EARLY IDENTIFICATION AND INTERVENTION FOR CHILDREN AT-RISK FOR READING FAILURE FROM BOTH ENGLISH-SPEAKING AND ENGLISH AS A SECOND-LANGUAGE (ESL) SPEAKING BACKGROUNDS.

by

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Abstract

This study examined the early reading development of native English speaking (L1) and children who speak English as a second language (ESL) who are receiving instruction in English. The study addressed whether there are original differences in pre-reading and language skills between L1 and ESL-speaking children, and whether similar patterns of reading development in English from kindergarten to grade 2 exist across language groups. As well, the study examined which skills in kindergarten identify those children at-risk for reading failure from all language backgrounds. The participants of the study were 978 grade 2 children who were seen as part of a longitudinal study that began in their kindergarten year. Within the sample, there were 790 children who are L1 speakers and 188 children who have a first language other than English and who spoke little or no English upon entry to kindergarten (ESL). In kindergarten, participants were administered standardized tasks of reading and memory as well as experimental tasks of language, phonological awareness, letter identification, rapid naming, and phonological memory. At the end of grade 2, children were administered various tasks of reading, spelling, language, arithmetic, and memory. All children received phonological awareness instruction in kindergarten and systematic phonics instruction in grade 1 in the context of a balanced early literacy program. In kindergarten, 23.8% of L1 speakers were identified as at-risk for reading failure and 37.2% of ESL speakers were identified as at-risk for reading failure. In grade 2, 4.2% of L1 speakers were identified as reading disabled and 3.72% of ESL speakers were identified as reading disabled. By the end of grade 2, the majority of the ESL speakers had attained reading skills that were similar to the L1 group. Although there were differences on each of the measures of reading, reading comprehension, spelling, phonological processing and arithmetic between average and disabled readers in grade 2, the ESL and L1 speakers had similar scores on all these tasks.

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who was passionate about the pursuit of knowledge.

There is strong evidence to support the finding that many of the difficulties encountered by English speaking dyslexic children are related to difficulties in various areas of phonological processing (e.g. Bradley & Bryant, 1983; Stanovich, 1992). Within the skills subsumed under phonological processing, phonological awareness is most clearly related to early reading achievement. A strong relationship exists between children's ability to categorize sounds and their eventual success in reading (e.g. Bradley & Bryant, 1983). Phonological awareness refers to an individual's conscious understanding of the individual sounds of the language, and allows them to segment and manipulate those sounds. Tasks which demand explicit phonological awareness, such as identifying the first sound in a word, blending phonemes into a word, or analyzing the constituent sounds in a word have emerged as effective predictors of reading development (e.g. Brady & Shankweiler, 1991). For example, Bryant, Bradley, Maclean and Crossland (1989) found a strong correlation between nursery rhyme knowledge at age 3, development of phonological sensitivity during the preschool years, and success in learning to read. This relationship prevailed even after controlling for differences in vocabulary, social background, and initial phonological sensitivity. Phonological awareness is a powerful predictor of the speed and efficiency of reading acquisition, and a better predictor than other more general measures such as IQ or oral language proficiency (Share, Jorm, Maclean, & Matthews, 1984).

Early Identification of Reading Failure

The early identification of dyslexia is necessary in order to provide timely intervention before children have experienced consistent and repeated failure in school, and while their difficulties remain limited to the act of reading. The experiences of failure during the initial stages of reading acquisition have a variety of negative consequences on the subsequent development of the young child, specifically in reading and related activities. Early reading difficulties that are not identified and addressed through intervention and remediation have a significant and lifelong impact on the disabled reader. With time, the disabled reader becomes

less and less able to read age-appropriate material. Consequently, the reading disabled child reads less and is less likely to enjoy reading as compared to successful readers (Blachman, 1996). Less practice in reading increases the gap between the good reader and the disabled reader in terms of vocabulary development and acquisition of knowledge. This has a negative impact on achievement in all academic areas as well as extra-curricular activity and peer relations (Stanovich, 1986). The negative impact of a reading disability extends well beyond school failure and can have tragic consequences on the life of an individual. A high prevalence of reading disabilities has been identified among adolescent homeless youth and adolescents who have committed suicide (Barwick & Siegel, 1996; McBride & Siegel, 1997).

The difficulties associated with reading reflect a persistent deficit, rather than a developmental lag in linguistic (phonological) skills and basic reading skills (e.g. Bruck, 1992). Longitudinal studies have demonstrated the persistence of a reading disability. Fletcher et al. (1994) found that of those children diagnosed as reading disabled in 3rd grade, 74% remain disabled in 9th grade. Children who fall behind in kindergarten and grade 1 fall further and further behind over time (Lyon, 1995). Research has shown that for a small number of children (i.e. 15% - 20%), phonemic awareness does not develop or improve with time (e.g. Fletcher et al., 1994; Francis, D., Shaywitz, S., Stuebing, K., Shaywitz, B. & Fletcher, J., 1996). Calfee, Lindamood & Lindamood (1973) examined the development of phonological awareness in 660 students between Kindergarten and Grade 12. They found that a plateau effect occurred in 30% of the students, whereby phonological awareness development was limited to very minimal levels. The phonological awareness development of the individuals was strongly related (.73) to their performance on the WRAT reading and spelling subtests. Consequently, within the sample, poor readers at the high school level had phonological awareness skills inferior to those good readers and spellers at the primary level. Children with phonological awareness difficulties require explicit instruction in phonemic awareness at the pre-reading and early reading stages (i.e. kindergarten and grade 1). Early identification is critical in order to provide

intervention and to mediate the impact that a reading disability has on many aspects of a child's life. Developmentally appropriate intervention for reading is important in the early primary years, as the child continues to fail to learn to read with fluency. It has become clear that there is a persistent deficit in phonological processing, rather than a developmental lag, which impedes successful reading acquisition. It is possible to identify which kindergarten children will be at the 10th percentile or below on word recognition measures at the grade 3 level (Lyon, 1995). The implementation of intervention is less effective once a child has failed consistently for 2 to 3 years. After this period of time, there is typically a decreased motivation to read as well as significant delay in the development of reading and related skills (Fletcher, 1992).

It is possible to teach phonological awareness to young children in the pre-reading stage, before reading failure takes place (e.g. Lundberg, Frost & Peterson, 1988). Research has shown that developmentally appropriate intervention and instruction for pre-readers involves phonemic awareness and sound-spelling activities in kindergarten as part of early formal literacy training (e.g. Ball & Blachman, 1991; Foorman et al., 1997). Ball and Blachman (1991) found that 7 weeks of explicit instruction in phonemic awareness combined with explicit instruction in sound-spelling correspondences for kindergarten children was more powerful than instruction in sound-spelling correspondences alone and more powerful than language activities in improving reading skills. These studies reflect the evidence that lends support to the practices of early prevention and early identification of those children at-risk for reading failure. Foorman et al. (1997) conducted a study with three groups of kindergarten and grade 1 children to examine the most effective method of instruction for reducing reading failure in young children. Three different conditions of instruction were examined. The first condition was a whole language method of instruction based on the premise that when children are immersed in a print-rich environment with interesting text the sound-spelling codes are picked up through context. The second type of instruction was an embedded phonics method, a structured approach to phonics, still within a print-rich environment. The third condition was a

systematic, explicit phonic approach that included phonemic awareness instruction, explicit instruction in sound-spelling relationships, and extensive practice in decodable text. The group for whom instruction in sound-spelling relationships occurred concurrently with phonemic awareness instruction made the greatest gains. The authors found that at the grade 1 level, explicit, systematic instruction in sound-spelling relationships was more effective in reducing reading disabilities than a print-rich environment, even for those children who had received instruction in phonemic awareness. This study demonstrated the effectiveness of phonemic awareness instruction combined with explicit, systematic instruction in common sound-spelling correspondences. The most successful preventive programs to reduce the occurrence of reading difficulties involve explicit phonemic awareness instruction at the classroom level (for a review see Adams, 1990).

Phonological Awareness & ESL-speaking Children

Although a great deal is known about the pre-reading skills necessary for early reading acquisition in English, the question remains as to whether the same patterns exist in those children who are designated as learning English as a second language (ESL). Little is known about the development of phonological skills, as well as other important precursors of reading for children with ESL backgrounds. It is important to consider the extent to which their different linguistic background affects the process of learning to read English. Specifically, it is unknown the extent to which the lack of fluency in the language of instruction has an impact on the reading acquisition for the child who speaks ESL as compared to the native English speaker.

Research that has focused on the cross-language transfer of phonological awareness from the native language to the second language indicates that phonological awareness skill transfers from the first to the second language (e.g. Chiappe & Siegel, 1999; Cisero & Royer, 1995; Durgunoglu, Nagy & Hancin-Bhatt, 1993).

Durgunoglu, Nagy & Hancin-Bhatt (1993) examined whether phonemic awareness experience at home and school in the child's first language is related to word recognition in

another language. The sample consisted of 31 Spanish-speaking students in the first grade who were beginning, non-fluent readers receiving English instruction alongside their native English-speaking peers. The results of the study indicated that Spanish word recognition and Spanish phonological awareness were better predictors of performance on English pseudoword and word reading tests than were English or Spanish oral proficiency or English word recognition. On the transfer tests, the children who had better phonological awareness and Spanish word recognition skills performed much better than did children who could read some Spanish words but had weak phonological awareness skills. Thus, phonological awareness was a significant predictor of performance on word recognition tests both within and across Spanish and English. The authors reported that oral proficiency was not as good a predictor of reading performance in English and Spanish as compared to phonological awareness.

Cisero & Royer (1995) examined the development of phonological skills, as well as the transfer to English of phonological skills acquired in Spanish. In one of the experiments within the study, the authors examined how the development of phonological awareness in native language is related to phonological awareness in another language. The sample consisted of native Spanish-speaking and native English-speaking grade 1 children. The first grade native Spanish-speaking children were administered tasks of rhyme detection, initial and final phoneme detection in English and Spanish, on two different occasions. The authors examined whether native language competence with phonological awareness at time 1 can predict the gain in second language phonological awareness skills from time 1 to time 2. Cisero & Royer (1995) confirmed that in their sample of native Spanish-speaking children with little or no experience with English, they children were able to transfer their phonological awareness skills from Spanish to the English task of initial phoneme detection. Accuracy on the Spanish task was a significant predictor of English performance in the native Spanish speakers at time 2, even after the variance associated with English performance at time 1 was accounted for. The results of the study supported the findings of Durgunoglu, Nacy & Hancin-Bhatt (1993) whereby

cross-language transfer of phonological awareness may take place, even in phonological skills that are still developing.

In the study conducted by Durgunoglu, Nagy & Hancin-Bhatt (1993), it is important to note that oral language proficiency was not as good a predictor of reading performance in English and Spanish as was phonological awareness. This supports other research that has outlined that reliance on oral language proficiency is often the cause of underassessment of children's reading ability in the second language that the child is acquiring (e.g. Moll & Diaz, 1985). It is important to continue to examine the role of phonological awareness as a predictor of reading development given that it may be a stronger, better predictor of reading performance for children who speak English as a second language than oral language skills.

