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Language proficiency and early literacy skills of Cantonese-Speaking English language learners in the U.S. and Canada

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Abstract

This study describes the language proficiency and early literacy skills of Cantonese-speaking English language learners (ELLs) in kindergarten. A total of 113 Cantonese-speaking kindergarteners in Canada and the United States, composed of three subsamples from three different locations participated in this study. Results showed that on average, the Cantonese-speaking ELLs in this study performed below average on vocabulary measures when compared with monolingual norms, but at or above average on English letter-word identification and phonological awareness (PA) tasks. Cluster analysis was used to identify two new groups of children based on their language proficiency in each language: English dominant and Cantonese-dominant. There were no differences on PA in English and Cantonese between the cluster groups. However, the English dominant group performed significantly higher on English vocabulary and English decoding than the Cantonese dominant group. At the same time, the Cantonese dominant group performed significantly higher on Cantonese vocabulary and Cantonese word reading than the English dominant group. Finally, multiple regression analysis revealed that there was cross-language facilitation of PA on Chinese character recognition. Educational implications and directions for future research are discussed.

Over the past two decades, the number of English language learners (ELLs) in schools in the U.S. and Canada has risen dramatically. In the U.S., ELL students enrolled in public schools increased by 65 percent between 1994 and 2004, from three to five million students, while the total kindergarten through 12th grade (K-12) enrolment in the United States only grew 12 percent (Batalova, 2006). Moreover, the largest numbers of ELLs (44 percent) were enrolled in pre-kindergarten through third grade classrooms (August, 2006). In Canada there is also a steady increase of English as a Second Language-learning students (Canada Census, 2006), with 50-70% of school-age children in Canada's largest cities being the children of immigrants, many of who are minority language speakers (Lamarre & Dagenais, 2004). For example, in Vancouver, Canada, more than 60% of the students in Vancouver public schools come from homes where English is not the dominant language, with 60% of those students being Canadian-born (Gunderson, 2007). Successfully educating these children is now a major concern throughout the United States and Canada.

Although research is limited on this topic, English language learners across North America appear to be "at risk" of beginning schooling in English less prepared than children from middle-class English-speaking homes (Snow, Burns, & Griffin, 1998). Even at the beginning of first grade, ELLs are, on average, already behind their middle-class English-speaking peers in vocabulary and emergent literacy skills (Snow et al., 1998), leading to higher risks of reading problems (Dickinson & Tabors, 2001; Lonigan, 2003; Snow et al., 1998; Storch & Whitehurst, 2002; Whitehurst & Lonigan, 1998). Much of the past research on ELLs in English-speaking countries has focused on native Spanish-speaking children. Although the majority of ELLs in the United States are Spanish-speakers, Chinese is the next frequently spoken home language among non-English speaking families in the United States (Shin &

Bruno, 2003). In Canada, people who reported one of the Chinese languages (e.g. Cantonese, Mandarin) as their mother tongue accounted for the largest proportion of people who spoke neither English nor French as their home language (Canada Census, 2006)

More recently research is being conducted with young bilinguals whose first language and second language are entirely different in terms of their writing systems, such as Chinese and English. However, most of the studies on Chinese children are from those living in Hong Kong or China (e.g. Chen et al., 2004; Chen, Hao, Geva, Zhu, & Shu, 2009; Leong, Tse, Loh, & Hau, 2008; Tong & McBride-Chang, 2010). Given the paucity of studies on Chinese-speaking ELL children living in English-speaking countries, we lack a clear picture of what constitutes typical language and early literacy development for these ELL children as they begin elementary school in North America. Thus, the main goals of this study were: (1) to compare the first (L1) and second language (L2) vocabulary, phonological awareness, and decoding/character recognition skills of Chinese-English kindergarteners living in both the United States and Canada, (2) to examine the effect of language dominance on PA skills in English and Chinese, and (3) to explore the possible cross-language facilitation of phonological awareness on reading in this group of children. By comparing samples across the two countries and children attending different kindergarten programs, we aimed to: (1) examine the varying levels and proficiencies of L1 and L2 of Cantonese-speaking kindergarteners attending public schools where English is the majority language, and (2) reveal aspects of the language and literacy development of bilingual children that are common in both countries.

The focus on vocabulary and early literacy skills, expressed in phonological awareness and letter/character recognition, is an important one given the consensus that these early skills are important precursors for children's later literacy development (Dickinson & Tabors, 2001;

Hu & Catts, 1998; Snow et al., 1998), both for English monolinguals (e.g. Lonigan, 2003; Whitehurst & Lonigan, 1998) and ELL children (e.g. see review in August & Shanahan, 2006). This line of research on ELLs has shown that there is considerable variability in emergent language and literacy skills, with some children at a higher risk for developing reading difficulties (Snow et al., 1998). A better understanding of the skills that ELL children come to kindergarten with can help us understand why some children perform better than monolingual peers in early reading tasks (Bialystok, 2001), while some others are at greater risk for reading problems than their monolingual peers (Limbos & Geva, 2001; Moll & Diaz, 1985).

It is commonly inferred that ELLs' limited oral proficiency, often measured by receptive vocabulary in English, is the main cause for any difficulties they may have with word decoding or language processing skills in English (August, Carlo, Dressler, & Snow, 2005; Limbos & Geva, 2001; Moll & Diaz, 1985). However, a growing body of research has shown that despite their low oral proficiency, ELLs develop comparable phonological awareness and word reading skills in the early grade with their monolingual English-speaking counterparts (Lesaux, Lipka, & Siegel, 2006; Lesaux & Siegel, 2003; Lipka & Siegel, 2007). Due to the very limited research devoted to establishing the overall oral proficiency of ELL children generally (August & Hakuta, 1997; Lesaux & Geva, 2006), and Cantonese children specifically, it is even more important to accurately establish the level of oral proficiency in the L1 and L2 at school entry, and examine the relationships between oral proficiency and early literacy skills at the beginning of elementary school.

Research with monolingual English-speaking children suggests that vocabulary plays a role in the development of phonological awareness for monolingual English-speaking children (see Goswami, 2000, for a review; Walley, Metsala, & Garlock, 2003). Studies with Spanish-

speaking ELL children show that children with either high Spanish or English vocabulary performed better on English phonemic segmentation (San Francisco, Carlo, August, & Snow, 2006). The authors conclude that for bilinguals with alphabetic languages, L1 vocabulary may facilitate L2 phonological awareness as long as L1 is developed enough for its positive effect to emerge. Also with Spanish-speaking ELLs, Gottardo (2002) found that English vocabulary and reading were related, suggesting that vocabulary knowledge supports phonological recoding skills. In a study with Spanish-speaking ELL children, Uchikoshi (2006) found that children with higher English vocabulary at the beginning of kindergarten also started kindergarten with higher scores on a letter-word identification task and on elision and blending tasks than children with lower English vocabulary. Moreover, initial English vocabulary was associated with rate of growth in the elison, blending, and sounds matching tasks; children with higher English vocabulary at the beginning of kindergarten had steeper growth rates in English phonological awareness skills during their kindergarten year than children with lower initial English vocabulary. Uchikoshi (2006) also found that children with higher Spanish vocabulary at the beginning of kindergarten also had higher scores on the English elision and sound matching tasks. To our knowledge, whether L1 and L2 vocabulary play a role in phonological awareness and letter-word recognition skills for children whose two languages do not share the alphabet is still unknown.

The relationship between language dominance and more general metalinguistic skills has been examined (Bialystok, 1988; Bialystok & Majumder, 1998; Galambos & Hakuta, 1988; Ricciardelli, 1992) with results consistently showing that only the *balanced* bilinguals, those with equally high levels of oral proficiency in both languages, demonstrated an advantage, and the more balanced the children's L1 and L2 proficiency, the higher the scores on metacognitive

tasks. Much like general metalinguistic ability, such as syntactic and grammatical awareness and non-linguistic skills, balanced language proficiency could also enhance performance on phonological awareness tasks.

