BILITERACY ACQUISITION IN KOREAN-ENGLISH BILINGUAL CHILDREN: PHONOLOGICAL, SYNTACTIC, WORKING MEMORY AND ORTHOGRAPHIC SKILLS

by

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ABSTRACT

A great deal is known about the development of reading and related skills in native English-speaking (L1) children, yet not much is known about reading in children who are learners of English as a Second Language (ESL), especially with children who grow up learning two languages concurrently. The present study investigated reading, phonological, syntactic, orthographic, and working memory skills of Korean-English bilingual children who learn how to read and write in both languages concurrently. The participants were children between the ages 5 and 13 (from Kindergarten to Grade 6) who received English schooling, and at the same time, enrolled in the Korean Heritage Language Programs. Fifty-nine children were included in the analysis, and a comparison monolingual group was drawn from an existing research data. For cross-linguistic evidence, there was a significant correlation between Korean word reading and English phonological awareness in kindergarten and grade 1, although no significant relationship was found in older grades. Neither oral cloze nor working memory had cross-language significance in correlations with word reading in Korean and in English. Korean orthographic awareness had no correlation with English orthographic awareness, English spelling and reading. In kindergarten and grade 1, there were significant mean differences between monolingual and bilingual children in several measures. Reading performance in bilingual sample was significantly higher than the monolingual sample, whereas bilingual children's language skills (syntactic awareness in grade 1, phonological awareness, working memory) were significantly lower than the ones of L1 speakers. However, in grades 2 and higher, monolingual and bilingual children

performed similarly. In conclusion, as expected, phonological awareness was significantly related to reading in each respective language. The finding also supports the grain size theory regarding the levels of phonological awareness; Korean employing predominantly syllable level in its shallow orthography, paired with the fact that is an easily-decodable shallow orthography, syllable level phoneme awareness is more important in reading in Korean than phoneme level awareness. Linguistic interdependence hypothesis is partially supported regarding the transfer of phonological awareness. Other three skills, syntactic awareness, working memory, and orthographic awareness were not related significantly across languages, supporting script-dependence hypothesis for those three skills.

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To my parents

INTRODUCTION

Overview

Bilingualism is promoted in many contexts in Canada. One example is the Heritage Language program. With the steady stream of immigration, as many as 17% of children who grow up as Canadians between 5 and 16 years-old were born in another country during the 1990s (StatisticsCanada, 2001). As part of multiculturalism policy, there exist many opportunities to maintain their "heritage" language (i.e., the language spoken at home that is other than English and French) in Canada, such as Heritage Language programs. The configuration of such programs varies across the country. Some programs are funded by the government through school districts as after-school programs, and some are privately run by parents or religious organizations. Therefore, many Canadian children whose first language is neither English nor French have the opportunity to learn to read and write in their heritage language.

Statement of Problem

A great deal is known about the development of reading and related skills in native English-speaking (L1) children, yet not much is known about reading in children who are learners of English as a Second Language (ESL), especially with children who grow up learning two languages concurrently. How does reading develop in bilingual children? What are the related skills that predict successful development or failure of reading with bilingual children? For bilingual children, is there any relation between the first language (L1) and the second language (L2) with respect to reading development? The present study investigated the reading,

phonological, syntactic, orthographic and working memory skills of Korean-English bilingual children who learn how to read and write in both languages concurrently.

Hypotheses

With respect to the relation between two languages in bilingualism, there are two opposing hypotheses: the linguistic interdependence hypothesis and the script-dependence hypothesis. First, the linguistic interdependence of Cummins (1979) argues that there is a significant relationship between L1 and L2, such that a deficit in one language will manifest in the other language. Regarding the long debate over whether bilingualism hinders or enhances learning (Bialystok, 2001; Hakuta, 1986), the linguistic interdependence theory posits that learning skills in one language will be transferred to another language, and learning two languages will enhance the process of both (Cummins, 1979).

In support of the linguistic interdependence hypothesis, da Fontoura and Siegel (1995) investigated reading related skills in Portuguese-English speaking bilingual children between 9 and 12 years old (grades 4 to 6). They found that children with reading difficulties in English also had difficulties in reading Portuguese. In particular, there was a strong and significant relationship between phonological processing skills in L1 and L2. Other skills, syntactic awareness and working memory, also showed moderate relationship between English and Portuguese. Similarly, a study of Hebrew-English bilingual children (Geva & Siegel, 2000) found significant correlations among performances on reading, syntactic awareness, and working memory tasks in both Hebrew and English. Furthermore, a similar study (D'Angiulli, Siegel, & Serra, 2001) examined the reading related skills in

Italian-English speaking bilingual children between 9 and 13 years old (grades 4 to 8). Again, phonological processing skills in English and in Italian were strongly related to each other. However, a relationship was less clear in the measures of syntactic awareness and working memory. Lesaux and Siegel (2003) reported findings from a longitudinal study investigating literacy skills in L1 speakers and in ESL children. They found that reading-disabled L1 children and reading-disabled ESL children both showed common skill deficits including phonological processing, syntax, and working memory.

In relation to orthographic skills, Abu-Rabia and Siegel (2002) investigated reading related skills, including orthographic skills, in Arabic-English speaking children between 9 and 14 years old (grades 4 to 8). In support of the linguistic interdependence theory, there were significant correlations between L1 and L2 in all three skills (i.e., phonological processing, syntactic awareness, and working memory); in particular, phonological processing skills showed the highest correlation between L1 and L2. Orthographic skills in Arabic were significantly correlated with word reading in English, but orthographic skills in English were not significantly correlated with word reading in Arabic. Abu-Rabia and Siegel (2002) concluded that this could be due to the positive transfer of the predictable letter-sound correspondence in Arabic to English.

Another hypothesis, the script-dependence hypothesis, contends that each language develops independently from one another, and this hypothesis particularly contends that reading develops with its own orthographic features in each language. This hypothesis proposes that reading problems in one language will reflect the

specific correspondence between the graphemes and phonemes in the language, and this will not influence another language (Liberman, Shankweiler, Fischer, & Carter, 1974; Lindgren, de Renzi, & Richman, 1985).

In support of the script-dependence hypothesis, Ryan and Meara (1991) investigated the reading acquisition of Arabic (L1) and English (L2) in the Arabic-speaking children. They found that Arabic speaking children who were learning to read in English heavily depended on the consonants and yielded different types of errors in reading when trying to recognize English words following the orthography of Arabic. In the vowel recognition task in English, Arabic speaking children made more errors than other ESL students who were non-Arabic-speaking and native English speaking students.

Converging evidence suggests that at least one of the reading-related skills, phonological processing, is transferable across languages; therefore providing evidence against the script-dependence hypothesis (Abu-Rabia & Siegel, 2002; Chiappe, Glaeser, & Ferko, 2007; Chiappe, Siegel, & Gottardo, 2002; Chiappe, Siegel, & Wade-Woolley, 2002; D'Angiulli, et al., 2001; da Fontoura & Siegel, 1995; Gottardo, Yan, Siegel, & Wade-Woolley, 2001; McBride-Chang, et al., 2005). First, three studies in bilingual children found a strong correlation in phonological processing in their first languages (i.e., Italian, Portuguese, and Arabic) and in English (Abu-Rabia & Siegel, 2002; D'Angiulli, et al., 2001; da Fontoura & Siegel, 1995). Second, several longitudinal studies in ESL populations (Chiappe, Siegel, & Gottardo, 2002; Chiappe, Siegel, & Wade-Woolley, 2002; Lesaux & Siegel, 2003; Lipka, Siegel, & Vukovic, 2005) report that what differentiates good readers and

poor readers across different language groups (i.e., ESL, bilingual, and L1) was phonological processing. Another study (Gottardo, et al., 2001) found more evidence for the cross-linguistic transfer of phonological processing skills in Chinese-English speaking bilingual children between grades 1 and 8. The children spoke Chinese as their first language and received English instruction in school. Despite the orthographic difference (i.e., Chinese being non-alphabetic language versus English being an alphabetic language), there was a strong correlation in phonological processing between English and Chinese, and both were also correlated with reading in English. In addition, phonological processing skills in Chinese were a strong predictor of reading in English, along with phonological processing skill in English.

However, it is still unclear whether other skills, such as syntactic awareness, working memory, morphological awareness, and orthographic skills, are linguistically interdependent or language-specific. For example, whereas in some studies (D'Angiulli, et al., 2001; da Fontoura & Siegel, 1995; Gottardo, et al., 2001) syntactic awareness and working memory were less or not at all correlated with reading in English, in other studies (Abu-Rabia & Siegel, 2002) syntactic awareness and working memory were significantly correlated with reading in English. Some studies (Chiappe, Siegel, & Gottardo, 2002; Lesaux & Siegel, 2003; Lipka, et al., 2005) consistently report that ESL children lag behind L1 children in syntactic awareness and working memory, yet syntactic awareness and working memory are not predictors of reading in English for ESL children.

Purpose of the Study and Research Questions

The purpose of this study was to investigate the reading-related skills of Korean-English speaking bilingual children both in Korean and in English. In particular, this study aims to understand which skills are transferable between L1 and L2 reading and which skills are language-specific.

This study examined four processes, which are related to reading development, in Korean-English bilingual children: phonological processing, syntactic awareness, working memory and orthographic skills.

Similarities and Differences between Korean and English

Phonologically, Korean has 14 basic consonants and 10 basic vowels, whereas English has 25 basic consonants and 15 basic vowels (Chiappe, et al., 2007). Although the phonemes in Korean largely overlap with those in English (Wang, Park, & Lee, 2006), Korean does not have some of the English phonemes such as /z/ /sh/ /f/ /v/ (Chiappe, et al., 2007). Korean is referred as an alphabetic syllabary (Taylor & Taylor, 1995) where the script (Hangul) employs both phoneme- and syllable-level units. Thus, learners of Korean Hangul should be able to blend phonemes similar to learners of English. However, Korean is simpler in its syllable structure and does not have consonant clusters. The phonological units in Korean are represented at the syllable-level containing body and coda (i.e., consonant-vowel-consonant or consonant-vowel) (Cho & McBride-Chang, 2005; Kim, 2007), whereas English has consonant clusters (i.e., *str* and *ps* in *straps*). Moreover, unlike English, Korean syllables are equally stressed (Cho & McBride-Chang, 2005).

