The Literacy Skills of English Language Learners in Canada

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The purpose of this article is to review published studies of the English literacy of children in Canada who are English language learners (ELLs) with the goal of understanding the reading development of ELLs and characteristics of reading disabilities (RD) in this population. Phonological processing, syntactic awareness, and working memory of ELLs with and without RD were compared to that of native English-speaking (L1) students with and without RD. Our review found that ELLs with RD experienced reading difficulties similar to those of L1 students with RD. On the basis of the evidence, ELLs are not at greater risk for RD than their native English-speaking peers. We propose that the diagnosis of a reading disability can be made in a similar manner in both ELL and L1 students.

In this article, we summarize Canadian research on reading and the identification of reading disability (RD) in English language learners (ELLs). Reading ability in English is considered crucial to success in North American society (August & Hakuta, 1997; Snow, Burns, & Griffin, 1998). Because literacy skill in English is an important variable in predicting academic success, the United States has made the development of the literacy acquisition of ELLs a research priority (August & Hakuta, 1997). This issue is a priority shared by many Canadian researchers. Canada, like many other countries, has had a considerable amount of immigration over the last 70 years. As Canada has two official languages, English and French, children who come from homes in which neither English nor French is spoken receive most of their schooling in English or French, depending on the area of the country in which they live. Because the majority of provinces in Canada offer educational instruction in English, many immigrant children from non-English-speaking countries are ELLs.1

Young ELLs arriving from other countries are placed into regular classrooms as soon as possible. Heritage language classes, in which the child receives instruction in the native or home language, are provided as part of a Canadian federal multicultural initiative. The grade level at which Heritage language classes begin differs across school boards, and many cultural groups provide additional Heritage language training after school hours or on weekends. Many ELLs, therefore, have continued exposure to education in their native language, although schooling occurs in English or French.

According to official statistics (Statistics Canada, 2001), Canada may have a greater proportion of ELLs than does the United States. As of May 15, 2001, 5.4 million people, or 18.4 percent of the total population were born outside the country. For comparison, 11.5 percent of the population (32.5 million people) were foreign-born in the United States in 2002 (Schmidley, 2003). Of the 1.8 million immigrants who arrived in Canada during the 1990s, 17 percent were children between 5 and 16 years of age. In the United States, 9.2 percent of foreign-born individuals were under the age of 18 (Schmidley, 2003).

The large number of students that attend Canadian schools with limited or no English is a challenge to the educational system. Given this large number of ELLs, it is important to know whether their development of literacy skills differs in significant ways from children who are native speakers of English.

The purpose of the present review is to evaluate the research on the development of literacy skills in Canadian children identified as ELLs. We specifically focus on the development of cognitive skills in three areas for normally achieving ELLs and L1 students, as well as students with RD; these areas are phonological processing, syntactic awareness, and working memory. Finally, we consider the implications of research findings for the diagnosis of RD in ELLs. Our review is guided by the following research questions: (1) Do the same cognitive processes that influence reading development in L1 groups influence ELL reading development; and (2) Do ELLs with RD exhibit similar cognitive profiles to L1 students with RD, that is, can RD be identified in ELL groups, using the same procedures and techniques used with L1 children?

Theoretical Foundations

There are two major theories about the relationship between skills in first and second languages. According to the linguistic interdependence hypothesis developed by Cummins (1979), children who have learning problems in their first language should show similar problems in their second language. As well, academic skills acquired successfully in the first language should be transferred to the second language. The main idea of this theory is that learning a second language does not hinder the progress of either, and, in fact, may enhance both. Further, difficulties experienced in one language will be experienced in other languages.
Alternatively, the script-dependent hypothesis posits that the skills in one language are primarily influenced by its orthographic structure and the predictability of grapheme–phoneme correspondence rules (e.g., Lindgren, DeRenzi, & Richman, 1985). Thus, different reading and writing problems will emerge across languages due to differences in the characteristics of language scripts. For example, whereas English does not have a one-to-one relation between graphemes and phonemes (words are not always pronounced as they are spelled and there are many irregularities), Arabic, Italian, and Portuguese have much more predictable grapheme–phoneme correspondence rules. Thus, the script-dependent hypothesis would predict that an ELL child whose first language is Arabic might not experience any difficulty in Arabic, but might suffer considerable problems in learning to read English. The script-dependent hypothesis predicts that the deficits experienced in learning a second language are relative to the structure of the language. Therefore, it is possible that children may experience difficulty in one language but not another.

Support for the linguistic-interdependence hypothesis comes from Canadian research on normal achieving ELLs. Performances of ELLs who were native speakers of Portuguese (Da Fontoura & Siegel, 1995), Italian (D’Angiulli, Siegel, & Serra, 2001), and Arabic (Abu-Rabia & Siegel, 2002) were compared to their respective native English-speaking peers, age 9–14. Figure 1 summarizes the performance of these three groups on the Reading subtest of the Wide Range Achievement Test (WRAT3; Wilkinson, 1993). Specifically, Figure 1 demonstrates that ELLs can manifest comparable reading ability to L1 students. Within the normally achieving groups, the Italian ELLs performed significantly better than L1 students on word reading skills (D’Angiulli, Siegel, & Serra, 2001), the Arabic ELLs (Abu-Rabia & Siegel, 2002), and the Portuguese ELLs (Da Fontoura & Siegel, 1995) performed in a similar way to their L1 peers. These results support the linguistic-interdependence hypothesis because ELLs performed in a similar way, and in the Italian case, significantly better than L1 students. The results raise questions about the cognitive processes that might lead to different profiles of English language learning for both normally achieving students and those with RD.