Verhoeven (1994; 2007) compared groups of immigrant children with various levels of L1 and L2 proficiency and determined how phonological awareness related to language dominance. In a longitudinal study, Verhoeven (2007) tracked the performance of Turkish-Dutch children at the beginning and end of kindergarten, with respect to relative L1 and L2 proficiency on measures of phonological awareness. The children in kindergarten were considered *emergent bilinguals* because the L2, Dutch, was just beginning to develop at school, whereas an increasing number of students were considered balanced bilinguals by the end of kindergarten. Turkish minority-speaking children used their L1 mostly in the home environment, and the L2 was only later developed at school. Only the children with balanced and higher levels of L1 and L2 proficiency showed significantly higher scores on all phonological awareness tasks. Children with lower L1 and L2 competence, on the contrary, demonstrated the lowest phonological awareness skills.

More recently, a study (Tahan, Cline, & Messaoud-Galusi, 2011) examined the pre-literacy skills of Arabic-English bilingual children who were in kindergarten at time of testing. The children were divided into three groups based on their language dominance: Arabic-dominant, English-dominant, and equally strong in both languages. Differently from Verhoeven's (2007) results, the Tahan et al. (2011) found no difference between the groups on the phonological awareness tasks indicating that balanced bilingualism may not be necessary for the development of phonological awareness skills. Therefore, they interpreted their results not as

a consequence of language dominance, but as indicative of language transfer of phonological awareness skills between the two alphabetic languages.

Studies across different language combinations indicate that phonological awareness can transfer between languages (Bialystok et al., 2005; McBride-Chang & Kail, 2002). Goswami (2000) observed, however, that differences in the speed and level of phonological development occur after the acquisition of alphabetic literacy. As a result, more recent studies have focused on the impact of orthographic similarities and differences on the transfer of basic literacy skills between languages (Bialystok, 2007), showing that the knowledge of another alphabetic language with transparent letter-sound correspondences (e.g. Spanish) may facilitate the acquisition of phonological awareness in English because the two languages have similar phonological and orthographic structures (Bialystok, Luk, & Kwan, 2005; Bialystok, Majumder, & Martin, 2003).

A cross-linguistic transfer effect, in which phonological awareness skills in one language predict reading skills in another, was first observed between alphabetic languages such as English and Spanish (Durgunoglu, Nagy, & Hancin-Bhatt, 1993), and English and French (Comeau, Cormier, Grandmaison, & Lacroix, 1999). More recently, researchers have found evidence of cross-language transfer in the phonological systems of Chinese-English bilinguals (Bialystok et al., 2005; Chien, Kao, & Wei, 2008; Gottardo, Chiappe, Yan, Siegel, & Gu, 2006; Gottardo, Yan, Siegle, & Wade-Woolley, 2001; Keung & Ho, 2009; Marinova-Todd, Zhao, & Bernhardt, 2010; Tong & McBride-Chang, 2010; Wang, Yang, & Cheng, 2009). Moreover, Chinese phonological awareness is correlated with, and contributes a unique variance to English reading (Gottardo et al., 2001; McBride-Chang & Ho, 2000; Tong & McBride-Chang, 2010; Wang, Perfetti, & Liu, 2005; Wang et al., 2009). Similar to children who are native English

speakers (e.g., Perfetti, Beck, Bell, & Hughes, 1987), there was also within-language relationship between English phonological awareness and word reading for Cantonese-English bilingual children (Gottardo et al., 2001; Hu & Catts, 1998). However, very few studies have explored the effect of learning English as a second language on the development of phonological awareness and word reading skills in Chinese. Two studies to date have shown that Chinese-English bilingual children have more advanced phonological awareness skills in Chinese relative to monolingual Chinese speakers (Marinova-Todd et al., 2010) and relative to Chinese-English bilingual children with more limited amount of English exposure (Bialystok et al., 2005). A third study by Chen, Nguyen, Hong, Xu and Wang (2010) showed the beneficial effects of English instruction, which led to acceleration not only in the phonological awareness skills in Chinese, but also in Chinese reading of Chinese-speaking children who were learning English as a second language.

Cantonese differs from English in many aspects but particularly in terms of phonological structures and orthography. Most notably, Cantonese and English do not share a writing system. Cantonese has a morphosyllabic writing system (Shu & Anderson, 1997), which contains both semantic radicals that are associated with meaning and phonetic radicals that are associated with the sound of the character (Ho & Bryant, 1997). Additionally, each Chinese character represents a single syllable and consists of consonant-vowel-consonant or consonant-vowel constructions with no consonant clusters. In contrast, English has an alphabetic writing system, in which generally letters represent individual sounds (phonemes), and there are multiple consonant clusters. Therefore the ability to manipulate phoneme and map them onto letters is crucial when learning how to read in an alphabetic language, such as English.

Moreover, unlike English, Chinese is a tonal language with Cantonese having six tones. Tone awareness is necessary in learning to speak and read Chinese, because tones carry meaning in words. Many words in Chinese are homophonous except for their tonal differences, the source of information regarding word meaning. For example, the word "ma" in Chinese could be either □ (*maa*1 in Cantonese meaning mother) or □ (*maa*5 in Cantonese meaning horse) and if a child does not use the correct tone, some unexpected confusion may arise. Cheng (1992) suggested that phonological awareness also plays an important role in Chinese character identification. More than 80% of Chinese characters are semantic-phonetic compounds, which have a semantic radical to indicate the word meaning and a phonetic radical to provide clues to the pronunciation of the character, ranging from exact homophones to analogy cues at the level of syllable or rhyme (Leong, 1986). Anderson, Li, Ku, Shu, and Wu (2003) and He, Wang, and Anderson (2005) found that Chinese children are able to use information about the pronunciation derived from the phonetic radicals to decode unfamiliar compound characters, and this analytic ability was associated with children's performance on Chinese phonological awareness tasks. Therefore, phonological awareness skills play, albeit more limited, role in the development of reading skills in Chinese, a logographic language which still requires the reader to understand the nature of the correspondence between the written script and the spoken language. Therefore, the research to date (Adams, 1990; Anderson et al., 2003; Blachman, 1997; Brady & Shankweiler, 1991; Gough, Ehri, & Treiman, 1992; He et al., 2005) suggests that the role of phonological awareness in learning to read may be universal across languages.

So far, research conducted with children in English-speaking countries has been with older elementary-school students. We need to have a clearer picture of the skills children have when they first come to school in North America in order to better understand the diversity of

their L1 and L2 oral and literacy-related skills, and how those skills interact with their literacy performance in English. In particular, the focus of research to date has been on predictors of reading, including phonological awareness, decoding, and morphological knowledge. We still do not know much about the language proficiency expressed in the vocabulary size in the L1 or L2 of these children as they enter school.

The following research questions were addressed:

1. How do the early language and literacy skills in English compare to those in Cantonese for a group of Cantonese-speaking ELL children living in English-dominant countries?
2. What is the effect of language dominance on the early literacy skills of Cantonese-English bilingual kindergarteners living in English-dominant countries?
3. Do phonological awareness skills in one language transfer to reading skills in the other language when the two languages are structurally different?

Method

Participants

Data for the present study were collected from schools in major urban school districts on the west coasts of Canada and the United States. This study is part of a larger study examining the language and literacy development of these children in both countries. At time of testing, children were in their kindergarten year. District demographics and school data indicated that 75% or more of the participating students in the U.S. qualified for free or reduced lunch. Children in both countries attended schools in working-class neighborhoods and with a large proportion of recent immigrant families. In both countries, the average mother had attended

some high school. The sample consisted of 28 Cantonese-speaking kindergartners in Canada and 85 Cantonese-speaking kindergarteners in the U.S., for a total of 113 participants. The American sample was composed of two subgroups: 53 children attended full-day kindergartens with bilingual Cantonese-English programs (American bilingual group), while 32 children attended half-day kindergartens where the curriculum was English immersion (American mainstream group). There were 64 girls and 49 boys in the whole sample, with a mean age of 5;8 years (no significant difference in age between the two countries).

