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NEUROPSYCHOLOGICAL INSTRUCTION: A PROCESS

RELATED APPROACH IN EARLY READING SKILL DEVELOPMENT

By Karen Boyle Donahue

Submitted in Partial Fulfillment of the Requirements for the

Degree of Doctor of Psychology

July 2011

PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE

DEPARTMENT OF PSYCHOLOGY

Dissertation Approval

This is to certify that the dissertation presented to us by _Karen Boyle Donahue_____

on the __31 st____ day of _May__, _2011_____, in partial fulfillment of the

requirements for the degree of Doctor of Psychology, has been examined and is

acceptable in both scholarship and literary quality.

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Acknowledgements

I would like to thank my dissertation chairperson and friend, Dr. Lisa Hain, for her never ending support, positive encouragement, and quirky sense of humor. You carried me through many times of self-doubt, and gave me the self-confidence and inspiration to move forward. To my dissertation committee members I would like to thank you for your time, expertise, and knowledge in the many facets of literacy development for early learners. To the students and staff on Atlantis Prep, your commitment to education, learning, and the young child is purely inspirational. I hope I have in some way touched the lives of your children in the same way you have touched mine. This accomplishment would have been possible without the support of my family, all of whom were always available for an empathetic hug, a helping hand, and a kick in the pants as needed. I am eternally grateful to my in-laws for their never ending support, willingness to lend a hand, and enduring familial love and acceptance. Especially Patricia, who stepped in countless times to help in every possible way, without even having to be asked. You are truly a saint in my eyes. I hope that my parents are smiling upon me from heaven with pride, knowing that I finally reached this goal. I give the utmost gratitude to my husband, Michael, and my two sons Michael and Jack, for their love, patience, and support in enduring the hardships and accomplishments that coincided with this arduous journey. This program has been a sacrifice for us all, and thus the achievement should be mutually shared. I hope to never miss another special event, memorable moment, or any ounce of quality family time as you are truly the meaning, purpose, and inspiration of my life. I feel very blessed to have you in my life, and I love you all so much!

Abstract

Proficient and fluent reading ability for all Americans continues to be a highly prioritized, yet under achieved aspiration in current educational institutions. The acquisition of proficient reading fluency and comprehension are, undoubtedly, the most essential priorities in the academic development of school aged children, yet a discouraging number of students continue to struggle with the reading process throughout school aged years. Research has targeted key instructional areas that must be implemented in successful reading curriculum in the early childhood years. Namely, phonological awareness, phonics instruction, reading fluency, vocabulary development, and reading comprehension are core components that must be incorporated into literacy curricula and mastered by students as instruction is occurring in order to drive successful, long term reading outcomes. Advances in neurological research have added to current knowledge regarding how a child's brain develops proficient reading ability. Neural networks are formed to create language systems, while brain plasticity in the first seven years of life allows for developmental manipulation. Despite these advances in knowledge and research, reading intervention continues to be reactive, and is usually applied after a student has fallen behind age expected benchmarks. There is a need for current research to demonstrate proactive methods to support successful literacy outcomes from the start of formal instruction, thereby thwarting the phenomenon of reading failure, and increasing reading proficiency for more students. Archival data were obtained from a program evaluation utilizing a pre/post test experimental design to measure reading gains for regular education Kindergarten students receiving balanced literacy instruction. The data were further examined to determine if students receiving balanced literacy

instruction, in addition to the use of the PAL II Guides for Intervention as a proactive

twelve week supplement to regular instruction, would realize greater gains in reading

readiness than those students receiving balanced literacy instruction alone. All students

($N = 31$) who participated in the program evaluation were randomly assigned to one of

two groups and received pre and post assessments in pre reading skill development.

Findings indicate the use of a quality based, balanced literacy program does result in

gains for writing legibility and speed; copying automaticity, legibility, and speed;

receptive coding ability; auditory and verbal rhyming of words; phoneme segmentation

and phoneme deletion; and syllable manipulation. Findings further indicate that the

combined use of balanced literacy and the PAL II supplemental intervention yielded

significant gains in writing automaticity, legibility and speed; copying automaticity,

legibility, and speed; receptive coding; auditory and verbal rhyming of words; phoneme

segmentation and phoneme deletion; syllabic manipulation; and verbal working memory.

In an examination of the amount of measurable growth, those students receiving the PAL

II supplement in addition to the balanced literacy program, made more statistically

significant incremental gains than the group receiving balanced literacy alone in nine of

the thirteen pre-reading skill variables. Medium effect sizes were noted for the balanced

literacy plus intervention group over the balanced literacy group for writing automaticity,

writing legibility, and copying automaticity. Large effect sizes were noted for the

balanced literacy plus intervention group over the balanced literacy group for copying

legibility, receptive coding, rhyming, syllables, phonemes, and verbal working memory.

A small effect size was noted in writing speed but no effect size was noted for copying

speed. These findings lend support to current research that emphasizes the importance of

developing successful pre-reading skill acquisition in the early childhood years via the

proactive use of quality instruction and supplemental intervention. Research further

denotes the importance of early instruction while critical neural development is occurring

in young learner's language systems. Results from this study support this finding, and can

be utilized as a proactive strategy to enhance learning for all students at the beginning of

formal school instruction. By doing so, more young students are likely to develop

improved mastery of the skills needed to become successful future readers, and fewer

students will be left to struggle with reading skill development throughout school aged

years.

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Chapter 1

Introduction

Overview

Proficient and fluent reading ability for all American citizens continues to be a highly prioritized, yet under achieved aspiration in current educational institutions. The acquisition of proficient reading fluency and comprehension are, undoubtedly, the most essential priorities in the academic development of school aged children (Meisinger, Bloom, & Hynd, 2009). Despite the increasing awareness of pervasive literacy problems, and an increased scientific understanding of the specific psychological processes involved in developing skillful, neurologically based reading systems, many students in our schools lack the core proficiencies needed to become competent readers.

For some children, learning to read comes naturally; however, for a great number of students, learning to read can be a difficult and discouraging undertaking, one that becomes increasingly laborious and more futile over time. Students with reading difficulties are likely to fall behind average learners in the early years, and these achievement gaps tend to grow exponentially throughout educational years into adulthood, sometimes culminating in lifelong struggles in many functional domains. Why are educators and psychologists waiting for students to have significant deficits in reading before providing meaningful instruction and intervention? The time has come to put knowledge into action; unrelenting professional efforts must be placed on the successful acquisition of reading skills for all students at the onset of formal educational years. It is time to make meaningful changes in how instructional practices are materialized in early childhood classrooms; it is time to apply current knowledge of a

neurologically based, process approach to balanced literacy for all students, in order to achieve reading success for a majority of students in the formative years, as reading instruction occurs.

Statement of the Problem

Overall, national literacy rates present an unacceptable and shocking reality, with approximately 90 million American adults qualifying under the category of functionally illiterate (National Reading Panel; NRP, 1999). Research over the past decade highlights the fact that as many as 27% of high school students read below basic levels of expected proficiency (Grigg, Donahue, and Dion, 2007), and over one-third of fourth grade students are deficient in basic reading ability (NAEP, 2003). Educational institutions are clearly falling short in successfully preparing today's students with the necessary academic skills required to compete in a global market.

More recent statistics reflect only a slight improvement of partially proficient achievement, with scores for fourth and eighth grade students showing slight improvement in 2009, as compared with 2007 (NCES, 2009). Such negative outcomes in literacy acquisition have led to increased focus on the instructional strategies that are most useful in teaching young children to read proficiently (O'Connor, Fulmer, Harry & Bell, 2005). If children do not develop adequate levels of reading proficiency by fourth grade, what does this illustrate about literacy instruction in the primary grades? The recent, but now past practice, of allowing "wait to fail" patterns of intervention, and strategies, which included "giving the gift of time," to struggling readers did not remediate poor reading skills. Therefore it is reasonable to consider the possibility that other areas of difficulty are contributory. Two significant areas, namely strong pre-

reading skill development and the neural development of language systems within the learner, should be an area of focus in the early childhood years (Berninger& Richards, 2002; Feifer, 2008).

Without early intervention of reading difficulties, prognosis for the remediation of at-risk readers is grim (Wolf & Katzir-Coehn, 2001). As students are promoted from one grade to the next, reading deficits, without intensive quality intervention, tend to worsen dramatically (Francis, Shaywitz, Stuebing, Shaywitz, & Fletcher, 1996; Torgesen, Wagner, Rashotte, Alexander, & Conway, 1997). Numerous studies document the fact that students with reading weakness in first grade tend to have reading achievements that are lower than same age peers over time. There is a ninety percent probability that struggling readers in first grade will continue to be poor readers in fourth grade (Burke et al., 2009; Kamps, Willis, Greenwood, Thorne, Lazo, Crockett, et al., 2003).

Equally shocking is research, indicating that three-quarters of all reading disabled third graders will continue to exhibit disabilities in ninth grade (Foorman, Breier, & Fletcher, 2003). Once young learners fail to successfully achieve an essential foundation in reading proficiency, the reactive interventions required to remediate these difficulties can be substantial. Research indicates that a large majority of students classified as eligible for Special Education and Related Services are qualified under the criterion of specific learning disability (SLD). Approximately ninety percent of the three million students labeled SLD are diagnosed with a primary deficit in basic reading ability (Bradshaw, 2003). The financial and emotional costs of poor reading achievement are extraordinary, and often times nearly impossible to remediate fully.

Clearly, current research findings elucidate the need to support struggling readers in early years, specifically within the primary grades when critical pre reading skills are taught. Without quality instruction and timely intervention, poor readers will continue to experience what is known as the "Matthew Effect," whereby poor readers become even worse readers over time (Shaywitz, 2003; Stanovich, 1986).

As a result of such alarming national literacy rates, intensified attention has been focused on the methods utilized in schools to teach children to read effectively. In the 1990's Congress convened a national panel to investigate the findings of evidence-based research on effective practices for teaching children to read. The primary goal was to identify the key skills and methodologies, central to successful reading achievement, based on scientifically supported empirical research. The panel's two year investigation covered 100,000 research studies and culminated with *The Report of the National Reading Panel* (NRP, 2000). This publication outlined five critical areas of instruction crucial to proficient and fluent reading ability; (a) phonological awareness, (b) phonics instruction, (c) reading fluency, (d) vocabulary development, and (e) reading comprehension. Each skill is integral to the overall student goals of engaging in automatic, fluent, and comprehensive reading ability.

Federal initiatives to support struggling students include the No Child Left Behind Act of 2001 (NCLB, 2001), and the Individuals with Disabilities Education Act (IDEA, 2004). NCLB has mandated that all school aged children will be proficient in Language Arts Literacy and Mathematics by the year 2013, and schools must employ assessment measures to monitor student development of academic skills. Specific to the early childhood years, the Reading First component of the NCLB Act requires that early

intervention for at-risk readers be implemented to counteract reading problems in grades one, two, and three (NCLB, 2001), while students are still "learning to read", and not yet fully "reading to learn." This proactive component of the legislation postulates that all students will achieve grade level expected benchmarks in reading development by the end of third grade via quality instruction and progress monitoring.

IDEA has made changes to previous classification criterion for Special Education and Related Services that had mandated an IQ-Achievement discrepancy requirement for at-risk readers in order to be eligible for individualized educational services. The previous criterion of a discrepancy requirement resulted in the delay of intervention services for many students until the third or fourth grade (Hale, 2008). This delay inadvertently served, over time, to increase the learning gap between proficient readers and poor readers. The update of IDEA in 2004 was significant because it allowed the eligibility of services to be determined via other criterion, thus permitting acquisition of intervention services at younger ages, before deficits become disabilities.

Federal initiatives have led to a greater understanding of the broad array of processes involved in the successful attainment of skilled reading. Additionally, this legislation has increased the school's accountability in the achievement of reading for all students. The national goal of enhancing literacy acquisition has resulted in a clear priority; public schools must focus on the early development of reading skills prior to the development of detrimental achievement gaps for young learners. The importance of quality instruction, intervention, progress monitoring, and early identification at the primary grades is paramount in improving long term reading outcomes for all students (NCLB, 2001). Providing proactive intervention at the pre-kindergarten, kindergarten,

and first grade years is now viewed as a critical component in the development of future success in reading (Molfese, 2006; NRP, 2000; Shaywitz, 2003).

As stated, negative outcomes in literacy acquisition have led to increased focus on the instructional strategies that are most useful in teaching young children to read proficiently (O'Connor, Fulmer, Harry, & Bell, 2005). Given the monumental societal costs of poor reading achievement, and the neurological advances that document how best to develop brain based reading systems in young learners, the focus of national schools must be concentrated on the successful development of reading proficiency for early childhood learners. How can current knowledge of brain systems and learning best be materialized within the classroom setting to foster reading proficiency for all students from the start of one's education? Which supplemental instructional practices can be added to current curricula to develop competent reading skills in all students? What does evidence based research reveal about reading instruction and acquisition, and how can such crucial knowledge be given to teachers and, subsequently, into classrooms?

Many studies have focused on reactive intervention strategies for students with learning deficits; however, it now appears plausible to think more proactively and to direct increased efforts to the sustained success of beginning learners. Pre-reading skills that have been evidenced to promote proficient reading aptitude include phonemic knowledge, phonological awareness, mastery of the alphabetic principle, orthographic understanding, and rapid letter naming (NRP, 2000; Shaywitz, 2003; Shaywitz, Morris, &Shaywitz, 2008). These crucial skills must be automatized in the neurological reading systems of all early learners in order to sustain future academic achievement across all domains. The pre reading skills necessary for proficient reading must be delivered to,

and mastered by all young students so that reading difficulties can be thwarted in critical early learning years. Direct and explicit instruction in kindergarten through second grade must incorporate these principal skills to create effective readers and eliminate the phenomenon of reading failure in future years (Shaywitz, Morris, & Shaywitz, 2008).

Purpose of the Study

The purpose of this study is to investigate the effectiveness of a neurologically based, process approach to reading instruction in the regular education kindergarten setting. The Process Assessment of the Learner, Beginning Reading 1, Lesson Set 1 was used as a supplemental instructional program to improve the reading skills of regular education kindergarten students. This research aims to contribute valuable information to the fields of education and neuropsychology, needed to determine those types of proactive supplemental instruction that can effectively develop proficient brain based reading processes in early learners and maintain grade level reading proficiency for all young students. In doing so, the goal is to increase the successful acquisition of early reading proficiency and thereby decrease the need for future remediation and intervention of struggling readers.

Chapter 2

Literature Review

The intention of this literature review is to present current knowledge and research highlighting the methods that proficient readers utilize to read in the early stages of reading and how implementation of this knowledge impacts future reading achievement. Furthermore, an explanation of the relevant neurological systems involved in the development of proficient reading ability will be explored. It is the intent that this review will lead to the use, and further development of proactive strategies necessary for acquisition of pre reading skills of students in early childhood years, specifically kindergarten, because research demonstrates this period to be a critical window in the development of neurological systems critical to reading success.

Prevalence of Reading Problems

Literacy is a topic of great discussion and discourse across the United States, the result of a literacy crisis within the American population. Over the past decade, research has examined the prevalence of reading deficits among children and adults. Attainment of adequate literacy skills leads to more productive success in school and in adulthood. Conversely poor readers are at increased risk for lifelong problems which may include delinquency, school-based behavioral problems, school avoidance/truancy, and limited future employment opportunities (Adams, 1990; Juel, 1996; Lyon, 1998; Riley, 1996; McGill-Frazen, 1987). Exactly how successful has the United States schools been at teaching students to read? According to research, 40% of students in American schools are reading below expected levels of aptitude (National Center for Educational Statistics, 2003). Additionally, this report denotes 27% of high school students and 37% of fourth

grade students are not proficient in basic reading skills (Katzir, Wolf, O'Brien et al., 2006). Prevalence rates for minority students are even more alarming, with 68% of minority students in fourth grade failing to achieve basic reading proficiency, in comparison with non-minority students (NCES, 2003; Thomas-Tate, Washington, & Edwards, 2004).

Students from low income families and racial/ethnic minority groups demonstrate consistently lower reading achievement in the primary grades (Molfese, Modglin, Beswick, Neamon, Berg & Berg et al., 2006). Minority students begin kindergarten with lower readiness levels, leading to a continual process of catch up, and resulting in severe disadvantages from the start of school (Bailet, Repper, Piasta, & Murphy, 2009; Bowey, 1995; Fry, 2007; Peisner-Feinberg et al., 2001; Phillips et al., 2008). English Language Learners (ELL) in particular, are noted as having significant difficulty with the phonology and the orthographic structures of English and are at increased risk for reading deficits (Lundberg, 2002). ELL represent as much as ten percent of the total school population, and as a group, have the lowest academic achievement, highest drop-out rates, and come from highest incidences of poverty (Lundberg, 2002; NCES, 2003). Children of poverty, in general, have increased probability of developmental difficulties, have less developed cognitive skills, and are less likely to attain basic levels of reading as compared with more affluent peers (Fry, 2007; Molfese et al., 2006; Vadasy & Sanders, 2008). Clearly, the need to provide quality educational instruction and progress monitoring of early reading achievement in culturally diverse populations is warranted.