In the last 40 years, research on the development of reading skills has substantially advanced our understanding of the reading process, including reading failure. Since the concept of learning disability was first outlined by Samuel Kirk (1963), investigators have concentrated on identifying the basic skills that are important to understanding the reading process in normally achieving as well as learning-disabled populations. Results have increased our ability to identify and respond to children at risk for reading failure in the early school years. Research results have identified three cognitive processes as significant for the development of reading in English as a first language: phonological processing, syntactic awareness, and working memory (for a review, see Siegel, 1993). However, it is not known whether and to what extent these processes are important for reading acquisition in ELLs. With the large number of ELLs in school systems in Canada and the United States, and with the common assumption that English language learning status puts children at risk for reading failure, it is imperative to determine whether there is convergence in research findings from studies of ELLs’ literacy development.

**The Role of Phonological Processes**

Current theories on the development of reading in English stress that phonological processing is the most significant underlying cognitive process used in the acquisition of reading skills (Stanovich, 1986). With respect to reading acquisition, phonological processing involves two major skills: phonological awareness and phonological decoding. Phonological awareness is the ability to identify and manipulate syllables and phonemes in oral language, whereas phonological decoding is the association of sounds with letters or combinations of letters.

Phonological processing exists on a continuum of difficulty, beginning with the awareness of whole words as units of sound through to the linking of sounds to letters. As implied
above, phonological awareness is generally used to refer to oral language whereas phonological decoding involves print. Thus, phonological awareness skills are especially attractive to researchers studying children's early literacy skills before reading instruction occurs. On the other hand, phonological decoding refers to the understanding of grapheme–phoneme conversion rules. Both phonological awareness and phonological decoding have been identified as necessary precursors to successful reading acquisition and are critical skills in predicting the speed and efficiency of reading acquisition for native speakers of English (e.g., Adams, 1990; Bradley & Bryant, 1983; Share, Jorm, Maclean, & Matthew, 1984; Wallach & Wallach, 1976). In fact, there is a consensus in the reading literature that a core deficit in phonological processes underlies RD (Siegel, 1993).

Researchers have studied extensively the relationship between phonological awareness and phonological processing and literacy skills in ELLs. In Canada, many studies have been conducted to examine the development of phonological processing skills in ELLs. Figure 2 illustrates some of the Canadian research results for specific language groups by showing the performance on the Word Attack subtest of the Woodcock Reading Mastery Test (WRMT; Woodcock, 1987) for Portuguese ELLs (Da Fontoura & Siegel, 1995), Italian ELLs (D’Angiulli, Siegel, & Serra, 2001), and Arabic ELLs (Abu-Rabia & Siegel, 2002) as well as their respective L1 peers, age 9–14. Figure 2 demonstrates that within the normally achieving group, Italian-speaking ELLs had significantly better phonological decoding skills than the native English speakers, whereas Arabic and Portuguese ELLs performed in a similar way to the English native speakers. Comparison of the normally achieving L1 students and ELLs demonstrates that ELLs can perform similarly to their L1 peers at the elementary grades as long as they have adequate exposure to English. These comparisons suggest that there may be differences in the ease with which students with different native languages learn word recoding. We will discuss the case of ELLs with RD students later in this review.

A large-scale longitudinal study designed to examine the reading development of ELLs and native English speakers is currently underway in Canada (see Chiappe, Siegel, & Gottardo, 2002; Chiappe, Siegel, & Wade-Woolley, 2002; Lesaux & Siegel, 2003). Of particular interest, this longitudinal study is conducted within a school district that serves a large immigrant population; most of the ELLs are immigrants to Canada who speak a language other than English to their parents, siblings, and extended families. The main languages spoken by the immigrant populations served by the school district include Chinese, Farsi, and Korean, followed by Japanese, Spanish, and Tagalog. In all, 30 language groups are represented in the district. Through the longitudinal study, it is possible to track the reading development of a large number of ELLs in order to compare changes in performance of ELLs and their L1 peers. It is important to note that for the purposes of the present review, only those findings that have implications for our overarching research questions are discussed. Interested readers are referred to the original papers for more detailed information.

The longitudinal study is conducted in a school district committed to the early identification of and intervention for children at risk for reading failure. As part of a district-wide initiative, all kindergarten children receive systematic phonological awareness instruction, and children identified as at risk receive targeted intervention in phonological awareness. During first grade, reading instruction involves systematic instruction in phonics within the context of a balanced literacy program. For those with difficulty, this instruction continues in a resource room setting. In this district, ELLs and native English-speaking children live in the same predominantly middle-class neighborhoods and attend the same schools. Thus, the overall correlation between ELL status and the socioeconomic status (SES) indicator (average income and other income-related measures per school) is not significant (Lesaux & Siegel, 2003). The lack of a significant correlation reduces the possibility that the performance of the ELLs was confounded by SES.