Syntactic Awareness

Similar to phonological awareness, syntactic awareness is a skill that is related to beginning reading achievement. Syntactic awareness refers to an understanding of the grammatical structure of the language, specifically within sentences (Tunmer & Hoover, 1992). Given that syntactic awareness skills require proficiency with the language, it is a critical element in reading acquisition in a second language. The ability to process syntax has been identified as an important component of word learning (Ehri & Wilce, 1980). Readers with good syntactic awareness skills are able to use the sentence and context clues that lend themselves to the ability to make predictions about the words that come next in text. As well, good syntactic skills allow the reader to monitor their reading comprehension processes in an effective manner. This monitoring may take place in two different forms: to correct word recognition difficulties within a passage, and to derive the meaning of a difficult word in a passage (Tunmer & Hoover, 1992). Syntactic awareness is often measured using an oral cloze task whereby the child must provide a word to complete a sentence. Several studies have focused on the relationship between syntactic skills and reading ability. Willows & Ryan (1986) reported a predictive relationship between syntactic processing and early reading achievement. Tunmer et al. (1987)

found that poor readers were deficient in syntactic awareness even when compared to a sample of reading-matched controls. Siegel and Ryan (1988) found that reading disabled 7 to 13 year-old children performed significantly more poorly on measures of syntactic awareness than age-matched normal readers. Previous studies have shown a deficit in syntactic awareness skills for children with ESL (e.g. Da Fontoura & Siegel, 1995).

Da Fontoura & Siegel (1995) conducted a study with 9-12 year old children for whom instruction was in English, and the language in the home was Portuguese. The children were administered tasks of word and pseudoword reading, language, and working memory in Portuguese and English. The performance of the bilingual group was compared with the performance of an age-matched monolingual English group. The only measure on which the monolingual and bilingual normally achieving readers differed significantly was the measure of English syntactic awareness. Scores on the English oral cloze task were significantly lower for the bilingual group as compared to the monolingual group. The same pattern was evident for the reading disabled groups; in addition, the bilingual children had significantly more difficulty with the English syntactic awareness task.

Memory

Some research has focused on the relationship between working memory processes and reading ability. Working memory refers to the temporary storage and/or manipulation of information while performing a variety of cognitive tasks, including the retrieval of information from long-term memory (Baddeley, 1986). Such tasks may involve comprehension, learning and reasoning. Specific to reading, working memory is vital as the reader must simultaneously decode words and remember what has been read. In the early reading acquisition stage, working memory is critical as the grapheme-phoneme conversion rules for each segment of the word are recalled and held in memory as the reader decodes each part of the word (Siegel, 1993).

In a longitudinal study, Mann & Liberman (1984) examined the relationship of phonological awareness and verbal short-term memory to reading ability. In kindergarten, the children were administered tasks of verbal short-term memory and phonological awareness. In grade 1, children were administered tasks of reading, phonological awareness, and verbal short-term memory. The study showed that phonological awareness skills and verbal short-term memory ability in kindergarten were significantly correlated with grade 1 reading achievement.

Siegel and Ryan (1989) studied working memory in 7 to 13 year-old normally achieving and reading disabled children. The two working memory tasks administered involved working memory for language and working memory for numerical information. The reading disabled children had significantly lower scores on both types of working memory tasks as compared to normal readers. The results of the study indicated the significance of working memory for the development of reading and computational arithmetic skills.

McDougall, Hulme, Ellis & Monk (1994) found a significant relationship between reading ability and memory for verbal material in children ages 7 to 9. Siegel (1994) found that deficits in working memory are characteristic of reading disabled individuals throughout childhood, adolescence, and adulthood. Chiappe, Hasher & Siegel (2000) examined working memory in English-speaking normal and disabled readers of various ages. The results of the study are consistent with the findings of Siegel (1994) that working memory is a lifelong deficit for disabled readers, with difficulties extending beyond childhood through adolescence and adulthood.

A few studies have examined working memory and second language reading acquisition. Geva and Siegel (2000) reported significant correlations among reading and memory tasks in both English and Hebrew for English speaking children learning to read Hebrew. The authors also reported that verbal memory was a significant predictor of basic reading skills in both English and Hebrew. Consistent with the findings for English normal and disabled readers, Da Fontoura & Siegel (1995) reported that those Portuguese-Canadian

children classified as reading disabled in English showed significantly poor performance on tasks of working memory in both English and Portuguese. The deficits in working memory for reading disabled children suggest a generalized difficulty with working memory for those children with reading disabilities.

ESL speakers receiving instruction in their non-native language

A number of studies have been conducted to examine the early reading and spelling development of children who receive classroom instruction in a language other than the language they speak in the home. For example, Verhoeven (1990) conducted a study to examine the differences in reading acquisition between children learning to read in their native language as compared to children learning to read in a second language. The longitudinal study was designed to examine the reading acquisition during the first two years of schooling for monolingual Dutch children and bilingual Turkish children. After 20 months of literacy instruction, the overall performance of the two groups on word reading efficiency was not statistically different. In reading comprehension, however, the Turkish children performed at significantly lower levels throughout grade 1 and grade 2 as compared to the Dutch children. The results of the study indicated that the reading comprehension of the Turkish children was more strongly correlated with oral proficiency in the second language than word recognition skills.

Wade-Woolley and Siegel (1997) compared native English-speaking and ESL Grade 2 children on their ability to attain accurate spellings of English words and pseudowords. The sample was divided by language status as well as by reading performance. The spelling performance within the sample was reflective of reader group; the poor readers had significantly lower spelling scores than the normal reader group. However, the language status of the children was not a significant factor in spelling performance. Spelling performance was more highly correlated with reading skills than with first language. The findings from this study suggest that the acquisition of a second language does not have an impact on the ability of ESL

children to become proficient in English spelling. This study supports previous research that demonstrated that even if differences in the orthographic complexity of the child's first and second language exist, emergent spelling patterns in both languages of the child are similar (Geva, Wade-Woolley & Shany, 1993).

Only one study to date has examined the profile of both native and non-native speakers of English and their English reading acquisition. Chiappe and Siegel (1999) examined the grade 1 performance of a group of 38 Punjabi-speaking Canadian children (ESL) and a group of 50 native English speakers on tasks assessing reading skill, phonological processing and syntactic awareness. All children were attending schools in Canada, and receiving instruction in English. Measures of word recognition and phonological processing successfully discriminated between the grade 1 average and poor readers, however they did not discriminate between the two language groups. It is critical to note that the ESL children had skills in phonological awareness and reading comparable to their native English-speaking peers despite lower scores on a measure of oral language that tapped syntactic awareness skills. From this study, it appears that difficulties in reading acquisition result from a deficit in phonological processing independent of the language of instruction. Among both the native English-speaking and ESL children, the authors identified a link between phonological processing difficulties and reading difficulties. It is important to conduct further research to validate the relationship between phonological ability and the development of reading in ESL-speaking children receiving instruction in English.

Present Study

The purpose of the present study was to examine the early reading development of native English speaking (L1) and English as a second language-speaking (ESL) children who are receiving instruction in English. By examining the reading, spelling, language, arithmetic, and memory skills in a large cohort of children from linguistically diverse backgrounds across time, three questions in the area of early reading development are examined. The first question

addresses whether there are differences in pre-reading and language skills between L1 and ESL speakers in the beginning of kindergarten. The second question addresses whether similar patterns exist in ESL-speaking and L1 speakers who are normal readers or who are experiencing reading failure in the spring of grade 2. The third question addresses which skills at the beginning of kindergarten are the most effective predictors of subsequent reading failure in children from ESL and L1 backgrounds.

Measures assessing both phonological and syntactic skills were administered in order to address the ambiguity surrounding the relationship between such factors as oral proficiency and phonological awareness and the reading development of the child in the target language.

Method

Design

All children were tested in the fall of kindergarten, and classified as at-risk for reading failure or not at-risk based on their performance on the reading subtest of the Wide Range Achievement Test -3 (WRAT3; Wilkinson, 1993) reading subtest. Children were classified as at-risk for reading failure if their performance on the WRAT reading subtest was at or below the 25th percentile. In kindergarten, children were classified as not at-risk if their performance on the WRAT reading subtest was at or above the 30th percentile. Two hundred and ninety-six children (236 L1 speakers and 60 ESL-speaking children) had a score below the 26th percentile on the WRAT reading subtest and thus were classified as at-risk for reading failure. Eight hundred and sixty-six (766 L1 speakers and 100 ESL-speaking children) had a score above the 29th percentile on the WRAT reading subtest and thus were classified as not at-risk for reading failure. Of the 1238 children in the full kindergarten sample, there were 610 females and 628 males. The mean age of the sample in kindergarten was 64.39 months with a standard deviation of 3.45 months.

Children were tested in the spring of grade 2, and classified as average readers or reading disabled based on their performance on the reading subtest of the Wide Range Achievement Test -3 (WRAT3; Wilkinson, 1993) reading subtest. In grade 2, forty children (33 L1 speakers and 7 ESL speaking children) were reading below the 26th percentile and were classified as reading disabled. Nine hundred and thirty eight children (757 L1 speakers and 181 ESL speaking children) were reading above the 29th percentile and thus were classified as average readers. Of the children in the full grade 2 sample, 469 were females, and 509 males. The mean age of the sample was 93.72 months with a standard deviation of 3.66 months.

Participants

The children are part of a longitudinal study that began in their kindergarten year. These children represent all of the children from all of the 30 schools in the school district. Within the full sample in kindergarten there were 1041 L1 speakers and 197 ESL speakers. In grade 2, due to attrition, the full sample included 790 L1 speakers, and 188 ESL speakers. Children were classified as ESL in kindergarten if they spoke a language other than English at home to parents, siblings, and grandparents. Most of the ESL speakers were immigrants to Canada, although some had been born in Canada. In the elementary schools in this school district, children with ESL backgrounds receive the same early classroom instruction in English as their non-ESL peers. In the case of many ESL children who are born in Canada or who arrive from their native country as young children, they begin the same schooling in English at the same time as their non-ESL peers, despite very limited oral proficiency. The full sample represented a wide range of socioeconomic status. The ESL children came from a variety of linguistic backgrounds; the full sample included a total of 38 different native languages. For the ESL children, the predominant native languages were Cantonese, Mandarin and Farsi.

Kindergarten Measures[1]

Literacy Measures

Wide Range Achievement Test – 3 (Wilkinson, 1993): Reading subtest (blue form). Each child was asked to name capital letters and to read some simple words.

Letter Identification. Each child was asked to name lower-case letters.

Phonological Processing Measures

Sound Mimicry. The children's skill at recognizing and reproducing sounds in oral language was assessed using the Sound Mimicry subtest of the Goldman, Fristoe, and Woodcock (1974) In this task, children repeated pseudowords of increasing difficulty that had been read to them by the experimenter (e.g. ab, dod, bafmotbem).

Rhyme Detection Task from the Phonological Awareness Test (Muter, Hulme & Snowling, 1997). In this task, the children were shown four pictures. A picture of the target word appeared above three pictures. Children were asked which of the three words rhyme with the target word. An example from the task is: "What rhymes with cat? Fish, sun or hat?"

Phoneme Deletion Task from the Phonological Awareness Test (Muter, Hulme & Snowling, 1997). For this task, the examiner would present the child with a picture of the word and then ask them to delete a phoneme (initial or final) from the word. For example, when the children deleted initial phonemes from the words, the examiner would say "Bus without /b/ says ____", and when the children deleted final phonemes from the words, "Bag without /g/ says _____."

Syllable Identification and Phoneme Identification tasks from the Phonological Awareness Test (Muter, Hulme & Snowling, 1997) were administered. In these tasks, children were required to complete words. In the syllable identification task, the examiner presented a picture (i.e. rabbit) to the child. The examiner said the first part of the word (i.e. "ra") and asked the child to finish the word (i.e. "bit"). In the phoneme identification task, the examiner presented a picture (e.g.