Of students with SLD, approximately 75% experience primary learning weakness in reading, with the highest proportion of such students exhibiting deficits in word

recognition (Berninger, Abbott, Thompson, & Raskind, 2001; Ehri, 1998; Fletcher and Lyon, 1998; Harn, Stoolmiller, & Chard, 2008). Other studies estimate the occurrence of reading problems in classified students to be as high as 90% (Kavale & Forness, 2000). Students with reading deficits in first grade are less likely to become proficient readers in later grades, thus a focus on early instruction is of paramount importance to ensure reading proficiency for more students (Burke, Hagan-Burke, Kwok, & Parker, 2009).

Without early intervention to remediate reading difficulties, prognosis for the remediation of at-risk readers is grim (Wolf & Katzir-Coehn, 2001). As students are promoted from one grade to the next grade, reading deficits, without intensive quality intervention, tend to worsen dramatically (Francis, Shaywitz, Stuebing, Shaywitz, & Fletcher, 1996; Torgesen, Wagner, Rashotte, Alexander, & Conway, 1997). Numerous studies document the fact that students with reading weakness in first grade tend to have reading achievement that is lower than same age peers over time. There is ninety percent likelihood that struggling readers in first grade will continue to be poor readers in fourth grade (Burke et al., 2009; Kamps, Willis, Greenwood, Thorne, Lazo, Crockett et al., 2003).

Equally alarming is research that indicates three-quarters of all reading disabled third graders will continue to exhibit disabilities in ninth grade (Foorman, Breier, & Fletcher, 2003). Clearly, such studies elucidate the need to support struggling readers in early years, specifically within the primary grades when critical pre reading skills are taught. Without quality and timely intervention, poor readers will continue to experience what is known as the "Matthew Effect," whereby poor readers become even worse readers over time (Shaywitz, 2003; Stanovich, 1986).

On a more positive note, research indicates negative outcomes in reading acquisition can be combated with appropriate, quality instruction at the early grades (Burke et al., 2009; Molfese et al., 2006). Multi-tiered intervention practices, along with ongoing progress monitoring of reading achievement are necessary for reading skills success, including reading automaticity (Lyon, Fletcher, Fuchs, & Chhabra, 2006; Mathes & Denton, 2002; Snow, Burns, & Griffin, 1998; Torgesen, 2000). The premise behind this body of research is that a majority of reading disabilities could be eliminated, and that all children can learn to read with appropriate instructional practice in Pre-Kindergarten and Kindergarten (Amtmann, Abbott, & Berninger, 2008). Rates of at-risk readers, at the end of first grade, could decrease by six to ten percent with quality instruction and consistent monitoring of student progress within the regular classroom (Lyon et al., 2006; Torgesen, 2000). In fact, when supplemental services are added to quality classroom instruction in the first grade to assist struggling readers, such interventions may decrease the population of at-risk readers to as low as 2%-5% by the end of first grade (Mathes, Denton, Fletcher, Anthony, Francis, & Schatschneider, 2005; McMaster, Fuchs, Fuchs, & Compton, 2005). Although research does not suggest that all reading problems experienced by students will be eliminated, it does provide evidence based practices that can greatly reduce the phenomenon of poor readers in our schools, resulting in successful reading acquisition for a great number of young students.

Predictors of Reading Achievement

Undoubtedly the stage has been set to improve instruction at the primary levels, beginning with evidence-based practices that teach necessary pre reading skills. For advances in instructional practice to occur, an examination of what research discusses

about pre reading and early reading skills cannot be ignored. What building blocks need to be mastered in the beginning of reading instruction to form a solid literacy foundation? What additional skills are required to promote future educational achievement? Why do some students learn to read fairly easily, yet others experience such difficulty acquiring competency in reading? Are there factors beyond instructional quality that impact a child's readiness to read? The past two decades of reading research have provided answers to many of these thought provoking questions.

Acquisition of reading fluency requires complex and integrated processes, along with cognitive skills that are not acquired simply through exposure (Pellegrini, 2002; Simos, Fletcher, Sarkari, Billingsley, Francis, & Castillo et al., 2005). Reading proficiency must be taught through explicit, systematic instruction of varying skills that build upon previously learned skill sets to promote future reading success (Hudson et al., 2009; International Dyslexia Association; NRP, 2000). More specifically, individual sounds must be broken down into phonemes so that individuals may understand that spoken language translates to written language, and further develops into reading fluency and automaticity.

During reading, phonemes must be linked to visual symbols or graphemes, and graphemes must be blended to form letter sound relationships. The multiple sounds are then sequenced to form a word, and the word must be processed to gain meaning (Sternberg, 2003). This complex set of tasks needs to be applied to each and every word that one reads in the form of print (Shaywitz, 2003). Therefore, when comparing the acquisition of spoken language with the acquisition of reading fluency, more complex

tasks must be automatized to gain meaning and comprehension (Simmons, Kame'enue, & Harn et al., 2007).

In addition to auditory processes utilized in spoken language, reading involves other neurological processes including orthographic awareness, phonemic awareness, working memory, and lexical knowledge (Feifer & De Fina, 2000). Pre-literacy skills have been documented in research to predict future reading achievement and include the constructs of phonological awareness, letter identification, alphabetic principles, decoding skills, and automaticity (NRP, 2000; Snow, Burns, & Griffin, 1998; Shaywitz, 2003; Simmons et al., 2007). Students struggling in one or more of these areas are likely to have disconnects leading to poor reading outcomes (Fiorello et al., 2006; Vellutino, Fletcher, Snowling, & Scanlon, 2004). It is imperative that pre reading skills be mastered at the Kindergarten level to develop more complex, fluent reading development and to facilitate academic progress in future grades (Bishop, 2003; Denton, Fletcher, Anthony, & Francis, 2006).

Experiential Influences Prior to Formal Schooling

Prior to any formal school education, children develop language and print experiences which serve as precursors to reading development. Daily exposure to oral, aural, and written language contribute to cognitive development and neural systems, which impact a child's readiness to understand language, phonology, semantics, syntax, and vocabulary (Dickinson & Neuman, 2006; Snow, Burns, & Griffin, 1998). Specifically, the ages between three and five represent an essential period for progression of early literacy skills, social emotional functioning, and brain growth (Dickinson &

Neuman, 2006). Experiences fostering pre-reading development include oral language, listening and reading of picture books, recognition of environmental print and symbols, and writing practice through experimentation (Snow et al., 1998).

Home resources including quality parent-child interaction, socio economic status, availability of print resources, and repeated verbal interaction opportunities with adults provide environmental factors that positively support a child's literacy development (Lareau, 2002). Without home based opportunities in the early years, students are at risk for developing poor or weak reading skills. Further research indicates that children from impoverished homes typically have less exposure to verbal communication and print. Impoverished families typically reflect parents with less exposure to education and limited availability of books in the home; students from low SES backgrounds tend to be poor readers in comparison with more affluent peers (Dickinson & Neuman, 2006; Snow et al., 1998). Various studies document the significant differences in kindergarten children's cognitive skills with regard to socio economic status. A large scale study estimated the disparity of cognitive development to be approximately at sixty percent when comparing students from affluent homes with children from impoverished households (Lee & Burkam, 2002). The complex road to literacy begins well before a child enters his or her first formal classroom. Early experiences can have great impact, both positively and negatively, on one's dexterity in learning to read.

Phonological Awareness

Many clinical investigations confirm phonological awareness as a precursor to literacy, and a strong predictor of future reading ability (Adams, 1990; Anthony & Lonigan, 2004; Bailet et al., 2009; Blachman, 1984; Burke et al., 2009; Foorman, Breier,

& Fletcher, 2003; Molfese et al, 2006; Schatschneider & Torgesen, 2004; Schatschneider,

Fletcher, Francis, Carlson, & Foorman et al., 2004; Simmons et al., 2007; Snowling,

Gallagher, & Frith, 2003; Whitehurst & Lonigan, 2002). Consequently, students who

exhibit strong phonological awareness at an early age are more successful readers,

compared with students who experience difficulty at an early age (Gray & McCutchen,

2006). It is imperative that instructional practices incorporate phonological awareness to

set the foundation for future learning success, and that progress monitoring be

implemented and remediated early (Foorman, Breier et al., 2003; Phillips et al., 2008;

Shaywitz et al., 2008).

Phonological awareness incorporates many tasks such as phonemic awareness,

the understanding of syllables, rhyming words, and phonics, all necessary skills to break

the alphabetic code in reading (Phillips et al., 2008). Phonemic awareness (PE) refers to

one's ability to identify, focus on, and manipulate the individual sounds in spoken words

(Muter, 2003; NRP, 2000). The emphasis is on mastery and manipulation of the

individual sounds, or phonemes, in words. There are 44 phonemes in the English

language, which are derived from the 26 letters of the English alphabet (Shaywitz et al.,

2008). Instructional strategies that have been shown to teach PA encompass phoneme

isolation, phoneme identity, phoneme categorization, phoneme blending, phoneme

segmentation, phoneme addition, and phoneme deletion (Center for the Improvement of

Early Reading Achievement [CIERA], 2003; NRP, 2000).

One's ability to internalize such sound related tasks is a critical precursor to

reading because it is suggested that PA aids in understanding the alphabetic structure of

the English language (NRP, 2000; Phillips et al., 2008; Shaywitz & Shaywitz, 2008). In a

meta-analysis of research examined by the NRP (2000), PA instruction was highly

predictive of a student's ability to read individual words, read pseudo words, and gain

meaning from texts. Furthermore, the effects of PA training on reading development last

long beyond the instructional training period, influencing learning success in later years

(NRP, 2000). According to the NRP report, the overall effect size on PA instructional

outcomes was 0.86. The effect size of PA instruction on reading outcomes was 0.53, and

the effect size of PA on spelling was 0.59 (NRP, 2000). Research demonstrates the

significant impact of PA training in the successful acquisition of pre reading skills.

If phonemic awareness skills are known to be predictive of future reading success,

how can this information be applied to instructional practice? What is known about these

skills in relation to learning in a kindergarten classroom? Clearly, phonological

awareness encompasses a multitude of skill sets, and according to the research, the

attainment of such aptitudes involves a variety of instructional factors (NRP, 2000). How

do moderators such as instructional group size, grade level, task difficulty, and length of

training impact successful outcomes?

The meta-analysis done by the NRP demonstrates the fact that instruction of

phonemic awareness produced the largest positive results when training was provided in

small group settings ($d = 1.38$). Instruction of PA in a one to one setting did not produce

better results (NRP, 2000; Vadsay & Sanders, 2008). Small group instruction of PA

yielded larger effect sizes than one to one ($d = 0.60$) and classroom instruction ($d = 0.67$)

(NRP, 2000). Similar findings are supported in other research experiments as well

(Elbaum, Vaughn, Hughes & Moody, 2000; Vadsay and Sanders, 2008; Vadsay, Sanders,

& Peyton, 2006). Clearly, the modality of instruction to gain the best results is in small group settings within the primary classroom.

Another interesting result of this meta-analysis is that of all preschool through sixth grade students included in the research review, kindergarten students had the greatest benefit from PA instruction ($d = 0.95$) (NRP, 2000). These results suggest a window of opportunity about the time when PA instruction is most effective for reading development. Instruction at the Preschool ($d = 2.37$) and kindergarten level produced greater effect sizes than instruction in first grade ($d = 0.48$), and in second through sixth grades ($d = 0.70$). This outcome is due likely to the fact that many pre-kindergarten and kindergarten students begin school with limited knowledge in letter sounds, letter identification, and word knowledge (NRP, 2000; Simmons et al., 2007). Therefore the status of being a beginning reader seems to be a significant factor in gaining the greatest benefit from PA instruction.

Furthermore, effect sizes for phonemic awareness were greatest when students received explicit and systematic instruction in one ($d = 1.16$) or two ($d = 1.03$) areas of phonemic awareness. Instruction that involved multiple phonemic awareness tasks was less beneficial ($d = 0.27$) (NRP, 2000). When applied to reading outcomes, effect sizes showed $d = 0.71$ for instruction focusing on one skill and $d = 0.79$ for instruction entailing two skills (NRP, 2000). Although the construct of PA does not incorporate letter sound correspondence which is a skill taught in the future through phonics instruction, phonemic instruction with the inclusion of letters did produce better results than instruction without letters.

With respect to the type of sound manipulation involved in instruction, phoneme blending and segmentation yielded effect sizes ($d = 0.87$; $d = 0.61$) (NRP, 2000) larger than other types of phonemic awareness tasks. It is hypothesized from these results that phoneme blending and segmenting are directly involved in both reading and spelling, aiding in the future ability to decode words and spell unfamiliar words.

Difficulty of phonemic task is another consideration in instructional practice (Phillips et al., 2008). Which tasks are appropriately taught to which aged students? In a study that examined level of PA task difficulty, the following PA skills were ranked from easiest to most difficult:

1. Initial sound comparison;

2. Blending onset-rime units into real words;

3. Blending phonemes into real words;

4. Recognizing the new word after a phoneme has been deleted;

5. Segmenting whole words into individual phonemes;

6. Combining phonemes to create nonsense words

(Shatschneider, Francis, Foorman, Fletcher, & Mehta, 1999). When children are instructed in learning initial sounds, and comparing individual phonemes in words, young students come to understand words are composed of distinct sounds, and when blended together, have word meaning. As students progress through easier skill sets, more difficult tasks are introduced to build upon established knowledge. Phoneme

segmentation and blending will aid in proficiency with spelling and word decoding in the latter part of kindergarten and first grade, building upon the earlier phonemic foundation (Schatschneider, 1999).

Studies involving the length of instruction provided insight on gains in acquisition of PA skills. PA training is just one aspect of learning to read, and must be taught as one part of a more complete, balanced curriculum. The amount of instructional time spent of PA tasks varied in research findings. The NRP report found significant results for instruction that lasted between 5 and 9.3 hours ($d = 1.37$), as well as for instruction lasting between 10 and 18 hours ($d = 1.14$), (NRP, 2000). More current research supports these findings, with significant results for instructional periods lasting from 8 to 16 hours (Musti-Rao & Cartledge, 2007).

According to the research, PA instruction is best applied through systematic instruction, provided in small group settings, consisting as a time specific portion of a more comprehensive literacy program. Benefits of PA instruction lead to proficiency in the ability to manipulate individual sound units, which aids in future reading acquisition. The ability to focus on, and to manipulate phonemes, is a crucial pre-reading skill that supports understanding of the alphabetic system. PA skills lead to future proficiency in understanding relationships of phonemes to graphemes, word decoding, and spelling ability (Gray & McCutchen, 2006; Shaywitz, 2003). PA, more specifically phoneme identification, phoneme blending, and phoneme segmenting, serves as a bridge that connects comprehension of spoken language to comprehension of written language (Phillips, et al. 2008). PA is a means to an end in the road to developing reading acquisition.

Letter Identification

Once phonological awareness is established, the next step in building early literacy proficiency is to automatize one's ability to identify the 26 uppercase and 26 lowercase letters of the English alphabet. In order eventually to understand the alphabetic principle, students must understand the connection of speech sounds to letters or graphemes; the ability to name individual letters rapidly and to identify letter symbols must be internalized. Understanding the relationship between sounds (phonemes) and letters (graphemes) is at the center of the alphabetic principle, and without this knowledge, one cannot successfully master the skill of reading (Adams, 1990; Ehri, 1998; Hudson, 2009; NRP, 2000). Numerous research studies document fluent letter naming ability as a strong predictor of reading skills, and when introduced in early instruction, leadsto stronger performance outcomes kindergarten and first grade (Catts, Fey, Zhang, & Tomblin, 1999; Molfese, Modglin, Beswick, Neamon, Berg, & Berg et al., 2006; Piasta & Wagner, 2010; Pullen & Justice, 2003; Whitehurst & Lonigan, 1998).