This review focuses on aspects of the longitudinal study that have been completed to date. In one study, kindergartners were assessed on a battery of tasks that included measures of reading, phonological processing, working memory, and spelling (Chiappe, Siegel, & Wade-Woolley, 2002).
Phonological processing was assessed using the Phonological Awareness Test (PAT; Muter Hulme & Snowling, 1997), which reflected a broad range of phonological processing skills. In particular, the PAT included measures of rhyme detection, syllable and phoneme identification, and phoneme deletion. An additional measure of phonological processing that was obtained in kindergarten was the ability to recognize and reproduce sounds in oral language (Sound Mimicry subtest; Goldman, Fristoe, & Woodcock, 1974). Children were identified as normally achieving if their performance on the rhyme detection task was in the average range (one standard deviation or above the sample mean). At-risk was defined as performance below one standard deviation on rhyme detection. In subsequent grades, normally achieving was defined as performance at or above the 30th percentile on a standardized measure of word recognition. RD was defined as performance at or below the 25th percentile on reading. Annual assessments of the children occurred at the end of each school year.

Overall, the findings from this study demonstrated that there were differences between the ELLs and the monolingual groups in kindergarten only on the rhyme task. No differences between the language groups on any phonological task were found in grades 1 or 2 (Chiappe, Siegel, & Wade-Woolley, 2002; Lesaux & Siegel, 2003). Thus, at the beginning of kindergarten, ELLs did not appear to be at a disadvantage with respect to their phonological skills, although it is possible that the other tests of phonological awareness were not as sensitive in detecting such differences due to floor effects. However, at the end of grade 1, ELLs as a group continued to perform similar to their native English-speaking peers on phonological processing measures (Chiappe, Siegel, & Wade-Woolley, 2002), suggesting that task construction was not accountable for the lack of differences between groups. Chiappe, Siegel, and Wade-Woolley (2002) suggested that the rhyme detection task required knowledge of vocabulary and rapid lexical access. That the ELLs had lower scores than L1 students might also be related to the fact that in pre-school years, there is a strong concentration in the English language on activities with children that emphasize rhyming. For example, L1 English speakers might practice nursery rhymes with their parents or in group activities, and many books for children in English seem to rely on rhyme. Thus, it was not unexpected that the L1 group demonstrated stronger rhyming skills.

In regression analyses in the native English-speaking sample (Chiappe, Siegel, & Wade-Woolley, 2002), measures of phonological processing in kindergarten accounted for a significant amount of variance in first-grade reading (between 4.4 and 18.5 percent). Similarly, kindergarten measures of phonological processing accounted for 14.8 percent of the variance in first-grade reading in the ELL group when entered into a regression model before letter identification. When letter identification was entered first, phonological processing lost its significant contribution, suggesting shared variance between letter identification and phonological processing. Chiappe, Siegel, and Wade-Woolley (2002) found that phonological processing in the first grade also accounted for a significant amount of variance in first-grade reading in native English speakers (between 3.9 and 20.5 percent) as well as in ELLs (between 4.7 and 26.2 percent).

At the end of second grade, phonological processing was measured by the Rosner Auditory Analysis Test (Rosner & Simon, 1971). Normally achieving was defined as performance at or above the 30th percentile on a standardized measure of word recognition and RD was defined as performance below the 25th percentile on reading. The ELL (n = 100) and L1 (n = 766) typical reader groups performed similarly on the Rosner (Lesaux & Siegel, 2003). On a standardized measure of pseudoword decoding (Word Attack; Woodcock, 1987), the ELL typical reader group performed significantly higher than the L1 typical reader group, indicating heightened phonological skills. In regression analyses examining the prediction of second-grade reading skills from kindergarten skills, phonological processing accounted for a significant amount of variance in both the native English-speaking group (4.7–4.8 percent) and the ELL group (11.2–16.8 percent).

Taken together, the results of the longitudinal study indicate that in the early elementary years, ELLs who are not at risk for reading failure do not differ from their native English-speaking peers on phonological processing. Although it may be the case that our tasks were not sensitive enough to detect differences at the beginning of kindergarten, differences were not found in subsequent grades, thereby providing support for the kindergarten results. In fact, in the second grade, ELLs performed significantly better than the L1 students on a measure of phonological decoding, suggesting that ELLs might display an advantage in phonological decoding. The results of regression analyses indicated that phonological skills might be more important for reading of ELLs than for L1 students.

In contrast, several studies have found the opposite pattern, namely, that ELLs performed more poorly than L1 students on measures of phonological processing. For instance, Geva, Yaghoub-Zadeh, and Schuster (2000) examined the phonological decoding of ELL and L1 students in a longitudinal study. They found that first- and second-grade ELLs had significantly lower scores on a pseudoword repetition task than native English-speaking students. In another study, Wade-Woolley and Siegel (1997) examined the phonological processing abilities of second-grade ELL and L1 students. The primary languages spoken by the ELLs in this study were Cantonese, Mandarin, Gujarati, Urdu, and Punjabi. These researchers found that the second-grade ELL group had significantly lower scores on a pseudoword repetition and phoneme deletion task.

