AN ABSTRACT OF THE DISSERTATION OF

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Abstract approved:

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Dr. LeoNora M. Cohen

This study examined relationships between pre-tested early literacy skills and post-tested reading achievement in 52 kindergarten and 39 first-grade children. An archival data set was available for statistical analysis. Data analysis was completed in three stages: Participants' entry-level literacy and language scores were compared on two Assessment of Literacy and Language (ALL) screening subtests. At the kindergarten level, the literacy-based and language-based subtests included the ALL letter knowledge and basic concepts subtests. The screening test for first graders included the ALL phonics and the parallel-production subtests. Prior to data analysis, the two kindergartens ALL pre-test scores were used to identify children at risk for developing reading problems. At risk was defined as pre-test scores at or below the 25th percentile on one or both screening pretests. Three groups emerged from this analysis: a group with scores below the 25th percentile cut-off point on one subtest (one deficit group) , a group with scores below the cut-off point on both literacy and language subtests (two deficits group), and a third group who scored above the cut-off point on both

subtests. Repeated measures' means analyses (Keselman, 1994) of the three groups were compared on pretest and post test measures. This analysis was followed by a series of regression analyses to test models for best-fit predictions of reading achievement outcomes on the Group Reading Assessment and Diagnostic Evaluation (GRADE). Results of the study found that this group of kindergarten children enrolled in school with weak letter-knowledge skills. Over 42 percent of the kindergarten participants were at risk for this one literacy skill deficiency alone. Thirty-eight percent were at risk because of literacy and language-based deficits, and only nineteen percent of the class had no deficiencies. End-of-year achievement was directly related to the number of entry-level deficits. Children with one deficit obtained significantly higher word-reading achievement scores than children with two deficits, and children with no deficits scored significantly higher than both groups on word-reading achievement outcomes. The best-fit prediction equation for kindergarteners included phonological awareness and basic concepts. Both subtests significantly predicted reading outcomes at the kindergarten level. A literacy and spoken language combination of skills were best-fit predictors of end-of-the-year word reading and reading comprehension for first graders. At the first-grade level, vocabulary was significantly correlated with reading comprehension. The differential roles of literacy and language were discussed in relation to word reading and reading comprehension achievement outcomes.

Differentiating the Impact of Literacy and Language Skill Development on Reading
Acquisition: An Exploratory Study

by

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I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

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Haze Lawrence Pope, author

ACKNOWLEDGEMENTS

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DEDICATION

To my loving mother, Sarah Davis Johnson Pope,

who gave me the gift of reading,

a gift she herself did not obtain until her senior years (age 66).

Chapter 1 - Introduction

American public schools have the challenging task of educating children from

different socioeconomic, cultural, and language backgrounds. The scope of the

problem is reflected in the recurring achievement gap among children along the lines

of socioeconomic status. Based on standardized achievement scores, low-income

children trail their more affluent peers in most academic subjects. This achievement

gap has drawn considerable attention and efforts from education policy makers.

Intense focus on reading research and instruction has emerged through and from these

efforts. (Snow, Burns, & Griffin, 1998; National Reading Panel, 2000). Within the

past decade, the U.S. Department of Education has spent a massive amount of funds

under the No Child Left Behind Act (NCLB) and its Reading First program with the

goal of closing the achievement gap among children from low socioeconomic

backgrounds and their more advantaged peers.

However, a large number of these children continue to fail, particularly in

learning to read in the early grades. Consider the gap between the reading levels of

children on free lunch compared with a group of 4th graders who were not on the free-

lunch program. As reported by the National Assessment of Educational Progress

(2005), fifty-eight percent of 4th graders eligible for free lunch programs were reading

below basic reading proficiency compared to twenty-seven percent of students from

the higher-income groups. This high failure rate among children on free lunch is more

than twice the failure rate of the children not on free lunch in spite of the fact that Title

One has addressed reading problems in low-income groups for decades (Bean, Cassidy, Grumet, Shelton, & Wallis, 2000). This is a high failure rate, and it is one that should not be acceptable to parents, teachers, and policy makers.

Many skills associated with learning to read are developed early in a child's life, well before they enroll. As noted by the National Early Literacy Panel (2008), preschool children who are read to by their parents or who attend kindergarten are exposed to stories, print, and language that eventually expedite learning to read when they enroll in school. Just what specific early literacy skills enhance learning the complex task of decoding print into meaning? This question was addressed by the National Reading Panel (NRP; 2000) after reviewing hundreds of research studies that focused on relationships between early literacy development and reading acquisition. The NPR identified five important components of early reading development. These components include phonological awareness, phonics, oral reading fluency, vocabulary, and comprehension and are defined below:

- *Phonological Awareness*: Refers to one's sensitivity to different levels of speech sounds in spoken language (i.e., onsets, rhymes, syllables, and words) and one's ability to manipulate these sounds in words (e.g., deleting a sound to create a new word)

- *Phonics:* Refers to the systematic rules for mapping speech sounds to letters and combinations of letters, making pronunciation and spelling of words consistent. Phonics often starts with teaching children the sounds of each letter before they are taught letter-sound combinations.

- *Fluency*: Refers to the speed and accuracy of a child's word-reading skills. Fluency is generally measured by taking the number of words a child reads per minute.

- *Vocabulary:* Refers to levels of written and spoken word meanings. The rate of vocabulary growth improves after children learn to read.

- *Reading Comprehension*: Involves an understanding of what is read and the ability to accurately extract meaning from the written language.

Distinctions between Literacy and Language

In the process of learning to read, children must become aware of a number of spoken and written components of language. Children who become efficient readers learn how to "map" the letters of written language into speech sounds and how to "integrate" those letter sounds into meaningful messages (Lombardino, 2011). In this study, literacy refers to components of language that are associated with mapping and integrating letters and letter combinations into speech sounds (letter knowledge, phonological awareness, and phonics). On the other hand, good readers use the structural components of language, including vocabulary, semantics, and syntax, to convert print on pages into meaningful messages and to comprehend what is read. In general, literacy-based skills are associated with the decoding stage of reading, where children need to master connections between letters and speech sounds in order to efficiently decode and read words. On the other hand, language-based skills, including vocabulary, are highly correlated with reading comprehension and cognitive development (Snow, 1998). The structural components of language and the sound

components of print-based literacy are the distinguishing operational differences between literacy and language as defined in this study.

Identification of Children at Risk for Future Reading Difficulty

Using screening tests is perhaps the first step toward reducing the incidence of reading failure among students from high-risk backgrounds. Screening tests are used to identify students who are likely to develop future reading problems, to inform instruction for early reading intervention, and to save time and resources. Thus, screening tests have a predictive component, making it possible to address the instructional needs of children before their problems become severe and are less likely to be responsive to intervention. In identifying the struggling reader, screening tests also point to skills that place students at risk, giving teachers precise information for instructional modifications early in the child's schooling.

These positive benefits of screening for reading problems also include the benefits of time and money. Screening tests are shorter; they require less time to administer, score, and interpret, and they reduce the overall test administration time for teachers and staff. However, not all reading screening tests are equal; not all measure the same reading skills, and not all are valid and reliable measures of the reading skills described in the previous paragraph. Moreover, some early screening tests are not valid and reliable predictors of future reading problems, making them close to useless for early intervention purposes (Pomplun, 2004; Sofie & Riccio, 2002). In addition, screening tests that are standardized on a national sample of students are likely to provide the most useable and meaningful test results.

Standardized tests allow for the comparison of test scores between tests, and this is a very important quality for accurate identification of struggling readers.

The major purpose for using screening tests is to prevent children from high-risk backgrounds from developing severe reading problems as they progress through the grades. To accomplish this goal, screening tests should not only have good validity, but also they should cover, in content, the skills that have been shown to correlate with reading acquisition. This latter function is not only important for identifying children at risk but also for the development of effective reading curriculum and intervention strategies. Intervention strategies that are considered good teaching practices are balanced in the core curriculum and contain content specific for students who need intervention. If a screening test is limited in scope, that is if it does not cover core literacy and language skills addressed in the National Reading Panel's (2000) recommendations, intervention strategies are also likely to be limited (Pomplun, 2004; Sofie et al 2002).

This was demonstrated in the No Child Left Behind *Reading First Program*, which failed to raise the reading comprehension scores of struggling readers. In many of these programs, screening was limited to phonological awareness; few other language-based skills were included. The *Dynamic Indicators of Basic Early Literacy Skills* (DIBELS) has been the most widely used and best known screening test used in the program. DIBELS is a valid and reliable screening test (Elliott, Lee, & Tollefson, 2001). The problems is that it is highly slanted toward phonological awareness, which is a skill associated with the decoding phase of the reading process. Interestingly,

Reading First has been considered a failure by some because on some reading measures, children in Reading First Schools performed no better than children in control schools at the time the program was discontinued. However, Reading First was successful, in some contexts, in that data showed that a significant improvement in the decoding skills of Reading First students (U.S. Department of Education, 2008). Hence, DIBELS was used to screen and identify children on the basis of one component reading skill (phonological awareness), and treatment was successful in teaching children with weaknesses in this core domain.

It seems that the major lesson learned from Reading First is that assessment drives instruction, and instruction based on an unbalanced assessment leads to unbalanced results. For these reasons, the *Assessment of Literacy and Language* (ALL), a test that measures both literacy and language, was selected for this study. ALL is a balanced, national standardized test that measures various component skills in emergent literacy and spoken language. This test is further described in future chapters.

Problem Statement

Although studies have consistently shown the importance of oral language development in reading acquisition, there are very few studies that have assessed both literacy and language skills in the same study and with the same screening test. In fact, researchers have studied the role of language in reading acquisition as early as preschool (Catts, 1993), and there are several studies that investigated the language-reading relationships in kindergarten students (Scarborough, 2005). To obtain a

complete picture of the emergent literacy literature, teachers would need to read several separate research articles on literacy and language. Furthermore, few of these studies used the same or even similar language tests, so teachers would need to determine what aspects of language the tests are measuring and how to make the results practical for the classroom.

This study uses the *Assessment of Literacy and Language* (ALL) to address these problems by investigating the predictive strength of both literacy and language screening measures on reading achievement scores. The following experimental questions were addressed in this study:

Research Questions

1. What levels of literacy and language skills did kindergarten participants demonstrate on the ALL in the beginning of their school year, and how did these scores compare with those in the national sample?

2. What percentage of kindergarten children were identified as being at risk for reading difficulties based on the ALL screening battery scores, and were there differences between the scores of children who were identified as at risk and the children who were not at risk?

3. Do kindergartners at risk for reading difficulties achieve at levels significantly below their non-risk peers on end-of-the-year reading achievement measures?

4. Which entry-level emergent literacy or spoken language skills best predicted end-of-year word-level reading achievement for kindergarten students?

5. For first-grade students, which entry-level emergent literacy or spoken language skills best predict end-of-year word-level reading and reading comprehension achievement?

6. For first-grade students, which emergent literacy and spoken language skills are most highly correlated with reading comprehension?

Rationale for the Study

Many children enroll in school lacking the literacy and language skills necessary to become good readers. Near the end of the last decade, the National Center for Educational Statistics (NCES) performed a comprehensive survey of kindergarten literacy and entry-level skills. That survey found that 66 percent of kindergarteners were able to recognize all the letters of the alphabet when they enrolled in school. Twenty-nine percent knew beginning sounds of words and 17 percent knew the ending sounds of words. Among the children assessed in that study, just two percent could read sight words, and barely one percent could read words in context. Assessing beginning-level skills of kindergarteners has practical benefits for teachers. This was one of many conclusions drawn from the NCES assessment:

> If teachers are aware of the skills and abilities that the typical child has mastered before the first day of class, teachers and school systems are less likely to design a course of study that is either too challenging or not challenging enough for the typical child. In this regard, it is useful to appreciate not only what the average child knows at school entry but also what the range of knowledge is across an entire class of children.