Although letter identification is a seemingly simple task, as with many reading related skills, letter identification taps into integrated neurological processes (Levine, 1999; Sandak, Mencl, Frost, & Pugh, 2004; Tan, Spinks, Eden, Perfetti, & Siok, 2005, Wolf, Miller, & Donnelly, 2000). Letter identification requires a student to be able to identify a visual-orthographic representation, and simultaneously connect that visual symbol to a specific letter name, thus integrating two critical skills at the same time. Consequently letter recognition requires multiple neurologically activated processes such as visual attention, visual memory, visual spatial ability, and visual discrimination (Feifer & De Fina, 2000; Levine, 1999). The second part of letter identification adds the ability

to identify, simultaneously, a particular visual symbol of interest by letter name. Naming

of letters taps other neurologically based processes such as executive attention, working

memory, long term memory, and lexical knowledge (Feifer & De Fina, 2000; Levine,

1999; Shaywitz, 2003). The ability to identify and name letters is a critical precursor to

reading (Piatsa & Wagner, 2010). One must have knowledge of how sounds are

represented by letters in a systematic, somewhat predictable manner, in order to break the

written code and successfully read text (Hudson, Pullen, Lane, & Torgesen, 2009).

Automaticity

For a student to gain true mastery of phonemic awareness and letter identification,

the skills must be activated automatically in the brain (Wolf, Miller, & Donnelly, 2000).

The accuracy and rate at which a student can identify letters is important in the

development of reading because it leads to the automatic association of letters with

corresponding sounds, which is encompassed in the alphabetic principle (Hudson, et. al,

2009; Adams, 1990). For a process to be automatic, it must be fast, effortless,

autonomous, and completed without conscious control or attention (Logan, 1988;

Samuels & Flor, 1997). Skill automaticity reflects a level of understanding that is well

established in long term memory (Samuels & Flor, 1997). Continuous letter naming

ability is a strong predictor of oral reading, with strongest correlations found younger

readers (Katzir et al., 2006; Wolf, Bally, & Morris, 1986, Wolf et al., 2000).

Furthermore, automaticity at the lexical and sub-lexical level is necessary for

fluent reading (Hudson et al., 2009; Shaywitz & Shaywitz, 2008). With continuous

repetition in letter naming instruction and practice, letter naming can occur with extreme

rapidity and little conscious attention (Wolf, Miller, & Donnelly, 2000). Rapid,

automatized naming ability is essential, and particularly important for young students who are building foundational skills that lead to proficient reading. Rapid, automatized naming is predictive of reading fluency, which is the ultimate goal of any reading program (Hudson et al., 2009; McCullum, Bell, Wood, Below, Choate, & McCane, 2006). As letter recognition becomes automatic, working memory is less taxed and is available for more complex reading tasks such as comprehension (Hudson et al., 2009; Wolf et al., 2000; Perfetti, 1985; Shaywitz, 2003).

The Alphabetic Principle

Once phonological awareness and letter naming have been internalized, the next pre-reading stage in early reading development is an understanding of the alphabetic principle (Ehri, 2002; Harn et al., 2008; NRP, 2000; Muter 2003; Shaywitz & Shaywitz, 2008). Mastery of alphabetic skill develops over time, and builds upon previously learned skills of phonology and letter identification (NRP, 2000). Although timing of instruction is dependent upon developmental levels of the target student population, instruction of the alphabetic principle usually begins in Kindergarten and continues in first grade and beyond (Harn, Stoolmiller, and Chard, 2008; Simmons et al., 2007).

The underlying construct of the alphabetic principle is that letters of the alphabet (graphemes) represent corresponding sounds (phonemes) of spoken language, and that letter sound relationships can be incorporated to read real words, as well as to nonsense words (Adams, 1990; Foorman, Francis, Shaywitz, Shaywitz, & Fletcher, 1997; NRP, 2000; Torgesen, 2000). Simply stated, words have an internal structure based on their individual sounds which are represented by letters of the alphabet. Young readers often learn to recognize many word forms by sight, because a familiar word is automatically

recognized from visual memory and lexical knowledge (Hudson et al., 2009). For beginning readers, sight word vocabulary is limited, and children cannot possibly memorize every word of the English language. Consequently, an analytic means of deciphering an unfamiliar word must be employed, a skill otherwise known as decoding (Hudson, 2009).

One's grasp of decoding the alphabetic principle is fundamental in understanding that the sound structure of spoken language is represented by letters and words in written language (Fletcher & Lyon, 1998). Decoding allows beginning readers to read short words by utilizing the strategy of blending together letter-sound associations found in printed words in order to gain word meaning (CIERA 2003; Ehri, 2002). Fluency and automaticity with the alphabetic principle lead to strong decoding skills among beginning readers (Hudson et al., 2009; Shaywitz & Shaywitz, 2008). Decoding, which is the segmenting and blending of sounds, is a skill utilized by readers on the road to fluency (Shaywiz & Shaywitz, 2008). Limitations in decoding ability, whether due to speed, accuracy or retrieval shortcomings, can lead to belabored and dysfluent reading, potentially resulting in a reading disability over time (Hudson et al., 2009; Schatschneider & Torgesen, 2004). Letter sound correspondences, and the linking of this knowledge to written text, is a common strategy utilized to sound out an unknown word encountered while reading (Schatschneider & Torgesen, 2004).

As with letter identification, an understanding of the alphabetic principle is a very complex, multifaceted task that does not occur naturally, without explicit practice and instruction (Simmons et al., 2007; Shaywitz & Shaywitz 2008). Many cognitive processes are activated during decoding including visual attention, visual memory, lexical

access, and long term memory, to name only a few (Shaywitz & Shaywitz 2008; Wolf,

Miller, & Donnelly, 2000). The alphabetic principle appears to be a fairly concrete task;

however, this assumption is far from accurate. There are 26 letters in the alphabet, and 44

individual phonemes to learn; this appears to be rather simple at first glance. However,

when examining the English language, one must consider the complexities of

orthography and various orthographic codes involved. Orthographic codes characterize

the visual representation of symbols, letters, words, and sub word units that make up

written language (Berninger, 1998; Hudson, 2009; McCloskey & McCloskey, 2004).

Many letters or letter patterns have more than one sound and spelling, creating a very

inconsistent and often non-phonetic word structure. These variations across letters and

phonemes lead to the inclusion of 210 graphemes in the English language, creating a long

list of letter sound relationships for the early reader to memorize, automatize, unitize, and

apply in reading tasks (Ehri, 2002; Wolf & Katzir-Cohen, 2001). For example, the sound

/k/ can be represented with the letter /c/ or /k/ or /ck/, and the long /e/ sound can

correspond with the letter codes /e/, /ee/, or /ea/ (Denton et al., 2006; Phillips et al.,

2008). To become a proficient reader, automatic mastery of such codes in visual memory

and lexical knowledge must be internalized, because orthographic understanding is

shown to be a robust predictor of reading proficiency in later school years (Fiorello et al.,

2006; Georgiou, Parila, & Papadopoulous, 2008; Torgesen, Wagner, Rashotte, Burgess,

& Hecht, 1997).

Research Based Methods of Instruction

If one's mastery of the alphabetic principle is critical to future reading fluency,

how can this construct best be implemented in instructional practice? Phonics instruction,

incorporating the connecting letters to sounds in language, is the method typically used in

teaching the alphabetic principle. Systematic phonics instruction is shown to be

successful in teaching the relationships between sounds and letters (Foorman et al., 2003;

Foorman, & Torgesen, 2001; Adams, 1990). Furthermore, systematic phonics instruction

has demonstrated reliably positive impacts on word decoding and word identification

(Berninger, Abbott, Verneulen, Ogier, Brooksher, & Zook et al., 2002; Denton et al.,

2006; Torgesen, 2000) In relation to early reading achievement, the meta analysis done

by the NRP (2000) demonstrates the fact that systematic phonics instruction had the

greatest effects for students in Kindergarten ($d = 0.56$) and first grade ($d = 0.54$).

Although students in grades 2-6 demonstrated growth as a result of systematic phonics

instruction ($d = 0.27$), comparative gains were less powerful in later grades. Results

suggest that the optimal time at which instruction yields the greatest instructional impact

on reading development is early, just before students are learning to read independently

(NRP, 2000).

Given the compelling effects of systematic phonics in the beginning reader's

progress toward the alphabetic principle and future reading development, an examination

of systematic phonics instruction and the types of systematic phonics that are most

effective for young readers is required (Denton et al., 2006). With 210 graphemes

available from 26 alphabetic letters and 44 phonemes, how can this be optimally

synthesized to materialize the most favorable classroom learning? Systematic phonics has

been defined as direct instruction in the use of familiar letter sound relationships which

are used in systematic reading practice for the purposes using known letter sound

correspondences to sound out or decode words (NRP, 2000). Phonics instruction can be

introduced through various programs and styles. Synthetic phonics emphasizes the alphabetic principle by converting letters into sounds and then blending the resulting sounds to form words (Denton et al., 2006). Synthetic phonics focuses on the smallest phonemes and progresses to larger sub word units, utilizing a part to whole relationship (Foorman et al., 2003; NRP, 2000). Other systematic phonics programs involve larger sub word units, and emphasize analysis of larger sub word units. Examples include strategies such as onset rime, phonograms and spelling patterns (Hudson, 2009). Onset-rime phonics looks at word patterns and separates the beginning sounds prior to the first vowel (onset) from the syllables phonemes that come after the first vowel (rime); for example; in the word ball /b/ would be the onset, and /all/ would be the rime (CIERA, 2003; Foorman, Breier et al., 2003). Analogy phonics or phonogram instruction encourages the analysis of word families. For example, a known sub word unit /_op/ can be blended with various beginning sounds to form new words such as /hop/, /top/, /mop/, and /drop/ simply by changing the beginning letter or letter blends (NRP, 2000, CIERA, 2003). Phonics instruction can be further developed through less direct methods such as embedded phonics, which encourages text reading experiences to enhance previously learned phonics strategies. With repeated exposure, letter sound relationships and patterns of word units can become automatically activated, as with phonemic awareness and letter identification, to aid in reading development (Wolf, Katzir, & Cohen, 2001).

Learning to read proficiently and with automaticity is a complex and involved process that develops over time, with specific quality instruction and repeated practice. Young students begin school with few basic literacy skills, and in a very short period of time are expected to master a very complex, not always predictable, coded system that

expresses language in a written form. Fluency and comprehension of written code is the eventual goal of reading development so that students are able to gain meaning from text connected print.

Phonological awareness, letter identification, and the alphabetic principle are early reading skills that are predictive of successful future reading achievement (CIERA, 2003; Morris, Bloodgood, & Perney, 2003; NRP, 2000). As educators and psychologists, it is necessary to ensure that all students master critical early literacy skills as instruction is taking place, in order to avoid the detrimental compounded effects of future reading problems. The provision of quality instruction is not enough to ensure that all students master these ever so important skills. Progress monitoring and purposeful assessment during early instruction are critical components of successful reading development. Assessment of response to instruction ensures the fact that students are developing skill proficiency in the early grades, and that instructional interventions are being incorporated for students who fail to achieve expected progress benchmarks as early as kindergarten and first grade.

A Neurologically Based Systems Approach to Reading Development

As described previously, evidence based research over the past decade has led to specific instructional skills that must be mastered in order to produce quality young readers. Although this knowledge is critical to promote improved literacy rates in our schools, it is only half of the puzzle when developing a true understanding of the principles involved in successful reading development. An examination of the neurological factors related to this critical instruction leads to a well-informed

understanding of the neural mechanics that drive instructional practice and successful outcomes (Berninger & Richards, 2002; Feifer & De Fina, 2000). With technological advances in brain imaging over the past ten to fifteen years, researchers have been able to visualize the brain in action while it approaches a variety of tasks, and yields critical information about the neural networks involved in the development of literacy (Berninger & Richards, 2002; Hale and Fiorello, 2004; Posner & Rothbart, 2006; Shaywitz, 2003). In order for psychologists and teachers to truly understand the processes related to successful reading acquisition, it is critical that the neurological systems approach be clearly understood by all instructional and support personnel in educational institutions.

Neuro-Developmental Windows in the Development of Language Systems

As stated previously, reading is a multifaceted neurological skill that involves a multitude of psychological processes, many of which are interconnected and activated simultaneously during the overall task of reading (Berninger & Richards, 2002; Elliot, 1999; Feifer & DeFina, 2000; Miller, 2010; Posner & Rothbart, 2006). Each system that supports literacy builds upon, connects with, and is developmentally connected in a neurological framework (Berninger, 2000). Research suggests that timeframes exist whereby a critical window of neurological development for literacy and language development is most easily ascertained in the first seven years of life (Berninger & Richards, 2002; Eliot, 1999; Feifer & DeFina, 2000). Because of this, the early stages of formal education are critical to reading development. Thus it is imperative to establish solid neural reading systems at this stage of instruction, while there is time to route and re-route neural pathways that support successful literacy acquisition in young learners (Feifer & De Fina, 2000).

At this age range, brain plasticity allows for pedagogical manipulations that can proactively lead to well developed neural systems (Berninger & Richards, 2002; Eliot, 1999; Feifer & DeFina, 2000). This proactive, early instruction serves to increase the rates of successful readers and to decrease the incidence of disabled readers (Feifer & DeFina, 2000). As the brain develops, neural synapses and dendrites grow over time to support one's processing of the sounds of spoken language (Berninger & Richards, 2000). The number of synapses and dendrites in the brain for the understanding of sounds peaks in the brain between the ages of three and seven, thus yielding the optimal time frame to hear sounds in oral language and connect those sounds to letters, words, and eventually to written text (Berninger & Richards, 2002; Eliot, 1999; Feifer & De Fina, 2000). As a child ages beyond this period, neural pruning occurs. The brain rids itself of unused synapses and dendrites, making it more difficult to utilize language circuits within the brain that support phonemic awareness (Berninger & Richards, 2002; Eliot, 1999; Feifer & De Fina, 2000). As a result, learning of language becomes incredulously more difficult, resulting in one's decreased ability to process sounds in a logical, semantic manner, thereby negatively impacting reading skill development (Feifer & De Fina, 2000; Shaywitz, 2003). This process may be one of the primary reasons why 74% of students classified as reading disabled in third grade continue to be learning disabled in ninth grade (Lyon, 1996). The optimal window of development of phonemic awareness is closing around the age of nine, thus learners who have not mastered oral sounds of language by this age most likely will continue to struggle over time (Feifer&DeFina, 2000).

A Systems Approach to Brain Function and Reading

Research literature on child neurology suggests that there are functional neurological systems related to the development of reading ability (Berninger, 2000; Berninger & Richards, 2002; Feifer & De Fina, 2000). Research efforts over the past twenty years, led by Virginia Berninger, advocate a functional systems approach to literacy whereby reading development can be understood in terms of four related language systems that develop in the brain over time. This complex biological process involves the following neural systems: 1. Language by ear; 2. Language by mouth; 3. Language by eye, and 4. Language by hand (Berninger, Abbott, Abbott, Graham, & Richards, 2002; Berninger & Richards, 2002). Language systems begin to develop prior to birth, and continue to grow and develop into young adulthood (Berninger, 2000; Berninger & Richards, 2002; Eliot, 1999). Functional neural connections develop in the brain from posterior structures to anterior structures as children age (Eliot, 1999; Feifer & De Fina, 2000; Hale & Fiorello, 2004). Over time, the connections within systems and between systems solidify internally (Berninger, 2000). Analytically, each system has its own developmental timeline with a unique internal neural organization (Berninger & Richards, 2002). Despite the unique features of each language system, each system interacts with other neural systems, and these interconnected relationships are critical to one's understanding and acquisition of literacy (Berninger, 2000; Berninger et al., 2002). In order to learn the skill of reading successfully, the neural circuitry within the brain for processing language must be firmly established (Shaywitz, 2003).

The development of language by mouth, or oral language, begins with an infant's first oral utterances (Berninger & Richards, 2002). Developmental increases in dendritic

growth eventually lead to the emergence of meaningful, expressive oral language, more specifically single word utterances, around the age of two (Elliot, 1999). More specifically, the Broca's area is beginning to develop and myelinate. The Broca's Area is in the inferior frontal cortical region (inferior frontal gyrus), and is responsible for making syntactical-articulatory connections (Berninger and Richards, 2002; Shaywitz, 2003). It is the area in the brain that processes morphology, grammar, and syntax. Consequently, as expressive oral motor structures develop over time, they contribute to one's production of language. Systems supporting language by mouth contribute to expressive speech and verbal reasoning (Berninger, 2000).

In terms of reading development, language by mouth is crucial for multiple tasks such as speech perception, speech production, articulation of sounds, phonological skills, vocabulary, oral reading, grammar/syntax, and reading comprehension. Without a solid development of one's system for language by mouth, future proficient development of language by eye and hand, or in other words, systems for reading and writing cannot develop proficiently (Berninger, 2000; Berninger and Richards, 2002).