Orthographically, both English and Korean have alphabetic orthographies. However, unlike English, Hangul letters are represented at the syllable-level as a single square block, and within each block, two to four symbols representing phonemes are included (Cho & McBride-Chang, 2005; Wang, et al., 2006). The letters are configured in either left-right or top-bottom arrangement in each syllable block, and the left (or the top) letter is the consonant followed by the right (or the bottom) vowels in the consonant-vowel syllable. In the case of consonant-vowel-consonant syllables, there are additional consonant or consonants located in the bottom part of the syllable block. In terms of the letter-sound correspondence, the rules of combining consonants and vowels are reliable and relatively transparent, which gives Korean Hangul a shallow orthography, meaning that the sound-letter correspondence is transparent and predictable (Chiappe, et al., 2007). In comparison, grapheme-phoneme correspondence in English is rather opaque and often unpredictable (D'Angiulli, et al., 2001; da Fontoura & Siegel, 1995), which classes English as a deep orthography.

Syntactically, Korean is quite different from English. First, the order of subject, verb and object is different. In Korean, the subject is followed by an object first then a verb (e.g., 나는 사과를 샀다. I [an] apple bought.), whereas in English the subject is followed by a verb first then an object (e.g., I bought an apple.) (See Sohn (2001) for detailed review of Korean language.) In addition, as in Japanese, Korean has subject and object markers, which allows omission of the subject in a sentence that is very common (e.g., 사과를 샀다. [I] [an] apple bought.). In contrast, English does not have subject and object markers, and is very resistant to dropping the subject.

Like in Japanese (Imai & Haryu, 2001), the use of articles (e.g., *a* and *the*) in Korean is very limited, and often plurality is guessed through the context (e.g., 나는 사과를 샀다. can mean "I bought [an/the] apple[s]."), whereas in English, it is ungrammatical to omit articles except some abstract nouns.

Phonological Awareness

Phonological processing refers to the cognitive skills used to discriminate and manipulate phonemes of a language (i.e., sound units in English) and to map the sounds onto the letter combinations (Lipka, et al., 2005). Phonological processing has long been found to be the best predictor of reading in L1 speakers (Stanovich, Siegel, & Gottardo, 1997), and this is a stepping stone for reading and writing at the word-level.

There are two types of phonological processing: phonological awareness and phonological decoding (Lipka, et al., 2005). Even though phonological awareness itself is not a reading skill but more a language skill, it is strongly related to the development of reading in English that the literature has looked extensively at phonological processing in relation to reading development in English (Geva & Siegel, 2000; Lyon, Fletcher, & Barnes, 2003). Phonological awareness is a fundamental step for reading, because discriminating phonemes (i.e., phonological awareness) leads to the mapping of sounds onto combinations of letters and decoding the words (i.e., phonological decoding), and this chain of learning cannot be skipped or completed in reverse order. For example, children need to first discriminate the phonemes /f/ and /v/, then should be able to associate /f/ with the combinations of letters "ph" in "phone." Since English grapheme-phoneme

correspondence is less transparent than in other languages (D'Angiulli, et al., 2001; da Fontoura & Siegel, 1995), learners of English must learn this skill before beginning to read.

In reading development amongst ESL students, Chiappe, Siegel and Gottardo (2002) found that phonological awareness is transferable across different languages, and Lesaux and Siegel (2003) found that phonological processing is also the best predictor of reading development in ESL children. In other words, as phonological processing is simply a skill for discriminating sound units of one language and mapping the sounds to letters, once a child develops this skill, the child can discover the rules of sounds in another language with ease. However, for the comparison between ESL and L1 children, there are mixed findings whether ESL children show better or worse phonological processing (Chiappe, Siegel, & Wade-Woolley, 2002; Lipka, et al., 2005).

Recent cross-linguistic studies in phonological processing, including Korean and English, provide new findings on cross-language development of reading (Chiappe, et al., 2007; Cho & McBride-Chang, 2005; McBride-Chang, et al., 2005; Wang, et al., 2006). First, Chiappe et al. (2007) investigated speech perception and phonological processing skills amongst Korean-English bilingual children as well as native English-speaking children in southern California in the United States. They found that speech perception and phonological processing were predictors of reading in English for both language groups, despite the difference in phonological representation between the two languages. Second, Cho and McBride-Chang (2005) divided the levels of phonological awareness into two levels: syllable-level

and phoneme-level. Amongst Korean children in Grade 2 who received instruction in

English as a Second Language as part of the curriculum, Cho and McBride-Chang

(2005) found that syllable-level awareness in Korean was a predictor of Korean

reading, yet phoneme-level awareness in Korean was not a predictor of Korean

reading. Interestingly, the phoneme-level awareness not only in English but also in

Korean were predictors of English reading in Grade 3. Cho and McBride-Chang

(2005) attributed this to differences in orthographic features, whereas Korean has

shallow orthography (i.e., relatively transparent letter-sound correspondence) and

syllable-based orthography (i.e., a string of each syllable as a block containing

several phonemes constitutes a word), English has deep orthography (i.e., relatively

opaque letter-sound correspondence) and phoneme-based orthography (i.e., a

string of several phonemes constitutes a word). Thus, Cho and McBride-Chang

(2005) argued that depending on the orthography of the language, certain levels of

phonological awareness may be more pertinent in predicting the reading of the

particular language. Finally, McBride-Chang et al. (2005) investigated phonological

awareness and morphological awareness across English, Cantonese, Mandarin,

and Korean. In phonological awareness, McBride-Chang et al. (2005) found, again,

that phonological awareness in Korean was a significant predictor of word reading in

Korean. This pattern was also true for English. However, phonological awareness in

Cantonese and Mandarin were not predictors of reading in these respective

languages. The authors interpreted this result as due to the orthography of the

language. Korean script uses both phoneme- and syllable-level units, and English

script uses phoneme-level units; in comparison, Cantonese and Mandarin scripts

are represented as syllable-level units. Thus, phonological awareness was an important predictor of reading because both Korean and English require the manipulation of phonemes, whereas Cantonese and Mandarin require an awareness of syllables (McBride-Chang, et al., 2005).

As found in other studies, there will be a significant relationship in phonological processing between English and Korean, and phonological processing skills in English and in Korean will be predictors of reading in both languages, supporting the linguistic interdependence hypothesis.

With respect to the level of phonological awareness (Cho & McBride-Chang, 2005; McBride-Chang, et al., 2005), the different levels of phonological awareness may be of importance depending on the specific language. The linguistic interdependence hypothesis predicts that either phoneme level of syllable level will consistently be a predictor of reading in both languages. In contrast, the script-dependence theory predicts that only phoneme-level phonological awareness will predict reading in English, whereas only syllable-level phonological awareness will predict reading in Korean. In addition, the script-dependence theory predicts that a relationship between phonological awareness and reading will occur only within each language.

Syntactic Awareness

Syntactic awareness refers to the ability to understand the grammatical rules of a language, including word order, prepositions, articles, and auxiliary verbs. This is also important for reading because "it requires making predictions about the words that comes next in sequence" while reading a sentence (Lipka, et al., 2005).

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Syntactic awareness has been found to be more challenging for poor readers than for good readers amongst L1 speakers (Siegel & Ryan, 1988).

With respect to children with ESL, syntactic awareness has been found to be notoriously difficult for ESL children (Chiappe, Siegel, & Gottardo, 2002; Chiappe, Siegel, & Wade-Woolley, 2002; Lesaux & Siegel, 2003). Lipka et al. (2005) found that ESL children' exposure to English instruction for more than 3 years was not enough to make ESL children' syntactic awareness in English comparable to that of L1 speakers. In addition, findings in studies with bilingual children from various language backgrounds (e.g., Portuguese, Italian, and Arabic) suggest that syntactic awareness is not as transferable as phonological processing. Lipka et al. (2005) explain that there may be positive transfer between languages when the first language has a more heavily inflected structure than English (e.g., Arabic or Italian).

Very few studies have examined the relationship between syntactic awareness and reading (Abu-Rabia & Siegel, 2002; D'Angiulli, et al., 2001; da Fontoura & Siegel, 1995). First, a study in Italian-English bilingual children (D'Angiulli, et al., 2001) found significant correlations between the oral cloze task and reading within the same language. However, there were mixed findings in the cross-language relationship between oral cloze tasks and word reading. When compared as a function of reading-level groups, less skilled bilingual (Italian-English) and monolingual (English only) readers performed significantly lower on an English oral cloze task than those who were skilled readers. Next, Abu-Rabia and Siegel (2002) also found significant correlations between syntactic awareness and reading skills within the same language in English and in Arabic, supporting the claim that

syntactic awareness is cross-linguistic. Finally, da Fontoura and Siegel (1995) compared good readers and poor readers in Portuguese-English bilingual children, finding that the English oral cloze task (but not the Portuguese oral cloze task) differentiated between bilingual reading-disabled and normally achieving students. None of the three studies included analysis on syntactic awareness as a predictor of reading. There is no empirical study available that provides information on the Korean-English bilingual population.

Very few studies have examined the cross-language transferability of syntactic awareness, and these studies yield mixed findings. Thus, there is not enough cross-linguistic research on this to come to a conclusion, and this study intends to explore whether syntactic awareness is more language-specific or more linguistically interdependent. If syntactic awareness is more language-specific (i.e., supporting the script-dependence hypothesis), there will be no significant relationship in the performances on syntactic awareness between English and Korean. On the other hand, if syntactic awareness is transferable between languages (i.e., supporting the linguistic interdependence hypothesis), there will be a significant relationship in the performance on syntactic awareness between the two languages.

Working Memory

Working memory refers to holding information and actively manipulating the information while performing other cognitive tasks (Baddeley, 1983). This ability is associated with many academic skills and domains, including phonological processing and processing speed. This is pivotal for beginning readers so that they

can decode the letters and retrieve the corresponding sound, and put those sounds together in order to pronounce the whole word. Amongst the L1 population, Siegel and Ryan (1988) found a deficit in working memory along with a deficit in syntactic awareness in poor L1 readers. In addition, Siegel and Ryan (1989) also report that children with reading disability performed significantly lower on both verbal working memory and non-verbal working memory tasks than normally achieving readers.

