

As you are aware, we are conducting a model research/inservice project designed to increase the success of students at risk for school failure. One research component of this project is to conduct academic interventions for students at-risk of reading failure and study the effects of this intervention on both academic and social behavior. This letter is to request your participation in this research component of the project. It means you will be willing to implement the early reading intervention in your classroom for students who need intensive reading instruction.

My doctoral student, Lefki Kourea, and I will be in collaboration with you on the assessment procedures, intervention development, implementation, and evaluation process. We will assist you in developing specific strategies that we all feel will best meet the needs of your students for this purpose. We will help you design the materials, where needed, and assist you in the classroom application. Lefki will visit you weekly, as needed, to assist with the implementation and to consult with you about the effects. One or two university students also will be available to assist in data collection. In order to obtain comprehensive information of your students selected for this research project, we will review your students' school records, request your assessment of their academic performance, and conduct interviews with your students.

We also hope to make videotapes and to take photographs of these strategies. We anticipate that setting up and implementing the research project will take the remainder of the school year. We plan to get parent permission to collect pupil data and to take pictures within your class setting. Both midway through and at the completion of the project we would like for you to complete a questionnaire evaluating its effects. Participation is totally voluntary and you should feel free to withdraw at any time. If you choose not to participate, it will not affect your position or involvement in other aspects of the project in any way.
I am available to discuss this research project with you in detail. You may reach me by telephone at 292-7629 or by e-mail at Cartledge.1@osu.edu. I look forward to discussing this with you further.

Sincerely,

Gwendolyn Cartledge
Professor and Principal Investigator
APPENDIX H

TEACHER CONSENT FORM FOR PARTICIPATION
IN EDUCATIONAL RESEARCH
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 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 participation.

I know that I can choose not to participate without penalty to me. If I agree to participate, I can withdraw 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. I will not be identified by name and I will be depicted in these tapes in positive ways.

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: ____________________________________

Signed: ______________________ (Principal Investigator or his/her authorized representative)

Signed: ______________________ (Person authorized to consent for participant, if required)

Witness: ______________________ (When required)
APPENDIX I

TEACHER INFORMATION FORM
Information Sheet for ERI Instructional Assistants

Name: ______________________________________

1. Age: Please put an X mark to the appropriate category

☐ 20-25     ☐ 41-45
☐ 26-30     ☐ 46-50
☐ 31-35     ☐ 41-55
☐ 36-40

2. Educational Background: Please indicate any diplomas/ degrees/ certifications/ licenses/ endorsements you have and the respective educational institution you received them from.

<table>
<thead>
<tr>
<th>Educational title</th>
<th>Educational Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

3. Number of years of teaching experience (excluding the current year): _______

Please, describe the type (i.e., tutoring, classroom instruction) of your teaching experience.

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

4. Please indicate the grade level of students you worked with in the past:

☐ Pre – K (specify age __________________________)
☐ Middle school (specify grade levels __________________________)
☐ Kindergarten
☐ High school (specify grade levels __________________________)
☐ Elementary (specify grade levels)
5. Did you work with:

☐ Urban students
☐ Suburban students
☐ or both

6. Please indicate the number of years working with the above students:

Urban students _______ years
Suburban students __________ years

7. Did you work with students that have English as their second language?

☐ Yes ☐ No

If yes, please indicate:

7a. the number of years working with this student population _____

7b. the ethnicity of these students _________________________________________

8. Did you work with special education students?

☐ Yes ☐ No

If yes, please briefly describe your experience with this type of student population (i.e., disability, type of instruction)

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

9. Did you have any previous experience with early reading interventions?

☐ Yes ☐ No

If yes, please describe briefly what kind of reading interventions you used.
APPENDIX J