To gain background information about the students, children were given a questionnaire to take home to their parents in both English and Chinese (see Table 1 for a summary of these data). Response rate was 100% for the Canadian group, 98% for the American bilingual group, and 81% for the American mainstream group. The majority of children in each group were born in either the United States or Canada although the majority of the parents had been born either in Hong Kong or the Cantonese-speaking area of China. Although the educational levels of the mothers ranged from no education to professional degrees, the majority of the parents had some secondary education. Although the majority of the children were born in North America, the age when they were first exposed to English somewhat varied: 2;6 for the American bilingual group, 3;5 for the American mainstream group, and 2;10 for the Canadian group. The majority of the children used Cantonese or a mix of Cantonese and English at home, although more spoke both languages than only Cantonese. At the same time, the majority of parents and family members spoke only Cantonese at home, although more reported using both languages in the home in the American mainstream group. The percentage of children attending Chinese language schools during afterschool or on the weekends varied, with 14 out of 28 children enrolled in Canada,

followed by 14 out of 52 in the American bilingual group, and only 3 out of 26 children in the American mainstream group.

[insert Table 1 about here]

Children were recruited by contacting public schools that had large proportions of Cantonese-speakers. All children whose native language was identified as Cantonese by the school home language survey were given parental consent forms to take home. Return rate of the consent forms was 73% (range of 60% to 98% depending on the class). According to the teachers, there appeared to be no pattern pertaining to the lack of return of consent forms. All American classrooms used the same state-adopted reading textbook and addressed the kindergarten state standards in their instruction, which included a balanced approach to literacy instruction including both phonics and sight word strategies. Teachers in each grade level at each school met weekly to discuss curriculum and other issues to make sure similar content was being taught. In Canada, the teachers all reported that they used balanced approaches to literacy instruction, including both phonics and sight word strategies, in accordance with the British Columbia (BC) Performance Standards for Reading and Writing (BC Ministry of Education, 2009)

A total of 53 American children were enrolled in four classrooms in three schools in one urban school district on the west coast of the U.S., where the children attended full-day kindergartens with bilingual Cantonese-English programs (American bilingual group). These children were enrolled in early exit transitional bilingual programs that moved students into English-only instruction by fourth grade. The ultimate goal of transitional bilingual classrooms is to move ELL children slowly into mainstream classrooms where they will be placed with monolingual English speakers. Each school had one Spanish-English bilingual program, one or

two Cantonese-English bilingual programs, and mainstream English classroom(s) for each grade from kindergarten to third grade. In kindergarten, the teachers (Cantonese-English bilinguals) reported that they used Cantonese 80-90% of the time in class, and English 10-20% of the time.

A total of 32 American children came from 11 classrooms in 3 schools in another urban school district on the west coast of the U.S., where the children attended half-day kindergartens where the curriculum was English immersion (American mainstream group). All instruction was in English. The number of Cantonese-speaking children in the classroom varied from 2 to 11 in classrooms of approximately 20 to 22 students.

In Canada, children came from six mainstream classrooms in four schools from a major urban school district, where at time of testing, English language learners attended full-day kindergartens where the curriculum was English immersion. All instruction was in English. The number of Cantonese-speaking children in the classrooms varied from 2 to 8 in classrooms of approximately 18 to 22 students.

Measures

All children were individually administered a series of tests in both their home and school languages by trained research assistants who were native speakers of English or Cantonese on two separate days during the winter of kindergarten. Each session lasted approximately 30 minutes. When there were no standardized Cantonese assessment instruments available for research, experimental measures developed and used by Gottardo et al. (2001, 2006) were used in this study. Reliability of the experimental measures was estimated by internal consistency of items with Cronbach's alpha.

Vocabulary

English receptive vocabulary was measured with the Peabody Picture Vocabulary Test – 3rd edition (PPVT-III; Dunn & Dunn, 1997). The child was asked to select the picture from an array of four that best matched the spoken word presented by the assessor. Reported split-half reliability from the norms for native English-speaking children at age 6 is .92 (Dunn & Dunn, 1997). The Chinese version of the Peabody Picture Vocabulary Test – Revised (Lu & Liu, 1998) was used to measure Chinese receptive vocabulary. Reported split-half reliability from the norms for native Chinese-speaking children is .95 (Lu & Liu, 1998).

Letter-word/Character Recognition

The American children were tested with the letter-word identification subtest of the Woodcock Language Proficiency Batter (WLPB; Woodcock, 1991) in English. The letter-word identification task measures the child's reading identification skills with isolated letters and words. The items become more difficult as less frequently used words are tested. Reported internal consistency reliability from the norms for children at age 6 for native English-speaking children is .96 for the letter-word identification subtest (Woodcock, 1991).

The Canadian children were tested with the reading subtest of the Wide Range Achievement Test—3 (WRAT-3; Wilkinson, 1993). The WRAT-3 reading subtest is equivalent to the WLPB Letter-Word Identification subtest in that it also measures the child's reading identification skills with isolated letters and words of increasing difficulty. Reported reliability from the WRAT-3 norms for native English-speaking children at age 5;6 is .91 (Wilkinson, 1993). Past studies examining the concurrent validity of basic reading skill tests with young elementary school students show that correlations between the WLPB and WRAT were high (r^2=.85; Woodcock, 1991). As both the WRAT-3 and WLPB have a standard mean of 100 and a standard deviation of 15, the standard scores were used in the subsequent analysis.

All children were assessed with the Chinese character recognition measure used in Gottardo et al. (2001; 2006). This measure included 20 highly frequent characters. The items are commonly used in texts encountered by beginning readers. The items were presented in order of increasing difficulty, and the score was the total number correct out of 20 items. Cronbach's alpha, a measure of internal consistency, for this sample was estimated to be .93.

Phonological Awareness

The elision, blending, and sound matching sub-tests of the Comprehensive Test of Phonological Processing (CTOPP; Wagner, Torgesen, & Rashotte, 1999) were used to measure phonological sensitivity in English. On the elision task, children heard a word and were asked to repeat the word after deleting parts of the word. On the blending task, children were asked to put sounds or syllables together to form a word. The sound matching task uses a multiple-choice procedure to measure whether a child can match initial and final sounds of words. This subtest is made up of 20 items, with the first 10 matching initial sounds and the last 10 matching final sounds. A picture book is used to help the child remember the possible responses to each item. Reported internal consistency reliability from the norms for native English-speaking children at age 6 is .92 for elision, .89 for blending, and .93 for sound matching (Wagner et al., 1999).

Cantonese phonological awareness was measured with the Cantonese phonological awareness tasks used in Gottardo et al. (2001, 2006). The *Tone Discrimination* task consisted of 15 experimental trials including all possible contrasts among the six tones of Cantonese. Words in each trial shared the same strings of phonemes and differed only by tones. Therefore, children were required to use tone to distinguish between words. In each trial the children heard three words pronounced by a native-speaker and were asked to identify the word that had a different

tone. The score was the total number correct out of 15 items. Cronbach's alpha for this sample was estimated to be .74.

The *Rhyme detection* task consisted of 15 experimental trials using real Cantonese words. In each trial the children heard three words pronounced by a native-speaker and were asked to identify which word did not rhyme. Most exemplars included two words that shared the same tone and rime, whereas the other word had a different rime. The score was the total number correct out of 15 items. Cronbach's alpha for this sample was estimated to be .70.

