12-9-2008

The Effects of Supplemental Instruction in Phonological Awareness on the Skills Of Kindergarten Students

Sally King Shanahan
Indiana University of Pennsylvania

THE EFFECTS OF SUPPLEMENTAL INSTRUCTION IN PHONOLOGICAL AWARENESS ON THE SKILLS OF KINDERGARTEN STUDENTS

A Dissertation Submitted to the School of Graduate Studies and Research in Partial Fulfillment of the Requirements for the Degree Doctor of Education

Sally King Shanahan

Indiana University of Pennsylvania

December 2008

Indiana University of Pennsylvania
The School of Graduate Studies and Research
Department of Educational and School Psychology

We hereby approve the dissertation of

Sally King Shanahan

Candidate for the degree of Doctor of Education

_____ _____
Lynanne Black, Ph.D.
Assistant Professor of
Education & School Psychology,
Advisor

_____ _____
Joseph Kovaleski, D.Ed.
Professor of Education &
School Psychology

_____ _____
Mark John Staszkiewicz, D.Ed.
Professor of Education &
School Psychology

_____ _____
Becky A. Knickelbein, D.Ed.
Assistant Professor of
Education & School Psychology

ACCEPTED

_____ _____
Michele S. Schwietz, Ph.D.
Assistant Dean for Research
The School of Graduate Studies
and Research

The Effects of Supplemental Instruction in Phonological Awareness on the Skills Of Kindergarten Students

Author: Sally King Shanahan

Dissertation Chair: Dr. Lynanne Black

Dissertation Committee Members: Dr. Joseph Kovaleski
Dr. Mark Staszkiewicz
Dr. Becky Knickelbein

This project examines the effects of supplemental instruction in phonological awareness, home literacy activities, sex, and environmental factors on the emerging literacy skills of kindergarten students.

Research indicates that the foundation for good reading begins to develop well before school through interaction between children and their home and community environments. The linguistic richness of a child's early environment as well as their ability to access that environment are factors in reading readiness. Research indicates that a reading weakness needs to be identified and remediated as early as possible in the child's learning career.

In this study, the Comprehensive Test of Phonological Processing (CTOPP) was used to identify kindergarten students' weaknesses in phonological processing. Students who demonstrated weaknesses on the pre-test of the CTOPP were provided with supplemental instruction in phonological

processing using the *Road to the Code* curriculum. At the end of the school year, the students were post-tested with the CTOPP. A MANOVA was used to determine whether the differences between the three groups of students lower group (LG); middle group MG; and, higher group (HG) were mitigated.

The effect of home literacy activities on development of phonological processing skills was assessed using Pearson Product Moment correlation to determine whether the frequency of particular activities correlated with composite scores on the CTOPP.

Results suggested that instruction in phonological awareness improved both phonological awareness and phonological memory skills and mitigated the difference between the lower scoring students and middle scoring students in phonological awareness on the CTOPP. Telling stories to children, reading to children, and singing songs and listening to music were weakly, positively correlated to scores on the Phonological Awareness composite of the CTOPP. Telling stories and teaching letters and numbers to children were both weakly positively correlated to the Phonological Memory composite of the CTOPP. Sex of the student, preschool attendance, one or two parent families, and one or two parents working were not significant

influences on the development of phonological processing skills of students in the district.

ACKNOWLEDGEMENTS

There are many people who I need to thank for their support and encouragement throughout the completion of this project. My children, John and Kathleen, have supported me and taken care of themselves, our home, and our critters every summer for the last five years. My committee, especially Dr. Black, my Chair, who guided me through this long and arduous process, and Dr. Staszkiewicz, who took the impossible out of statistics were invaluable to me. More than thanks go to my school roommate and friend Andrea who has walked this long and challenging path with me! More than anyone else “she gets it.” There are also several people in my school district who supported me with their energy and time. I must acknowledge school psychologist, Colleen Pelton, and (at the time interns), Shukura Monroe and Emily Sonenschein, who, with me, assessed 120 kindergarten children, twice, as well as the reading specialists who taught the curriculum *Road to the Code* to the kindergarten students, Dr. Elaine Bomkamp and Frances Bordogna. I also want to thank the principals of the district schools, Susan Mingey and Tim Bickhart, who developed and supported the program, as well as Dr. William Keilbaugh, the superintendent of the district, who allowed

me to use the data generated in the schools for my dissertation.

Most importantly I must acknowledge my mother, Romaine Albright King, a woman born before her time. She instilled in me a thirst for knowledge and the belief that I could accomplish if I set my mind to it! Her drive and encouragement continue to influence me well past her tenure on this earth. I only hope that I have this same kind of influence on my own children, who are truly, the greatest creations in my life!

TABLE OF CONTENTS

LIST OF TABLES

Table

LIST OF FIGURES

CHAPTER I

INTRODUCTION TO THE PROBLEM

Reading is the key to academic success. The importance of early reading skills cannot be overstated. Children who struggle with reading in the early grades tend to remain behind their peers throughout school (Aaron, 1997). Since efficient reading skills are necessary in all course areas, academic progress in all subjects falters if a child struggles in reading (McIntyre, Jones, Powers, Newsome, Petrosko, Powell & Bright, 2005; Uhry & Clark, 2005). Adams (1995) adds that early reading instruction is important because reading is the key to education and education is the key to success for individuals and our democracy.

When and how to begin teaching children to read has been the subject of debate since the mid-1800s (Adams, 1995). The meaning-first curriculum was developed in the 19th century and basal readers were the primary mode of reading instruction until the mid-1900s. Words were introduced in conjunction with their meaning to be recognized holistically by sight. Reading comprehension was emphasized over phonetic understanding through the 1940s. In the 1950s, Rudolph Flesch introduced the idea

that English is an alphabetic language and phonetic by definition; thus, phonetic instruction is necessary as well.

Jeanne Chall's research, which began in the fall of 1959, was the culmination of the debate between meaning-first curriculum and teaching phonics (Adams, 1995). Chall's extensive research surprised even her and determined that systematic phonics instruction was a valuable component to beginning reading instruction (Adams, 1995).

Current research (National Reading Panel,2000; Pressley, 2002; Shaywitz, 2005; Torgesen, 1998) into the area of reading instruction has demonstrated that phonological awareness (PA), rapid naming (RN), and phonological memory (PM) skills are indicators of reading success. Phonological awareness is the knowledge that words are made up of the smallest units of sound (phonemes) that are associated with individual letters and letter groups (graphemes) (Torgesen, 1998). This basic concept is the foundation of the alphabetic principle and the beginning of phonics instruction (Adams, 1995). Phonological memory refers to the ability to code information phonologically for temporary storage in working or short term memory. The temporary coding and storage of

phonological information allows for interpretation of the sounds and giving meaning to the word. Rapid naming, the third phonological processing skill necessary for reading, is defined as the efficient retrieval of phonological information from long term or permanent memory (Wagner, Torgessen, & Rashotte, 1999). Rapid naming contributes to reading fluency which the National Reading Panel (NRP) reported was another processing skill necessary for efficient skilled reading (NRP, 2000). Reading fluency refers to how quickly and accurately a student is able to read.

In addition to an emphasis on phonetic instruction, research (Adams, 1995; NRP, 2000; Shaywitz, 2005; Torgesen, 1998) stresses the need to identify and remediate reading weaknesses early in a student's career. Berninger and Richards (2002), as well as Feifer and Della Toffalo (2007), have reported neurological evidence that supports the necessity for early diagnosis and remediation of phonological awareness weaknesses. Although reading skills can still be learned at a later age, the process becomes more difficult and less grounded in phonological awareness (Berninger & Richards, 2002). The NRP (2000) supports the philosophy that students who are weak in phonological awareness should begin remediation as early as possible.

This perspective is also shared by Adams (2005), Torgesen (1998), and Shaywitz (2005).

Furthermore, Thomas and Nicholson (1999), Cunningham and Allington (2003), and Torgesen (1998) discuss the importance of early literacy experiences, at home and at school, on the development of phonological awareness and early reading skills. Hart and Risley (1995) determined that language use in the home affects both receptive and expressive language development and thus reading skills. Also, early exposure to language, both oral and written, is important in the acquisition of reading skills (Pressley, 2002). In addition, significant research data supports the concept that the type and amount of home literacy activity is essential to the development of good reading skills. Downer and Pianta (2006) concluded that positive early family experiences, high quality childcare, and concurrent academic classroom/preschool experiences affect early academic and cognitive functioning. Wood (2002) determined that storybook reading was positively related to reading, vocabulary and short-term memory, while singing and rhyming was positively related to reading and spelling development.

The present research examined the effects of supplemental phonological awareness instruction provided to kindergarten students, who demonstrated developmental

delays in any of the three composite areas, phonological awareness, phonological memory, and/or rapid naming of the Comprehensive Test of Phonological Processing (CTOPP). The effects of the type and the amount of home literacy, as well as possible sex differences, were also be investigated.

The Problem

Students in the school district in which the intervention occurred are over-represented in special education. According to initial findings in the Special Education Elementary Longitudinal Study (SEELS) in process from 1999-2005, 11% of all students between the ages of 6 and 13 are receiving special education (NICHCY, 2003). Of these students, 75% are diagnosed with either a specific learning disability (LD) or a speech and language impairment. The National Center for Educational Statistics (NCES) provided statistics for the school year 2005-2006. Nationwide, 13.8% of students received special education services. Of the 13.8%, 5.6% were diagnosed with LD. According to the Pennsylvania Department of Education, Special Education Data Report for the school year 2005-2006, 17.7% of the children in the district received special education services. Of the district's children

receiving special education services, 86% were diagnosed with LD. This is higher than the Pennsylvania Department of Education's statistics, which state that 53.9% of the 14.7% of the students statewide who receive special education services were diagnosed with LD. An informal survey completed in the fall of 2006 with learning support teachers at one of the elementary schools in the school district determined that 95% of their learning support students were receiving some kind of reading support. This suggests that approximately 15.1% of the district's students are receiving special education services for reading weaknesses. The percentage of students receiving learning support services in the district is much higher than those statewide and nationwide and according to the teachers who teach them, most of the students receive some level of reading support.

According to research (NRP, 2000, Torgesen, 1998), the first step in developing phonemic awareness, and thus reading skills, is implementing a comprehensive reading curriculum. Children in the district are taught to read using the Houghton Mifflin reading program. According to Houghton Mifflin's literature, they have based their current reading program on the findings of the NRP and the National Research Council (NRC), as well as on the results

of the Houghton Mifflin Research Symposia (Cooper, Pikulski & Lipson, 2003). According to Cooper, et al. (2003), the reading series emphasizes learning the alphabetic principle in kindergarten and first grade and extensive activities are implemented to develop phonemic awareness in kindergarten and first grade. As the students move through the primary grades, explicit and systematic phonics instruction is linked to carefully controlled practice text.

In the district elementary schools, the Houghton Mifflin curriculum is implemented through the Four Block Framework. The Four Block Framework was developed by Patricia Cunningham based on theories posited in her books written with Allington, *Schools That Work* (2002) and *Classrooms That Work* (2003). The framework grew out of her work in schools. The kindergarten introduction to Four Blocks is appropriately named Building Blocks (www.wfu.edu/fourblocks). Recent findings from emergent literacy research have demonstrated that children who easily learn to read and write have had a variety of experiences with reading and writing that enable them to profit from the school reading curriculum (Cunningham & Allington, 1999). The Building Blocks Framework provides a variety of reading and writing experiences that are

developmentally appropriate for kindergarten age students, as well as a structure for activities designed to develop phonemic awareness, such as rhyming, letter naming and blending, and other essential pre-reading skills (www.wfu.edu/fourblocks).

According to the literature available on the Houghton Mifflin reading program and the Four Block Framework, the district students, beginning with kindergarten students, are receiving an appropriate research-based curriculum presented within a balanced curriculum structure. In spite of this balanced reading instruction, the students are represented in special education and receive learning support services in reading at three times the national average. Because of these high numbers, two of the district's elementary schools decided to implement an early reading intervention program during the 2006-2007 school year. All kindergarten students were assessed using the CTOPP. The CTOPP is a valid and well researched tool used to assess pre-reading skills (Wagner, Torgesen, & Rashotte, 1999). Using the results of the CTOPP, weaker students, who scored below the 25th percentile on any of the three composites of the CTOPP, were identified. Based on the results of the CTOPP, the students were classified into three groups: the lower

group (LG), middle group (MG), and the higher group (HG). The LG students who demonstrated skills developed below the 25th percentile received not only the typical classroom instruction but also supplemental phonological instruction provided through the *Road to the Code* curriculum (Blachman, Ball, Black, & Tangel, 2000). According to the Florida Center for Reading Research (www.fcrr.org) *Road to the Code* is a scientifically researched program designed to incorporate phonological awareness activities into kindergarten and first grade. The LG received a total of 15 hours of supplemental instruction averaging 45 minutes of supplemental instruction weekly provided by the reading specialist. Instruction was provided from December of 2006 until May 2007 for a total of 24 weeks. Five of the six supplemental groups received 15 minutes of supplemental instruction three times weekly, while the sixth group received 22-25 minutes of supplemental instruction twice weekly. The difference was necessary due to scheduling issues for the reading specialist and the kindergarten teacher's schedule.

Not only does reading skill depend on a solid foundation in PA but it also depends on a good linguistic foundation. The home literacy activities that students are exposed to effect their reading readiness and future

reading skills (Nancolis, Lawrie, & Dodd, 2005; Nord, Lennon, & Liu, 1999; Petrill, Deater-Deckard, Thompson, DeThorne, & Schatschneider, 2006; Pressley, 2002). Expressive and receptive vocabulary and phonological processing skills are developed through exposure to an environment rich in language activities. Home literacy experiences rich in language improve a child's readiness to read (Hart & Risley, 1995). Different kinds of activities and the amount of opportunities the child has to interact with the activities influence the development of reading skills (Wood, 2002; Nord, et al., 1999).

Home literacy activities contribute to a child's readiness skills upon entering school. A review of the district's statistics from the Standard and Poors (2004) school evaluation service suggests that the environment in this school district is solidly middle to upper middle class. According to greatschools.net (2007) only 5% of the district's student population is eligible for free and reduced lunches compared to 31% of students statewide. However, it is naïve to assume that all students in the district have rich home literacy experiences. Kindergarten parents were asked to complete a home literacy survey. The ratings were compared to the results of the CTOPP composite areas. Results suggest specific activities tend to

contribute to the development of phonological awareness, phonological memory, or rapid naming as measured by the CTOPP.

This project adds to the available research on the use of supplemental instruction with emergent readers. If supplemental instruction at earlier developmental stages improves a students reading development, there will be fewer referrals for reading disabilities as these students move through the early grades. Developmental delays, if not remediated, look like, act like and end up being treated like reading disabilities (Hale & Fiorell0, 2004). The data from this project will add to the data encouraging earlier identification and remediation of reading weaknesses and will hopefully make supplemental support a typical regular education initiative for emerging kindergarten readers. Teachers and school psychologists may be able to make recommendations regarding curriculum and interventions based on these results.

Examining the correlations between different home literacy practices and the scores on the three composite areas of the CTOPP will add to the data available regarding which home literacy practices are most beneficial to developing pre-reading skills. School psychologists can

use this information in making recommendations to parents and other caretakers about which activities will benefit the development of reading skills. Moreover, research has been completed about how males and females enter kindergarten prepared to learn and how they continue to learn throughout the school year (Ready, Logerfo, Burkam, & Lee, 2005). Although this project did not add any data to the mystery of why females tend to be more ready to read, it did substantiate or rule out whether this difference exists within the district. Results should guide the practices of the district's school psychologists and teachers, both in regard to reading interventions and the diagnosis of reading disabilities.

Research Questions/Hypothesis

1. Does the use of supplemental phonological awareness instruction mitigate the deficiency between lower scoring (LG) students compared to the average scoring (MG) and higher scoring (HG) students in any of the CTOPP composite areas? If the difference is mitigated, can this improvement in mean scores still be seen at the end of first grade using Rigby levels, the district's end of the year Benchmark tool?

Research (NRP, 2000; Shaywitz, 2003; Torgesen, 1998) suggests that supplemental instruction in phonological processing will improve the skills of students who demonstrate weaknesses such as those assessed by the three composite areas of the CTOPP; phonological awareness, phonological memory, and rapid naming. Thus, it is hypothesized that the use of supplemental phonological awareness instruction will mitigate the deficiency between LG compared to MG and HG students in all of the CTOPP composite areas. There will be a significant difference in pre-test scores between LG students, MG students, and HG students on all of the three composite areas of the CTOPP. There will not be a significant difference between LG students, MG students, and HG students on the post-test scores on any of the three composite areas of the CTOPP. The improvement will continue through first grade as documented using Rigby levels, the district's end of the year Benchmark for first grade.

2. Is there a particular kind of home literacy activity that can be linked to higher scores in any of the composite areas of the CTOPP?

It is hypothesized that the frequency of different types of home literacy activities will positively correlate to higher scores on some of the composite areas of the

CTOPP. Specifically, the higher the frequency of reading, telling stories, teaching letters and numbers, singing and rhyming will positively correlate with higher scores on the Phonological Awareness composite and the Phonological Memory composite of the CTOPP. There will be no correlation between arts and crafts and trips to the library with any of the three composite areas of the CTOPP. None of the home literacy activities will correlate with the Rapid Naming composite on the CTOPP.

3. Is there a particular type of home literacy activity that occurs more often with girls than with boys?

It is hypothesized that the frequency and types of home literacy activities completed with females and males will not differ significantly.

4. Is there a significant difference in the scores of male and female kindergarten students based on the pre-test scores in any of the three composite areas of the CTOPP?

Research (Ready, Logerfo, Burkham, & Lee, 2005) suggests that girls tend to come to kindergarten with better pre-reading skills and develop reading skills during their first year of school more efficiently and quicker than their male peers. Therefore, it is hypothesized that females will achieve significantly higher pre-test scores

than males on the three composite areas of the CTOPP. As a result, there will be more males in the LG than females.

5. Is there a significant difference in the scores of male and female kindergarten students based on the post-test scores on any of the three composites of the CTOPP?

It is hypothesized that there will not be a significant difference between the scores of females and males in the LG on the post-test scores in any of the three composite areas of the CTOPP, but there will continue to be significant differences between males and females in the MG and HG on the post-test scores in any of the three composite areas of the CTOPP.

Problem Significance

Research is clear that reading weaknesses impede academic success (Aaron, 1997). Hale and Fiorello (2004) report that no matter what the diagnosis, reading disability or developmental delay, children need to have their weaknesses identified and remediated as early as possible in their reading development. Research reviewed by the NRP (2000) indicated that PA instruction was effective with developmentally delayed students as well as learning disabled students. These are the students that

the kindergarten supplemental reading program is hoping to reach. This program evaluation will provide information regarding the effectiveness of supplemental instruction in phonological processing skills with kindergarten students exhibiting pre-reading weaknesses as defined by the CTOPP.

In the district, as well as nationwide, reading disabilities/weaknesses interfere with the acquisition of all academic information (Aaron, 1997). Currently, school districts have a choice to use an ability-achievement discrepancy model or the Response to Intervention (RTI) model in determining whether learning disabilities are the cause of a reading weakness (IDEA, 2004). Under the ability/achievement discrepancy model, comprehensive evaluations to classify disabilities may be delayed until second grade while educators wait for the student to build an adequate discrepancy for the educational diagnosis of specific learning disability. However, discrepancies cannot be assumed to be learning disabilities without documentation of adequate instruction (Pressley, 2002).

RTI provides the rationale for adequate instruction in some districts. The RTI model calls for tiers of support and instruction to meet the needs of struggling students. The determination of a disability is based on the student's response to instruction deemed to be appropriate to their

needs (Fuchs, Fuchs, & Compton, 2004). Many districts are still depending on the regular education curriculum alone to see if the student improves. The assumption is that the teaching of reading is done using a research-based curriculum. Thus, many districts may not provide psychological evaluations until late first or second grade (Torgesen, 1998).

This project attempted to add data to support taking a proactive approach to dealing with emergent readers' weaknesses. Diagnosing and remediation of emergent readers' weaknesses have been listed as an important component in the development of competent readers (NRP, 2000). If supplemental instruction is effective with the district's weaker emergent readers, the results may be generalized to other middle class districts. If there are one or more home literacy practices that correlate with high scores in PA, PM, or RN on the CTOPP, this information may be shared with confidence in training pre-school parents and caretakers in similar socioeconomic areas.

Definition of Terms

The Comprehensive Test of Phonological Processing (CTOPP) is a well researched, validated and normed screening and diagnostic tool. The CTOPP looks at three

composite areas that relate to pre-reading skills: phonological awareness, phonological memory, and rapid naming (Wagner, Torgesen, & Rashotte, 1999).

Emergent literacy is the developmental process of literacy acquisition that occurs between birth through kindergarten, while early literacy is the developmental process of literacy acquisition between first and second grade (Gunn, Simmons, & Kameenui, 1995).

The high group (HG) is comprised of students who score above the 75th percentile, above the average range, on any one of the composites of the CTOPP.