However, there is some suggestion in the literature on English language learning that learning a second language actually facilitates the acquisition of literacy skills presumably through transfer. In fact, several studies have examined the reading skills of ELLs in both the native and second language to determine if phonological processing skills are correlated in the two languages. The hypothesis is that a significant relationship provides support for the positive transfer of language skills between languages.

Gottardo, Yan, Siegel, and Wade-Woolley (2001) found that Cantonese rhyme detection was significantly correlated
with measures of English rhyme detection and English phoneme deletion in a sample of 65 Canadian children (grades 1–8) whose first language was Cantonese, but who were being instructed in English. Chinese rhyme detection was also associated with English reading skill. Further, Cantonese rhyme detection was significantly related to English reading even when the English phonological processing variables were statistically controlled. The authors concluded that the quality of phonological representations in children’s L1 allowed them to reflect on phonology in that language. The children in the Gottardo et al. (2001) study varied in terms of their language experiences: some children were recent immigrants to Canada, having lived in the country for less than 2 years, whereas other children had been born in Canada and had received all their primary academic schooling in English. The results might reflect the language background of the families. Most of the parents of the participants were adults when they immigrated to Canada and had received all of their schooling in Hong Kong. They had at least a high school education from Hong Kong and were literate in Chinese.

D’Angiulli, Siegel, and Serra (2001) investigated the correlation between phonological measures administered in English and Italian in 81 Italian ELLs between the ages of 9 and 13 (grades 4–8). The authors found a significant correlation between English and Italian pseudoword reading tasks, indicating the possibility of a positive transfer of skills from a regular language with predictable grapheme phoneme correspondences (i.e., Italian), to a highly irregular language (i.e., English). These results suggest that prior experience with a regular language may facilitate phonological processing skills in an irregular language. Here, too, the background of the families might help us interpret the results. The children were all born in Canada although their parents were of Italian origin. Both English and Italian were spoken by the parents, whereas the grandparents only spoke Italian. All children had English as their first instructional language and attended Italian classes in school every day for 35 minutes as a part of a Heritage Language Program. All children were from middle-class backgrounds.

Similar results were obtained with Arabic and Portuguese samples (Abu-Rabia & Siegel, 2002; Da Fontoura & Siegel, 1995). Specifically, Abu-Rabia and Siegel (2002) examined 9- to 14-year-old students in grades 4 through 8. All the children were born outside Canada and had lived in Canada for at least 2 years. The majority of the children came from a low socioeconomic level. The language spoken at home was Arabic, but all children had English as their instructional language in Canadian schools. The children attended Arabic Heritage Language programs for approximately 3 hours per week where they received instructions in reading, writing, and speaking Arabic. Abu-Rabia and Siegel (2002) found that English and Arabic phonological processing skills, as measured by pseudoword reading in each language, were highly correlated. Similarly, Da Fontoura and Siegel (1995) found that English and Portuguese phonological processing skills were highly correlated, and also significantly related to word reading. The positive transfer of phonological processing skills from Italian, Arabic, and Portuguese to English indicates some support for the interdependence hypothesis.

A study conducted by Bialystok, Majumder, and Martin (2003) compared the performance of monolingual children with two groups of bilingual children on three phonological awareness tasks: segmentation, sound meaning, and phoneme substitution. In addition, children were tested for their ability to decode simple words and nonwords. Participants were students in grades 1 and 2 who were either native English speakers, Chinese-English speaking, or Spanish-English speaking. For both the Chinese and Spanish ELL groups, English was the language of school instruction, while Chinese or Spanish was the language of the family and cultural community. The groups differed on the segmentation task, but not on the sound meaning or phoneme substitution tasks. All three groups differed in their ability to segment words, the most proficient being the Spanish-English ELLs. The Chinese-English ELL group, in contrast, had the most difficulty with this task. The authors suggested two reasons for the Spanish-English advantage: the sound structure of English is more similar to Spanish than to Chinese, and Spanish itself may provide an advantage by promoting access to phonological awareness. The authors cited evidence from research on skilled and less skilled Spanish-speaking readers, who performed similarly on a phoneme segmentation task (Borzone de Manrique & Signorini, 1994). The different levels of performance in the segmentation task were not correlated with success in reading. The phoneme substitution task, considered the most predictive phonological awareness task for reading, was not influenced by the language experience of the children. Therefore, the authors concluded that the results failed to support a role of bilingualism in developing phonological awareness, although they acknowledged that knowledge of a language with similar phonetic structure may be an advantage (Bialystok, Majumder, & Martin, 2003).

In sum, our review of studies on phonological processing reveal inconsistent findings, with ELL children demonstrating weak phonological skills in some cases, average skills in other cases, and above average skills in yet other instances. These inconsistent findings might be attributable to several factors. First, there might be differences in instructional approaches in the schools; although the studies did not provide such information. So far in Canada, to our knowledge, no study has examined the influence of different educational methods on the development of phonological skills of ELLs. Another factor to consider might relate to the samples in the studies. Some studies examined ELLs as a group without differentiating among the languages, and other studies examined ELLs who spoke a specific language. Therefore, it is difficult to determine if the differences in the results are due to a positive or negative transfer from a specific language to English, or a result of the different phonological processing skills of ELLs in general. A final factor to consider may be the use of different measures of phonological processing used across studies. Although the results are far from conclusive, there is some evidence that ELL groups can perform comparably to the L1 students, indicating that learning to read in a second language does not need to be a risk factor. Additional research is needed to examine the factors that contribute to successful acquisition of phonological skills in ELLs from different language backgrounds.
The Role of Syntactic Awareness

Another necessary skill for reading is syntactic awareness (Ehri & Wilce, 1980). Syntactic awareness is “the ability to reason consciously about the syntactic aspects of language, and to exercise intentional control over the application of grammatical rules” (Gombert, 1992, p. 39). This ability appears to be critical for fluent and efficient reading of text, and it requires making predictions about the words that come next in the sequence. Syntactic factors may influence the difficulty of reading single words, such as function words, prepositions, and auxiliary verbs, which are difficult to integrate in a semantic network (Siegel, 1992).