With respect to ESL population, unlike L1 speakers, Lipka et al. (2005) report that the findings are inconsistent in ESL children compared to L1 children. There was a difference in the working memory measures between the performance of L1 and ESL in Kindergarten (Chiappe, Siegel, & Wade-Woolley, 2002); however, this difference disappeared by Grade 2 (Lesaux & Siegel, 2003), and working memory was not a significant predictor of later reading. Amongst the children with ESL during Kindergarten, working memory did not predict reading in Grade 1, whereas in L1 speakers in Kindergarten it predicted reading in Grade 1. Another study in Chinese-English speaking bilinguals (Chiappe, Siegel, & Gottardo, 2002) also reports that, along with syntactic awareness, working memory is not as transferable to the second language.

Few studies report findings in bilingual children (Abu-Rabia & Siegel, 2002; D'Angiulli, et al., 2001; da Fontoura & Siegel, 1995). First, da Fontoura and Siegel (1995) found that Portuguese-English bilingual children with reading disability performed lower in working memory tasks than normally achieving students, yet this difference between reading-level groups was significant only in Portuguese. However, Abu-Rabia and Siegel (2002) found that working memory did not

significantly distinguish between good readers and poor readers amongst the Arabic-English bilingual children. Finally, D'angiulli et al. (2001) only found a significant correlation between English working memory task and Italian word reading, whereas working memory and reading were not correlated within the same language in Italian and in English. In addition, working memory did not distinguish good readers from poor readers in Italian-English bilingual children as well as those in English monolingual children. All three studies did not report analysis on working memory as a predictor of reading. Lastly, there is no empirical evidence available on the relationship between working memory and reading in Korean-English bilingual children.

Some researchers have approached the relationship between memory and reading development via short-term memory (Swanson, Saez, & Gerber, 2006). Working memory is the active manipulation of information while mentally storing other information in short-term memory, whereas short-term memory is the passive storage of information (Swanson, et al., 2006). In their longitudinal study of reading development in ESL children who are at-risk and not-at-risk for reading disability, Swanson et al. (2006) found that short-term memory is language-specific, whereas working memory, especially phonological working memory, is less language specific. Amongst ESL children, the best predictor of reading was phonological working memory, and short-term memory and semantic working memory were not significant in predicting reading. Swanson et al. (2006) found that working memory in Spanish was an important predictor of English reading in ESL children, yet the type of working memory that predicted English reading was indeed phonological working

memory, as measured by a rhyming task, which is a similar measure to the one used by Siegel and her colleagues as a phonological awareness task. Thus, it is not clear to what extent the finding of Swanson et al. (2006) was attributable to working memory rather than phonological processing.

If working memory is language-specific, there will be no significant relationship in performances on working memory measures between English and Korean as predictors of reading. In contrast, if working memory is cross-linguistic, there will be a significant relationship in performances on working memory measures between English and Korean as predictors of reading.

Orthographical Awareness

Orthography is investigated as a potential predictor of reading development (Abu-Rabia & Siegel, 2002; Geva & Siegel, 2000; Lindgren, et al., 1985; Siegel, Share, & Geva, 1995). Orthographic awareness, or orthographic knowledge, refers to children's understanding of the conventions used in the writing system of their language (Treiman, Cassar, Perfetti, Rieben, & Fayol, 1997). In other words, children should understand plausible letter combinations in the writing system of the language that they learn how to read and write (Cassar & Treiman, 1997). A study with L1 children with reading disabilities (Siegel, et al., 1995) found that children with dyslexia showed higher orthographic skills than children without dyslexia. Siegel et al (1995) concluded that children with dyslexia who lack phonological skills compensate in reading by depending on visual (i.e., orthographic) skills.

In the ESL population, Wade-Woolley and Siegel (1997) investigated spelling performance in comparison to L1 students. Poor performance on spelling was found

in both poor ESL readers and poor L1 readers; however, ESL children who were good readers did not show any lag compared to L1 speakers despite the heavy demand of phonology from English in the English spelling task.

Few studies provide findings in bilingual populations (Abu-Rabia & Siegel, 2002; Cho & McBride-Chang, 2005; da Fontoura & Siegel, 1995; Wang, et al., 2006). First, a cross-linguistic study in Arabic-English bilingual children (Abu-Rabia & Siegel, 2002) found some relationship between reading disability and different orthographic systems. Bilingual children who were reading-disabled had consistently higher scores in pseudo-word reading tasks and spelling tasks than monolingual L1 reading-disabled students. This study found significant correlation between English orthographic task and Arabic orthographic task. Second, da Fontoura and Siegel (1995) found a similar pattern, although orthographic skills were not directly measured in the study. Their explanation of this finding was that both Portuguese and Arabic have more transparent phoneme-grapheme correspondence than English, and this allowed bilingual children with reading disability to perform better than L1 speakers. Third, Geva and Siegel (2000) investigated orthographic knowledge and reading in Hebrew-English bilingual children. They found that the categories of decoding errors in Hebrew and English were orthography-specific, and children read voweled Hebrew (a shallow orthography) more accurately than English (a deep orthography), supporting the script-dependence hypothesis. Furthermore, as described in relation to phonological awareness, Cho and McBride-Chang (2005) found that phoneme-level awareness in both Korean and English was a better predictor of English reading, whereas syllable-level awareness in Korean was a

better predictor of Korean reading. The authors attributed this to the different orthographic systems in Korean and English, which require learners to be sensitive either to syllables in Korean or to phonemes in English. In other words, although orthographic knowledge was not directly examined, Cho and McBride-Chang (2005) found that the level of phonological awareness may depend on the orthographic system of the particular language. Finally, related to the population of interest, a study in Korean-English bilingual children (Wang, et al., 2006) did not find orthographic transfer between reading in two languages. They found Korean and English orthographic skills were neither significantly correlated, nor predicted readings in the other language. Wang et al. (2006) attributed this finding to the different orthographic system visually as well as in depth. In other words, the reason is because English is a linear and deep orthographic system, whereas Korean is a nonlinear (square block-shaped) and shallow orthographic system. It was not available to find evidence that they are significantly correlated across languages. Thus, with exception of the study between Arabic and English, most studies found support for script-dependent hypothesis.

Although several studies find in favor of the script-dependent hypothesis for orthographic skills, there is not enough evidence to determine whether orthography is language-specific or cross-linguistic. If orthography is language-specific, there will be no significant relationship between orthographic knowledge in the two languages and reading. On the other hand, if orthography is cross-linguistic, there will be a significant relationship between orthographic knowledge in the two languages and reading.

METHOD

Research Design and Proposed Analysis

This study is a correlational design comparing means and correlations between groups, the bilingual group and a comparison monolingual group. In addition, regression analyses were used to find which reading-related skills are predictors of reading.

Participants

Sixty-five participants between the ages 5 and 13 (from Kindergarten to Grade 6) were recruited in Greater Vancouver, Canada. Participants were selected who received English schooling, and at the same time, enrolled in the Korean Heritage Language Programs. Three locations participated in this study: Kwang Lim Korean language school, Sieunso Korean language school, Bear Creek Community Church. In this region, Korean Heritage Language Programs are often affiliated with churches, and run as non-profit independent programs. For example, the Kwang Lim Korean language program takes place at the Kwang Lim Korean Methodist Church in Surrey for three hours every Saturday during the school year. Teachers of these Korean language programs are from the affiliated churches, and some of them have teaching licensure or experience prior to coming to Canada. In those programs, semesters are run similarly to the school year in the elementary schools. Most children were born in Canada or immigrated to Canada before school age, and their parents spoke predominantly Korean at home. Out of 65 participants, 6 students were excluded in the analysis because those students did not meet the age and

grade criteria and one student had been in the country only for few months; 59 students were included in the analysis.

A comparison group of 59 English-speaking monolingual was selected from a larger sample from a longitudinal study. These children were matched with bilingual children on chronological age, gender, and grade. Because all of the children in the Korean sample scored higher than 30th percentile on word reading measure (WRAT3), the comparison group was randomly drawn from those who scored higher than 30th percentile on WRAT3 Reading subtest. The children in the comparison group came from school in the same geographical region.

Tasks

A series of English and Korean tasks were administered. English tasks were chosen with the intention of mirroring the measures as much as possible in the previously collected data.

English Tasks

English Word Reading (Wilkinson, 1995). The Reading subtest of the Wide Range Achievement Test- 3rd edition (WRAT-3) (Wilkinson, 1995) was administered to each participant. An increasingly difficult series of words in the Reading subtest was presented to the participants, and participants will read out the items (e.g., in, lame, horizon).

English Spelling (Wilkinson, 1995). The Spelling subtest of the Wide Range Achievement Test- 3rd edition (WRAT-3) (Wilkinson, 1995) was administered to each participant. An increasingly difficult series of words in the Spelling subtest was read

to the participants, and participants will be asked to spell out the words (e.g., in, light, believe).

English Pseudoword Reading (Woodcock, 1987). The Word Attack subtest in the Woodcock Reading Mastery Test (Woodcock, 1987) was administered to each participant. An increasingly difficult series of pseudowords was visually presented, and participants were asked to read out the words (e.g., *cyr, roo,* and *wrey*).

English Pseudoword Spelling (Woodcock, McGrew, & Mather, 2001). The Spelling of Sounds subtest in the Woodcock-Johnson III Tests of Achievement was administered to each participant. An increasingly difficulty series of pseudowords was orally presented, and participants were asked to spell the psuedoword in a way if they were real words (e.g., wub)

English Phoneme and Syllable Deletion. Selected subtests from the Phonological Abilities Test (Muter, Hulme, & Snowling, 1997) and Perceptual Skills Curriculum (Rosner, 1973) were administered depending on the grade of the participants. For participants between kindergarten and grade 1, the Phoneme Deletion subtest from the Phonological Abilities Test (Muter et al., 1997) was administered. For participants in grades 2-4, the Auditory Analysis subtest of Perceptual Skills Curriculum (Rosner, 1973) was administered. For participants in grades 5-6, an experimental measure in Pseudoword Phoneme Deletion previously developed and used by Siegel was administered. The reason for administering different tests depending on their grade level was in order to compare the scores from a previously conducted study using these measures in North Vancouver.