Home literacy is defined as the activities and the home environment that support reading and other academic activities.

The low group (LG) is defined as students with scores below the standard score of 90, below the average range on any one of the composites of the CTOPP who receive supplemental instruction in phonological awareness.

The middle group (MG) is comprised of students who score between the 25th and the 75th percentile, the average range, on any one of the composites of the CTOPP.

Phonological awareness (PA) is the knowledge that words are made up of small units of sounds called phonemes

and their corresponding letters/visual representations called graphemes.

Phonological memory (PM) is the ability to code information phonologically for temporary storage in working or short term memory.

Rapid naming (RN) is the efficient retrieval of phonological information from long term or permanent memory.

Reading support is defined as supplemental instruction in phonological processing provided by the reading specialist. *Road to the Code* is the curriculum used with the students in the supplemental reading program

Rigby Literacy is a research based literacy program, published by Harcourt that uses leveled reading books to support emerging readers. With Rigby's leveled story books, the teacher can provide lower level readers to struggling students while higher performing students read higher level readers.

Rigby level is the level of Rigby reader that a student is currently reading in the classroom. The end of the year Rigby level benchmark referred to in this document refers to the level of Rigby reader in which a student performs at an instructional level (93rd to 97th percentile) at the end of the school year.

Assumptions

Because the CTOPP is a valid and well researched tool used to assess pre-reading skills necessary for reading, it is assumed that students who do well on the CTOPP have adequate pre-reading skills and will tend to develop reading skills when provided with good instruction. It is also assumed that students who do poorly on the CTOPP are demonstrating weak pre-reading skills and will tend to struggle to acquire reading skills in spite of good instruction (Lennon & Slesinski, 2001; Wagner, Torgesen, & Rashotte, 1999).

It is assumed that the home literacy surveys returned by the parents were completed to the best of their memory and knowledge.

It is assumed that the two reading specialists completed the fidelity instruments, The Kindergarten Early Literacy Feedback form to the best of their ability and answered the questions from the Intervention Fidelity Observation interview honestly and to the best of their memory.

Limitations/Delimitations

This is a program evaluation rather than a traditional experimental design with randomly assigned subjects. The

reading program was developed by the building principals, reading specialists, kindergarten teachers, and school psychologists in two elementary schools. Each person had input into the program and each had his/her particular role. Decisions were made based on schedules, administrative needs, and other school centered concerns. The supplemental reading program was not designed specifically as a research project, which creates limits as to how the information can be generalized.

Students who scored lower than the 25th percentile on any one of the composite areas of the CTOPP were considered for inclusion in the LG. LG students received the supplemental instruction in phonological awareness. Each set of classroom data was evaluated separately by a team made up of the reading specialist, school psychologist, principal and kindergarten teacher. Only five students could be included in any group and there was only time for one group per class. The neediest five to six students in each class were chosen and intervention was provided within the classroom. As a result, a student from one classroom could be needier than a student from another classroom. However, because of the make up of the class, it is possible that a needier student would not get the treatment, but the less needy student would. As a result,

there may be students in the MG who actually score lower on one of the CTOPP composite areas than other students from the LG.

The sample size for students involved in supplemental instruction was comparatively small. The sample was also culled from a relatively homogenous SES group. The students were from two very similar elementary schools in the same middle class school district. Less than 8% of the students were minority students and less than 6% of the students were economically disadvantaged.

The supplemental instruction was provided by two different reading specialists. The curriculum used was *Road to the Code.* The reading specialists trained together to learn the program. There were no observations to determine whether the curriculum was presented with fidelity. However, the reading specialists were interviewed post hoc using an observation tool created by Benita Blachman, who wrote the *Road to the Code* curriculum, to determine whether how well the teachers adhered to the curriculum with fidelity (Appendix A). They were also given forms created by the Blachman research team (Appendix B) to complete to garner their feelings about the *Road to the Code* curriculum.

Inter-rater reliability was not established. Two district School Psychologists and two School Psychology interns were involved in the test administration. All four of the examiners were taught as a group how to administer the CTOPP. The group also met prior to each assessment period to review testing procedures to enhance commonality in administration practices and scoring. Each student was assessed by the same evaluator for both the pre-test and the post-test CTOPP assessment. CTOPP research on inter-scorer reliability determined that inter-scorer reliability on the Phonological Awareness composite for 5-6 year olds was .97. Reliability between scorers on the Phonological Memory composite and the Rapid Naming composite was .99 (Wagner, et al., 1999).

The home literacy survey was completed by 77 out of 133 parents which is approximately 58% of the kindergarten populations. Responses were voluntary. Surveys were sometimes only partially completed. The N will be determined by how many parents completed that particular part of the survey. It is possible that the more motivated, organized, and involved parents completed the surveys. Results of the survey must be considered with that bias in mind.

CHAPTER II

REVIEW OF AVAILABLE LITERATURE

Reading Overview

When and how to begin teaching children to read has been the subject of debate since the mid-1800s (Adams, 1995). During the colonial era, people who learned to read and write did so by learning the means, the alphabetic code, and then proceeding with the purpose of reading and writing. The alphabet and the phonemic significance of letters were taught through the use of key words; c is for cat. The primary book used to teach reading was the Bible because there was little else to read (Adams, 1995).

The meaning-first curriculum emerged in the middle of the 19th century with a resurgence of Jeffersonian ideals. Jefferson felt that the fate of the American democracy depended on the educational level of the common man. An educated populace WHO could read would make more informed decisions. Books were being written for other than religious or political purposes. There was a renewed focus on how to teach people to read. Horace Mann argued that teaching phonics was so dull that children would be bored to death by the skeleton shaped letters. Teaching whole meaningful words was a more exciting and meaning filled

approach to learning to read, according to Mann (Adams, 1995). Although many students were still being taught the alphabetic principle, Mann's emphasis on meaning-first curriculum gained prevalence. Words were introduced through meaning and reading comprehension was emphasized. Through the 1930s and 1940s, children were taught words introduced through their meanings in text. The look-say era of the basal reader was paramount. Phonetic instruction took a back seat to comprehension of text (Adams, 1995).

In the 1950s, Rudolph Flesch introduced the idea that English is an alphabetic language and phonetic by definition; thus, phonetic instruction was necessary as well. It was his belief that children needed to be taught the alphabet in conjunction with the sounds which the letters were associated. Flesch believed that children should be taught how to read simultaneously with learning how to write. Flesch's ideas stirred up a great debate on how best to teach reading (Adams, 1995).

Jeanne Chall's research, which began in the fall of 1959, was the culmination of the debate between meaning-first, whole language curriculum, and teaching phonics (Adams, 1995). Chall's extensive research surprised even her, and established the fact that systematic phonics

instruction was a valuable component to beginning reading instruction (Adams, 1995). However, the meaning-first, whole language movement was more evident during the last half of the 20th century than direct instruction in phonics (Thompson & Nicholson, 1999).

The whole language purists would be offended to think that they were similar to or a throw back to the look-say, meaning first curriculum (Adams, 1995). Whole language advocates espouse a literature-based approach to reading. It is their belief that children can learn to read just as they learned to speak, from exposure to enriching experiences with print. The use of basal readers where controlled vocabulary and sentence structure is key was banished by whole language advocates. Children were exposed to exciting, word-rich stories. They were encouraged not only to read but also to write using pre-conventional spelling. The curriculum was child centered and emphasizes meaning construction. The goal of whole language was to help children derive meaning from print and to express meaning in print (Thompson & Nicholson, 1999).

The debate between the phonics-based skills emphasis model of teaching reading and the meaning-first, whole language approach to teaching reading continued through the 1990s. However, the results of the National Reading Panel

(2000) clearly defined the need for phonemic awareness and phonics instruction. Still, whole language proponents continued to deny this evidence. According to Ellis (2001) the teacher's need for flexibility and creativity can make drill and repetition programs like systematic phonics instruction unappealing. Therefore, teachers often would rather use a whole-language instead of a phonics-based curriculum. The literature subsequently began to emphasize the need for more balanced kinds of programs that would integrate sequential systematic phonics instruction with the excitement and creativity of whole language programs (Pressley, 2002).

According to Pressley (2002) the balanced teaching model attempted to bring whole language programs together with the explicit, skills emphasis programs. Pressley (2002) stated that neither the whole language model nor the skills emphasis model by itself was incomplete. He stated that combining the two created a more balanced approach to reading, where children can be immersed in literature, as well as armed with the skills necessary to attack the words in books.

An example of a balanced approach to reading instruction is Patricia Cunningham's (Cunningham, Hall, & Sigmon, 1999) framework for balanced instruction called

Four Blocks. In this framework, instruction is divided into four 30–40 minute blocks of time with each block having a different emphasis. The Blocks are Guided Reading, Self-Selected Reading, Writing and Working with Words. Building Blocks is the kindergarten structure of the Four Blocks program (Hall & Williams, 2000).

Building Blocks provides a variety of reading and writing activities that are designed to instill the desire to learn to read and write, develop phonemic awareness, foster important language concepts, encourage letter and sound recognition, teach essential print ideas, and extend vocabulary. There are six critical understandings that are stressed in the Building Blocks balanced literacy program. The first understanding is called Desire to Learn to Read and Write. The teacher creates an environment within which students see themselves becoming independent readers and writers through a variety of developmentally appropriate activities. The second understanding, Language Concepts, is designed to foster the ability to read and write words through the use of morning messages, journal entries, sentence building activities, and environmental print.

Print Concepts, the third understanding, is intended to teach print concepts by modeling how to write and by participating in shared reading and shared writing

experiences. Developing Phonemic Awareness, through the use of rhyme, poetry activities, rhyming books, tongue twisters, and playing with language, is the fourth understanding. Interesting Words, the fifth understanding, involves extending the list of real-life words with those that students find personally relevant, such as favorite restaurants, favorite cartoon characters, and family members. Letters and Sounds is the sixth and last understanding. Letter and sound recognition are encouraged through activities with alphabet books, beginning and ending sounds, and shared writing (Hall & Williams, 2000).

The University of Oregon Reading First Center (2002) describes the five Big Ideas in Beginning Reading which focus on five big ideas of early literacy. The five ideas are phonemic awareness, alphabetic principle, fluency with text, vocabulary, and comprehension. The first big idea, phonemic awareness, is the ability to hear and manipulate sounds in words. Alphabetic principle, the second big idea, is the ability to associate sounds with letters and use these sounds to form words. The third big idea, fluency with text, is described as the effortless ability to read words in connected text. Vocabulary is the fourth big idea. It is described as the ability to understand and use words, both expressively and receptively, to acquire

and convey meaning. Comprehension, the fifth and last big idea, is the complex cognitive process involving the intentional interaction between the reader and the text to convey meaning (http://reading.uoregon.edu/scope/new_scope_2.php).

Current research (National Reading Panel, 2000; Pressley, 2002; Shaywitz, 2005; Torgesen, 1998) into the area of reading instruction has demonstrated that phonological awareness, rapid naming, and phonological memory skills are indicators of reading success. Phonological awareness has been determined to be the first and most important step in learning to read (Shaywitz, 2005; Torgesen, 1998). Phonological awareness is the knowledge that words are made up of the smallest units of sound (phonemes) that are associated with individual letters and letter groups (graphemes), as well as the ability to blend sounds and segment or isolate sounds in words. This basic concept is the foundation of the alphabetic principle and the beginning of systematic phonics instruction (Adams, 1995). Phonological memory, the second indicator of reading success, refers to the ability to code information phonologically for temporary storage in working or short-term memory. The temporary coding and storage of phonological information allows for

interpretation of the sounds and giving meaning to the word. Rapid naming, the third processing skill necessary for reading, is defined as the efficient retrieval of phonological information from long term or permanent memory (Wagner, et al., 1999). Rapid naming contributes to reading fluency, which the NRP (2000) reported was another processing skill necessary for efficient skilled reading. Reading fluency refers to how quickly and accurately a student is able to read.

Why Can't Some Children Read?

Neuropsychological Influences

According to Berninger and Richards (2002), current neuropsychological findings suggested that there is a developmental window of opportunity that allows predetermined dendrites to grow and develop into receptors of phonemic information and thus, begin the development of neurological reading pathways. If these circuits are not stimulated with the necessary input at the appropriate developmental stage, the connection may not develop. If the dendrites are not stimulated, they are pruned in the brain's natural clean up process. Diamond and Hopson (1998) discuss an example of this process. They write that if the condition known as "lazy eyes" is not treated before

the age of four, the child's binocular vision may never be normal. Because the stimulation was not provided at the developmentally appropriate time, the skill did not develop. Ratay (2001) described what he called neural Darwinism of the brain. Neural Darwinism theorizes that certain critical neural pathways must be explicitly stimulated within the appropriate developmental time frame or the appropriate neural connections are not formed. The creation of this necessary web of connections that makes reading possible depends on the child's genetics, environment, and the sum of the child's experiences.

Neuropsychology of reading development. Feifer and Della Toffalo (2007) present a developmental sequence of phonological processing in relationship to neurological growth and myelination in the brain based on neurological information they acquired from the writings of Berninger and Richards (2002). According to Feifer and Della Toffalo (2007), at the age of three to four years, preschool children begin to memorize nursery rhymes and rhyming songs. This skill is possible because this is the developmental stage of neurological growth when the auditory cortex in the temporal lobes mylinates (Berninger & Richards, 2002). Because of this neurological

development, with appropriate educational and home literacy experiences, preschool children can begin to more closely discriminate speech sounds. Around the age of four to five years, preschool age children are able to take sound discriminations from the right hemisphere and classify them in the left hemisphere. Brain development tends to progress from the right hemisphere to the left. Thus, the brain begins to crosstalk between the hemispheres (Berninger & Richards, 2002). Because of this neurological development, Feifer and Della Toffalo claim that children can begin to classify phonemes. With appropriate educational and home literacy experiences, they can match similar sounds and can pick out sounds that do not belong in a series, e.g., cat, sat, ran.

Most American children must be five years old to begin kindergarten. This is when, according to Berninger and Richards (2002), the brain's ability to make cross hemispheric associations begins to be more automatic. This allows for the visual/orthographic storage of words in the parietal lobes, while the same word is being stored in an auditory manner in the temporal lobes. Children at this age should be able to segment words into sounds, isolate the sounds in the beginning and in the end of a word and use inventive spelling (Feifer & Della Toffalo, 2007).

With appropriate educational experiences, beginning kindergarten students should be able to rhyme, as well as classify phonemes. During the kindergarten year, with appropriate educational experiences, children should be able to begin to learn how to segment and blend words. As a result, children need the right experiences at the appropriate developmental time of their lives (Torgesen, 1997) and according to Feifer and Della Toffalo (2007), without these appropriate experiences, children do not create the beginning pathways necessary to support reading.

Neuropsychology of reading impairments. Shaywitz (2005), reports that reading impairments tend to be associated with anisotropy or a lack of directional flow in the white matter tracts of the temporal-parietal pathways in the area of the Perisylvian gyrus. This disorganization of mylinated axons could be the reason that children with dyslexia have difficulty with phonological processing skills.

This route of new readers, the phonological processor, integrates orthographical and phonological information based on rule analysis. It is slower and more analytical in nature. It is most functional during the novel, beginning stages of reading. It is in this area that the

word is analyzed, pulled apart, and linked with sounds (Feifer & Della Toffalo, 2007). It is within this route, the phonological processor, that an exact neural image of the words is created and stored linguistically in the orthographic processor (Feifer & Della Toffalo, 2007). The orthographic processor is a second reading route. If the exact neural image is not created and stored in the orthographic processor, the child continues to read using the phonological processor. Children, using the phonological processor, can read but they read slowly and inefficiently. The child never advances to the more efficient linguistically structured memory based word form recognition area, the orthographic processor. This lower pathway runs closer to the bottom of the brain where the occipital lobe, located at the back of the brain, and the parietal lobe, located at the top of the brain, converges. This area is the linguistically structured, memory based, word form recognition area. The occipital parietal route, the orthographic processor, is the means most used by skilled readers as it responds rapidly to the word as an identifiable pattern. This area includes the fusiform gyrus or the word form area (McCandliss & Wolmetz, 2004).

McCandliss and Wolmetz (2003) used functional magnetic resonance imaging (fMRI) research to determine that

children with dyslexia failed to recruit the Perisylvian regions, the phonological processing areas of the brain, when facing phonologically demanding tasks. Other fMRI studies (Noble, Tottenham, & Casey, 2005) also showed that children with dyslexia did not make use of the left fusiform gyrus, the orthographic processing area, to interpret visual word forms. Most children tend to develop accommodations and use one of the two slower reading routes; the dorsal-parietal pathway which involves the Perisylvian gyrus, the phonological processor, a rule based analytic route or an anterior route, which involves Broca's area and is the endpoint of the inner articulation system. These routes are slower, less efficient reading pathways (Feifer & Della Toffalo, 2007).

Early environmental experience is critical to the development of literacy in children, so that the necessary experience-dependent neural connections can be given the opportunity to form permanent synaptic connections. Experience-dependent pathways are not genetically programmed for just one specific purpose. They are able to recreate new synapses and to reorganize synaptic activity depending on environmental experience and stimulation. Reading pathways are experience-dependent (Feifer & Della Toffalo, 2007). Students, who are not offered explicit

phonological instruction during the early stages of the neural formation of literacy skills, may have more difficulty acquiring these skills at later stages due to inefficient pre-established neural connections (Feifer & Della Toffalo, 2007). Berninger and Richards (2002) as well as Noble, et al. (2005) also report that if phonological awareness is not introduced at the appropriate neurodevelopmental stage, the dendrites will not develop into the necessary pathways.

In a study completed by Simos, Fletcher, Bergman, Breier, Foorman, Castillo, Davis, Fitzgerald, and Papanicolaou (2002), eight kindergarten age children diagnosed with dyslexia were studied using fMRI studies during the completion of pseudoword decoding tasks. These students had experienced significant difficulties with word recognition and phonological processing in the past. A control group of eight typical readers were also imaged during pseudoword decoding tasks. Before the intervention, the eight students with dyslexia demonstrated distinctly aberrant activation profiles on the fMRI, with little or no activation of the superior temporal gyrus (an area normally used in phonological processing), as well as increased activation of the right hemispheric area. After the eight students with dyslexia received 80 hours of intensive

remediation, they were given another fMRI. Not only did these students demonstrate a significant improvement on their reading skills, but also they demonstrated increased activity in the superior temporal gyrus. There were no changes in the fMRIs of the typical students (Simos, et al., 2002). Shaywitz (2005) repeated this research with similar results. Thus, research shows that age appropriate instruction provided at the earliest possible age can modify a reading impaired student's neural pathways (McCandliss & Wolmetz, 2004; Shaywitz, 2005; Simos, et al., 2000).

Because of the research findings that reading interventions are best introduced during appropriate early neuro-developmental stages, Eden, Jones, Capell, Gareau, Wood, Zeffiro, Dietz, Agnew, and Flowers (2004) completed research into how dyslexic adults responded to the same kind of direct instruction in phonological skills. These researchers replicated a study completed by Shaywitz (2005) with children. Results determined that dyslexic adults who received direct instruction in phonological skills made measurable gains in phonological processing. This increase in phonological skills transferred to increased accuracy in non-word decoding and oral paragraph reading. The post intervention fMRI detected a compensating mechanism on the

right hemispheric perisylvian regions, most notably the parietal cortex. Following a second experiment, the authors identified increased activity in bilateral parietal cortex and right hemispheric perisylvian regions. Changes in this same region, the phonological processor, were seen in remediation studies with children completed by Shaywitz. This research determined that even the adult brain, which lacks the plasticity of the child's brain, can compensate and make changes when provided with appropriate learning activities (Eden, et al., 2004). The purpose of this article was not to challenge the importance of research findings that state that reading is most efficiently taught at appropriate neurological developmental stages but to provide data that emphasizes that with appropriate instruction, even the adult non-plastic brain can compensate and develop reading pathways and improve reading weaknesses.

Environmental Influences

Petrill, et al. (2006) completed research into the effects of genetic and environmental influences on the reading skills of children. Participants in this study were monozygotic (118) and same-sex dizygotic (163) twins who were located throughout Ohio and Western Pennsylvania

with most living in the greater Cleveland, Columbus, and Cincinnati metropolitan areas. Most of the participants lived in two-parent families (96%) and were White (91%). More than 50% of participants' parents had a college education or better. The research found that the closer the genetic relationship of children, the greater the similarity of their emerging literacy skills. They also determined that shared environmental experiences were significant and substantial and accounted for one-third to one-half of the variance for intellect, letter decoding, phonological decoding, and phonological awareness. However, the research suggested that rapid letter naming was almost completely determined by genetic factors.