A number of studies have reported on difficulties with syntactic awareness in English among individuals with RD (e.g., Gottardo, Stanovich, & Siegel, 1996; Siegel & Ryan, 1988; Willows & Ryan, 1986). Syntactic awareness tasks have also been found to differentiate between native English-speaking students and ELLs. In the longitudinal study previously discussed (Chiappe, Siegel, & Wade-Woolley, 2002; Lesaux & Siegel, 2003), syntactic awareness was measured using an oral cloze task. In this task, children listened to a series of 35 sentences, 10 of which were syntactically well-formed (e.g., “The boy was chased by the dog”) and 25 that were syntactically ill-formed (e.g., “The tall, thin man playing was basketball”), and judged whether each sentence was “right” or “wrong” (Gottardo, Stanovich, & Siegel, 1996). The ELLs performed more poorly than their native English-speaking peers on both measures of syntactic awareness.

In summary, early school-aged students from diverse language backgrounds demonstrated poor performance on syntactic awareness skills compared to native English speakers, even though the ELLs did not display concurrent difficulties on measures of word reading. Thus, poor syntactic skills did not seem to be related to poor early literacy in ELL groups, at least in the first years of learning to read. Poor performance could reflect the negative influences of first language on the acquisition of English grammar, or it might be that ELLs need more time to acquire English grammar. Such factors are not easily disentangled using a group of students from diverse language backgrounds. It would be valuable to investigate the relation of syntactic awareness and reading for different native language groups, as the relation of the native and second language could be one reason ELLs perform relatively poorly on measures of syntactic awareness.

Although very few studies in Canada have examined syntactic awareness of students from specific language backgrounds, there has been some research conducted with students whose native language was Portuguese, Punjabi, Arabic, and Italian. In one study, first-grade Punjabi-speaking ELLs were compared to native English-speaking students on measures of reading, phonological processing, and syntactic awareness (Chiappe & Siegel, 1999). The performance profiles on word recognition and phonological processing tasks were similar for the two groups, except that the Punjabi-speaking children had lower scores on the English oral cloze tasks.

A similar pattern was found in an older Portuguese-speaking sample (Da Fontoura & Siegel, 1995). Specifically, fourth-, fifth-, and sixth-grade Portuguese-speaking students born in Canada were compared to native English-speaking normally achieving readers. Portuguese-speaking students were selected to demonstrate at least average levels of reading. There were no differences between the Portuguese and native English groups on the word reading tasks, but the ELL group was found to have significantly lower scores on syntactic awareness, as measured by the oral cloze task (Da Fontoura & Siegel, 1995). However, this pattern does not hold for older students speaking two other native languages: Arabic and Italian. Specifically, in a sample of students selected to be at least average readers, Arabic-English speaking children and native English-speaking students in grades 4–8 did not differ significantly on the oral cloze task (Abu-Rabia & Siegel, 2002). In a fourth- to eighth-grade Italian-English speaking sample, the Italian-English children had significantly higher syntactic awareness scores than their native English-speaking peers (D’Angiuilli, Siegel, & Serra, 2001).

The findings indicate that syntactic awareness was weaker for Portugese ELLs but not for Arabic or Italian ELLs in the middle school years. Thus, the research results on the acquisition of syntactic awareness by ELLs appears to vary for speakers of different native languages. There may be reasons for the differences in the findings on the performance on the oral cloze task. Most of the findings that demonstrated that ELLs experienced difficulty in acquiring English syntactic proficiency were studies of younger children (Chiappe & Siegel, 1999; Chiappe, Siegel, & Wade-Woolley, 2002; Lesaux & Siegel, 2003; Wade-Woolley and Siegel, 1997). In some cases, ELLs performed less well than native speakers.

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even after more than 2 years of exposure to English (Da Fontoura & Siegel, 1995; Lesaux & Siegel, 2003). In contrast, older ELLs did not consistently show poorer performance on syntactic skills than their native English peers. Thus, one hypothesis might be that older children who are ELLs may have internalized how to learn language and may be able to apply that implicit knowledge to learning subsequent languages. Another explanation may be that there is positive transfer when the grammatical system of the first language has a more heavily inflected structure than English, such as Arabic or Italian.