SAMPLES OF DIBELS PROGRESS MONITORING PROBES
<table>
<thead>
<tr>
<th>vob</th>
<th>nog</th>
<th>kad</th>
<th>es</th>
<th>el</th>
</tr>
</thead>
<tbody>
<tr>
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<td>dod</td>
<td>vif</td>
<td>hif</td>
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<td>dov</td>
<td>zut</td>
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<td>oc</td>
<td>ric</td>
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<td>baf</td>
<td>id</td>
<td>joc</td>
<td>tej</td>
</tr>
<tr>
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<td>Progress Monitoring 19</td>
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<td>------------------------</td>
<td></td>
<td></td>
<td></td>
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<td><strong>Phoneme Segmentation Fluency</strong></td>
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</tr>
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<td>lap /l/ /a/ /p/ steel /s/ /t/ /ea/ /l/</td>
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</tr>
<tr>
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<td>duck /d/ /u/ /k/ nuts /n/ /a/ /t/ /s/</td>
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<td>poor /p/ /oo/ /r/ sand /s/ /a/ /n/ /d/</td>
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<td></td>
<td></td>
</tr>
<tr>
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<td>path /p/ /a/ /th/ mad /m/ /a/ /d/</td>
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<td></td>
</tr>
</tbody>
</table>

Total: ___

Error Pattern:

Page 4 © 2002 Dynamic Measurement Group, Inc
APPENDIX K

ERI SAMPLE LESSON
### Activity Materials Time

#### 1. **Alphabetic**
- Introduce /j/
- **Materials:** Alphabetic Card: /j/
- Letter Card: /j/
- **Time:** 1-2 minutes

#### 2. **Phonologic**
- Does it begin with /j/?
- **Materials:** Picture cards: jam, inch, jeep, jet, jump
- **Time:** 4-5 minutes

#### 3. **Alphabetic**
- Sounds
- **Materials:** Sounds
- Teacher Resource Package 3
- **Time:** 4-5 minutes

#### 4. **Phonologic/Reading**
- Say the sounds/Say the word with fingers; regular words
- **Materials:** Regular words
- Teacher Resource Package 3
- Word cards: am, man
- **Time:** 4-5 minutes

### Writing and Spelling

#### 5. **Writer's warm-up**
- Introduce /j/
- **Materials:** Writer’s warm-up
- Student activity book 3
- **Time:** 2-3 minutes

#### 6. **Integrated**
- **Materials:** 3-Square strip
- **Time:** 2-3 minutes

#### 7. **Phonologic/Spelling**
- **Materials:** Word maze
- **Time:** 6-8 minutes

---

**New Sound /j/**

**Review Sounds /a/, /o/, /r/, /b/, /i/, /n/, /g/, /u/**

**Key Reading Skills:** Letter-Sound correspondence; word reading
## Activity 1: Introduce Letter Name and Sound

**Objective:** Children learn and trace the letter *j*.

### Time: 1-2 min

<table>
<thead>
<tr>
<th>To Do</th>
<th>Introduce letter name</th>
<th>Hold up the <em>j</em> Alphabet Card.</th>
<th>Model</th>
<th>The name of this letter is <em>j</em>.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lead</td>
<td>Say the name with me: <em>j</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Test</td>
<td>What is the name of this letter?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Introduce letter sound</th>
<th>Continue holding up the <em>j</em> Alphabet Card.</th>
<th>Model</th>
<th>The name of this letter is <em>j</em>.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lead</td>
<td>Say the name with me: <em>j</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Test</td>
<td>What is the name of this letter?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test knowledge of letter name and sound</th>
<th>Continue holding up the <em>j</em> Alphabet Card.</th>
<th>Test</th>
<th>What is the name of this letter? What is the sound of this letter?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Ongoing Assessment

- **If...** children make an error, **then...** tell them the name or sound, have them repeat the name or sound, and return to the letter a second time.

### Model tracing *j*

- **Model** how to trace *j* using your alphabet card.

### Test

- **Watch. I’ll trace the letter *j***.
  - Ask the children to trace the letter *j* on their letter cards three times. Have them say /j/ each time they trace the letter.