A child's early literacy experiences influence the ability to develop the neurological readiness for reading (Pressley, 2002). Sometimes young children do not have access to a language rich environment thus phonological awareness is not introduced at the appropriate developmental stage (Cunningham & Allington, 2002; St. Pierre, Ricciuti, & Rimdzius, 2005). The important give and take of conversation and reading of storybooks does not happen in all homes. Pressley (2002) states that children benefit from rich interpersonal, communicative relationships with parents, brothers, sisters, and the

other significant people in their environment. Physical environments that include literacy materials, from plastic refrigerator magnets to storybooks to writing materials, stimulate a child's interest in reading. Children, who have parents who demonstrate a high positive regard for literacy and literacy development in their children, tend to develop higher levels of readiness skills (Pressley, 2002). Inevitably, each child enters school on the first day with a unique set of skills. These skills are affected by both genetic and environmental factors. The skills are acquired through interaction with their parents, siblings, community, extended family, and daycare center providers and classmates (Petrill, et al., 2006).

Noble, Tottenham, and Casey (2005) examined ethnic and racial disparities in school readiness from a neuroscience perspective. The participants in the initial study included 60 African-American students from public kindergarten classes in the city of Philadelphia. Thirty of the students were considered middle SES and 30 of the students were considered low SES. The researchers used behavioral tasks to tap into the functioning of the three neurocognitive systems essential to school success; cognitive control, learning and memory, and reading. Following the preliminary study, the researchers expanded

their research to include 150 multiracial students who were equally distributed between SES levels. The research determined that low SES negatively correlated with both language development (reading) and cognitive control. In regards to reading, they found that a child who struggles with reading in the context of a low literacy environment might have difficulties that are different from a child who struggles with reading from a high literacy environment. Some children may not have had the opportunity to develop the neural connections necessary for reading due to a low literacy environment, while other children could have a neurologically based reading disability in spite of exposure to a literacy rich environment. The students, who read poorly due to lack of exposure, as well as children with neurologically based reading disabilities, can develop the neural pathways necessary for reading if given appropriate and timely remediation (Noble, et al., 2005).

Medical Influences

Winskel (2006) reported that an early history of otitis media can interfere with the development of appropriate phonological skills. Otitis media is an ear infection that about 70% of children have at least once in early childhood. Acute otitis media is a clinically

identifiable infection that has a sudden, brief onset. Even after the infection passes, the fluid remains. This condition, known as effusion, results in a conductive hearing loss. When the condition is recurrent and occurs between six to 18 months of life, it can result in the interference of appropriate cataloging of sounds in a child's early language development. If the child cannot catalogue the sounds the developing neural pathways are not stimulated and the brain does not have the neural foundation for the next literacy level.

Feifer and Della Toffalo (2007) noted that it is not the conductive hearing loss, but the effect that the hearing loss had on the developing auditory sensitivity of the temporal lobes, particularly Heschl's gyrus and Wernicke's area, that interfered with reading development. Winskel's (2006) research determined that there were significant differences in the development of all phonological awareness skills between children with an early history of otitis media and children who did not have an early history of otitis media. The differences were particularly large in reading nonwords, reading fluency, and reading comprehension. Winskel found that early recurrent otitis media contributed to deficits in the phonological coding of speech sounds, which led to later

problems in mapping phonemes to graphemes. Winskel's research was supported by similar research that she cited in her work, (Friel-Patti & Finitzo, 1990; Menyuk, 1986; Nittrouer & Burton, 2005). As a result, comprehensive medical and social histories are necessary to provide clues to reading difficulties.

Instructional Influences

Inappropriate or lack of appropriate instruction is another leading cause of reading problems. IDEA guidelines (2004) for specific learning disability diagnoses decree that children being considered for an LD diagnosis must have received scientifically based instruction through their primary reading curriculum as well as in their supplemental instruction curriculum. Denton, Vaughn, and Fletcher (2003) discuss the key ingredients to an effective reading program. It is their premise that, first and foremost, an effective and knowledgeable teacher is needed. Secondly, the instructional program must include key instructional components. A reading program must address phonological awareness early on followed by the alphabetic principle and phonics. As children build these skills, word reading becomes an important component followed by reading comprehension. The key factor underlying the

successful teaching of these principles is the mode in which the knowledgeable teacher integrates each component into the program for each child's different needs (Denton, et al., 2003). The third important factor in the effective reading program is differentiated instruction for students with reading difficulties. While some students seem to learn to read with little guidance, others struggle. Struggling students need instruction that is directive and explicit. The effective teacher is able to identify these students and modify the nature and intensity of instruction to meet their needs. The fourth component to an effective reading program is explicit instruction. Explicit instruction means that the teacher models and teaches skills and concepts clearly rather than requiring the student to make inferences that may lead to confusion for less proficient learners (Denton, et al., 2003).

Literacy Development

Reading is a cultural invention. While just about everyone learns to understand and then to speak their language without specific classroom instruction, reading must be taught (Pressley, 2002). Most children need to be instructed on how to relate the sounds of their language and to the symbols of their language. Reading begins at

home with the first words a child hears and this language skill is connected to later reading development. On the other hand, language development is primarily biologically determined and has an evolutionary base (Hale & Fiorello, 2004). No matter what a child's language is, the child begins to acquire that language at home. It is with the acquisition of language skills that reading skills begin to develop. As children develop receptive and expressive vocabulary, they begin to understand rhymes and early phonological awareness. With formal instruction, these skills then develop into conventional reading.

Emergent Literacy

Emergent literacy is the development of discrete skills that are prerequisites for reading. These skills are phonological awareness, letter sound correspondence, and letter naming. Emergent literacy is fostered by experiences that permit and promote meaningful interactions with both oral and written language. Exposure to oral language develops listening comprehension, vocabulary, and facility with language while exposure to written language develops an awareness of print, letter naming, and phonological awareness (Gunn, Simmons, & Kameenui, 1995).

The National Early Literacy Panel (NELP) (2006) reports that there are five indicators of early reading success. The indicators are phonological awareness, phonological memory, rapid naming, knowledge of alphabetics and being able to write your own name. The NELP meta-analysis looked at empirical research involving children between the ages of birth to five years of age/ kindergarten. Parameters of the meta-analysis were that research had to be published in English and in a refereed journal. The meta-analysis looked at predictive relationships between a skill measured in preschool or kindergarten and a conventional literacy outcome (decoding, reading comprehension, and spelling) measured at a later time. NELP found that activities involving alphabetics, such as making sense of print had a significant effect on phonological awareness and writing and a moderate effect on rapid naming, reading and spelling. Reading to and sharing books with children had a moderate impact on oral language and on print awareness. Parent home programs for improving literacy were found to have only a small effect on oral language alone. Preschool and kindergarten programs were found to have a substantial impact on reading readiness but only a small impact on reading itself (NELP, 2006).

Beginning phonological awareness is the ability to hear the difference in sounds and is demonstrated by the toddler's early attempt to mimic their parents' pronunciations of words rather than continue with "baby talk." An indication of developing phonological awareness in preschoolers is the ability to rhyme and recognize rhymes. Preschoolers also demonstrate beginning phonemic awareness as they learn the alphabet and the letters of their name (Thompson & Nicholson, 1999).

Adams, Foorman, Lundberg, and Beeler (1998), stated that reading skills begin with the development of phonological awareness, reporting that phonological awareness is essential to the development of reading skills, not only in English, but also in other alphabetic languages such as Spanish, French, Italian and Norwegian. In all of these languages researchers have found that the student, who struggles with reading, lacks phonological awareness. Research indicates that without direct instruction, phonological awareness eludes about 25% of middle class first grade students. The rate is even higher for students who come from less literacy rich homes and environments.

Early Literacy

Early literacy is the development of reading and writing skills that occur at the beginning of formal reading education toward the end of kindergarten and during first and second grades (Gunn, Simmons, & Kameenui, 1995). The National Reading Panel (2000) took on the challenge of reviewing the research that has been compiled on reading. They determined that there were five components of reading and they analyzed and synthesized the research evaluating the effectiveness of various approaches to teaching them. The NRP evaluated studies of phonics instruction, fluency, vocabulary and comprehension. The NRP determined that phonemic awareness is an important first step to reading. Pressley (2001) stated that the NRP was too limited in its research scope; however, he did find the conclusions of the NRP credible. It is Pressley's opinion that phonological awareness positively influences emergent literacy, as well as early literacy, including both early reading and spelling skills, and was an important part of early instruction.

When children enter school, they begin to learn the alphabetic principle. They are introduced to the visual symbols (orthographic representation/graphemes) that are associated with sounds (phonemes) that they have been

hearing from birth. The teacher teaches the alphabet and the corresponding sound that each letter makes. Blends, two letters that go together to make a particular sound, are taught. Children see the letters and hear the sounds. Children begin to associate how the sounds and the symbols go together to make words and what those words look like when written (Thompson & Nicholson, 1999). Children hear the word and provide meaning from the fund of receptive and expressive vocabulary knowledge that has been accumulating from birth. Then, children begin to engage in self teaching. They can decode a word, make the sound symbol association and imagine how the word sounds. Children find the meaning in their fund of word knowledge and continue to read. Children use the context of what they are reading to help figure out words they do not know. As a result, children increase their vocabulary and improve automaticity of the words they know. Reading becomes more automatic and children use their sound symbol knowledge with less thought. They can use that mental energy to comprehend what is being read; thus, children read faster and reading fluency increases. They learn to use dictionaries and find themselves reading chapter books and books without pictures. Fluency, vocabulary knowledge, and comprehension

increase and they are on their way to becoming proficient readers (Thompson & Nicholson, 1999).

Phonological awareness. As stated previously, phonological awareness is the awareness of and the ability to access the sound structure of the words of one's own language. Words are made up of strings of phonemes and the phonemes signal differences in meaning. Children who have an awareness of this structure have an advantage learning to read the printed forms of their language. As children develop, they demonstrate an awareness of increasingly smaller units of language. Initially, children develop the ability to recognize two words in a compound word. As their awareness skills develop, they can identify syllables, then onsets and rimes and finally, phonemes. Children who are weak in these skills have difficulty learning to read. When they are provided with interventions to improve these skills, they demonstrate improved phonological awareness and reading skills (Wagner, Torgesen, & Rashotte, 1999).

McIntyre, Jones, Powers, Newsome, Petrosko, Powell, and Bright (2004) completed research with 196 kindergarten children in 17 different schools. The students were 79% Caucasian, 16.3% African-American, and 4% other (mostly

Latino). The population was 57.2% male and 42.5% female. The percentage of students receiving free lunch was 56.5%. The teachers were asked to identify the lowest achieving 20% of their students. They provided 15 minutes of supplemental daily instruction in PA to the kindergarten children. As little as 15 minutes of PA instruction daily was found to accelerate the growth of phonological awareness in the students. Students who receive more academic attention simply perform better according to McIntyre, et al. (2004). Supplemental instruction was determined to be effective, more so than replacement curriculum, and was worth considering to reach all struggling students.

Phonological memory. Phonological memory is another predictor of reading success. Phonological memory refers to the ability to code information phonologically for temporary storage in working or short term memory (Wagner, et al., 1999). The part of memory most involved in phonological memory is the phonological loop. Baddeley (1997) describes the phonological loop as two unique parts working together. The first part is the phonological store which is like an audio tape that retains the most recent two seconds of auditory information. The second part is an

articulatory control process that provides input into the phonological loop initially and can refresh information already in the loop so that it can be stored longer than two seconds. Baddeley's theory of working memory also includes the central executive and the visual spatial sketchbook. The visual spatial sketchbook is the workbook for holding and manipulating visual spatial information while the central executive controls working memory and stores and processes information.

Deficiencies in phonological memory impair the ability to learn new written and spoken vocabulary. Wagner, et al. (1999) completed a series of 20 experiments investigating the consequences of poor phonological memory in children with reading disabilities. In the writing of the CTOPP manual, Wagner, et al. describe the findings from their research. They determined that children with poor phonological memories were not necessarily impaired in memory for non-verbal information, listening comprehension, or long term memory, but they had great difficulty remembering the separate sounds in words and decoding nonsense words. This research determined that this difficulty remembering the separate phonemes in orally presented non-words correlated with reading problems.

Similar research completed by Kibby, Marks, Morgan, and Long (2004), studied 40 students who were matched for school, age, sex, and general intelligence. The children were third through eighth grade students selected from the Shelby County School District in Tennessee. These identified students were matched with a control group who were similar in age, grade, gender, SES, and prior diagnosis of ADHD or learning issues. The control group was selected from the children of undergraduate students at the University of Memphis. In this group of 40 students, 20 were not reading disabled and 20 were. Students with Attention Deficit Hyperactivity Disorder (ADHD) were not ruled out as participants because statistics suggest that 10% to 60% of reading disabled students are also diagnosed with ADHD (Kibby, et al., 2004). However, the students with ADHD were not medicated during the study. All the students demonstrated adequate visual spatial sketchpad functioning, as well as adequate central executive functioning. The reading disabled students in this study as in the research cited by Wagner, et al. (1999) had intact visual memory and visual spatial memory; however, they demonstrated an impaired phonological loop specific to the phonological store. Their verbal memory for phonological units was under-developed.

Jeffries and Everett (2004) looked at the effect of working memory on learning difficulties. They included 87 children in their research. The participants were drawn from a public primary school in West Sussex, United Kingdom and a public secondary school in Kent, United Kingdom. The students were divided into three groups. The first group had no special education needs. The students in the second group had special education needs and had been diagnosed with dyslexia, and the students in the last group had special education needs but were not diagnosed with dyslexia. They had diagnoses of dyspraxia, emotional/ behavioral difficulties, and/or attention deficits. The groups were matched for age and sex. The dyslexic group showed weaknesses in all the PA tasks. However, the dyslexic group performed as well as the non-dyslexic special education need group in working memory, visual spatial sketchpad measures and visual motor coordination tasks. Both special education need groups performed poorly on the working memory phonological loop measures. This body of research supports other research (Jeffries & Everett, 2004; Kibby, et a., 2004; Wagner, et al., 1999) in their conclusion that many students with reading weaknesses have difficulty remembering the separate sound units that make up words.

R*apid naming.* Wagner, et al. (1999), state that rapid naming is the third phonological processing skill necessary for reading. Rapid naming, a predictor of reading fluency, is defined as the efficient retrieval of phonological information from long term or permanent memory. To read efficiently, the reader must quickly and automatically retrieve phonemes associated with letters and letter pairs, pronunciations of common segments of words, and pronunciations of whole words. The reader's ability to retrieve phonological codes associated with reading influences the degree to which words are decoded efficiently. Rapid naming requires speed and processing of visual and phonological information. Children who demonstrate difficulty with rapid naming tend to have difficulty reading fluently.

Research completed in England by Messer, Dockrell, and Murphy (2004) determined that weaknesses in rapid naming contributed to weaknesses in reading and language comprehension. Twenty school children (14 boys, 6 girls) between the ages of six years, six months and seven years 11 months were referred to the study by their speech and language therapists with the permission of their schools and their parents. All of the students were diagnosed with word finding difficulties. They were assessed using

various instruments to assess their nonverbal intellect, word finding, articulation, lexical comprehension, naming speed, and phonological awareness. The researchers found significant correlations between phonological awareness and literacy, as well as a separate and significant correlation between naming speed and literacy.

Parrila, Kirby, and McQuarrie (2004) completed longitudinal research that determined that rapid naming skills and phonological awareness in kindergarten were the best predictors of future reading skills. Participants were gathered from senior kindergarten classes in Kingston, Ontario. The students were first assessed in kindergarten with tools that assessed their verbal short term memory, phonological awareness, naming speed, articulation rate, word reading, and passage comprehension. The assessments were completed again in first, second, and third grades. Research findings determined that phonological processing and rapid naming tasks measured in kindergarten were the strongest predictors of later reading skills. When phonological processing skills were measured in first grade, they were better predictors but not significantly better predictors of later reading skills.

Savage, Fredrickson, Goodwin, Patni, Smith, and Tuersley (2004) completed research looking at the

relationship between Rapid Automatic Naming (RAN) and other cognitive processes among below average, average and high average readers. Participants attended school from grades three to five in an urban school in London, United Kingdom. There were 35 boys and 26 girls included in the study. The ethnic distribution was White English, 83.6%, White other, 4.9%, Black Caribbean, 1.64%, Black African, 1.64%, Asian Indian, 3.28%, and other 4.9%. English was not the first language of 8.2% of the sample. All students were assessed with a group reading test and spelling test. Each participant was assessed individually with measures of word reading, non word reading, rapid digit naming, postural stability, speech processing, and short term working memory. RAN was found to discriminate between below average and average readers in reading accuracy, reading comprehension, and spelling. RAN did not discriminate between average and high average readers. The researchers also found that most readers reach a RAN threshold early in their school careers. Some children demonstrate excellent RAN skills as early as kindergarten, but their skills do not improve. Their conclusion was that RAN evaluated in kindergarten and first grade is a good predictor of future spelling and reading skills.

Dyslexia and Reading Weaknesses

Research indicates that without direct instruction, phonological awareness eludes about 25% of middle class first grade students. The rate is even higher for students who come from less literacy rich homes and environments (Adams, Foorman, Lundberg, & Beeler, 1998). Phonological awareness, phonological memory, and rapid naming are imperative in developing good reading skills (Wagner, et al., 1999). Weaknesses in any of these areas, if not remediated, at the earliest possible developmental stage, can develop into more significant reading difficulties. Hale and Fiorello (2004) point out that many children's reading problems have to do with developmental delays rather than actual learning disabilities. Hale and Fiorello state that these children need to have their weaknesses diagnosed and remediated just as much as their disabled peers do.

Specific Reading Disabilities/Dyslexia

Research states that learning disabilities exist in the U.S. population at a rate of 5% (Hale & Fiorello, 2004) to 6% (Fuchs, Deshler & Reschley, 2004). These numbers are commensurate with the NCES statistics that state that in the school year 2005-2006, 5.6% of school students received

learning support services. Hale and Fiorello (2004) determined that a substantial portion of these children have reading disabilities. Shaywitz (2003) infers that 3.5% of American school children, slightly more than two million children, are receiving special education services for reading disabilities.

According to Hale and Fiorello (2004), there are three types of reading disabilities including phonological dyslexia, orthographic dyslexia, and mixed dyslexia. Phonological dyslexia is an interference with auditory processing skills that leads to poor phonological awareness. These students have difficulty with phonologically decoding words or using phonemic skills to spell. Their ability to assess and understand sound symbol relationships is poor. They depend on sight word memorization. Orthographic dyslexia results from dysfunction in early visual processes. According to the authors, these students are the children who have difficulty with fluency and reading speed. They may be able to decode words as long as they follow the general phonetic rules, but have great difficulty with sight words and decoding words that do not follow the rules. Their reading tends to be slow and laborious. Hale and Fiorello (2004) describe mixed dyslexia, which includes components

of both a phonological, as well as an orthographic, dyslexia.

Shaywitz presents four different reading disorders in her work (Shaywitz, 2003). Shaywitz's description of developmental dyslexia is comparable to Hale and Fiorello's (2004) description of phonological dyslexia. In developmental dyslexia, the primary difficulty is the student's struggle to understand phonics and phonemic awareness. As a result, the student relies on memorization of the visual sequence of words and contextual clues to read. Shaywitz's second type of reading disorder is a language learning disorder. Students with this disorder have deficits in all aspects of language, including the sounds and the meanings of words. This student would score lower on measures of verbal intellect; whereas, a developmental dyslexic would be likely to score higher on the same measures. Shaywitz also describes acquired dyslexia. Acquired dyslexia is any reading disorder that has resulted from brain trauma or infarct. Shaywitz describes hyperlexia, the fourth reading disorder, as the mirror image of developmental dyslexia. Hyperlexics are very skilled at decoding words and at word recognition; however, they do not understand what they read.

Feifer and Della Toffalo (2007) present three categories of dyslexia in their work. The first, dysphonetic dyslexia is difficulty utilizing a phonological route to successfully process letters and sounds. These students tend to be inaccurate when sounding out words, and they tend to rely on visual and orthographic cues in words. McCandliss and Noble (2003) state that poor phonological processing in the early years can lead to development of inefficient neural pathways between the letters and sounds. The second form of dyslexia presented by Feifer and Della Toffalo (2007) is surface dyslexia. This is visual word-form dyslexia which is sometimes called dyseidetic dyslexia. These children can sound out words but cannot automatically read them in print. These students rely too much on the phonetic properties of words, and their fluency is very poor. Mixed dyslexia is the most severe type of reading disability. These children have difficulty across the language spectrum, not just in reading. They have poor phonological processing skills, slower rapid and automatic name recognition, and inconsistent language comprehension skills. Feifer and Della Toffalo suggest that mixed dyslexia results from a neural disconnection problem that prohibits multiple brain regions from communicating effectively enough to identify words in print.

Double Deficit Weaknesses

Readers with weaknesses in both rapid naming and phonological awareness have the most difficulty with developing reading skills (Wagner, et al., 1999). When a student has difficulty with phonological awareness, as well as with a weakness in rapid naming, this is referred to as a double deficit. Feifer and Della Toffalo (2007) refer to double deficit weaknesses as mixed dyslexia. A student with a double deficit has no usable key to unlock the functional code of literacy. Because of the double deficit, these readers are less able to accommodate and find modifications for their reading weaknesses.