Language by ear, or aural language, starts to develop initially with in-utero experiences when the growing fetus first hears auditory stimuli from inside the womb (Berninger & Richards, 2002). This aural language system eventually develops receptive ability from the sounds one hears in speech. Auditory functions that support receptive language ability continue to develop over time, contributing to an understanding of language. As the dendritic volume in the brain develops in early years of life, myelination occurs between hemispheric commisures around the age of four (Eliot, 1999). At this point neuro-developmentally, the brain structures known as the

Wernicke's Area and Broca's Area are contributing to receptive and expressive language ability. The Wernicke's Area is located in the posterior superior temporal gyrus, and makes semantic-lexical connections in language by processing and storing sound-meaning relationships in words. Plainly stated, young children are able to comprehend the meaning of the words they hear in aural language with development of the Wernicke's Area. Additionally, young learners are also able to produce oral language expressively in a meaningful way with the development of Broca's Area. Myelination is occurring, with the connection of these two structures via the Arcuate Fasciculus (Feifer & De Fina, 2002). Functionally this creates an interrelationship between systems for language by mouth with language by ear; these are critical to the development of language proficiency (Berninger, 2000; Berninger et al., 2002; Berninger & Richards, 2002).

As applied to reading skill development, aural language focuses on the processing of phonemes, which are the individual sounds of language. Proficient auditory processing of sounds contributes to reading because phonemes must be linked to graphemes during the task of reading (Hale & Fiorello, 2004). Phonological processing supports one's dexterity with understanding sounds, syllables and decoding ability in learning to read. This aural language system development is crucial in a child's mastery of the alphabetic principle, and to the way in which sounds of language relate to letters of language. As stated, all language systems have functional connectivity with other language systems. Aural language is connected to language by mouth, eye, and hand through many academic tasks such as articulation/verbal expression, phonemic

awareness, decoding of syllables, word reading, spelling, and text generation (Berninger, 2000; Berninger et al., 2002; Berninger & Richards, 2002).

The connections between the oral and the aural language system must not be viewed in isolation. A young learner must be able to detect sounds in oral language and then process the sounds quickly in short term memory. Oral language then works with language by ear to hear and understand incoming words. Articulated words must be processed with audition, and then stored as word representations in lexical dictionaries (Hale & Fiorello, 2004). Language mediates via input (ear) and output (mouth) modalities, but the receptive and expressive mechanisms are intertwined (Berninger, 2000; Berninger et al., 2002; Berninger & Richards, 2002). As such, language processes within the brain are an inter-hemispheric activity tapping into a variety of neurological structures and connections (Feifer & De Fina, 2000; Hale & Fiorello, 2004). The "functional architecture" for language connects with various body parts, namely the mouth, ears, eyes and hand (Berninger, 2000). These integral connections allow for language processing at (1) the sub word or phoneme level, at (2) the word level which encompasses semantics, morphology, grammar, and syntax, and at (3) the text level (Berninger and Richards, 2002).

Language by eye, or the reading system, begins with a child's first exposure to print, with a parent reading aloud from a book or the child exploring a book (Berninger, 2000; Berninger and Richards, 2002). Language by eye develops somewhat later than oral and aural language systems; however, reading development occurs during early formal instructional years (Berninger, 2000; Berninger et al., 2002; Berninger & Richards, 2002). Language by eye builds upon the systems for language by mouth and

ear. Language by eye involves the extraction of visual information from print, otherwise

known as reading (Shaywitz, 2003). Recognition of visual word forms requires the

young learner to organize visual stimuli into a coded language system (Feifer & De Fina,

2002). Visual spatial awareness, along the dorsal stream, is required to perceive the

position of a printed word on a page, and track words along a line of text (Hale &

Fiorello, 2004). Language by eye begins in the primary occipital lobe, where object

recognition of print occurs via the ventral stream (Hale & Fiorello, 2004). The print is

then recognized as a word form. Visual word forms then are sent to the temporal area to

allow for recognition of the word name. Secondary association areas between the parietal

and temporal areas allow for comprehension of the word form (Shaywitz, 2003). Brain

areas that support the processing of single words involve the analysis of visual features or

the orthography of words (eye), the sounds of words or phonology (ear), and the meaning

of words or semantics (Berninger et al, 2002). Developing rapid, automatic connections

between functional language systems is crucial during the early school years to support

skilled, beginning reading (Posner & Rothbart, 2006).

Language by hand, or the writing system, begins with a child's first experience

with a writing instrument. The goal of language by hand is to produce coded, written

language output, proficiently. Development of language by hand is highly dependent

upon a solid foundation of the other functional language systems (Berninger et al., 2006).

The development of a writing system encompasses idea generation, handwriting,

spelling, and composition (Berninger et al., 2002). The goal is to communicate ideas

through a visible, written code of language. Developmentally, this is the last functional

language system to form, and continues to progress instructionally through high school (Berninger, 2000; Berninger et al., 2002).

As Berninger reviews, writing ability develops in stages, beginning with transcription experiences or scribbling, when preschoolers will pretend to write language via lines, squiggles, and marks on paper. As a child progresses in Kindergarten, handwriting to express language develops and typical writing may model letters within the alphabet. From this stage of writing, primary school aged learners develop more skill with systematic spelling, and are able to write meaningful words. Eventually text generation occurs, and this functional language system will continue to develop into high school years (Berninger, 2000).

Language by hand appears to be the most complex functional language system. In producing written language, the early learner must incorporate knowledge of sounds with knowledge of letter names through the motor output of writing, taking into account one's knowledge of orthography, phonology, and grapho-motor codes (Berninger et al., 2006). Neurological relationships between the phonology of words and the orthography of words must be integrated into lexical knowledge or long term memory (Berninger et al., 2006). In order to produce written language successfully, precursory skills in expressive and receptive speech must be well established. Language by ear impacts writing as does language by mouth. In order to spell words accurately, one must accurately hear and identify the sounds of speech accurately. Articulation impacts writing because deficits in spoken language may lead to weaknesses in spelling ability. Language by eye impacts writing through visual memory, a visual awareness of words in space, and visual organization of print on paper. Language by hand also relies heavily on

executive functions in the frontal area of the brain (Berninger, 2000; Berninger et al., 2006). Executive skills involved in writing include self-regulation, attentional capacity, planning skills, generation of ideas, self- monitoring, revising, and working memory (Berninger et al., 2002; Berninger & Richards, 2002; Miller, 2010).

Summary of Related Research

The primary obligation of American schools is to educate our children, and to produce effective literate citizens to advance the betterment of society. Learning to read efficiently and fluently for meaning is an essential survival skill that a child must acquire to have success in life. Given the prevalence of reading deficits with American students, our existing instructional programs are not succeeding in teaching our children to become fluent readers. Children are progressing without mastery of basic reading proficiencies, and as they are promoted from one grade level to the next, the gaps in reading achievement continue to compound exponentially. Interventions at remediation in the elementary schools are not closing the unrelenting learning gap when identified and applied in the second grade and beyond. This reality is neither impressive, nor acceptable. The focus of successful reading development must be placed at the earliest formal instructional levels, in order to ensure proactive development of successful reading acquisition from the very beginning of one's educational experience (Bishop, 2003).

Empirical research demonstrates the critical pre reading skills and instructional practices needed to cultivate skillful readers. It is evident that reading is a complex, neurological task that requires explicit instruction of skills, with each skill building upon the foundation of previously learned competencies. Research has resulted in the

knowledge of how best to teach children to read, yet schools are not succeeding. Toddlers are prepared for learning by building upon intrinsic curiosity and capitalizing on their motivation to learn about language and books through meaningful stimulatory experiences in the home setting.

Teaching an awareness of phonology, the identification of letters and sounds, and an understanding of the alphabetic principle in a multi layered instructional protocol results in children learning to read and decode words. Automaticity in each of these areas allows the executive functions and neural networks to attend to fluency, meaning and comprehension, producing fluent readers who are able to focus effort on text comprehension (Hudson et al., 2009; Perfetti, 1986; Shaywitz, 2003; Wolf & Katzir-Cohen, 2001).

The solid formation of neural circuitry that supports reading skills in young learners must be firmly established during critical periods of childhood development. Systems for language by mouth, ear, eye, and hand must be built neurologically through meaningful and explicit instructional practice in grades kindergarten, one, and two. The development of these systems must also be monitored for progress on an ongoing basis to remediate any delays before such delays turn into significant learning deficits.

Research denotes that shortfalls in any one or more of these foundational skills can lead to catastrophic, continual achievement problems throughout one's education. As noted, research hypothesizes that a large majority of disabled readers could be eliminated if a more proactive approach is implemented in pre-kindergarten, kindergarten, and first grade. The purpose of this current study is to examine the

effectiveness of a supplemental instructional program that targets the neuro-

developmental processes that contribute to skilled reading.

Research Questions

The research questions to be examined in this study are:

1. At pre-test assessment, were there significant differences between groups on the

   PAL-II measures of

   a. Alphabet Writing- Automaticity, Legibility, and Speed

   b. Copying- Automaticity, Legibility, and Speed

   c. Receptive Coding

   d. Rhyming

   e. Syllables

   f. Phonemes

   g. Working Memory Sentences: Listening

   h. Rapid Automatic Naming- Rate and Accuracy

   for Kindergarten learners?

2. At post test assessment, were there significant differences between groups on the

   PAL-II measures of

   a. Alphabet Writing- Automaticity, Legibility, and Speed

   b. Sentences Copying- Automaticity, Legibility, and Speed

    c. Receptive Coding

    d. Rhyming

    e. Syllables

    f. Phonemes

    g. Working Memory Sentences: Listening

    h. Rapid Automatic Naming- Rate and Accuracy

for Kindergarten learners?

3. Does the use of The Process Assessment of the Learner, Tier One, Beginning Reading I program as a supplement to balanced literacy instruction produce significantly greater gains than balanced literacy alone on measures of

    a. Alphabet Writing- Automaticity, Legibility, and Speed

    b.   Sentences Copying- Automaticity, Legibility, and Speed

    c. Receptive Coding

    d. Rhyming

    e. Syllables

    f. Phonemes

    g. Sentence Listening

    h. Rapid Automatic Naming- Rate and Automaticity

for Kindergarten learners from pre test measures to post test measures?

4. Are there significant differences in performance, based on age in months at pre-test assessment, among students in

   a. Alphabet Writing- Automaticity, Legibility, and Speed

   b. Sentence Copying- Automaticity, Legibility, and Speed

   c. Receptive Coding

   d. Rhyming

   e. Syllables

   f. Phonemes

   g. Sentence Listening

   h. Rapid Automatic Naming- Rate and Accuracy

   for Kindergarten learners?

Chapter 3

Methodology

Description and Demographics of School and Community

Atlantis Preparatory School, located in Monmouth County, New Jersey, is a private school catering to children between the ages of two years old through kindergarten. The area reflects a predominantly middle to upper middle class socioeconomic community in the suburban setting of Wall Township. As of 2005, the population of Wall Township was approximated at 26,265 people. Within that population sample, it is estimated that when broken down by age, the population consists of 1,671 people under the age of five, 5147 people between the ages of five and nineteen, 8,030 people between the ages of twenty and forty-four, 5,592 people between the ages of forty-five and fifty-nine, 3,201 people between the ages of sixty and seventy- four, and 1,620 people over the age of seventy- five (Wall Township Master Plan, 2005). When examined by race and ethnicity, the population is as follows: Caucasian- 24526, Black or African American- 155, Asian/Other- 189, and Hispanic- 391 (Wall Township Master Plan, 2005).

The median household income in Wall Township based upon the 2000 census was $73,989.00, with the median family income measuring at 83,795.00. Median house value in 2000 was $235,700, as per the census of 2000, and more recent statistics estimate the 2010 median house value to be $417,500 (Trulia.com). The Wall Township Public School District consists of six schools: West Belmar Elementary (K-5), Central Elementary School (K-5), Old Mill Elementary School (K-5), Allenwood Elementary School (K-5), Wall Township Intermediate School (6-8), and Wall Township High

School (9-12). All public schools provide full day educational programs for grades one through twelve, and elementary schools provide a half day (2.75 hours) kindergarten program. Therefore, many children attend private programs for kindergarten that provide a full day academic program.

Altantis Preparatory School has a student population of 327children. All students are taught by certified teachers, and all classes have a paraprofessional. Class sizes are limited to a maximum of 16 students or less, depending on the age and developmental level of the students in a particular program. Of the total school population, ten percent are enrolled in a full day kindergarten program, with 16 students participating in a Midstream Program which serves as a full day transitional kindergarten program for younger students who may be age appropriate for kindergarten, but developmentally are not ready. Average family income for families with students at Atlantis Prep is reported as over $200,000 per year. Tuition rates for Atlantis Prep programs range from $3,200 to $10,000 per year. Ethnic demographics of the school population are as follows: White students make up 95 %, Black/African American compose less than 1%, Hispanic students compose 2%, Asian students represent 2%, and Other ethnic backgrounds represent less than 1%.

Within the kindergarten population, the ethnic demographic is as follows: Caucasian = 96%, Black/African American = 0, Hispanic= 0, Asian= 4% and Other= 0. Within the kindergarten population, 65% of the students are male and 35% of the students are female.

Sources of Data

In September of 2010, in consultation with Atlantis Preparatory School, the author of this dissertation implemented a supplemental reading program evaluating the use of The Process Assessment of the Learner (PAL) Guides for Intervention. The PAL Beginning Reading I, Lesson Set I, Tier I (Lessons 1-24) was provided to regular education, kindergarten students in addition to the regular, balanced literacy reading curriculum, McMillan-McGraw Hill. These lessons were provided via a small group instructional setting of 8 students, and lessons were given two times per week, for 30 minutes, for 12 weeks. The purpose of the intervention was to measure reading gains for students receiving the regular balanced literacy curriculum alone, and further to determine if greater gains would occur for students with the addition of the supplemental reading intervention to the regular curriculum. Students who participated in the program evaluation were randomly assigned.

Thirty- one students were randomly assigned to one of two groups consisting of full day kindergarten students. The balanced literacy plus intervention group received the PAL supplemental program in addition to the regular balanced literacy curriculum, and the balanced literacy group received the regular balanced literacy curriculum alone. All students were evaluated with pre test (October, 2010) and post test (February, 2011) assessments in the area of developing reading processes. The Process Assessment of the Learner, Second Edition was used to measure pre-intervention reading readiness skill levels and the post-intervention reading readiness skill level of each child within the study.

Participants

The study utilized data obtained by the Atlantis Prep School during a program evaluation of the PAL II Guides for Intervention. The data set from the completed program was obtained from the Director of the Atlantis Prep School. Assessment data and descriptive information with no specific identifiers were entered into a Microsoft Excel spreadsheet and then converted into an SPSS Data File for analysis.

Criteria for inclusion in this study included being a registered kindergarten student at Atlantis Prep School for the 2010-2011 academic school year. All students were regular education students with no diagnosed learning disability or classification for Special Education and Related Services. None of the students had any diagnosis of a vision or hearing disability, and all students were from homes where English is the primary language. Of the thirty- one students who participated in the study, none was excluded.

The sample consisted of thirty- one kindergarten students ($N= 31$) with 20 males ($n = 20$; 64.5%) and 11 females ($n = 11$; 35.5%). The age range of participants at the start of the study was 62 months to 77 months. Written approval and authorization to utilize the data set was obtained from the Atlantis Prep School Director.

Of the thirty one students ($N = 31$), sixteen ($n = 16$) students received the PAL supplemental reading instruction in addition to the regular reading curriculum, and fifteen ($n = 15$) students received only the regular instruction. Of the thirty- one students ($N = 31$) all were considered to be regular education students.

Classroom Instructional Program for All Students

All program students received regular, balanced literacy instruction in the regular education classroom during integrated lessons, consisting of a language arts block of ninety minutes per day. Balanced literacy was provided based upon the Mac Millan McGraw Hill (2003) Kindergarten curriculum.

Data Collection

The data utilized in the current study were collected from pre-test and post-test measures used during this academic school year. Data were ascertained from the scoring protocols of the Process Assessment of the Learner, Second Edition (PAL II) selected subtests. Data were collected in October of 2010 and February of 2011. Data were also collected from daily lesson notes from the certified teacher providing the supplemental instruction. Student progress was monitored by the classroom teachers through regular curriculum based measures to document individual student progress. The total number of weeks when the balanced literacy plus intervention group received the supplemental instruction was 12 weeks.

The data were entered into a Microsoft Excel spreadsheet for each student within the study sample. The subjects of the program evaluation received pre-test and post-test assessments in the areas of alphabet writing, copying, receptive coding, rhyming, syllables, phonemes, sentence listening, and rapid automatic letter naming. Two school psychologists consulting with Atlantis Prep School administered the PAL II assessment individually to each student within the study. All protocols were scored by the two school psychologists to ensure scoring accuracy. The data collectors received training on the assessment instruments via a webinar presented by The Psychological Corporation.