All tests are similar in terms of rationale for deleting phonemes and syllables. For example, in phoneme deletion, the participant was asked to repeat a word (e.g., mop), then asked to say the word with either an initial, middle or final phoneme (e.g., "Now say mop word without /m/"). For example of syllable deletion, the participant was asked to repeat a word (e.g., cropfist), then asked to say the word with either an initial or final syllable (e.g., "Now say cropfist word without crop").

English Oral Cloze (Siegel & Ryan, 1988). To match the versions of Oral Cloze in the existing data, where the comparison group was drawn from, different versions were administered depending on the grade levels: for kindergarten, a version with 13 items; for grade 1, a version with 14 items; for grades 2-5, a version with 11 items; for grade 6, a version with 20 items. Such changes commensurated the increasing knowledge of syntax as children grew older in the previous study. All versions followed the same rationale and procedure: each sentence with one missing word were orally presented to the participants, and participants were asked to fill out the missing word in order to make the sentence grammatically correct (e.g., "Jane ___ her sister ran up the hill.").

English Working Memory. For children in kindergarten, a Memory for Sentences subtest in Stanford-Binet Intelligence Scale: Fourth Edition (Thorndike, Hagen, & Sattler, 1986) were administered. The subtest included forty-two items, and children were asked to repeat after the sentence, which gradually increased in length and difficulty. For example, the researcher asks the child to repeat after her, "Children drink milk"; then the successful recital of the sentence is recorded as correct. For analysis purpose, raw scores were used. For students in grades 1-6, an

experimental measure by Siegel & Ryan (1989) was administered. The participants were orally presented with sentences that are missing the last word, and will be asked to fill out the missing word. After consecutive presentation of sentences in the set, the participants were asked to remember all of the words that they answered in the set. There were three trials in each set, and the set was comprised of an increasing number of sentences (i.e., three sentences to each set 2a, 2b, 2c; then four sentences to each set 3a, 3b, 3c). For example, the researcher presented orally, "In the summer, it is very _____." "People go to see monkeys in a ____." With dinner, we sometimes eat bread and _____." The child was asked to fill out the blank after every sentence, then after the presentation of all sentences in the set, the child was asked to repeat all the words in the blanks. Since the number of sentences increased in the later sets, the task became increasingly demanding on verbal working memory.

English Orthographic Awareness (Siegel, et al., 1995). Seventeen pairs of pseudowords were visually presented, then the participants were asked to choose one of each pair that "can be" or "looks like" an English word (e.g., filv-filk; tolz-tolb).

Korean Tasks

The Korean items were developed by the author, and were intended to match the items in the English tasks as much as possible, according to the rationale and theoretical background described in Siegel and Ryan (1988). Korean items were not translation of English items. The only task that had some overlapping vocabulary between English and Korean tasks was Korean Working Memory, yet the number was less than 10 words. After the initial draft, the tasks were reviewed by a

colleague who publishes in this topic, Young-Suk Kim. In conclusion, the tasks were independent from each other across English and Korean although they were developed on similar principles.

The challenge in developing measures were (1) difficulty in knowing comparability with respect to item gradients; (2) difficulty due to Korean transparent orthography in developing difficult items in reading and spelling; (3) innate language difference yielding different grammatical blanks in working memory; (4) different positions of blanks in oral cloze between English and Korean. First, even though the tasks were peer-reviewed, it was virtually impossible to gauge whether the item gradients, the rate that the items become progressively difficult, were comparable. Second, because Korean has a shallow, transparent orthography, it was difficult to find irregular and difficult items in reading and spelling. Third, in working memory task, in English the last words missing were verbs, adjectives and nouns; in Korean the last words were verbs and adjectives. In addition, Korean verbs are heavily inflected indicating tense and polite/casual forms; thus, the marking of the answer in Korean had to be flexible compared to English tasks. In Korean working memory task, the points were given as long as the child could produce that makes sense in the sentence regardless of tense and polite/casual form. Finally, in examining syntactic awareness, Korean oral cloze included subject, object and possessive markers. English does not use markers to indicate the function of each word in the sentence; rather it relies on the word order. Due to this innate language differences, the items in Korean included several items blanking positions of subject, object and possessive markers. Thus, even though the Korean oral cloze task was devised on

the same principle as the English task, the items looked considerably different from the English task.

Korean Word Reading. An experimental measure parallel to the Word Identification in the WRAT-R (Wilkinson, 1995) was developed by the author. Eighty words were visually presented, and participants were asked to read the words aloud. The words were selected from the teaching resource package that is used in the province of British Columbia in Canada (University of British Columbia, 2006). The progression of difficulty was determined according to the level defined in the resource package. An example is: "사과 ([Sakwa]; apple). All Korean tasks are included in the Appendices.

Korean Spelling. An experimental measure parallel to the Spelling subtest in the WRAT-R (Wilkinson, 1995) was developed by the author. An increasingly difficult series of Korean words was orally presented, and the participants were asked to write each word in Korean. The list of words was selected from the same sources as in the Korean Word Reading Task.

Korean Pseudoword Reading. An experimental measure parallel to the Word Attack subtest in the Woodcock Reading Mastery Test- Revised (Woodcock, 1987) was developed by the author. Fifty words with increasing difficulty were presented, and participants were asked to read the pseudowords aloud. This task was designed to measure phonological processing skills, especially being able to read possible sound combinations in Korean that do not have any meaning. An example is: "수주" ([Soojoo]).

Korean Phoneme and Syllable Deletion. Adapted from Wang et al. (2006), an experimental measure parallel to the experimental English Phoneme and Syllable Deletion task was developed by the author. The rationale of deleting phonemes and syllables in Korean are discussed in the Cho and McBride-Chang (2005). In this Korean task, a list of consonant-vowel-consonant words was verbally presented, and children were asked delete either initial or final phonemes from words. For the phoneme deletion, the participant was asked to repeat a word (e.g., tum 텀), then asked to say the word with either an initial or final phoneme. For example of initial phoneme deletion, say "tum 텀" without saying "/ㅌ(t)/" would be "um 엄", and for final phoneme deletion, say "tum 텀" without saying "/ㅌ(t)/" would be "tuh 터." For the syllable deletion, the participant is asked to repeat a word, then say the word without initial-, middle-, or final syllable. For example of syllable deletion, say "gum mog uh (금목어)" without saying "mog (목)."

Korean Oral Cloze. Twenty Korean sentences that were missing one word in each sentence were orally presented, paralleling the English Oral Cloze Task (Siegel & Ryan, 1988). The children needed to fill out the missing word in order to make the sentence grammatically correct. An example is: "어린 열매가 빼곡히 가지에 매달려 _____." (Little fruits ___ hanging on the vines.)

Korean Working Memory. Adapted from the English version (Siegel & Ryan, 1989), children were asked to supply one missing word in each sentence, then asked to repeat all the words in each trial. Each set had three trials (i.e., 2a, 2b, 2c), and the number of sentences increased over sets (i.e., 2a, 3a, 4a). An example is: "코끼리는 크고, 쥐는 ___ (An elephant is big, a mouse is ___)" "도서관에서

사람들은 책을 ___ (At the library, people books ____)" Due to syntactic difference between English and Korean, the translation into English sometimes has blank in the middle of the sentence, but in the original item in Korean, all items controlled to lack one word at the end of a sentence.

<u>Korean Orthographic Awareness (Wang et al. 2006).</u> The orthographic choice task from Wang et al. (2006) was administered. Twenty-eight items of pseudoword pairs was visually presented, and the participants were asked to choose one of each pair that "can be" or "looks like" a Korean word. For example, "말, 듷."

Procedure

The children were individually tested in two sessions. Both English tasks and Korean tasks were administered to all participants, and the order of which language was randomly chosen.

RESULTS

Means and Standard Deviations

Table 1 shows the means and standard deviations for the English and Korean tasks by grades in bilingual children. The means and standard deviations are presented for individual grade levels for each measure.

Table 1 Bilingual Students' Performance on English Measures by Grades

	Kn N=6	Gr1 N=17	Gr2 N=9	Gr3 N=7	Gr4 N=8	Gr5 N=9	Gr6 N=3
English Measures							
WRAT3 Reading SS	117.67 (20.97)	117.94 (6.51)	110.00 (13.74)	114.00 (16.68)	106.88 (8.18)	108.78 (7.73)	100.33 (6.11)
Word Attack SS	132.53 (9.81)	124.44 (8.44)	116.00 (7.83)	112.83 (4.96)	109.13 (5.69)	107.44 (5.68)	106.33 (3.79)
Oral Cloze Percent Correct (maximum=1)	.26 (.37)	.41 (.18)	.61 (.13)	.61 (.09)	.74 (.17)	.77 (.14)	.67 (.20)
Phonological Awareness Percent Correct (maximum=1)	.18 (.24)	.82 (.18)	.70 (.19)	.78 (.08)	.78 (.11)	.57 (.14)	.56 (.10)
Working Memory Percent Correct (maximum=1)	.31 (.13)	.20 (.16)	.33 (.07)	.36 (.15)	.53 (.15)	.45 (.12)	.50 (.22)
WJ3 Letter Word Identification SS	120.00 (17.08)	121.06 (6.68)	111.33 (7.86)	112.14 (8.63)	105.50 (6.48)	106.78 (6.85)	103.33 (1.53)
WRAT3 Spelling SS	117.17 (11.92)	113.76 (10.74)	118.89 (13.29)	117.86 (14.14)	111.00 (7.91)	116.89 (5.60)	118.00 (6.56)
Orthographic Awareness	9.33 (2.94)	12.71 (1.65)	15.78 (0.83)	14.57 (1.40)	15.38 (1.60)	15.38 (1.19)	16.67 (0.58)
Spelling of Sounds SS	112.60 (10.16) (N=5)	108.06 (27.46)	110.56 (5.43)	109.57 (7.14)	107.38 (9.80)	103.22 (5.43)	103.33 (4.73)
Korean Measures							
Real Word Reading (maximum =80)	17.83 (22.08)	52.94 (24.11)	59.67 (23.85)	63.00 (20.30)	58.00 (25.29)	68.67 (7.70)	71.33 (7.64)
Oral Cloze (maximum=20)	3.00 (3.46)	6.06 (4.79)	10.33 (5.70)	7.86 (5.50)	12.13 (6.45)	11.56 (6.00)	10.00 (1.00)
Pseudoword Reading	8.83 (14.78)	35.71 (20.50)	45.78 (23.13)	55.86 (22.63)	48.88 (19.71)	42.89 (10.80)	37.00 (5.20)