Shaywitz's, Feifer, and Della Toffalo's and Hale and Fiorello's models of reading diagnostic categories are only as useful as their ability to guide reading interventions. No matter what the reason for deficits in phonological processing, it is clear that early diagnosis and remediation are necessary (Adams, 1995; NRP, 2000; Torgesen, 1998).

Early Identification and Remediation

Torgesen (1998) determined there were three elements of an effective preventive program in reading. The first element is the right kind of high quality instruction. The

second element, according to Torgesen, is the right intensity and duration of the program. The third and fourth elements have to do with having the right children at the right time to gain from the instruction (Torgesen). However, many schools base support services for struggling students on the ability/achievement discrepancy concept (wait to fail model). This occurs in spite of current educational and neuropsychological research that has shown that the earlier interventions are initiated with these students, the greater the effect on their reading development (Torgesen).

The NRP's (2000) analysis of the research shows that phonemic awareness can be taught. Research reviewed by the NRP determined that skills were best taught in small groups, one or two skills at a time for periods of no more than 25 to 30 minutes in length. NRP findings indicated that effect sizes were largest when training lasted less than a total of 20 hours. McIntyre, et al. (2005) completed research that determined that as little as fifteen minutes of direct daily phonological training provided as a supplement to the regular curriculum accelerated phonological awareness growth in kindergarten students. NRP research also found that instruction in phonemic awareness transferred and helped with the

acquisition of both reading and spelling skills. Teaching segmenting and blending skills in association with the letters that represent sounds had the greatest impact on the later development of reading skills, while segmenting phonemes in words and representing them with letters had the greatest impact on spelling. PA instruction was effective with younger (preschool through first grade) general education students, as well as with older (second grade and higher) reading disabled students. The research studies reviewed by NRP, determined that while PA instruction was effective with younger students in their beginning spelling efforts, it did not help older reading disabled students to spell. Findings are demonstrative of the need for early diagnosis and intervention with students who lack phonemic awareness. PA is not a complete reading program; however, it is a key component to early reading and spelling instruction. The meta-analysis of reading research compiled by the NRP (2000), as well as the NELP (2006), reported that children learned to read more efficiently when they were taught with a curriculum that emphasizes the development of phonological awareness. Children who demonstrated reading weaknesses were best able to learn to read when they were provided with direct instruction in phonological awareness.

Nelson, Benner, and Gonzalez (2005) investigated the effects of a cohesive and intensive preventive pre-reading intervention on the development of phonological awareness, rapid naming and word reading skills of students at risk for emotional disturbance and reading problems. The students were drawn from moderate to high poverty elementary schools from a medium sized mid-Western city. The researchers used the *Steppingstones to Literacy* curriculum, a phonologically based program. Nelson, et al. (2005), determined that there was a moderate to large effect size on the phonological awareness, rapid naming, and word reading skills of the students following intervention with the program.

McIntyre, et al. (2005) followed first and second graders for over a year. These students were provided with supplemental phonological awareness intervention. The researchers found that the first graders demonstrated significant improvement in phonological skills and reading comprehension. The second graders made gains in reading comprehension, but not in their development of phonics skills. This research (McIntyre, et al.) supports early identification and remediation of phonological processing weaknesses.

Similar research was completed by Trout, Epstein, Mickleson, Nelson, and Lewis (2003). Trout, et al. (2003) used the *Direct Instruction* reading curriculum, *Reading Mastery I,* to develop phonological awareness and the *Great Leaps* program to develop fluency. The participants were from three separate elementary schools in a mid-sized city in the Midwest. Of the participants, 83% were Caucasian and 17% were Hispanic. Over 50% of the participants were eligible for free and reduced lunch. This research determined that early identification and remediation with *Direct Instruction* curriculum was successful with kindergarten-age students at risk for reading and emotional problems.

Jitendra, Edwards, Starosta, Sacks, Jacobson, and Choutka (2004) evaluated the use of a supplemental tutoring program, *Read Well,* with second and third grade students reading at a first grade level. The students attended two separate elementary schools in the same school district in the Northwestern United States. The students' challenges were identified using various educational categories, including LD (learning disability), ESL (English as a second language), and ADHD (Attention Deficit Hyperactivity Disorder). *Read Well* incorporates phonological awareness as well as phonics, fluency, vocabulary, and comprehension

into 38 instructional units. Results determined that at the end of the program students improved in word reading and in decoding. The majority of the students (80%) improved their phonological awareness skills. This study is significant because children with varied educational impediments demonstrated improvement with the same program.

Research studies completed in the United States, as well as Canada and Great Britain, have demonstrated the effectiveness of supplemental reading programs used with struggling readers who had a weakness in phonological awareness. Research completed by Torgesen, (1998), Adams (1995), Shaywitz (2003), Pullen, Lane, Lloyd, and Nowak, (2005), Elbro (2004), and Carroll and Snowling (2004) support the findings that providing direct instruction in phonological awareness early in a child's development will improve the child's chances of later reading success.

Home Literacy

Home environments and preschool settings have been found to affect a beginning student's reading progress (St. Pierre, et al., 2005). Most children do not begin to learn to read words until they start school; however, the linguistic richness of their preschool, home and childcare environments affects reading progress in school (Pressley,

2002). A student's oral language, especially their knowledge of word meanings, is related to their ability to understand words that are presented in written form. Also, the knowledge that reading can lead to entertaining and stimulating information provides inspiration for the student to learn to read (Pressley, 2002).

Providing a rich and exciting word filled life during a child's early years is a benefit to their early education (Cunningham & Allington, 2002). Research has shown that home literacy activities, as well as the relationships and confidence that are developed through the activities, have a positive impact on the emergent literacy development of pre-school children. Roberts, Jurgens, and Burchinal (2005) researched the role of home literacy on preschool children's emergent literacy skills. Participants were 72 African-America children and their mothers or primary guardians who in low SES environments. The researchers looked at the frequency of shared reading as well as the parents' book reading strategies. They used observation to elicit information about the parents' sensitivity to the child during the reading process and the child's enjoyment of reading. The rapport and nurturance between parent and child during the reading process was important to the child's level of connection to the reading process.

Roberts, et al. (2005) found, based on their research, that the overall support and responsiveness of the home environment was the strongest predictor of children's language and early literacy skills. They determined that the level of support and responsiveness of the home environment contributed over and above any one specific literacy activity.

Downer and Pianta (2006) looked at the association of early home and childcare predictors with first grade classroom functioning. The researchers examined family and child care experiences from birth to 54 months of age. Participants were recruited through hospital visits to mothers following the birth of a child. The mothers had a mean educational level of 14.58 years with average family incomes3.87 times the poverty threshold. The participants were drawn from 10 major urban areas across the United States. Ethnic backgrounds of the families were primarily Caucasian with only 16.7 being non white. Boys and girls were equally represented in the sample. Information was collected through interviews and observations. The researchers concluded that maternal sensitivity during play was a key predictor of academic success, as well as the level of maternal education and family income. Downer and Pianta's (2006) research found that a stimulating home

environment and quality childcare experiences contributed to higher cognitive and reading skills in first grade. However, the most potent predictor of first grade functioning was the child's own cognitive development at 54 months.

Cadieux and Boudreault (2002) completed research into the effects of paired reading. In paired reading, the parent and child alternate between reading text simultaneously, then individually. The task is child-centered and promotes intimacy and reading skill. Participants were kindergarten students and their parents selected from the same school district in the Outaouais region in the Province of Quebec. Outaouais is a region of western Quebec, Canada. The region includes several urban areas and is located on the north side of the Ottawa River opposite Canada's capital, Ottawa. The students were chosen because they were at risk for reading delays. The researchers first assessed the children with a series of tests to determine cognitive skills, achievement skills, auditory processing skills, and feelings of self worth. The parents were trained, supervised, and monitored to insure that the technique was correctly and regularly employed. Results showed positive gains in all areas assessed for the children from the families that used the

paired reading process regularly with fidelity. The children showed higher scores on the test of cognition, the test of achievement and the tests of auditory processing. Measures of self worth were also found to be positively related to fidelity with paired reading (Cadieux and Boudreault, 2002).

Wood (2002) and Nord, Lennon, and Liu (1999) also completed research into different kinds of home literacy activities and how they affect emerging reading skills. Wood (2002) looked at the effect and frequency of storybook reading, letter based activities such as spelling with refrigerator magnets, singing and rhyming, and letter based games such as scrabble. Participants were chosen from two playgroups in the Northampton region of the United Kingdom. The children were due to start school the following school year. In the first year sample, there were 30 boys and 31 girls included, with ages that ranged from 3.5 years to 4.8 years. The second year sample included 29 boys and 34 girls of the same pre-school age. The SES ranged from unemployed fathers (1.5%) to higher managerial and professional fathers (3.1%). The children were non-readers. Parents were given a survey to complete that gathered information about the kinds of activities they performed most frequently with their children. The

children's pre reading skills were assessed and compared to the kinds of activities experienced. The results of Wood's research showed that storybook reading and story telling were positively related to better phonological awareness, vocabulary, and short term memory. Singing and rhyming were positively correlated to better reading and spelling skills, while letter based games were positively related to an awareness of rhymes and non-words phonic reading. Wood (2002) determined that children who experienced a variety of home literacy activities fared the best academically when they started kindergarten.

Nord, et al. (1999) also researched home literacy activities. Their findings were that reading and storytelling contributed to a creative imagination and expanding vocabulary. Singing was linked to an understanding of the rhythm of language and phonological awareness. In addition, the researchers discovered that parents tended to perform different literacy activities with their children at different times. Parents were more likely to teach their three year olds songs but to take their four to five year olds to the library. Research determined that 82% of parents read to their three to five year olds three or more times weekly. They found that 50% of the parents told their children stories, while 64%

taught their children letters. Also 48% of the parents taught their children songs and 39% did arts and crafts with their children. The research determined that storybook reading was positively related to recognizing all the letters of the alphabet, counting skills, and writing names. Storytelling was linked to the child's ability to recognize letters, count, read, and write their own names. Working with letters and trips to the library were correlated with increased signs of emerging literacy. Indeed, the researchers found that even arts and crafts, because of the conversation that takes place during the activity, supports literacy. Nord, et al. (1999) determined that child-centered activities in general were linked to improved literacy.

Hart and Risley (1995) studied parent-child interactions among different social groups. They found some striking differences. On average, professional parents talked to their toddlers more than three times as much as welfare parents did. That difference resulted in a large discrepancy in the children's vocabulary size. The average three-year-old from a welfare family demonstrated an active vocabulary of around 500 words; whereas, a three-year-old from a professional family demonstrated a vocabulary of over 1000 words. Those differences become

more pronounced as the children grow older, and have a direct effect on their success in learning to read (Hart & Risley, 1995).

Based on this research, St. Pierre, et al. (2005) hypothesized that low literacy children would benefit from being in a family that participated in a literacy program. Over half of the parents in the participant families had less than a ninth grade education. The families were involved in an early intervention literacy program called Even Start. Even Start's philosophy is based on the assumption that the children's level of literacy will improve when their parents' literacy level is improved. St. Pierre, et al. (2005) followed the progress of families in the program. Their research did not show promising results; however, St. Pierre, et al. recommended that more research needed to be done with a different scientifically based curriculum. The researchers still believed that improving the overall literacy of adult members of the family would positively affect the younger members. They concluded that the curriculum used by the program was not adequate for the program participants' needs, reaffirming the need for scientific research based curriculum in all areas of literacy.

Effect of Sex on Reading Development

One of the factors that may influence the development of kindergarten pre-reading skills is the sex of the student. There is research to suggest that sex is an issue in developing emergent and early reading skills. According to Klecker (2006), boys tend to acquire reading skills later than girls. In her study, using National Assessment of Educational Progress (NAEP) data, Klecker found that there was a significant difference between the reading skills of boys and girls across 4^{th}, 8^{th}, and 12^{th} grade years. At all three grade levels, girls scored better than their male peers.

Viadro (2006) stated that boys receive poorer grades in school and are disproportionately represented in special education classes. She also reported that research using MRI studies discovered that females possess a greater density of neurons in the parts of the temporal cortex that are associated with language processing and comprehension. Viadro's research using MRI studies also determined that the prefrontal cortex, a part of the brain associated with complex thoughts, attention and impulse control, develops in females an average of 11-18 months earlier than in males.

On the other hand, a twin study completed by Hawke, Wadsworth, and DeFries (2006) was unable to find any evidence for a genetic etiology to explain the differences between males and females. In addition, another study (Ready, et al., 2005) looked at the difference in learning behaviors of boys and girls in kindergarten. Their research results stated that girls entered kindergarten with somewhat stronger literacy skills. Girls were also found to have learned slightly more than the boys throughout their kindergarten year. The girls were described as attentive, task-oriented, and persistent. The boys were described as having more prevalent external behavior problems. This research (Ready, et al., 2005) suggested that boys are more likely to have reading weaknesses than girls, but the reading weaknesses are linked to less school-like behaviors. Whether these weaknesses are neurological in nature or are simply cultural expectations of boys, the researchers contend that they do contribute to the gender gap in reading (Ready, et al., 2005).

Shaywitz (2003) addresses the sex issue in the area of reading development in the Connecticut Longitudinal Study. In the study, Shaywitz compared her screening identification of students with reading disabilities to the

school's identification of students with reading disabilities by teacher referral. According to school identification of reading disabilities boys were reading disabled three to four times more often than girls. However, according to Shaywitz's identification, there was no significant difference between boys and girls. Further research into this phenomenon (Shaywitz, 2003) suggested that boys were more quickly referred for identification due to externalizing behaviors. Girls were more likely to sit quietly in their seats and their deficits were not noticed as readily.

Summary

There is strong research to support that reading is essential to academic success (Aaron, 1997; Adams, 1995; McIntyre, et. al., 2005). Reading is a neurological process that involves the development of neural pathways to accommodate it. Children's brains are more attuned to certain pre-reading and reading activities at different neurological developmental levels. It is important that children interact with language and literacy activities during these neurological windows of opportunity to enhance the development of these reading pathways.

Research indicates that phonological awareness, phonological memory and rapid naming are all indicators of future reading success in young children (NELP, 2006; NRP, 2000; Torgesen, 1998). Weaknesses in any one of these areas can impede reading progress. Research has shown that these weaknesses can be improved with early identification and direct instruction in phonological awareness (NRP, 2000; Nelson et. al., 2005; Wagner, et. al., 1999). Research-based instruction in phonological awareness provided at the appropriate neurodevelopmental time can actually facilitate the creation of more efficient neural reading pathways (McCandliss & Wolmetz, 2004; Shaywitz, 2005; Simos, 2005). Other research has determined that the amount and type of home literacy activities can additionally influence a preschool child's reading readiness skills and their later response to reading instruction (NELP, 2006; Petrill, et. al., 2006; Pressley, 2002; St. Pierre, et. al., 2005; Cunningham & Allington, 2002). Even the sex of a student has been demonstrated in research to be a potential predictor of early reading success (Viadro, 2006; Klecker, 2006; Ready et. al., 2005). Poor reading skills lead to under achievement as well as referrals to special education.

CHAPTER III

METHODOLOGY

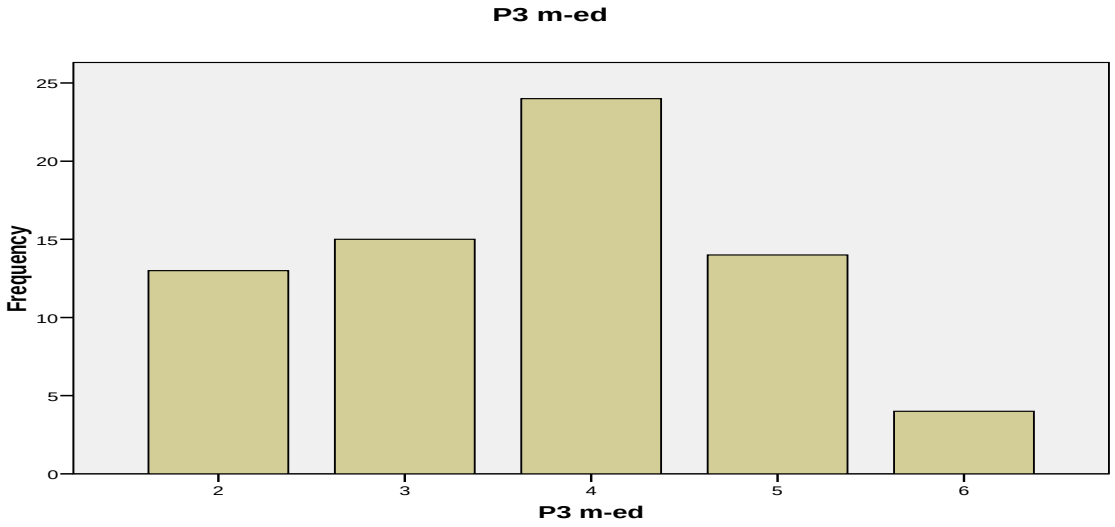
Setting of the Study

The school district's kindergarten supplemental reading support program was initiated in two of its five elementary schools during the 2006-2007 school year. The school district covers 9.9 square miles of a suburban county outside of a major city in the mid-Eastern part of the United States. There are a total of 5,409 students in the school district. The district's median household income is $115, 000. Fewer than 8% of the students are being raised in single-parent households (Standard & Poors, 2004). According to Standard and Poor, the majority of students are non-minority students (91%), who live in two-parent homes (92%), and speak English as their primary language (95%). Only 5% of the students are eligible for free or reduced price lunches.

Nord, Lennon, and Liu (1999) assert that children at risk for reading failure tend to live below the poverty threshold and in one parent families. They are more likely to be a member of a minority group and/or speak English as a second language (Nord, et al., 1999). The typical student in this school district is not statistically at

risk for reading failure. There are higher levels of parental literacy and lower levels of economic disadvantage in the district. The culture of the district's community is for both parents and their children to have more than high school diplomas. The Special Education Data Report (2006) states that 97.10% of the district's students graduate. According to the school district website, approximately 90% of the district's graduates continue formal education at colleges, universities, and technical schools. Figures 1 and 2 provide data regarding the educational levels of the parents who completed the home literacy survey.

Elementary School A had 357 students in grades kindergarten through fifth grade in the 2006-2007 school year. There were a total of 57 kindergarten students of which 27 were boys and 30 were girls. The kindergarten classes did not exceed 20 students. There were two ESL students in Elementary School A's three kindergarten classes. The ethnic background of Elementary School A students was 89.1% Caucasian, 1.4% African-American, .8% Hispanic and 8.7% Asian-American. Of the district's 357 students, 5.7% are economically disadvantaged. Pupil



Code: 1-<HS, 2-HS, 3-Some college, 4- College grad, 5-Masters degree, 6-More than Masters degree

Figure 1. Mother's education.

Code: 1-<HS, 2-HS, 3-Some college, 4- College grad, 5-Masters degree, 6-More than Masters degree

Figure 2. Father's education.

Service files from the 2006-2007 school year reported that 78 (18.3%) of Elementary School A students received special education services. This is comparable to the district's average of 17.7% special education students (Pennsylvania Department of Education, 2006). However, this is not comparable to the estimated percentage of students with special education services nationwide (13.8%).

Elementary School B is one of the district's larger elementary schools with 511 students in grades kindergarten to fifth grade. Elementary School B has three classrooms in each grade. The teacher to student ratio is 1:16. Kindergarten classes that seldom exceed 20 students did during the 2006-2007 school year because there were 63 kindergarten students. Of the 63 students, 27 were girls and 36 were boys. There were seven ESL students in the three kindergarten classrooms. During the school year, two students moved away and one student was placed in an out of district placement. By the end of the school year the kindergarten class numbers were 20, 19, and 21 students equaling a total of 60 students. The ethnic background of Elementary School B's students was 94.8% Caucasian, 2.2% African-American, and 5.7% Asian-American. Of Elementary School B's 511 students, 1.4% were economically disadvantaged. Pupil Service files from 2006 reported that

87 (17%) of Elementary School B's students received special education services. This is comparable to the District's average of 17.7% special education students (Pennsylvania Department of Education, 2006). However, this is not comparable to the percentage of students with special education services nationwide (13.8%).

Study Sample

The population for this study is the kindergarten students in a relatively homogenous, middle class suburban neighborhood where less than 6% of the students are economically disadvantaged. The district's curriculum (Houghton Mifflin) and curriculum delivery system (Four Blocks Framework) are described as evidence-based by the authors (Cooper, Pikulski, Lipson, 2003; www.wfu.edu/fourblocks; Pressley, 2002). Houghton Mifflin asserts that their reading program is research based and developed by scholars whose work has been reviewed by their peers as well as placed under scrutiny by national panels (Cooper, et al., 2003).

Kindergarten students are assigned to kindergarten classrooms based primarily on a family preference for morning or afternoon classes. As a result, random sampling techniques could not be employed as the school district had

already assigned students to their respective classrooms and teachers.