PAL II Guidelines for Intervention

The PAL II Guides for Intervention, according to Berninger and Abbott (2003), is a

research based program aimed at developing the functional language systems of young

learners. The theory behind this curriculum is that children develop strong reading skills,

based on cognitive, neural, and developmental circuits that build functional language

systems within one's brain. The functional language systems include Language by

Mouth (oral language), Language by Ear (aural language, Language by Eye (reading),

and Language by Hand (writing). Durable circuits are built through a student's repeated,

active engagement within the learning environment through systematic, research based,

intensive instruction. The lessons sets within the PAL are designed with these process

based neural circuits as the basis for all instructional practices. The lesson sets integrate

various levels of language to foster functional reading systems. Therefore, language

processing involves multiple skills at various levels. Instruction is provided at the sub-

word level, the word level, and the text level to provide active engagement and repeated

practice in three language levels (oral language, aural language, and language by eye).

The sub-word level focuses on codes which represents the lowest level of language. The

codes are composed of sounds and letters that can be combined to make single words.

The word level of language development focuses on single words that represent single

units of language. The text level of language represents single words that are combined

into phrases, sentences, and paragraphs to provide meaningful text. All levels are

integrated within the developmental trajectory of the young learner and draw upon

varying neural processes throughout the brain's anatomy. The PAL Guidelines for

Intervention integrate the varying skill levels of language in order to yield a functional

reading system within the young learner's brain. Lessons sets are further broken down to address a multi tier level of instruction with Tier 1 lessons aimed at prevention and reduction of reading problems through supplemental instruction within the regular classroom. Tier 2 lessons sets are designed to modify regular curricular instruction, by adding and adapting the curriculum to meet individual student weaknesses through more intensive supplemental instructional practices both within the classroom and in small group settings. Tier 3 lesson sets provide more specialized instructional treatment for students with significant reading and/or writing problems, students who are most likely classified with a learning disability.

PAL Guidelines for Intervention, Lesson Set 1,Tier 1, Beginning Reading

The lessons within this program were designed to assist at- risk readers in the first grade, and can be modified to work with younger or older students. The goal of the program was to provide regular instruction to struggling readers to improve reading skill levels commensurate with grade level expectations. Within the current study, the goal of the supplemental instruction was more highly proactive because regular instruction was provided to regular education Kindergarten students to improve reading readiness levels through systematic early instruction that focuses on the development of functional reading systems. The instructional approach focused on language development at the sub-word, word, and text level. During the sub-word learning phase, instruction focused on orthographic awareness (internal spelling units of words), phonological awareness (the phonemes of spoken words), and the alphabetic principle (spelling and phoneme correspondences). These lessons incorporated teacher modeling, student imitating, and repeated practice to encourage the development of oral and aural language systems.

Lessons fostered a student awareness of the relationships between orthography and phonology to be utilized in learning to read. In the word learning phase, lessons focused on the student's ability to synthesize sound units to create a single spoken word, allowing the understanding of the alphabetic principle to be applied to words. Each lesson utilized the Talking Letters student cards which exposed children to common letter combinations or digraphs that are routinely found in beginning reading words. This repetition of letter combinations was aimed at solidifying the spelling phoneme relationships in the young learner's mental dictionary, thus allowing for the predictability of sub-word units to be applied to word level reading. During the text level learning phase, internalized knowledge of letter-sound relationships were applied to both familiar and unknown words in the reading of text. Children were encouraged to read chorally with the teacher, and independently with teacher guidance. Comprehension of material was encouraged through group discussion that took place after each completed story (See Appendix for detailed lesson plans).

Teacher Training in PAL Guidelines for Intervention

Five certified teachers, two employed as regular education teachers and three employed as paraprofessionals, received training in the use of PAL Guides for Intervention program by two school psychologists. The training was conducted for two days, and lasted eight hours in total training time. Additionally, consultations sessions occurred between the school psychologists and the five teachers throughout the twelve weeks of the intervention to provide ongoing support regarding lesson programming, student achievement, and monitoring of student progress.

Description of Reading Skill Measures

The following measures of reading skills were utilized in the program evaluation process: Curriculum Based Measures within the Macmillan McGraw-Hill Reading program (Macmillan McGraw-Hill, 2003) and selected subtests from The Process Assessment of the Learner, Second Edition (Berninger, 2007). The following is a description of each measure utilized.

MacMillan McGraw Hill Reading

MacMillan McGraw Hill Reading, 2003, is the primary reading curriculum that was provided to all students within the study in daily blocks of instruction. The overall curricular program consists of comprehensive learning materials for students grades K-3. Instructional development incorporates phonemic awareness, phonics, fluency, vocabulary, and comprehension as overall reading goals. An analysis of this program was conducted by the University of Oregon as part of the Reading First initiative. According to a report titled, "Critical Elements of Analysis", the following summation was provided to describe the effectiveness of this program in light of standards set by the National Reading Panel. The Macmillan McGraw Hill program yielded the following scores, specific to kindergarten, to rate the overall program. Skills are rated from highest score to lowest score as follows:

1. Coordinates and integrates phonemic awareness and phonics instruction and student materials.

2. Provides ample practice on high-priority skills.

3. Includes systematic and cumulative review of high priority skills.

4. Provides explicit and systematic instruction.

5. Demonstrates and builds relationships between fundamental skills leading to higher order skills.

Process Assessment of the Learner, Second Edition

The PAL-II is a set of individually administered, standardized measures developed to measure reading and writing skills and the related neural processes in young learners in kindergarten through Grade 6. The assessment measure is designed to link assessment results with appropriate instructional interventions to develop solid reading and writing systems within young learners (Berninger, 2007). The assessment can be used to identify useful information for understanding the problems that individual children may experience in developing skills to foster proficient reading and writing skills. More specifically, the PAL-II helps to identify which processes related to reading and writing are well developed within the learner, and which processes are underdeveloped. Therefore, the test results can be used to design instructional practices that are meaningful to an individual student's progress in developing reading and writing systems. The PAL-II is based upon empirically validated research to screen students who may be at risk for reading and writing problems, and assesses individual student proficiency with developmentally appropriate reading and writing related processes.

Within the Reading Related Processes, subtests appropriate for kindergarten grade level development, domains are divided into Orthographic Coding (OR), Phonological Coding (PL), Rapid Automatic Naming (RAN), Verbal Working Memory (WMV), and Handwriting (HWG). The Orthographic Coding domain is composed of a measure of Receptive Coding. The Receptive Coding subtest evaluates a child's ability to code whole written words into memory and then segment each word into units of different

size. The Phonological Coding domain comprises measures of Rhyming, Syllables, and

Phonemes. The Rhyming Subtest (RY) evaluates the kindergarten child's ability to

analyze and generate rhymes for spoken words. The Syllables Subtest (SY) evaluates the

child's ability to segment spoken words into syllables. The Phonemes Subtest (PN)

evaluates the child's ability to segment spoken words into phonemes. The Rapid

Automatic Naming (RAN) subtest, evaluates the child's ability to name single letters

accurately and quickly through oral responses. (It should be noted that the PAL II does

not administer the RAN to kindergarten students as part of the regular standard battery to

assess kindergarten level development.) The Verbal Working Memory domain is based

upon the Sentence Listening subtest (WMSL). The Sentence Listening subtest evaluates

the child's ability to store and manipulate sentences in working memory. The

Handwriting Domain comprises the Alphabet Writing subtest (AW) and the Copying

Subtest (CP). The Alphabet Writing Subtest evaluates a child's automatic printing of

lowercase letters in alphabetic order from memory. The Copying A Subtest evaluates the

child's ability to copy a sentence containing all the letters of the alphabet (Task A).

Reliability and Validity of the PAL II

The PAL II is a battery of subtests designed to measure various domains of

reading and writing and the related neural processes in children K - Grade 6. The

subtests vary in difficulty, stimulus procedures, response tasks, and time restraints.

According to the test developers, reliability coefficients were obtained, utilizing the split-

half and alpha methods, and stability coefficients. The reliability studies for the PAL II

were performed using measures of internal consistency. The results of reliability studies

conducted by the authors indicate that there is adequate to high internal consistency, with

composite scores having the highest measures of reliability. Measures assessing

individual subtests demonstrated the highest internal consistencies for Pseudoword

Decoding, Rhyming, Are They Related ?, Find the True Fixes, Morphological Decoding

Fluency, Compositional Fluency, and Verbal Working Memory Letters, Words, and

Sentences: Listening. Test-Retest reliability measures showed lower reliability

coefficients for Alphabet Writing and Copying subtests (PAL II User's Guide).

Test-retest reliability data describe a sample consisting of 129 children

categorized into K-3 ($n = 81$) and 4-6 ($n = 48$) grade groups. The study sample reflects a

diverse population, with students from varying ethnic backgrounds. Retesting took place

between 2 and 34 days after original testing, with a mean average of 15 days. Reliability

studies reflect greater test-retest reliability for the K-3 children, with coefficients mainly

in the range of .70 and greater and only a few falling at .50 or below. For the 4-6 grade

category, nearly half of the reliability coefficients for the subtests fell below .70. The

handwriting measures reflected the lowest test-retest reliability (PAL II User's Guide).

Construct validity was measured through observation of student strategies in

developing response items and through error analysis. The test author states that the

PAL-II RW is designed to measure developmental processes in five domains:

cognitive/memory, receptive/expressive language, fine and gross motor,

attention/executive function, and social/emotional (Berninger, V., n.d.).

Study Design

This study utilized a pre-test/post test design with one quasi experimental group

and one control group to determine differences in early reading skills for kindergarten

students after the implementation of the PAL II Guides for Intervention supplemental

instruction to the experimental group. The independent variable for this study was the

supplemental instruction program, PAL II Guides for Intervention; the dependent

variables for this study were student reading skills as measured by scores on the PAL II,

selected subtests, including Receptive Coding, Rhyming, Syllables, Phonemes, Rapid

Automatic Naming, Sentence Listening, Handwriting, and Copying with the intervention

and without. Reading skills were measured prior to the start of the supplemental

intervention for both groups and again at the end of the twelve week intervention.

Data Analysis

The study focused on the analysis of the collected data from the balanced literacy

plus intervention group and the balanced literacy group. Pre- and Post *t*-tests were

conducted with all of the dependent variables used to assess reading skills. Mean

differences were examined to determine variation of scores between students receiving

the regular curriculum with the supplemental instruction and the students receiving the

regular curriculum alone. Independent samples *t*-tests were then conducted to examine

differences between the pre- and post test score changes of the two groups. Progress was

measured by differences in pre- and post test scores on the PAL II.

Summary

The purpose of this study was to investigate the effectiveness of the PAL II

Guides for Intervention as a supplemental curriculum in improving the reading skills of

regular education students in kindergarten. The research sought to determine if the

proactive addition of a supplemental program aimed at developing reading processes in

young learners produced significant gains in early literacy acquisition than instruction

with the use of a comprehensive reading curriculum alone.

Chapter 4

Results

Descriptive Statistics

Descriptive statistics are presented in Table 1 for both pre and post test administrations of the PAL II for the entire sample population ($N = 31$).

Table 1

Means and Standard Deviations for Entire Sample across PAL-II Variables

	Pre-Test October 2010			Post-Test February 2011		
Variable	*N*	*M*	*SD*	*N*	*M*	*SD*
Alphabet Writing Automaticity	31	11.3	2.5	31	12.8	2.5
Alphabet Writing Legibility	31	11.6	3.7	31	14.5	3.7
Alphabet Writing Total Time	31	10.7	3.2	31	14.0	3.4
Copying Automaticity	31	10.0	1.9	31	12.1	1.8
Copying Legibility	31	11.4	3.6	31	13.4	2.3
Copying Total Time	31	10.2	1.7	31	12.7	2.8
Receptive Coding	31	9.0	3.2	31	11.5	3.5
Rhyming	31	9.3	2.4	31	13.4	3.8
Syllables	31	9.8	2.6	31	12.1	2.3
Phonemes	31	8.1	3.3	31	11.8	2.5
Working Memory Sentences	31	11.6	1.4	31	13.2	1.8
Rapid Automatic Naming- Rate	31	0.00	1.0	31	0.00	1.0
Rapid Automatic Naming- Accuracy	31	0.0	1.0	31	0.00	1.0

Note. All variables are scaled scores from the Process Assessment of the Learner, Second Edition, with the exception of Rapid Automatic Naming- Rate and Accuracy, which are reported as z-scores.

Descriptive statistics are presented in Table 2 for both pre and post test administrations of the PAL II for the balanced literacy plus supplemental intervention group (*n* = 16).

Table 2

Means and Standard Deviations for Balanced Literacy + Intervention Group across PAL II Variables

	Pre-Test			Post-Test		
	October 2010			February 2011		
Variable	*n*	*M*	*SD*	*n*	*M*	*SD*
Alphabet Writing Automaticity	16	11.6	2.2	16	13.4	2.3
Alphabet Writing Legibility	16	11.9	3.2	16	15.8	3.4
Alphabet Writing Total Time	16	10.9	3.2	16	14.6	3.2
Copying Automaticity	16	10.1	1.7	16	12.6	1.7
Copying Legibility	16	12.0	3.5	16	14.6	1.4
Copying Total Time	16	10.3	1.6	16	12.9	2.7
Receptive Coding	16	10.4	2.7	16	13.0	2.0
Rhyming	16	10.0	2.3	16	15.8	2.3
Syllables	16	10.0	2.4	16	13.5	0.5
Phonemes	16	8.7	3.0	16	13.1	1.4
Working Memory Sentences:	16	11.8	1.1	16	14.4	1.5
Rapid Automatic Naming- Rate	16	-0.06	1.06	16	-0.30	0.85
Rapid Automatic Naming- Accuracy	16	0.22	1.08	16	.238	0.9

Note. All variables are scaled scores from the Process Assessment of the Learner, Second Edition, with the exception of Rapid Automatic Naming- Rate and Accuracy, which are reported as z-scores.

Descriptive statistics are presented in Table 3 for both pre and post test administrations of the PAL II for the balanced literacy group (*n* = 15).

Table 3

Means and Standard Deviations for Balanced Literacy Group across PAL II Variables

| | Pre-Test | | | Post-Test | | |
| | October 2010 | | | February 2011 | | |
Variable	*n*	*M*	*SD*	*n*	*M*	*SD*
Alphabet Writing Automaticity	15	11.0	2.9	15	12.2	2.7
Alphabet Writing Legibility	15	11.2	4.3	15	13.1	3.6
Alphabet Writing Total Time	15	10.5	3.2	15	13.3	3.6
Copying Automaticity	15	9.9	2.1	15	11.5	1.6
Copying Legibility	15	10.7	3.7	15	12.2	2.4
Copying Total Time	15	10.1	1.9	15	12.5	3.1
Receptive Coding	15	7.5	3.1	15	9.9	4.1
Rhyming	15	8.5	2.3	15	10.8	3.4
Syllables	15	9.7	2.9	15	10.7	2.6
Phonemes	15	7.5	3.5	15	10.5	2.7
Working Memory Sentences: Listening	15	11.4	1.7	15	11.9	1.2
Rapid Automatic Naming- Rate	15	0.06	0.96	15	0.32	1.08
Rapid Automatic Naming- Accuracy	15	-0.23	0.89	15	-0.25	1.00

Note. All variables are scaled scores from the Process Assessment of the Learner, Second Edition, with the exception of Rapid Automatic Naming- Rate and Accuracy, which are reported as z-scores.

Pearson Correlation Coefficients were calculated between all pairs of pre- and post-tests. Correlation coefficients are reported in Table 4.

Table 4

Pre and Post Test Paired Sample Correlations

Dependent Variable	*N*	*Correlation*	*Significance*
Alphabet Writing Automaticity Pre Test and			
Alphabet Writing Automaticity Post Test	31	.459	.009
Alphabet Writing Legibility Pre-Test and			
Alphabet Writing Legibility Post-Test	31	.729	<.001
Alphabet Writing Total Time Pre-Test and			
Alphabet Writing Total Time Post-Test	31	.671	<.001
Copying A Automaticity Pre- Test and			
Copying A Automaticity Post-Test	31	.280	.128
Copying A Legibility Pre-Test and			
Copying A Legibility Post Test	31	.590	<.001
Copying A Total Time Pre-Test and			
Copying A Total Time Post-Test	31	.517	.003
Receptive Coding Pre-Test and			
Receptive Coding Post Test	31	.605	.001
Rhyming Pre-test and Rhyming Post Test	31	.710	.001
SyllablesPre-Test and Syllables Post Test	31	.570	.001
Phonemes Pre-Test and Phonemes Post-Test	31	.681	.001
Working Memory: Sentence Listening Pre-Test and			
Working Memory: Sentence Listening Post-Test	31	.353	.051
Rapid Automatic Naming Rate Pre-Test and			
Rapid Automatic Naming Rate Post Test	31	.820	.001
Rapid Automatic Naming Accuracy Pre-Test and			
Rapid Automatic Naming Accuracy Post-Test	31	.701	<.001

*Note. * p < .05 ** p< .01*

The correlation coefficients revealed significant pre-test/post-test differences for most of the measures on the PAL II, with the exception of Copying Automaticity, on which no significant differences were found on performance from pre-test assessment to post-test assessment. Findings indicate that there were significant positive correlations between scores for all pairs of pre and post tests, with the exception of Copying Automaticity.