### Ongoing Assessment

- **If...** children make an error, **then...** put your hand over their hand and guide them to trace the letter. Then have children try to trace the letter on their own. Repeat as necessary.
### Activity 2: Isolate Initial Sound

**Does it begin with /j/?**
**Objective:** Children isolate initial /j/.

<table>
<thead>
<tr>
<th>To Do</th>
<th>To Say</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model names of pictures</strong></td>
<td><strong>Model</strong> This is _____. What is this? Model names of pictures selected for the game. Have children repeat them. Test children on picture names: What is this?</td>
</tr>
<tr>
<td>Gather the picture card. Hold up each picture card.</td>
<td><strong>To Say</strong></td>
</tr>
<tr>
<td><strong>Introduce the game. Does it begin with /j/?</strong></td>
<td>Tell children they will play a game. They will name pictures that have the first sound /j/.</td>
</tr>
<tr>
<td>Practice production of the target sound</td>
<td>When you say /j/, your tongue is up and your lips are open. Watch, /j/. Open your lips and say /j/.</td>
</tr>
<tr>
<td><strong>Model the game</strong></td>
<td><strong>Model</strong> It’s my turn. I’ll say the name of the picture and then tell if it has the first sound /j/: <em>jam</em> (exaggerate the first sound). <em>Jam has the first sound /j/.</em> My lips are open when I say /j/, <em>jam</em>. Next picture: <em>inch</em> (exaggerate the first sound). <em>Inch does not have the first sound /j/.</em></td>
</tr>
<tr>
<td>Model two examples: <em>jam, inch.</em></td>
<td><strong>Test</strong> What is this? Does <em>jeep</em> have the first sound /j/? Exaggerate the first sound. Confirm correct responses and prompt sound production: Yes, <em>jeep</em> has the first sound /j/. Let’s say /j/. Remember, when you say /j/, your lips are open. Continue with the remaining cards.</td>
</tr>
<tr>
<td><strong>Play the game to test knowledge of initial /j/</strong></td>
<td><strong>Ongoing Assessment</strong></td>
</tr>
<tr>
<td>Test the children with <em>jeep, jet, jump rope and up.</em></td>
<td>If... children make an error, then... model the correct answer. Review the sound production cue. Have children repeat the correct answer. Return to the example a second time.</td>
</tr>
</tbody>
</table>

(Time 4-5 min)
Activity 3  Discriminate Letter Sounds

Sounds
Objective: Children discriminate letter sounds

(Time 4-5 min)

<table>
<thead>
<tr>
<th>To Do</th>
<th>To Say</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduce the activity</td>
<td>Display the sounds page.</td>
</tr>
<tr>
<td></td>
<td>I will point to a letter. You will tell me the sound for the letter. Some of the sounds will be quick sounds. You should say a quick sound only for as long as I touch under the letter. (Point to the letter briefly if it is a stop sound such as /b/. Hold your finger under the letter for about two seconds if it is a continuous sound such as /aa/. )</td>
</tr>
</tbody>
</table>

Test knowledge of letter name and sound | Continue to display the sounds page. |
| | Give individuals turns. |
| Test | What is the sound for this letter? Hold your finger under the letter for about two seconds as children say the sound. Confirm correct responses: Yes, /aa/. Continue with the remaining letters, moving from left to right across page. |

Ongoing Assessment

If... children make an error, then... tell them the sound, have them repeat the sound, and move back two letters on the page (or repeat the letter if it is at the beginning of the page).  
If... children make an error, then... repeat the test for all of the letters on the page.
### Activity 4  Read Words

