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Comparing vocabulary development in Spanish- and Chinese-speaking ELLs: the effects of metalinguistic and sociocultural factors

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Abstract This study evaluated the impact of two metalinguistic factors, English derivational awareness and English–Spanish cognate awareness, and the impact of two sociocultural factors, maternal education and children's length of residence in Canada, on English Language Learners (ELLs)' vocabulary knowledge. The participants of the study were 89 Spanish-speaking ELLs, 77 Chinese-speaking ELLs, and a comparison group of 78 monolingual English-speaking children in Grades 4 and 7. The sample included both first-generation (born outside of Canada) and second generation (born in Canada) immigrant children. The study yielded several important findings. First, it confirmed the strong link between derivational awareness and vocabulary knowledge observed in the previous research, and extended this relationship to two groups of ELLs from different first language backgrounds. Second, this study unveiled differences in vocabulary learning between Spanish-speaking and Chinese-speaking ELLs. While Spanish-speaking children were able to utilize the cognate strategy to learn English words, this strategy was not available for Chinese-speaking ELLs. With respect to the sociocultural factors, length of residence in Canada was significantly related to ELLs' vocabulary development. Interestingly, length of residence in Canada only influenced the development of noncognate vocabulary, but not cognate vocabulary, in Spanish-speaking ELLs, which provides additional evidence for these children's use of the cognate strategy.

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Finally, maternal education was not related to English vocabulary development. The theoretical and educational implications of these findings were discussed.

Keywords Vocabulary · English language learner (ELL) · Morphological awareness · Cognate awareness · Length of residence · Maternal education

Introduction

Vocabulary is a great challenge in literacy development for language minority children across different societies (e.g., Carlo et al., 2004; Droop & Verhoeven, 2003; Jean & Geva, 2009; Verhallen & Schoonen, 1993). In English-speaking countries, children who are native speakers of English have already learned 5,000–7,000 words by the time they enter primary school (Biemiller & Slonim, 2001). In comparison, the number of English words English Language Learners (ELLs) know is significantly lower (August, Carlo, Dressler, & Snow 2005; Cunningham & Allington, 2009; Jean & Geva, 2009; Proctor, Carlo, August, & Snow, 2005; Umbel, Pearson, Fernandez, & Oller, 1992). Umbel et al. (1992) found that even Spanish-speaking ELLs from middle to high socioeconomic status (SES) scored below the mean of the norming sample on receptive vocabulary in first grade. According to Cummins (2000), it usually takes ELLs 7–10 years to catch up with their peers in academic vocabulary. However, some ELLs may still lag behind even after an extended period of schooling in an English mainstream classroom (Geva & Farnia, 2009). A serious consequence of the delay in vocabulary development is that ELLs are less able to comprehend text at the grade level than native speakers of English (August et al., 2005).

Research has uncovered several factors that facilitate children's vocabulary development. One such factor is morphological awareness, the ability to recognize that words can be segmented into smaller units of meaning (Carlisle, 1995). While the importance of morphological awareness for vocabulary learning is well-documented in English monolingual children (Anglin, 1993; Nagy, Beringer, & Abbott, 2006; Nagy & Scott, 2000; White, Power, & White, 1989; Wysocki & Jenkins, 1987), few studies have examined this relationship in ELLs. In the present study, we investigated the contribution of morphological awareness to vocabulary in Spanish-speaking ELLs and Chinese-speaking ELLs. Another factor that influences ELLs' vocabulary is cognate awareness. There is preliminary evidence that cognate awareness facilitates English vocabulary learning in Spanish-speaking ELLs (Carlo et al., 2004; Hancin-Bhatt & Nagy, 1994; Nagy, Garcia, Durgunoglu, & Hancin-Bhatt, 1993). However, cognate awareness is not universal to all ELLs. Chinese-speaking ELLs do not have opportunities to develop cognate awareness, due to the fact that Chinese and English do not share any cognates. Using Chinese-speaking ELLs as a baseline, the present study sought to investigate whether cognate awareness would enhance vocabulary learning in Spanish-speaking ELLs.