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[1]See appendix A for a copy of non-standardized tasks administered in kindergarten.

watch). The examiner said the first part of the word (i.e. "wa") and asked the child to finish the word (i.e. "tch").

Rapid Automatized Naming (RAN). Phonological recoding in lexical access, or word retrieval, was assessed using a variation of the Rapid Automatized Naming task (RAN; Denckla & Rudel, 1976). In this task, the child named 40 items on a page consisting of line drawings of 5 different items (tree, chair, bird, pear, car) repeated 8 times. To ensure that all children knew the target words, a practice page of the 5 items was presented immediately before the presentation of the 40 items. The score was the time taken (number of seconds) to complete the chart of 40 items.

Measures of Oral Language

Syntactic Awareness. Children's syntactic awareness was assessed using an oral cloze task (Willows and Ryan, 1981; Siegel & Ryan, 1989). In the oral cloze task, 12 sentences were read to the children, and then children attempted to provide the missing word in each sentence. An example of this task includes "*The moon shines bright in the* ____."

Memory

Stanford Binet (Thorndike, Hagen, & Sattler, 1986) Memory for Sentences subtest. In this task children are asked to repeat sentences from simple two word sentences (e.g. Drink milk) to complex sentences (e.g. Ruth fell in a puddle and got her clothes all muddy.)

Spelling.

In order to examine children's spelling ability in kindergarten, children were asked to print their names, and five simple words (i.e. mom, no, I, cat, dad).

Grade 2 Measures[2]

Reading Measures

Wide Range Achievement Test – 3 (Wilkinson, 1993): Reading subtest (blue form). This test involves a reading list of words of increasing difficulty. Each child was required to read as many

[2] See appendix B for a copy of all non-standardized tasks administered in grade 2.

words as possible from the list. The task administration was discontinued when ten consecutive words were read incorrectly. Sample words from the list include in, cat, stretch, triumph.

Woodcock Johnson Reading Mastery Test (Form G) (Woodcock, 1973): Word Identification. This subtest is made up of a word-reading list of increasing difficulty. Each child was required to read as many words as possible from the list. The task administration was discontinued when all items in a given level were failed. Sample words from the list include: is, find, mathematician.

Woodcock Johnson Reading Mastery Test (Form G) (Woodcock, 1973): Word Attack. In order to measure decoding skills, the subtest is made up of a list of pseudowords of increasing difficulty. The child is required to decode as many words as possible from the list. The task administration was discontinued when all items in a level were failed. Sample words from the list include: dee, ap, straced.

Reading Comprehension. The Stanford Diagnostic Reading Test (Karlsen & Gardner, 1994) Reading Comprehension was administered in groups in each of the Grade 2 classrooms. Each child received a booklet and was required to read the short passages within the booklet and provide responses to multiple-choice questions in a prescribed time limit.

One minute word reading (WRAT3 reading; Wilkinson, 1993 (tan form). In this task the child was presented with a list of real words of increasing difficulty and asked to read as many words as possible within a one-minute time period. Sample words include: as, because.

One minute pseudoword reading: (Word Attack alternate form list; Woodcock; 1973). In this task the child was presented with a list of pseudowords and asked to read as many words as possible within a one-minute time period. Sample words include: yee, dreek.

Memory

Working Memory for Words (Siegel & Ryan, 1989). The children were presented orally with sentences that were missing the final word. The children were required to provide the missing word and then repeat all the missing words from each set. There were three trials within each set of increasing sentences (2, 3, 4, 5). To minimize word-finding problems, the sentences were

chosen so that the word was virtually predetermined. The children did not experience any difficulty in supplying the missing word. Examples of sentences: Snow is white, grass is _____;. The task administration was discontinued when the child failed all the items at one level.

Working Memory for Numbers (Siegel & Ryan, 1989). This task involved counting yellow dots from a field of blue and yellow dots arranged in a randomly determined irregular pattern on a 5 x 8 inch index card, for sets (levels) of 2, 3, 4, or 5 cards and then recalling the counts for each set in the correct order. There were three sets at each level. The task administration was discontinued when the child failed all the items at one level.

Phonological Processing. Phonological processing was assessed using Rosner's Auditory Analysis Test (Rosner & Simon, 1971) which includes both syllable and phoneme deletion. The child was asked to say a word and then asked to say the word again having taken part of the sound off the word (e.g. "Say smell," "Now say smell without the /m/ sound)." Two practice items and 40 test items were administered. Participants were asked to delete syllables or single phonemes from both the initial and final positions in each word, and also single phonemes from blends. The 40 items were arranged in approximate order of difficulty and administration of the test items was discontinued after 5 consecutive error responses.

Lexical Access. A Rapid Automatized Naming (RAN) task was used to test the efficiency of lexical retrieval. In this task, children were required to name individual numbers (1-9) presented in a random order in a 5 X 5 array. Each child's performance was timed in seconds.

Syntactic Awareness. An oral cloze task (Siegel & Ryan, 1988) was administered to each child. In this task, children were asked to supply the missing word for each of the 12 sentences read to them. Sample item: "The moon shines bright in the _____."

Spelling.

Wide Range Achievement Test – 3 (Wilkinson, 1993): Spelling (blue form). This test is made up of orally presented words of increasing difficulty of which the child was required to generate the correct spelling. Sample items: must, enter.

Real word spelling. A task of word spelling to dictation was administered. The children had to generate the correct spelling for 10 different words. Sample items: love, toy.

Nonword spelling. A task of nonword spelling to dictation whereby the child had to generate a plausible letter representation of the word was administered. Sample items: ged, tave.

Arithmetic

Wide Range Achievement Test – 3 (Wilkinson, 1993): Arithmetic (blue form). This test is made up of a page of computational written mathematics problems that the child is required to solve to the best of their ability. Sample items: 2+7 =__, 33-17 = __.

District Wide Reading Program

The school district to which the children belong is one that has made a commitment to a balanced reading acquisition program that includes phonological awareness instruction. Following the kindergarten assessment, each school received feedback on the performance of the children who took part in the study. The classroom teachers and resource personnel received feedback on the individual performance on every task of each child who participated in the study. Specifically, those children who were classified as at-risk for reading failure were identified within the feedback. The phonological awareness training took the form of classroom-based, small group activities led by teachers and was universal for all children in kindergarten. The kindergarten phonological awareness training for all children was in the context of a variety of literacy activities, which included a combination of activities with an explicit emphasis on the sound-symbol relationship as well as independent activities such as cooperative story writing and journal writing using invented spelling. Given the district's commitment to early identification and intervention for children at-risk for reading failure, for some children in the study, the phonological awareness intervention continued into grade 1 and took the form of more targeted small group activities.

Procedure

Trained graduate students conducted individual assessments in the schools. Each child was assessed individually in a quiet room. The spelling, reading comprehension and arithmetic tasks were administered in a group setting in the classrooms. Some children were not administered every task due to absence from the classroom on the day of testing.

Results

Kindergarten Results

The results of a 2 x 2 ANOVA revealed a significant main effect ($p<.001$) for native language on kindergarten performance (effect sizes across measures ranging from .000 to .059). A significant main effect for classification in kindergarten ($p<.001$) was detected (effect sizes across measures ranging from .008 to .577). A 2 x2 ANOVA revealed that native language and classification did not interact to create a significant interaction effect for kindergarten performance (effect sizes across measures ranging from .000 to .007). See appendix C for a table of F-values and effect sizes for each kindergarten task. There were significant language effects on all individual measures except WRAT reading, letter identification, Phoneme Identification, Syllable Identification and Phoneme Deletion tasks. There were significant effects for the at-risk classification on all tasks within the L1 group, and for the ESL group on all tasks except Sound Mimicry and Memory for Sentences. See appendix E for a summary of mean scores and F-values by reader classification groups.

Literacy Measures. Table 1 summarizes the children's performance on the early literacy measures in kindergarten.

Table 1. Mean Scores on Measures of Early Literacy.

Kindergarten Measure	Not at-risk		At-risk	
	L1	ESL	L1	ESL
WRAT3 reading percentile				
M	68.18	72.28	12.85	10.50
SD	18.02	18.58	7.19	7.25
Letter Identification (max. 26)				
M	18.34	19.99	6.25	4.67
SD	5.67	5.88	4.70	4.75
Spelling (max. 6)				
M	3.05	2.72	1.18	.96
SD	1.81	1.87	.98	.87

WRAT3 = Wide Range Achievement Test (3rd Ed.)

There were no significant differences between the ESL and L1 groups on the WRAT reading subtest, $F(1, 1088) = 1.98$, ns, and on the Letter Identification task, $F(1, 1088) = 1.99$, ns. However, within the two language groups, there were significant differences between the at-risk and not at-risk children on all literacy measures. The ESL at-risk group performed significantly more poorly than the ESL not at-risk group on the WRAT reading subtest, $F(1, 140) = 486.82$, $p<.001$, as well as on the Letter Identification task, $F(1, 140)=239.63$, $p<.001$. By definition, the L1 at-risk group performed significantly more poorly than the L1 not at-risk group on the WRAT reading subtest, $F(1, 929)=2012.69$, $p<.001$. The at-risk group also performed significantly more poorly on the Letter Identification task, $F(1, 929)=856.32$, $p<.001$. As a group, the L1 group performance was significantly higher than the ESL-speaking group on the measure of Simple Spelling, $F(1, 1088)=9.20$, $p<.01$. Within the ESL group, the at-risk children performed significantly more poorly than the not at-risk children on Simple Spelling, $F(1, 140) = 42.436$, $p<.001$, Within the L1 group, the not at-risk children's scores were significantly higher than the at-risk children on Simple Spelling, $F(1, 929) = 225.56$, $p<.001$.

Phonological Processing Measures. Table 2 summarizes the results of the kindergarten measures of phonological processing.

Table 2. Mean Scores on Measures of Phonological Processing.

Kindergarten Measure	Not at-risk		At-risk	
	L1	ESL	L1	ESL
GFW Sound Mimicry percentile				
M	82.51	76.01	73.64	69.28
SD	19.49	25.56	25.33	28.80
Rhyme Detection (max. 10)				
M	7.24	5.64	5.71	4.03
SD	2.91	3.23	3.37	3.05
Syllable Identification (max.8)				
M	5.03	4.72	3.53	3.07
SD	2.38	2.19	2.81	2.67
Phoneme Identification (max.8)				
M	3.23	3.51	1.44	1.42
SD	3.01	2.99	2.33	1.99
Phoneme Deletion (max. 16)				
M	3.93	3.48	2.04	1.56
SD	4.74	4.89	3.25	2.95

GFW = Goldman Fristoe Woodcock

As a group, the ESL group performed significantly more poorly than the L1 group on Sound Mimicry, $F(1, 1088) = 7.096$, $p<.001$, and Rhyme Detection, $F(1,1088) = 40.38$, $p<.01$. There were no significant differences between the language groups on the measures of Syllable Identification, $F(1, 1088) = 1.67$, ns, Phoneme Identification, $F(1, 1088) = 0.002$, ns and Phoneme Deletion, $F(1,1088) = 3.02$, ns. Within the ESL group, there were no significant differences between at-risk and not at-risk children on Sound Mimicry, $F(1, 140) = .720$, ns. Within the ESL group, the at-risk group performed significantly more poorly than the not at-risk group on the Rhyme Detection task, $F(1, 140) = 7.68$, $p<.001$, the Syllable Identification task, $F(1, 140) = 13.97$, $p<.01$, the Phoneme Identification task, $F(1, 140) = 17.88$, $p<.001$, and Phoneme Deletion task, $F(1, 140) = 6.59$, $p<.001$. Within the L1 children, the not at-risk group

scores were significantly higher than the at-risk group on all measures of phonological processing including Sound Mimicry, F(1, 929)=27.56, p<.001, Rhyme Detection, F(1, 929)=37.51, p<.001, Syllable Identification, F(1, 929)=49.38, p<.001, Phoneme Identification, F(1, 929)=59.26, p<.001, and Phoneme Deletion, F(1, 929)=29.56, p<.001. Table 3 summarizes the results kindergarten measures of oral language, memory, and lexical access.