Statistical Analysis

First, all raw scores were converted to standard scores for the standardized assessments. The three subtests for phonological awareness were then combined to form an English phonological awareness (PA) composite score (Wagner et al., 1999). The PPVT and CTOPP measures have been standardized on a norming population of monolingual English or Chinese speakers (for the Chinese PPVT[1] only), which allowed us to analyse these descriptive statistics from a comparative perspective. When interpreting the results of these standardized tests with this bilingual population, it is important to note that we are comparing bilingual children to norms that have been developed for monolingual children. Additionally, a recent review of the literature by NIH and the U.S. Department of Education noted that "a comparison group of English-speaking monolinguals is not always the optimal comparison group for bilingual individuals; however, for purposes of studying English language learners students in the U.S.

[1] At the time when we collected the data, the only standardized measure of Chinese vocabulary available that was equivalent to the English PPVT, was developed and standardized in Taiwan. Together with language development experts, who were also native speakers of both Mandarin and Cantonese, we went over every item on the test and assured that it would be appropriate for children speaking Cantonese. We made adjustments to less than 2% of the items. Therefore, we deemed appropriate to rely on the standard scores as a comparison guidelines for our study, but the interpretations should be treated with caution.

education system including such comparisons can be important" (McCardle, Mele-McCarthy, & Leos, 2005, p. 70).

For experimental measures in Cantonese, raw scores are reported. A series of one-way univariate analysis of variance (ANOVA) were conducted first on the three groups by area. Then, cluster analysis on their L1 and L2 vocabulary was conducted, resulting in the emergence of two clusters. With these clusters, correlation analysis and multiple regression analysis were conducted to further examine the relationships among the language and literacy variables.

Results

Group differences based on location were examined. The means, standard deviations, and ranges of the scores for vocabulary, phonological awareness, and letter/character knowledge by location are presented in Table 2.

[insert Table 2 about here]

All three Cantonese groups had below average English receptive PPVT scores when compared with the published English monolingual norms. The results from a one-way ANOVA on the English receptive vocabulary scores revealed no significant main effect of group, $F(2,110) = .23$, $p = .79$ However, a one-way ANOVA on the Cantonese receptive vocabulary scores revealed a significant main effect of group, $F(2,110) = 7.45$, $p = .0009$. The post-hoc Tukey's Honestly Significant Difference (HSD) test indicated that both the American bilingual group and the Canadian group scored significantly higher than the American mainstream group.

Despite lower oral proficiency in English, Cantonese-English bilingual children in both countries, on average, tended to score as well as their monolingual age-matched English-speaking peers according to the published monolingual norms on the CTOPP. A one-way

ANOVA on the PA composite score revealed a main effect of group, F (2,110) = 2.97, p = .06. The post-hoc mean comparisons, using Tukey's HSD test, indicated that the Canadian group scored significantly higher than the American mainstream group, and there was no difference between the Canadian and the American bilingual groups.

A one-way ANOVA on both Cantonese Rhyme and Tone separately, and the post-hoc Tukey's HSD tests indicated that the Canadian group performed significantly higher than both American groups (Rhyme; F(2,110) = 14.59, p <.0001; Tone: F(2,110) = 13.52, p <.0001). There were no significant differences between the two American groups.

On the letter-word identification measures in English, on average, the Cantonese-English bilingual children in both countries tended to score as well as, or even better than their monolingual age-matched English-speaking peers according to the published monolingual norms. The results from a one-way ANOVA on the letter-word identification scores revealed no significant main effect of group, F(2,110) =.65, p = .53.

For the Chinese character reading, one-way ANOVAs on Chinese word reading revealed a main effect of group, F(2,110) = 15.46, p <.0001. The subsequent post-hoc Tukey's HSD tests indicated that the Canadian group scored significantly higher than both American groups and the American bilingual group performed significantly higher than the American mainstream group.

To sum, the Cantonese-speaking ELLs in both Canada and the United States appear to be more similar than different in their English language skills. There were no differences in their English vocabulary and decoding scores. Additionally, although there were some significant group differences among the phonological awareness scores, on average, all three groups scored within the norm for their monolingual English-speaking peers on the phonological awareness tasks. There were significant differences in the levels of Cantonese. Children who attended

bilingual programs and children who lived in Canada tended to have higher scores on the Cantonese measures than children who attended mainstream English classrooms with no formal L1 exposure. Taken together these results show that developing first language proficiency (in Chinese) does not hinder the development of second language proficiency and academic performance in English.

As the variation among Cantonese ELLs' language and literacy scores appeared not be due to location, but rather based on school environment and opportunity for L1 support, in the next step, all groups were collapsed and re-examined using English and Cantonese vocabulary scores to investigate differences based on their language dominance.

Cluster Analysis

Using agglomerative cluster analysis (Ward's method) on all subjects with English and Cantonese vocabulary, two clusters emerged. The means, standard deviations, and ranges of the scores for vocabulary, phonological awareness, and letter/character knowledge, as well as for background variables, by clusters are presented in Table 3. Examining the two clusters revealed that one cluster included children who had higher English PPVT scores and lower Cantonese PPVT scores (English dominant) and the other cluster contained children who had higher Cantonese PPVT scores and lower English PPVT scores (Cantonese dominant).

The English dominant cluster had significantly higher scores on English vocabulary (F (1,110) = 78.40, $p < .0001$) but significantly lower scores on Cantonese vocabulary (F (1,110) = 43.39, $p < .0001$) when compared with the Cantonese dominant cluster. On average, the English dominant group had English vocabulary scores only a half standard deviation below the mean of their age-matched English-speaking monolingual peers according to the published monolingual norms. However, the Cantonese-dominant group, on average, scored close to two standard

deviations below the mean of their age-matched English-speaking monolingual peers. At the same time, the English dominant group scored 1.5 standard deviations below the mean of their age-matched Chinese-speaking monolingual peers on Chinese vocabulary, while the Cantonese dominant group scored around the mean of their age-matched Chinese-speaking monolingual peers.

Similar to the vocabulary results, the English dominant group scored significantly higher on the English decoding task than the Cantonese dominant group (F (1,110) = 4.54, p = .04). Although on average both groups scored higher than their age-matched English speaking monolingual peers, the English dominant group scored close to one standard deviation higher than their age-matched English-speaking monolingual peers, while the Cantonese dominant group scored only half of a standard deviation higher. At the same time, the Cantonese dominant group scored significantly higher on the Chinese character recognition task than the English dominant group (F (1,110) = 6.03, p = .02)

There were no significant differences between the two clusters on English phonological awareness (F (1,110) = 3.58, p = .06), Chinese rhyme (F (1,110) = 2.96, p = .09), and Chinese tone (F (1,110) = 1.35, p = .25). For English phonological awareness, on average the children scored around the mean of their age-matched English-speaking monolingual peers. Additionally, there were no significant differences between the two clusters on age of first English exposure (F (1,104) = .86, p = .36), number of L1 children's books in the home (F (1,110) = 2.22, p = .14), and number of English children's books in the home (F (1,110) = 3.23, p = .07). Furthermore, there were no significant differences in the composition of the clusters based on location and extra L1 afterschool schooling.

[insert Table 3 about here]

Table 4 shows correlations among measures in the study, by cluster group. Overall, the results showed that the English variables were moderately and positively correlated with each other for the Cantonese-dominant group. For the English dominant group, only English decoding and English phonological awareness measures were moderately correlated. Cantonese reading, rhyme and tone were moderately and positively correlated for the Cantonese dominant group, while only rhyme and tone were correlated for the English dominant group. While only English vocabulary was weakly correlated with Cantonese vocabulary for the English dominant group, for the Cantonese dominant group, Cantonese vocabulary was correlated with English vocabulary, English decoding, and English phonological awareness. The background variables were not correlated with the achievement measures.