National Center for Education Statistics (2001, p.1)

The National Reading Panel's recommendations for teaching reading included a balance between instruction in literacy and language-based skills (NRP; 2000). Despite a strong recommendation that instruction balance the two skills, intervention in most schools serving large numbers of at-risk students is slanted toward teaching decoding skills. Many of these schools have not yet included assessment and intervention for the language components of reading such as vocabulary and morphological skills. This unbalanced emphasis given to decoding instruction evolved through Reading First Schools. Unfortunately, few researchers have studied Reading First since the program was discontinued. Most knowledge about the program is found in the final study (U. S. Department of Education, 2008) or in the memories of educators who participated in the program. Reading First no doubt contributed to the lack of attention given oral-language instruction. However, this emphasis is understandable given the plethora of data showing high correlations between phonological awareness and reading acquisition. Furthermore, the vast majority of early literacy tests available were composed of phonological knowledge (e.g., rhyming, decoding) tasks with little to no attention given to the semantic (i.e., meaning) measures of language.

Purpose Statement

This study was designed to: (1) identify children at risk for reading difficulties using a nationally standardized test, (2) examine relationships between severity of deficits from screening measure and later reading outcomes and (3) determine which

screening tests best predict reading outcomes in two grades, kindergarten and first grade. The predictor variables in this study are the ALL *Letter Knowledge* and *Basic Concept* tests for kindergarten children and the ALL *Phonics* and *Parallel Sentence Structure* test for first grade children. The outcome variables are the *Word Reading* and the *Reading Comprehension* subtests from the GRADE.

Epistemology

During my career in school psychology, I had daily contact with struggling readers. Perhaps most of the children I assessed, regardless of the reason for the referral, had some type of reading problem. Learning to read is a common problem among children with behavior disorders, learning disabilities, and mental disabilities (Snow et al, 1998). Even though large numbers of special education students have reading problems, I never felt that we knew exactly how to think outside the box; we used what we were taught as best practice. I developed an interest in early literacy when I worked in a small elementary school. At that time, the school was among the lowest achieving elementary schools in the state, year after year, getting some of the lowest achievement scores on reading and math tests. I joined the staff two years after the district superintendent reconstituted the school and brought in all new teachers. The superintendent replaced the school's principal with a person he felt could change the school's downward achievement trend. This newly appointed principal asked administration to reassign me to her school from a nearby high school, where I had worked as a school psychologist.

When I arrived at the school, the staff was developing a school-wide reading program. Ninety minutes were set aside for student reading in every classroom at each grade level. Each teacher used a commercially-developed reading program, acclaimed for improving reading scores among at-risk populations. The principal and teachers believed in the axiom "improve reading to improve overall academic achievement." The principal also believed in staff development, and she provided the staff many workshops and community-learning opportunities. Training opportunities increased when the school was awarded a Reading First grant. I learned much about literacy instruction from teachers prior to the grant, but I gained considerable knowledge about early literacy development from staff-development opportunities the Reading First training afforded. The training was intensive; it included several workshops each year, most focusing on data-based relationships between early literacy skills and learning to read. Professors from one of the state's major universities developed the training materials, lectured, and supervised the workshops. I used the training in my roles as a teacher and psychologist.

Conceptual Framework

I view research methods as tools to discover new information and ways of testing one's ideas and hypotheses. I do not see quantitative or qualitative research methods as philosophical positions to take with regard to empirical studies. Both methods provide different ways of seeking information, and both have strengths and weaknesses. The key is to know how and when to use each statistical methodology and what circumstances warrant the use of each method.

I am an eclectic pragmatist in my philosophy, practice, and approach to research. I view theories and ideologies as sound but partial explanations for phenomena and events. I am not convinced that there is any one theory, ideology, or philosophy that explains or predicts all phenomena and events. I formed this philosophy at a time when psychologists were split between two camps: behavior theorists vs. cognitive theorists. Seeing the beauty and the value of each camp, I refused to become a disciple for either position, preferring instead to use the best from both positions. In regards to teaching and learning, I bring more of my cognitive psychological background to the forefront. In this respect, I join the constructivist viewpoint of learning and adhere to positions proposed by Piaget (1969), Bruner (1990), and Vygotsky (1962); theorists and methodologists that encourage learners to discover knowledge and construct frameworks of understanding (Darder, Baltodano, & Torres, 2003).

Rationale for the Study

In many public schools, children with reading problems are not identified until their problems become serious enough to impact the classroom in some way. Usually this occurs in about the third grade for children, unless these children have co-morbid learning difficulties such as children who enroll in school with obvious speech and language problems, those who show signs of mental retardation, or those exhibiting severe deficits with translating print into words. This instructional void between first and third grade exists for a large group of students.   The majority of these students come from a poor literacy background, where little emergent literacy instruction takes

place. In some cases, these children have developmental reading disabilities that become most apparent when students are reading to learn in the 3rd and 4th grades. These two groups of students do not fit typical special education disability categories, at least not in the early grades. Their reading related difficulties are not classified as special needs. Unlike children with special needs, they do not enroll in school with problems that potentially limit their ability to learn. Instead, they enter school at risk for developing reading problems, and they become struggling readers as they progress through the grades

This study is designed to help integrate both emergent literacy and spoken-language screening data with later reading achievement in beginning-of-the-year kindergarten and first-grade children.

Chapter 2 – Review of the Literature

In this chapter, findings from studies investigating preschool literacy and language development are considered. Many of these studies involve parent-child interactions, the home environment, and its impact on literacy learning. Research findings that highlight factors that predict future reading skill and that compare the assessment data on at-risk children with their typical developing peers are addressed.

Early Literacy Development

Parents from different cultural and socio-economic backgrounds may or may not differ in their attitudes about early literacy development, but studies show differences in their approach to helping their children master early literacy skills (Seung & Strasser, 2002; LeFevre & Senechal, 1999). Storybook reading is likely the most popular area of investigation in this line of research. These researchers investigated and reported on the frequency of parent-child storybook reading, as well as the interaction that takes place between the parent and child during the reading process. It is commonly agreed upon that children learn many important early literacy skills through parent-child interactions while reading storybooks. The research findings from these studies varied, but researchers basically agreed that children learned rhyming skills, oral language skills, vocabulary, and print awareness from reading story books with their parents. The more frequent the reading, the more likely the child developed these skills. Results from these studies also indicate that low-income parents read fewer books in the home, read less frequently with their children, and interacted with them in ways that likely did not enhance literacy

development (Dodici, Draper, & Peterson, 2003; Sonnenschein & Munsterman, 2002).

The positive relationship between frequency of book reading and literacy development seems intuitive and conclusive, but many of the studies that focused on the interaction between parent-child relationships while reading revealed important qualitative information; information that was not reported in some of the quantitative studies (Stadler & McEvoy, 2003). These studies showed that while the frequency of parent-child storybook reading was important, the relationship between the parent and child during the reading process was just as important if not more important. More specifically, these studies found that the quality of the discussion that parents initiated about the story had a powerful impact on the child's literacy and cognitive development (Mahoney, Boyce, Fewell, & Spiker 1998).

One qualitative study found that some low-income parents were more likely to teach reading and writing during storybook time, and it found that this approach had the outcome of reducing children's interest and motivation in storybook reading (Sonnenschein & Munsterman, 2002). This finding is important because children who are less motivated for reading when they enter school are likely to be at risk, and they will need much more support than children who have experienced the pleasure of reading. A related study reported that parents who use harsh punishment and parents who use an autocratic style of discipline not only lessened the positive results of frequent book reading, but also they negatively affected the rate at which their children learned early literacy skills (Gest, Freeman, Domitrovich & Welsh, 2004).

At this point, we know little about the importance of well-developed language skills and how these skills enhance learning to read when children enroll in school. With the exception of vocabulary, early language development was investigated in many of the studies reviewed and previously discussed in this chapter. The Gest et al. (2004) study was an exception. In that study, several language outcome variables were included such as vocabulary, grammatical understanding, and sentence imitation along with some of the less-studied literacy skills (print awareness). These researchers found that the language skills of children whose parents were likely to use physical punishment were depressed regardless to how frequent they read storybooks to their children.

The fact that most children are not yet reading in the early grades may be a limiting factor for investigating language skills in the lower elementary grades. Current findings suggest that early language development is associated with cognitive development and reading comprehension (Snow, 1998), but some early studies reported high correlations between language skill development and word reading in first graders (Sawyer, 1992). This finding may refute the undocumented notion that language and comprehension skills should not be stressed until children learn how to read. However, some researchers feel that both comprehension and language development are addressed in improving children's vocabulary in the early grades. In fact, some of the studies discussed in previous sections found high correlations between early storybook reading and vocabulary development (Senechal & LeFevre, 2002; Weigel, Martin, & Bennett, 2006). These findings suggest those improving

children's vocabulary and comprehension skills in conjunction with their decoding skills may be a positive practice.

Although Johnson (1993) addressed reading and writing problems in children with learning disabilities, her findings are relevant to the current topic on early language skill development. Johnson listed several language-related skills that are important to reading and writing acquisition, including expressive and receptive language skills. In discussing the importance of language development, she noted that oral language is the first symbol system that children acquire and that verbal comprehension problems and verbal expression impact higher levels of learning, including reading. This said, she admitted to the reciprocal nature between learning to read and language development by indicating the importance of reading itself to language development and improved vocabulary development.

Findings of this type raise questions about the wisdom of using a singularly drill-type approach to teaching decoding skills to children with poor receptive and expressive language skills. If a child has difficulty understanding whole words, it seems likely that he or she may have difficulty learning the discrete sound units in words. If the phonemic-awareness-type decoding tasks become too difficult, boredom and inattention could become the child's escape.

Even though there are arguable reasons for not focusing on reading comprehension until children learn decoding skills, a solid argument can be made for the effects language has on cognitive development. Children need to understand some language concepts when they enter school. For example, they will benefit from

instruction more quickly and successfully when they know concepts like "up, down, under, and over." These are abstract concepts, shaped in homes where children are encouraged to use de-contextualized forms of language, and this is the language used in most schools. Since reading is the process of taking meaning from written language, learning to read is highly dependent upon the degree to which children have developed these de-contextualized skills (Hoff, 2006; Snow, et. al, 1998). In discussing the implications of their findings, these researchers noted that parents who use styles of conversation that build bridges between oral language and concepts facilitate the development of their children's cognitive and comprehension skills.

Early Predictors of Skilled Reading

Structural language as defined in the previous chapter is most commonly represented by vocabulary development (others include grammar and syntax) in the school setting. Generally, there is a strong relationship between early language skills and learning to read (National Institute of child Health and Human Development, 2005). On the other hand, vocabulary knowledge is not only related to reading comprehension, it is also related to decoding and word recognition (Lombardino, 2011; Scarborough, 2006). More specifically, the size of oral vocabulary development as measured on achievement tests is associated with decoding, and its depth (strength of word meanings) is more related to reading comprehension (Ouellette, 2006). For these reasons, it is important that educators bear in mind the distinction between vocabulary size and the depth of their knowledge of word meanings so as to assure students balance depth and breadth in vocabulary growth (Anglin, 1993). It appears

that vocabulary knowledge increases in proportion to the amount of reading a person does. Some researchers estimate that readers learn about 20,000 words between grades 3-5 and show steep vocabulary growth rates into the middle-school grades (Lombardino, 20011, Nagy & Scott, 2000).