**(Time 4-5 min)**

<table>
<thead>
<tr>
<th>To Do</th>
<th>To Say</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduce the activity</strong></td>
<td>It’s time to play <em>Say the Sounds the Word and Fingers</em>. I will say the sounds of a word slowly. You’ll slowly repeat each sound as you touch a finger. Then you’ll say the sounds quickly to say the word.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lead the activity</th>
<th>Segment and blend <em>map</em>.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lead</strong></td>
<td>Let’s do a three-sound word together. Hold out three fingers. Have children hold out three fingers pointed toward you. Have them use the pointer finger of the other hand to touch a finger for each sound, moving from left to right. <strong>Listen to the sounds:</strong> (pause) <em>/mmm/</em> <em>/aaal/</em> <em>/pl/</em>. Touch a finger as you say each sound without stopping between the sounds. <strong>Say the sounds slowly with me:</strong> <em>/mmm/</em> <em>/aaal/</em> <em>/pl/</em>. Touch a finger for each sound. <strong>Now say the sounds quickly with me to say the word.</strong> Clap with children as you and they say the word: <em>map</em>.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test knowledge of segmenting and blending</th>
<th>Test children on <em>fin</em>.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Test</strong></td>
<td>It’s your turn to do a three-sound word. Hold out three fingers. <strong>Listen to the sounds:</strong> (pause) <em>/fff/</em> <em>/iiii/</em> <em>/nnn/</em>. Touch a finger as you say each sound. <strong>Say the sounds slowly.</strong> Touch a finger for each sound as children say the sounds slowly. <strong>Now say the sounds quickly to say the word.</strong> Clap with children as you and they say the word.</td>
</tr>
</tbody>
</table>

Repeat the test with *am, sun, man, and up*. For *am* and *up*, have children hold out two fingers.
Give individuals turns.

<table>
<thead>
<tr>
<th>If... children do not touch the appropriate finger for each sound,</th>
<th>then... model how to do it. Have them try again. If necessary, guide their hands to touch the appropriate fingers.</th>
</tr>
</thead>
<tbody>
<tr>
<td>If... children stop between the sounds,</td>
<td>then... model how to say the sounds without stopping between them. Have children say the sounds again.</td>
</tr>
<tr>
<td>If... children have trouble saying the sounds quickly,</td>
<td>then... tell them the word. Say the sounds slowly and quickly for them before having them try again.</td>
</tr>
<tr>
<td>Activity 5</td>
<td>Writer’s Warm-Up</td>
</tr>
<tr>
<td>-----------</td>
<td>------------------</td>
</tr>
</tbody>
</table>

Introduce *j*
Objective: Children trace and write *j* and review writing *a*, *a*, *u*, *b*, *n*, *i*, and *r* (Time 2-3 min)

<table>
<thead>
<tr>
<th><strong>To Do</strong></th>
<th><strong>To Say</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Review letter name and sound</td>
<td>Hold up the <em>j</em> Tracing Card. Review the letter name and sound.</td>
</tr>
<tr>
<td>Model tracing <em>j</em></td>
<td>Distribute a write’s warm-up to each child. Continue holding up the tracing card.</td>
</tr>
<tr>
<td>Model writing <em>j</em></td>
<td>Model writing <em>j</em> on the lined side of the tracing card.</td>
</tr>
<tr>
<td>Model</td>
<td>Watch as I trace the letter <em>j</em> with my finger. Have children trace the first two letters on their warm-up sheets. Then model tracing <em>j</em> again, and have children use their pencils to trace the next two letters on their sheets.</td>
</tr>
<tr>
<td>Model</td>
<td>Watch as I trace the letter <em>j</em>. I start at the dot and write the letter. Have children write the letter two times on their warm-up sheets. Remind them to write their letters carefully and correctly.</td>
</tr>
</tbody>
</table>

**Ongoing Assessment**

If... children make an error, then... put your hand over their hand and guide the writing of the letter. Then have children write the letter on their own. Repeat as necessary.

<table>
<thead>
<tr>
<th>Test children on writing <em>j</em></th>
<th>Model writing <em>j</em> again.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have children cover the letters they traced and wrote. Have them write the letter two times from memory. Then have them uncover their papers and compare the letters.</td>
<td></td>
</tr>
<tr>
<td>Do your letters look the same? Circle the letter that is your best work.</td>
<td></td>
</tr>
<tr>
<td>Review</td>
<td>Gather the tracing cards.</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><em>a, g, u, b, n, l, r</em></td>
<td></td>
</tr>
</tbody>
</table>

Have children trace and write each review letter one time.