In addition to metalinguistic factors, the present study also explored the effects of two sociocultural factors, length of residence in Canada and maternal education, on ELLs' vocabulary learning, as a number of reports have documented the importance of these factors in the literacy development of language minority students (Golberg, Paradis, & Crago, 2008; Jia, 1998; Lesaux & Geva, 2006). Traditionally, researchers have examined the vocabulary development of ELLs from either a psycholinguistic or a sociocultural perspective. Since research evidence has shown that both psycholinguistic and sociocultural factors play a role in ELLs' vocabulary development, we integrate the two paradigms in the present study to provide a more comprehensive picture.

Morphological awareness and vocabulary

In this study we focused on one specific aspect of morphological awareness—derivational awareness. Spanish and English share many common features in derivational morphology. In both languages, derivational suffixes often change the syntactic property and meaning of a word, e.g., *communic**ate**– communic**ation**,* in English, and *comunic**ar** –comunic**ación***, in Spanish. There are restrictions in terms of the syntactic category to which a derivational suffix can attach. For example, in English, the suffix *–ize* converts an adjectives to a verb, and *-y* turns a noun into an adjective (Tyler & Nagy, 1989); in Spanish the suffix *–oso* converts a noun into an adjective, and *–ción* changes a verb into a noun. Furthermore, Spanish and English share a number of derivational suffixes from Greek and Latin origin, e.g., *–al* in *environment**al*** in English and *ambient**al*** in Spanish.

In contrast, compound morphology predominates in Chinese vocabulary (Packard, 2000). Over 70% of Chinese words are compound words formed by combining two root words (Xing, 2006), e.g., 猪肉/zhu1rou4/(pig meat/pork), 花瓶/hua1ping2/(flower bottle/vase). The number of derivational morphemes is considerably smaller in Chinese than in the typical Indo-European language (Li & Thompson, 1981). Although rules have been proposed to distinguish between roots and derivational suffixes in Chinese (Packard 2000), the two types of morphemes can still be easily confused, even by a native speaker who does not specialize in linguistics.[1] For example, 员/yuan/(person whose job is X) in 教员/jiao4yuan2/(teach person/instructor) is a bound root, whereas 者/zhe3/(person who does X) in 自愿者/zhi1yuan4zhe3/("self desire person"/volunteer) is a derivational suffix.

There are at least two ways in which derivational awareness facilitates vocabulary learning. First, understanding the structure of derived words helps children extract the meaning of these words from constituent morphemes. When children encounter an unknown derived word, e.g., *friendliness*, they are often familiar enough with the root morpheme, e.g., *friend*, to make a reasonable guess about the word meaning (Nagy & Anderson, 1984). Further, derivational suffixes determine the syntactic property of derived words. Knowledge of their syntactic and distributional properties enable children to understand and produce new vocabulary more effectively, particularly in sentence contexts (Carlisle, 2007; Mahony, 1994;

[1] According to Packard (2000), there are at least two criteria that can be used to distinguish between bound roots and derivational suffixes in Chinese: (1) derivational affixes are more general in meaning than bound roots, and (2) derivational suffixes are more productive than bound roots.

Tyler & Nagy, 1989). For example, the suffix *–ize* signifies that a derived word is a verb. With this knowledge, children may be able to figure out the exact meaning of *categorize* provided that the root morpheme *category* is known.

Research has shown that the ability to perform morphological analysis facilitates vocabulary learning in children who are native speakers of English (Anglin 1993; Freyd & Baron, 1982; Reed, 2008; Wysocki & Jenkins, 1987). This ability develops with age and reading experience and is more evident in children in grade four and above (Carlisle, 2000). Many studies have found that derivational awareness explains unique variance in vocabulary and reading comprehension after controlling for other reading related variables such as nonverbal skills, phonological awareness, and word reading (Carlisle, 2000; Carlisle & Fleming, 2003; Deacon & Kirby, 2004; Nagy, Berninger, Abbott, Vaughan, & Vermeulen, 2003; Nagy et al., 2006). For example, Carlisle and Fleming (2003) observed in a longitudinal study that third graders' derivational awareness was predictive of their vocabulary 2 years later. Similarly, Nagy et al. (2006) found that derivational awareness made a unique contribution to vocabulary in children ranging from grade four to grade nine. They also observed that derivational awareness and vocabulary were so closely associated in some subgroups of children that the contribution of derivational awareness to reading comprehension in these groups was mediated through vocabulary (e.g., Nagy et al. 2006).