[insert Table 4 about here]

Multiple regressions

Despite the fact that both clusters performed similarly on English phonological awareness, the English dominant group scored significantly higher on English decoding than the Cantonese dominant group. To examine the relationship between language dominance and phonological awareness on decoding, in both English and Cantonese, multiple regression analysis was conducted. Additionally, the cross-language relationships seen in the correlations for the Cantonese-dominant group were further examined.

Table 5 shows results of a fixed order regression analysis in which English decoding was predicted by language dominance cluster and phonological awareness. First, the language dominance cluster variable was entered in the model (step 1a). Cantonese-dominance was negatively associated with English decoding. Then, English phonological awareness was entered (step 2). Language dominance was no longer significant and thus taken out of the model, and

only phonological awareness was entered (step 1b). English phonological awareness measures explained the variance in English decoding more than the language dominance variable, accounting for 31% of the variance in English decoding, F (1,111) = 49.32, $p < .0001$. Chinese rhyme and tone were not significant when included in the model, as well as the interaction between the cluster variable and phonological awareness.

[insert Table 5 about here]

Table 6 shows results of fixed order regression analysis in which Cantonese character reading was predicted by language dominance, Cantonese rhyme, and English phonological awareness. First, the language dominance variable was entered in the model (step 1). Cantonese-dominance was positively associated with Cantonese character reading. Then, Cantonese rhyme and tone were entered in the model, but as Cantonese tone was not significant, it was taken out of the model and only rhyme was entered in the model (step 2). Cantonese rhyme explained an additional 10% of the variance in Cantonese word reading, F (1, 110) = 6.03, p = .02. English phonological awareness was then entered in the model (step 3). Results show that language dominance, Cantonese rhyme and English phonological awareness accounted for 19.7% of the variance in Cantonese word reading. The interaction between the cluster variable and phonological awareness, as well as the interaction between the cluster variable and rhyme, were not significant.

[insert Table 6 about here]

Discussion

The primary goal of this paper was to describe the oral proficiency and early literacy skills of Cantonese-speaking English language learners enrolled in kindergarten on the west

coast of Canada and United States. The overall vocabulary and early literacy skills were similar to past findings with ELLs with various L1s (Jongejan, Verhoeven, & Siegel, 2007; Lesaux, Rupp, & Siegel, 2007; Nakamoto, Lindsey, & Manis, 2007). The children in this sample had low vocabulary scores in both L1 and L2. Contrary to previous research with Spanish-speaking ELLs (Dickinson & Tabors, 2001; Lonigan, 2003; Snow et al., 1998) showing that at the beginning of first grade, ELLs' vocabulary and emergent literacy skills are behind those of their English-speaking peers, the children in our sample, on average, had age-appropriate phonological awareness skills and letter-naming/word decoding skills in English.

When grouped by location, on average, the Canadian group and the American bilingual group performed better than the American mainstream group on the Cantonese measures, yet they were not behind on the English measures. In fact, there were no differences in English vocabulary and English decoding skills among the three regional groups. These results provide evidence that developing the first language (Cantonese) proficiency does not hinder the development of second language (English) proficiency. This advantage in Cantonese proficiency could be attributed to the bilingual instruction at school (for the American bilingual group), the after-school Chinese classes (for the children who were enrolled in them across both countries) and from home literacy activities. As this was a descriptive study to examine the language and literacy skills of Cantonese-speaking ELLs in the U.S. and Canada, the data did not address formally and in detail the factors that lead to strong L1 and L2 skills. Future studies should collect qualitative data on the amount of L1 language use at home and school, as well as the quality of L1 language used at home and school to determine the conditions that lead to strong L1 and L2 skills and the conditions that influence whether there will be a facilitative effect of bilingualism on emerging literacy skills in both L1 and L2.

Closer examination of the data revealed two clusters dividing the children into English-dominant and Cantonese-dominant. English-dominant children had significantly higher scores on English vocabulary and English decoding than the Cantonese-dominant children. At the same time, the Cantonese-dominant children had significantly higher scores on Cantonese vocabulary and Cantonese word reading than the English-dominant group. Interestingly, there were no significant differences between the two groups on English phonological awareness, Cantonese rhyme, and Cantonese tone. These findings support Tahan et al. (2011) and suggest that balanced bilingualism may not be necessary for the development of phonological awareness skills, but rather suggests the existence of transfer of phonological awareness skills between the two orthographically different languages.

Interestingly, a balanced group of bilinguals did not emerge, which could be a reflection of the demographic characteristics of our sample. It is possible that a large proportion of our sample consisted of children who were dominant in one language, reflecting the greater prevalence of language-dominant bilinguals among the immigrant population of ELLs across North America who experience subtractive, rather than additive bilingualism (Hoff & Shatz, 2009).

Moreover, the regression results revealed a possible transfer of phonological awareness skills even between two languages with different writing systems, and particularly the effect of phonological awareness skills in English on the early literacy skills in Chinese. All children in this sample were attending schools in the U.S. or Canada and receiving reading instruction in English. When learning how to read in English, children must master manipulating phonemes. Past research has also shown that this extra exposure to English, a language with more complex phonological structure than Chinese, accelerates the development of Chinese phonological

awareness (Bialystok et al., 2005; Chen et al., 2010) and Chinese reading (Chen et al., 2010) among Chinese-speaking children.

The transfer observed in the present study was seen from L2 to L1, but not from L1 to L2. This may be due to the fact that children were attending schools in parts of North America, where the educational goals in the public schools are mastery of the English language and literacy attainment in English. Even in the bilingual programs in the U.S., the goals are not to create bilingual children, but to use the home language to ensure grade-level mastery of academic context so that the child can quickly and easily make full transition to English-only instruction. Future research using classroom observations and teacher interviews may help to further explain these findings.

Our results also revealed that upon school entry language proficiency measured with vocabulary size in both languages is not a significant predictor of early reading in Chinese ELLs, and does not moderate the effect of phonological awareness on early decoding in this population. Teachers need to be made aware of this finding so that they do not wrongfully attribute poor reading skills to lack of oral proficiency (Limbos & Geva, 2001) in this population. Moreover, it is now apparent that there must be other factors in addition to phonological awareness that predict the rest of the variance in the decoding skills of Chinese-speaking ELLs in Kindergarten. Therefore, future research needs to focus on identifying those factors (e.g., socio-cultural and ethno-linguistic among others) in order to reveal what exactly contributed to these children's well-developed early literacy skills in English, a language very different than the home language of these children.

Findings from this study present important educational implications and directions for future research on the language and literacy skills of ELL students. First of all, the finding that

on average, all children, including the English-dominant children, in the sample scored lower than monolingual-English norms on English vocabulary and the possible impact this may have on their future English reading achievement (e.g. Nation, 2001; Proctor, Carlo, August, & Snow, 2005) suggest the need for classroom teachers to focus on developing bilingual children's vocabulary during kindergarten. In fact, as the children come to kindergarten already with low vocabulary knowledge, there is a need for preschool teachers and head start staff to work on vocabulary building in ELL populations prior to kindergarten entry. Even though it appears that low vocabulary size does not seem to interfere with the development of early literacy skills, in order to ensure that ELL children can comprehend English text, it is crucial that preschools and kindergartens focus on building vocabulary knowledge and providing children with strategies to increase their vocabulary.