	Kn N=6	Gr1 N=17	Gr2 N=9	Gr3 N=7	Gr4 N=8	Gr5 N=9	Gr6 N=3
(maximum=50)							
Syllable Deletion (maximum=20)	11.00 (2.68)	13.53 (3.14)	15.56 (4.33)	15.00 (2.08)	18.13 (2.10)	18.33 (1.41)	17.00 (2.65)
Phoneme Deletion (maximum=20)	4.00 (4.34)	11.65 (6.44)	14.33 (6.75)	15.14 (3.72)	18.00 (3.02)	19.00 (1.32)	18.67 (2.31)
Syllable and Phoneme Deletion Total (maximum=40)	15.00 (4.52)	24.59 (8.87)	29.89 (9.06)	30.14 (4.53)	34.63 (5.24)	37.33 (2.35)	35.67 (4.04)
Working Memory (maximum=15)	2.17 (1.33)	4.06 (2.01)	5.78 (2.44)	5.00 (1.73)	6.63 (1.51)	8.00 (2.83)	7.00 (2.00)
Spelling (maximum=40)	2.67 (2.25)	15.88 (7.09)	20.44 (9.63)	21.00 (8.04)	22.38 (8.91)	24.78 (5.87)	21.33 (2.31)
Orthographic Awareness (maximum=28)	17.50 (3.83)	22.18 (3.86)	23.89 (3.18)	23.43 (3.26)	24.75 (1.98)	25.11 (1.27)	25.33 (1.15)
Pseudoword Spelling (maximum=20)	1.33 (1.51)	10.71 (6.70)	12.89 (8.62)	14.57 (6.40)	15.00 (8.78)	15.44 (6.77)	13.67 (2.89)

Standard deviations are in parentheses.
N is specified if different from the grade group.

Table 2 shows the means and standard deviations for the English tasks by grades in monolingual children, drawn from a previous large longitudinal data.

Table 2 Monolingual Students' Performance on English Measures by Grades

	Kn N=6	Gr1 N=16	Gr2 N=10	Gr3 N=7	Gr4 N=8	Gr5 N=9	Gr6 N=3
English Measures							
WRAT3 Reading SS	110.00 (11.24)	112.27 (13.21)	112.00 (9.10)	117.57 (14.72)	113.63 (9.07)	107.22 (12.65)	112.19 (11.98)
Word Attack SS	-	110.06 (11.79)	114.22 (12.03)	117.57 (14.72)	112.88 (13.16)	125.33 (11.24)	113.26 (14.20)
Oral Cloze Percent Correct (maximum=1)	.38 (.21)	.67 (.13)	.68 (.20)	.66 (.16)	.77 (.14)	.77 (.14)	.75 (.13)
Phonological Awareness Percent Correct	.60 (.40)	.99 (.02)	.63 (.13)	.79 (.17)	.80 (.11)	.51 (.19)	.72 (.19)

	Kn N=6	Gr1 N=16	Gr2 N=10	Gr3 N=7	Gr4 N=8	Gr5 N=9	Gr6 N=3
(maximum=1)							
Working Memory Percent Correct (maximum=1)	.37 (.04)	.48 (.07)	.31 (.12)	.35 (.11)	.39 (.10)	.43 (.13)	.58 (.14)
Letter Word Identification SS	-	112.35 (13.13)	112.22 (13.03)	123.86 (14.51)	115.25 (9.84)	115.33 (14.30)	133.00 (27.71)
WRAT3 Spelling SS	-	-	107.56 (10.32)	114.43 (12.69)	112.00 (16.18)	104.11 (14.00)	108.33 (2.52)
Spelling of Sounds SS	-	-	-	-	-	106.67 (6.54)	107.00 (12.00)

Standard deviations are in parentheses.
N is specified if different from the grade group.

Table 3 shows overall performance differences on reading and spelling tasks between monolingual and bilingual children. For two reading tasks and spelling, there were not significant differences between bilingual and monolingual children's performances. However, bilingual children performed significantly higher than monolingual children, $t_{(93)}=2.74$, p<.01, with a medium effect size, Cohen's d = .57.

Table 3 Mean Comparisons on English Tests between Monolingual and Bilingual Children

English Tasks	Bilingual	Monolingual	t	Cohen's d
WRAT3 Reading SS	112.44 (12.20)	112.19 (11.98)	.11	.02
Word Attack SS	116.83 (10.70)	113.26 (14.20)	1.40	.28
Word Identification SS	113.22 (10.41)	115.96 (14.47)	-1.16	-.22
WRAT3 Spelling SS	115.70 (10.46)	109.08 (12.81) (N=37)	2.74**	.57
Spelling of Sounds SS	108.79 (16.41)	106.75 (7.57) (N=12)	.42	.16

Ns=58~59, unless specified
SS=Standard Score; Standard deviations are in parentheses.
* p<.05; ** p<.01; ** p.<001

Correlations among the Tasks

      Table 4 shows the partial correlations among the scores obtained by bilingual children on English and Korean tasks, controlling age. Several English measures had significant correlations within language. As expected, all of pseudoword and word reading and spelling measures had significant correlations between each other. English spelling task had a significant correlation with both word reading (rs=.63, .60, ps<.05) as well as pseudo word reading (r=.52, ps<.05) measures. Working memory did not show any significant relationship with reading and spelling measures. Pseudoword spelling had significant correlations with psuedoword and word decoding (rs=.27, .37, ps<.05).

Table 4 Partial Correlations among English Measures Controlling for Age (Bilingual Children)

English Tasks – English Tasks									
	1. WRAT 3 Reading SS	2. Word Attack SS	3. Word Identification SS	4. WRAT3 Spelling SS	5. Orthographic Awareness	6. Spelling of Sounds SS	7. Oral Cloze Percent Correct	8. Phonological Awareness Percent Correct	9. Working Memory Percent Correct
1. WRAT3 Reading SS	-								
2. Word Attack SS	.56***	-							
3. Word Identification SS	.76***	.63***	-						
4. WRAT3 Spelling SS	.63***	.52***	.60***	-					
5. Orthographic Awareness	.22	.09	.32*	.22	-				
6. Spelling of Sounds SS	.18	.27*	.22	.37**	.15	-			
7. Oral Cloze Percent Correct	.30*	.02	.16	.23	.28*	-.09	-		
8. Phonological Awareness Percent Correct	.17	-.01	.18	.06	.40*	-.07	.22	-	
9. Working Memory Percent Correct	.13	.12	.03	.09	.04	.05	.23	-.26	-

Ns=54~56

SS=Standard Score

Standard deviations are in parentheses.

* p<.05; ** p<.01; ** p.<001

Many Korean measures had strong correlations with each other. Korean sight word reading had strong correlations with Korean pseudoword reading (r=.69), Korean syllable awareness (r=.50) and phoneme awareness (r=.39), Korean spelling (r=.79), and Korean psuedoword spelling (r=.72). It is interesting to note that the correlation of Korean word reading with Korean syllable awareness was stronger

than with Korean phoneme awareness. In addition, Korean orthographic awareness (r=.43), Korean working memory (r=.42), and Korean oral cloze (r=.54) were all significantly related to Korean word reading. This finding is similar to the L1 research in English, syntactic awareness, working memory, phonological awareness, and orthographic awareness are all significantly related to word reading in Korean as the first language.

Table 5 Partial Correlations among Korean Measures Controlling for Age (Bilingual Children)

Korean Tasks – Korean Tasks	10. Korean Word Reading	11. Korean Oral Cloze	12. Korean Pseudoword Reading	13. Korean Syllable Deletion	14. Korean Phoneme Deletion	15. Korean Working Memory	16. Korean Spelling	17. Korean Orthographic Awareness	18. Korean Pseudoword Spelling
10. Korean Word Reading	-								
11. Korean Oral Cloze	.54***	-							
12. Korean Pseudoword Reading	.69***	.45***	-						
13. Korean Syllable Deletion	.50***	.50***	.46***	-					
14. Korean Phoneme Deletion	.39**	.41**	.26*	.40**	-				
15. Korean Working Memory	.42**	.60***	.31*	.52***	.39**	-			
16. Korean Spelling	.79***	.61***	.65***	.56***	.42**	.41***	-		
17. Korean Orthographic Awareness	.43**	.26*	.46***	.49***	.34**	.39**	.46***	-	
18. Korean Pseudoword Spelling	.72***	.58***	.63***	.43**	.27*	.41**	.88***	.31*	-

Ns=55~56

SS=Standard Score; Standard deviations are in parentheses.

* p<.05; ** p<.01; ** p.<001

This study intended to examine cross-language relationships of reading-related skills. First of all, there was a significant correlation between English phonolgical awareness and Korean phoneme deletion, Korean word and pseudoword reading (*r*s=.45, .34, .40, *p*s<.05, respectively). In comparison, English

phonological awareness did not show a significant relation with Korean syllable deletion. Cross-language transfer of phonological awareness is partially supported. Second, Korean oral cloze had no relationship with English oral cloze; oral cloze does not show relationship across languages, supporting script dependent hypothesis. Neither Korean oral cloze nor English oral cloze had cross-language significance in correlations with word reading in Korean and in English. Third, the cross-language relation of working memory was not significant between Korean and English; this supports for script-dependent hypothesis. Likewise Korean and English working memory measures did not have significant correlations with cross-language word reading measures. Finally, Korean orthographic awareness did not have significant correlations with English orthographic awareness as well as English spelling and reading. This is consistent with the evidence that orthography is language-specific. Interestingly, Korean orthographic awareness had a significant relationship with English phonological awareness tasks (r=.28, p<.05). Being sensitive to the rules of one writing system was related to being good at sound units of another language. However, the parallel relations between English orthographic awareness and Korean phoneme deletion tasks were not significant. This may be due to the transparent Korean orthography, which allows its speakers to make more predictable connections between writing rules and phonemes.