Table 3. Mean Scores on Measures of Syntactic Awareness, Memory, and Lexical Access

Kindergarten Measure	Not at-risk		At-risk	
	L1	ESL	L1	ESL
Oral Cloze (max.12)				
M	2.63	1.68	1.55	.56
SD	2.84	2.55	2.12	1.25
Memory for Sentences (max. 37)				
M	17.26	14.21	15.36	13.53
SD	3.70	4.12	3.47	4.41
Rapid Naming (sec.)*				
M	66.46	73.86	76.73	91.13
SD	2.87	26.55	24.72	33.32

*scale is reversed whereby longer time indicates slower naming.

As a group, the ESL children performed significantly more poorly than the L1 group on the Oral Cloze measure of syntactic awareness, F(1, 1088)=20.48, p<.001. Within the ESL group, the not at-risk group scores were significantly higher than the at-risk group, F(1, 140) = 7.69, p<.001. Similarly, within the L1 group, the not at-risk group scores were significantly higher than the at-risk group, F(1, 929) = 29.17, p<.001.

Memory. As shown in Table 3, the ESL children, as a group, performed significantly more poorly than the L1 group on the Memory for Sentences, F(1, 1088) = 68.01, p<.001. Within the ESL group, there were no differences between the not at-risk children and the at-risk children, F(1, 140) = 1.44, ns. Within the L1 group, the not at-risk group scores were significantly higher than the at-risk group, F(1, 929) = 47.91, p<.001.

Lexical Access. As shown in Table 3, the ESL children, as a group, performed more poorly than the L1 group on the Rapid Naming task, $F(1,1088) = 32.02$, $p < .001$. Within the ESL group, the not at-risk group scores were significantly higher than the at-risk group, $F(1, 140) = 15.07$, $p < .001$. Similarly, within the L1 group, the not-at risk group scores were significantly higher than the at-risk group, $F(1, 929) = 12.57$, $p < .001$.

Grade 2

The results of a 2 x 2 ANOVA revealed no significant interaction effect of native language group and reader group on grade 2 measures (effect sizes across measures ranging from .001 to .002). The results of a 2 X 2 ANOVA revealed that there was a significant main effect ($p < .001$) for reader group on grade 2 performance (effect sizes across measures ranging from .002 to .152). A 2 X 2 ANOVA revealed that there was no significant main effect for native language on grade 2 performance (effect sizes across measures ranging from .001 to .003). See appendix D for a table of effect sizes for each task in grade 2. See appendix F for a summary of mean scores and F-values by reader groups in grade 2.

Reading Measures. The performance of the reader and language groups on the reading measures is shown in Table 4.

Table 4. Mean Scores on Measures of Reading

Grade 2 Measure	Average Readers		Reading Disabled	
	L1	ESL	L1	ESL
WRAT3 reading percentile				
M	73.97	75.71	11.30	10.57
SD	4.12	3.83	2.67	3.55
W-J Word Identification percentile				
M	76.42	80.29	19.55	13.00
SD	11.95	10.26	13.89	14.97
W-J Word Attack percentile				
M	74.50	77.25	23.58	16.00
SD	7.61	6.80	5.29	5.38
SDRT Comprehension percentile				
M	55.51	54.14	14.06	14.83
SD	3.62	3.32	8.22	7.91
One-minute word reading* (max.44)				
M	22.68	24.24	10.17	10.67
SD	5.46	4.51	4.25	6.02
One-minute pseudoword reading* (max.45)				
M	24.18	26.28	6.28	8.33
SD	8.74	7.49	4.70	3.20

* = number correct

WRAT3 = Wide Range Achievement Test (3rd Ed.)

W-J = Woodcock Johnson Reading Mastery Tests

SDRT = Stanford Diagnostic Reading Test

The disabled readers performed significantly more poorly than the average readers for the WRAT3 reading, $F(1, 869) = 120.80$, $p<.001$. The disabled readers recognized significantly fewer words than the average readers for the W-J Word Identification, $F(1, 869) = 105.28$, $p<.001$. On the W-J Word Attack, the disabled readers decoded significantly fewer pseudowords than the average readers, $F(1,869) = 92.27$, $p<.001$. On the Stanford Diagnostic Reading Comprehension Test (SDRT), the disabled readers performed

significantly more poorly than the average readers, $F(1, 869) = 130.57$, $p<.001$. The disabled readers read significantly fewer words than the average readers on the one-minute word reading test, $F(1, 869) = 98.61$, $p<.001$, and the one-minute pseudoword reading task, $F(1, 869) = 73.48$, $p.<.001$.

Within the L1 children the average readers scored significantly higher than the reading disabled children on the WRAT3 reading, $F(1, 832) = 250.87$, $p<.001$, the W-J Word Attack, $F(1, 833) = 162.82$, $p<.001$, the W-J Word Identification, $F(1, 833)=161.32$, $p<.001$, and the Stanford Diagnostic Reading Comprehension Test, $F(1, 809) =101.29$, $p<.001$. The L1 average readers read significantly more words than the reading disabled group on the one-minute word reading test, $F(1, 759) = 124.89$, $p<.001$, as well as on the one-minute pseudoword reading test, $F(1, 829) = 113.83$, $p<.001$.

Within the ESL children, there was no overlap between the scores for two reader groups on the WRAT3 reading by definition, $F(1, 195) = 66.32$, $p<.001$. The ESL average reader scores were significantly higher than the ESL reading disabled group on the W-J Word Identification, $F(1, 194)=55.94$, $p<.001$, the W-J Word Attack, $F(1, 195)=52.02$, $p<.001$, and the Stanford Reading Comprehension, $F(1, 191)=15.75$, $p<.001$. The ESL average readers read significantly more words than ESL disabled readers on the one-minute word reading test, $F(1, 179) = 42.35$, $p<.001$, and the one-minute pseudoword reading test, $F(1, 194) = 29.69$, $p<.001$.

Within the average reader population, the ESL children read significantly more pseudowords on the W-J Word Attack than L1 children, $F(1, 937) = 4.06$, $p<.001$. The effect sizes for the reading measures ranged from .12 to .22.

Syntactic Awareness, Phonological Processing and Lexical Access. Table 5 shows the performance on measures of syntactic awareness, phonological processing, and lexical access.

Table 5. Mean Scores of Syntactic Awareness, Phonological Processing and Lexical Access

Grade 2 Measure	Average Readers		Reading Disabled	
	L1	ESL	L1	ESL
Oral Cloze* (max.11)				
M	7.63	6.68	5.18	4.71
SD	1.66	2.10	1.69	2.69
Rosner Auditory Analysis* (max.30)				
M	22.02	22.60	12.82	17.50
SD	5.89	5.68	6.24	6.66
Rapid Naming (sec.)				
M	12.84	12.37	15.72	15.57
SD	2.99	2.69	3.53	4.93

* = number correct

The average reader performance was significantly better than the disabled readers on the Oral Cloze task, $F(1, 869) = 20.61$, $p<.001$. Within the average reader population, the performance of the ESL group on Oral Cloze was significantly poorer than the L1 speakers, $F(1, 935) = 42.65$, $p<.001$. There were significant differences between the average readers and the disabled readers on the Rosner Auditory Analysis Test, $F(1, 869) = 22.18$, $p < .001$. On the rapid naming test, the average reader performance was significantly better than the disabled readers, $F(1,869)=7.88$, $p<.001$.

Within the L1 children, the average reader scores were significantly higher than the disabled readers on the Oral Cloze, $F(1, 835) = 66.58$, $p<.001$, the Rosner Auditory Analysis Test, $F(1, 835) = 72.65$, $p<.001$, and the Rapid Naming test, $F(1, 835) = 24.98$, $p<.001$. Within the ESL children, the average reader scores were significantly higher than the disabled readers on the Oral Cloze, $F(1, 192)=5.14$, $p<.05$, the Rosner Auditory Analysis Test, $F(1, 193)= 4.35$, $p<.05$, and the Rapid Naming Test, $F(1, 194)= 8.74$, $p<.01$.

Working Memory and Arithmetic. The performance of the reader and language groups on measures of working memory and arithmetic are shown in Table 6.

Table 6. Mean Scores on Measures of Working Memory and Arithmetic

Grade 2 Measure	Average Readers		Reading Disabled	
	L1	ESL	L1	ESL
Working Memory Words* (max.12)				
M	3.52	3.34	2.61	2.86
SD	1.56	1.76	1.39	1.46
Working Memory Numbers* (max.12)				
M	6.16	6.22	5.36	4.14
SD	2.36	2.46	2.26	1.07
WRAT3 arithmetic percentile				
M	52.46	59.26	31.64	38.50
SD	22.32	2.89	17.51	13.35

WRAT3= Wide Range Test of Achievement (3rd Ed.)

Working Memory. There were no significant differences between the average readers and the disabled readers on the Working Memory for Words task, $F(1, 869) = 1.56$, ns. The average reader performance was significantly better than the disabled readers on the Working Memory for Numbers task, $F(1, 869) = 6.11$, $p<.05$. Within the L1 children, there were no significant differences between the average readers and the disabled readers on the Working Memory for Numbers task, $F(1, 835)=3.26$, ns. On the Working Memory for Words task, the L1 average readers performed significantly better than the L1 disabled readers, $F(1, 834)=10.38$, $p<.001$. Within the ESL children, there were no significant differences between the average readers and the disabled readers on the Working Memory for Words task, $F(1, 193)=.47$, ns. On the Working Memory for Numbers task the ESL average readers performed significantly better than the ESL disabled readers, $F(1, 194)=4.55$, $p<.05$.

Arithmetic. As a group, the average readers performed significantly better than the disabled readers on the WRAT3 arithmetic, $F(1, 869)=12.34$, $p<.001$. Within the average reader group, arithmetic performance of the ESL group was significantly higher than the L1 average readers, $F(1, 908)=25.89$, $p<.001$. Within the L1 group, the average readers performed significantly

better than the disabled readers, F(1, 804)=29.20, p<.001. Within the ESL group the average readers performed significantly better than the disabled readers, F(1, 191)=4.82, p<.05.

Spelling. Table 7 shows the performance of the reader and language groups on the spelling measures.

Table 7. Mean Scores on Measures of Spelling.

Grade 2 Measure	Average Readers		Reading Disabled	
	L1	ESL	L1	ESL
WRAT3 Spelling percentile				
M	62.96	70.01	20.61	16.83
SD	2.96	3.28	2.19	1.94
Real Word Spelling* (max.10)				
M	8.88	9.29	5.12	5.17
SD	1.42	1.07	2.32	2.20
Nonword Spelling* (max.10)				
M	8.40	8.84	5.52	5.67
SD	1.54	1.86	2.73	1.97

WRAT3= Wide Range Test of Achievement (3rd Ed.)