Secondly, the fact that cluster analysis revealed two clusters, English-dominant and Cantonese-dominant, suggests that teachers need to be aware of the presence of ELL children of both types in their classrooms. Children with lower language proficiency in English, the Chinese-dominant group, are particularly at risk of learning difficulties, as they already show weaker decoding skills in English. It is also possible that language dominance would play an even bigger role in the children literacy development in the later grades, when the academic curriculum places even greater demands on the children's language skills in English. Therefore, further research is needed to establish the exact effect of language dominance on the literacy development of ELL children beyond kindergarten. Most importantly, the results of the current study suggest that in order to accurately establish ELL children's levels of oral proficiency and academic performance, not only is it important to consider oral language proficiency as measured by standardized tests, but also early literacy skills, such as phonological awareness and

letter-naming, to properly assess ELL children. Especially with English language learners, teachers, speech-language pathologists, and other educators often find it difficult to determine whether the observed oral language limitations fall within the normally expected range of variation for age and experience, or are evidence of a language or learning disorder. Past research demonstrates that educators may use only oral language proficiency, including vocabulary, as an indication of the child's overall academic performance (Limbos & Geva, 2001), resulting in a trend for school personnel to misdiagnose and to misplace at least some ELL students in special education classes (Artiles, Rueda, Salazar, & Higareda, 2005; U.S. Department of Education, 2008). Additionally, more information on the curriculum, frequency, and attendance of Chinese language schools, as well as observed differences in parental expectations, home literacy and language use is necessary.

Few studies have examined the language and literacy skills of bilingual children in both their home language and school language. The findings from this research increase our understanding of the language development processes of bilingual children from a major immigrant population in the U.S. and Canada. Our study examined the English language skills that children bring to kindergarten as a foundation for understanding the reasons for possible academic difficulties later on. Knowing the levels of language skills with which children come to kindergarten and how this influences early English literacy skills contributes to the development of preventive measures at the pre-kindergarten stages as well as of instructional strategies for developing English literacy skills in kindergarten. Ultimately, we hope to provide the knowledge needed to inform sound policies affecting the future education of the constantly growing number of children from immigrant families both in the United States and Canada.

References

Adams, M. J. (1990). *Learning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.

Anderson, R. C., Li, W., Ku, Y-M., Shu, H., & Wu, N. (2003). Children's use of partial information in learning to read Chinese. *Journal of Educational Psychology, 95*, 52-57.

Artiles, A. J., Rueda, R., Salaar, J. J., & Higareda, I. (2005). Within group diversity in minority disproportionate representation: English language learners in urban school districts. *Exceptional Children, 71*, 283-300.

August, D. (2006). Preface. D. August & T. Shanahan (Eds.), *Developing Literacy in English Language Learners*. (Report of the national literacy panel on language-minority children and youth). (pp. xiii-xvi). Mahwah, New Jersey: Lawrence Erlbaum Associates.

August, D., Carlo, M., Dressler, C., & Snow, C. E. (2005). The critical role of vocabulary development for English language learners. *Learning Disabilities Research and Practice, (20)*1, 50-57.

August, D. & Hakuta, K. (Eds.) (1997). *Improving Schooling for Language-minority Children: A Research Agenda.* Washington, DC: National Academy Press.

August, D. & Shanahan, T. (Eds.). (2006). *Developing literacy in second-language learners: Report of the National Literacy Panel on Language-Minority Children and Youth*. Mahwah, NJ: Lawrence Erlbaum.

Batalova, J. (2006). Spotlight on Limited English Proficient Students in the United States. *Migration Information Source*. Retrieved July 30, 2008, from http://www.migrationinformation.org/USfocus/display.cfm?id=373.

B. C. Ministry of Education (2009). BC Performance Standards: Reading and Writing, http://www.bced.gov.bc.ca/perf_stand, accessed 20 September 2010.

Bialystok, E. (1988). Levels of bilingualism and levels of linguistic awareness. *Developmental Psychology, 24*, 560-567.

Bialystok, E. (2001). *Bilingualism in Development: Language, Literacy and Cognition*. New York: Cambridge University Press.

Bialystok, E. (2007). Cognitive effects of bilingualism: How linguistic experience leads to cognitive change. *International Journal of Bilingual Education and Bilingualism, 10*(3), 210-223.

Bialystok, E., Luk, G., & Kwan, E. (2005). Bilingualism, Biliteracy, and Learning to Read: Interactions Among Languages and Writing Systems. *Scientific Studies of Reading, 9*(1), 43-61.

Bialystok, E., & Majumder, S. (1998). The relationship between bilingualism and the development of cognitive processes in problem solving. *Applied Psycholinguistics, 19*(1), 69-85.

Bialystok, E., Majumder, S., & Martin, M. M. (2003). Developing phonological awareness: Is there a bilingual advantage? *Applied Psycholinguistics, 24*(1), 27-44.

Bialystok, E., McBride-Chang, C., & Luk, G. (2005). Bilingualism, language proficiency, and learning to read in two writing systems. *Journal of Educational Psychology, 97*(4), 580–590.

Blachman, B. A. (1997). Early intervention and phonological awareness: A cautionary tale. In B. A. Blachman (Ed.), *Foundations of reading acquisition and dyslexia: Implications for early intervention* (pp. 409-430). Mahwah, NJ: Lawrence Erlbaum.

Brady, S. A., and Shankweiler. D. P. (1991), Phonological processes in literacy: A tribute to Isabelle Y. Liberman. Hillsdale, NJ: Erlbaum.

Canada Census (2006). The Evolving Linguistic Portrait: Sharp increase in population with a mother tongue other than English or French. Retrieved Nov. 1, 2010 from http://www12.statcan.ca/census-recensement/2006/as-sa/97-555/p2-eng.cfm

Chen, X., Anderson, R.C., Li, W., Hao, M., Wu, X. & Shu, H. (2004). Phonological awareness of bilingual and monolingual Chinese children. *Journal of Educational Psychology,* 96(1), 142-151.

Chen, X., Hao, M., Geva, E., Zhu, J. & Shu, H. (2009). The role of compound awareness in Chinese children's vocabulary acquisition and character reading. *Reading and Writing: An Interdisciplinary Journal,* 22, 615-631.

Chen, X., Nguyen, T., Hong, G., Xu, F. & Wang, Y. (2010). Effects of cross-language transfer on first-language phonological awareness and literacy skills in Chinese children receiving English instruction. *Journal of Educational Psychology*, 102, 712-728.

Cheng, C. M. (1992). Lexical access in Chinese: Evidence from automatic activation of phonological information. In H. C. Chen and O. J. L. Tzeng (Eds.), *Language processing in Chinese.* Amsterdam: Elsevier.

Chien, C., Kao, L., & Wei, L. (2008). The role of phonological awareness development in young Chinese EFL learners. *Language Awareness, 17*(4), 271 — 288.

Comeau, L., Cormier, P., Grandmaison, E., & Lacroix, D. (1999). A longitudinal study of phonological processing skills in children learning to read in a second language. *Journal of Educational Psychology, 91*(1), 29-43.

Dickinson, D. & Tabors, P. (Eds.). (2001). *Beginning Literacy with Language: Young Children*

Learning at Home and School. Baltimore, MD: Paul H. Brookes Publishing.

Dunn, L. M. & Dunn, L. M. (1997). *Peabody Picture Vocabulary Test- Third Edition.* Circle Pines, MN: American Guidance Service.

Durgunoglu, A., Nagy, W., & Hancin-Bhatt, B. (1993). Cross-language transfer of phonological awareness. *Journal of Educational Psychology, 85*, 453-465.

Galambos, S. J., & Hakuta, K. (1988). Subject-specific and task-specific characteristics of metalinguistic awareness in bilingual children. *Applied Psycholinguistics, 9*(2), 141-162.

Goswami, U. (2000). Phonological and lexical processes. In M. L. Kamil, P. B. Mosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of reading research* (Vol. III, pp. 251–267). Mahwah, NJ: Erlbaum.

Gottardo, A. (2002). The relationship between language and reading skills in bilingual Spanish-English speakers. *Topics in Language Disorders, 22*, 46–70.

Gottardo, A., Chiappe, P., Yan, B., Siegel, L., & Gu, Y. (2006). Relationships between first and second language phonological processing skills and reading in Chinese-English speakers living in English-Speaking contexts. *Educational Psychology, 26*(3), 367-393.