**Ongoing Assessment**

<table>
<thead>
<tr>
<th>If... children make an error,</th>
<th>then... use the tracing card to model the letter. If necessary guide the writing of the letter. Then have children write the letter on their own. Repeat as necessary.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduce the activity</td>
<td>Hold up the /j/ Alphabet Card.</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td><strong>Lead the activity</strong></td>
<td><strong>To Do</strong></td>
</tr>
<tr>
<td>Set out the 3-square stip and the letter tiles. Segment the word <em>gum</em>.</td>
<td>The first word is <em>gum</em>. What is the first word? Have children hold out three fingers. Say the sounds in <em>gum</em> and touch a finger for each sound.</td>
</tr>
<tr>
<td>Isolate the first sound in <em>gum</em>.</td>
<td>Does everyone know what the first letter in <em>gum</em> is? Call on a child to choose the correct letter tile and place it in the first square of the strip.</td>
</tr>
<tr>
<td>Lay out two letter tiles <em>g</em> and one other. Identify the letter for the first sound in <em>gum</em>.</td>
<td>Say the sounds in <em>gum</em> again and touch a finger for each sound. Stop when you get to the next sound. What is the next sound in <em>gum</em>? Point your middle finger: That’s right; /uuu/ is the next sound in <em>gum</em>.</td>
</tr>
<tr>
<td>Isolate the middle sound in <em>gum</em>.</td>
<td></td>
</tr>
<tr>
<td>Lay out two letter tiles, <em>u</em> and one other. Identify the letter for the first sound in <em>gum</em>.</td>
<td></td>
</tr>
<tr>
<td>Isolate the middle sound in <em>gum</em>.</td>
<td></td>
</tr>
</tbody>
</table>

**Activity 6** Correct Sound to Letter

Practice Session: Spelling
Objective: Children segment words and connect sound to letters
Lay out two letter tiles, m and one other. Identify the letter for the first sound in gum.

Confirm the spelling of gum.

sound. Stop when you get to the last sound. What is the next sound in gum? Point your ring finger: That’s right; /mmm/ is the last sound in gum.

Does everyone know what the last letter in gum is? Call on a child to choose the correct letter tile and place it in the last square of the strip.

Now say each sound in gum with me as I point to the letters: /g/ /uuu/ /mmm/. Now say the sounds quickly to say the word: gum. That’s right; g-u-m spells gum. The sounds in gum are /g/ /uuu/ /mmm/.

Practice with nob, pan, bug, and mop, as time allows.

**Ongoing Assessment**

| If... children make an error, | then... model the answer, have them repeat it, and return to the sound and letter a second time. |
Word Maze
Objective: Children connect sounds to letters to spell words

(Time 6-8 min)

<table>
<thead>
<tr>
<th>Introduce the activity</th>
<th>Distribute a word maze to each child.</th>
<th>The next activity is a word maze. I’m going to say a word. You are going to spell the word by writing the letters that go with the word’s sounds. Let’s see if we can get through the maze!</th>
</tr>
</thead>
</table>

| Model the activity | Hold up a word maze. Point to the first word blank. | Model | The first word in the maze is *bun*. I will say the sounds in *bun* and touch a finger for each sound: /b/ /uuu/ /nnn/. The first sound in *bun* is /b/. Point to your index finger. I’m going to write the first letter in *bun*. Write a *b* in the first box. **Now you write the first letter in *bun***. Continue using this process to model the sounds /uuu/ and /nnn/ (use your middle and ring fingers) and write the letters *u* and *n* in the middle and last boxes. Have children write these letters in the boxes with you. Confirm the spelling: **Say each sound in *bun* with me and touch your letters as we say each sound: /b/ /uuu/ /nnn/. Say the sounds quickly. That’s right; *b-u-n* spells *bun*.** |
| --- | --- | --- |

<table>
<thead>
<tr>
<th>Test children on spelling <em>gum</em>, <em>pan</em>, and <em>bog</em></th>
<th>Test</th>
<th>Find your way through the maze to the next word. The next word is <em>gum</em>. What is the word? Say the sounds in <em>gum</em> and touch a finger for each sound: /g/ /uuu/ /mmn/. What is the first sound in <em>gum</em>? Point to your index finger. <strong>That’s right; /g/ is the first sound in <em>gum</em></strong>. Everyone, right the first letter in <em>gum</em> in the first box. Continue in this fashion until children have identified the other sounds and</th>
</tr>
</thead>
</table>
letters in *gum* and have all three letters in the squares.