Table 6 Partial Correlations among English and Korean Measures Controlling for Age (Bilingual Children)

English Tasks – Korean Tasks	10. Korean Word Reading	11. Korean Oral Cloze	12. Korean Pseudoword Reading	13. Korean Syllable Deletion	14. Korean Phoneme Deletion	15. Korean Working Memory	16. Korean Spelling	17. Korean Orthographic Awareness	18. Korean Pseudoword Spelling
1. WRAT3 Reading SS	.15	-.01	.002	-.09	.003	.122	.09	-.16	.07
2. Word Attack SS	.07	.05	-.08	-.19	-.09	.07	-.09	-.08	.001
3. Word Identification SS	.11	-.09	.04	-.20	-.10	-.004	-.01	-.09	-.03
4. WRAT3 Spelling SS	.21	.05	.11	-.06	-.16	.03	.17	-.11	.24
5. Orthographic Awareness	.27*	.17	.25	-.04	.22	.07	.21	.15	.11
6. Spelling of Sounds SS	.05	.19	.07	-.15	-.07	-.03	.09	.008	.18
7. Oral Cloze Percent Correct	.06	.10	-.01	.09	.22	.15	.08	-.01	-.002
8. Phonological Awareness Percent Correct	.34***	.17	.40**	.08	.45***	.04	.26	.28*	.22
9. Working Memory Percent Correct	-.17	-.09	-.19	.07	.06	.14	-.11	.14	-.12

Ns=55~56

SS=Standard Score; Standard deviations are in parentheses.

* p<.05; ** p<.01; ** p.<001

Mean Comparisons between Monolingual and Bilingual Children

To better understand scores without developmental differences particularly in experimental measures, two or three grades were grouped into each grade groups. Tables 7-9 show t-tests of the mean differences between monolingual comparison group and Korean-English bilingual children. For comparison purposes, the grades

were divided into three groups: kindergarten and grade 1 (Table 7), grades 2 to 3 (Table 8), and grades 4 to 6 (Table 9). Table 7 shows that, in kindergarten and grade 1, there were significant mean differences between monolingual and bilingual children in several measures. Overall performance on WRAT3 reading task was significantly higher in the bilingual sample, whereas their language skills (syntactic awareness in grade 1, phonological awareness, working memory) were significantly lower than the ones of L1 speakers.

Table 7. Mean Comparisons on English Tests between Monolingual and Bilingual Children (Kindergarten-Grade 1)

English Tasks	Bilingual	Monolingual	t	Cohen's d
WRAT3 Reading SS	117.87 (11.44)	110.55 (11.17)	2.17*	.65
Word Attack SS	125.91 (9.06)	110.06 (11.79) N=17	4.81***	1.51
Word Identification SS	120.78 (9.95)	112.35 (13.13) N=17	2.31*	.72
Oral Cloze Percent Correct (maximum=1)	.37 (.24)	.60 (.20)	-3.33**	-1.04
Working Memory Percent Correct (maximum=1)	.23 (.16)	.45 (.08)	-6.01***	-1.74
Phonological Awareness Percent Correct (maximum=1)	.68 (.34)	.89 (.26)	-2.38*	-.69

Ns= 22~23, unless specified
SS=Standard Score; Standard deviations are in parentheses.
* p<.05; ** p<.01; ** p.<001

Table 8 shows, in grades 2 and 3, monolingual and bilingual children show comparable performances on all of the measures. In all measures, there was no group difference between bilingual children and monolingual children.

Table 8. Mean Comparisons on English Tests between Monolingual and Bilingual Children (Grades 2-3)

English Tasks	Bilingual	Monolingual	t	Cohen's *d*
WRAT3 Reading SS	111.75 (14.70)	115.94 (12.99)	-.87	-.20
Word Attack SS	114.73 (6.81)	115.69 (12.91)	-.26	-.09
Word Identification SS	111.69 (7.93)	117.31 (14.50)	-1.36	-.48
WRAT3 Spelling SS	118.44 (13.21)	110.56 (11.56)	1.80	.63
Oral Cloze Percent Correct (maximum=1)	.60 (.11)	.67 (.18)	-1.20	-.47
Working Memory Percent Correct (maximum=1)	.34 (.11)	.33 (.12)	.39	.08
Phonological Awareness Percent Correct (maximum=1)	.73 (.16)	.70 (.17)	.66	.18

Ns=15~17

SS=Standard Score; Standard deviations are in parentheses.

* p<.05; ** p<.01; ** p.<001

Table 6 shows, in grades 4 to 6, in most measures, monolingual and bilingual children performed similarly from each other with the exception of one of the two word reading measure. It is difficult to tell why one word reading measure did not yield any group difference whereas the other word reading measure did. It may be due to the outlier in the monolingual sample given the monolingual group consistently had higher standard deviations (SD=11.85, 15.64) for each measure compared to the bilingual group (SD=7.89, 6.08). Finally, unlike the overall group comparison earlier, there was no significant difference in spelling task in this grade range. Nonetheless, effect sizes in both comparisons were similarly in the moderate range, Cohen's *d* = .57 (kindergarten-grade 6), .61 (grades 4-6). Thus, such difference in t-test results can be attributed to the comparison size.

Table 9. Mean Comparisons on English Tests between Monolingual and Bilingual Children (Grades 4-6)

English Tasks	Bilingual	Monolingual	t	Cohen'd d
WRAT3 Reading SS	106.75 (7.89)	110.80 (11.85)	-1.27	-.40
Word Attack SS	107.95 (5.31)	114.05 (16.98)	-1.53	-.48
Word Identification SS	105.75 (6.08)	117.95 (15.64)	-3.25**	-1.03
WRAT3 Spelling SS	114.70 (7.11)	107.90 (13.91)	1.95	.62
Spelling of Sounds SS	104.90 (7.38)	106.75 (7.57) N=12	-.68	-.25
Oral Cloze Percent Correct (maximum=1)	.74 (.16)	.77 (.13)	-.58	-.21
Working Memory Percent Correct (maximum=1)	.49 (.14)	.43 (.13)	1.33	.44
Phonological Awareness Percent Correct (maximum=1)	.65 (.16)	.66 (.21)	-.10	-.05

Ns=20, unless specified
SS=Standard Score; Standard deviations are in parentheses.
* p<.05; ** p<.01; ** p.<001

In summary, with the exception of higher reading performance in kindergarten and grade 1, the results are consistent with the previous findings that ESL children's reading-related skills are usually behind the L1 speakers in early primary grades, while such gap disappears in later grades.

Hierarchical Regression

Another question that the present study investigated was the level of phonological awareness in Korean reading acquisition. In order to find out whether one level (i.e., phoneme level or syllable level awareness) is a stronger contributor of reading and spelling in Korean, hierarchical regressions were performed. Table 10 shows the hierarchical regression results when Korean syllable deletion was put into the model first followed by Korean phoneme deletion for four different dependent variables: Korean word reading, Korean pseudoword reading, Korean

word spelling, and Korean pseudoword spelling. In all four models, Korean syllable

deletion independently accounted for the variance for Korean reading and spelling

tasks, over and above the contribution of Korean phoneme deletion. Thus, not only

for reading in Korean but also for spelling in Korean, syllable level phonological

awareness is a stronger contributor than phoneme level phonological awareness.

**Table 10 Independent Contribution of Korean Syllable Deletion (over and
above Korean Phoneme Deletion) to Korean Reading and Spelling**

	R	Adjusted R^2	R^2 Change	Significance
Korean Word Reading				
Korean Phoneme Deletion	.54	.28	.30	.0001
Korean Syllable Deletion	.65	.40	.13	.0001
Korean Pseudoword Reading				
Korean Phoneme Deletion	.39	.14	.15	.002
Korean Syllable Deletion	.54	.26	.14	.0001
Korean Word Spelling				
Korean Phoneme Deletion	.61	.36	.37	.0001
Korean Syllable Deletion	.73	.52	.17	.0001
Korean Pseudoword Spelling				
Korean Phoneme Deletion	.44	.18	.19	.001
Korean Syllable Deletion	.56	.30	.13	.0001

DISCUSSION

Overall bilingual and monolingual children showed comparable performance in almost all of the reading measures. Word reading and decoding in bilingual children were higher in early primary grades with a reversed trend in older children. Bilingual children performed slightly lower than monolingual children in English phonological awareness, English working memory and English syntactic awareness in most grades. In the monolingual sample, the spelling task was administered only to older grades; the bilingual children showed higher performance in word spelling, while such gap may fluctuate depending on the grade. One interesting observation is that the initial significant difference in word spelling between bilingual and monolingual groups disappeared when the grades were split into two levels (i.e., grades 2-3 and grades 4-6). Such result may be due to the decrease in sample size when two language groups were divided into another two grade groups each in order to compare in narrower grade ranges. Nonetheless, bilingual children tend to score higher, even though the significance of this difference varied depending on the size of comparison. This may be related to the positive and significant relationship between Korean orthographic awareness and English phonological awareness in relation to more transparent (consistent) correspondence in Korean orthography. When children are strong in Korean orthographic legality, it is more likely that they are stronger in understanding English phonemes, thus helping them with spelling in English.

The results indicate that in primary grades phonological awareness across languages were significantly related in the bilingual group, although it was no longer

found in older grades. It is somewhat counterintuitive that, in kindergarten and grade 1, the bilingual group performed significantly higher in English word reading compared to L1 speakers, while their English language skills (i.e., syntactic awareness, English phonological awareness, working memory) were significantly below those of L1 speakers. The findings indicate that, even though bilingual children may be behind in language skills in English, it does not hinder bilingual children's performance in English; rather in the present study, bilingual children performed higher. There may be a positive contribution of the heritage language that is not captured in the English language tasks. Thus, this may be a demonstration of positive influence of bilingual language environment. However, such generalization should be made with caution as this study included only a limited sample size.

In addition, the bilingual group's decoding performance (word attack) was significantly higher than the one of their monolingual counterparts, while the bilingual sample's English phonological awareness is significantly below of those in monolingual children. Such interesting contrast may be because bilingual children are exposed to more transparent orthography in Korean in addition to opaque orthography in English. The reliable predictability in decoding in Korean may allow bilingual children to be stronger decoders even though their English phonological awareness is not as strongly established as the English monolingual children. Despite the time difference of administration in bilingual and monolingual samples, the bilingual sample's within-sample pattern is free from the Flynn effect (Flynn & Neisser, 1998).