Results from Pre-Test Assessment

Paired samples *t*-tests were conducted to assess differences between pre-test scores for balanced literacy plus supplemental intervention and balanced literacy groups. Significance was analyzed at $p < .05$. Levene's Test for Equality of Variances was conducted to identify any violations of the equality of variances assumption so that corrected *t*-tests could be used as indicated. No violations of the equality of variances assumptions were identified for this test.

Pre-test scores are reported for the balanced literacy plus supplemental intervention group in Table 1. Pre-test scores for balanced literacy group are reported in Table 2. Pre-test findings showed no significant differences between groups at the pre test assessment, with the exception of Receptive Coding on which the group to receive the intervention had shown a higher mean score, as shown in Table 5.

Table 5

Pre-Test Paired Samples t-tests for Balanced Literacy + Intervention and Balanced Literacy groups

Variable	*t*	*df*	*Sig. (2-tailed)*
Alphabet Writing Automaticity	0.62	29	.541
Alphabet Writing Legibility	0.50	29	.623
Alphabet Writing Total Time	0.35	29	.732
Copying Automaticity	0.28	29	.780
Copying Legibility	0.99	29	.333
Copying Total Time	0.19	29	.854
Receptive Coding	2.84	29	.008
Rhyming	1.71	29	.097
Syllables	0.35	29	.730
Phonemes	1.05	29	.304
Working Memory Sentences	0.81	29	.424
Rapid Automatic Naming- Rate	-0.32	29	.750
Rapid Automatic Naming- Accuracy	1.27	29	.215

*Note. * $p < .05$ ** $p < .01$*

There was a significant pre-test difference for Receptive Coding between the balanced literacy plus supplemental intervention group (*M*= 10.44, *SD*= 2.71) and the balanced literacy group (*M*= 7.47, *SD*= 3.11), *t*(29) = 2.84, *p*=.008, two tailed.

Results from Post-Test Assessment

Independent samples *t*-tests were conducted to assess differences between groups at the post-test assessment, as shown in Table 6.

Table 6

Post-Test Independent Samples t-tests for Balanced Literacy + Intervention and Balanced Literacy groups

Variable	*t*	*df*	*Sig.*	*d*
Alphabet Writing Automaticity	1.40	29	.173	.503
Alphabet Writing Legibility	2.08	29	.046*	.748
Alphabet Writing Total Time	1.01	29	.323	.361
Copying Automaticity	1.79	29	.084	.649
Copying Legibility	3.34	29	.002**	1.23
Copying Total Time	0.39	29	.697	.142
Receptive Coding	2.69	29	.014*	1.03
Rhyming	4.88	29	<.001**	1.77
Syllables	4.22	29	.001**	1.84
Phonemes	3.23	29	.004**	1.22
Working Memory Sentences:	4.95	29	<.001**	1.81
Rapid Automatic Naming- Rate	-1.78	29	.086	.639
Rapid Automatic Naming- Accuracy	-0.25	29	.175	.499

*Note. * p < .05 ** p < .01*

Post-test findings showed significant differences between groups for Alphabet

Writing Legibility, Copying A Legibility, Receptive Coding, Rhyming, Syllables,

Phonemes, and Working Memory: Sentence Listening. The group that received the

intervention outscored the balanced literacy group across all variables.

Levene's Test for Equality of Variances was conducted to identify any violations of

the equality of variances assumption so that corrected t-tests could be used as indicated.

Violations of the equality of variances assumptions were identified for this test. Levene's

Test for Equality of Variances was significant for Receptive Coding, Syllables, and

Phonemes. Therefore, equal variances were not assumed for those variables.   Equal variances were assumed for Alphabet Writing Automaticity, Alphabet Writing Legibility, Alphabet Writing Total Time, Copying Automaticity, Copying Legibility, Copying Total Time, Rhyming, Working Memory Sentence Listening, and Rapid Automatic Naming of Letters: Rate and Accuracy.

On those variables that were significant, Cohen's d was computed as a measure of effect size. A small effect size was found for Alphabet Writing Total Time, whereas medium effect sizes were found for Alphabet Writing Automaticity, Alphabet Writing Legibility, and Copying A Automaticity. Large effect sizes were found for Copying A Legibility, Receptive Coding, Rhyming, Syllables, Phonemes, and Working Memory Sentence Listening. Please refer to Table 6 for Cohen's *d* values.

Differences in Pre to Post-Test Performance of Balanced Literacy + Intervention and Balanced Literacy Group

Independent samples *t*-tests were conducted to assess differences in performance within each group from pre-test to post-test across PAL II dependent measure. Significance was analyzed at the *p* < .05. There were significant differences in the pre- to post-test mean scores for the balanced literacy plus supplemental intervention group in Alphabet Writing Automaticity, Alphabet Writing Legibility, Alphabet Writing Total Time, Copying A Automaticity, Copying A Legibility, Copying A Total Time, Receptive Coding, Rhyming, Syllables, Phonemes, and Working Memory Sentence Listening. No significant differences were found in Automatic Naming of Letters- Rate and Accuracy for the balanced literacy plus supplemental intervention group. There were significant

differences in the pre- to post-test mean scores for the balanced literacy group in

Alphabet Writing Legibility, Alphabet Writing Total Time, Copying A Automaticity,

Copying A Legibility, Copying A Total Time, Receptive Coding, Rhyming, Syllables,

and Phonemes. There were no significant differences for the balanced literacy group in

Alphabet Writing Automaticity, Working Memory Sentence Listening, and Rapid

Automatic Naming of Letters- Rate and Accuracy.

Descriptive statistics for pre and post test scores for the balanced literacy plus

supplemental intervention group are reported in Table 7.

Table 7

Independent Samples Pre to Post t-Tests for Balanced Literacy + Intervention Group

	Pre-Test October 2010			Post-Test February 2011		
Variable	*n*	*M*	*SD*	*n*	*M*	*SD*
Alphabet Writing Automaticity	16	11.56	2.16	16	13.44	2.28
Alphabet Writing Legibility	16	11.88	3.22	16	15.75	3.40
Alphabet Writing Total Time	16	10.88	3.36	16	14.56	3.20
Copying Automaticity	16	10.06	1.73	16	12.63	1.75
Copying Legibility	16	12.00	3.50	16	14.56	1.41
Copying Total Time	16	10.25	1.61	16	12.88	2.66
Receptive Coding	16	10.44	2.71	16	13.00	2.03
Rhyming	16	9.94	2.29	16	15.81	2.29
Syllables	16	10.0	2.39	16	13.50	0.52
Phonemes	16	8.69	2.98	16	13.06	1.44
Working Memory Sentences	16	11.81	1.11	16	14.38	1.54
Rapid Automatic Naming- Rate	16	-0.06	1.06	16	-0.30	0.85
Rapid Automatic Naming- Accuracy	16	0.22	1.08	16	0.24	0.97

Note. All variables are scaled scores from the Process Assessment of the Learner, Second Edition, with the exception of Rapid Automatic Naming- Rate and Accuracy, which are reported as z-scores.

Levels of significance in paired samples t-tests for the balanced literacy plus supplemental intervention group are reported in Table 8.

Table 8

Independent Samples t-tests for Balanced Literacy + Intervention Group

Variable	t	df	Sig. (2-tailed)
Alphabet Writing Automaticity	-2.77	15	.014*
Alphabet Writing Legibility	-6.01	15	<.001**
Alphabet Writing Total Time	-4.98	15	<.001**
Copying Automaticity	-4.97	15	<.001**
Copying Legibility	-3.06	15	.008**
Copying Total Time	-5.26	15	<.001**
Receptive Coding	-4.19	15	.001**
Rhyming	-10.60	15	<.001**
Syllables	-6.30	15	<.001**
Phonemes	-7.08	15	<.001**
Working Memory Sentences:	-6.62	15	<.001**
Rapid Automatic Naming- Rate	1.67	15	.116
Rapid Automatic Naming- Accuracy	-1.00	15	.922

*Note. * p < .05 ** p < .01*

The balanced literacy plus supplemental intervention group showed significant differences in mean scores on all PAL-II variables, with the exception of Alphabet Writing Automaticity and Rapid Automatic Naming- Rate and Rapid Automatic Naming- Accuracy.

Descriptive statistics from pre to post-test for the balanced literacy group are reported in Table 9.

Table 9

Descriptive Statistics for Balanced Literacy Group

	Pre-Test October 2010			Post-Test February 2011		
Variable	*n*	*M*	*SD*	*n*	*M*	*SD*
Alphabet Writing Automaticity	15	11.00	2.88	15	12.20	2.65
Alphabet Writing Legibility	15	11.20	4.30	15	13.13	3.60
Alphabet Writing Total Time	15	10.47	3.20	15	13.33	3.60
Copying Automaticity	15	9.87	2.13	15	11.53	1.64
Copying Legibility	15	10.73	3.65	15	12.20	2.43
Copying Total Time	15	10.13	1.89	15	12.47	3.11
Receptive Coding	15	7.47	3.11	15	9.87	4.07
Rhyming	15	8.53	2.26	15	10.80	3.63
Syllables	15	9.67	2.92	15	10.67	2.55
Phonemes	15	7.47	3.50	15	10.53	2.70
Working Memory Sentences:	15	11.40	1.68	15	11.93	1.16
Rapid Automatic Naming- Rate	15	-0.06	0.96	15	0.32	0.28
Rapid Automatic Naming- Accuracy	15	-0.23	0.89	15	-0.25	1.0

Levels of significance in paired samples *t*-tests for the balanced literacy group are reported in Table 10.

Table 10

Paired Samples t-tests for Balanced Literacy Group

Variable	*t*	*df*	*Sig. (2-tailed)*
Alphabet Writing Automaticity	-1.83	14	.089
Alphabet Writing Legibility	-2.88	14	.012*
Alphabet Writing Total Time	-4.60	14	<.001**
Copying Automaticity	-2.78	14	.015*
Copying Legibility	-2.48	14	.027*
Copying Total Time	-3.10	14	.008**
Receptive Coding	-2.58	14	.022*
Rhyming	-5.01	14	<.001**
Syllables	-2.42	14	.030*
Phonemes	-5.43	14	<.001**
Working Memory Sentences	-1.26	14	.229
Rapid Automatic Naming- Rate	-1.90	14	.078
Rapid Automatic Naming- Accuracy	0.11	14	.918

*Note. * p < .05 ** p < .01*

The balanced literacy group showed significant differences in mean scores on Alphabet Writing Legibility, Copying Automaticity, Copying Legibility, Receptive Coding, and Syllables. Significant differences were found on Alphabet Writing Total Time, Copying Total Time, Rhyming, and Phonemes. No significant differences were found for the balanced literacy group on Alphabet Writing Automaticity, Working Memory Sentences: Listening, Rapid Automatic Naming- Rate, and Rapid Automatic Naming- Accuracy.

Performance Differences Based on Age of Student

Three levels were created, based on age of student at pre-test assessment and post-test assessment. At pre-test assessment, younger aged kindergarten students measured between 62 and 66 months old; average agedkindergarten students measured between 67 and 71 months old , and older aged kindergarten student were 72 months old and above. At post-test assessment, younger aged kindergarten students measured between 66 and 70 months old; average aged kindergarten students measured between 71 and 75 months old , and older aged kindergarten student were 76 months old, and above. A one-way repeated measures ANOVA was conducted to assess differences between each dependent variable and age of student at pre-test and post-test assessments. Significance was analyzed at the $p < .05$.

Results indicate that there were no significant differences in PAL II measures of student performance, based on age of student for Alphabet Writing Automaticity, Alphabet Writing Legibility, Alphabet Writing Total Time, Copying Automaticity, Copying Legibility, Copying Total Time, Receptive Coding, Rhyming, Syllables, Working Memory Sentence Listening, and Rapid Automatic Naming of Letters: Rate and Accuracy. The analysis of variance revealed a significant difference for the Phonemes pre-test, $F (2,28) = 3.95$, $p = .031$, as reported in Table 11.

Table 11

ANOVA analysis of phoneme pre-test based on three levels of student age

Source	SS	df	MS	F	p	eta²
Between Groups	69.738	2	34.87	3.95	.031*	.220
Within Groups	246.97	28	8.82			
Total	30	316.7				

Note. * *p* < .05

A Bonferroni post hoc analysis was conducted to examine where the significant differences existed between younger aged, average aged, and older aged kindergarten students on the Phonemes pre-test performance. There was no significant difference in the means of scores when comparing younger ($M = 6.63$, $SD = 2.87$) to average aged students ($M = 7.86$, $SD = 3.37$) on the Phonemes pre-test.   There was a significant difference in the means of scores when comparing younger ($M = 6.63$, $SD = 2.87$) to older aged ($M = 9.78$, $SD = 2.91$) students on the Phonemes pre-test, thus the older aged kindergarten students performed significantly better than the younger aged kindergarten students on measures of phoneme knowledge.

Chapter 5

Discussion

Summary

Current literacy rates in America reflect a nation with significant deficits in basic reading skills (Burke et al., 2009; Foorman, Breier, & Fletcher, 2003; Kamps, Willis, Greenwood, Thorne, Lazo, Crockett, et al., 2003; Katzir et al., 2006; National Center for Educational Statistics, 2003). Research indicates that despite identification of reading problems, many struggling readers are resistant to successful outcomes in literacy intervention over time (Burke, et. al., 2009; Kampset, et al., 2003). It is common for struggling readers to remain below basic proficiency, even upon high school graduation, despite intensive efforts to remediate reading weaknesses (Burke et al., 2009; Katzir et al, 2006; National Center for Educational Statistics, 2003).

Federal initiatives have led to a greater understanding of the broad array of processes involved in the successful attainment of skilled reading, both instructionally and neurologically (IDEA, 2004; NCLB, 2001; NRP, 2000). National focus on reading achievement over the past decade has been focused on deciphering those methods which can effectively teach children to read. The National Reading Panel reports that phonological awareness, phonics instruction, reading fluency, vocabulary development, and reading comprehension are integral skills in the overall development of automatic, fluent, and comprehensive reading ability (NRP, 2000). Furthermore, efforts to create solid pre-reading skills in the early childhood years are noted to be a critical factor in long term reading outcomes (Molfese, 2006; NCLB, 2001; NRP, 2000; Shaywitz, 2003).

Pre-reading skills evidenced to promote proficient reading aptitude include phonemic knowledge, phonological awareness, mastery of the alphabetic principle, orthographic understanding, and rapid letter naming. These crucial skills must be automatized in the neurological reading systems of all early learners in order to sustain future academic achievement across all domains (Berninger, 2000; Berninger et al., 2002; Posner & Rothbart, 2006; Shaywitz, 2003).Research indicates that negative outcomes in reading acquisition can be ameliorated with appropriate quality instruction at the early grades (Burke et al., 2009; Molfeseet at., 2006). In light of this knowledge, the current study utilized an assessment measure, namely the PAL II Process Assessment of the Learner, Second Edition, and a supplemental intervention, The PAL II Guides for Intervention, both of which were devised from a neurological framework.

With technological advances in brain imaging, researchers have been able to gain critical information about the neural networks involved in the development of proficient literacy (Berninger & Richards, 2002; Hale and Fiorello, 2004; Shaywitz, 2003).Research suggests that time frames exist whereby a critical window of neurological development for literacy and language development is most easily ascertained in the first seven years of life (Berninger & Richards, 2002; Eliot, 1999; Feifer & DeFina, 2000). Therefore, the early stages of formal education are critical to reading development. Thus it is imperative to establish solid neural reading systems at this stage of instruction while there is time to route and re-route neural pathways that support successful literacy acquisition in young learners.

In October of 2010, Atlantis Prep School conducted a program evaluation of the effectiveness of the PAL II Guides for Intervention as a supplement to balanced literacy

instruction. The purpose of the study was to evaluate student mastery of pre-reading

skills through the use of balanced literacy, and determine if students would realize even

stronger reading skills with the use of the PAL II as a supplement to the current balanced

literacy program in the regular education Kindergarten setting.

Study Findings Related to Pre-Test Level Skills of Sample Population

Results of the current program evaluation indicated that both groups of

kindergarten students demonstrated equivalency at baseline assessments in basic reading

skills. Pre-test assessments demonstrated no significant differences between groups on

PAL II dependent measures, with the exception of Receptive Coding, on which the

balanced literacy plus intervention group mean score was significantly higher than that of

the balanced literacy group. Further analysis of mean scores was conducted with age of

student, which further confirmed baseline equivalency prior to the intervention study.