The Role of Working Memory

Working memory has received increased attention in the L1 reading literature for its vital role in reading processes (see Swanson & Siegel, 2001 for a review). Working memory refers to the limited capacity cognitive system involved in the simultaneous storage and processing of information (e.g., Baddeley & Logie, 1999; Swanson & Siegel, 2001). For beginning readers, decoding requires a heavy demand on working memory, particularly verbal (as opposed to visual-spatial) working memory. Beginning readers must retrieve the appropriate grapheme–phoneme correspondences from long-term memory, hold those in memory in the appropriate sequence, and blend them to produce the appropriate pronunciation of the target word. In the L1 literature, working memory tasks have been found to be among the most important predictors of reading performance (e.g., Siegel & Ryan, 1989; Swanson & Howell, 2001).

Although the findings related to the link between working memory and reading in ELL samples are not robust, Canadian researchers have begun to make significant advancements in our understanding of this relationship. In the longitudinal study discussed previously, working memory differences were found between L1 and ELL children in kindergarten and first grade (Chiappe, Siegel, & Wade-Woolley, 2002), although these differences disappeared by second grade (Lesaux & Siegel, 2003). Working memory in kindergarten and first grade was assessed using the Memory for Sentences subtest of the Stanford Binet (Thorndike, Hagen, & Sattler, 1986). In both kindergarten and first grade, ELLs reproduced significantly fewer sentences than their L1 peers, although the groups did not differ in their overall performance on standardized measures of literacy (i.e., word recognition, decoding, spelling). In regression analyses in the L1 sample, kindergarten working memory accounted for a small but significant amount of variance in first-grade reading (between 1.7 and 5 percent), whereas kindergarten working memory did not account for any variance in first-grade reading in the ELL sample. Similarly, although first-grade working memory accounted for a significant albeit small amount of variance in first-grade reading in the L1 sample, working memory did not account for significant variance in the ELL sample.

These results might suggest that verbal working memory in kindergarten and first grade is unrelated to reading ability in ELLs, which is inconsistent with L1 research, but these results must be interpreted cautiously. The relationship between working memory and reading might have been affected by the vocabulary and syntactic demands of the verbal working memory task (Chiappe, Siegel, & Wade-Woolley, 2002). The language demands of the task might be seen in the progress made by children in a study of children progressing from kindergarten to second graders (Lesaux & Siegel, 2003). In this study, working memory was assessed by the Working Memory for Words measure (Siegel & Ryan, 1989). In this task, children were presented orally with sets of sentences missing the final word. The child was required to provide the missing word of each sentence (processing component) and at the end of each set (two, three, four, or five sentences) was required to repeat the words provided (storage component). Word-finding problems were minimized by using sentences in which the missing words were virtually predetermined. An example of a sentence is: “Snow is white, grass is ____.” In contrast to their performance in kindergarten and first grade, by the end of the second grade, ELLs performed in a manner similar to that of their English-speaking peers on this verbal working memory task.

Taken together, the findings from the longitudinal study suggest that in the early elementary years, verbal working memory might play a somewhat different role in reading acquisition than as has typically been seen in the L1 literature. These findings indicate that the weaknesses in working memory experienced by ELLs in the early grades tend to decrease over time. This decrease (presumably due to an increased facility with the language) is consistent with recent cross-sectional Canadian studies. For example, D’Angiulli, Siegel, and Serra (2001) found that a sample of 9- to 13-year-old Italian-speaking ELLs performed the same as or significantly better than their native English-speaking peers on measures of working memory in both English (working memory for words) and Italian. Similarly, Abu-Rabia and Siegel (2002) demonstrated that there was no significant difference in working memory for words in a cross-sectional sample of 9- to 14-year-old Arabic-English speaking Canadian children and native English-speaking children.

In summary, children who enter school with little or no exposure to English might perform below their L1 peers on tests of verbal working memory, although this might be expected, given the vocabulary and syntactic demands of verbal memory tasks. More importantly, lower performance on working memory does not appear to affect early literacy skills (i.e., word recognition, decoding, spelling, comprehension; Chiappe, Siegel, & Wade-Woolley, 2002; Lesaux & Siegel, 2003), and the differences in working memory performance between ELL and L1 children appear to decrease over time.

Identification of RD Among ELLs: Can L1s Procedures Be Used?

A limited number of studies have specifically examined the development of reading in ELLs who have been identified as having RD. To examine whether the three cognitive processes thought to be important to L1 reading development can discriminate ELL with RD from normally achieving ELLs researchers typically use one of three designs: (1) ELLs
identified as average or RD are compared on the three cognitive processes to examine potential differences; (2) ELLs identified as RD in English are measured on their cognitive processing skills in English and their first language to examine potential differences; and (3) ELLs identified as RD are compared to L1 RD groups to examine potential differences.

Using the first approach, several studies demonstrated that individuals with deficient cognitive and linguistic skills experienced difficulties in acquiring basic reading skills, regardless of the language and script involved, and regardless of whether the written language was their native or second language (e.g., Brown & Hulme, 1992; Doctor & Klein, 1992). Such studies provide support for the interdependence hypothesis. Similar results have been demonstrated in Canada.

In the longitudinal study previously described, kindergarten measures of phonological processing discriminated between the at-risk and not at-risk ELLs, indicating that phonological processing deficits are characteristic of children at risk for reading difficulties (Lesaux & Siegel, 2003). There were no differences between the risk and no-risk ELLs on oral cloze or working memory, even though the overall performance on these tasks of ELLs was significantly below L1 performance. This indicates that in kindergarten, ELLs were characterized by weaknesses in syntactic and working memory whereas the at-risk students were weak in all three cognitive processes. These results indicate that kindergarten screening for reading difficulties should be based primarily on measures of phonological processing.