**Now say each sound in *gum* with me and point to your letters as we say each sound:** /g/ /uuul/ /mmmi/. Say the sounds quickly. That's right; *g-u-m* spells *gum*.

Repeat the test for *pan* and *bog*. After each word, have children find their way through the maze to the next word.

<table>
<thead>
<tr>
<th><strong>Ongoing Assessment</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>If... children make an error,</td>
</tr>
</tbody>
</table>
APPENDIX L

EXPERIMENTER-CONSTRUCTED

FLUENCY ACTIVITY
# Activity 8: Reading Fluency

**Objective:** Children read decodable passages  
**Time:** 3-5 min.

<table>
<thead>
<tr>
<th><strong>To Do</strong></th>
<th><strong>To Say</strong></th>
</tr>
</thead>
</table>
| **Introduce the activity** | **Gather the word cards.**  
**Everybody, we’re going to read some words to get ready for our reading game. I will show the words and then you will read them.** |
| **Word practice (1 min)** | **Hold up one card at a time. Model reading each word using your pointer finger.**  
**Listen, “______” What word?**  
**Next word “______” What word?**  
**Next word “______” What word?** |
| **Test word knowledge** | **Give individual turns.**  
**I will call individual names to read the words to me.**  
**If students make an error, THEN model the correct word and have them repeat it.** |
| **Model reading** | **Read the passage slower than you normally would and point to the words as you read.**  
**Get ready for our reading game. Put your finger on the first word of our story and follow along as I read it.** |
| **Guided Practice (only on 1 & 2 day of the story)** | **Read one sentence and then have students repeat the same sentence with you.**  
**Now, we will read the story together. I will read a sentence first, and then we will read the same sentence together. Get ready with your finger on the first word.** |
| **Partner reading (2 min)** | **Pair students with a partner.**  
**While children read, monitor their reading and give points for:**  
1. taking turns  
2. fixing partner’s errors  
3. using finger  
**Now, it’s your turn to read the story with your partner. First readers are “______” and second readers are “______” (say student names)**  
**Remember to take turns reading one sentence at a time. If your partner makes a mistake, you help out with your “fixing” card.**  
**I will watch and give points to the team that does its best reading.** |
| **Test reading knowledge (1 min)** | **Select randomly one student to read for 1 minute.**  
**Now, I will call “______” to read to me for 1 minute. Everybody, follow along as “______” reads. Get ready. Begin!**  
**If student gets stuck on a word for 3 sec., tell the student the word Errors: mispronunciations, words after a 3-second hesitation, and omissions.** |
APPENDIX M

TREATMENT INTEGRITY CHECKLIST
**ERI Procedural Integrity Checklist**

Implementer: __________________ School: ___________ Observer:__________________

Date: __________ Start time: _____ End time: _____ Lesson: _____ Student names:

---

**Instructions:**

Time the length of the session as you collect procedural integrity data.

1. Indicate the extent to which the implementer performs each of the following steps by checking the appropriate box.
2. Write comments, observations, or suggestions for improvement in the space provided.

<table>
<thead>
<tr>
<th>Instructional behaviors</th>
<th>Never (0)</th>
<th>Rarely (1)</th>
<th>Mostly (2)</th>
<th>Always (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follows script</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td><strong>Models</strong> the skill (For example, says “The name of this letter is “m.”)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Provides <strong>guided practice</strong> on target skill (E.g., says “Say the name of the letter with me: m.”)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td><strong>Assesses</strong> students individually on target skill (E.g., Asks, “What is the name of the letter?”)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Uses manipulatives (e.g., alphabet cards, picture cards) as outlined in the lesson</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Provides <strong>immediate feedback</strong> (Example: says “Good” for correct responses, and provides correct response for incorrect responses)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Uses appropriate <strong>pacing</strong> (e.g., fast for review skills, provides thinking pause on more difficult skills)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Delivers <strong>error-correction</strong> according to script</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Provides <strong>reinforcement</strong> (star card) approximately once every 5 minutes for appropriate behavior</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

**Session Integrity** = \( \frac{\text{Number of steps completed}}{\text{Total number of steps (10)}} \times 100 \)

**Quality of implementation** (scale: 0-27)

---

Notes/ Comments:
APPENDIX N

STUDENT READING SAMPLE STORIES
Tim

Tim can hop in the van.