As expected, there was significant relationship between Korean phoneme awareness and English phonological awareness tasks. Linguistic interdependence hypothesis is partially supported regarding the transfer of phonological awareness. Other reading-related skills, syntactic awareness, working memory, and orthographic awareness were not related significantly across languages. Thus, the evidence supports for script-dependence hypothesis for those three skills.

As to the question which level of phonological awareness in prediction of reading, consistent with recent findings by Cho and McBride-Chang (2005), syllable deletion was a more important contributor of Korean word reading than phoneme deletion. Goswami and colleagues (Ziegler & Goswami, 2005) proposed a grain size theory that, depending on the representation of phonology in the orthography, speakers of each language need to use certain level of unit size ("grain size") in the process of decoding. The finding of this research supports the grain size theory. In other words, because Korean uses more syllable units than phoneme unit, paired with the fact that is an easily-decodable shallow orthography, speakers of Korean can use syllables in word reading instead of harder and smaller units, phonemes.

In this study it is difficult to analyze whether the level of phonological awareness (i.e., syllable level vs. phoneme level) has a different relationship across languages, because one English measure had only phonemes and another had both phonemes and syllable, and the measure had pseudo word phonemes; moreover, the sample size was low per measure. As some languages differ in utilizing the levels of phonological awareness in relation to orthography of that particular language, it will be worthwhile to compare whether certain levels of phonological

awareness are more important in cross-language transfer, and whether there is evidence in other language combinations of the interplay of levels of phonological awareness with orthography of the language in predicting word reading.

Limitations

With the intention of drawing a comparison group, the measures in this study were selected parallel to the measures from an existing, longitudinal data. Thus, the choice of measures was confined to the measures used in the previously collected data, which resulted in taking several versions of measures for one skill. This created some difficulty in analysis; indirectly such design resulted in diminishing the sample size per measure. The reason why Korean measures had more significant correlations within language could have been due to the fact that one measure per skill were used throughout grades, which increased sample size compared to English measures; this could have affected the power that eventually influences statistical significance. Second, a large age range as well as small sample size also made analysis more complicated. As a first study on this topic conducted in this region, it was difficult to anticipate the participant number per grade. For future research, narrowing down the target age range will lead to a more fruitful outcome with more definitive evidence. Next, the measures could have been more thoughtfully selected. For example, I could have used English measures that capture syllable and phoneme separately. Whereas Korean measures were separately devised for phoneme and for syllable levels, English measures included both items; in addition, one task for older grades consisted of pseudowords unlike in younger grades. This restrained the analysis that the level of phonological awareness was

examined only in Korean. Furthermore, the two samples had different demographic characteristics. The comparison data was drawn from a rather homogeneous environment (i.e., same reading program within the same district) and was a longitudinal dataset. In comparison, the Korean sample was drawn from anywhere in the greater Vancouver area and was a cross-sectional sample.

The results can be informative to educators that for Korean speakers, teaching them to develop phoneme level awareness in learning to read in English is important. The results support the benefit of bilingualism that, even in a cross-sectional sample with varying geographic locations across greater Vancouver area, children performed comparably on English measures, and the gaps in earlier grades disappeared within two years of schooling. In terms of policy, this study appreciates the community effort to conserve heritage language. The findings of this research demonstrate that additional first language (heritage language) instruction does not impair their second language (English); in some cases, it rather facilitates reading and spelling performance in the second language. In embracing multiculturalism, more federal and provincial attention to these heritage language programs is called to systematically support maintaining heritage languages.

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APPENDICES

Appendix 1. Korean Phonological Awareness Tasks

Syllable Deletion Korean 음절 빼기 한국어

<u>Instruction</u>

내가 먼저 단어를 말해줄게요. 어떤 단어들은 진짜 단어들이고, 어떤 단어들은 의미가 없는 가짜 단어들이에요. 따라해보세요. "학교" "학교"에서 "학"이라는 소리를 빼면 무슨 소리가 남아요?

맞으면, "맞아요. "학교"에서 "학"이라는 소리를 빼면, "교"라는 소리가 남아요."
틀리면, "맞는 답은 "교"에요. 왜냐하면 "학교"에서 "학"이라는 소리를 빼면 "교"소리만 남기 때문이에요.

	Item	Delete	Response	Score		Item	Delete	Response	Score
E1	학교	학			10	고이토	이		
E2	사과	과			11	무군속	속		
1	나비	나			12	노미라	미		
2	시계	계/개			13	다소해	해		
3	나무	나			14	재단모	재		
4	동생	생			15	가님벽	님		
5	마금	금			16	고리차개	고		
6	수주	수			17	기선재한	선		
7	이노	노			18	부라만다	만		
8	당소	당			19	복지정석	석		
9	수방거	수			20	쌍교현명	현		

Raw Score	/20

Phoneme Deletion Korean 음소빼기 한국어

<u>Instruction</u>

내가 먼저 단어를 말해줄게요. 어떤 단어들은 진짜 단어들이고, 어떤 단어들은 의미가 없는 가짜 단어들이에요. 따라해보세요. "나" ""에서 "ㄴ"라는 소리를 빼면 무슨 소리가 남아요?

맞으면, "맞아요. "나"에서 "ㄴ"이라는 소리를 빼면, "아"라는 소리가 남아요."
틀리면, "맞는 답은 "아"에요. 왜냐하면 "나"에서 "ㄴ"이라는 소리를 빼면 "아" 소리만 남기 때문이에요.

	Item	Delete	Response	Score		Item	Delete	Response	Score
E1	나	ㄴ			10	쿤	ㅋ		
E2	가	ㅏ			11	경	ㄱ		
1	다	ㄷ			12	홉	ㅎ		
2	방	ㅂ			13	딘	ㄴ		

	Item	Delete	Response	Score		Item	Delete	Response	Score
3	장	ㅈ			14	맵	ㅁ		
4	말	ㅁ			15	참	ㅊ		
5	별	ㅂ			16	흰	ㄴ		
6	벽	ㄱ			17	할	ㄹ		
7	산	ㄴ			18	백	ㄱ		
8	팔	ㄹ			19	괌	ㅁ		
9	담	ㅁ			20	준	ㄴ		

Raw Score	/20

Appendix 2. Korean Word Reading Task

Word Reading Korean 한국어

Direction:

이제 단어 읽기를 할 거에요. 여기에 있는 단어들을 한줄 씩 아래로 읽어 내려가면 되요. 모르는 단어가 나오면, 모른다고 나한테 얘기해주고 그 다음단어를 읽어주세요.

1-12: 아동이 잘못 대답할 경우, "글자 이름을 말해주세요." 라고 한번 얘기해 줄것.

Item		Response	Score	Item		Response	Score
1	ㄱ (글자이름)			21	공		
2	ㅁ			22	색		
3	ㄷ			23	도시		
4	ㅍ			24	사람		
5	ㅊ			25	비누		
6	ㅎ			26	감자		
7	ㅃ			27	우산		
8	ㅓ			28	부르다		
9	ㅜ			29	만나다		
10	ㅐ			30	어깨		
11	ㅠ			31	드디어		
12	ㅔ			32	양말		
13	나			33	몸무게		
14	강			34	덩실덩실		
15	아기			35	수증기		
16	몸			36	갑자기		
17	코			37	금요일		
18	밤			38	코끼리		
19	돌			39	많다		
20	집			40	앉다		

Item		Response	Score	Item		Response	Score
41	똑바로			61	얌전하다		
42	남편			62	수표		
43	손주			63	단풍잎		
44	수염			64	저렴하다		
45	혈관			65	개학		
46	배고픔			66	부리다		
47	외국인			67	피로		
48	미래			68	장대비		
49	옷감			69	예시		
50	제과점			70	지하실		
51	뚜껑			71	국경		
52	꽃병			72	진흙		
53	서명			73	관람객		
54	구석			74	혼잡하다		
55	표현			75	공교롭다		
56	얼리다			76	찧다		
57	기절하다			77	팍팍하다		
58	울긋불긋하다			78	값어치		
59	발표하다			79	검푸르다		
60	날카롭다			80	예사롭다		

Appendix 3. Korean Spelling Task

<u>Spelling Korean</u> 한국어

<u>Direction</u>

이제 받아쓰기를 할 거예요. 이번엔 진짜 단어들이에요. 처음에는 글자부터 시작해서 나중에는 단어를 얘기해 줄게요. 내가 단어를 불러줄 때마다 빈칸에 하나씩 써 내려가주면 되요. 어려운 단어가 나오면, 모른다고 얘기하고 그 다음 단어로 넘어가세요.

1-6: __이라는 글자를 써주세요.

아동이 모른다고 대답할 경우,"예를 들어, 내가 ㄹ 을 써달라고 하면, 어떤 글자(spelling)를 써야 하나요?"

맞을 경우,"맞아요. ㄹ 을 써야해요. 자, 이제 시작해 봅시다."

틀릴경우,"맞는 답은 ㄹ 이에요. 왜냐하면, ㄹ 이라는 한글 글자는 ㄹ 이기 때문이에요. 다시한번 해볼까요. 내가 ㄹ 을 써달라고 하면 어떤 글자(spelling)를 써야 하나요?"

Item		Response	Score	Item		Response	Score
1	ㄱ			21	캄캄하다		
2	ㄴ			22	포동포동		
3	ㅂ			23	굴러가다		
4	ㅏ/아			24	참석하다		
5	ㅗ/오			25	부치다/붙이다		
6	ㅑ/야			26	굶다		
7	나			27	빨리		
8	그			28	특히		
9	다			29	낮추다		
10	산			30	몫/목		
11	모자			31	풍부하다		
12	그림			32	겉절이		
13	바다			33	땋다		
14	입다			34	그까짓		
15	앉다/안다			35	심취하다		
16	걱정			36	회계사		
17	부엌			37	어휘		
18	훔치다			38	예견하다		
19	넓다			39	췌장		
20	닭			40	녹취록		

Raw Score	/40

Appendix 4. Korean Pseudoword Spelling Task

<u>Pseudo Word Spelling Korean</u> 한국어

<u>Direction</u>
이제 단어 쓰기를 할 거예요. 그런데 여기 단어들은 의미가 없는 가짜 단어들이에요. 처음에는 글자부터 시작해서 나중에는 단어를 얘기해 줄게요. 내가 단어를 불러줄 때마다 빈칸에 하나씩 써 내려가주면 되요. 어려운 단어가 나오면, 모른다고 얘기하고 그 다음 단어로 넘어가세요.