As a group, the average reader performance was significantly higher than the disabled reader performance on the WRAT3 spelling, F(1, 869)=66.84, p<.001. As well, the average readers spelled more words correctly than the disabled readers on both the Real Word Spelling, F(1,869)=124.73, p<.001, and the Nonword Spelling, F(1, 869) = 37.10, p,.001. Within the average reader population, the ESL children's performance was significantly higher than the L1 readers on the WRAT3 Spelling, F(1, 903) = 20.97, p <.001, the Real Word Spelling, F(1, 834) =12.23, p<.001, and Nonword Spelling, F(1, 833) = 16.32, p<.001.

Within the L1 group, the average reader performance was significantly higher than the disabled readers on the WRAT3 Spelling, F(1, 800) = 110.45, p<.001, the Real Word Spelling, F(1, 737) = 136.76, p<.001, and the Nonword Spelling, F(1, 736) =70.29, p<.001. Within the ESL group, the average reader performance was significantly higher than the disabled readers on the WRAT3 Spelling, F(1,190) = 35.49, p<.001, the Real Word Spelling, F(1,178) =68.96, p<.001, and the Nonword Spelling, F(1, 177) = 5.97, p<.001.

Prediction of Reading Skill

Stepwise regression analyses were used to select the kindergarten variables that were the best predictors of WRAT-3 reading performance in grade 2 for both ESL and L1 speakers. With the exception of the children's kindergarten WRAT-3 reading subtest, all of the kindergarten variables were entered into the equation. The results are summarized in Table 8.

Table 8. Regression Analysis Predicting Children's WRAT-3 Reading Performance in Grade 2

Kindergarten Measure	R^2	ΔR^2	Probability
L1 Group			
1. Letter Identification	.094	.094	p<.001
2. Phoneme Deletion	.131	.037	p<.001
3. Memory for Sentences	.154	.023	p<.001
ESL Group			
1. Rhyme Detection	.118	.142	p<.001
2. Phoneme Deletion	.214	.072	p<.001

Among the L1 group, 3 variables explained 15.4% of the variance in WRAT-3 reading in grade 2: Letter Identification, Phoneme Deletion, and Memory for Sentences.

Among ESL children in kindergarten, 2 variables explained 21.4% of the variance in WRAT-3 reading: Rhyme Detection and Phoneme Deletion. Thus, phonological processing skills were important predictors of WRAT-3 reading performance at the end of kindergarten for children from both language groups.

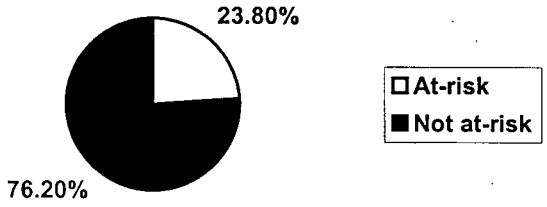
Kindergarten and Grade 2 Classification

Figure 1 shows the results of the kindergarten and grade 2 assessments. As shown in Figure 1, 23.80% of the L1 group were identified as at-risk for reading failure in kindergarten, while

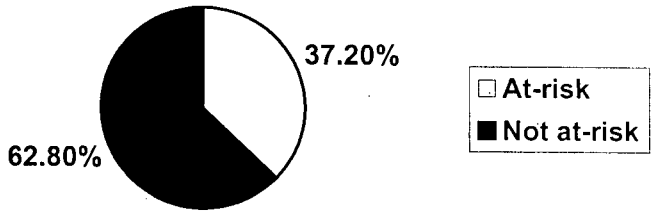
76.20% of the L1 group were identified as not at risk for reading failure. In kindergarten, 37.20% of the ESL group were identified as at-risk for reading failure, while 62.80% were identified as not at-risk for reading failure. In grade 2, 4.20% of the L1 group were identified as reading disabled, while 95.80% of the L1 group were identified as normal readers. Of the grade 2 ESL group, 3.72% of the children were identified as reading disabled, while 96.28% of the children were identified as normal readers.

Figure 1. Frequency of reader type by native language - Kindergarten vs. Grade 2.

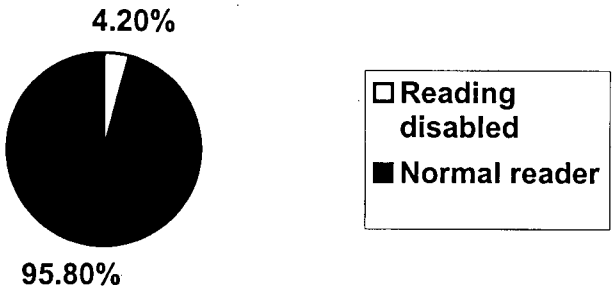
L1 Speakers – Kindergarten



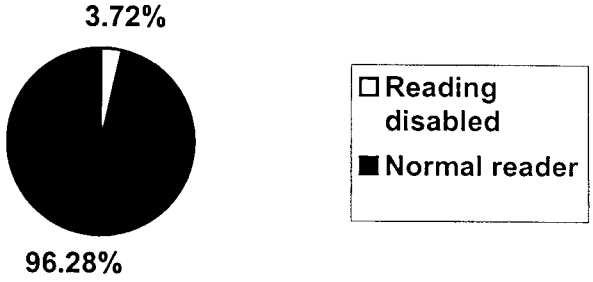
ESL Speakers - Kindergarten



L1 Speakers – Grade 2



ESL Speakers – Grade 2



Discussion

In kindergarten, the ESL-speaking children performed more poorly than the L1 children on many tasks. In kindergarten, four distinct groups were evident following the pre-reading assessment of both L1 and ESL children; there were overall differences by language group and within those language groups there were distinct groups of at-risk and not at-risk children. Within the ESL-speaking children, there were no significant differences between the at-risk and not at-risk children on the tasks of verbal auditory memory and the Sound Mimicry task. Both of these tasks require linguistic proficiency in order to manipulate and remember English, and proved difficult for all ESL-speaking children as compared to their native English-speaking peers.

The performance of ESL speaking children on measures of reading in grade 2 reflects a developmental profile that is very similar to the profile of their L1 peers. In kindergarten, there were overall differences by language group and within those language groups there were distinct groups of at-risk and not at-risk children. By grade 2, the impact of language status had disappeared, and two distinct groups had emerged: normal and disabled readers. The frequency with which ESL children were classified as reading disabled occurred was approximately the same as the L1 children. By Grade 2, the ESL group had acquired the sound-symbol relationships of the English language to the extent that they were reading and spelling at a level equivalent to their L1 peers. The results of the study provide substantial evidence that phonological processing plays an important role in reading development for both native and non-native speakers of English.

When examining the current results it is important to consider that the school district to which the children in the current study belong is committed to early identification and intervention for children at-risk for reading failure. As well, the district is committed to providing a balanced early reading program that includes phonological awareness and explicit phonics instruction. For the majority of children who experienced early reading difficulties in

kindergarten, their difficulties were likely mediated through a balanced early reading program that included phonological awareness instruction. The classroom teachers and resource personnel received feedback on the individual performance on every task of each child who participated in the study. Specifically, those children who were classified as at-risk for reading failure were identified within the feedback. The kindergarten phonological awareness training for all children was in the context of a variety of literacy activities, which included a combination of activities with an explicit emphasis on the sound-symbol relationship as well as independent activities such as cooperative story writing and journal writing using invented spelling. For children who continued to have difficulty the phonological awareness intervention continued into grade 1 and took the form of more targeted small group activities.

By Grade 2, a comparable proportion of ESL children and L1 children were able to develop strong phonological processing skills and read at an average level in English. This supports previous research that found that even if a young child is still developing phonological awareness skills in their native language, their developing skills will aid their reading acquisition in English (Cisero & Royer, 1995). Verhoeven (1990) also found that word recognition skills were not different across language groups after 20 months of classroom instruction. On the pseudoword reading task, the ESL average reader group performed at a significantly higher level than the L1 group. This indicates the positive effect of bilingualism with regard to the development of phonological skills.

For L1 children, letter identification, phoneme deletion, and verbal working memory accounted for 15% of the variance in grade 2 reading performance. Within the ESL-speaking population, rhyme detection and phoneme deletion accounted for 21% of the variance in grade 2 reading performance. Although moderate, these predictions support that even in a large diverse sample, with many factors contributing to development and variability over 3 years, it is possible to identify those skills in kindergarten that lend themselves to future reading success. For children from all linguistic backgrounds, phonological processing skills in kindergarten are

critical to future reading success. The relatively small effect sizes of the findings in the study may be reflective of a large sample with large variance. As well, robust effect sizes are normally associated with controlled studies with systematic experimental manipulation. The effect sizes, although small, also support the role of phonological processing skills in the development of reading for children from varying linguistic backgrounds.

Although a subgroup of ESL speaking children did experience difficulty with reading acquisition in English, their performance profile is very similar to the L1 children with a reading disability. Reading disability, in either the L1 speakers or the ESL children, was characterized by low scores on all measures of phonological processing, as well as syntax and working memory. The difficulties with phonological processing for the children with reading disability are reflected in the extremely low scores on the one-minute word reading task, and even lower scores on the one-minute pseudoword reading task. Both of the tasks, and particularly the pseudoword reading task demand effective, fluent decoding. The L1 and ESL disabled readers had difficulty with reading, spelling, and phonological processing tasks, including working memory. The similar difficulties for the disabled readers across both language groups is consistent with previous research that demonstrates the role that phonological processing, syntactical awareness and working memory play in the development of reading skills in English, regardless of native language (e.g. Chiappe & Siegel, 1999; da Fontoura & Siegel, 1995). One difference to consider between the L1 and ESL disabled readers was in arithmetic whereby the performance of the ESL group was significantly higher than the performance of L1 speaking disabled readers. Future years of study with this sample warrants continual monitoring of the development of arithmetic in the disabled reader to examine whether this difference persists between language groups.

It is critical to note that within the average reader population, the ESL children performed at a significantly lower level in the area of syntactical skills. The absence of difficulty with word recognition tasks despite lower scores in syntactic awareness is consistent previous research in

the area of second language reading acquisition. Da Fontoura & Siegel (1995) found that Grade 4, 5 and 6 bilingual Portuguese-English children did not demonstrate difficulty with word reading tasks despite scores on the oral cloze task that were significantly lower than the monolingual English-speaking normal readers. Similarly, Chiappe & Siegel (1999) found that despite scores on the oral cloze task that were significantly lower than the monolingual English-speaking group, the average reader Punjabi-speaking children had no difficulties with word reading tasks.

Although the ESL children had native English speaking peers and teachers as oral language models from kindergarten through to grade 2, this exposure was not sufficient to develop their syntactic skills to the same extent as their L1 peers. It is not known whether the syntactic skills of the ESL children are underdeveloped and lagged behind only at this young age, or whether the syntactic skills develop in a different manner and remain underdeveloped as compared to children who are native speakers of English. Further investigation and examination of the development of syntactic skills of children who speak English as a second language is required in order to address this question, and will be subject to future study in the context of this longitudinal study.

When examining spelling performance, there is a clear indication that the language status of the children was not a significant factor in spelling performance. In the case of spelling for the normal readers, the ESL average readers performed significantly better than the L1 average readers on a measure of word spelling. Previous studies have found that spelling performance in ESL children is more related to reading skill than to first language (e.g. Wade Woolley & Siegel, 1997). The results of this study are consistent in that the average reader population as a whole had similar processing profiles, and the poor readers from both language groups had phonological processing deficits and a distinct processing profile. The results of this study reflect a trend of higher scores on measures of phonological processing in ESL children, specifically spelling and pseudoword reading. This supports a theory of phonological

processing and related task performance as a function of reading skill rather than language status.