Phonological Awareness

Over the past few decades, research investigating early literacy skills in children have identified specific literacy and language skills that children learn in the home that later enhance learning to read when they enter school (Snow, Burns, & Griffin, 1998; Whitehurst & Lonigan, 1998). Among these skills, phonological awareness emerged as a major variable in explaining how children learn to read and spell (Felton, 1993, Stadler, & McEvoy, 2003; Yeh, 2003). These studies suggest that phonological awareness is a necessary skill for learning to decode written language, and those children who start school at risk for these skills are likely to lag behind their peers in learning to read. Phonological awareness is a skill frequently investigated in the literature. Some researchers feel that this single skill accounts for most of the variance in word reading compared to print awareness or letter knowledge (Yeh, 2003).

While phonological awareness is important to the decoding stage of reading, it is important to keep this point in mind that learning to read involves many different skills, including oral language skills, vocabulary development, and print awareness (Whitehurst, et, al 1998). More importantly, reading involves getting meaning from print, and decoding or phonological awareness is just one stage in the process. One

researcher noted that because phonological awareness is easy to teach (compared to language) and the results are quicker, there is a tendency to over-teach phonics to the exclusion of language (Paris, 2011). The Yeh (2003) study showed the importance of balance and the power of differentiated instruction in his study of phonological awareness. He compared two instructional techniques for teaching phonological awareness skills to Head Start children: One teacher used segmentation and blending and another used rhyming and alliteration instruction with a group of 44 low-income students. The group of students receiving the segmentation and blending training performed better on word identification, but both teaching techniques were equally effective when students received additional instructions on how to pay attention in class.

Comparing the Literacy Skills of Children in Urban and Rural Areas

There is very little research comparing the literacy skills of urban and rural populations. However, this topic is briefly touched upon in some studies investigating environmental print (advertisement and other print massages in the environment). In these studies, the point is clearly made that urban children are exposed to far more environmental print than children in rural environments (Neuman & Roskos, 1993). While this difference in print implies that the urban child should learn to read environmental print quicker and thus transfer these skills to word reading, this was not the actual results of the study. Using a group of urban and rural students, Neuman and Roskos found no relationship between environmental print and word reading. Instead, they found that a student's ability to read environmental print, both urban and rural,

stemmed from context cues, not from knowledge of letter. They read print better when all cues were present, and letters were not relevant because the cues in the signs or labels provided enough information. This finding was basically duplicated in another study (Snow, 1997). Snow reported that environmental print is a poor predictor of reading achievement.

Assessment Practices

Over four decades ago, IQ test scores in conjunction with cut-off score criteria on standardized achievement tests have been used to determine which children received specialized reading instruction. This assessment procedure became known as a discrepancy model for identifying children with learning and reading problems. This model, with modifications, has been used in most states to determine how students were identified and provided special education. Under the model, students identified with learning and reading problems increased by 50 percent over the past 25 years, and many of these students were identified as having reading problems (Fuchs, Fuchs, & Speece, 2000). This model is still used by many school districts who have not adopted the more recent response to the reply for intervention. However, because of low IQ scores, many children with reading problems are not identified under this system (Sternberg & Grigorenko, 2002). If schools do not have a comprehensive assessment program, some students can easily fall through the cracks when relying on one assessment, i.e. special education. For example, some researchers have found that a simple reading test alone is as predictive in identifying struggling readers as the combination of IQ tests scores (high verbal, low performance) used to diagnose

learning disabilities (Vellutino, Scanlon & Lyon, 2000). Obviously this research

finding raises questions about the accuracy of IQ scores for identifying reading

problems.

Furthermore, researchers who argue against the aptitude-achievement formula

have concluded that IQ scores do not measure the underlying cognitive skills needed

in the reading process. This last point is indirectly supported by studies which show

that Full-Scale IQ scores show little predictability for reading potential, while verbal

IQ scores are more reliable predictors of reading potential (Compton, Fuchs, Fuchs, &

Bryant, 2006). Interestingly, studies show that verbal IQ scores are highly related to

one's overall language skills (Vaughn & Fuchs, 2003).

The Reading Process

Learning to read is a progressive process requiring children to master two basic

strategies: the decoding stage or the beginning stage of learning to link print to speech

sounds and reading comprehension which is the final stage in the reading process

(Gough & Tunmer, 1986). Each stage of learning to read is dependent upon the other,

and a combination of several literacy and language skills are involved at each stage

(Gough, & Tunmer, 1986; Vellutino, Tunmer, Jaccard, & Chen, 2007). Like many

concepts in the literature, there is not always a consensus definition of the decoding

stage. Generally, decoding is defined as "sounding out" or identifying the letter-sound

combinations that lead to word recognition (Gough, et al). Many of the emergent

literacy skills involving print awareness, letter knowledge, and phonological

awareness are important skills for learning to decode. Although reading

comprehension is the end stage and perhaps the most important stage in the reading process, decoding is the core stage of learning to read at the kindergarten and first-grade levels.

There are several theoretical models of reading acquisition. Two are described in this section along with some general comments about the reading process. The Chall (1979-1983) model or framework of reading divides the reading process into two stages: the learning-to-read and reading-to-learn stages of reading development. The two stages are divided, but they are operationally dependent upon each other (Lombardino, 2011). The first stage describes decoding, and the second describes reading comprehension. The two stages are sequenced developmentally with the first stage describing how children learn the language foundation to support early literacy skills, including necessary skills for decoding. In the second stage, children develop meaning and comprehension related skills, setting the stage for reading to learn. This framework gives practitioners, more specifically, practitioners in the early elementary grades, a mental framework for placing the performance of children in regards to levels of growth in the course of a school year.

Another developmental model that addresses strengths and weaknesses was proposed by Bishop and Snowling (2004). In their model, the two stages are framed such that profiles can be developed across the stages to reflect a student's strengths and weaknesses. The first stage or *dimension* of reading development in this system is described in terms of strengths and weaknesses on phonological skills (low-level skills related to decoding). The final dimension describes strengths and weaknesses in the

development of non-phonological skills (high-level skills related to reading comprehension). The struggling reader can be identified in this system since it allows for comparison between relative strengths and weaknesses within and between dimensions.

Decoding and Instruction:

While there is substantial evidence supporting the role of decoding in the reading process, there is much more controversy over how it should be taught at the classroom level. This is probably due to any number of reasons. The decoding stage is not only the first stage in the reading process; it involves many variables which children have to learn about print as opposed to the comprehension stage, which is more language based. The instructional technique receiving the most criticism is the "skill-and-drill" approach and some of the phonics approaches that emphasize the segmentation and blending of letter sounds using list of words outside of context. This technique is used in some reading programs despite findings to show that it is a less effective technique and does not generalize to actual reading (Cunningham, 1990) In fact, the skill-and-drill technique received major criticisms from a group of parents in a low-income school in Portland, and it was the subject of middle-class parents moving their children from the schools using that technique (Parker, 2007). It is interesting to note that this article reported that low-income children were having success learning to read with this instructional technique, despite the parents' objecting to it. This discrepancy is easily understood to mean a difference between

children learning decoding vs. learning how to use those skills in actual reading context as reported in the Cunningham study (1990).

Teachers generally wait until students acquire word-reading skills before initiating vocabulary instruction. However, some researchers report that oral language instruction before children learn to read words may improve comprehension and verbal skills in the later stage of the reading process (Snow, et al, 1998). Among the comprehension skills, vocabulary is perhaps studied more consistently than others although there are some researchers who believe that comprehension would be improved if teachers would place more emphasis on giving students the opportunity for developing their oral language skills in the early grades. This is one area where creativity and experimentation are needed because there is data showing adult-child verbal interaction is helpful to both verbal and skill development and cognitive development.

Studies presented in this chapter argued for the importance of identifying children at risk for reading difficulties immediately when they enroll in school. Studies were cited to show a need to understand the interaction between literacy and language variables on reading outcomes and the importance of using assessment to inform intervention. Finally, the need for a creditable assessment system in identifying children at risk was discussed. These are the issues addressed in the current study which was designed primarily to investigate relationships among literacy language and reading achievement outcomes. The methods and statistical analysis used to analyze the study will be described in the next chapter.

Chapter 3 - Methodology

This chapter opens with a discussion of the demographics and data source, the participants, and description of the data collection and data set. Next, the instruments used are described. The data collection process and data analysis are discussed, including the justification for multiple regression and correlation analysis.

Demographic and Data Source

The source of the data collected for this study was from a small, rural elementary school in the Pacific Northwest. The school received Title-One Reading funds and about 50 percent of the student population was on free lunch. Based on the 2000 census, there were 1,687 people, 667 households, and 460 families in the city. Thirty-one point two percent of the households had children under the age of 18 living in the home. Fifty-three percent were reported as married households, 10.2 % female households, and 31 % reported as non-family. The median income for a household in the city was $41,949, and the median income for a family was $46,759. Males had a median income of $45,179 versus $23,036 for females. The *per capita income* for the city was $18,511. About 8.4% of families and 10.4% of the population were below the poverty line, including 16.9% of those under age 18 and 6.4% at age 65 or over. At the time of this study, the city had very limited preschool services. In fact, Head Start services in the area were limited, and the waiting list was long. It served only eight children the year this study was done.

Participants

Two kindergarten classes and three first-grade classes were involved in this study. The first-grade classes were on a normal school day schedule, and the two kindergarten classes were on a half-day schedule. There were a total of 66 kindergarteners, including 30 females (45.5%) and 36 males (54.5%). The first-grade participants included a total of 63 students with 29 males (46%) and 34 females (54%) in the three classes. The ethnic composition of first graders was white (n=63; 100%). The ethnic composition for kindergartners was white (n=65; 99.9%) and Hispanic (n=1; 0.1%). The percentage of participants who received free or reduced lunch was 46.5 percent of the total number of participants (n=60).

The overall attrition rate of the study was 11.6% (n=15). The attrition rate for kindergarten was the highest at 13.6% (n=9). Among first graders, six students fell out of the project (9.5%). Another 18 first graders were excluded because they were given a different first-grade test level. Obviously, the elementary school and the participants in this study are not representative of the national population relative to diversity and income, but sometimes samples that are unrepresentative can provide a wealth of information, especially qualitative, practical information

Description of Data Collection and Data Set

In the fall and spring of the 2009-2010 school year, the district's kindergarten and first-grade teachers administered tests of early literacy and reading achievement to 66 kindergarten and 63 first-grade students. Two subtests from the *Assessment of Literacy and Language* (ALL) were administered at each grade level in the fall of the

school year. Each test was administered individually, taking about 20-30 minutes per student. All students were tested again in the spring of that same school year. This time the *Group Reading Assessment and Diagnostic Evaluation* (GRADE) was given to students in the classroom by their teachers. That test assessed end-of-the-year reading achievement. (Subtests are italicized throughout for ease of reading).

The ALL is a nationally standardized, individually administered test that provides separate measures and scores on dimensions of literacy and language for children in prekindergarten through first grade. According to the test manual, ALL has three assessment functions; it is used: (a) for screening the spoken language and emergent literacy skills of children from preschool through first grade (b) for diagnosing children with language disorders, and (b) for identifying children at risk for reading difficulties (Lombardino, Lieberman, & Brown, 2005). The ALL provides a screening measure with different language and literacy tests for preschool, kindergarten and first-grade levels. Four screening tests (which are also part of the diagnostic battery) were used for this study. There are two tests at each of the three levels. One test is designed to assess emergent literacy skill and the other is designed to assess spoken language skill. In the fall of the school year, kindergarten children in this study were tested with the ALL *Letter Knowledge* (emergent literacy) and the *Basic Concepts* (spoken language) subtests. At the same time of the year, first-grade children were tested with the ALL *Phonics* (emergent literacy) and the *Parallel Sentence Production* (spoken language).