Two of the district's elementary principals, concerned about the high levels of reading weaknesses and learning disabilities diagnosed in their schools, initiated a supplemental reading program in their kindergarten classes. Information was collected on all kindergarten students to assess their individual progress, as well as the classroom's progress. That information was released later as archival data to be coded for use in this study.

The kindergarten students, who were included in the supplemental reading program, attended kindergarten in either Elementary School A or Elementary School B. The students ranged in age from no less than five years of age in the fall of 2006 to no more than six years 11 months in the spring of 2007. The age range is based on the age parameters of the CTOPP for administration of particular subtests at that age level.

All kindergarten students at Elementary School A and all but one of the kindergarten students at Elementary School B were screened with the CTOPP in November and December of the 2006-2007 school year. The excluded student was a student with exceptional educational needs who attended both the a.m. and the p.m. kindergarten

sessions. This student had an individual educational plan and his curriculum and goals were different than those of the other kindergarten students. The CTOPP assessed the students' PA, PM, and RN skills. ESL students were screened and considered for the supplemental reading program using the same parameters as their English-speaking peers.

The students who scored lower than the 25th percentile on the CTOPP were referred to a reading team comprised of the school psychologist, teacher, reading specialist, and principal. Each set of classroom data were evaluated by the team separately. Results of the assessments and progress in class were discussed. Students with the lowest composite scores and/or multiple low composite scores were chosen for the LG first. Only five or six students could be included in the LG in each classroom and there was only time for one LG per class. The neediest five to six students in each class were chosen to receive supplemental intervention. The rest of the students were divided into the MG, those students who scored for the most part between the 25th and the 75th percentile on the three composites of the CTOPP and the HG, those students who generally scored above the 75th percentile on the three composite areas of the CTOPP.

Because of the make up of the classes, it is possible that a needier student from one class would not get the treatment, while a less needy student from another class would get the treatment. As a result, there may be students in the MG who actually scored lower on one of the CTOPP composite areas than another student from the LG. The chosen students (LG) were provided with supplemental reading instruction, using the *Road to the Code* reading program. All of the students were taught the Houghton Mifflin reading curriculum within the Building Blocks framework. There were a total of 120 kindergarten students including 57 females and 63 males. The LG was made up 34 students, 21 females and 13 males, while the MG was composed of 34 females and 25 males and the HG was made up of 10 females and 16 males.

Home literacy is defined as the activities and the environment at home that contribute to reading and academic success. All kindergarten students' parents were asked to complete a home literacy survey. Approximately 58% of the parents of the 120 kindergarten students responded by returning the survey. The children whose parents responded to the survey are the sample for the home literacy portion of the project.

Data Collection

Method of Obtaining Data

In November and December of the 2006-2007 school year, all kindergarten students in Elementary School A and all but one of the kindergarten students in Elementary School B in the school district were screened with the CTOPP.

There were four examiners who assessed a total of 120 kindergarten students in the two schools. Each assessment took an average of 30 minutes. The assessments were completed over a two to three week period in November-December 2006 and again in May 2007. Although inter-rater reliability was not established, the staff persons administering the test were taught as a group how to administer the test. The group also met prior to each assessment period to review testing procedures to enhance commonality in administration practices and scoring. Students were assessed by the same evaluator for both the pre-test and the post-test administration of the CTOPP and as much as possible, in the same order. This process was selected to enhance pre-test and post-test reliability, as well as to standardize the amount of time that passed between pre-test and post-test. The results of the pre- and post-tests were used to look at the growth of all the

students as well as to look at the effectiveness of the supplemental instruction in PA.

The LG students received approximately 15 hours total of supplemental instruction using the *Road to the Code* curriculum provided by the reading specialist between the months of January and May 2007. The students received 45 minutes of supplemental instruction weekly. Five of the six LG groups received 15 minutes of supplemental instruction three times weekly, while the sixth group received 22-25 minutes of supplemental instruction twice weekly. The difference was necessary due to scheduling issues between the reading specialist and the kindergarten teacher. The *Road to the Code* curriculum emphasizes the development of phonological awareness skills. All of the students participated in the general education Houghton Mifflin curriculum provided within the Building Blocks Framework as well.

All of the 120 Elementary School A and Elementary School B kindergarten parents were asked to complete a home literacy survey during the 2006-2007 school year. Approximately 58% of the parents responded and completed the survey. Parents who completed the home literacy survey also signed an attached permission slip allowing their responses to be used to determine whether the frequency of

certain types of home literacy activities can be correlated with higher pre-test scores on any of the three CTOPP composite areas.

Assessments Used

The CTOPP was chosen as the measurement tool. The CTOPP is a norm-referenced assessment that looks at three of the predictors of early reading success; PA, PM, and RN. Raw scores are compared to age and scaled scores are derived for the individual subtests. Subtest scores are combined into three composite areas and composite standard scores are determined. According to Torgesen (1999), the composite areas (PA, PM, and RN) are correlated rather than independent. Phonological awareness and phonological memory have higher correlations with one another than they have with rapid naming. Confirmatory factor analytic studies reveal that the correlation between PA and PM is .88 while the correlation between PM and RN is .45 and the correlation between PA and RN is .46 (Wagner, et al., 1999).

The creators of the CTOPP (Wagner, et al., 1999) state that the instrument has four principle uses. The first use is to identify students who are significantly below their peers in areas of phonological processes determined by

research to be important in developing reading skills. The second use, according to the authors, is to determine individual student patterns of developmental strengths and weaknesses in reading. The third purpose of assessment using the CTOPP is to document individual student progress as a consequence of special intervention programs. The last purpose is for the CTOPP to be used as a measurement device in research studies investigating phonological processing. The CTOPP was chosen as the instrument to assess students primarily because it met the three primary needs of the program. The program required an instrument, which could determine which kindergarten students needed supplemental intervention and what those students' phonological strengths and weaknesses were so that a curriculum could be chosen to meet their needs. The program also needed an instrument that would document the progress all students made during the time period, especially those students who received the supplemental phonological awareness instruction. Another benefit was that this instrument was developed to be used to determine the effectiveness of special interventions and as a measurement tool for research investigating phonolological processes.

Reliability for the CTOPP composite areas is excellent. The coefficient alpha for the PA composite is .95, for the RN composite is .87 and for the PM composite is .84 (Wagner, et al., 1999). The CTOPP's validity also is excellent. The discriminating powers of the CTOPP subtests are all over .35, the level of acceptability. Scores range from a low of .37 in Memory for Digits to a high of .61 for Sound Matching. The CTOPP demonstrated moderate to strong correlations with the Word Identification and Word Analysis subtests of the Woodcock Reading Mastery Test-Revised (Wagner, et al., 1999).

The home literacy survey was developed based on the research of Nord, et al. (1999) and Wood (2002). Nord and her associates looked at the effects of the kinds of parent child activities and the frequency of the parent child activities on the development of reading skills. Wood completed similar research using similar activities. Both researchers looked at reading, storytelling, letter-based activities, and singing and rhyming to determine their effect on the development of emergent literacy skills. Wood also looked at the effect of playing word games, while Nord, et al. (1999) looked at arts and crafts activities and visiting the library. Using the findings of this research, the home literacy survey was developed. The

survey was submitted to a panel of experts within the school district as well as within the university. Changes were made as needed. The home literacy survey is included as Appendix A.

Rigby levels are used in the school district as benchmarks to document a student's progress throughout their first grade year. Rigby Literacy, a reading program published by the Harcourt Publishing Company, can be used as the core program or as a supplemental program (http://rigby.harcourtachieve.com). In the district, Rigby Literacy is used as a supplemental reading series in conjunction with the core Houghton Mifflin reading program. Rigby Literacy provides a series of leveled books for students. During Four Blocks guided reading, each student reads at their own instructional level (93% to 97%). When a student becomes independent (>97%) at a particular level, they move on to the next series of books at the next reading level. Students are expected to be reading at Rigby level 18 at the end of their first grade year. Teachers keep running records of each student's progress with the Rigby books throughout the school year. Rigby levels are collected and used in the district as an indicator of whether a student is at, below or above grade expectations during and at the end of their first grade

school year. The first grade end of the year (EOY) Rigby levels will be used to look at the LG, MG, and HG students' skills at the end of their first grade year (2007-2008).

Intervention Program

The supplemental instruction provided as treatment was *Road to the Code,* a scientifically researched program designed to incorporate phonological awareness activities into kindergarten and first grade (Florida Center for Reading Research, www.fcrr.org). *Road to the Code* is meant to supplement, not replace the classroom curriculum. The overriding goal of *Road to the Code* is to develop students' awareness that words can be segmented into phonemes and that these segmented units are represented by letters of the alphabet. The lessons are designed to be presented to small groups of 5 students in 15 to 20 minute intervals. One of the program's strengths is its inherent design of teaching to mastery.

The Florida Center for Reading Research (www.fcrr.org) (FCRR) reviewed the research on the program and did not note any weaknesses. FCRR research states that the *Road to the Code* manual regularly reminds teachers to verify that students have mastered an objective before continuing the lesson. Also, the activities are highly structured and

developmentally sequenced to ensure a high rate of student success. FCRR research found the manual to be teacher friendly and easy to use. Suggestions for pacing and differentiation are provided and materials and activities are varied to maintain student interest and motivation. Research for the *Road to the Code* is strong and this program has been found to be particularly useful for developing beginning reading and spelling skills (FCRR, www.fcrr.org).

Intervention Fidelity

Fidelity to the intervention was determined using instruments provided by Benita Blachman, creator of the *Road to the Code* reading program. The first document, Intervention Fidelity Lesson Observations (Appendix C), was written by Dr. Blachman in 2003. However, since it was not possible to observe the providers retroactively, the observation was used as an interview tool. This researcher interviewed both of the Reading Specialists who provided the lessons to the students in the LG. Responses to the interview were; Yes, No, or Somewhat, as suggested by the observation. If the response was somewhat, an explanation was requested. Fidelity to the *Road to the Code* lessons was determined by comparing the number of Yes and Sometimes

responses to the number of No responses. Fidelity to the program would be considered adequate if no more than 5% of the responses to the questions were No. The Kindergarten Early Literacy Feedback Form (Appendix B), another form created by Blachman in 2003, was used to gather information from the reading specialists who provided the reading instruction. This form explored the Reading Specialists' feelings about the program.

Information gathered from the interviews revealed that the two reading specialists adhered to the curriculum with extremely high levels of fidelity. The questions in the Intervention Fidelity Lesson Observation interview were answered with a majority of Yes responses. There were not any No responses and only 7% Sometimes responses.

Although interviewed separately, the Reading Specialists' response patterns were similar. Both of the Reading Specialists stated that the program's clear instructions and directions, as well as the inclusion of all the materials necessary for successful implementation, increased fidelity. For the most part, the students enjoyed the activities; however, they did become bored with the "say it and move it" letter sound introduction. One of the teachers observed that most of her LG students had

learned rhyming and beginning sounds to mastery by the end of the program.

Neither teachers' difficulties with the program were intervention related. One teacher stated it was sometimes difficult for her to find a quiet space to work with her students. Another stated that as the year progressed, attention and distractibility became more of an issue, due to one particular student. The program was scheduled at the beginning of the day and sometimes students came in late interfering with consistency. One of the teachers would have liked more time to complete the program. Both teachers' schedules were very full. Although they were both able to complete the program with the students, they both felt more time with the program would have benefitted their students.

Data Analysis

There are five research questions to be answered by this study. The first question is the following: Does the use of supplemental phonological awareness instruction mitigate the deficiency between lower scoring (LG) CTOPP students compared to the average scoring (MG) and higher scoring (HG) CTOPP students in any of the CTOPP composite areas? This question was answered utilizing a 3 (LG, MG,

HG) by 2 (male, female) factorial model, initially with the three composite pre-test scores of the CTOPP as the dependent variables. If there is a significant difference between the pre-test groups, the post-test data will be evaluated in the same manner to determine whether the differences between the groups were mitigated. The data will be analyzed by means of a Multivariate Analysis of Variance (MANOVA). Rigby levels collected at the end of the students first grade year will be used to look at whether or not the progress made in the kindergarten year is maintained.

The second and third research questions are the following: (2) Is there a particular kind of home literacy activity that can be linked to higher scores in any of the composite areas of the CTOPP; and, (3) Is there a particular type of home literacy activity that occurs more often with girls than with boys? These questions were answered by correlating the results of the home literacy survey with the three composite scores of the CTOPP. Pearson Product Moment Correlation and a Correlational Matrix were used to look at whether any of the home literacy activities correlate with any of the composite areas of the CTOPP.

The fourth and fifth questions, regarding: (1) whether there is a significant difference in the scores of male and female kindergarten students based on the pre-test scores in any of the three composite areas of the CTOPP; and, (2)whether there is a significant difference in the scores of male and female kindergarten students based on the post-test scores on any of the three composites of the CTOPP, will be answered again using a Multivariate Analysis of Variance (MANOVA). These questions will be answered utilizing a 3 (LG, MG, HG) by 2 (male, female) factorial model, with the three composite scores of the CTOPP as the dependent variables.

Reading progress can be affected by a child's cultural, social, and economic factors. Research (Cunningham & Allington, 2003; Downer & Pianta, 2006; Fuchs, et al., 2004) suggests that reading progress may be affected by preschool attendance, living in a one parent or two parent family, or living in a home where both parents work. Data regarding these factors were collected through the home literacy surveys. Although these factors are not part of the hypothesis, they will be evaluated using T Tests to attempt to substantiate or rule out their effect on the results of this research.

CHAPTER IV

RESULTS

Analysis

There were five questions addressed by this research. Because of the similarities of data and the statistical procedures used in the analyses, questions one, four, and five will be reported together. Questions two and three were answered by the home literacy data and similar operations and will be reported together later in this section.

The first question is does the use of supplemental phonological awareness instruction mitigate the deficiency between lower scoring (LG) students compared to the average scoring (MG), and higher scoring (HG) students in any of the CTOPP composite areas? If the difference is mitigated, can this improvement in mean scores still be seen at the end of first grade using Rigby levels, the district's end of the year benchmark tool?

It was hypothesized that the use of supplemental phonological awareness instruction would mitigate the deficiency among LG compared to MG and HG students in all of the CTOPP composite areas. There would be a significant

difference in pre-test scores among LG students, MG students, and HG students on all of the three composite areas of the CTOPP. There would not be a significant difference among LG students, MG students, and HG students on the post-test scores on any of the three composite areas of the CTOPP. The improvement will continue through first grade as documented using Rigby levels, the district's end of the year benchmark for first grade.

The data were evaluated using MANOVA as well as repeated measures ANOVA. Table 1 shows PA, PM, and RN pre- and post-test means for the three instructional groups (LG, MG, HG) used in the analyses.

Two MANOVA procedures in which sex (male and female) and supplemental instruction groups (LG, MG, HG) served as independent variables and the three composite areas of the CTOPP (PA, PM, and RN) served as the dependent variables, were used to answer research hypothesis one. It was necessary to determine whether there was a difference among the three instructional groups, LG, MG, and HG before supplemental PA instruction took place. The first MANOVA used pre-test data from the three composite areas of the CTOPP to attempt to answer this question. Assuming there was a difference, the second MANOVA which used post-test data from the three composite areas of the CTOPP as the

Table 1

Pre- and Post-Test Means for the Three Groups and Three Composite Areas of the Comprehensive Test of Phonological Processing

		LG		MG		HG		Total	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post
PA	m	89.0	98.7	98.14	102.7	112.3	113.2	98.8	103.8
Total	sd	10.5	10.7	6.1	7.9	9.9	9.6	11.7	10.5
PM	m	90.3	94.8	103.7	102.4	115.8	109.8	102.7	101.7
Total	sd	9.4	11.2	10.1	10.3	9.9	9.6	11.7	10.5
RN	m	92.4	88.9	104.2	98.2	112.0	111.5	102.7	98.6
Total	sd	16.3	12.9	11.2	11.2	13.6	13.7	14.9	14.5
	N	32	33	59	59	26	25	117	117

dependent variables was used to determine whether the differences were mitigated.

The results of the first MANOVA using the pre-test means determined that there was an overall significant difference among all three groups, LG, MG, and HG on all three of the composite areas of the CTOPP. According to Wilks' Lambda, the main effect for the group was significant at .000 (F = 26.869; df = 6, 218). Thus, there was a significant difference among student groups before the intervention. Neither the main effect for sex nor the sex by group interaction were significant.

Because there was a difference among the three groups on the three dependent variables, it was necessary to determine specifically the nature of that significance. The follow up Univariate tests revealed that the groups differed on each of the three dependent variables (PA (F = 50.516; df = 2), PM (F = 46.566; df = 2) RN(F = 16.927; df = 2)). There was a significant difference between phonological awareness skills, phonological memory skills, and rapid naming skills in all three groups.

Once determining that there were differences on each of the dependent variables a subsequent Post Hoc test, Tukey HSD, was utilized to determine where the means of the three student groups differed significantly on the pre-test

data. The mean difference was significant at the .01 level, between the LG and MG, LG, and HG, and MG and LG on all of the three composite areas of the CTOPP: PA, PM, and RN. There were significant differences among the three student groups (LG, MG, and HG) prior to intervention and instruction.

Because there were differences before intervention took place, the second MANOVA was completed using the post-test means listed in Table 1. The means of the three composite areas of the CTOPP were used as the dependent variable to determine whether the significant differences still remained after intervention. According to Wilks' Lambda, the main effect for the group continued to be significant at .000(F = 13.087; df = 6, 218). There was still an overall significant difference among the three student groups.

Because there were differences among the three groups on the three dependent variables, it was necessary to determine specifically the nature of those differences. The follow up Univariate tests revealed that the groups differed significantly at a .000 level in each of the three dependent variables (PA (F = 17.227; df = 2), PM (F = 14.666; df = 2) and RN (F = 22.151; df = 2)). Thus, there continued to be a significant difference among phonological

awareness skills, phonological memory skills, and rapid naming skills among the groups after intervention took place.

A Post Hoc test, Tukey HSD, was utilized to determine where the means of the three student groups differed significantly. Results using the post-test data determined that the mean difference was significant at the .05 level, between the LG and HG and the MG and HG in PA, as well as among all groups in PM, and RN. However, the mean difference between LG and MG was not significant on the post-test data in PA. The difference between the LG and MG on the Phonological Awareness composite was mitigated. There continued to be significant differences, however, among Phonological Memory means and Rapid Naming means for the LG, MG, and HG.

The End of the Year (EOY) Rigby levels were used to look at the difference among the LG, MG, and HG means at the end of the kindergarten student's first grade year. The grand mean score for all kindergarten students' end of the first grade year Rigby levels was 18.9 with a standard error of .462.

An ANOVA was used with the EOY Rigby level results to determine whether there were significant differences among the LG, MG, and HG at the end of the kindergarten students'

first grade year. A significant difference was found among the three groups (F = 20.621, df = 2). Tukey HSD was used to determine the nature of the difference between the groups. The analysis revealed that the LG scored lower (m = 15.33, sd = 3.875) than the MG (m = 18.19, sd = 4.947) and the MG scored lower than the HG (m = 23.20, sd = 5.431). The mean difference was significant between the LG and MG (alpha = .025), between the LG and HG (alpha = .0000) and between the MG and HG (alpha = .000)at the .05 level. Table 2 shows the EOY mean scores of the LG, MG, and HG.

Table 2

End of Year Means

	N	Mean	SD
1	24	15.33	3.875
2	54	18.19	4.047
3	25	23.20	5.432
Total	103	18.74	5.158

The first part of hypothesis one was partially accepted. While the difference between the LG and MG in PA was mitigated, the differences between LG and HG and MG and

HG were not mitigated in PA. There were significant differences among all three instructional groups (LG, MG, and HG) in both PM and RN. The second part of the first hypothesis was rejected. EOY reading benchmarks determined that there were significant differences among all three groups (LG, MG, and HG) at the end of the first grade year.

Because the original analyses did not strongly support the first hypothesis, a second analysis was preformed to determine whether there were significant pre-test to post-test differences. The rationale for this further analysis was that, while the LG group may not have been able to perform as well as the MG and HG groups after intervention, it was of interest to know whether the gains from pre-test to post-test were significant. If so, was there any differential change based on group membership (LG, MG, HG). This was accomplished using a repeated measures ANOVA with the three instructional groups (LG, MG, and HG) as independent (between subjects) variables and pre-test to post-test (time) as the within variable. The dependent variables were the three dimensions of the CTOPP (PA, PM, and RN). The main effects of group (LG, MG, and HG) and time (pre to post) are not relevant to the study because collapsing the pre-test and post-test and collapsing across groups does not provide any insights to the research

questions. Thus, these are not described below. However, examining the interaction between the instructional groups and the pre-post factor will determine whether there was a differential impact on the three groups.

The interaction of pre-test to post-test within factor in PA and LG, MG and HG was significant at the .002 level ($f = 6.738$, $df = 2, 114$). Thus, there is a differential impact on the three groups. The LG, the group who received the supplemental PA intervention grew by 8.34 points while the MG only grew by 4.52 and the HG by only 1.32 (See Table 3). The difference in growth in the LG can be explained by the fact that they were the only group who received supplemental instruction in PA.