Diz can hop in the big van.

Nat can hop in the red van.

Dan can hop in the big red van.

Was Tim in the big red van?

Tim? Tim?

Yes, he was in the big red van.
The Pup and the Bug

A big bug sat on the end of a log. The pup ran to get the bug.

The pup fell in the mud! The pup got mud on the rug.

Mom said to get the pup in the tub!

A big bug sat on a cup in the tub. The pup got up to get the bug.

The bug fell in the tub!

The bug and the pup had fun in the tub.

Mom sent Diz to get a mop.
The dog likes to talk, talk, talk

A tall man had a dog that liked to talk and liked to read.

One day the dog was reading a book. The tall man was in the hall. He called the dog. He yelled, “Dog, come here and play ball with me.”

The dog yelled back at the man, “I hear you call, call, call but I don’t like to play ball, ball, ball.”

The man was getting mad. He yelled, “Dog, stop reading that book and start playing ball.”

The dog said, “I will not do that, that, that, when I can sit here and get fat, fat, fat.”
APPENDIX O

TEACHER READING SAMPLE STORIES
**Target words:** big, van, was

**Story 4**

**Tim**

Tim can hop in the van. (6)

Diz can hop in the big van. (13)

Nat can hop in the red van. (20)

Dan can hop in the big red van. (28)

Was Tim in the big red van? (35)

Tim? Tim? (37)

Yes, he was in the big red van. (45)
The Pup and the Bug

A big bug sat on the end of a log. The pup ran to get the bug. (17)

The pup fell in the mud! The pup got mud on the rug. (30)

Mom said to get the pup in the tub! (39)

A big bug sat on a cup in the tub. The pup got up to get the bug. (57)

The bug fell in the tub! (63)

The bug and the pup had fun in the tub. (73)

Mom sent Diz to get a mop. (80)
The dog likes to talk, talk, talk

A tall man had a dog that liked to talk and liked to read. (14)

One day the dog was reading a book. The tall man was in the hall. He called the dog. He yelled, “Dog, come here and play ball with me.” (43)

The dog yelled back at the man, “I hear you call, call, call but I don’t like to play ball, ball, ball.” (65)

The man was getting mad. He yelled, “Dog, stop reading that book and start playing ball.” (81)

The dog said, “I will not do that, that, that, when I can sit here and get fat, fat, fat.” (101)
### Data Sheet for the Fluency Activity

( Goal: 40cwpm )

<table>
<thead>
<tr>
<th>Student</th>
<th>Story 1: Diz</th>
<th>Story 2: Can Diz hit it?</th>
<th>Story 3: It was hot!</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Date</td>
<td>CWPM</td>
<td>Errors</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Move on to the next story after spending 3 instructional sessions on the previous story.

**Scoring Rules:**

<table>
<thead>
<tr>
<th>Correct words are</th>
<th>Incorrect words are:</th>
<th>Ignore words that are</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ words read correctly within 3 seconds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓ self-corrected within 3 seconds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓ words read more than 3 seconds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓ omissions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓ substitutions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓ mispronunciations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓ additions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓ not read clearly due to articulation or speech problems</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX Q

STARCARDS
APPENDIX R

WEEKLY LOG
## Weekly ERI Log

<table>
<thead>
<tr>
<th>Date</th>
<th>Group #</th>
<th>Lesson #</th>
<th>Instructional Time</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Start time (min: sec)</td>
<td>End time (min: sec)</td>
</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>

**Total weekly instructional time**
APPENDIX S

PRE-ACCEPTABILITY FORM
Date: _______________ Intervention: Early Reading Instruction (ERI)

Instructional Assistant: _______________ Grade Level: _______________

Please complete the items listed below by circling only one answer that best indicates how you feel about the intervention. Please read the items carefully because a circle accidentally placed on one number rather than another may not represent the meaning you intended.