A number of researchers, including the authors of ALL, recommended using percentile cut-off score points between the 25th -40th percentiles for determining at-risk reading status (Bracken, & Fischel, 2005; Lombardino, et al, 2005). The more conservative 25th percentile cut-off point was employed in this study. With these cut-off points, the number and percent of students at risk, and the category of at-risk status (literacy and language) were determined. Table 3.1 shows the breakdown, including the number and percent of students in the three groups:

Table 3.1
Kindergarten At-risk and Not At-risk Groups: Number and Percent

Groups' performance status	Number of students	Percent of students
1 (one deficit area)	20	38.5
2 (two deficit areas)	22	42.3
3 (no deficit areas)	10	19.2
Total	52	100

The Assessment of Literacy and Language Subtests

Descriptions of the four ALL subtests used in this study follow: (1) The B*asic Concepts* test of spoken language was used to assess knowledge of size, location, number, position and shapes; (2) The *Letter Knowledge* subtest, an emergent literacy measure, was used to assess three components of letters knowledge: letter identification, letter naming, and letter production. (3) The *Phonics* subtest, an emergent literacy test, was used to assess sound-letter associations and decoding of simple phonetically regular nonsense words, and (4) The *Parallel Sentence Production* subtest, a spoken language test, was used to assess knowledge of grammatical morphemes and syntactical language structures.

Group Reading Assessment and Diagnostic Evaluation

The *Group Reading Assessment and Diagnostic Evaluation* (*GRADE*) is a leveled reading achievement test based on five reading components, spelled out in the test manual and manifested in groups of subtests that range from pre-reading skills through sentence and passage comprehension (Williams, 2001). This test was administered to kindergarten and first-grade students in its entirety in the spring. Four *GRADE* subtests scores were used as dependent variables. These included *Word Reading, Listening Comprehension, Phonological Awareness*, and *Total Test* at the kindergarten level, and word reading and the comprehension composite scores at the first-grade level. *Listening Comprehension* was included from the GRADE to assess a language-based skill at the kindergarten level. *Phonological Awareness* was included to assess kindergarten students' pre-decoding skills.

The GRADE is also a norm-referenced test; it provides a range of statistical scores, including percentiles, stanines, and standard scores for analysis and diagnosis. The following 5 scores were used as outcome measures: (1) *Word Reading* measures a student's skills for decoding regular words phonetically and the ability to identify common sight words. This subtest is included in the K-3 grade levels; it is not assessed beyond third grade. Likewise, the raw score for *Word Reading* is not included in the *Total Test* composite score at level K, but it is included at levels 1-3. Instructions for administering the subtests involve reading a target word, re-reading it in a sentence that contains the target word, and having the student select the target word from a list of several choices, *(2) Reading Comprehension Composite:* Two

comprehension measures are included in this subtest score, sentence comprehension and passage comprehension. In the sentence comprehension part of the test, Students are required to read a single sentence with a missing word and select the word that completes the meaning of the sentence from several given choices. Passage comprehension requires students to read a written narrative of one or more paragraphs and answer several questions about the narrative (Williams, 2001), (3*) Listening Comprehension is* a subtest that measures the child's ability to listen to a sentence read by the teacher and selects a picture out of four that best describes what the sentence read by the teacher, (4) *Phonological Awareness* is a combined score for two auditory subtests: sound matching and rhyming. The first subtest assesses the child's ability to hear and recognize sounds at the beginning and end of words. The subtest measures the child's ability to hear the same sounds at the beginning and end of words. Print is not a factor in this subtest as children are not required to match sounds with alphabetic letters as was the case with phoneme-grapheme, and (5). *Total Test* is a summary score of GRADE subtest measures. At the kindergarten level, the *Total Test* score is the combined contribution of subtest scores.

Data Collection

The scores of the 66 kindergarten students and 63 first-grade students were collected by the reading specialist and other school staff, including kindergarten and first grade teachers. The data used in this study was obtained a few months after the tests were administered. In accordance with the University's Institutional Review

Board for the Protection of Human Subjects, information identifying individual

participants was removed from the data before it was included in this study.

Data Analysis

Data collected for this study was analyzed in three stages. In the first stage,

descriptive statistics were used to describe student performance on the ALL pretest

scores.   In the second stage, the ALL and GRADE scores of students who achieved

within normal limit and at-risk scores were compared. Group means, standard

deviations, and percentages were used to describe differences in the literacy and

language-achievement levels of the at-risk groups. In the final stage, multiple

regression and correlation analyses were used to identify the specific literacy and

language variables that best predicted student reading achievement scores. The first

two stages, descriptive statistics and summative-group comparisons, were fairly

straightforward. However, the selection and use of multiple-regression procedures to

measure relationships between beginning-of–the-year ALL scores and end-of-the-year

GRADE scores was more involved. As a result, multiple regressions, as employed in

this study, are discussed in further detail below.

Multiple Regression and Correlation Analysis

Multiple regression and correlation (MRC) methods are subsets of a general

class of multivariate statistics that are widely used to address complex research in

many fields of study (Grimm & Yarnold, 2005). There has been a rapid increase in the

use of multivariate statistics, which Grimm & Yarnold contributed to the development

of computer technology. Furthermore, they reported an increase of 57% in the number

of studies using multivariate statistics in just two research journals between 1976 and 1992. There are well known examples of the practical uses of multivariate procedures in education, psychology, and the health fields, ranging from the prediction of students' GPA's to the prediction of a person's risk for heart attacks. In this study, MRC was used to predict word reading and reading comprehension from specific skills such as letter knowledge and phonics.

Multiple regression and correlation (MRC) analyses are used to predict the outcome of one continuous dependent variable from two or more independent continuous variables (Licht, 2005). The actual computation of MRC statistics is rather involved, but when calculated with computer software, three essential indices are produced: (1) a multiple-correlation coefficient (R), (2) a correlation coefficient of determination (R-squared), and (3) a final-prediction equation. According to the Licht, the prediction equation is calculated from the combined strength of association between the independent variables (R) and the proportion of variance (R-squared) in the dependent variable that is shared with the independent variables. The multiple correlation coefficients are generally measured in decimals between 0 and 1; .5 represents a moderate correlation between variable; and 1.0 represents a perfect correlation. The coefficient of determination, on the other hand, is indexed as a percentage. For example, an R-square of .46 is interpreted as 46% of the shared variance between an independent and dependent variable.

 MRC prediction equations are calculated using two different methods. The two methods are distinguished by the way in which variables are initially analyzed and

included in the final prediction equation. These include the simultaneous- and the stepwise-regression methods. The simultaneous method is a procedure that analyzes all variables at the same time, and all variables are included in the final equation based on the contribution made to shared variance in the dependent variable. On the other hand, stepwise techniques are true to the name; each independent variable is analyzed in steps, and either included or eliminated from the equation, leaving the fewest number of independent variables that contribute most to shared variance in the dependent variable (Licht, 2005).

Despite the widespread use of both MCR methods, some researchers cautioned against the use of stepwise regression, especially where testing theories are involved (Gliner, 2000; Licht, 2005). Gliner (2000) expressed several reservations about stepwise-regression procedures and noted that "while stepwise linear regression makes a lot of sense conceptually, there are several problems that have been associated with this approach, and one should probably use this approach only as an exploratory procedure" (p. 298). Gliner also warned of higher probabilities for producing type-1 errors with stepwise regression, and the automatic aspects of the computer software exclude researchers from some of the decision making in the analysis process. However, it is important to note that these criticisms were made over a decade ago and that many of the contemporary statistical programs were developed during that time. In addition, many of these older programs, such as SPSS, have been revised several times within the past decade. Some of the revised features include instant statistical advice and permit more input and control from the researcher.

This study employed a stepwise-regression procedure, using the SPSS computer software package. SPSS allows a number of different ways to analyze stepwise regression, depending on how data is included and excluded from the regression equation. Stepwise-regression forward analyzes the data in a forward manner, putting the variable that shares the highest variance in the equation first and proceeding to add variables until additional variables fail to add value to the equation. The backward-stepwise procedure starts by initially adding all variables and then it eliminates variables until additional variables fail to add value to the equation. Finally, the stepwise procedure includes analysis forward and backward. This procedure was adopted to address the research questions posed in this exploratory study.

Chapter 4 - Results

This study investigated relationships among literacy, language, and reading achievement in kindergarten and first-grade participants. It proceeds to outline the results of the study under the headings of each research question, starting first with kindergarten students and ending with questions related to first graders. Findings will be discussed as they relate to each question.

Research Questions

1. What levels of literacy and language skills did kindergarten participants demonstrate on the ALL in the beginning of their respective school years, and how did these scores compare with those in the national sample?

2. What percentage of kindergarten children were identified as being at risk for reading difficulties based on the ALL screening battery scores, and was there a significant difference between the scores of children at risk and children who were not identified as at risk?

3. Do kindergartners at risk for reading difficulties achieve at levels significantly below their non-risk peers on end of the year reading achievement measures?

4. Which entry-level emergent literacy or spoken language skills best predict end-of-year word-level reading achievement for kindergarten students?

5. Which first-grade emergent literacy and spoken language skills are most highly correlated with reading comprehension?

6. Which entry-level emergent literacy or spoken language skills best predict end-of-year word-level reading and reading comprehension achievement for first grade students?

Findings for Research Question 1:

What levels of literacy and language skills did kindergarten participants bring to the school setting?

Descriptive statistics was used to address this research question. Mean scores on the ALL and *Letter Knowledge* subtests were compared. The kindergarten class obtained mean scores of 13.2 and 18.0 on the *Letter Knowledge* and *Basic Concepts* subtests respectively. This comparison was statistically significant (95%ile confidence level), showing a large gap between the entry level of the class. The gap seen in the scores of these participants was not evident in the national sample scores on *Letter Knowledge* and *Basic Concepts* subtests (21.9 to 20.9). Compared with students in the national sample, kindergarten participants in this study obtained substantially lower literacy-based *Letter Knowledge* scores (13.3 to 21.9). However, there was a difference of only three points between the current mean and the national average (18.0 to 20.9). These differences are reflected in Table 4.1.

Table 4.1

Summary of Entry Level ALL Mean Subtest Scores for Kindergarten Children

		Letter Knowledge
Count	52	52
Average	18.0	13.3 *
Standard deviation	4.2	7.5
Minimum	5.0	3.0
Maximum	25.0	30.0
Range	20.0	27.0
Standardization Average	*20.9*	*21.9*
Standardization Standard Deviation	*3.9*	*6.4*

- Denotes statistically significant at 95% confidence level

ALL Pretest Mean Comparsions
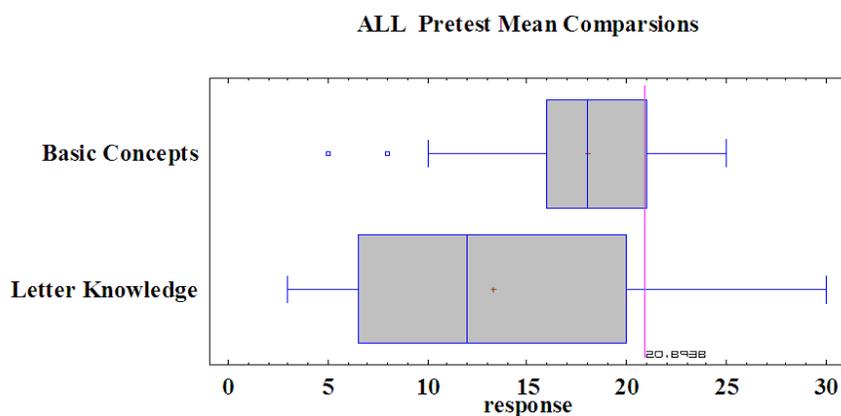
Note: Vertical red line represents national average

Figure 4.1 Box and whisker plot for entry-level ALL mean subtest scores for kindergarten children.