In fact, the relationship between morphological awareness and vocabulary is likely to be reciprocal in nature. It appears that vocabulary forms the foundation for developing morphological awareness (Hao, Chen, Dronjic, Shu, & Anderson, in press; Nicoladis, Palmer, & Marentette, 2007). For example, Nicoladis et al. (2007) showed that for French–English bilingual children between the ages of 4 and 6 years, mastery of past tense morphology in both languages corresponded to type and token frequency of the verbs they were exposed to. Hao et al. (in press) demonstrated that Chinese children in kindergarten were better at identifying the shared morpheme in two compound words when word meanings were closely related. On the other hand, a number of intervention studies have found that training on different aspects of morphological awareness led to improved vocabulary, reading or writing skills, suggesting a causal connection between morphological awareness and literacy (Carlo et al., 2004; Chow, McBride-Chang, Cheung, & Chow, 2008; Nunes, Bryant, & Olsson, 2003).

Due to lack of systematic research, much less is known about the role of derivational awareness in vocabulary development among ELLs. Only several studies have been conducted in this area. Kieffer and Lesaux (2008) followed Spanish-speaking ELLs from grade four to grade five. The researchers observed strong associations between English derivational awareness, English vocabulary, and English reading comprehension in each grade. However, grade four derivational awareness did not make a unique contribution to grade five reading comprehension after vocabulary and word reading were controlled for. The contribution of derivational awareness to vocabulary and reading comprehension has also been observed in Chinese-speaking ELLs. In a more recent 1-year longitudinal study, Lam, Chen, Geva, Luo, and Li (accepted) showed that for Chinese-speaking ELLs in Grade 1, English derivational awareness accounted for unique variance not only in concurrent English vocabulary, but also in subsequent English vocabulary and English reading comprehension a year later. These findings suggest that English derivational awareness is important for English vocabulary learning in young ELLs who speak Chinese as their first language, despite the fact that Chinese has few derived words.

Cognate awareness and vocabulary

Cognates are words in different languages that are of a common historical origin (Whitley 2002). Cognates are often similar in pronunciation, spelling and meaning. For example, the English word *advance* is *avance* in Spanish and *avancer* in French. Following previous research (Cunningham & Graham, 2000; Malabonga, Kenyon, Carlo, August, & Louguit, 2008; Nagy et al., 1993), we define cognate awareness as the ability to recognize the cognate relationship between words in two languages. Cognate awareness is a metalinguistic understanding because it requires children to reflect on the lexical relationship between two languages.

There are several reasons why English–Spanish cognate awareness facilitates vocabulary learning for Spanish-speaking ELLs. Spanish and English share a large number of cognates, estimated at 10,000–15,000 words, which account for one-third to one-half of an educated person's active vocabulary (Nash, 1997). In many cases, cognate words in Spanish and English are identical in spelling and meaning, e.g., *vision*, *personal*, *fundamental*. Even when there are spelling differences across the two languages, changes are often small and predictable, e.g., *action-acción, nation-nación, curious-curioso, delicious-delicioso*. As a result, it is relatively easy to guess the meaning of an English word when its Spanish cognate is known. However, unlike derivational awareness, which has been shown to enhance vocabulary learning in ELLs from different first language backgrounds (Kieffer & Lesaux, 2008; Lam et al., accepted), cognate awareness only develops in ELLs whose first language is etymologically related to English. Chinese and English do not have any cognates, rendering it impossible for Chinese-speaking ELLs to take advantage of the cognate strategy in learning English vocabulary.

It is not clear when Spanish-speaking ELLs first become aware of cognates, since most previous studies on cognate awareness involved children in Grade 4 and above. Based on available evidence, relatively balanced Spanish–English bilinguals have developed a reasonable level of cognate awareness by grade four and this awareness increases with grade level (e.g., Hancin-Bhatt & Nagy, 1994). On the other hand, there are large individual differences in cognate awareness even in older children (Garcia & Nagy, 1993). Garcia (1988, 1991) observed that some Spanish-speaking ELLs in Grades 5 and 6 were still not able to identify obvious cognates between English and Spanish. Since all the Hispanic children in the sample were enrolled in English only classes, it is possible that the Spanish proficiency of these students was not sufficiently developed to reap the benefits of cognates. Taken together, degree of bilingualism appears to be a key factor that affects Spanish-speaking ELLs' cognate awareness. According to Nagy et al. (1993), additional factors may include L1 proficiency, orthographic and phonetic similarity, and knowledge of derivational morphology.