Pre-test scores were separated into age groups at pre-test assessment, with three levels of

age- younger aged student, average aged student, and older aged student. Student age

was not a significant factor in the development of most areas of pre-reading readiness

within this sample. The only comparison that yielded a significant difference at pre-test

assessment was for the older aged students in comparison with younger aged students and

only with their phonemic knowledge as measured by the Phonemes subtest of the PAL II.

Consequently, all students began the intervention program with similarly developed

levels of pre-reading skills: alphabetic writing skills, copying skills, receptive coding

ability, rhyming capacity, awareness of syllables, working memory for sentence listening,

and rapid automatic naming of letters.

Study Findings Related to Instruction Using Balanced Literacy

According to the current study findings, pre to post paired samples *t*-tests demonstrated significant growth over the twelve week period for the balanced literacy group with instruction utilizing balanced literacy alone on nine of the thirteen variables on the PAL II. Students receiving balanced literacy alone demonstrated significant gains in areas of writing, including alphabet letter writing legibility (AWL) and writing speed (AWTT) as well as copying automaticity (CPALL), copying legibility (CPAL), and copying speed (CPATT). Despite not receiving any supplemental intervention, students were able to produce significant gains in written language with explicit daily exposure to quality balanced literacy instruction. Significant gains were also noted in orthographic awareness, as seen with measurable growth in receptive coding ability (RC). Students were able to encode words into memory, and then utilize the information to judge orthographic similarities and differences. Student growth in phonemic awareness ability also showed measurable gains in pre reading skills involving the auditory and verbal rhyming of words (RY), identification of phonemes through phoneme segmentation and phoneme deletion (PN), and facility with syllabic manipulation of sub-word units (SY).

Such findings are to be expected within the balanced literacy group, despite no supplemental instruction, given a previous research evaluation of the MacMillan McGraw Hill Reading, 2003 reading curriculum in the kindergarten grade level (Oregon Reading First Center, 2001). According to the University of Oregon, the Macmillan McGraw Hill program is rated as highly effective in the coordination and integration of instruction in phonemic awareness and phonics skills. Furthermore, the curriculum is noted as providing systematic and explicit instruction with cumulative review of high

priority reading skills, as set forth by the National Reading Panel (NRP, 2000; Oregon

Reading First Center, 2001). Given the quality of instruction provided within the

MacMillan McGraw Hill Reading curriculum, student growth in pre reading skills is

likely.

Intervention with the PAL II as a Supplement to Balanced Literacy

According to the current study findings, pre to post paired samples *t*-tests

demonstrated significant growth over the twelve week period for the balanced literacy

plus intervention group on eleven of the thirteen variables on the PAL II. Instruction for

this group included balanced literacy with the addition of the PAL II instructional

supplement. Students receiving balanced literacy plus supplemental instruction

demonstrated significant gains in all six assessed areas of writing, including alphabet

letter writing automaticity from memory (AWAL), letter writing legibility (AWL) and

letter writing speed (AWTT) as well as copying automaticity (CPALL), copying

legibility (CPAL), and copying speed (CPATT). As with the balanced literacy group,

significant gains were also noted for the balanced literacy plus intervention group in

orthographic awareness. Measurable growth was noted in receptive coding ability (RC)

on which students demonstrated proficient ability in encoding words into memory, and

then utilizing the information to judge orthographic similarities and differences. Students

in the balanced literacy plus intervention group demonstrated significant growth in

phonemic awareness ability. Measurable gains were noted in pre reading skills involving

the auditory and verbal rhyming of words (RY), identification of phonemes through

phoneme segmentation and phoneme deletion (PN), and facility with syllabic

manipulation of sub-word units (SY). Students also showed significant growth in verbal

working memory (WMSL).

Balanced Literacy versus Balanced Literacy plus Supplemental Instruction

The results of this study indicated that students in both groups made significant

gains over the twelve week period in the following pre-reading skills: alphabet writing

legibility, copying automaticity and legibility, receptive coding, rhyming, syllables,

phonemes, and verbal working memory. In an examination to determine the amount of

measurable growth, students receiving the PAL II supplement in addition to the balanced

literacy program made more statistically significant incremental gains than the group

receiving balanced literacy alone in nine of the thirteen pre-reading skill variables.

Medium effect sizes were noted for the balanced literacy plus intervention group over the

balanced literacy group for alphabet writing automaticity, alphabet writing legibility, and

copying automaticity. Large effect sizes were noted for the balanced literacy plus

intervention group over the balanced literacy group for copying legibility, receptive

coding, rhyming, syllables, phonemes, and verbal working memory. A small effect size

was noted in alphabet writing speed and no effect size was noted for copying speed. This

may be due to the fact that the supplemental intervention included only the reading skill

lessons of the Guides for Intervention, and did not include the corresponding handwriting

intervention. Rapid automatic naming of letters for speed and accuracy did not show any

statistical significance for either group, which may be the reason why this particular

subtest is not normed for kindergarten age students on the PAL II. Because rapid

automatic naming skills are indicative of future oral reading skill achievement, this

subtest was included in the current study (Adams, 1990; Hudson et al., 2009; Katzir et al.,

2006; McCullum, Bell, Wood, Below, Choate, & McCane, 2006; Wolf, Bally, & Morris, 1986, Wolf et al., 2000).

Research highlights the importance of strong pre-reading skill development through quality instruction at the early elementary years, when neurological development is most receptive to language based learning (Berninger & Richards, 2002; Eliot, 1999; Feifer & DeFina, 2000; Shaywitz, 2003). Given the grave status of reading proficiency in schools today, instructional intervention and progress monitoring is crucial in Kindergarten and first grade to increase reading skill proficiency, and to thwart increasing levels of reading failure over time (Burke et al., 2009; NRP, 2000).

The current study supports the NRP recommendation to utilize a balanced literacy approach in successful early reading instruction; this should incorporate phonemic awareness, letter identification and automaticity, thereby supporting future student development of the alphabetic principle (NRP, 2000). Current findings show that students are able to master these key pre-reading skills via balanced literacy instruction. As reported in the current study, students receiving quality balanced literacy instruction gained proficient mastery of pre-reading skills. With the additional supplemental instruction to support reading development, students demonstrated an even greater internalization of crucial pre-reading skills. If pre-reading skill mastery is indicative of future reading achievement, as noted in the literature, the students in this study have a solid foundation on which to build in future reading development.

From an instructional standpoint, current findings support the need for quality instruction at the beginning of reading instruction. From a neurological standpoint, current findings support research that neural reading systems can be, and should be

established early, prior to the age of seven, while neural systems are still pliable and can

support successful literacy acquisition in young learners. Current study findings add

support to research that suggests a majority of reading disabilities could be eliminated,

and that most children can learn to read with appropriate instructional practice in

prekindergarten and kindergarten (Amtmann, Abbott, & Berninger, 2008).

The study results have significant implications for future reading instructional

practices, early acquisition of pre reading skills, decreased rates of students requiring

special services, and overall improved national rates of literacy. The use of a

supplemental research- based intervention, served to enhance current instructional

practices in a Kindergarten literacy program, and also to enhance student mastery of pre-

reading skill development. Current findings support research that denotes many critical

factors that lead to skilled reading, including research- based, explicit instruction in

phonemic awareness, phonology, phonics, vocabulary, and comprehension; repeated

practice with learning objectives; opportunity for regular participation in the lessons, and

small group instruction (Hudson et al. 2009; International Dyslexia Association; NRP,

2000;Vadsay and Sanders, 2008; Vadsay, Sanders, & Peyton, 2006). Programs such as

the PAL Reading and Writing lessons can be incorporated as a supplement to any reading

program to enhance the development of reading systems within learners, with little

financial cost to educational institutions.

Research also emphasizes the importance of early instruction while critical neural

development is occurring in young learner's language systems (Berninger, 2000;

Berninger, et al., 2002; Shaywitz, 2003). Results from this study support this finding,

and can be utilized as a proactive strategy to enhance learning for all students at the

beginning of formal school instruction. Language systems are built systematically, and the findings from the current study support the development of the psychological processes needed to achieve proficient literacy (Berninger & Richards, 2002). Early instruction should highlight the big five areas of reading, and monitor progress with individual student's skill development (NRP, 2000). By doing so, more young students are likely to develop improved mastery of the skills needed to become successful future readers, and fewer students will be left to struggle with reading skill development throughout school aged years (Burke, et al., 2009; Francis, et al., 1996; Torgesen, et al., 1997; Wolf & Katzir-Cohen, 2001).

Research also suggests that explicit instruction and the consistent progress monitoring that drives instruction yields lower rates of struggling readers (Burke, et al. 2009; Lyon, Fletcher, Fuchs, & Chhabra, 2006; Mathes & Denton, 2002; Molfese, et al. 2006; Snow, Burns & Griffin, 1998; Torgesen, 2000). With interventions occurring during Kindergarten and first grade, rates of students at- risk for learning disabilities are likely to decrease. Therefore, current findings suggest meaningful ways to decrease Special Education statistics, and may result in more children reading on grade level, as predicated by federal mandates such as NCLB and Reading First initiatives to improve national literacy outcomes (Mathes, et al., 2005, McMaster, et al., 2005).

Limitations

There were multiple limitations that may have influenced or impacted the findings of the current study. Internal validity of the study may have been compromised by a variety of outside factors influencing reading skill development for individual students. For example, extraneous factors such as private tutoring, varying experience with past

reading instruction, opportunity for reading practice at home, and family assistance are additional variables that were not accounted for in the current study. Students may also have had varying years of pre-school experience, further influencing study findings. As a result, external sources may have influenced current results, thereby reducing the validity of interpretations in attributing the results to the balanced literacy and supplemental instructional programs.

The results are further limited due to the use of the same assessment measure, the PAL II, both on the pre-test and on the post-test administration. Practice effects may have been a factor influencing test performance because there is only one form of the PAL II assessment, and it was given two times over a twelve week period. Consequently, the post test findings may have been influenced by repeated testing and familiarity with the instrument, and not solely on the instructional and supplemental intervention programs.

Limitations to external validity are also found within the study sample characteristics and the extent to which findings may be generalized to other populations. The study used data obtained from a program evaluation of the PAL Research Based Reading Lessons conducted by the Atlantis Prep School. The overall sample size of the students measured in the current study is particularly small, and may not generalize to other regular education kindergarten programs. There was a lack of ethnic and socioeconomic diversity within the current study sample; therefore findings may not generalize to samples with more diverse backgrounds. Additionally, the study took place in a full day, private school setting, and findings may not be generalizable to students

participating in public school programs that provide varying amounts of instructional time at the kindergarten level.

Selection bias was minimized in the current sample due to the use of archival data, with random assignment of students into two groups. There was no impact of attrition, because all students who began the study intervention remained in the school program, thus were present throughout the study.

The current study utilized only one reading lesson set from the PAL II Guides for Intervention, and measured only twelve weeks of instructional outcomes. The PAL II Guides for Intervention has multiple reading lesson sets, and provides corresponding writing lesson sets that were not utilized during the current study. The program is also designed to be utilized with first grade students, although it may be used for younger populations, as it was in the current study. Future studies may evaluate the impact on student development with supplemental programs that utilize both the reading lessons and the handwriting lessons for a longer period of time, with various early elementary school grade levels.

Recommendations for Future Research

Providing quality reading instruction that enables all students to read with proficiency, fluency, and meaningful comprehension is a primary national goal. The ability to create solid neural frameworks for speaking, listening, reading, and writing in young students is a plausible task, in light of current research endeavors and advances in technology. Learning to read does not have a "one size fits all" model, and determining

those programs which would be most effective for various learning styles is a monumental task.

The current study is only a small sampling of potential future findings on the successful reading development of young children. Additional research is needed to replicate the current study within other settings. The premise motivating the study involved a proactive approach to reading skill development. The current study involved similarly developed, regular education students with age appropriate skill development at the start of the intervention. The classroom environment for the study sample groups consisted of two small sized classes and the benefit of two certified teachers in each classroom with a full day instructional program. Future studies are needed with larger sized samples, classrooms with a higher number of students and only one teacher, and populations with learning disabilities or below age expected levels of pre reading readiness. Future studies need to be conducted to allow for enhanced generalizability of the findings.

Ideally, future research would incorporate supplemental instruction and progress monitoring for the entire school year, not only a twelve week period. Additionally, future intervention studies would incorporate the PAL II reading program and the PAL II writing program to determine outcomes when the reading and writing neural systems are developed simultaneously. It would provide valuable information to investigate how the entire PAL II reading and writing program would impact end of the year pre-reading skill mastery.

Many other intervention programs are available to be utilized with a variety of populations, settings, and learning styles. Research is needed with a variety of supplemental programs that support early reading skill development, including the way in which such programs may enhance or support various core reading curricula. Additionally, future research may examine the use of PAL II Guides for Intervention to be used as a supplement to reading curricula, other than Macmillan McGraw Hill (2003), to determine if similar results can be replicated.

In building upon the current study, future research may focus on how the PAL II or other supplemental programs impact long term reading development. Investigations may examine if students with solid pre-reading development remain successful readers over time, and whether or not a percentage of these students become at-risk or disabled readers at the end of first, second, and third grades. Furthermore, such research may support the presence of an early developmental neurological window for reading skill development. It may be the case, therefore, that students with mastery of pre reading skills at the Kindergarten level perform better over time in comparison with students without such early reading skill proficiency.

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Appendix

PAL Beginning Reading Lesson 1, Tier 1:

SUBWORD LEVEL

Target Skill	Letter(s)-phoneme correspondences in alphabetic principle (spelling to phoneme direction)
Materials	Talking Letters Student Desk Guide
Estimated Time	10 minutes

WORD LEVEL

Target Skill	Application of alphabetic principle to monosyllabic word reading
Materials	Teacher constructed word card deck (from Lists 1 and 2)
Estimated Time	10 minutes

TEXT LEVEL

Target Skill	Story Reading; oral reading and reading for personal
	meaning.
Materials	Beginning Level Paperback books
Estimated Time	10 minutes

Materials for Lesson Set 1, Tier 1

Instructional Materials:

Talking Letters Student Desk Guide for each student

Word Families List

Word Card deck constructed from List 1 and List 2

Beginning-level paperback books: Use the following 12 first grade

Reading level books

- *Itchy, Itchy Chicken Pox* by Grace Maccarone, Scholastic.

- *Monkey See, Monkey Do* by Marc Gave, Scholastic.

- *At the Carnival* by Kirsten Hall, Scholastic.

- *I See a Bug* by Kirsten Hall, Scholastic.

- *Buzz Said the Bee* by Wendy CheyetteLewison, Scholastic.

- *Here Comes the Snow* by Angela Shelf Medaris, Scholastic.

- *Bubble Trouble* by Mary Packard, Scholastic.

- *A Bad, Bad, Day* by Kirsten Hall, Scholastic.

- *We Play on a Rainy Day* by Angela Shelf Meadows, Scholastic.

- *I'm a Seed* by Jean Marzollo, Scholastic.

- *I Love Cats* by Catherine Matthias, The Children's Press.

- *My Five Senses* by Aliki, Harper Collins.

Lesson 1:

Subword Level: Introduce Talking Letters-Teacher modeling and student imitation of target words, sounds and letters.

Practice Talking Letters- Consonant Side, first two rows (one letter consonants).

Word Level: Practice reading the 48 words on the word card deck by reviewing the word card deck with the spelling units separated spatially, by pointing to each spelling unit, naming the letter or letters in the spelling unit, and saying the sound that goes with the spelling unit. Instruction includes teacher modeling and student turn- taking. Students then sound out the whole word by spelling unit, and then blend the sounds to name the whole word.

Text Level: Book 1- First Time

Choral Reading: Teacher and students read the text together in parallel.

Reading for Meaning: Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.

Lesson 2:

Subword Level: Introduce Talking Letters-Teacher modeling and student imitation

of target words, sounds and letters.

Practice Talking Letters- Consonant Side, first two rows (one letter

Consonants). Vowel Side: Introduce the first row (vowels in

closed syllable).

Word Level: Practice reading the 48 words on the word card deck by reviewing

the word card deck with the spelling units separated spatially, by

pointing to each spelling unit, naming the letter or letters in the

spelling unit, and saying the sound that goes with the spelling unit.

Instruction includes teacher modeling and student turn- taking.

Students then sound out the whole word by spelling unit, and then

blend the sounds to name the whole word.

Text Level: Book 1- Second Time

Choral Reading: Teacher and students read the text together in

parallel.

Reading for Meaning: Discuss the book. Ask children to cite their thoughts about the book. Encourage reading for pleasure, and allow the child to have responses about what is communicated through written language.

Lesson 3:

Subword Level: Practice Talking Letters- Consonant Side, first two rows (one letter Consonants).