In second grade, there were significant differences between the English language learning average and disabled readers on phonological processing and oral cloze (Lesaux & Siegel, 2003). The ELLs also performed significantly less well on oral cloze than the L1 average achieving group. On working memory measures, there were no significant differences between the English language learning average readers and poor readers, although L1 average readers had significantly higher working memory scores than L1 poor readers. This pattern suggests that unlike L1 learners, working memory may not be characteristic of poor reading in ELLs, at least at the end of second grade.

In a study examining a specific language group, six ELL Punjabi-speaking and 11 native English-speaking first-grade students were classified as poor readers based on their performance on a standardized measure of word recognition (Chiape & Siegel, 1999). These children had reading scores below the 26th percentile. The researchers found that measures of phonological processing (i.e., pseudoword repetition, phoneme recognition, phoneme identification) discriminated average from poor readers, whether the children were native English-speakers or ELL Punjabi-speaking students.

Using the second approach to determine the cognitive characteristics of ELLs who are poor readers, Da Fontoura and Siegel (1995) examined the English and Portuguese reading skills of ELL Portuguese-Canadian children aged 9–12. Portuguese is an alphabetic language that is regular and predictable in sound–letter correspondence. Poor readers in Portuguese displayed the same difficulties in English, with problems in phonological processing, and, to a lesser degree, deficiencies in working memory and syntactic awareness. Abu-Rabia and Siegel (2002) also examined ELLs with RD.

The authors found that in a sample of Arabic-Canadian ELLs, Arabic students with reading problems in English were likely to display similar reading problems in Arabic, including difficulties in pseudoword reading, measures of phonological processing, working memory, and oral cloze.

The third approach used to assess the cognitive processing skills among ELLs with RD compares RD students to native English speakers who have RD. Figures 1 and 2 show comparisons between ELLs from three different first languages and native English speakers. As can be seen in Figure 1, on the word reading task (WRAT3; Wilkinson, 1993), the Portuguese-English RD, the Italian-English RD, and the Arabic-English RD performed much like the native English speakers with RD (Abu-Rabia & Siegel, 2002; Da Fontoura & Siegel, 1995; D’Angiuili, Siegel, & Serra, 2001). Figure 2 summarizes the performance of the three language groups on the Word Attack subtest of the Woodcock Reading Mastery Test (WRMT; Woodcock, 1987). Portuguese-English speakers with RD and the Arabic-English speakers with RD had higher scores on the English pseudoword reading measure than English speakers with RD; further Portuguese and Arabic speakers with RD performed better than the Italian speakers with RD (Abu-Rabia & Siegel, 2002; Da Fontoura & Siegel, 1995; D’Angiuili, Siegel, & Serra, 2001). Overall, studies examining the cognitive profiles of ELL children with reading difficulties demonstrated that ELLs who were identified as RD showed the same difficulties with phonological processing, syntactic awareness and working-memory as English native speakers with RD.

### Problems of Valid Assessments of RD

Accuracy of assessment is an important factor in identifying RD in ELLs. Limbos and Geva (2001) examined the accuracy of teacher assessments in screening for RD among ELL and L1 first graders in 12 schools in three different areas of a large metropolitan city in Canada. Many of the participants were born in Canada but did not speak English until they began to attend school. The most common first language was Punjabi, followed by Portuguese, Cantonese, and several other languages. Teacher rating scales and nominations showed a low sensitivity in identifying all students at risk for RD relative to other forms of screening. For ELLs, teachers reported that errors in judgment of reading performance were at least partly explained by over-reliance on oral language proficiency as an indicator.

It is important not to rely on oral language proficiency as an indicator of RD among ELLs. As demonstrated in the Lesaux and Siegel study, the percentage of ELL kindergartners identified as at risk (37.2 percent) exceeded the percentage of native English-speaking students identified as at risk (23.8 percent). By the end of the second grade, there were similar percentages of students identified as RD in both ELL (3.72 percent) and L1 (4.2 percent) groups. In the interim, the students had received phonological awareness training provided in the context of a variety of literacy activities, including a combination of activities with an explicit emphasis on the sound–symbol relationship, in kindergarten, and a balanced early reading program that included small-group
phonological awareness and phonics instruction for all children regardless of language status or reading level in grade 1. For the majority of children who had experienced early reading difficulties in kindergarten, their difficulties were likely remediated through these instructional programs. Thus, a “response to treatment” model of monitoring prior to labeling might be indicated for ELLs. This is consistent with findings from the United States that suggest that direct instruction in phoneme–grapheme strategies is of value for ELLs (Adams, 1990; August & Hakuta, 1997).