**To what extent do you agree or disagree with the following statements?**
(Circle only one number on each line)

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

1. I find this intervention to be an acceptable way of dealing with students’ reading difficulties. 1 2 3 4 5
2. I would be willing to use this procedure if I had to improve a student’s reading difficulties. 1 2 3 4 5
3. I believe that it would be acceptable to use this intervention without students’ consent. 1 2 3 4 5
4. I like the procedures used in this intervention. 1 2 3 4 5
5. I believe this intervention is likely to be effective. 1 2 3 4 5
6. I believe the student will experience discomfort during the intervention. 1 2 3 4 5
7. I believe this intervention is likely to result in permanent improvement. 1 2 3 4 5
8. I believe it would be acceptable to use this intervention with students who can not choose interventions for themselves. 1 2 3 4 5
9. Overall, I have a positive reaction to this intervention. 1 2 3 4 5
10. The ERI training helped me to understand how to teach the ERI program 1 2 3 4 5
11. The ERI training gave me sufficient opportunities for practicing the ERI activities 1 2 3 4 5
12. I am satisfied with the ERI training. 1 2 3 4 5
If there is anything else you would like to tell us about the ERI intervention and the ERI training, please do so in the space provided below:

........................................................................................................................................
........................................................................................................................................
........................................................................................................................................
........................................................................................................................................
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........................................................................................................................................
APPENDIX T

POST-ACCEPTABILITY FORM
Date: ______________ | Intervention: Early Reading Instruction (ERI)

Instructional Assistant: ______________ | Grade Level: First

Please complete the items listed below by circling only one answer that best indicates how you feel about the intervention. Please read the items carefully because a circle accidentally placed on one number rather than another may not represent the meaning you intended.

To what extent do you agree or disagree with the following statements?
(Circle only one number on each line)

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

1. I found this intervention to be an acceptable way of dealing with students’ reading difficulties.

2. I would be willing to use this procedure if I had to improve a student’s phonological awareness difficulties.

3. I believe that it would be acceptable to use this intervention without students’ consent.

4. I liked the procedures used in this intervention.

5. I believe this intervention helped my students develop their reading skills.

6. I believe the students experienced discomfort during the intervention.

7. I believe this intervention resulted in permanent student improvement.

8. I believe it was acceptable to use this intervention with students who can not choose interventions for themselves.

9. I would recommend this intervention to other teachers.

10. Overall, I have a positive reaction to this intervention.

Please do provide additional thoughts and comments in the space below:

........................................................................................................................................
........................................................................................................................................

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APPENDIX U

STUDENT INTERVIEW FORM
Student Social Validity Form

Student: __________________________ Instructional Assistant: ___________

Interviewer: _____________________ Date: ___________________

Instruction: “I’d like to ask you some questions about your tutoring with
___________ (say IA’s name). This is not a test and you can tell me how you feel. When I ask you a question, I’d like you to give me your answer by pointing to one of these faces.” [Note: Explain each of the faces to the student.]

<table>
<thead>
<tr>
<th>Questions</th>
<th>Not much</th>
<th>A little</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Did you like being in this special tutoring?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Did you like spending time with __________ (say IA’s name)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Did you like earning prizes/candies?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Did you like learning about sounds and letters?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Did you like reading stories with __________ (say IA’s name?)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Did you learn things that will help you become a good reader?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

“Now, I’d like you to answer more questions by saying either YES or NO?”

<table>
<thead>
<tr>
<th>Questions</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Do you feel you learned all your sounds and letters when working with __________ (say IA’s name)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Do you use the sounds/letters/words you learned in the tutoring?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes, Do you use your sounds/letters/words</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. in class?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. At home?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. With other kids?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8. Do you feel you learned important things? If yes, Tell me two important things you learned in the tutoring.
A. ______________________________________________
B. ______________________________________________

9. Do you wish you would have worked with ___________ (say IA's name) for another week?

Is there anything else you would like to tell me about your special tutoring? (encourage student to say a final thought)

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________