Figure 4.1 is a box and whisker plot that summarizes statistical measures of central tendency and measures of dispersion, including the median, mean, and range of test scores. The box and whisker plot was graphed by one of the statistical packages used to analyze data for this study. In this case, the two subtest means are represented

by the dark red plus signs in the respective boxes. The dark blue vertical lines running down the center of each box represents the median and the range by the horizontal whiskers running through the boxes. Finally, the red vertical line running from top to bottom was imposed to show the average score for children in the standardization sample for the subtest.

Findings for Research Question 2:

What percentage of kindergarten children were identified at risk and not at risk for reading difficulty based on the ALL screening battery, and was there a significant difference between the means of the two groups?

This research question was addressed in two steps. First a conservative cut-off point was established at the 25th percentile on both ALL subtests (Lombardino, Lieberman & Brown, 2005). Students scoring at or below the 25th percentile on one or both subtests met that criterion. The first group scored below the cut-off point on the *Letter Knowledge* subtest, and above the cut-off point on the *Basic Concepts* subtest (1-deficit group). The second group obtained scores below the cut-off point on both subtests (2-deficit group), and the third group obtained scores above the cut-off point on both subtests (no-deficit group).

Mean scores were computed for the three groups using multivariate matched groups or repeated measures analysis. This analysis involved several steps, including an ANOVA for comparing the variance within and between the three group means, a Kruskal-Wallis for testing the underlying normalcy assumption of the subtest, and a

Fisher's Least-Square Significance Difference to test significance levels between the

means. The final steps in this analysis are reflected in Table 4.2

Table 4.2 displays the results, showing the group number, the means, and the

combination of mean scores that are significantly different. For example, the

combinations 1-2 under the contrast heading in Table 4.2 indicate a significant

difference between the means of group one and group two. The combination 3-2

indicates that there is also a significant difference between the means of group three

and group two. The difference between groups one and three is not significant on the

measure.

Table 4.2
At-risk and Not-At-risk Group Summative Statistics: Basic Concepts

Groups Status	Count	Mean	Contrast	Sig	Difference	Percent
1 (one deficit)	20	19.7	1-2	*	4.88	38.5
2 (two deficits)	22	14.8	1-3		-2.0	42.3
3 (no deficits)	10	21.7	3-2	*	-6.88	19.2
Total	52	18.0				

 * Denotes a statistically significant difference @ 95% level of confidence

These results are graphically shown in Figure 4.2, where the class mean

(M=18.0) represented by the red vertical line is the reference point for comparing the

means of the three groups on the subtest. As shown, group two is the only group

mean below the class mean, which was 18.0, Groups one and two scored above the

mean on this subtest, and the mean for group three is slightly above the national mean,

which was reported under question number one as 20.9.

At-Risk Basic Concepts
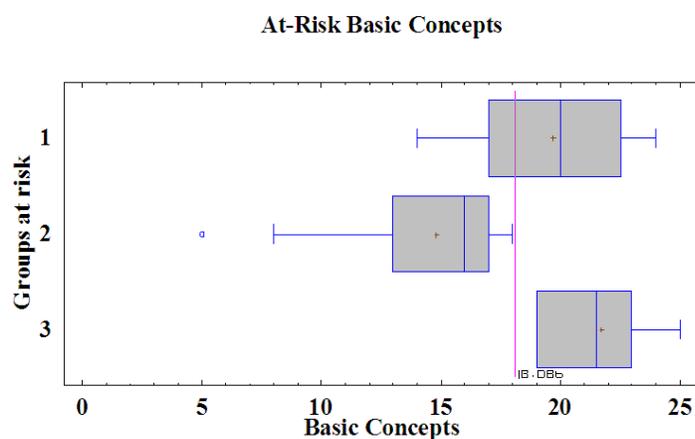
*Figure 4.*2 Box and whisker plot for entry-level ALL mean subtest scores for kindergarten children.

In summary, findings under question two were as follows (1) 38.5 percent of the total number of kindergarten students entered school with single-skill deficits on the *Letter Knowledge* subtest; 2) Another 42.3 percent showed delays in the development of both skills; 3) 19 .2 percent had subtest scores above the class mean on both subtests; and 4) Significant differences were noted between groups 1 and 2 and groups 2 and 3; and 5) the group means were not significantly different for groups 1 and 3.

The *Letter Knowledge* subtest was analyzed on the same three groups of students. While the number and percent of students in each group remained the same, substantial changes are seen in the magnitude and positions of the group means. For example, comparative analysis of the means on the two subtests shows a large difference in the means of group one and two. Group one obtained a mean of 19.7 on the *Basic Concepts* subtest but got a much lower mean on *Letter Knowledge* (14.8).

The difference in the two means for group two is even more dramatic. The second

group, group two obtained means scores of 8.3 on *Letter Knowledge*, and 14.8 on

Basic Concepts. Group three obtained less than one point between the mean scores on

Letter Knowledge and *Basic Concepts*. These results are presented in Table 4.3 and

Figure 4.3.

Table 4.3
At-Risk and Not-At-Risk Group Summative Statistics: Letter Knowledge

Group status at risk	Count	Mean	Contrast	Sig	Difference	Percent
2 (two deficits)	22	8.3	1-2	*	5.89	42.3
1 (one deficit_	20	14.2	1-3	*	-8.15	38.5
3 (no deficits)	10	22.4	2-3	*	-14.03	19.2
	52	13.3				100

F-Ratio = 22.9 = *: *p* < .05

At-Risk Letter Knowledge
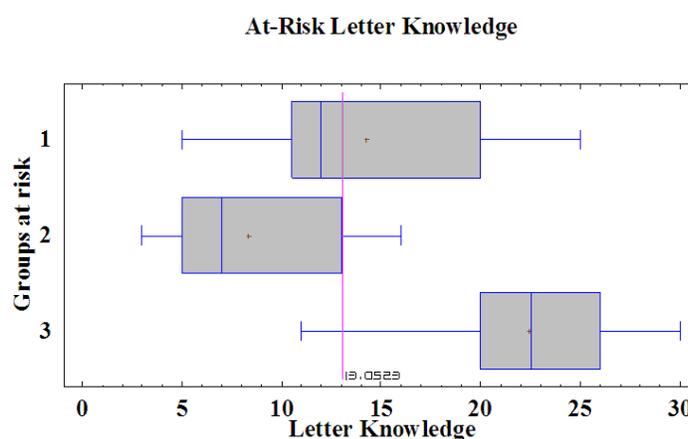
Figure 4.3 Box and whisker plot for entry-level ALL mean subtest scores for
kindergarten at-risk and not-at-risk groups.

The overall results of this analysis suggest the following: 1) that the gap

reflected in the class means of the two subtests (13.3-18-0), reported under question

one, is fairly evenly distributed in the scores of group one and group two in this analysis, 2) that while group two scored below the cut-off points on both subtests, their language skills are substantially higher than their literacy skills (14.2, 8.3).

Findings for Research Question 3:

Do kindergartners at risk for reading difficulties achieve at levels significantly below their peers on end-of-the-year reading achievement measures?

This research question addresses the relative achievement levels of the three groups on kindergarten *Word Reading* outcomes. Mean scores for this measure is presented in Table 4.4 and figure 4.4.

Table 4.4
At-Risk and Not-At-Risk Summative Group Statistics: Word Reading

Means for Word Reading by Groups

Groups	Count	Mean	Pooled s Stand Err	Lower limit	Upper limit	Contrast	Sig
1 (one deficit)	20	5.85	0.542075	5.07	6.62	1-2	*
2 (two deficits)	22	2.90	0.516848	2.17	3.64	1-3	*
3 (no deficits)	10	8.80	0.76661	7.71	9.88	2-3	*
Total	52	5.17					

F-Ratio =21.57 = *: $p < .05$

Group two, the group with deficiencies in both literacy and language, is the only at-risk group whose mean score (M=2.9) is below the class mean (M=5.17). It is also significantly different from the other two group means. For example, group one, who started the year at risk for *Letter Knowledge*, performed slightly above the class mean on the *Word Reading Achievement* subtest (M=5.85), as did group three (M=8.80) .

Posttest Word Reading Achievment
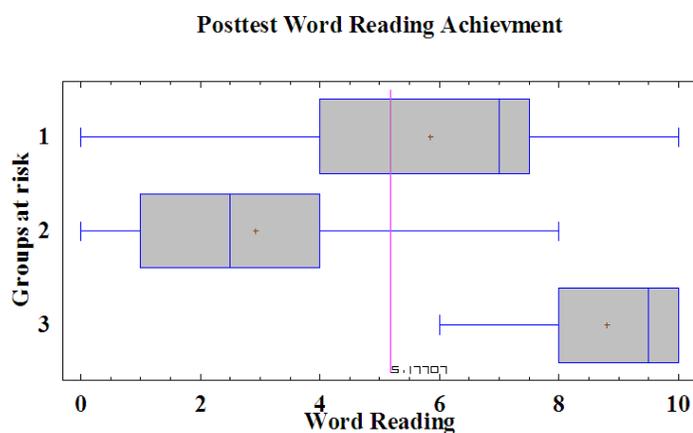
Figure 4.4 Box and whisker plot for posttest GRADE group mean scores for kindergarten children.

Results for end-of-the-school-year achievement on the *Total Test* show the same significance pattern as that shown on the *Word Reading* subtest, except that group two scored closer to the class mean on the *Total Test*. Results for the *Total Test* are presented in Table 4.5 and Figure 4.5.

Table 4.5

At-Risk and Not At-risk Summative Statics: GRADE Total Test Scores

Groups at risk	Count	Mean	Stnd. error (pooled s)	Lower limit	Upper limit	Contrast	Sig
1	20	70.5	1.8757	67.8347	73.1653	1-2	*
2	22	61.1818	1.78841	58.6405	63.7231	1-3	*
3	10	77.8	2.65264	74.0306	81.5694	2-3	*
Total	52	67.9615					

F-Ratio= 14.98 =   *: p < .05*

End of Year Total Test Achievement
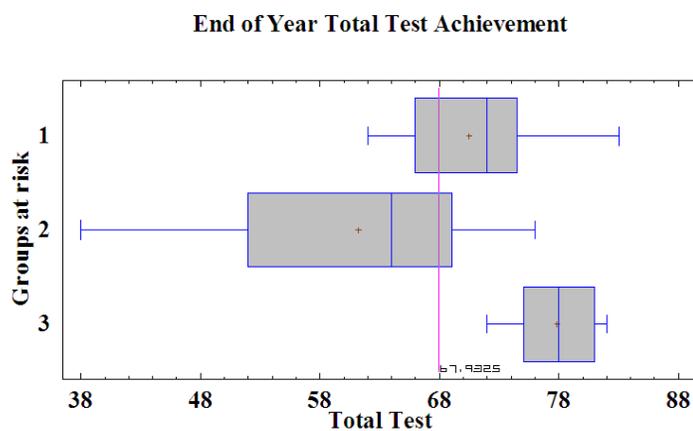
Figure 4.5 Box and whisker plot for GRADE *Total Test* achievement scores for first grade students.

Findings for Research Question 4:

Which entry-level emergent literacy or spoken language skills best predict end-of-year word-level reading achievement for kindergarten students?

As previously stated, the dependent variable at the kindergarten level was student performance on end-of-year *Word Reading* achievement. The prediction equation and probability plot were calculated from the variables in Table 4.6.