Table 3

Pre- and Post-Test Means in Phonological Awareness for Lower Group, Middle Group, and Higher Group

	Pre-Test (PA)	Post-Test (PA)
Lower Group	89.39	98.73
Middle Group	98.14	102.66
Higher Group	111.68	113.00

The interaction of pre-test to post-test within factor in PM and LG, MG and HG was significant at the .001 level (f =7 .033, df = 2, 115). Thus, there is a differential impact on the three groups. The LG, the group who received the supplemental PA intervention grew by 4.06 points while the MG regressed by -1.27 points and the HG regressed by -5.64 points (See Table 4). The LG grew over four points, while both the MG and HG moved in a negative direction. The positive growth in the LG can be explained by the fact that they were the only group who received supplemental instruction in PA.

Table 4

Pre- and Post-Test Means in Phonological Memory for Lower Group, Middle Group, and Higher Group

	Pre-Test (PM)	Post-Test (PM)
Lower Group	90.38	94.44
Middle Group	103.71	102.44
Higher Group	115.48	109.84

The interaction of pre-test to post-test within factor in RN and LG, MG and HG was not significant (alpha = .196, f = 1.656, df = 2, 113). Thus there is no differential

impact on the three groups. The LG, the group who received the supplemental PA intervention regressed by -3.5 points, while the MG regressed by -6.2 points and the HG regressed by -.5 points (See Table 5). The LG, the MG and the HG all moved in a negative direction.

Table 5

Pre- and Post-Test Means in Rapid Naming for Lower Group, Middle Group, and Higher Group

	Pre-Test (RN)	Post-Test (RN)
Lower Group	92.4	88.9
Middle Group	104.2	98.2
Higher Group	112.00	111.5

These results suggest that the treatment not only mitigated the difference between the LG and the MG, but also created significant improvement in the LG in both PA and PM. RN means moved in a negative direction in all three of the instructional groups. Neither the regular curriculum nor the regular curriculum in combination with supplemental instruction in PA was able to inhibit the RN regression.

While not part of the hypotheses, there were several factors evaluated as part of the research to assess their possible effect on the data collected in the study. The first factor investigated was whether students who attended preschool would demonstrate higher pre-test means on any of the three composite areas of the CTOPP. Results using this data determined that in this research, preschool attendance was not a significant factor in the differences of means of these students (PA = .226, $p<.05$; PM = .601, $p<.05$; RN = .549, $p<.05$). Table 6 reports the means of pre-school (y) and non preschool (n).

Table 6

Report of Preschool Means

P		Pre 1	Pre 2	Pre 3
u	Mean	92.57	97.43	96.86
	N	14	14	14
	Std. Deviation	13.888	16.128	10.136
n	Mean	98.63	102.73	102.81
	N	65	66	64
	Std. Deviation	9.828	12.282	15.013
y	Mean	101.36	104.08	104.69
	N	39	39	39
	Std. Deviation	12.887	13.460	15.990
t	Mean	98.81	102.55	102.73
	N	118	119	117
	Std. Deviation	11.621	13.191	14.938

Note. n = no preschool; y = preschool; u = unknown, t = total.

Additionally, living in one parent or two parent families was analyzed as a factor that may have affected the results of the three composite areas of the CTOPP. Results of an Independent Samples Test determined that there was not a significant difference between the pre-test means and/or post-test means on the three composite areas of the CTOPP of children living in one parent or two parent families. It is important to consider this finding along with the knowledge that there were only four children in the sample who lived in one parent families (See Table 7).

Table 7

Statistics and Significance for One Parent or Two Parent Families

	P1 Family	N	Mean	Standard Deviation	Standard Error Mean	Sig. (2-tailed)
Pre 1	2	4	90.75	6.449	3.224	.761
	1	72	100.83	11.723	1.382	
Pre 2	2	4	97.75	7.500	3.750	.945
	1	72	103.17	12.260	1.445	
Pre 3	2	4	108.25	19.653	9.827	.789
	1	72	104.76	16.022	1.888	
Post 1	2	4	100.00	5.888	2.944	.962
	1	71	105.41	10.743	1.275	
Post 2	2	4	93.25	9.287	4.644	.640
	1	71	101.48	11.305	1.342	
Post 3	2	4	99.25	15.945	7.973	.807
	1	71	99.92	14.965	1.776	

Note. 1 = two parent family; 2 = one parent family.

Living in a family with one parent working or two parents working also was analyzed as a factor that may have affected the results of the three composite areas of the CTOPP. Results of an Independent Samples Test determined that there were no significant difference kindergarten students living in a family with one employed parent or those living in a family with two employed parents on the pre-test or post-test means of the three composite areas of the CTOPP. Table 8 shows the means, standard deviations, and significance of the differences of the means.

Table 8

Group Statistics and Significance for One or Two Parents Working in Family

	P2 Employed	N	Mean	Standard Deviation	Standard Error Mean	Sig. (2-tailed)
Pre 1	2	30	99.60	13.423	2.451	.761
	1	45	100.44	10.457	1.559	
Pre 2	2	30	103.00	12.052	2.200	.945
	1	45	102.80	12.376	1.845	
Pre 3	2	30	104.23	16.554	3.022	.789
	1	45	105.27	16.107	2.401	
Post 1	2	29	104.97	12.443	2.311	.962
	1	45	105.09	9.443	1.408	
Post 2	2	29	100.28	11.677	2.168	.640
	1	45	101.56	11.295	1.684	
Post 3	2	29	100.21	17.083	3.172	.807
	1	45	99.33	13.506	2.013	

Note. 2 = two parents working; 1 = one parent working.

This research did not substantiate an effect due to prior preschool attendance, one or two parent families or one or two working parents on the development of pre reading skills, namely PA, PM, and RN.

The fourth question to be analyzed was whether there was a significant difference in the scores of male and female kindergarten students based on the pre-test scores in any of the three composite areas of the CTOPP.

It was hypothesized that females would achieve significantly higher pre-test scores than males on the three composite areas of the CTOPP. As a result, there would be more males in the LG than females. The descriptive data for the pre-test and post-test means used to answer question 4 and question 5 are included in Table 9.

The frequency data from Table 10 were used in Chi Square analysis. Although there are more girls in the LG than boys, the difference in the frequency of girls versus boys is not significant (alpha = .161)

Table 9

Descriptive Statistics for Sex

		LG		MG		HG		Total	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post
Female									
PA	m	89.4	100.5	98.2	102.7	110.9	109.4	97.3	102.9
	sd	11.8	12.3	6.4	7.4	11.9	8.8	11.6	9.7
PM	m	88.5	97.2	105.9	103.1	117.1	111.7	102.2	101.2
	sd	9.4	11.4	10.6	10.7	11.1	13.7	14.1	12.8
RN	m	95.5	88.1	102.9	98.8	108.7	111.1	101.5	97.3
	sd	17.4	13.2	10.5	11.2	11.1	13.7	13.7	14.2
	N	20	20	34	34	10	10	64	64
Male									
PA	m	88.6	96.7	98.16	102.7	113.2	115.8	100.5	104.9
	sd	8.5	7.8	5.7	8.8	8.6	9.4	11.7	11.3
PM	m	93.5	96.5	100.7	101.4	115.0	108.6	103.4	102.2
	sd	8.8	10.9	8.6	9.8	10.2	9.5	12.2	10.8
RN	m	87.2	90.08	106.04	98.2	114.0	111.8	104.2	100.06
	sd	13.4	12.9	12.1	11.5	14.9	14.0	16.4	14.8
	N	12	13	25	25	16	15	53	53

Table 10

Distribution of Boys and Girls in the Lower Group,

Middle Group, and Higher Group

	LG	MG	HG	Total
Males	13	25	16	54
Females	21	34	10	65
Total	34	59	26	119

Two MANOVA procedures in which sex (male and female) and supplemental instruction groups (LG, MG, HG) served as independent variables and the scores of the three composite areas of the CTOPP (PA, PM, and RN) served as dependent variables, were used to answer research hypotheses four and five. The first MANOVA used pre-test CTOPP data, while the second MANOVA used post-test CTOPP data.

As mentioned before, the MANOVA using pre-test data were used to analyze the hypothesis for the first research question. In addition the MANOVA main effect for sex was used to answer the fourth question. According to the results of the MANOVA using pre-test data, there was not a significant mean difference between boys and girls on any of the three of composite areas of the CTOPP. According to Wilks' Lambda, the main effect for the sex was not significant($F = .095$; $df = 3, 109$). Also, there was not a significant difference between groups when the interaction of sex and instructional group was used. According to Wilks' Lambda, the main effect for sex and instructional groups was not significant at ($F = 1.617$; $df = 6, 218$). Thus, there was no significant difference between the pre-test scores of males and females.

The second part of the hypothesis was that there would be more boys in the LG than girls. According to the data in Table 11, there were more females than males in the LG. However, the frequency was not significant (alpha = .162).

Table 11

End of Year Group Statistics for Males and Females

	Gender	N	Mean	Standard Deviation	Standard Error Mean
End of Year	f	56	18.70	4.628	.618
Reading	m	47	18.79	5.778	.843

The fourth hypothesis was rejected. There was not a significant difference between the means of boys and girls in the pre-test data. And, although there were more girls in the LG, the frequency was not significant.

The fifth question addressed whether there were significant differences in the scores of male and female kindergarten students based on the post-test scores on any of the three composites of the CTOPP.

It was hypothesized that there would not be a significant difference between the scores of females and males in the LG on the post-test scores in any of the three

composite areas of the CTOPP, but there would continue to be significant differences between males and females in the MG and HG on the post-test scores in any of the three composite areas of the CTOPP.

As mentioned before, the MANOVA using post-test data were also used to analyze the hypothesis for the first research question. In addition, the main effect of sex using the post-test MANOVA will be used to answer question five. According to the results of the MANOVA using post-test data, there was not a significant difference between boys and girls on any of the three of composite areas of the CTOPP. According to Wilks' Lambda, the main effect for sex was not significant (F = .140; df = 3, 109). There was no significant interaction effect, when the interaction of sex and instructional groups was used (Wilks' Lambda = .225; F = 1.378; df = 6, 218). Thus, there was no significant difference in post-test scores between males and females.

The data were also evaluated using repeated measures ANOVA. The test comparing pre-test to post-test using PA as the dependent variable yielded an F value of 41.733(df 1, 115) which was significant at .000. The main effect test for sex yielded an F value of 1.576 (df 1, 115) which was not significant (alpha = .212). Lastly the effect of

the interaction (pre PA, post PA) with sex (male, female) yielded an F value of .134 (df 1, 115), which is not significant (alpha = .715). Thus, there is no significant difference between males and females (See Figure 2) pre-test to post-test and there is no differential interaction term for pre-test to post-test in PA.

The repeated measures ANOVA comparing pre-test to post-test using PM as the dependent variable yielded an F value(df 1, 116), which was not significant. The main effect test for sex yielded an F value of .143 (df 1, 116), which was not significant (alpha = .706). Lastly the effect of the interaction (pre PM, post PM) with sex (male, female) yielded an F value of .070 (df 1, 116) which is not significant (alpha = .792). Thus, there is no significant difference between males and females (See Table 1) pre-test to post-test and there is no differential interaction term for pre-test to post-test in PM.

The repeated measures ANOVA comparing pre-test to post-test using RN as the dependent variable yielded an F value of 16.945 (df 1, 114) which was significant at .000. The main effect test for gender yielded an f value of 1.370 (df 1, 114) which was not significant (alpha = .244). Lastly the effect of the interaction (pre RN, post RN) with sex (male, female) yielded an F value of .065 (df 1 114),

which is not significant (alpha = .973). Thus, there is no significant difference between males and females (See Figure 2) pre-test to post-test, and there is no differential interaction term for pre-test to post-test in RN.

An Independent Samples T Test was completed using Rigby levels collected at the end of the kindergarten students' first grade year. The expected Rigby level for students at the end of their first grade year is level 18. The difference between the mean for male students (18.79) and the mean for female students (18.7) was not significant. Table 11 provides the groups statistics for Rigby levels for males and females at the end of their first grade year.

Therefore, the data indicates that there were no significant mean differences between the skills of boys and girls at the beginning of kindergarten, at the end of kindergarten or at the end of their first grade year.

Hypothesis five was partially rejected. There were no differences between the mean scores in reading for males and females at the end of their kindergarten year or at the end of their first grade year.

Because of the similarities of data and the statistical procedures used in the analyses, questions two

and three will be reported together. These two questions were answered using the data from the home literacy surveys as well as the scores from the three composite areas of the CTOPP.

The second question asked whether there was a particular kind of home literacy activity that could be linked to higher scores in any of the composite areas of the CTOPP.

It was hypothesized that the frequency of different types of home literacy activities would positively correlate to higher scores on some of the composite areas of the CTOPP. Specifically, the higher the frequency of reading, telling stories, teaching letters and numbers, singing and rhyming would positively correlate with higher scores on the PA composite and the PM composite of the CTOPP. There would be no correlation between arts and crafts and trips to the library with any of the three composite areas of the CTOPP. None of the home literacy activities would correlate with the RN composite on the CTOPP.

The data from the home literacy survey and the pre-test of the three composite areas of the CTOPP were correlated using the Pearson Product-Moment Correlation. Seven predictors were correlated to each of the three pre-

test dependent values (PA, PM, and RN). Reading to the child, telling stories to the child, teaching numbers to the child, doing arts and crafts with the child, going to the library with the child, and/or singing songs and playing music with the child were six of the predictors. The last predictor was the number of hours the child spent watching television per week. The predictors were correlated with the three composite areas of the CTOPP; PA, PM, and RN to determine if there were any positive correlations.

The results of the analysis determined that there was a mild correlation (.05 level) between singing songs and playing music with your child and phonological awareness development. Reading to your child was also mildly correlated (.05 level) with phonological awareness. In addition, there was a moderate correlation (.01 level) between telling stories to your child and the development of phonological awareness skills. Furthermore, there were moderate correlations (.01 level) between the development of phonological memory and telling stories to your child and teaching letters and numbers to your child. Table 12 provides the correlations between the home literacy activities and the Composite scores of the CTOPP.

Table 12

Correlations Between Home Literacy Activities and Composite Scores on Comprehensive Test of Phonological Processing

	Being Read To	Telling Stories	Letters And #s	Arts And Crafts	Trips To Library	Songs Music	Rhyme Poetry	Watch TV
Pre 1 (PA)	.256*	.327**	.201	.039	.042	.273*	.167	-.213
Pre 2 (PM)	.167	.310**	.335**	.203	-.058	.198	.180	-.043
Pre 3 (RN)	-.039	-.042	.044	.035	-.097	-.091	-.059	-.122

Note. *Correlation is significant at the .05 level.

**Correlation is significant at the .01 level.

The hypothesis was partially accepted. There were specific activities that did positively correlate with composite areas of the CTOPP. Specifically, the higher the frequency of reading, telling stories, singing and rhyming, the higher the scores on the PA composite. However, there was no correlation between teaching letters and numbers and PA. There was also a positive correlation between telling stories and scores on the PM composite, as well as with teaching letters and numbers and scores on the PM composite. However there was no correlation between reading to children and singing songs and music and scores on the PM composite. There was no correlation between arts and crafts and trips to the library with any of the three composite areas of the CTOPP. None of the home literacy activities were correlated with the RN composite on the CTOPP as predicted. It is important to note that although there were positive correlations, the correlations were weak. More research is necessary to substantiate these findings.

The third question was whether there was a particular type of home literacy activity that occurred more often with girls than with boys? It was hypothesized that the frequency and types of home literacy activities completed with females and males would not differ significantly.

An Independent Samples T-Test was used to look at whether the means of different home literacy activities differed significantly for boys versus girls. Table 13 shows the results of the Independent Samples T-Test.

Table 13

T-Test for Equality of Means

	Sex	N	Mean	S.D.	Sig.
Reading to	F	38	5.55 days	1.6	.912
Your Child	M	39	5.59 days	1.3	
Telling	F	37	4.54 days	2.0	.818
Stories	M	37	4.43 days	2.0	
Letters and	F	36	5.28 days	1.799	.173
Numbers	M	39	4.79 days	1.128	
Arts and	F	37	3.14 days	1.903	.963
Crafts	M	39	3.15 days	1.565	
Trips to	F	26	1.42 days	1.963	.622
Library	M	24	1.21 days	.833	
Songs and	F	37	5.62 days	1.991	.064
Music	M	39	4.74 days	2.074	
Rhyming and	F	32	3.16 days	1.919	.621
Poetry	M	37	2.95 days	1.598	
Watching	F	34	13.01 hrs weekly	7.279	.277
Television	M	37	11.35 hrs weekly	5.219	

The means of different home literacy activities from the home literacy surveys was compared to the sex of the student using an Independent Samples T-Test. There were no significant differences between boys and girls in the mean time spent in any of the activities; reading to your child

(alpha = .912), telling stories to your child (alpha = .818), doing arts and crafts with your child(alpha = .963), going to the library with your child (alpha = .622), singing songs and playing music with your child (alpha = .064), rhyming and reading poetry with your child (alpha = .621)and teaching letters and numbers to your child (alpha = .173). Girls watched an average of 13.01 hours of television weekly, while boys watched an average of 11.35 hours weekly; however, the difference was not significant (alpha = .277).

The third hypothesis was accepted. There were no significant differences in the frequency of different types of home literacy activities completed with females and males.

Summary

Results determined that there was a significant mean difference in the pre-test data at the .01 level, among the LG and MG, LG and HG, and the MG and LG on all of the three composite areas of the CTOPP; PA, PM, and RN before supplemental intervention. Results using the post-test data determined that there were mean differences, significant at the .05 level, among the LG and HG and the MG and HG on the Post 1 (PA), as well as among all

instructional groups in the the Post 2 (PM), and Post 3 (RN). However, the mean difference between LG and MG was not significant on the post-test data on Post 1. The difference between the LG and MG on the phonological awareness composite was mitigated by supplemental instruction in phonological awareness. There were continued differences in phonological memory and rapid naming. However, at the end of the students' first grade year, using EOY Rigby levels, there were again significant differences among all instructional groups.

There were no significant differences between groups when frequency data were analyzed using Chi Square regarded the numbers of males and females in the LG. There were no significant differences between groups when the interaction of sex and instructional groups was analyzed using pre-test and post-test MANOVA. There were no significant differences between the Rigby level means of the same boys and girls at the end of their first grade year using an Independent Samples T-Test.

The results of the home literacy survey and the three composite areas of the CTOPP were correlated to determine whether there were any correlations among them. There were weak positive correlations between phonological awareness and singing songs and playing music with children as well

as between phonological awareness and reading to children. There were also weak positive correlations between telling stories to children and the development of phonological awareness skills. Weak positive correlations existed between the development of phonological memory and telling stories to children and teaching letters and numbers to children. Results using frequency data from the home literacy survey and an Independent Samples T-Test, determined there were no significant differences between boys and girls in the frequency of literacy activities occurring in the home.

CHAPTER V

SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Summary of Findings

The purpose of this research was to assess the outcomes of supplemental instruction in phonological awareness on struggling kindergarten students, as well as to look at the effect of home literacy activities, sex and family characteristics on the development of prereading skills. The supplemental reading program evaluated in this research was developed out of a concern that there were too many students in special education in the district, in spite of an adequate curriculum and few environmental risks that would negatively affect reading progress. There was strong research (Nelson, et al., 2005; Torgesen, 1998; Wagner, et al., 1999) that supplemental instruction in PA provided at the kindergarten level would improve skills in Phonological Awareness (PA), Phonological Memory (PM) and Rapid Naming (RN).

The present research supported the possibility that supplemental PA instruction provided only three times weekly improved the PA and PM means of the lower group (LG) of kindergarten students. The difference between the LG

and the middle group (MG) was in fact mitigated at the end of their kindergarten year. These LG students entered first grade with PA skills developed within the range of their average performing peers. With these average skills, the chances of continued development of early literacy skills and reading ability are much improved. As a result, these students are at less of a risk of being referred for special education at a future time.

The results of this research suggested that students do respond positively to scientifically based reading interventions as early as kindergarten, even when that intervention occurred only 15 minutes daily three times a week. The differences between the LG and MG were only mitigated in PA, but there was a significant differential between the before and after intervention scores in PM for the LG. Based on these findings, the District should continue to screen kindergarten students and provide supplemental phonological awareness instruction to struggling students. If the District increased the intensity of the intervention to 15 minutes 5 times weekly, an increase in 30 minutes of staff time weekly, the affect on the skills of weaker students would likely be even greater. However, further program evaluation to assess these results and compare them to the results of the

present study would need to be conducted to determine if in fact this is true.

The present research suggests that RN, an important indicator of reading skill development (Wagner, et al., 1999), was less responsive to supplemental instruction in PA, than PA and PM were. RN skills were not affected by the intervention. Increased intervention intensity may result in improved RN; however, more research is needed to know whether that would occur. Also research regarding effective RN interventions is recommended and necessary. RN skills have been found by research to be more influenced by genetics than environmental factors (Petrill, et al., 2006) and to reach a threshold earlier in a student's academic career (Savage, et al.,2005). However, weaker RN skills may be improved, if an appropriate intervention is found. Because RN contributes to reading fluency and fluency is important to competent reading, further research into this area is needed.