Gottardo, A., Yan. B, Siegel. L., & Wade-Woolley, L. (2001). Factors related to English reading performance in children with Chinese as a first language: More evidence of cross-language transfer of phonological processing. *Journal of Educational Psychology, 93*, 530-542.

Gough, P. B., Ehri, L. C., and Treiman, R. (Eds.). (1992). Reading acquisition. Hillsdale, NJ: Erlbaum.

Gunderson, L. (2007). *English-only instruction and immigrant students in secondary schools: A critical examination.* Mawah, NJ: Lawrence Erlbaum Associates.

He, Y., Wang, Q., and Anderson, R. C. (2005). Chinese children's use of sub-character information about pronunciation. *Journal of Educational Psychology, 97*, 572- 579.

Ho, C. S. & Bryant, P. (1997) Development of phonological awareness of Chinese children in Hong Kong. *Journal of Psycholinguistic Research, 26*(1), 109–126.

Hoff, E. & Shatz, M. (2009). *Blackwell Handbook of Language Development.* Chichester, UK: Blackwell Publishing Ltd.

Hu, C. F. & Catts, H. W. (1998). The role of phonological processing in early reading ability: What we can learn from Chinese. *Scientific Studies of Reading, 2*, 55–79.

Jongejan, W., Verhoeven, L., & Siegel, L. (2007). Predictors of reading and spelling abilities in first- and second-language learners. *Journal of Educational Psychology, 99*(4), 835-851.

Keung, Y. & Ho, C. H. (2009). Transfer of reading-related cognitive skills in learning to read Chinese (L1) and English (L2) among Chinese elementary school children. *Contemporary Educational Psychology, 34*, 103–112.

Lamarre, P. & Dagenais, D. (2004). Language practices of trilingual youth in two Canadian cities. In C. Hoffman & J. Ytsma (Eds.), *Trilingualism in family, school and community* (pp. 53-74). Clevedon, England: Multilingual Matters.

Leong, C. K. (1986). What does accessing a morphemic scripts tell us about reading and reading disorders in an alphabetic scripts? *Annals of Dyslexia, 36*, 82-102.

Leong, C.K., Tse, S.K., Loh, K.Y., & Hau, K.T. (2008). Text comprehension in Chinese children: Relative contribution of verbal working memory, pseudoword reading, rapid automatized naming, and onset-rime phonological segmentation. *Journal of Educational Psychology*, 100(1), 135-149.

Lesaux, N. & Geva, E. (2006). Synthesis: Development of literacy in language-minority students. In D. August & T. Shanahan (Eds.), *Developing Literacy in Second Language Learners: Report of the National Literacy Panel on Language-Minority Children and Youth*. Mahwah, NJ: Lawrence Erlbaum Associates.

Lesaux, N. K., Lipka, O., & Siegel, L. S. (2006). Investigating cognitive and linguistic abilities that influence the reading comprehension skills of children from diverse linguistic backgrounds, *Reading & Writing: An Interdisciplinary Journal, 19*, 99-131.

Lesaux, N. K., Rupp, A. A., & Siegel, L. S. (2007). Growth in reading skills of children from diverse linguistic backgrounds: Findings from a 5-year longitudinal study. *Journal of Educational Psychology, 99*(4), 821-834.

Lesaux, N. K. & Siegel, L. S. (2003). The development of reading in children who speak English as a second language. *Developmental Psychology, 25*, 1005-1019.

Limbos, L. M. & Geva, E. (2001). Accuracy of teacher assessments of second-language students at risk for reading disability. *Journal of Learning Disabilities, 34*, 136-151.

Lipka, O. & Siegel, L. S. (2007) The development of reading skills in children with English as a second language. *Scientific Studies of Reading, 11*, 105-131.

Lonigan, C. J. (2003). Development and promotion of emergent literacy skill in preschool children at-risk of reading difficulties. In B. R. Foorman (Ed.), *Preventing and Remediating Reading Difficulties: Bringing Science to Scale* (pp. 23−50). Timonium: MD: York Press.

Lu, L. & Liu, H. S. (1998). *The Peabody Picture Vocabulary Test-Revised in Chinese*. Taipei: Psychological Publishing.

Marinova-Todd, S. H., Zhao, J., & Bernhardt, M. (2010). Phonological awareness skills in the

two languages of Mandarin-English bilingual children. *Clinical Linguistics and Phonetics, 24*, 387-400.

McBride-Chang, C. & Ho, C. S. H. (2000). Developmental issues in Chinese children's character acquisition. *Journal of Educational Psychology, 92*, 1–6.

McBride-Chang, C., & Ho, C. S.-H. (2005). Predictors of beginning reading in Chinese and English: A 2-year longitudinal study of Chinese kindergartners. *Scientific Studies of Reading, 9*, 117-144.

McBride-Chang, C., & Kail, R. (2002). Cross–cultural similarities in the predictors of reading acquisition. *Child Development, 73*, 1392–1407.

McCardle, P., Mele-McCarthy, J., & Leos, K. (2005). English language learners and learning disabilities: Research agenda and implications for practice. *Learning Disabilities Research and Practice, 20*(2), 68−78.

Moll, L.C. & Diaz, S. (1985). Ethnographic pedagogy: Promoting effective bilingual instruction. In E.E. Garcia & R.V. Padilla (Eds.). *Advances in Bilingual Education Research* (pp. 127-149). Tucson: University of Arizona Press.

Nakamoto, J., Lindsey, K.A., & Manis, F.R. (2008). A Cross-Linguistic Investigation of English Language Learners' Reading Comprehension in English and Spanish. *Scientific Studies of Reading, 12*(4), 351-371.

Nation, I. S. P. (2001). *Learning Vocabulary in Another Language. Cambridge, England: Cambridge University Press.*

Perfetti, C. A., Beck, I., Bell, L.C. & Hughes, C. (1987) Phonemic knowledge and learning to read are reciprocal: A longitudinal study of first grade children. *Merryl-Palmer Quarterly*, 33, 283-319.

Proctor, C. P., Carlo, M., August, D., & Snow, C. E. (2005). Native Spanish speaking children reading in English: Toward a model of comprehension. *Journal of Educational Psychology, 97*, 246–256.

Ricciardelli, L. A. (1992). Bilingualism and cognitive development in relation to threshold theory. *Journal of Psycholinguistic Research, 21*(4), 301-316.

San Francisco, A. R., Carlo, M. August, D., & Snow, C. (2006). The role of language of instruction and vocabulary in the English phonological awareness of Spanish-English bilingual children. *Applied Psycholinguistics,* 27, 229-246.

Shin, H. & Bruno, R. (2003). *Language Use and English Speaking Ability*. U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau.

Shu, H. & Anderson, R. C. (1997). Role of radical awareness in the character and word acquisition of Chinese children. *Reading Research Quarterly, 32*, 78–89.

Snow, C., Burns, M., & Griffin, P. (Eds.) (1998). *Preventing Reading Difficulties in Young Children*. Washington, DC: National Academy Press.

Storch, S. A. & Whitehurst, G. J. (2002). Oral language and code-related precursors to reading: Evidence from a longitudinal structural model. *Developmental Psychology, 38*(6), 934−947.

Tahan, S., Cline, T., & Messaoud-Galusi, S. (2011) The relationship between language dominance and pre-reading skills in young bilingual children in Egypt. *Reading and Writing: An Interdisciplinary Journal,* Online First™, 14 March 2011.

Tong, X. & McBride-Chang, C. (2010). Chinese-English biscriptal reading: Cognitive component skills across orthographies. *Reading and Writing: An Interdisciplinary Journal*, 23, 293-310

Uchikoshi, Y. (2006) English vocabulary development in bilingual kindergarteners: What are the best predictors? *Bilingualism, Language and Cognition, 9*(1), 33-49.