Table 4.6
Correlation Analyses: Kindergarten ALL and GRADE Correlation Matrix

	1	2	3	4	5	6	7
ALL subtests							
1. Basic Concept	–						
2. Letter Knowledge	.409**	–					
GRADE subtests							
3. Phonological Awareness	.326*	.528***	–				
4. Word Reading	.454***	.476***	.474***	–			
5. Listening Comprehension	.080	.328*	.437***	.054	–		
6. Early Literacy	.316*	.441**	.622***	.416**	.524***	–	
7. Total Test	.386**	.580***	.883***	.562***	.555***	.850***	–

*: $p < .05$; **: $p < .01$, ***: $p < .001$

A prediction equation and probability plot were constructed from the variables in table 4.6. This table is a correlation matrix, showing strong relationships between the literacy and language measures used in this study. In fact, the p-values in the table range from .05 to .01. The backward stepwise-regression procedure was used to construct the equation and the probability plot. The backward procedure tested all variables in table 4.6 simultaneously, and it automatically removed variables from the equation that did not meet a pre-established p-value for remaining in the equation.

The stepwise-regression procedure generated the results displayed in Table 4.7. As noted, the final equation selected *Basic Concepts* and *Phonological Awareness* as best-fit predictors of reading achievement at the kindergarten level. The equation, as displayed in Table 4.7 is as follows: *Word Reading* = -3.65156 + 0.242966*Phonological Awareness* + 0.25714*. This equation is an estimate of the amount of variance that scores on the subtest *Word Reading* share with the two

independent variables. Combined *Basic Concepts* and *Phonological Awareness*

represent 32.54% of the variance in the *Word Reading* subtest scores; however, this

finding is limited only to the variables used in the analysis. For example, the *Letter*

Knowledge and *Listening Skills* subtest scores were excluded from the equation in the

last two steps of the analysis, an indication that these two skills were highly correlated

with *Word Reading,* as well. In fact, the correlation matrix shows a significant

relationship between *Letter Knowledge*, which was excluded in the last step of the

regression analysis, and *Phonological Awareness,* which was included in the final

equation (.528 $p < .001$). Stepwise regression is a procedure that selects only variables

that improves or adds to explaining variance to the final equation, including variables

that differ by very small values (Gliner, 2000). In summary, the results in this section

show that literacy and language skills are both involved in the prediction of word

reading skills at the kindergarten level.

Table 4.7
Prediction Equation: ALL to GRADE Kindergarten Word Reading Prediction

Final Kindergarten Regression Analysis

Parameter	*Estimate*	Standard *Error*	T *Statistic*	*P-Value*
CONSTANT	-3.65156	1.87657	-1.94587	0.0574
Phonological Awareness	0.242966	0.0826187	2.94081	0.0050
Basic Concepts	0.25714	0.0951577	2.70226	0.0094

First-Grade Emerging Skills

This section of the chapter focuses on the emerging reading-comprehension

skills of first-grade students. Data analysis for first graders was analyzed for trends to

explain connections between language, literacy, and reading comprehension. The

section starts with a summary of first-grade pretest scores from the ALL, followed by

two research questions.

Descriptive data for the 39 first-grade participants in the study is presented in

Table 4.8. Average scores from the national standardization sample are listed at the

bottom of the table. As reflected in the table, first-grade students in this study scored

within two points of the national average on the *Parallel Sentence Production* subtest,

and within four points on the *Phonics* subtest. There is a gap of four points between

the scores of the two subtests for participants in this study, but there is an even larger

one for the national sample.

Table 4.8
First Grade ALL Descriptive Statistics

Measures	First-Grade Group (N=39)		Standardization Sample	
	Mean	SD	Mean	SD
Phonics	21.56	3.409	25.5	6.4
Parallel Sentences	17.44	2.900	19.3	4.6

Findings for Research Question 5:

Which early literacy and language skills are most highly correlated with reading

comprehension at the first-grade level?

The degree of relationships between the ALL *Phonics* and *Parallel Sentence*

Production measures and GRADE *Word Reading* and *Comprehension* achievement

outcomes are displayed in Table 4.9. *Phonics*, a first-grade literacy measure, was

highly correlated with *Word Reading* achievement at the end of the school year

(r=.429 p<.01). This strong relationship between literacy (as measured by *Phonics*)

and *Word Reading* was not evident between the *Phonics* the ALL *Parallel Sentence*

Production subtest, which was correlated at r=.070, a correlation that was not

significant. However, the GRADE *Vocabulary* subtest actually registered the highest

correlation between the language measure (*Parallel Sentence Production*) and *Word*

Reading achievement. The correlation between *Vocabulary* and *Word Reading* was

r=.916 p<.001, one of the highest correlations in the matrix. Yet, upon further

analysis, *Phonics* is also highly correlated with *Vocabulary* (r=.425 p<.425). These

correlations show the overlapping links between literacy and language measures at the

first-grade level.

Table 4.9
Correlation Analyses between All Measures in First-grade Group

	1	2	3	4	5
ALL subtest scores	–				
1. Phonics					
2. Parallel Sentences	.081	–			
GRADE scores	.425**	.139	–		
3. Vocabulary					
4. Word Reading	.429**	.070	.916***	–	
5. Comprehension	.282	.342*	.7368***	.665***	–

*: $p < .05$; **: $p < .01$, ***: $p < .001$

A similar pattern of relationships is seen in correlations between ALL language

measures and the GRADE *Comprehension Composite* measures. In Table 4.9, the

Parallel Sentence Production subtest is significantly correlated with the GRADE

Comprehension Composite posttest score. (r=.342 p< .05). However, *Vocabulary* was

more highly correlated with *Comprehension Composite* (r=736 p<.001). It is also

interesting to note the strong correlation between *Comprehension Composite* and *Word Reading* (.665 p<001), one of the highest correlations in the matrix. As noted the GRADE *Vocabulary* subtest was central to both *Word Reading* and *Comprehension Composite*. Thus, while the two ALL predictor variables (*Phonics* and *Parallel Sentence Production*) were significantly correlated with both *Word Reading* and *Comprehension Composite*, the GRADE *Vocabulary* subtest had the highest correlation between both *Word Reading* and *Comprehension Composite*. However, it should be mentioned that the GRADE *Comprehension Composite* score is a composite score that measures three dimensions of comprehension, including word, sentence, and paragraph dimensions of comprehension. This does not diminish the correlations reported above, but it is difficult if not impossible to disentangle the different aspects of comprehension in the correlation matrix. In summary, these findings indicate that the literacy (*Phonics*) is highly correlated with *Word Reading*, and not significantly correlated with *Comprehension Composite*. This is the reverse for *Parallel Sentence Production*, which is significantly correlated with *Comprehension Composite*, but not with *Word Reading*.

Findings for Research Question 6:

Which entry-level emergent literacy or spoken language skill best predicts end-of-year word-level reading and reading comprehension achievement for first-grade students?

To address this research question, stepwise-regression analysis was used to construct a probability plot to describe the variables that best predict word reading and reading comprehension at this level. As reflected in Table 10, *Phonics* was the primary

predictor of variables in the regression plot. It accounted for 18% on *Vocabulary*, 18% on *Word Reading*, and 10% on the *Total Test* score. Only the *Parallel Sentence Production* scores had any impact on reading comprehension and that was at a modest 12% of the variance. These findings are presented in Table 4.10. The implications of these and other research results described in this chapter are discussed in Chapter 5.

Table 4.10

Stepwise Regression Analysis in First-Grade Group

Variables	R^2	Adjusted R^2	$\bullet R^2$	$\bullet F$	*p*
(A) Vocabulary					
Phonics	.180	.158	.180	8.142	.007
(B) Word Reading					
Phonics	.184	.162	.184	8.325	.006
(C) Comprehension					
Parallel Sentences	.117	.093	.117	4.900	.033
(D) Total Test					
Phonics	.104	.079	.104	4.274	.046

$\bullet R^2$: R square change, $\bullet F$: *F* change, *p*: Significance of *F* change

Summary of Kindergarten Data

The entry-level literacy skills of the kindergarten children sampled in this study were substantially below the skill levels of their age peers in the national standardization. On the other hand, their language skills were within the average range when compared to the performance of children in the national sample. This discrepant pattern, one that shows a large gap between literacy and language-skill development, was not a feature of children in the national sample; their literacy and language skills were more equally balanced. Three general patterns of performance were found for the children in this sample. Two of these patterns reflect at-risk profiles. One group showed deficient literacy skills but adequate spoken language skills. The second

group exhibited deficiencies in both literacy and spoken language. A third group of students performed above at-risk cutoffs on both sets of skills. The second at-risk group, those with deficits in literacy and language, scored significantly below group one and group three on end-of-year *Word Reading* achievement. Group one obtained end-of-year *Word Reading* scores that were above the class mean but significantly below the mean score of the third group. Finally, end-of-year *Word Reading* achievement was best predicted by the ALL *Basic Concepts* test given at the beginning of the school year and the GRADE *Phonological Awareness* test given at the end of the school year.

Summary of First Grade Data

Unlike kindergarteners, first-grade students scored fairly close to the national average on the two ALL subtests (*Phonics*, *Parallel Sentence Production*). They enrolled in school with slightly higher literacy skills (*Phonics*) relatively to language-based skills (*Parallel Sentence Production*). There was also a gap between the literacy and language scores of first graders; however, the gap in the first-grade sample was the opposite pattern as that found in the kindergarten sample. The first graders scored higher on the literacy-based *Phonics* subtest than on the language-based *Parallel Sentence Production* subtest.

There was a significant correlation between the ALL subtests and the GRADE achievement scores. The ALL *Phonics* subtest best predicted the GRADE *Vocabulary, Word Reading,* and *Total Test* scores. The ALL *Parallel Sentence Production* subtest best predicted the GRADE *Reading Comprehension Composite*

score. Implications of these and other research results described in this chapter are

further discussed in Chapter 5.

Chapter 5 -Discussion

This study examined relationships between entry-level literacy skills and end-of year-reading achievement performance among kindergarten and first-grade children. Results from two ALL subtests (*Letter Knowledge* and *Basic Concepts*) scores were used to explain kindergarten literacy and language entry-level performance. These same scores were used to predict kindergarten end-of-year-achievement performance on the GRADE. To accomplish this, regression analysis was used to plot a prediction equation. The final kindergarten equation included one ALL variable (*Basic Concepts*) and one end-of-year variable (*Phonological Awareness*), as best predictors of word reading achievement. The same procedures were used with first graders; except the prediction equation for that class included both ALL subtest predictors (*Phonics* and *Parallel Sentence Production*). A correlation matrix, showing correlation coefficients between all variables, including testing in the fall and spring, was plotted for first graders as well.

In the last chapter, the results of the study were described under the headings of six research questions. The current chapter expands on the results and links them to the larger body of knowledge on emergent literacy development and reading acquisition. The results of the previous chapter were organized under the headings of each research question. This chapter addresses the underlying implications of the research questions, alluding to the number of the research question as a reference point only. The chapter is organized under the following headings: 1) Description of kindergarten entry-level skills;   2) Comparative analysis of kindergarten at-risk

groups; 3) End-of –year-word reading skills; 4) Prediction of kindergarten reading achievement outcomes and; 5) Prediction of first-grade reading performance.

Kindergarten Entry Level Skills

Kindergarten and first-grade teachers, unlike their peers in the upper-elementary grades, must prepare for a class of children with little or no information about the academic or prior learning experiences of students enrolling in their classes. Students in second and third grade have academic histories from the previous grade, and teachers at those grade levels are able to use that history to inform instruction. For decades many public schools avoided large-scale testing or screening of students in early elementary school, and these teachers, especially kindergarten teachers, relied mostly on their knowledge of the child's family for background information. In some schools, preschool information is supplemented by short developmental surveys given to parents or children enrolling in kindergarten. However, the importance of assessing and screening children for potential reading problems is beginning to change this practice, particularly in schools serving children on free-lunch in Title One programs.