In addition to immediate pre and post program evaluation data, data were collected at the end of the first grade year to observe whether the progress made in kindergarten was maintained in the first grade year. The end of first grade year benchmark assessments are Rigby levels, a guided reading series. Rigby levels measure the

students' ability to read text and answer questions about that text. Comparing the pre-test results of the CTOPP and the end of the year Rigby levels did substantiate the research that states that a child's PA, PM, and RN skills at the beginning of kindergarten are indicative of their reading skills at the end of their first grade year (Wagner, et al., 1999). Essentially, there remained significant differences between the three instructional groups (LG, MG, and HG).

The data suggested that the improvements in PA did not continue to the end of the first grade school year. However, the instrument used as the end of first grade screener, Rigby levels, does not assess PA or PM directly and thus may not be sensitive to phonological awareness. Because of this, it would have been beneficial to provide an end of first grade year CTOPP assessment or an assessment with an instrument more sensitive to PA to the LG students to ascertain whether their skill improvements in PA and PM were maintained to the end of first grade.

Rigby levels, on the other hand, are designed to assess word reading and reading comprehension. First grade students start the year reading in the 1 to 3 level Rigby readers and are expected to be reading in the 18 level Rigby readers by the end of the school year. While the

present data did note significant differences in Rigby levels among the three groups (LG, MG, HG), the LG mean at the end of the year reflected less than a three month delay in Rigby level. A student with a three month delay likely would not be referred for a special education assessment in the District, but would be recommended for reading summer camp or other regular education reading support.

Anecdotal information from the first grade teachers also supported the data from the present study. They stated that the scores of the first grade students, who had received the supplemental kindergarten reading program, were not as skill deficient as the lower functioning first grade students in prior years. Further assessment of this anecdotal information could be completed by using archival information from teachers' files on the Rigby levels of students in the years before the supplemental instruction in PA was provided in kindergarten. End of year first grade Rigby levels for these students could then be compared to those students from the prior school years to compare EOY functioning in both groups of students. It seems plausible that the students, who received the supplemental POA instruction would perform better in EOY Rigby benchmark assessments but research would be needed to substantiate this claim.

Regarding the MG and HG, the differences between these groups found at the pre-test were also found at the post-test. These two groups received the regular classroom curriculum and maintained their levels of scores over the school year. These data suggest that students who scored higher on measures of phonological processing at the beginning of kindergarten continued to score within those higher ranges through exposure to an appropriate reading curriculum in kindergarten. This data further suggest that the regular education kindergarten and first grade reading programs in this district are adequate to support the growth of skills for both MG and HG students. This was again apparent in the results of the end of year (EOY) instructional reading benchmarks using Rigby levels. There was a significant difference between the MG and HG end of the year (EOY) instructional reading levels.

In the area of sex, this research did not substantiate other data suggesting that girls tend to enter kindergarten with better pre-reading skills and continue to develop reading skills during their first year of school more efficiently and quicker than their male peers (Klecker, 2006). Girls were over-represented in the LG; however, the representation of the girls was not significantly different than the representation of the boys. Also, there were no

significant differences between the girls' means and the boys' means on the three composites of the CTOPP at the beginning of kindergarten or at the end of kindergarten. In addition, the difference in EOY means of boys and girls were insignificant at the end of first grade. Thus, there were no significant differences between boys' and girls' mean scores in screening measures at the beginning of kindergarten, end of kindergarten or at the end of first grade.

This finding supports Shaywitz's (2005) results in the Connecticut Longitudinal study. When students with reading disabilities were identified by school districts following special education referrals from teachers, boys were identified more than girls. When identification was made from screening, however, the boys and girls statistics were similar. Because boys are more likely to display externalizing behaviors when they are not engaged in instruction, they tend to be referred earlier and identified at a greater rate for disabilities than girls due to behavior rather than skills deficit.

The present research indicates that screening, early identification and remediation may proactively inhibit this increase in externalizing behaviors in boys. Thus, they may never reach the level of frustration, which may be the

cause of these behaviors and this disengaging from instruction. Furthermore, screening, early identification and remediation may be important factors in preventing behavioral problems in first and second grade classrooms. Screening identifies reading weaknesses equally in girls and boys and allows for early attempts to remediate the weaknesses, thus reducing the rate of second grade referrals for reading weaknesses. Identifying and remediating reading weaknesses early may also prevent behavioral problems in boys and thus, result in decreased special education referrals for behavioral problems and reading difficulties in the district.

One of the concerns raised by the results of this research was the proportion of English as a second language (ESL) students in the LG. More ESL students were in the LG than in either the MG or HG. While 5% of the District's students speak English as a second language, 14% of the students in the LG were ESL students. This over-representation of students in the lower, struggling portion of the kindergarten population may be the result of a lack of or poor quality preschool and early instruction. More research is necessary to determine if these numbers are typical of ESL students in this District and in similar SES

areas. If this data is valid, services for ESL students must be reviewed and adjusted to meet their unique needs.

Additionally, the present research suggested that preschool attendance did not appear to have a significant impact on the kindergarten students' reading readiness skills as measured by the CTOPP. This finding is counter to the majority of research (NRP, 2000). Preschool attendance data were collected from the kindergarten registration forms completed by parents at the point of registration of their child. The parent was expected to list preschool and daycare experiences beside the following item: School? _____. Thus, this researcher questioned whether the parents understood the expectations of the form and/or took the time to complete the form in its entirety. It is possible that children who attended preschool may be included in the no preschool group because of a mistake in form completion.

Another possible reason for the lack of effect of preschool on emergent literacy skills may be that the families in this district provide a rich home literacy environment, as evidenced by literacy rates in the community, even without preschool. Thus, children who do not attend preschool are still exposed to a highly literate environment. Another reason for the lack of effect of

preschool attendance may be the size of N. Since preschool data were only available on 104 of the 120 students, the results may not be representative.

Two other factors were considered; living in one parent or two parent families, as well as having one or two working parents. Neither of these factors was found to have a significant impact on kindergarten reading readiness skills as measured by the three composite areas of the CTOPP in this school district.

While the size of N in this study may have contributed to the lack of significant effect of the above factors, the culture of this community may also be a factor. The culture of the District is very academic in nature. Children are read to and spoken to from the moment of their birth. Students begin kindergarten with the expectation of going to college, and college is often the first step in higher education for these students. Most District parents are proactive in regards to developing academic skills. All but one parent in this group of kindergarten parents finished high school and the majority of parents had college and graduate school educations (see Figure 1). These data suggest that the home environment is as rich and word filled as the typical preschool environment. This

district's culture, then, may have equalized the potential effects of the aforementioned factors

When considering home literacy activities, it was hypothesized that the frequency of different types of home literacy activities would positively correlate to higher scores on certain composite areas of the CTOPP. Specifically, the higher the frequency of reading, telling stories, teaching letters and numbers, singing and rhyming, the higher the scores on the PA composite and the PM composite of the CTOPP.

The findings of this research revealed that telling stories to children, reading to children and singing songs and listening to music were all weakly but positively correlated to PA development. Also, telling stories and teaching letters and numbers to children were both weakly, positively correlated to PM development. This present research supports some, but not all, of either Wood's (2002)or Cadieux and Boudreault's (2002) research or the research completed by Nord, et al. (1999). It is possible that the parents who completed the home literacy survey were those parents, who were more organized and involved with their child's education and the survey itself may have reflected the most popular activities of students with good pre-reading skills. The results of this research clearly

support that reading to children, telling stories to children, singing and listening to music as well as teaching numbers and letters to children helps to prepare them for success with early reading skills when they enter kindergarten.

This research also demonstrated that in the district the home literacy activities provided for boys and girls were basically the same. The frequency and type of home literacy activities completed with boys and girls were not significantly different. This finding may also be a factor as well in the lack of difference between the scores of boys and girls on the three composite areas of the CTOPP. Boys and girls in the district are afforded the same home literacy skills and develop commensurate reading skills.

Conclusions

Results of this research provide support for presenting supplemental scientifically based phonological awareness instruction as early as kindergarten for struggling students even in suburban, middle income school districts. Supplemental instruction in PA is an important component to kindergarten reading instruction and should be provided to struggling students at least 15 minutes daily, three days a week. School psychologists, then, should use

their influence to encourage early screening, identification and remediation of reading weaknesses for students.

Furthermore, school psychologists need to become involved in developing appropriate and effective screening tools for early intervention and kindergarten and first grade students. The present research, through observation of the results of the pre-test CTOPP and the EOY first grade benchmarks (Rigby levels), supported prior research findings which stated that PA, PM, and RN skills in kindergarten are indicative of reading skills at the end of first grade (Parrila, et al., 2004; Wagner, et al., 1999). This type of screening information can be used to guide instruction, and hopefully prevent, disabilities that may result from untreated developmental delays.

In the area of home literacy, the present research demonstrated weak positive correlations between telling stories to children reading to children and singing songs and listening to music and the PA composite of the CTOPP. Telling stories and teaching letters and numbers to your child were both weakly positively correlated to the PM composite of the CTOPP as well. These home literacy activities should be encouraged in preschool and kindergarten homes. Part of the school psychologists' role

is prevention. The home literacy activities found to have weak, positive correlations to developing PA and PM have also been found to be effective preventive strategies in other research (Downer & Pianta, 2006; Nord, et al., 1999; Wood, 2002). Therefore, these activities should be recommended by school psychologists to parents of young children for use in homes and to teachers of young children for use in preschools.

Because of the over-representation of ESL students in the LG, the District needs to consider increased preschool and kindergarten services focused on the unique needs of these students. These children are often living with parents speaking only their primary language at home, are at-risk for significant later learning problems if preschool and kindergarten programs are not created to meet their unique needs. The lobbying for and creation of these programs should be important and appropriate roles for the school psychologists in the district.

Suggestions for Future Research

There were several limitations to this study that should be addressed in future research. The sample size was small and was culled from a relatively homogeneous SES group. The students were from two similar elementary

schools in one suburban, upper middle class school district. Less than 8% of the students were minority students and less than 6% were economically disadvantaged. The same research needs to be done across school districts providing a more heterogeneous group of students with a greater percentage of minority students and more diverse SES students. The sample should be larger, so the results would be more generalizable to other student populations.

The reading program that was used in this research was developed by building principals, reading specialists, kindergarten teachers, and school psychologists in two elementary schools. It was created as an early reading program that would screen, identify and remediate the skills of struggling kindergarten students. Each person on the team had input into the program and each had his/her particular role. Decisions were made based on schedules, administrative needs and other school centered concerns not according to scientific research method. The supplemental reading program was not created as a research project, but as a reading program. As a result, applying scientific analytics to a non scientific project limits generalization. Similar research using random sampling and scientifically based research methods is recommended.

Because the reading specialists involved in the reading program already had full schedules, the intervention was provided at the lowest frequency found to be effective in the NRP meta analysis of research (2000). The students received 45 minutes of supplemental instruction in reading weekly. It was provided three times weekly for 15 minutes a session in five of the classes and for two times weekly for 22 or 23 minutes per session for another class. This level of service contributed to significant gains in both PA and PM for the LG. Perhaps a greater intensity of supplemental instruction would have contributed to an even more significant impact on PA and PM, and may have had a positive impact on RN skills for the LG. Research with struggling kindergarten students, who are provided an increased intensity of intervention, is necessary to assess the impact on the reading readiness skills measured by the CTOPP.

Neither the supplemental instruction for the LG nor the typical kindergarten curriculum for the LG, MG, and HG affected the mean scores for RN. RN is an important indicator of future reading skills. However, supplemental instruction in PA provided in this study did not affect RN skills. It is important to determine what strategies and interventions may be effective for developing RN skills in

kindergarten students. An increased intensity of PA instruction may improve RN skills; however, other interventions designed to address RN specifically may also be necessary. Further research into activities designed to improve RN skills is necessary.

Further research also is recommended to delve further into the most effective home literacy activities and possible home interventions. Parents and preschools need to know not only what activities will develop PA and PM, but also what activities will develop RN. None of the home literacy activities were correlated with RN. As mentioned before, RN is an important skill that predicts reading success in later years. Home literacy activities that would help build rapid naming skills would enhance home literacy and preschool programming.

Finally, the district's ESL students were over represented in the LG. They demonstrated primarily weaknesses in PA and PM. Research into what interventions and activities are effective for improving PA, PM, and other pre-reading skills with this population is necessary. The district needs to reach out and complete child-find activities to find these children and intervene with specialized services before these students enter

kindergarten with significantly poorer skills than their non-ESL peers.

This research has only scratched the surface regarding findings in the areas of preschool home literacy activities as well as supplemental PA instruction in kindergarten. While this research supports the findings of prior researchers, using a different population, there is much more to do. Hopefully, other researchers, whether professionals or graduate students, will be motivated by these findings and undertake research to provide the answers this research was unable to obtain.

REFERENCES

Aaron, P. G. (1997). The impending demise of the discrepancy formula. *Review of Educational Research, 67*(4), 461-502.

Adams, M. J. (1995). *Beginning to read, thinking and learning about print*. Cambridge: MIT Press.

Allington, R. L., & Cunningham, P. M. (2002). *Schools that work, where all children can read and write (2nd ed.)*. Boston: Allyn and Bacon.

Baddeley, A. (1997). *Human memory, theory and practice* (rev. ed.) East Essex, UK: Psychology Press.

Berninger, V. W., & Richards, T. L. (2002). *Brain literacy for educators and psychologists.* San Diego: Academic Press.

Big ideas in beginning reading. (2002). Retrieved April 19, 2008 from http://reading.uoregon.edu/scope/new scope 2.php

Blachman, B., Ball, E., Black, R., & Tangel, D. (2000). *Road to the code, a phonological awareness program for young children.* Baltimore: Paul H Brookes Publishing Co.

Cadieux, A., Boudreault, R. (2002). The effects of a parent child paired reading program on reading abilities, phonological awareness and self-concept of at risk pupils. *Reading Improvement, 42*(4), 224-237.

Carroll, J. M., & Snowling, M. J. (2004). Language and phonological; skills in children at high risk of reading difficulties. *Journal of Psychology and Psychiatry, 45*(3), 631-640.

Cooper, J. David, Pikulski, John J., (K-3), Cooper, J. David, Lipson, Marjorie Y., & Pikulski, John J. (2003). *A research-based framework for Houghton Mifflin reading grades K-8, 2002*. Houghton Mifflin.

Cunningham, P. M., & Allington, R. (2003). *Classrooms that work, they can all read and write* (3rd ed.). Boston: Allyn and Bacon.

Cunningham, P. M., Hall, D. P., & Sigmon, C. M. (1999). *The Teacher's guide to the four blocks: A multimethod, multilevel framework for grades 1-3.* Greensboro: Carson-Dellosa Publishing Company Inc.

Denton, C. A., Vaughn, S., & Fletcher, J. M. (2003). Bringing research based practice in reading intervention to scale. *Learning Disabilities Research and Practice, 18*(3), 201 -211.

Diamond, M., & Hopson J. (1998). *Magic trees of the mind. How to nurture your child's intelligence, creativity, and healthy emotions from birth to adolescence*. New York: Penguin Books.

Downer, J. T., & Pianta R. C. (2006). Academic and cognitive functioning in first grade: associations with earlier home and child care predictors and with concurrent home and classroom experiences. *School Psychology Review, 35*(1), 11-30.

Eden, G. F., Jones, K. M., Cappell, K., Gareau, L., Wood, F. B., Zeffiro, T. A., Dietz, N., Agnew, J. A., Flowers, D. L. (2004). Neural changes following remediation in adult developmental dyslexia, clinical study. *Neuron, 44*, 411-422.

Elbro, C. (2004). An intervention study with children at risk for dyslexia. *Journal of Educational Psychology, 96*(4), 660-670.

Ellis, A. K. (2001). *Research on educational innovation.* Larchmont, NY: Eye on Education.

Feifer, S. G., & Della Toffalo, D. A. (2007). *Integrating RTI with cognitive neuropsychology: A scientific approach to reading.* Middletown: School Neuropsych Press.

Fuchs, D., Deshler, D. D., & Reschly, D. J. (2004). National Research Center on Learning Disabilities: Multimethod studies on identification and classification issues. *Learning Disability Quarterly, 2*(4), 189-193.

Fuchs, D., Fuchs, L. S., & Compton, D. (2004). Identifying reading disabilities by responsiveness to instruction: Specifying measures and criteria. *Learning Disabilities Quarterly, 27*(4), 216-227.

Greatschools, the parents guide to K-12 success. (2007). Retrieved July 7, 2008 from http://www.greatschools.net

Gunn, B. K., Simmons, D. C., & Kameenui, E. (1995). *National Center to Improve the Tools of Educators, Technical report, 19*. Retrieved July 22, 2007 from http://idea.uoregon.edu.

Hale, J. B., & Fiorello, C. (2004). *School neuropsychology: A practitioners handbook.* New York: The Guilford Press.

Hall, D., & Williams, E. (2000). *The teachers guide to building blocks*: *A developmentally appropriate multilevel framework for kindergarten.* Greensboro, NC: Carson-Dellosa.

Harcourt Achieve. *Rigby literacy*. Retrieved August 21, 2008 from http://rigby.harcourtachieve.com

Hart, B. & Risley, T. R. (1995). *Meaningful experiences in the everyday experience of young American children.* Baltimore: Paul H. Brooks.

Hawke, J. L., Wadsworth, S. J., & DeFries, J. C. (2006). Genetic influences on reading difficulties in boys and girls: The Colorado twin study. *Dyslexia*, *12*(1), 21-29.

ies, National Center for Educational Statistics. (2007). Retrieved 7/9/08 from http://nces.ed.gov

Jeffries, S., & Everatt, J. (2004). Working memory: Its role in dyslexia and other specific learning difficulties. *Dyslexia, 10*, 196-214.

Jitendra, A. K., Edwards, L. L., Starosta, K., Sacks, G., Jacobson, L. A., & Choutka, C. (2004). Early reading instruction for children with reading difficulties: Meeting the needs of diverse learners. *Journal of Learning Disabilities, 35*(5), 421-439.

Kibby, M. Y., Marks, W., Morgan, S., Long, C. J. (2004). Specific impairment in developmental reading disabilities: A working memory approach. *Journal of Learning Disabilities, 3*(4), 349-363.

Klecker, B. (2006). The gender gap in NAEP fourth-, eighth-, and twelfth grade reading scores across years. *Reading Improvement, 43*(1), 50-56.

Lennon, J., & Slesinski, C. (2001). Comprehensive test of phonological processing (CTOPP): Cognitive linguistic assessment of severe reading problems. *NASP Comminque, 29*(9). Retrieved June 12, 2005 from www.nasponline.org

McCandliss, B. D., & Noble, K. G. (2003). The development of reading impairment: A cognitive neuroscience model. *Mental Retardation and Developmental Disabilities, 9*, 196-205.

McCandliss, B. D., & Wolmetz, M. (2004). *Developmental psychobiology of reading disability*. Retrieved August 2, 2007 from Sackler Institute for Developmental Psychobiology, Weill Medical College of Cornell University database. http://sacklerinstitute.org/cornell/summer_institute/2004/McCandliss_Wolmetz

McIntyre, E., Jones, D., Powers, S., Newsome, F., Petrosko, J., Powell, R., & Bright, K. (2005). Supplemental instruction in early reading: Does it matter for struggling readers? *The Journal of Educational Research, 99*(2), 99-106.

Messer, D., Dockrell, J. E., & Murphy, N. (2004). Relation between naming and literacy in children with word-finding difficulties. *Journal of Educational Psychology, 96*(3), 462-470.

Muter, V., Hulme, C., Snowling, M. J., & Stevenson, J. (2004). Phonemes, rimes,vocabulary, and grammatical skills as foundations of early reading development: Evidence from a longitudinal study. *Developmental Psychology, 40*(5), 665-661.

National reading panel, teaching children to read: An evidence based assessment of the scientific research literature on reading and its implications for reading instruction. (2000).

Nancollis, A., Lawrie, B., & Dodd, B. (2005). Phonological awareness intervention and the acquisition of literacy skills in children from deprived social backgrounds. *Language, Speech and Hearing Services in Schools, 36*, 325-335.

Nelson, J. R., Benner, G. J., & Gonzalez, R. (2005). An investigation of the effects of a prereading intervention on the early literacy skills of children at risk of emotional disturbance and reading problems. *Journal of Emotional and Behavioral Disorders, 13*(1), 3-12.

Noble, K. G., Tottenham, N., & Casey, B. J. (2005). Neuroscience perspectives on disparities in school readiness and cognitive achievement. *The Future of Children, 15*(11), 71-89.

Nord, C. W., Lennon, J., & Liu, B. (1999). Home literacy activities and signs of children's emerging literacy, 1993-1999. *National Center on Education Statistics 2000-2002* (rev.).