Item 1: __이라는 글자를 써주세요.
아동이 모른다고 대답할 경우, "예를 들어, 내가 /ㅅ/ 소리가 나는 단어를 써달라고 하면, 어떤 글자(spelling)를 써야 하나요?"
맞을 경우, "맞아요. ㅅ 을 써야해요. 자, 이제 시작해 봅시다."
틀릴경우, "맞는 답은 ㅅ 이에요. 왜냐하면, /ㅅ/ 소리가 나는 한글 글자는 시옷 이기 때문이에요. 다시한번 해볼까요. /ㅅ/ 소리가 나는 글자는 어떤 글자(spelling)인가요?"

Item		Response	Score	Item		Response	Score
1	ㅂ			16	소랗다/소랏다		
2	다			17	쌀묵		
3	고			18	뚳병/뚯병/뚣병		
4	면			19	거꿉다		
5	노라			20	진축		
6	액			21	혹잡하다		
7	요길			22	빌례하다		
8	퐁			23	예포로		
9	말가리			24	돑이/도피		
10	국성			25	민흙/민흑		
11	덤구르다			26	뚜평		
12	삶다/삿다			27	훼장		
13	채송			28	소취		
14	샀다/산따			29	현퀴		
15	코채			30	살췌		

Raw Score	/30

Appendix 5. Korean Oral Cloze Task

Oral Cloze Korean 한국어

Direction

이번엔 내가 문장을 읽어줄 거예요. 문장마다 빈 칸이 있는데, 그때마다 내가 "음음" 이라고 하면, 그 빈칸에 들어갈 말을 나한테 말해주면 되요. 한번 연습해볼까요? "철수는 아침마다 오렌지주스__ 마신다." "철수는 아침마다 오렌지주스__ 마신다." 무슨 말이 들어가야 하나요?

맞으면, "맞아요. 빈칸에는 "를"이 들어가야 해요. "철수는 아침마다 오렌지주스를 마신다."
틀리면, "다시 들어보세요. '철수는 아침마다 오렌지주스__ 마신다'에서 빠진 말은 '를'이에요." "다시한번 해볼까요? '철수는 아침마다 오렌지주스__ 마신다.' 빈칸에 들어갈 말은 뭐예요?"

Item		Example answers	Response	Score
1	진만야, 우리 나가서 놀___!	자		
2	재현아, 학교에 몇시___ 가니?	까지, 에		
3	오늘 연필___ 교과서를 샀어요.	하고, 과		
4	선생님께서는 자신__ 부모님이 계신 시골로 가셨습니다.	의		
5	매일 저녁___ 철수는 책을 읽습니다.	마다, 에		
6	정민이가 왜 아직 __ 왔지?	안		
7	옛날 어린이__은 노래 부르기를 매우 즐겼습니다.	들		
8	연희네 외가집은 사과가 유명__ 고장에 있습니다.	한		
9	여름은 덥___, 겨울은 추워요.	지만		
10	어제 밤엔 차__ 바람이 쌩쌩 불었습니다.	찬, 차가운		
11	개는 집을 지키기도 하고, 심부름을 하기__ 합니다.	도		
12	집에 빨리 가야___. 안녕히 계세요.	지, 겠어요, 해		
13	임금님___ 아이에게 소원을 들어주시겠다고 말씀하셨어요.	께서, 은		
14	영희야, 개집 앞에 가까이 가지 ____.	마라		
15	저는 시금치가 싫어요. 시금치___ 고기만 주세요.	말고, 대신		
16	친구___ 편지가 왔어요.	한테, 에게서		
17	오늘은 할머니께서 대신 아침밥을 ___ 주셨어요.	지어, 만들어, 해		
18	이 말은 번개____ 빠르답니다.	만큼, 처럼, 보다		
19	산딸기를 따는 일이 재미있을 것 ____.	같아요, 같다		
20	너무 덥기___ 집에 있을 거예요.	덥기 때문에, 더워서		

Raw Score	/20

Appendix 6. Korean Working Memory Task

Working Memory Korean 한국어

<u>Instruction</u>
이제 내가 문장 몇 개씩 읽어 줄 거예요. 문장마다 마지막 단어가 하나씩 빠져있어요. 문장 하나를 끝낼 때마다, 끝에 들어갈 말을 말해주면 되요. 한번 연습해봅시다. "아침마다 영희는 우유를 ____."

맞으면, "맞아요, 마지막에 들어갈 말은 "마신다" 에요."
틀리면, "마지막에 들어갈 말은 "마신다"에요. 다시한번 해봅시다. "아침마다 영희는 우유를 ___."
마지막에 무슨 말이 빠져있나요? 고마워요. 방금전에 말했던 단어를 다시 말해주세요.

Discontinue:
- When the child has failed an entire level (e.g., when child failed 2A, 2B, 2C.)

Note:
- Announce each level (e.g., 자, 이제는 __ 문장으로 할 거예요.)
- 제시한 대답을 그대로 기억하는 게 목적이기 때문에, 아동의 대답이 문맥상 맞으면 인정됨.

Item	Sample Answer	Response	Score
1A 1) 여름에는 매우 ____	덥다, 더워		
		(_____)	
1B 1) 아침에는 밥을 ____	먹어		
		(_____)	
1C 1) 학교가 끝나면 집에 ___	와, 온다		
		(_____)	

자, 이제는 두 문장으로 해봅시다. 아까처럼 문장마다 마지막에 들어갈 말은 말해주면 되고, 내가 두 문장을 다 끝내면, 말했던 단어들을 그대로 다시 말해주세요. 한번 연습해봅시다.
"수영을 갈 때는, 수영복을 ____." (아동이 대답함, e.g., "입어") "빨간 신호등 앞에서 차가 ___." (아동이 대답함, e.g., "선다"). 자, 그럼 이제 방금전에 말했던 단어들을 그대로 다시 말해주세요. (정답: e.g., 입어, 선다.)

맞으면, "맞아요. 방금전에 말했던 단어들은 "____,____"에요."
틀리면, "방금전에 말했던 단어들은 ___, ___예요." 다시한번 해봅시다. "수영을 갈 때는, 수영복을 ____." (아동이 대답함, "입어") "빨간 신호등 앞에서 차가 ___." (아동이 대답함, "선다"). 자, 그럼 이제 아까 했던 단어들을 그대로 다시 말해주세요.

Item	Sample Answer	Response	Score
자, 이번에는 두 문장으로 할 거예요.			
2A 1) 축구게임에서 공을 ____.	찬다, 차요		
2) 내 발에는 발가락이 열개 ____.	있다		

Item	Sample Answer	Response	Score
		(_____,_____)	
2B 1) 겨울에 눈이 오면, 눈사람을 ____.	만든다		
2) 아플 때는 병원에 ____.	간다		
		(_____,_____)	
2C 1) 거북이는 작고, 코끼리는 ___.	커요		
2) 칼로 야채를 ____.	자른다		
		(_____,_____)	

자, 이제는 3 문장으로 할거예요.

Item	Sample Answer	Response	Score
3A 1) 달리기는 빠르고, 걷기는 ____.	느리다		
2) 영화관에서 사람들은 영화를 ___.	본다		
3) 우유는 하얗고, 김치는 ___.	빨갛다		
		(_____,_____,_____)	
3B 1) 태양은 낮에 보이고, 달은 밤에 _____.	뜬다, 보인다		
2) 봄이 되면, 농부는 들판에 씨를 ____.	뿌린다		
3) 내 머리카락은 ____.	검다, 짧다		
		(_____,_____,_____)	
3C 1) 겨울에는 매우 ___.	춥다		
2) 사람들은 미술관에 그림을 보러 ___.	간다		
3) 밥을 먹을 때, 나는 국도 같이 _____.	먹는다		
		(_____,_____,_____)	

자, 이제는 4 문장으로 할 거예요.

Item	Sample Answer	Response	Score
4A 1) 숟가락을 좀 갖다 ____	주세요		
2) 여름에 더울땐 선풍기를 ___.	튼다		
3) 학교 첫날 엄마와 같이 학교에 ____.	갔다		
4) 갑자기 비가 내려서 온 몸이 홀딱 ____.	젖었다		
		(_____,_____,_____,_____)	
4B 1) 여름 바다는 파랗고, 겨울 눈은 ____.	하얗다		
2) 매일 학교가 끝나면, 나는 축구 연습을 ___	한다		
3) 사자는 재빨리 달리고, 지렁이는 천천히 _____.	기어간다		
4) 농부가 돼지한테 먹이를 ____.	준다		
		(_____,_____,_____,_____)	
4C 1) 겨울에는 눈이 ____.	내린다		
2) 국은 숟가락으로 떠 ____.	먹는다		
3) 나는 스케이트장에 스케이트 타러 ___.	간다		
4) 샴푸로 머리를 ____.	감는다		
		(_____,_____,_____,_____)	

자, 이제는 5 문장으로 할거예요.

Item	Sample Answer	Response	Score
5A 1) 생일파티에 우리는 케익을 ____	먹는다		

Item	Sample Answer	Response	Score
2) 연필은 가볍고, 책가방은 ____.	무겁다		
3) 일주일에 한번씩, 나는 내 방을 ____.	청소한다		
4) 여름에는 날씨가 매우 ____.	덥다		
5) 호수에 돌을 던지면, 돌이 아래로 ____.	가라앉는다		
	(____,____,____,____,____)		
5B 1) 토끼는 매우 빠르고 거북이는 매우 ____.	느리다		
2) 생일날 우리는 미역국을 ____.	먹는다		
3) 쥬스는 달고, 커피는 ____.	쓰다		
4) 봄에는 정원에 꽃이 ___	핍니다		
5) 축구경기 때, 우리는 한국팀을 ____.	응원한다		
	(____,____,____,____,____)		
5C 1) 가위로 종이를 ____.	자른다		
2) 밤에는 춥고, 낮에는 ____	따듯하다		
3) 닭은 다리가 두개 ____.	있다/다		
4) 가게에서 아이스크림을 ____.	산다		
5) 어미개는 크고, 새끼강아지는 ___	작다		
	(____,____,____,____,____)		