Similarly, in the area of reading comprehension, the ESL children performed at comparable levels to the L1 average readers. This finding is inconsistent with previous findings in second language reading acquisition. Verhoeven (1990) found that even after 20 months of literacy instruction, the performance of the bilingual Turkish children, although comparable in word recognition, was inferior in the area of reading comprehension. Verhoeven (1990) attributes this lower level of achievement to syntactic ability and oral proficiency. The findings from this study indicate that the early stages of reading comprehension are similar for both L1 and ESL speakers, and are unrelated to the native and target language of the ESL child. It remains in question as to whether ESL children in the present study will maintain a comparable level of achievement as compared to their L1 peers as the text becomes more complex with longer passages, and demands that the reader make inferences, as well as understand metaphors and analogies.

The significantly higher performance of the ESL average readers on many measures, including pseudoword reading, spelling and arithmetic as compared to the L1 average readers must be further investigated. In particular, in the case of phonological recoding and spelling, investigation needs to be carried out to determine if the learning process of the ESL children is more systematic than for their L1 peers. Given that English is not spoken in the home, early reading acquisition and language development relies very heavily on classroom instruction. The superior performance of the ESL average readers on the pseudoword reading and word spelling measures may reflect the direct, explicit phonological awareness activities in their classrooms. On the other hand, it may be explained from a linguistic perspective; as ESL-speaking children acquire English, their second language, there is an increase in their metalinguistic awareness and this may account for their elevated performance on tasks of phonological awareness. Campbell & Sais (1995) reported accelerated phonological awareness ability in a sample of

bilingual kindergarten children who were exposed to a second language during their preschool years.

This study is relevant for those individuals involved in both the education and research of children at-risk for reading failure. In order to provide early intervention and remediation for all children who are at-risk for reading failure, it is critical that teachers and other professionals are aware of those early reading skills that identify children who speak English as a second language and who may experience reading difficulties.

The results demonstrate the ability for ESL children who enter kindergarten with little or no English to attain a level of achievement in the areas of reading, spelling, and mathematics that is comparable to their native English-speaking peers by Grade 2. It is evident that the development of reading skills in children who speak English as a second language is very similar to the development of reading skills in native English speakers. Phonological processing plays a more significant role than syntactic awareness in the development of reading skills for both L1 and ESL speakers. The successful acquisition of the sound-symbol relationship in English for early reading is dependent on such factors as instruction and individual differences as opposed to the fluency and proficiency with the English language. Difficulties in acquiring the sound-symbol relationship for fluent, automatic decoding arise in approximately 20% of children (Lyon, 1995). Within the Grade 2 sample from the district, approximately 4% of children continue to experience reading failure.

There is a higher incidence of school dropout among children from ESL backgrounds as compared to native English-speaking students (Gunderson, 1999). It is critical to understand the development of academic skills for children who enter the school system in kindergarten with little or no experience with English. Specifically, it is necessary to consider the extent to which their different linguistic background has an impact on the process of learning to read English. For those ESL-speaking children who experience difficulty with early reading acquisition in English, the results of this study demonstrate that, as in L1 speakers, it is related

to phonological awareness ability. In order for all children to receive equal opportunity in developing fluent reading skills, it is critical that both native English speaking and ESL speaking children are identified at a young age as at-risk for reading failure. Once identified as having early reading difficulty, it is necessary that those children receive early intervention that includes, but is not limited to, explicit phonological awareness instruction.

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APPENDIX A

Oral Cloze

Instructions: I will read something to you and there will be one word missing. Where the word is missing, I will say "beep." I want you to think of a word that would sound right in the "beep."

For example, I might say, "The moon shines bright in the "beep." (pause and repeat) and I want you to say "sky" , etc. O.K. Let's try another one. I'll say, "The children "beep" with the toys." (pause and repeat). What is the missing word? If the child fails to respond, say, "How about play?" Then it would be "The children play with the toys." Let's try another one. "The puppy wags its "beep". (pause and repeat). Good! Let's try some more.

Discontinue if the child fails the practice items and the first three task items.

1. The _____ little pigs ate corn.
2. Fred put the big turkey _____ the oven.
3. The _____ put his dairy cows in the barn.
4. Jane _____ her sister ran up the hill.
5. It was a sunny day with a pretty _____ sky.
6. Betty _____ a hole with her shovel.
7. Jim set the lamp on the desk so he could _____.
8. The boy had big brown eyes and a pleasant _____.
9. The children put on their boots _____ it snows.
10. When we go _____ the building, we must be quiet.
11. Dad _____ Bobby a letter several weeks ago.

Rhyme Detection

Instructions

Examiner:

"Here is a picture of a cat. Down here are three more pictures..." (the examiner points to and names each of the 3 choice pictures). Now which of these three - fish, sun or hat rhymes with cat?" Provide the correct answer (hat) if necessary and explain that hat rhymes with cat because they end with the same sound (at).

Continue as above with the other 2 demonstration items, giving explanations when necessary. The instructions fro the 10 items are the same as for the demonstration items. Do not give feedback on the test items.

If the child fails the demonstration items and the first 5 test items, you may discontinue the test.

Demonstration Items

Stimulus Word	Response Items		
1. cat	fish	sun	hat
2. ball	wall	bell	bag
3. spoon	cup	moon	ship

Test Items

Stimulus Word	Response Items		
1. boat	foot	bike	coat
2. key	cow	tree	door
3. chair	car	table	bear
4. house	mouse	horse	window
5. head	hand	bed	eye
6. bell	bottle	dress	shell
7. sock	clown	clock	shoe
8. train	rain	tractor	spoon
9. egg	bag	spoon	leg
10. car	star	bike	cake

Syllable and Phoneme Identification

Instructions for Syllable Identification (Word completion)

Examiner: "Here is a picture of a rabbit. I'm going to say the first part of the word. Can you finish it off for me? Here is a ra..." (The child should respond 'bit.' If the child fails to give the correct answer, say "IF I say ra, you finish the word by saying bit. Let's try it again with rabbit. Ra...." Supply the bit again if necessary.)

Repeat as above for the second example, bottle. A full explanation and feedback are given for the two demonstration items.

Present the test items 1 to 8 with the instructions, "This is a table. Ta...." Do not give feedback for the test items.

If the child fails the demonstration items and the first four test items, the task may be discontinued.

Demonstration Items

___ Ra-bbit
___ Bo-ttle

Test Items

1. ___ Ta-ble
2. ___ Pic-ture
3. ___ Cabb-age
4. ___ Mon-ey
5. ___ O-range
6. ___ Sand-wich
7. ___ Mon-ster
8. ___ Lem-on

score: _____/8

Instructions for Phoneme Identification

Examiner: "Now we are going to do something that is a bit more difficult. Here is a picture of a watch. I'll say the first part - you finish it off. Here is a watch. Wa..." Provide corrective feedback if necessary. Repeat for the demonstration item, cat.

Proceed with items 1-8 using the instructions "This is a horse. Hor..." Do not provide feedback for test items.

If the child fails the demonstration items and the first four test items, the task may be discontinued.

Demonstration Items:

___ Wa-tch
___ Ca-t

Test Items:

1. ___ Hor-se
2. ___ Fi-sh
3. ___ Kni-fe
4. ___ Shi-p
5. ___ Bo-ne
6. ___ Car-d
7. ___ Ga-te
8. ___ Do-g

score: _____/8

Phoneme Deletion

Instructions for Initial Phoneme Deletion:

Examiner: "Here is a picture of a bus. If I say the word /bus/ without the /b/, we'll be left with /us/. Bus without /b/ says us. Let's try some more. Give all 4 demonstration items, and explain fully, as for "bus."

Administer items 1 to 8 with the instruction, "Meat without /m/ says...." Do not give feedback for the test items.

If the child fails the demonstration items and the first 4 test items, you may discontinue the task.

Demonstration Items

___ bus ___ sad ___ pie ___ cow

Test Items

1. ___ seat
2. ___ bear
3. ___ hat
4. ___ sit
5. ___ jam
6. ___ tin
7. ___ cake
8. ___ cup

score ___/8

Instructions for Final Phoneme Deletion

Examiner: "Now this time, instead of taking off the first sound of words, let's try and take off the last sound. This will make things that are not real words. Here's a picture of a foot. Can you hear the last sound in foot? The last sound in foot is /t/. Now can you say foot without /t/? Foot without /t/ is foo."

Give all 4 demonstration items, and explain fully as for foot.

Administer items 1 to 8 with the instruction, "Meat without /t/ says...." Do not give feedback for the test items.

If the child fails the demonstration items and the first 4 test items, you may discontinue the task.

Demonstration Items

___ foot ___ bag ___ bell ___ spoon

Test Items

1. ___ seat
2. ___ sad
3. ___ hat
4. ___ bus
5. ___ jam
6. ___ tin
7. ___ cake
8. ___ cup

score ____/8

Total score ____/16

Letter Identification

Instructions

Examiner: I am going to show you letters one at a time. Tell me the name of each letter.

_____j
_____g
_____l
_____z
_____s
_____a
_____e
_____u
_____d
_____w
_____t
_____f
_____n
_____o
_____c
_____m
_____x
_____v
_____h
_____r
_____b
_____q
_____y
_____l
_____k
_____p

Score _____/26

j	g	l	z
s	a	e	u
d	w	t	f
n	o	c	m
x	v	h	r
b	q	y	i
k	p		

Picture Naming (Rapid Automatized Naming)

Show the child the 8 X 5 table of pictures and say:

> "I want you to look at these pictures and tell me what they are. Let's look at the first row. I'll point to each picture, and then you can tell me what it's a picture of. Let's start."