In addition to concerns about when assessing the oral proficiency of English language learning kindergartners, there is little agreement on what an assessment for identifying RD among ELLs should include. Traditionally, researchers and practitioners used the IQ test as part of a battery to assess students with possible learning disabilities. In the last 20 years, there has been a growing body of research that suggests IQ is not a valid measure to assess learning disabilities (e.g., Fletcher, Francis, Rourke, Shaywitz, & Shaywitz, 1992; Siegel, 1988, 1989, 1992). In addition, studies have shown that there were no significant differences in cognitive skills or the benefits from remediation between traditionally defined IQ-achievement discrepant students with RD and those with only a low reading score but who were not discrepant (Vellutino et al., 1996; Vellutino, Scanlon, & Lyon, 2000). There are even more concerns about the use of IQ as a measure for identification of RD in ELLs due to the cultural biases inherent in many of these measures and their standardized administration (Gunderson & Siegel, 2001). IQ tests require expressive language, understanding of vocabulary, culture-specific knowledge, and verbal memory; administering an IQ test to language minority individuals is problematic because it places them at a disadvantage in terms of language and culture. The diagnosis of RD in ELLs should be based on standardized achievement tests of reading, spelling, and, if possible, writing. A low score on any of these measures, in the absence of co-occurring conditions such as mental retardation, severe neurological problems (e.g., autism), or severe social or emotional difficulties might indicate RD.

**CONCLUSIONS**

From studies that have been conducted in Canada, it seems that three processes, phonological processing, syntactic awareness, and working memory, are different in students with RD and average readers in first and second language groups. If future research confirms that ELLs who experience difficulties with reading have the same cognitive weaknesses as native English-speaking children who experience difficulties with reading, it would appear that a diagnosis of RD can be made in a similar manner in both groups, although with the caveat that abilities should be assessed in both languages within an individual whenever feasible.

Results from studies involving languages with regular orthographies provided support for both the interdependence and the script-dependent hypotheses. Specifically, the interdependence hypothesis posits that the processes that are important for the development of reading in the first language will also be important in learning to read a second language. However, there are other skills, such as syntactic awareness, and verbal working memory that probably require different amounts of exposure to English before ELLs are able to perform at similar levels to the native English-speaking students. In some cases, such as with syntactic awareness, ELLs caught up with their native English peers only after three or more years of exposure to English instruction and schooling.

With respect to the issue of the identification of a learning disability in ELL children, research in Canada indicates that in general performance on measures of phonological awareness, syntactic awareness, and working memory distinguishes students with RD and average readers, and that this is true for performances in both the native and second language for ELLs. In the Canadian studies reviewed here, ELLs with RD generally performed similarly to native English-speaking students with RD. Some ELLs with RD had significantly higher scores on English pseudoword reading tasks than L1 students with RD, possibly due to a broader knowledge of phonological processes that came from exposure to more than one phonological system. The proposal here is that assessments for ELLs at risk for RD should include the same measures typically used to assess RD in L1 students.

**FUTURE RESEARCH**

The findings reported in this review must be interpreted cautiously for several reasons. First, the majority of studies were correlational designs using cross-sectional samples. Further, in these studies, limited information was provided on variables such as home literacy experiences, the language status of the child, language exposure of the instructor, different kinds of support programs for ELLs, and different compositions of classrooms, making it difficult to draw definitive conclusions (see Tabor & Snow, 2001 for a review of relevant research in this area).

Another limitation relates to the SES levels and native language proficiency measures represented in the studies in the review. Specifically, there is a well-known relationship between low SES and poor literacy skills. The studies in the current review tended to come from middle-class backgrounds, which are in contrast to many of the studies with ELLs reported in the United States. In Canada, current trends in immigration policies are based on the interplay between pragmatic consideration and altruism in Canada, and political and economic events and conditions in other countries. The Canadian immigration policy is designed to select people who are perceived as likely individuals to make the greatest contribution to the country. Immigrants are selected based on their ability to contribute to the economy and fill labor-market gaps. In addition, family reunification programs enable new immigrants who are already established to sponsor relatives to join them. Refugee acceptance procedures are also established to select a quota of refugees among the total number of immigrants accepted (Coelho, 1998). In the United States, most ELLs come from disadvantaged SES backgrounds (August & Hakuta, 1997); for example, 70 percent of English language learning children were eligible for free or reduced price lunches compared with 38 percent overall in the same school (August & Hakuta, 1997).
Finally, as is evident from our review, studies were not consistent in their reporting of the level of proficiency in first language for ELLs. Thus, it is not known to what extent first language proficiency in ELLs influenced the findings of studies we reviewed. Future research on the development of English language skills in ELLs from different language backgrounds should include a focus on transfer between the first and second languages, the special characteristics of each language system, and the interplay between them. In addition, future research should consider such variables as the age of first exposure to English, literacy instructional methods, the proportion of ELLs in the classroom in which the child is being educated, and the specific characteristics of the first language of the student. Whenever possible, it is important to consider language and reading skills in the first language. The reading difficulties experienced by some ELLs appear to be a manifestation of underlying cognitive deficits, and not necessarily a result of lack of exposure to a second language. On the basis of the available studies, it appears that exposure to a language that is more regular and predictable in terms of letter–sound correspondence, such as Arabic, Italian, or Portuguese, may actually result in positive transfer for ELLs. Future studies should examine specific language groups and their positive or negative transfer in the acquisition of English as a second language.

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NOTE

1. In Canada, the term ESL is used; in the United States, it is English Language Learner (ELL); and in the United Kingdom, it is English as an Additional Language (EAL).

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