Vowel Side: Review the first row (vowels in closed syllable).

Word Level: Practice reading the 48 words on the word card deck by reviewing the word card deck with the spelling units separated spatially, by pointing to each spelling unit, naming the letter or letters in the spelling unit, and saying the sound that goes with the spelling unit. Instruction includes teacher modeling and student turn- taking. Students then sound out the whole word by spelling unit, and then blend the sounds to name the whole word.

Text Level: Book 2- First Time

Choral Reading: Teacher and students read the text together in parallel.

Reading for Meaning: Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.

Lesson 4:

Subword Level: Practice Talking Letters- Consonant Side, first two rows (one letter

Consonants).

Vowel Side: Review the first row (vowels in closed syllable).

Word Level: Practice reading the 48 words on the word card deck by reviewing

the word card deck with the spelling units separated spatially, by

pointing to each spelling unit, naming the letter or letters in the

spelling unit, and saying the sound that goes with the spelling unit.

Instruction includes teacher modeling and student turn- taking.

Students then sound out the whole word by spelling unit, and then

blend the sounds to name the whole word.

Text Level: Book 2- Second Time

Choral Reading: Teacher and students read the text together in

parallel.

Reading for Meaning: Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.

Lesson 5:

Subword Level: Practice Talking Letters- Consonant Side, first two rows (one letter

Consonants).

Vowel Side: Review the first row (vowels in closed syllable).

Word Level: Practice reading the 48 words on the word card deck by reviewing

the word card deck with the spelling units separated spatially, by

pointing to each spelling unit, naming the letter or letters in the

spelling unit, and saying the sound that goes with the spelling unit.

Instruction includes teacher modeling and student turn- taking.

Students then sound out the whole word by spelling unit, and then

blend the sounds to name the whole word.

Text Level: Book 3- First Time

Choral Reading: Teacher and students read the text together in

parallel.

Reading for Meaning: Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.

Lesson 6:

Subword Level: Practice Talking Letters-

Consonant Side: Introduce rows three and four and the first two

items on row five (two letter blends).

Word Level: Practice reading the 48 words on the word card deck by reviewing

the word card deck with the spelling units separated spatially, by

pointing to each spelling unit, naming the letter or letters in the

spelling unit, and saying the sound that goes with the spelling unit.

Instruction includes teacher modeling and student turn- taking.

Students then sound out the whole word by spelling unit, and then

blend the sounds to name the whole word.

Text Level: Book 3- Second Time

Choral Reading: Teacher and students read the text together in

parallel.

Reading for Meaning: Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.

Lesson 7:

Subword Level: Practice Talking Letters-

Consonant Side: Review rows three and four and the first two

items on row five (two letter blends).

Vowel Side: Introduce silent *e* syllable on last row.

Word Level: For all remaining lessons, shuffle the cards before presenting them

Or vary the order in which the words in the list are practiced (so

The students are not just memorizing the list of words).

Text Level: Book 4- First Time

Predicted Reading: The teacher and students read in parallel, but

Children are told that when the teacher stops, they are to raise their

hands if they can read the next word. The teacher stops after every

5 to 6 words, on average. The teacher calls on a different student

each time to ensure repeated practice and turn- taking of predicting

the next word.

Reading for Meaning: Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.

Lesson 8:

Subword Level: Practice Talking Letters-

Consonant Side: Introduce two letters- other (digraphs and silent

Letters).

Vowel Side: Review silent *e* syllable on last row.

Word Level: For all remaining lessons, shuffle the cards before presenting them

or vary the order in which the words in the list are practiced (so

The students are not simply memorizing the list of words).

Text Level: Book 4- Second Time

Predicted Reading: The teacher and students read in parallel, but

Children are told that when the teacher stops, they are to raise their

hands if they can read the next word. The teacher stops after every

5 to 6 words, on average. The teacher calls on a different student

each time to ensure repeated practice and turn- taking of predicting

the next word.

Reading for Meaning: Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.

Lesson 9:

Subword Level: Practice Talking Letters-

Consonant Side: Review last two rows (two letters- other).

Vowel Side: Introduce the third and fourth rows (vowel teams).

Word Level: For all remaining lessons, shuffle the cards before presenting them

or vary the order in which the words in the list are practiced (so

The students are not simply memorizing the list of words).

Text Level: Book 5- First Time

Predicted Reading: The teacher and students read in parallel, but

children are told that when the teacher stops, they are to raise their

hands if they can read the next word. The teacher stops after every

5 to 6 words, on average. The teacher calls on a different student

each time to ensure repeated practice and turn-taking of predicting

the next word.

Reading for Meaning: Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.

Lesson 10:

Subword Level: Practice Talking Letters-

Consonant Side: Review the third and fourth rows (two letter

blends)

Vowel Side: Introduce the fifth and sixth rows (*r-* and *l-*

controlled vowels except for the – *le* syllable). Also the *ild*

and *old* word families.

Word Level: For all remaining lessons, shuffle the cards before presenting them

or vary the order in which the words in the list are practiced (so

the students are not simply memorizing the list of words).

Text Level: Book 5- Second Time

Predicted Reading: The teacher and students read in parallel, but

children are told that when the teacher stops, they are to raise their

hands if they can read the next word. The teacher stops after every

5 to 6 words, on average. The teacher calls on a different student

each time to ensure repeated practice and turn -taking of predicting

the next word.

Reading for Meaning: Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.

Lesson 11:

Subword Level: Practice Talking Letters-

Consonant Side: Review fifth and sixth rows (two letters- other).

Vowel Side: Review the third and fourth rows (vowel teams).

Word Level: For all remaining lessons, shuffle the cards before presenting them

or vary the order in which the words in the list are practiced (so

The students are not simply memorizing the list of words).

Text Level: Book 6- First Time

<u>Predicted Reading:</u> The teacher and students read in parallel, but

children are told that when the teacher stops, they are to raise their

hands if they can read the next word. The teacher stops after every

5 to 6 words, on average. The teacher calls on a different student

each time to ensure repeated practice and turn- taking of predicting

the next word.

<u>Reading for Meaning:</u> Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.

Lesson 12:

Subword Level: Practice Talking Letters-

Consonant Side: Review the third and fourth rows (two letter

blends).

Vowel Side: Review the fifth and sixth rows (*r-* and *l-*

controlled vowels except for the – *le* syllable). Also, review the *ild*

and *old* word families.

Word Level: For all remaining lessons, shuffle the cards before presenting them

or vary the order in which the words in the list are practiced (so

The students are not simply memorizing the list of words).

Text Level: Book 6- Second Time

         Predicted Reading: The teacher and students read in parallel, but children are told that when the teacher stops, they are to raise their hands if they can read the next word. The teacher stops after every 5 to 6 words, on average. The teacher calls on a different student each time to ensure repeated practice and turn- taking of predicting the next word.

         Reading for Meaning: Discuss the book. Ask children to cite their thoughts about the book. Encourage reading for pleasure, and allow the child to have responses about what is communicated through written language.

Lesson 13:

Subword Level: Practice Talking Letters-

         Consonant Side: Review the first two rows (one letter consonants).

         Vowel Side: Review the first row (closed syllables)

Word Level: For all remaining lessons, shuffle the cards before presenting them or vary the order in which the words in the list are practiced (so the students are not simply memorizing the list of words).

Text Level: Book 7- First Time

Assisted Decoding: Teacher calls on children to take turns reading one sentence per turn. Teacher points out capital letters and punctuation signals, indicating where sentences begin and end. When any child comes to a word he or she does not know, the teacher guides the group in using the Talking Letters Student Desk Guide to decode it, spelling unit by spelling unit, and in synthesizing the associated phonemes to construct a name code for the whole word.

Reading for Meaning: Discuss the book. Ask children to cite their thoughts about the book. Encourage reading for pleasure, and allow the child to have responses about what is communicated through written language.

Lesson 14:

Subword Level: Practice Talking Letters-

Consonant Side: Review the third and fourth rows (two letter blends).

Vowel Side: Review the third and fourth rows (vowel teams) and the silent *e* in the last row.

Word Level: For all remaining lessons, shuffle the cards before presenting them or vary the order in which the words in the list are practiced (so the students are not simply memorizing the list of words).

Text Level: Book 7- Second Time

Assisted Decoding: Teacher calls on children to take turns reading

one sentence per turn. Teacher points out capital letters and

punctuation signals ,indicating where sentences begin and end.

When any child comes to a word he or she does not know, the

teacher guides the group in using the Talking Letters Student Desk

Guide to decode it, spelling unit by spelling unit, and in

synthesizing the associated phonemes to construct a name code for

the whole word.

Reading for Meaning: Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.

Lesson 15:

Subword Level: Practice Talking Letters-

Consonant Side: Review the last two rows (two letter-others).

Vowel Side: Review the third and fourth rows (vowel teams)

Word Level: For all remaining lessons, shuffle the cards before presenting them

or vary the order in which the words in the list are practiced (so

the students are simply just memorizing the list of words).

Text Level: Book 8- First Time

Assisted Decoding: Teacher calls on children to take turns reading one sentence per turn. Teacher points out capital letters and punctuation signals, indicating where sentences begin and end. When any child comes to a word he or she does not know, the teacher guides the group in using the Talking Letters Student Desk Guide to decode it, spelling unit by spelling unit, and in synthesizing the associated phonemes to construct a name code for the whole word.

Reading for Meaning: Discuss the book. Ask children to cite their thoughts about the book. Encourage reading for pleasure, and allow the child to have responses about what is communicated through written language.

Lesson 16:

Subword Level: Practice Talking Letters-

Consonant Side: Review the first two rows (one letter consonants).

Vowel Side: Review the first row (closed syllables)

Word Level: For all remaining lessons, shuffle the cards before presenting them or vary the order in which the words in the list are practiced (so the students are not simply memorizing the list of words).

Text Level: Book 8- Second Time

Assisted Decoding: Teacher calls on children to take turns reading one sentence per turn. Teacher points out capital letters and punctuation signals, indicating where sentences begin and end. When any child comes to a word he or she does not know, the teacher guides the group in using the Talking Letters Student Desk Guide to decode it, spelling unit by spelling unit, and in synthesizing the associated phonemes to construct a name code for the whole word.

Reading for Meaning: Discuss the book. Ask children to cite their thoughts about the book. Encourage reading for pleasure, and allow the child to have responses about what is communicated through written language.

Lesson 17:

Subword Level: Practice Talking Letters-

Consonant Side: Review the third and fourth rows (two letter blends).

Vowel Side: Review the third and fourth rows (vowel teams).

Word Level: For all remaining lessons, shuffle the cards before presenting them or vary the order in which the words in the list are practiced (so The students are not simply memorizing the list of words).

Text Level: Book 9- First Time

Assisted Decoding: Teacher calls on children to take turns reading one sentence per turn. Teacher points out capital letters and

punctuation signals, indicating where sentences begin and end. When any child comes to a word he or she does not know, the teacher guides the group in using the Talking Letters Student Desk Guide to decode it, spelling unit by spelling unit, and in synthesizing the associated phonemes to construct a name code for the whole word.

Reading for Meaning: Discuss the book. Ask children to cite their thoughts about the book. Encourage reading for pleasure, and allow the child to have responses about what is communicated through written language.

Lesson 18:

Subword Level: Practice Talking Letters-

Consonant Side: Review fifth and sixth rows (two letters- other).

Vowel Side: Review the fifth and sixth rows (*r-* and *l-*

controlled vowels except for the – *le* syllable).

Word Level: For all remaining lessons, shuffle the cards before presenting them

or vary the order in which the words in the list are practiced (so

the students are not simply memorizing the list of words).

Text Level: Book 9- Second Time

Assisted Decoding: Teacher calls on children to take turns reading

one sentence per turn. Teacher points out capital letters and

punctuation signals, indicating where sentences begin and end.

When any child comes to a word he or she does not know, the

teacher guides the group in using the Talking Letters Student Desk

Guide to decode it, spelling unit by spelling unit, and in

synthesizing the associated phonemes to construct a name code for

the whole word.

Reading for Meaning: Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.

Lesson 19:

Subword Level: Practice Talking Letters-

Consonant Side: Review the first two rows (one letter
consonants).

Vowel Side: Review the first row (closed syllables). Also the *ild*

and *ild* word families.

Word Level: For all remaining lessons, shuffle the cards before presenting them

or vary the order in which the words in the list are practiced (so

The students are not simply memorizing the list of words).

Text Level: Book 10- First Time

Assisted Decoding: Teacher calls on children to take turns reading

one sentence per turn. Teacher points out capital letters and

punctuation signals, indicating where sentences begin and end.

When any child comes to a word he or she does not know, the

teacher guides the group in using the Talking Letters Student Desk

Guide to decode it, spelling unit by spelling unit, and in

synthesizing the associated phonemes to construct a name code for

the whole word.

Reading for Meaning: Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.

Lesson 20:

Subword Level: Practice Talking Letters-

Consonant Side: Review the third and fourth rows and the first
two items on fifth row (two letters blends).

Vowel Side: Review the third and fourth rows (vowel teams) and

silent *e* syllable on the seventh row.

Word Level: For all remaining lessons, shuffle the cards before presenting them

or vary the order in which the words in the list are practiced (so

The students are not simply memorizing the list of words).

Text Level: Book 10- Second Time

Assisted Decoding: Teacher calls on children to take turns reading

one sentence per turn. Teacher points out capital letters and

punctuation signals, indicating where sentences begin and end.

When any child comes to a word he or she does not know, the

teacher guides the group in using the Talking Letters Student Desk

Guide to decode it, spelling unit by spelling unit, and in

synthesizing the associated phonemes to construct a name code for

the whole word.

Reading for Meaning: Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.

Lesson 21:

Subword Level: Practice Talking Letters-

Consonant Side: Review fifth and sixth rows (two letters- other).

Vowel Side: Review the fifth and sixth rows (*r-* and *l-*

controlled vowels except for the – *le* syllable).

Word Level: For all remaining lessons, shuffle the cards before presenting them

or vary the order in which the words in the list are practiced (so

The students are not simply memorizing the list of words).

Text Level: Book11- First Time

Assisted Decoding: Teacher calls on children to take turns reading

one sentence per turn. Teacher points out capital letters and

punctuation signals, indicating where sentences begin and end.

When any child comes to a word he or she does not know, the

teacher guides the group in using the Talking Letters Student Desk

Guide to decode it, spelling unit by spelling unit, and in

synthesizing the associated phonemes to construct a name code for

the whole word.

Reading for Meaning: Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.

Lesson 22:

Subword Level: Practice Talking Letters-

Consonant Side: Review all rows

Word Level: For all remaining lessons, shuffle the cards before presenting them

or vary the order in which the words in the list are practiced (so

The students are not simply memorizing the list of words).

Text Level: Book11- Second Time

Assisted Decoding: Teacher calls on children to take turns reading

one sentence per turn. Teacher points out capital letters and

punctuation signals, indicating where sentences begin and end.

When any child comes to a word he or she does not know, the

teacher guides the group in using the Talking Letters Student Desk

Guide to decode it, spelling unit by spelling unit, and in

synthesizing the associated phonemes to construct a name code for

the whole word.

Reading for Meaning: Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.

Lesson 23:

Subword Level: Practice Talking Letters-

Vowel Side: Review all rows (except for the second row, the

-*le* syllable, and the schwa syllables).

Word Level: Shuffle the cards before presenting them

or vary the order in which the words in the list are practiced (so

the students are not simply memorizing the list of words).

Text Level: Book12- First Time

Assisted Decoding: Teacher calls on children to take turns reading

one sentence per turn. Teacher points out capital letters and

punctuation signals, indicating where sentences begin and end.

When any child comes to a word he or she does not know, the

teacher guides the group in using the Talking Letters Student Desk

Guide to decode it, spelling unit by spelling unit, and in

synthesizing the associated phonemes to construct a name code for

the whole word.

Reading for Meaning: Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.

Lesson 24:

Subword Level: Practice Talking Letters-

Consonant and Vowel Sides: Review all rows on both sides of

Talking Letters Student Desk Guide (except for second row, the

-le syllable, and schwa syllables on vowel side). Review *ild* and

old word families.

Word Level: Shuffle the cards before presenting them

or vary the order in which the words in the list are practiced (so

the students are not just memorizing the list of words).

Text Level: Book12- Second Time

Assisted Decoding: Teacher calls on children to take turns reading

one sentence per turn. Teacher points out capital letters and

punctuation signals, indicating where sentences begin and end.

When any child comes to a word he or she does not know, the

teacher guides the group in using the Talking Letters Student Desk

Guide to decode it, spelling unit by spelling unit, and in

synthesizing the associated phonemes to construct a name code for

the whole word.

Reading for Meaning: Discuss the book. Ask children to cite their

thoughts about the book. Encourage reading for pleasure, and

allow the child to have responses about what is communicated

through written language.