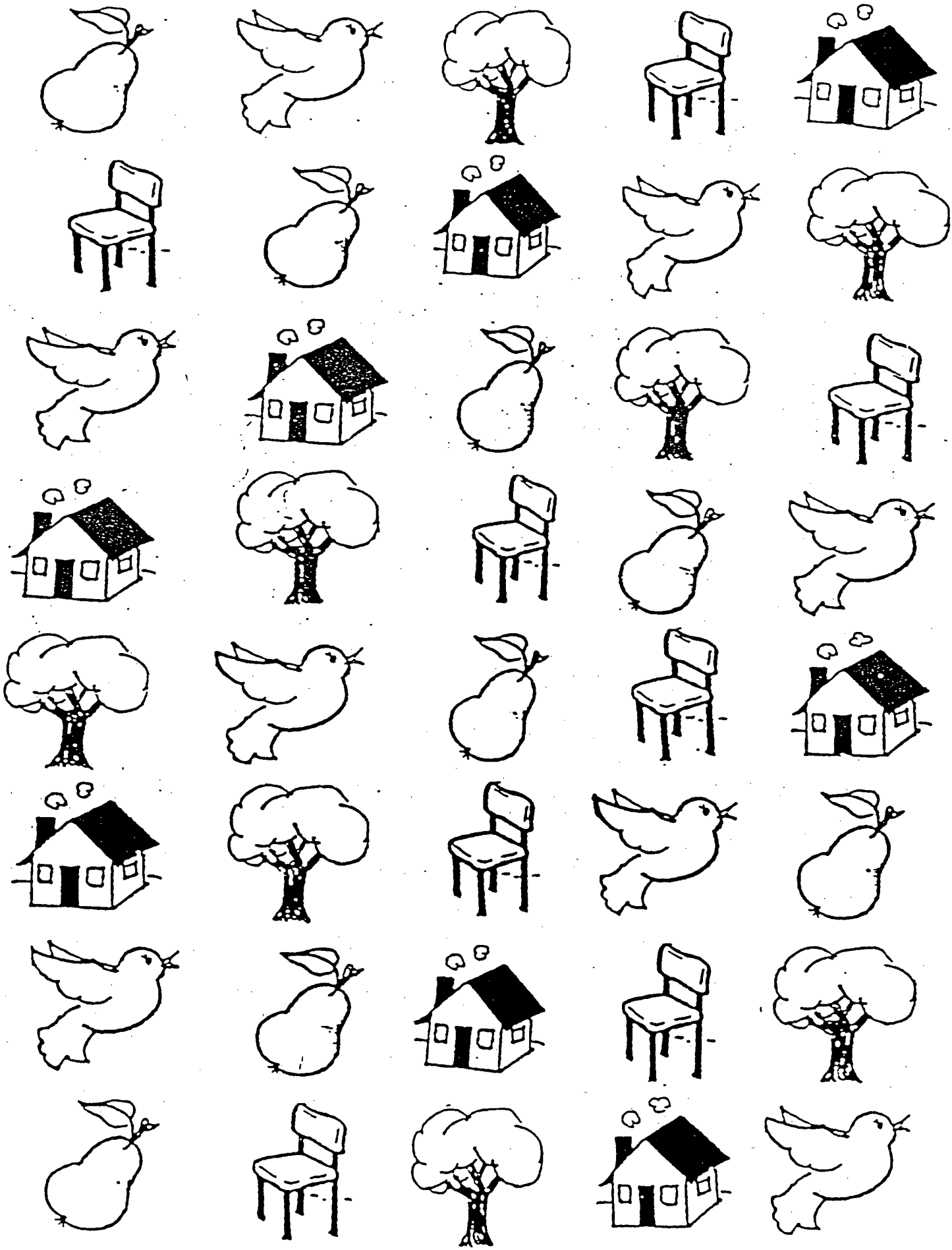
Point (from left to right) to the pear, the bird, the tree, the chair, and the house. Once the child can successfully name each picture, say:

> "Now let's see how fast you can tell me the names of all these pictures. I want you to go from here (point to the top left picture) to here (point to the top right picture), and then go to the next row and go from here (left) to here (right). Start when I say go. Ready? Set. Go!"

Record how long it takes the child to name all the pictures from the time you say "Go," and the number of uncorrected errors. Both the time (in seconds) and the number of uncorrected errors should be recorded on the coversheet.

If children consistently misname one of the pictures (such as calling the pear an apple) despite instructions to the contrary during practice, let them continue. However, make a note of it on the coversheet.

RAPID AUTOMATIZED NAMING (RAN) - Stimulus Sheet



Simple Spelling

" I would like you to show me how to write your name. Will you write your name here for me?" (Have the child write his or her name on the top line of the page.)

"Now I would like you to write some more words for me. I am going to read some words to you, and I would like you to print them for me. Try to spell them as best you can. I will say the word, then read a sentence with the word in it, and the say the word again. You only have to write the word once. Try your best. If you are not sure how to spell a word, it's okay to guess."

1.	no	There are no wrong answers.	no
2.	dad	My dad is happy.	dad
3.	mom	My mom played with me.	mom
4.	I	I live at home.	I
5.	cat	The cat played with the string.	cat

APPENDIX B

Name_____

ORAL CLOZE

Instructions: This time I will read something to you and there will be a word missing. Where the word is missing, I will say "beep." I want you to think of a word that would sound right in the spot where I say "beep". For example, I might say "The moon shines bright in the "beep." (pause and repeat) and I want you to say "sky." O.K. let's try another one. I'll say "The children "beep" with the toys." (pause and repeat). What's the missing word? (If the child fails to respond, say "How about, play? Then it would be "The children play with the toys." Let's try another one. "The little puppy wags its "beep." (pause and repeat). Good!

1. We have done the work already. We _____ it yesterday.
2. John is a good player. Bill is a better player than John. But Tom is the _____ player of them all.
3. Jane _____ her sister ran up the hill.
4. The brown dog is small; the gray dog is smaller; but the white one is the _____.
5. Betty _____ a hole with her shovel.
6. Yesterday, Tina and Marie _____ walking down the street.
7. The girl _____ is tall plays basketball well.
8. The hungry dogs have _____ all the food.
9. Jeffrey wanted to go _____ the roller coaster.
10. Dad _____ Bobby a letter several weeks ago.
11. Yesterday, Joe _____ the ball.

TOTAL /11

Rosner Auditory Analysis Test

Now we are going to play a game of removing sounds from words. I'm going to say a word and then tell you to take part of the sound off and then say what's left. Here is how it will work. "Say 'cowboy'." Wait for response. **"Now say cowboy again, but without the boy sound". "Say 'toothbrush'."** Wait for response. **"Now say toothbrush again, but without the tooth sound".** If the child fails either of the two practice items, attempt to teach the task by giving the correct response, explaining why it is correct, and re-presenting the item. **Say "sat". Now say "sat" without the /s/ sound.** If either item is failed again, discontinue testing and score the test zero. If the items are answered correctly, then proceed.

Testing for all subjects ends after five consecutive errors. Present the remainder of the items in the same way.

Check items answered correctly. Mark line under last item attempted.

Sample Items:

cow(boy) _____
(tooth)brush _____
(s)at _____

1.	birth(day)	_____	10.	ti(me)	_____
2.	(car)pet	_____	11.	plea(se)	_____
3.	(m)an	_____	12.	stea(k)	_____
4.	ro(de)	_____	13.	bel(t)	_____
5.	(w)ill	_____	14.	(sc)old	_____
6.	(l)end	_____	15.	(c)lip	_____
7.	(s)our	_____	16.	(s)mile	_____
8.	(g)ate	_____	17.	(p)ray	_____
9.	to(ne)	_____	18.	(b)lock	_____

19. (b)reak _____
20. s(m)ell _____
21. (t)rail _____
22. de(s)k _____
23. (sh)rug _____
24. cr(e)ate _____ remove [ee], answer [crate]
25. s(m)ack _____
26. re(pro)duce _____remove [pra], answer [reduce]
27. s(k)in _____
28. s(w)ing _____
29. (st)rain _____
30. g(l)ow _____
31. st(r)eam _____
32. c(l)utter _____
33. off(er)ing _____ remove [er], answer [offing]
34. dy(na)mo _____ remove [nuh], answer [dimo]
35. auto(mo)bile _____ remove [muh], answer [autobeel]
36. car(pen)ter _____ remove [puhn], answer [carter]
37. Ger(ma)ny _____ remove [muh], answer [journey]
38. lo(ca)tion _____ remove [kaa], answer [lotion]
39. con(tin)ent _____ remove [tin], answer [conent]
40. phi(lo)sophy _____ remove [law], answer [fuhsophy]

Total Correct _____ /40

Working Memory Numbers

Procedure: Place card A in front of child. After child finishes counting, immediately turn card over on a stack near yourself, not the child.

Using the card A, teach the child to count the yellow dots, ignoring the blue ones.

"Count the yellow dots. Try not to pay attention to the blue dots. Just count the yellow dots. You should touch each dot with your finger while you count out loud. Now you can practice counting the yellow dots."

"How many yellow dots were there?"

Using cards B and C:

"Now I want you to count the yellow dots on one card and then on another card. Be sure to touch each yellow dot and to count out loud. Then I want you to tell me how many dots there were on the first card and then on the second card."

"Okay, let's try it."

"Now we are going to count yellow dots on some more cards. You should start to count as soon as you see a new card. When you see a blank card, you should tell me how many yellow dots were on each card in that set. In the beginning, you will only count 1 card at a time, then 2 cards at a time, and then even more cards. Each time you see the blank card you should tell me the numbers for each card you counted. You should tell me the numbers in the order in which you saw the cards - that is, how many yellow dots on the first card, the second, and so on."

Discontinue when child has failed an entire level (i.e. all three items – A, B, C of a particular number).
Note: Announce each new level. Record numbers in the order the child has said them.

Practice:

1. Card A _____ 1b. Cards B,C _____ _____

Test Items:

2. A. _____ _____
   B. _____ _____
   C. _____ _____

3. A. _____ _____ _____
   B. _____ _____ _____
   C. _____ _____ _____

4. A. _____ _____ _____ _____
   B. _____ _____ _____ _____
   C. _____ _____ _____ _____

5. A. _____ _____ _____ _____ _____
   B. _____ _____ _____ _____ _____
   C. _____ _____ _____ _____ _____

TOTAL _____/12

4	1	3	2	5
9	4	2	7	5
3	6	1	9	3
6	8	9	4	8
3	1	5	2	6

RAN Task
(Speeded Number Naming)

When I turn over this piece of paper you are going to see some numbers. I want you to name them as quickly as you can. Start by going across the page and then do the next row. Keep going and don't stop.
(Use stopwatch to time and circle uncorrected errors)

4 1 3 2 5

9 4 2 7 5

3 6 1 9 3

6 8 9 4 8

3 1 5 2 6

Time (to the nearest second): _____

Number of uncorrected errors: _____

Working Memory Task

Instructions:

I am going to say some sentences and the last word in each sentence will be missing. I want you to tell me what you think the last word should be. Let's try one. "*For breakfast the little girl had orange* _____." Now I am going to read two sentences. After each sentence, I want you to tell me the word that should go at the end of the sentence. When I finish the two sentences, I want you to tell me the two words that you said for the end of each sentence. Please tell me the words in the order that you said them. Let's try it. "*When we go swimming, we wear a bathing* _____." *Cars have to stop at a red* _____."

Discontinue when the child has failed an entire level (i.e. all three items – A, B, C of a particular number)

Note: Announce each new level. Record the words in the order the child has said them.