Prevention of reading difficulties is the major reason that schools should commit resources for early identification and early intervention. Research data supports the efficacy of early intervention for preventing future reading problems (Raudenbush, 2009; Stanovich, 1986); for economic reasons (Heckman, 2006); and for instructional reasons (National Reading Panel, 2000). Within the past two decades both negative and positive arguments have been used to support early assessment and early intervention. The psychometric approach (special education) is most well

known. It has been around for many decades, but it came under criticism in the last

decade. This approach is criticized for excluding a large group of children. Children

with low IQ scores, children from poor literacy backgrounds, and children whose

reading problems are related to poor instruction are not diagnosed as having reading

problems under this approach (Stanovich, 1991). This waiting-to-fail system is slowly

being replaced by Response to Intervention (RTI), a positive method that uses

instruction to both intervene in and diagnose reading problems (Vellutino, Scanlon, &

Reed, 2000). Under RTI, the diagnoses of learning and reading disabilities are based

on a child's inability to respond to a series of well-planned interventions after a

specific period (Otaiba & Fuchs, 2002). Finally, there is a connection between teacher

knowledge about the entry-level skills of children and the ease at which children learn

to read (Adam, 1990), regardless of the assessment method used.

Early assessment, as defined in this study, refers to the assessment of emergent

literacy skills, the literacy and language skills children learn before they enroll in

school. Children enroll in school with different levels of emergent literacy skills, and

the reason for assessing these skills range from identifying children likely to have

difficulty with reading to the skills most correlated with reading success at the onset of

formal reading instruction (Lonigan, 1998). There is also evidence that the levels of

entry- level skills have an immediate impact upon the ways in which children respond

to instruction as early as kindergarten. Deficits in emergent literacy skills that children

learn between the ages of 4-5 have been associated with later school dropout, grade

retention, and special education placement (Snow, 1998). Thus, there are several

positive reasons for early assessment; they range from prevention to economic

benefits, not to mention the value it has for helping children succeed in school.

Research Question 1 (What levels of literacy and language skills did

kindergarten participants demonstrate on the ALL in the beginning of their school

year, and how did these scores compare with those in the national sample?) is in direct

response to these issues. It alludes to the importance of early identification and the use

of assessment data to inform instruction.

Among the early literacy skills, *Letter Knowledge*, in the form of naming the

letters of the alphabet, is frequently taught to children in the home before they enroll

in school. Learning the names of the alphabet is the first of several steps in the process

of learning to recognize words on the printed page. For example, these steps include

and support learning the names of letters, which in turn supports learning the sounds

of letters (Stahl & Murray, 1994). Once children learn links between the letter name

(grapheme) and the letter sound (phoneme), the next few steps in the chain leads to

learning *Phonemic Awareness*, decoding, and word recognition (Treiman & Boruassa,

2000).

Understanding the underlying concepts connected with these steps is not as

essential from a practical perspective as understanding the underlying literacy and

language-based problems of struggling readers. In general, many children begin to

have problems learning letter-sound correspondence, the step right after they have

learned the alphabet. There is considerable research evidence to suggest that

struggling readers start to have difficulty at the letter-sound correspondence stage,

including the phonemic awareness and phonological awareness steps in the decoding

process (Share, 2004; Torgesen, Wagner, & Rashotte, 1994; Torneus, 1984). There are

many reasons children do not connect and link the association between the printed

letter and the speech sound the letter represents. At this point, it is important to assure

that children get a good start by learning letter sounds for a strong foundation to the

steps that follow in the reading process.

 Findings reported in this current study are consistent with previous research

findings on the role of letter knowledge in the reading process. First, students who

performed poorly on the *Letter Knowledge* subtests were students who also performed

poorly on *Reading* achievement at the end of the school year. Kindergarteners who

performed well on *Letter Knowledge* tended to do well on end-of-year *Word Reading*,

giving support to the role of *Letter Knowledge* in the chain of learning tasks that lead

to *Word Recognition* and *Word Reading*. It is also interesting to note that the at-risk

group one, those who scored low on just the *Letter Knowledge* subtest, did not achieve

at levels consistent with their peers in the third group who had no deficits at the

beginning of the school year. This is not to indicate that there is a causal relationship

between weak *Letter Knowledge* skills and *Word Reading*. However, it does indicate

that students who lack these skills when they enroll in school will lose precious time

learning these skills while those who already have them can invest that time learning

the more advanced stages in the reading process.

In one study*, Letter Knowledge* was a primary predictor of reading fluency and

reading comprehension at the fourth-grade level (Leppanen, Aunola, Niemi, & Nurmi,

2008). The *Letter Knowledge* score in the current study was significantly different

from the *Basic Concepts* score as well. This indicates that a large percentage of the

class will face learning challenges with only one skill developed at levels consistent

with students in the national norms. Kindergartners in that nationally-normed group

enrolled in school with only one (1) point difference between the Means of the two

ALL subtests (20.9 to 21.9) Thus, data generated under question one separates the

class by skills; the next question differentiates the class by groups. Thus, it appears

that students who enter school with well-balanced and developed literacy and

language skills tend to learn how to read with less difficulty than those with one and

two at-risk factors.

At-Risk Status and Reading Acquisition

Traditionally, public schools have relied upon a referral system for identifying

children with reading and other learning problems. The referral system, generally

associated with special education, is associated with the deficit model of intervention,

which is a model that waits until the problem develops. Under this system, when and if

a child is referred for testing is dependent upon the classroom teacher. It is this aspect

of the system that lends to extreme variability in whether a child receives help, both

within a particular school and between different school districts. Unfortunately, this

variability leaves some students getting help promptly while others may not be

referred for help until well into the school year or, in some cases, not until the 3rd or

4th grade. Thus, unless children enroll in school with obvious mental or physical

disabilities, they may escape being identified until their problems have become quite serious.

The second research question posed in this study (What percentage of kindergarten children were identified as being at risk for reading difficulties based on the ALL screening battery scores, and were there differences between the scores of children who were identified as at risk and the children who were identified as not at risk?) is directly related to the identification of children with potential learning problems. A larger number of children referred for special education in later grades actually enrolled in school at risk for developing reading problems. Some experts estimate that roughly 80 percent of children diagnosed with learning disabilities have a primary reading problem (Snow, Burns, and Griffin, 1998). In the current study, 38.5 percent of the students were identified at risk with a literacy deficiency, and an additional 42.3 percent were identified at risk with both language and literacy deficiencies. While these percentages add up to a little over 80 percent, it is important to note that at risk is not the same as a diagnosis; it is not meant to imply that children at this age are destined to fail at reading because of their at-risk factors. Instead, the term is more useful for informing instruction than it is for diagnosing problems. This distinction becomes apparent in the next section when the achievement levels of the at-risk groups are compared.

End-of-Year Word Reading Skills

Research question 3 (Do kindergartners at risk for reading difficulties achieve at levels significantly below their non-risk peers on end-of-the-year reading

achievement measures?) addresses numerous issues regarding the differential impact of at-risk status on word achievement. First, the results in this section show that the beginning-of- the-year cut-off points were very good at distinguishing differences in group ID performance at the end of the year. Secondly, end-of the year *Reading* achievement scores were significantly different between each of the three groups, and the group with two deficiencies had the lowest scores on each variable tested. This finding is important because it shows a strong reason for early identification and a strong need for early intervention. In each comparison between the groups, with the exception of group one (one deficit group), the scores are stable. Group three (no-deficit group) achieved at levels above the at-risk groups in each comparison. Only group one, the group with one deficit, made unexpected gains on end-of-year *Word Reading*. This study did not produce a group with language-based deficits only, so there is a need to understand the impact of language-based skills at the kindergarten level.

However, the fact that group one achieved substantially above average on end-of-the-year reading is an indication that literacy impairment at the beginning of the year did not adversely impact *Word Reading*. It did slow the learning rate of group one because they did not achieve at the levels posted by group three, who started the year with no deficits. Perhaps this is what is meant by the "Matthew" principle, a principle that alludes to the advantage of the haves over those who do not have (Stanovich, 1986).

This finding is extremely powerful. First, the three groups started the year with substantial gaps between assessed literacy and language skills and ended the year with word achievement gaps that appear related to the number of literacy-language deficits. Children with no deficits scored significantly higher than the two at-risk groups. This raises questions: Will the literacy gaps (*Letter Knowledge*) between the two groups close as they progress through the grades? Another and related question is: Will the *Word Reading* achievement gap close as they progress through the grades? Answers to these questions cannot be determined in this study (the study is exploratory), but the results show informative trends. First, at the end of the year, it is clear that the three groups will go into first grade with substantial differences in word reading ability. End-of-the-year kindergarten reading levels for the three groups were 2.9 for group two, 5.85 for group one, and 8.8 (out of a possible 10) for group three. Now that the word-reading skill gaps have been the described, the questions at this point are: What type of intervention will be required to close these gaps? and How long a time period will be required to close them?

There is evidence to suggest that *Letter Knowledge* is only a temporary factor in the reading process and is not a factor once children learn to recognize and name the letters (Paris, 2011). This is implied in the notion that some literacy-related skills are mastered universally to the same degree by all children (constrained skills). The alphabet is such a skill; it is learned entirely by all children, albeit at different times or ages. As stated by Paris, (2011):

Learning the names and sounds of the letters in the alphabet are constrained skills. It is a discrete set of knowledge that can be taught directly within a brief period, and its growth is discontinuous and nonlinear. Most importantly, all children master the entire alphabet and attain the identical intercepts. (p. 231).

On the other hand, the author described language comprehension and vocabulary as continuous skills that a person learns over a life time. Viewed from this perspective, the progress of group one may continue through the grades, but whether they will catch up with group three is to be determined. However it is clear that the progress of group two is slowed by deficiencies in both letter and language-based skills, and will probably be slower than both groups without consistent and fairly intensive invention throughout the elementary grades. That intervention must include both literacy and language instruction to be effective, as confirmed by the findings of this study.

In this section, results showed that gaps in pre-reading skills can be measured at the very beginning of the school year for kindergarten, well before formal instruction. This implies that corrective actions can be taken before children begin to feel like failures. Secondly, differences between the three groups are identified on the basis of *Letter Knowledge* deficits, but actual word reading may be related to other factors, including language-based *Basic Concepts* skills, and perhaps the number of words children knew when they enrolled in school (this was not measured). Clearly group two, some 42% of the population, who had both language and literacy deficits, made significantly less progress than the other two groups. Moreover, teachers know

at the very beginning of the school year, which students need help and skills should be addressed.

In fact, this finding is consistent with recent developmental theories that categorize literacy-related skills as skills that are mastered universally to the same degree by all children (constrained skills). The alphabet is such a skill; it is learned entirely by all children, albeit at different times or ages. As stated by Paris, (2011):

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Predicting Kindergarten Achievement

The reading process generally includes two stages, decoding and reading comprehension. Literacy skills are usually the focus of prediction on decoding or word reading while oral language skills are generally the predictors for reading comprehension. Finding the strength of one variable on the other has been a major

focus of early literacy research, especially research on the relationship between literacy and decoding. Many of the national large-scale reading programs, including Reading First, based their instructional programs on findings from prediction and correlational studies. These studies identified the specific literacy or language variable that is most likely to improve a child's reading. The unspoken conclusion from these studies is that learning to read, whether learning decoding or reading comprehension, can be improved by teaching the predictor variable or the variable most strongly predictive of word-reading ability. For example, phonological skills and letter knowledge predict word identification at the decoding level; whereas, vocabulary and grammatical skills are linked to reading comprehension (Muter, Hulme, Snowling, & Stevenson (2004). These types of studies, particularly the phonological awareness studies, have the potential to narrowly focus instruction on one aspect of the reading process; in this case, it is the literacy-related decoding stage of reading. Some researchers have warned against this practice because it tends to shape an imbalanced approach to reading (Paris, 2011).