Parrila, R., Kirby, J. R., & McQuarrie, L. (2004). Articulation rate, naming speed, verbal short term Memory, and phonological awareness: Longitudinal predictors of early reading development? *Scientific Studies of Reading, 8*(1), 3-26.

Petrill, S. A., Deater-Deckard, K., Thompson, L. A., DeThorne, L. S., & Schatschneider, C. (2006). Reading skills in early readers, genetic and shared environmental influences. *Journal of Learning Disabilities, 39*(1), 48-55.

Pressley, M. (2001). *Effective beginning reading instruction.* Executive summary and paper commissioned by the National Reading Panel. Chicago: National Reading Conference.

Pressley, M. (2002). *Reading instruction that works: The case for balanced teaching* (2nd ed.). New York: The Guilford Press.

Pullen, P. C., Lane, H. B., Lloyd, J. W., Nowak, R., & Ryals, J. (2005). Effects of explicit instruction on decoding of struggling first grade students: A data based case study. *Education and Treatment of Children, 28*(1), 63-76.

Ratay, J. J. (2001). *A user's guide to the brain: Perception, attention, and the four theatres of the brain.* New York: Pantheon Books.

Ready, D. D., Logerfo, L. F., Burkam, D. T., & Lee, V. E. (2005). Explaining girl's advantages in kindergarten literacy learning: Do classroom behaviors make a difference? *Elementary School Journal, 106*(1), 21-38.

Roberts, J., Jurgens, J., & Burchinal, M. (2005). The role of home literacy practices in preschool children's language and emergent literacy skills. *Journal of Speech, Language and Hearing Research, 48*, 345-359.

Savage, R. S., Fredrickson, N., Goodwin, R., Patni, U., Smith, N., & Tuersley, L. (2005). Relationships among rapid digit naming, phonological processing, motor automaticity and speech perception in poor,

average, and good readers and spellers. *Journal of Learning Disabilities, 38*(1), 12-28.

Schatschneider, C., Fletcher, J. M., Francis, D. J., Carlson, C. D., & Foorman, B. R. (2004). Kindergarten prediction of reading skills: A longitudinal comparative analysis. *Journal of Educational Psychology, 96*, 265-282.

Shaywitz, S. (2005). *Overcoming dyslexia: A new and science based program for reading problems at any level.* New York: Vintage Books.

Simos, P. G., Fletcher, J. M., Bergman E., Breier J. I., Foorman, B. R., Castillo, E. M., Davis, R.N., Fitzgerald, M., & Papanicolaou, A. C. (2002). Dyslexia-specific brain activation profile becomes normal following successful remedial training. *Neurology, 58*, 1203-1213.

St. Pierre, R. G., Ricciuti, A. E., & Rimdzius, T. A. (2005). Effects of a family literacy program on low-literate children and their parents-findings from an evaluation of the even start family literacy program. *Developmental Psychology, 41*(6), 953-970.

Standard and Poors: School Evaluation Services. (2004). Retrieved July 17, 2007 from www.ses.standardandpoors.com

Synthesizing the scientific research on development of early literacy in young children. *National Early Literacy Panel, National Institute for Literacy, The Partnership for Reading.* Retrieved June 21, 2006 from www.famlit.org

Thompson, G. B., Nicholson, T. (1999). *Teaching to read, beyond phonics and whole language.* New York: Teachers College Press.

Torgesen, J. K. (1998). Catch them before they fall, identification and assessment to prevent reading failure in young children. *American Educator,* 32-38.

Trout, A., Epstein, M. H., Mickleson, W. T., Nelson, J. R., & Lewis, L. M. (2003). Effects of a reading intervention for kindergarten students at risk for emotional disturbance and reading deficits. *Behavioral Disorders, 28*(3), 313-326.

Uhry, J. K., & Clark, D. B. (2005*). Dyslexia theory & practice of instruction* (3rd ed.). Baltimore: York Press.

Viadero, D. (2006). Concern over gender gaps shifting to boys. *Education Week, 25*(27).

Wagner, R., Torgesen, R., & Rashotte, C. (1999). *Comprehensive test of phonological processing manual.* Austin: Pro Ed.

Who are the children in special education? A publication of the National Dissemination Center for Children with Disabilities. (2003). Washington: NICHCY.

Winskel, H. (2006). The effects of an early history of otitis media on Children's language and literacy skill development. *British Journal of Educational Psychology, 76*, 727-744.

Wood, C. (2002). Parent-child pre-school activities can affect the development of literacy skills. *Journal of Research in Reading, 25*(3), 241-248.

APPENDICES

APPENDIX A

Home Literacy Survey

Home Literacy Survey

Childs name _____

D.O.B._____

Family type: (check one)	**Employment:** (check one)	**Education: highest grade** (list highest grade)
Two parents____	Two parents____	Mother: ____
One parent_____	One parent_____	Father: _____
No parent _____		

How many days a week do you: **(please check the box that applies)**

	1	2	3	4	5	6	7
1. Read to your child?							
2. Tell stories to your child							
3. Teach letters and numbers to your child?							
4. Do arts and crafts with your child?							
5. Go to the library with your child?							
6. Sing songs and play music with your child?							
7. Rhyming and reading poetry to your child							

Nord, C. W., Lennon, J., & Liu, B., (1999). Home literacy activities and signs of children's emerging literacy, 1993-1999*, National Center on Education Statistics 2000-02 rev.*

How many hours a week does your child watch television?

APPENDIX B

Kindergarten Feedback Form

Kindergarten Early Literacy Project Feedback

We appreciate all of your hard work. Your feedback is important to us and will help us improve this program in the future. Please circle the number of the most appropriate answer and provide additional comments where requested. Thank you.

THE PROGRAM

1. How suitable was the length of the program (14 weeks) to the needs of your children?

Completely unsuitable	*Somewhat unsuitable*	*Somewhat suitable*	*Completely suitable*
1	*2*	*3*	*4*

2. How suitable was the length of the individual Road to the Code lessons to the needs of your children?

Completely unsuitable	*Somewhat unsuitable*	*Somewhat suitable*	*Completely suitable*
1	*2*	*3*	*4*

3. How suitable was the length of the individual Bridge lessons to the needs of your children?

Completely unsuitable	*Somewhat unsuitable*	*Somewhat suitable*	*Completely suitable*
1	*2*	*3*	*4*

4. What would you change (i.e., how would you improve) the Road to the Code lessons? (circle the numbers of all that apply)

		Give specific(s) / example(s)
1	Say-it-and-move-it/ Letter Sound Introduction and Review	

2	(Part 2)	
3	(Part 3)	
4	Other: (please specify):	

5. *What would you change (i.e., how would you improve) the <u>Bridge lessons</u>? (circle the numbers of all that apply)*

		Give specific(s) / example(s)
1	Letter/Sound Practice	
2	Sound Board	
3	Word Practice	
4	Sentence Strips/Read a book	
5	Dictation	
6	Other: (please specify):	

6. *How realistic was the expectation of implementing the lessons 4 days a week?*

Completely unrealistic	*Somewhat unrealistic*	*Somewhat realistic*	*Completely realistic*
1	*2*	*3*	*4*

7. Compared to your other lessons, how user-friendly was the preparation for using Road to the Code?

Completely difficult	*Somewhat difficult*	*Somewhat easy*	*Completely easy*
1	*2*	*3*	*4*

8. How appropriate was the maximum group size (4-5 children) for implementing the program?

Completely inappropriate	*Somewhat inappropriate*	*Somewhat appropriate*	*Completely appropriate*
1	*2*	*3*	*4*

9. Was the record keeping easy?

No, definitely not easy	*Not very easy*	*Very easy*	*Yes, definitely easy*
1	*2*	*3*	*4*

10. Please explain how the record keeping was or was not easy?

11. What do you like <u>best</u> about the program? (circle the numbers of all that apply)

		Give specific(s) / example(s)
1	Say-it-and-move-it	
2	Games	
3	Letter/sound practice	
4	Illustrations	
5	Other: (please specify):	

12. What do you like <u>least</u> about the program? (circle the numbers of all that apply)

		Give specific(s) / example(s)

1	Say-it-and-move-it	
2	Games	
3	Letter/sound practice	
4	Illustrations	
5	Other: (please specify):	

13. What books were read to or by your children? (circle the numbers of all that apply)

a. *Lesson 46 Bob Book—Mat*

No	*Yes*
0	*1*

b. *Lesson 48 Bob Book—Sam*

No	*Yes*
0	*1*

c. *Lesson 50 Dr. Maggie's Phonics Reader—I Spy*

No	*Yes*
0	*1*

d. *Lesson 52 Bob Book—Dot*

No	*Yes*
0	*1*

e. *Lesson 54 Bob Book—Dot and Mit*

No	*Yes*
0	*1*

f. *Lessons 55-57 Primary Phonics—Mac and Tab*

No	*Yes*
0	*1*

g. *Lesson 58 Bob Book—Mac*

No	*Yes*
0	*1*

h. *Lesson 59 Bob Book—Dot and the Dog*

No	*Yes*

0	*1*

i. Lesson 60 Bob Book—Jig and Mag

No	*Yes*
0	*1*

14. Since the program officially ended on May 21, did you continue with program lessons?

No	*Yes*
0	*1*

15. If yes, what lessons did you complete? (circle the numbers of all that apply)

Lesson 55	*Lesson 56*	*Lesson 57*	*Lesson 58*	*Lesson 59*	*Lesson 60*	*Additional lessons I created*
1	*2*	*3*	*4*	*5*	*6*	*7*

MATERIALS

16. Would you change any of the materials regularly used in the program? (circle the numbers of all that apply)

		Here are the changes I would make:
1	Say-it-and-move-it materials	
2	Game materials	
3	Letter/sound practice materials	
4	Illustrations	
5	Other: (please specify):	

17. What materials did you need that you didn't have?

18. What materials did you have that you didn't need?

19. Please note how you have used the additional materials that you received? (check all that apply)

	I have used this item	*Here is how I used it (please specify):*	*I have not used this item*	*I plan to use this item in the future*	*Here is how i plan to use this item in the future (please specify):*
a. Chalkboards					
b. Wordwall cards					
c. Magnetic sight words					
d. Magnetic letters					
e. Word building mats					
f. Overhead alphabet					
g. Alphadeck					
h. Short vowel cards					

i. Consonant cards					
j. Trade books					
k. Other (please specify):					

SUPPORT FOR THE PROGRAM

20. Did you feel that you had adequate support from your administration for your participation in this project/program?

Not adequate support	*Somewhat adequate support*	*Yes, definitely adequate support*
1	*2*	*3*

21. If you didn't feel that you had adequate support from your administration (i.e., you chose 1 or 2), what kind of support would you have liked?

22. If this were not a research project, but you learned of the program in some other way, would you have implemented this program without an ELK?

No, definitely not	*Not very likely*	*Very likely*	*Yes, definitely*
1	*2*	*3*	*4*

23. What was the most beneficial/helpful part of having an ELK?

24. How could an ELK have helped you more? What could she have done differently?

25. Was the video-taping and feedback session helpful?

No, definitely not helpful	*Not very helpful*	*Very helpful*	*Yes, definitely helpful*
1	*2*	*3*	*4*

26. Please explain how the video-taping and feedback session was or was not helpful?

27. Was the arrangement for getting substitute teachers adequate?

No	Yes
0	1

28. If the arrangement for getting substitute teachers was not adequate, please explain:

29. Do you feel that small meetings at your school with your ELK and the other teachers involved would have been helpful?

No	Yes
0	1

30. If you do feel that small meetings at your school with your ELK and the other teachers involved would have been helpful, how often should they be held?

Weekly	Every other week	Monthly
1	2	3

31. If you do feel that small meetings at your school with your ELK and the other teachers involved would have been helpful, when is the best time for these meetings?

Before school	During class with a paid substitute	During team meetings	During specials	After school
1	2	3	4	5

32. In what areas were the monthly research meetings the most helpful?

33. In what ways could the monthly research meetings have been improved?

34. Please rate the following contacts who were involved in the project:

ELKS	*Professional*	*Never 1 2 3 4 5 Always*
	Rapport with children	*Poor 1 2 3 4 5 Great*
	Knowledge regarding Road to the Code and bridge lessons	*Poor 1 2 3 4 5 Great*
	Knowledge regarding Kindergarten literacy and classroom structure	*Poor 1 2 3 4 5 Great*
Observers	*Punctual*	*Never 1 2 3 4 5 Always*
	Professional	*Never 1 2 3 4 5 Always*
	Unobtrusive	*Never 1 2 3 4 5 Always*
Testers	*Punctual*	*Never 1 2 3 4 5 Always*
	Professional	*Never 1 2 3 4 5 Always*
	Unobtrusive	*Never 1 2 3 4 5 Always*
	Rapport with children	*Poor 1 2 3 4 5 Great*
Phone Contacts	*Overall helpfulness*	*Poor 1 2 3 4 5 Great*

35. If you were in charge of implementing this program in another school, what supports would you feel needed to be in place to make it work? (circle the numbers of all that apply)

		Please explain:
1	Pre-made materials	
2	Extra time to meet with colleagues to	

	discuss the program	
3	Training for the teachers	
4	An extra person (e.g., an ELK) to provide in-class support	
5	Other: (please specify):	

CONCLUSIONS

36. Do you feel that this program was beneficial to the children in the groups?

Not beneficial-- Time could have been better spent	*Somewhat beneficial*	*Yes, definitely beneficial*
1	*2*	*3*

37. Please explain the reasons for your answer as to whether the program was beneficial to the children in the groups:

38. Will you use this program again when not "required"?

No, definitely not	*Not very likely*	*Unsure*	*Very likely*	*Yes, definitely*
1	*2*	*3*	*4*	*5*

39. If you would consider using the program again when not "required," what changes would you make?

40. Given that you have had pre-made materials and in-class support, what were things that still made it difficult to implement the program?

41. Knowing what you know now, if asked to participate in a similar research project in the future, would you?

No, definitely not	*Not very likely*	*Unsure*	*Very likely*	*Yes, definitely*
1	*2*	*3*	*4*	*5*

42. If you answered 1, 2, or 3, what could be changed to entice you to participate?

43. What, if anything, would you change about your experiences this year?

44. Please note any additional comments:

APPENDIX C

Intervention Fidelity Lesson Observation

Intervention Fidelity Lesson Observations	**Blachman (2003)**
School	
Teacher Name	
Observer Name	
Intervention Week (#1-14)	
Group Observed (A or B) *(Ask Teacher)*	
Number of Children Observed in Group	
Date Observed	
Time Observer Entered Room	
Time Observer Left Room	
Lesson Number Observed *(Ask Teacher)*	
Say-it-and-move-it	
Activity Number (1, 2, or 3)	
Start Time	
Narrative Description	
Were the instructions aligned with the instructions in the manual? (Y=Yes, N=No, or S=Somewhat)	
If Somewhat: Comments	
Were the materials ready? (Y=Yes, N=No, or S=Somewhat)	
If Somewhat: Comments	
Was the pacing of the lesson appropriate? (Y=Yes, N=No, or S=Somewhat)	
If Somewhat: Comments	
Were student responses monitored and corrective feedback provided? (Y=Yes, N=No, or S=Somewhat)	
If Somewhat: Comments	
Was student attention maintained? (Y=Yes, N=No, or S=Somewhat)	
If Somewhat: Comments	

End Time	
Total Time (minutes)	
Letter Name and Sound Instruction	
Activity Number (1, 2, or 3)	
Start Time	
Narrative Description	
Were the instructions aligned with the instructions in the manual? (Y=Yes, N=No, or S=Somewhat)	
If Somewhat: Comments	
Were the materials ready? (Y=Yes, N=No, or S=Somewhat)	
If Somewhat: Comments	
Was the pacing of the lesson appropriate? (Y=Yes, N=No, or S=Somewhat)	
If Somewhat: Comments	
Were student responses monitored and corrective feedback provided? (Y=Yes, N=No, or S=Somewhat)	
If Somewhat: Comments	
Was student attention maintained? (Y=Yes, N=No, or S=Somewhat)	
If Somewhat: Comments	
End Time	
Total Time (minutes)	
Phonological Awareness Practice	
Activity Number (1, 2, or 3)	

Start Time	
Narrative Description	
Were the instructions aligned with the instructions in the manual? (Y=Yes, N=No, or S=Somewhat)	
If Somewhat: Comments	
Were the materials ready? (Y=Yes, N=No, or S=Somewhat)	
If Somewhat: Comments	
Was the pacing of the lesson appropriate? (Y=Yes, N=No, or S=Somewhat)	
If Somewhat: Comments	
Were student responses monitored and corrective feedback provided? (Y=Yes, N=No, or S=Somewhat)	
If Somewhat: Comments	
Was student attention maintained? (Y=Yes, N=No, or S=Somewhat)	
If Somewhat: Comments	
End Time	
Total Time (minutes)	
Overall Lesson Evaluation	
Lesson Difficulty (VD=Very Difficult, D=Difficult, A=Average, E=Easy, VE=Very Easy)	
Lesson Quality (P=Poor, A=Average, E=Excellent)	
Gut Response	
Response Based on Criteria	
All Lesson Components Observed? (Y=Yes or N=No)	
If No: Reason for missing component(s)	
All Lesson Components Observed In Order? (Y=Yes or N=No)	
Total Lesson Time	

APPENDIX D

Permission to use CTOPP Results

THE SCHOOL DISTRICT OF HAVERFORD TOWNSHIP
OFFICE OF THE SUPERINTENDENT
1901 Darby Road, Havertown, PA 19083

February 4, 2008

Ms. Sally Shanahan
School District of Haverford Township
Office of Pupil Services

Dear Ms. Shanahan,

You have my permission to use the data collected on the kindergarten supplemental reading program that we completed last school year (2006-2007) as part of your dissertation. The information will include the pre and post CTOPP results of the 120 students here at Chestnutwold and Lynnewood Elementary. I am comfortable that the identity of each student is being handled with confidentiality.

I am looking forward to hearing about the results of the evaluation of the program. Thank you.

Sincerely,

William S. Keilbaugh, Ed.D.
Superintendent

Telephone (610) 853-5900, Ext. 5530 • Fax (610) 789-8373 • E-mail: keilbaughb@haverford.net

APPENDIX E

Permission to use Rigby Levels

Modification #7
Site Approval
Letter

THE SCHOOL DISTRICT OF HAVERFORD TOWNSHIP
OFFICE OF THE SUPERINTENDENT
The Oakmont School Central Administration & Early Childhood Education Center
50 EAST EAGLE ROAD, HAVERTOWN, PA 19083

July 15, 2008

Ms. Sally Shanahan
1150 Washington Street
Indiana, PA 15702

Dear Sally,

To continue your research regarding supplemental reading support in Kindergarten and its longitudinal effect, you may have access to and utilize the end of year Benchmark Data from the 2007-08 school year Kindergarten through 1st Grade at Lynnewood and Chestnutwold Elementary Schools.

If you need further clarification, please advise.

Sincerely,

William S. Keilbaugh, Ed.D.
Superintendent

WSK:pmi

Telephone (610) 853-5900, Ext. 7204 * Fax (610) 853-5942 * E-mail: keilbaugh@havsd.net

APPENDIX F

Permission to use Rigby Levels

THE SCHOOL DISTRICT OF HAVERFORD TOWNSHIP
OFFICE OF THE SUPERINTENDENT
1801 Darby Road, Havertown, PA 19083

February 4, 2008

Ms. Sally Shanahan
School District of Haverford Township
Office of Pupil Services

Dear Ms. Shanahan,

You have my permission to use the data collected on the kindergarten supplemental reading program that we completed last school year (2006-2007) as part of your dissertation. The information will include the pre and post CTOPP results of the 120 students here at Chestnutwold and Lynnewood Elementary. I am comfortable that the identity of each student is being handled with confidentiality.

I am looking forward to hearing about the results of the evaluation of the program. Thank you.

Sincerely,

William S. Keilbaugh, Ed.D.
Superintendent

Telephone (610) 853-5900, Ext. 5530 • Fax (610) 789-5573 • E-mail: keilbaughb@hsd.net

APPENDIX G

Permission to use Kindergarten Data

FEB-08-2008 FRI 11:37 AM PUPIL SERVICES FAX NO. 6108535936 P. 02

THE SCHOOL DISTRICT OF HAVERFORD TOWNSHIP
OFFICE OF THE SUPERINTENDENT
1801 Darby Road, Havertown, PA 19083

February 4, 2008

Ms. Sally Shanahan
School District of Haverford Township
Office of Pupil Services

Dear Ms. Shanahan,

You have my permission to use the data collected on the kindergarten supplemental reading program that we completed last school year (2006-2007) as part of your dissertation. The information will include the pre and post CTOPP results of the 120 students here at Chestnutwold and Lynnewood Elementary. I am comfortable that the identity of each student is being handled with confidentiality.

I am looking forward to hearing about the results of the evaluation of the program. Thank you.

Sincerely,

William S. Keilbaugh, Ed.D.
Superintendent

Telephone (610) 853-5900, Ext. 5530 • Fax (610) 789-8373 • E-mail: [illegible]