Verhoeven. L. (1994). Transfer in bilingual development: The linguistic interdependence hypothesis revisited. *Language Learning, 44*, 381-415.

Verhoeven, L.T. (2007). Early bilingualism, language transfer, and phonological awareness. *Applied Psycholinguistics, 28*(3), 425-439.

U.S. Department of Education, (2008). National Assessment of Educational Progress in Reading and Mathematics, 2007. Washington, DC : U.S. Department of Education.

Wagner, R. K., Torgesen, J. K., & Rashotte, C. A. (1999). *Comprehensive Test of Phonological Processing*. Austin, TX: Pro-Ed.

Walley, A. C., Metsala, J. L., & Garlock, V. M. (2003). Spoken vocabulary growth: Its role in the development of phoneme awareness and early reading ability. *Reading and Writing: An Interdisciplinary Journal, 16*, 5–20.

Wang, M., Perfetti, C. A., & Liu, Y. (2005). Chinese–English biliteracy acquisition: Cross-language and writing system transfer. *Cognition, 97*, 67–88.

Wang, M., Yang, C., & Cheng, C. (2009). The contributions of phonology, orthography, and morphology in Chinese-English biliteracy acquisition. *Applied Psycholinguistics, 30*, 291-314.

Whitehurst, G. J. & Lonigan, C. J. (1998). Child Development and Emergent Literacy. *Child Development, 69*(3), 848-872.

Wilkinson, T. (1993). *Wide Range Achievement Test—3*. Wilmington, DE: Guidance Associates.

Woodcock, R. W. (1991). *Woodcock Language Proficiency Battery—Revised*. Itasca, IL: Riverside Publishing Company.

Table 1. Participant characteristics across three sites

	American bilingual group	American mainstream group	West Coast Canada
Total Number of Participants	53	32	28
Mean Age	5;7	5;9	5;8
Gender			
Boys	21	14	14
Girls	32	18	14
Average Mother's highest Education	some high school	some high school	some high school
Child born in USA or Canada			
Yes	45	22	25
No	7	3	3
Parent born in USA or Canada			
Yes	2	1	0
No	48	19	26
Age first exposed to English	2;6	3;5	2;10
Languages Spoken at home by Child			
English	0	2	1
Cantonese	13	3	0
Both	39	21	26
Languages Spoken at home by Family			
English	1	0	1
Cantonese	40	15	17
Both	12	11	9
Attend Chinese language school afterschool or on the weekend			
Yes	14	3	14
No	38	23	14

Table 2. Student achievement scores in English and Cantonese by regional group (n=113).

Variables	American bilingual group (n = 53)	American mainstream group (n = 32)	Canada (n = 28)	Range	F	p
	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)			
English						
PPVT	83.72 (14.55)	81.38 (18.24)	83 (13.31)	40-108	.23	.7936
PA composite	94.25 (12.36)	91.41 (12.73)	98.75 (8.88)	70-126	2.97	.00554
Letter-Word Identification	109.83 (10.35)	107.69 (11.31)	110.75 (11.50)	92-157	.65	.5253
Cantonese						
PPVT	91.70 (15.95)	78.53 (11.02)	83.25 (32.67)	55-128	7.45	.0009
Rhyme Detection	5.28 (2.20)	5.19 (3.23)	8.39 (2.81)	0-14	14.59	<.0001
Tone Discrimination	6.28 (2.48)	4.88 (3.21)	8.61 (2.86)	0-13	13.52	<.0001
Character Recognition	3.02 (2.94)	.47 (1.37)	4.93 (4.59)	0-20	15.46	<.0001

Note. PPVT, PA composite, and letter-word identification scores are in standard scores. Rhyme detection, tone detection, and character recognition scores are in raw scores.

Table 3. Background data and student achievement scores in English and Cantonese by language dominant groups (*n*=113).

Variables	English Dominant (n = 55)	Cantonese Dominant (n = 57)	Range	*F*	*P*
	Mean (*SD*)	Mean (*SD*)			
English					
PPVT	92.96 (8.30)	73.23 (14.38)	40-108	78.40	<.0001
PA composite	96.85 (11.97)	92.67 (11.44)	70-126	3.58	.0610
Letter-Word Identification	111.78 (12.96)	107.49 (7.80)	92-157	4.54	.0353
Cantonese					
PPVT	78.55 (9.86)	95.95 (15.05)	55-128	43.39	<.0001
Rhyme Detection	5.53 (3.11)	6.49 (2.82)	0-14	2.96	.0884
Tone Discrimination	6.13 (2.99)	6.80 (3.20)	0-13	1.35	.2481
Character Recognition	1.98 (2.72)	3.58 (4.02)	0-20	6.03	.0156
Background					
First English exposure	2.63 (1.24)	2.87 (1.44)	0-6	.86	.3554
Number of L1 Books	1.28 (.84)	1.51 (.80)	0-3	2.22	.1393
Number of English books	2.19 (.83)	1.92 (.78)	0-3	3.23	.0749
	Total Number	Total Number			
Attend L1 Chinese school	16	18		.01	.9327
American bilingual	25	28		.15	.7006
American mainstream	18	13		1.37	.2446
Canada	12	16		.58	.4495

Note. PPVT, PA composite, and letter-word identification scores are in standard scores. Rhyme detection, tone detection, and character recognition scores are in raw scores.

Table 4. Correlations between measures for English-dominant and Cantonese-dominant students (n = 113).

	1	2	3	4	5	6	7	8	9
1. English PPVT									
English dominant	-								
Cantonese dominant	-								
2. English PA									
English dominant	.24	-							
Cantonese dominant	.48***	-							
3. English Letters									
English dominant	.19	.56***	-						
Cantonese dominant	.33*	.51***	-						
4. Cantonese PPVT									
English dominant	.29*	.14	-.12	-					
Cantonese dominant	.59***	.45***	.34**	-					
5. Cantonese Rhyme									
English dominant	.13	.01	.04	.03	-				
Cantonese dominant	.12	.29*	.13	.31*	-				
6. Cantonese Tone									
English dominant	.16	.26	.06	.16	.47***.	-			
Cantonese dominant	.14	.19	.01	.38**	57***	-			
7. Chinese Character Reading									
English dominant	.05	.18	.08	.16	.25	.15	-		
Cantonese dominant	.10	.34*	.24	.31*	.39**	.36**	-		
8. First English exposure									
English dominant	-.14	.12	-.06	.01	.14	.18	.15	-	
Cantonese dominant	-.17	-.30*	-.25	-.21	-.18	-.04	-.10	-	
9. Number of L1 books									
English dominant	-.04	.12	.14	-.09	.05	.14	.26	.09	-
Cantonese dominant	.01	.32*	.08	.03	.03	-.19	.23	-.38**	-
10. Number of English books									
English dominant	.24	.02	.004	.03	-.20	.03	-.23	-.05	.24
Cantonese dominant	-.01	.04	.10	-.10	.04	-.10	-.05	-.16	.23

*p < .05, **p < .01, ***p < .001

Table 5. Results of fixed order regression predicting English decoding by cluster group and English phonological awareness.

Step	R^2	ΔR^2	ΔF
1a. Language dominance (Cantonese dominant) cluster	.04	.04	4.54
2. English Phonological awareness	.31	.27	19.70***
1b. English phonological awareness	.31	.31	49.32

*p < .05, **p < .01, ***p < .001

Table 6. Results of fixed order regression predicting Cantonese reading by cluster group, Chinese rhyme and English phonological awareness.

Step	R^2	ΔR^2	ΔF
1. Language dominance (Cantonese dominant) cluster	.05	.05	6.03
2. Chinese rhyme	.15	.10	3.64***
3. English phonological awareness	.20	.05	.83***

*p < .05, **p < .01, ***p < .001