Under research question four (Which entry-level emergent literacy or spoken language skills best predicted end-of-year word-level reading achievement for kindergarten students?), the current study found that the two variables, *Phonological Awareness* and *Basic Concepts* were the two major predictors of word-reading achievement at the kindergarten level. Although *Letter Knowledge*, not *Phonological Awareness,* was the pretest predictor in this study, the correlation matrix presented in the previous chapter shows a significant relationship between *Letter Knowledge* and

Phonological Awareness. At this point, it is interesting to review what the two skills measure and how they are different. As noted in chapter three, the GRADE *Phonological Awareness* subtest is strictly an auditory or letter-sound discrimination subtest with no print involved in the test items. On the other hand, the ALL *Letter Knowledge*, as described in Chapter 3, involves some recognition of print and the names of the alphabet. While there is no mention of sound recognition in this description, some names of the alphabet do carry associated sounds, but this comparison shows the value of knowing what a particular variable is measuring and its place in the prediction equation (Stahl & Murray, 1994).

Predicting Reading Performance: First Grade

By the end of first grade, most children should have mastered the decoding and word reading stages of the reading process and should now focus on reading comprehension and vocabulary development. Research question 5 (For first-grade students, which entry-level emergent literacy or spoken language skills best predict end-of-year word-level reading and reading comprehension achievement?) addressed the underlying relationships between first-grade pretest scores and end-of-the-year achievement scores. On *Word Reading,* for example, the first-grade *Phonics* subtest score was highly correlated with end-of-year *Word Reading*, a finding that was expected. This is also the case with *Parallel Sentence Production*, the language-based subtest, which was not highly correlated with word reading but was moderately correlated with reading comprehension. Unexpectedly, *Vocabular*y, which was highly correlated with *Comprehension*, is correlated with W*ord Reading*, as well. As

previously mentioned, these correlations have been a source of instructional strategies over the decade, and in this case, the teaching of phonics and vocabulary should improve word-reading skills and comprehension at the first-grade level.

The first grade prediction equation and correlation matrix were used to address question 6 (For first-grade students, which emergent literacy and spoken language skills are most highly correlated with reading comprehension?). This correlation matrix showing high relationships between literacy and language variables, is somewhat consistent with the prediction equation at the first-grade level, reported in Table 4.9. *Phonics* was the major predictor for *Word Reading* performance, *Total Test,* and *Vocabulary.* The *Parallel Sentence Production* was the major predictor for *Reading Comprehension.* The prediction equation at the first-grade level accounted for much less variance on *Word Reading* than was the case with the prediction equation at the kindergarten level. The highest relationship was between *Phonics* and *Word Reading* and *Phonics* and *Vocabulary.* The implications of these results are discussed in the next chapter.

Chapter 6 - Conclusions and Recommendations

This chapter presents the summary and conclusions of the study. It adds comments regarding the limitations and lists several recommendations for both practical applications and future research directions.

Reflecting on the Results of the Study

Entry-level skills of kindergarten children and the emerging skills of first graders were assessed using the screening subtests of the Assessment for Literacy and Language (ALL). These subtests were selected for both practical and statistical reasons: First, the screening parts of the ALL not only saved time in test administration, but they provided a statistical base for identifying students who were at risk for developing reading problems. They also differentiated the role of the two literacy and language skills studied in this study relative to their impact in learning to reading at those two grade levels.

Over and above the six research questions posed in the study, the question which runs through all phases of the study is this: What were the differential roles of literacy and language on reading acquisition at the kindergarten and first-grade levels? The differential roles of literacy and language were to some extent explicated in the overall results of the study. For example more kindergarten students enrolled in school with deficits in *Letter Knowledge*, the ALL assessed literacy-based skill. Thus *Letter Knowledge* was the skill that was less developed in the class as a whole. This finding is reflected in the difference between the mean score that the kindergarten class obtained on this subtest at the beginning of the year and the national average.

However, this finding is not unique; it is likely that kindergarten children from across the county, particular those in low-income neighborhoods, will score low on *Letter Knowledge* if assessed, as these children were, at the beginning of the school year. Data shows that many children from low socioeconomic backgrounds lack the rich literacy and print backgrounds that enhance these skills before children enroll in school. Thus, if many children are enrolling in school with deficits in *Letter Knowledge*, what is the significance of this finding and, for that matter, the finding of the overall study?

It is well documented that many kindergarteners enroll in school lacking basic literacy skills, and that literacy activities such as letter knowledge make up a large part of kindergarten instruction across the country. However, this is general knowledge, not specific, standardized information, and it is not local. The findings in this study are specific to this school, to those teachers, and to those students. For example, findings in this study revealed the specific number of students with literacy deficits, the percentage of students with that problem, and the students at risk because of deficits due to letter knowledge. More importantly, teachers administered these tests, and they know the students who obtained these scores. This is the type of information needed to inform instruction. It can help teachers know how to teach to the individual and group needs of students. This is the type of information that comes with a well-designed early-assessment program, and it is the type needed for focused and effective early intervention.

Knowing the combination of at-risk factors and how they influenced end-of-year word reading has practical implications as well. The at-risk groupings not only identified students with risk factors, but also it provided differential information about each group. For example, it is informative to know that group two performed below the cut-off points on both literacy and language-based subtests, but the results of the study also revealed specific strengths and weaknesses of each group. In the case of group two, *Basic Concepts*, although below the 25th percentile, was slightly higher than *Letter Knowledge*. It was also the strength for group one, the group with low *Letter-Knowledge* skills and above 25% on *Basic Concepts* scores. While the evidence is not strong, it seems that a balanced skill pattern like the one found in group three is more efficient for learning. Findings in the study do not provide direct evidence for that conclusion, but it is clear that end-of–the-year *Reading* achievement was related to the number of at-risk factors in each group. End-of-the-year achievement scores increased in groups from low *Word Reading* scores in group two to the high *Reading* Achievement scores in the third, no deficit group.

The data for the first graders was straight forward, as the first graders tended to perform consistently with previous research results. As expected, language-based skills, including the ALL *Parallel Sentence Production* and the GRADE *Vocabulary* subtests predicted *Reading Comprehension* in that group. The prediction equation included *Phonics* and *Parallel Sentence Production*. Most of the relationships between first-grade measures, except for *Vocabulary*, were moderate rather than strong relationships.

Limitations of the Study

This is an exploratory study of an archival data set of literacy, language, and reading achievement screening and test scores. The study lacked any experimental controls, including random sampling or control groups. A large number of first-grade students either dropped out of the program or were excluded. These students represented test scores from a different and lower level of the GRADE, thus removing the low end of the test-score range at that grade level. As a result, only a correlation matrix and a regression equation were computed for this group. While caution in interpreting the results is warranted for the results of the study, the results have important applications for like-student populations.

Recommendations

Although this study did not produce direct evidence to support the following recommendations, it does provide indirect evidence that reading improvement is a school-wide project, not a project left to individual teachers without administrative support. For example, 42 kindergarten students enrolled in school with one or two literacy deficits at the beginning of the school year. How will the school assign these students to teachers when they enroll in first grade? Will school officials assign most of the hard-core at-risk students to the same teacher? No doubt, these students will be spread among several teachers. However, it is not that important how they are assigned; one, two, or even three teachers will have difficulty improving all of the skills of so many students without school-wide support.

This is especially true in schools serving large numbers of students at risk. When reading intervention is left to individual teachers, the results tend to be fragmented, lacking the coordination necessary to prevent children from falling through the gaps as they progress through the grades. A school-wide program involving all teachers in grades 1-3 with administrative commitment not only supports teacher efforts but also provides the resources and coordination needed to assure student success. Coordination is needed to link all aspects of a well-planned reading intervention program which includes a coordinated system of assessment tools, progress monitoring, test administration, staff development, and an intervention team. Finally, teacher buy-in is instrumental to the success of early reading-intervention approaches. School-wide reading approaches are much more likely to engender teacher buy-in. Following are some potential benefits from a data-based, welldesigned assessment, and an early-intervention program:

A Model School-Wide Reading Program

Data for this study was generated in a school that was just beginning to implement a school-wide approach to reading instruction. Teachers administered the achievement tests; the program had the commitment of administrators; and teachers were instrumental in getting the program established in the school. Perhaps the most outstanding aspect of the program was the connection between test results and curriculum materials which were developed to address the individual needs of students. In a sense, the assessment system, in combination with the curriculum materials, made it possible for ongoing professional development. This was because in

order to administer the tests, the teachers had to become familiar with test administration, terminology, variables, and test scores. Such a system is highly recommended; it has many potential benefits for teachers and students. Several changes are needed to effectively implement a school-wide approach to reading intervention.

Studies are needed to further address the interaction effect between literacy and language at the kindergarten level. While tradition implies that reading comprehension skills should be taught after children actually learn to read, results of this study suggest that children rely on comprehension skills before they actually learn to read. An example in this study is group one (1) whose entry-level language skills were substantially higher than their literacy skills. Students in that group had end-of-the-year achievement scores close to group three, the no-deficit group. At the kindergarten level, comprehension skills are much more likely connected to a child's oral language skills (Snow, 1998), and it seems intuitive that teachers help students develop these oral language skills before they learn to read. In addition, there is a need to better understand children whose comprehension skills lag behind the acquisition of decoding skills. These students learn to read words with little understanding of what was read, and they give few signs of having impairments beyond delays in literacy and language skills.

Surprisingly, this study did not produce a group of kindergarteners who performed poorly on just the ALL *Basic Concepts* subtest. There is still a need to learn more about the specific role of language-based skills at the kindergarten level. It

would also be interesting to compare the scores of rural and urban students on language measures like the one used in this study. The study cited in a previous chapter found no urban-rural differences in word reading skills, but that finding was noted in only one study. Further research may provide more information about rural and urban differences.

Recommendations for Further Research

Although the statistics used in this study were rather straight forward, the study could have been improved using a growth-modeling and or hierarchical linear-modeling procedure. Growth modeling provides information on individual student achievement over time. With the hierarchical linear-modeling, procedure data from kindergarten and first grade could have been combined. These procedures provide statistics on individual students by plotting growth curves and showing the rate of progress over the course of time. They require repeated measures with the same tests and fairly large sample sizes. These procedures were not appropriate for the extant data used in this study, but they may be applied to future research studies where larger sample sizes are possible.

Further research is needed in two areas. First, there is a need to know more about the role of oral language and comprehension at the kindergarten and first-grade levels and how both impacts reading acquisition and practical application. There is also a need to pinpoint growth rates or learning rates for children at risk. For example, how fast will the average student at risk require learning the alphabet? Stated another way, how many months of instruction are needed to move a child from at-risk to

average performance. These are just two areas that would improve delivery of intervention services.

Another area for research combined with a study similar to this one is research on the family backgrounds, including how often children are read to, educational level of parents, discipline approaches, and books in the home.

A study of preschool and non-preschool experiences assessed in the first weeks of kindergarten would also be beneficial, as substantial information suggested in the literature could possibly demonstrate the value of such experiences in reading readiness.

Final Thoughts

This study was the first to my knowledge that investigated the differential impact of language and literacy on reading acquisition. The current approaches which are heavily literacy based and tend to shape and limit classroom instruction to drill-related phonics, give little teaching time to children's language development. This study showed the importance of language in the reading equation as early as kindergarten. It suggested that assessment of language and literacy should be done at the beginning of kindergarten, rather than waiting until problems invariably appear in later grades, when too often children have become non-responsive to intervention. Moreover, the results of this study actually identified the gaps in early kindergarten, showing that children starting with major gaps in language and/or literacy continue with those gaps into the next grade level. If interventions based on identified problems are initiated at the beginning of kindergarten, it might be possible to reduce these gaps.

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