Items

2A
1) In a baseball game, the pitcher throws the _____.
2) On my two hands, I have ten _____.
Child's responses: _____(ball, fingers)

2B
1) In the fall, we need to rake _____.
2) When we are sick, we often go to the _____.
Child's responses: _____(leaves, doctor)

2C
1) An elephant is big, a mouse is _____.
2) A saw is used to cut _____.
Child's responses: _____(small, wood)

3A
1) Running is fast, walking is _____.
2) At the library people read _____.
3) An apple is red, a banana is _____.
Child's responses: _____(slow, books, yellow)

3B
1) The sun shines during the day, the moon at _____.
2) In the spring, the farmer plows the _____.
3) The young child had black hair and brown _____.
Child's responses: _____(night, field, eyes)

3C
1) In the summer it is very _____.
2) People go to see monkeys in a _____.
3) With dinner, we sometimes drink _____.
Child's responses: _____(hot, zoo, milk)

4A
1) Please pass the salt and _____.
2) When our hands are cold we wear _____.
3) On the way to school I mailed a _____.
4) After swimming, I was soaking _____.
Child's responses: _____
_____(pepper, gloves, letter, wet)

4B
1) Snow is white, grass is _____.
2) After school, the children walked _____.
3) A bird flies, a fish _____.
4) In the barn, the farmer milked the _____.
Child's responses: _____
_____(green, home, swims, cow)

4C
1) In the autumn, the leaves fall off the _____.
2) We eat soup with a _____.
3) I go to the pool to _____.
4) We brush and comb our _____.
Child's responses: _____
_____(trees, spoon, swim, hair)

5A
1) For the party, the girl wore a pretty pink _____.
2) Cotton is soft, and rocks are _____.
3) Once a week, we wash the _____ _____.
4) In the spring it is very ___ _____ _____.
5) I throw the ball up and then it comes _____.
Child's responses: _____
_____(dress, hard, car..., rainy, down)

5B
1) The snail is slow, the rabbit is _____.
2) At a birthday party, we usually eat ice cream and _____.
3) Sandpaper is rough but glass is _____.
4) In a garden, we pick _____.
5) Over the field, the girl rode the galloping _____.
Child's response: _____
_____(fast, cake, smooth, flowers, horse)

5C
1) To cut meat we use a sharp _____.
2) In the daytime it is light, and at night it is _____.
3) Dogs have four _____.
4) At the grocery store, we buy _____.
5) A man is big, a baby is _____.
Child's responses: _____
_____(knife, dark, legs, food, small)

Total Correct _____/12

SPELLING WORDS

REAL WORDS

men	The men are talking.	men
did	I did the work yesterday.	did
him	The book belongs to him.	him
sad	The movie made me sad.	sad
good	The chocolate tasted good.	good
love	I love to ski.	love
toy	He has a toy train.	toy
said	She said, "good morning."	said
head	His head hurt.	head
some	Some people came to visit.	some

SPELLING NONWORDS

fid (like hid)

pem

gan (like man)

het (like wet)

sog (like bog)

vood (like food) other acceptable spellings: vude

tave (like have) other acceptable spellings: tav, talve

vone (like gone) other acceptable spellings: vaun, vaughan, von, vawn

coth (like both) other acceptable spellings: koth, cothe, kothe, coath

gead (like head) other acceptable spellings: ged

APPENDIX C

F-values and Effect Sizes for Language Group on Kindergarten Performance

Kindergarten Measure	F-value	Eta squared
WRAT3 reading	1.98	.002
Letter Identification	1.99	.002
GFW Sound Mimicry	7.09*	.006
Rhyme Detection	40.38*	.036
Syllable Identification	1.67	.002
Phoneme Identification	.01	.000
Phoneme Deletion	3.02	.003
Oral Cloze	20.48*	.019
Rapid Naming	32.02*	.029
Memory for Sentences	68.01*	.059
Simple Spelling	9.20*	.008

*p<.001

WRAT3 = Wide Range Achievement Test (3rd Ed.)

GFW = Goldman Fristoe Woodcock

F-values and Effect Sizes for Reader Classification on Kindergarten Performance

Kindergarten Measure	F-value	Eta squared
WRAT3 reading	1455.06**	.577
Letter Identification	689.56**	.393
GFW Sound Mimicry	8.88*	.008
Rhyme Detection	26.11**	.024
Syllable Identification	35.49**	.032
Phoneme Identification	45.64**	.041
Phoneme Deletion	20.21**	.019
Oral Cloze	18.83**	.017
Rapid Naming	39.31**	.036
Memory for Sentences	15.41**	.014
Simple Spelling	131.42**	.110

*$p<.01$ **$p<.001$

WRAT3 = Wide Range Achievement Test (3rd Ed.)

GFW = Goldman Fristoe Woodcock

F-values and Effect Sizes for Language*Reader Classification on Kindergarten Performance

Kindergarten Measure	F-value	Eta squared
WRAT3 reading	3.97	.004
Letter Identification	7.78*	.007
GFW Sound Mimicry	1.19	.001
Rhyme Detection	.05	.000
Syllable Identification	.05	.000
Phoneme Identification	.25	.000
Phoneme Deletion	.01	.000
Oral Cloze	.01	.002
Rapid Naming	2.05	.002
Memory for Sentences	2.55	.002
Simple Spelling	.137	.000

*$p<.001$

WRAT3 = Wide Range Achievement Test (3rd Ed.)

GFW = Goldman Fristoe Woodcock

APPENDIX D

F-values and Effect Sizes for Language Group on Grade 2 Performance

Grade 2 Measure	F-value	Eta Squared
WRAT3 reading	.05	.000
W-J Word Identification	.01	.000
W-J Word Attack	.06	.000
SDRT Reading Comprehension	.01	.000
Working Memory for Numbers	1.55	.002
Working Memory for Words	.13	.000
Oral Cloze	1.12	.000
Rosner Auditory Analysis	2.37	.003
Rapid Automized Naming (RAN)	1.57	.002
One-minute word reading	.52	.001
One-minute pseudoword reading	.97	.001
WRAT3 Spelling	.14	.000
Real Word Spelling	.27	.000
Pseudoword Spelling	.27	.000
WRAT3 Arithmetic	1.73	.001

WRAT3= Wide Range Achievement Test

W-J = Woodcock-Johnson Reading Mastery Tests

SDRT = Stanford Diagnostic Reading Test

F-values and Effect Sizes for Reader Group on Grade 2 Performance

Grade 2 Measure	F-value	Eta squared
WRAT3 reading	155.83*	.152
W-J Word Identification	63119.12*	.112
W-J Word Attack	51791.04*	.115
SDRT Reading Comprehension	29783.19*	.063
Working Memory for Numbers	33.76	.007
Working Memory for Words	3.96	.002
Oral Cloze	63.47*	.024
Rosner Auditory Analysis	752.54*	.025
Rapid Automized Naming (RAN)	69.37*	.009
One-minute word reading	73.52*	.102
One-minute pseudoword reading	5581.37*	.078
WRAT3 Spelling	38984.06*	.086
Real Word Spelling	267.22*	.124
Pseudoword Spelling	109.89*	.040
WRAT3 Arithmetic	8067.38*	.018

*$p < .001$

WRAT3= Wide Range Achievement Test

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SDRT = Stanford Diagnostic Reading Test

F-values and Effect sizes for Language*Reader Interaction on Grade 2 Performance

Grade 2 Measure	F-Value	Effect Size
WRAT3 reading	.18	.000
W-J Word Identification	1.01	.000
W-J Word Attack	.78	.000
SDRT Reading Comprehension	.08	.000
Working Memory for Numbers	1.60	.002
Working Memory for Words	.29	.000
Oral Cloze	1.84	.002
Rosner Auditory Analysis	1.13	.001
Rapid Automized Naming (RAN)	.22	.000
One-minute word reading	.58	.001
One-minute pseudoword reading	.04	.000
WRAT3 Spelling	1.35	.002
Real Word Spelling	.94	.001
Pseudoword Spelling	.78	.001

WRAT3= Wide Range Achievement Test

W-J = Woodcock-Johnson Reading Mastery Tests

SDRT = Stanford Diagnostic Reading Test

APPENDIX E

Mean Scores and F-values on Kindergarten Tasks for L1 Children

L1 Children	Not At-risk	At-risk	F	p
Literacy Measures				
WRAT3 reading percentile	68.18	12.85	2012.69	<.001
Letter Identification	18.34	6.25	856.32	<.001
Simple Spelling	3.05	1.18	225.56	<.001
Phonological Processing				
GFW Sound Mimicry	82.51	73.64	27.56	<.001
Rhyme Detection	7.24	5.71	37.51	<.001
Syllable Identification	5.03	3.53	49.38	<.001
Phoneme Identification	3.23	1.44	59.26	<.001
Phoneme Deletion	3.93	2.04	29.56	<.001
Syntactic Awareness				
Oral Cloze	2.63	1.55	29.17	<.001
Lexical Access				
Rapid Naming (sec.)	66.46	76.73	12.57	<.001
Memory				
Memory for Sentences	17.26	15.36	47.91	<.001

WRAT3 = Wide Range Achievement Test (3rd Ed.)

GFW = Goldman-Fristoe Woodcock

Mean Scores and Significance of Kindergarten Tasks for ESL Children

ESL Children	Not At-risk	At-risk	F	p
Literacy Measures				
WRAT3 reading	72.28	10.50	486.82	<.001
Letter Identification	19.99	4.67	239.63	<.001
Simple Spelling	2.72	.96	42.44	<.001
Phonological Processing				
GFW Sound Mimicry	76.01	69.28	.720	ns
Rhyme Detection	5.64	4.03	7.68	<.001
Syllable Identification	4.72	3.07	13.97	<.001
Phoneme Identification	3.51	1.42	17.88	<.001
Phoneme Deletion	3.48	1.56	6.59	<.001
Syntactic Awareness				
Oral Cloze	1.68	.56	7.69	<.001
Lexical Access				
Rapid Naming (sec.)	73.86	91.13	15.07	<.001
Memory				
Memory for Sentences	14.21	13.53	1.44	ns

WRAT3 = Wide Range Achievement Test (3rd Ed.)

GFW = Goldman-Fristoe Woodcock

APPENDIX F

Mean Scores and F-Values on Grade 2 Tasks for L1 Children

L1 Children	Average Readers	Disabled Readers	F	p
Reading Measures				
WRAT3 Reading	73.97	11.30	250.87	<.001
WJ Word Identification	76.42	19.55	161.32	<.001
W-J Word Attack	74.50	23.58	162.82	<.001
SDRT Reading Comprehension	55.51	14.06	101.28	<.001
One-minute word reading	22.68	10.17	124.89	<.001
One-minute pseudoword reading	24.18	6.28	113.83	<.001
Phonological Processing				
Rosner Auditory Analysis	22.02	12.82	72.65	<.001
Syntactic Awareness				
Oral Cloze	7.63	5.18	66.58	<.001
Lexical Access				
Rapid Naming (sec.)	12.84	15.72	24.98	<.001
Memory				
Working Memory Words (max.12)	3.52	2.61	10.38	<.001
Working Memory Numbers (max.12)	6.16	5.36	3.26	ns
Arithmetic				
WRAT3 Arithmetic	52.46	31.64	29.19	<.001
Spelling				
WRAT3 Spelling	62.96	20.61	110.45	<.001
Real Word Spelling	8.88	5.12	136.76	<.001
Nonword Spelling	8.40	5.52	70.29	<.001

WRAT3 = Wide Range Achievement Test (3rd ed.)

W-J = Woodcock-Johnson Reading Mastery Tests

SDRT= Stanford Diagnostic Reading Test

Mean Scores and F-Values on Grade 2 Tasks for ESL Children

ESL Children	Average Readers	Disabled Readers	F	P
Reading Measures				
WRAT3 Reading	75.71	10.57	66.32	<.001
WJ Word Identification	80.29	13.00	55.94	<.001
W-J Word Attack	77.25	16.00	52.02	<.001
SDRT Reading Comprehension	54.14	14.83	15.75	<.001
One-minute word reading	24.24	10.67	42.35	<.001
One-minute pseudoword reading	26.28	8.33	29.69	<.001
Phonological Processing				
Rosner Auditory Analysis	22.60	17.50	4.35	<.05
Syntactic Awareness				
Oral Cloze	6.68	4.71	5.14	<.05
Lexical Access				
Rapid Naming (sec.)	12.37	15.57	8.74	<.01
Memory				
Working Memory Words (max.12)	3.34	2.86	.47	ns
Working Memory Numbers (max.12)	6.22	4.14	4.55	<.05
Arithmetic				
WRAT3 Arithmetic	59.26	38.50	4.82	<.05
Spelling				
WRAT3 Spelling percentile	70.01	16.83	35.49	<.001
Real Word Spelling	9.29	5.17	68.96	<.001
Nonword Spelling	8.84	5.67	5.97	<.05

WRAT3 = Wide Range Achievement Test (3rd ed.)

W-J = Woodcock-Johnson Reading Mastery Tests

SDRT= Stanford Diagnostic Reading Test