While it is widely recognized that cognate awareness facilitates vocabulary learning in adult second language learners (e.g., Bellomo, 1999; Hammond & Simmons, 1987; Moss, 1992), only a small number of studies has explored this relationship in ELL children. Employing the think-aloud protocol, Jiménez, Garcia, and Pearson (1996) reported that sixth and seventh grade Spanish-speaking ELLs who were successful readers used cognate strategies to understand English narrative and expository passages. Nagy et al. (1993) showed that for Spanish-speaking ELLs in grades four, five, and six, the ability to identify English words with Spanish cognates while reading passages predicted their understanding of the meaning of these words. Moreover, a positive correlation was found between Spanish vocabulary and knowledge of English words with Spanish cognates words in children who were adept at identifying cognates, but not in children who recognized few cognates. This finding suggests that cognate awareness is the key to using Spanish lexical knowledge in English vocabulary learning.

Proctor and Mo (2009) compared the performance of 16 English monolingual students and 14 Spanish–English bilingual students in grade four on an English vocabulary test consisting of both cognate and non-cognate items. Although the two groups of children did not perform differently in either cognate or overall vocabulary, the Spanish–English bilinguals demonstrated a significantly higher correct cognate-to-total-ratio, which was taken as evidence that cognate awareness helps bilingual Spanish–English students narrow the gap in vocabulary development. Spanish–English bilinguals' cognate awareness, however, might have been underestimated because the sample was composed of poor readers participating in a reading intervention. A study involving typically developing Spanish-speaking children is likely to yield stronger results. In addition, the sample size of Proctor and Mo (2009) was quite small, which undermines the generalizability of the results. These limitations point to the need for more research in this area.

Sociocultural factors and vocabulary

In addition to the metalinguistic factors, the present study explored the impact of two sociocultural factors, maternal education and length of residence in Canada, on ELLs' vocabulary development. Maternal education is considered a proxy to SES (Lucchese & Tamis-LeMonda, 2007). This and other related SES variables have been shown to influence children's vocabulary development (Conger, McCarthy, Yang, Lahey, & Kropp, 1984; McLoyd, 1990; Hart & Risley, 1995). Parents with higher levels of education are known to provide better quality social, human, and economic resources to their children (USDE NCES, 2001 cited in Lucchese & Tamis-LeMonda, 2007), which positively impacts home language and literacy experiences.

Variations in vocabulary acquisition among ELLs have also been attributed to sociocultural variables (Cobo-Lewis, Pearson, Eilers, & Umbel, 2002; Goldenberg, Rueda, & August, 2006; Lesaux & Geva, 2006). Cobo-Lewis et al. (2002) reported that Spanish-speaking children from higher SES families achieved a higher level of English vocabulary than those from lower SES families. Goldenberg et al. (2006)

identified maternal education as the best predictor of vocabulary growth in a longitudinal study that followed 5-year-old ELLs for 2 years. In a synthesis on literacy development in language minority students, Lesaux and Geva (2006) concluded that sociocultural factors such as parental education level and home literacy affect these children's second language reading comprehension.

Notably there is often a disassociation between parental education and family income in immigrant families (Louie, 2004). In Canada, the average education level of certain immigrant groups is higher than the rest of Canadians, whereas the income of immigrants, particularly recent immigrants, is below average (Statistics Canada, 2008). Since maternal education is more likely to reflect the quality of language interaction and literacy practices in immigrant populations, we focused on the effect of maternal education on vocabulary learning in the present study. We expected that ELLs whose parents had a higher level of education would develop more advanced English vocabulary.

In addition to SES factors, the amount of language input contributes to vocabulary development both before and after children begin to receive literacy instruction (Biemiller, 1999; Tomasello, 2003; Penno, Wilkinson, & Moore, 2002). For ELLs, age of arrival/length of residence in the new country is an important indicator of English language exposure and influences ELLs' English proficiency (Jia, 1998). It is estimated that a minimum of 5 years is needed for ELLs to catch up in academic vocabulary with their English monolingual peers (Collier, 1987, 1989; Collier & Thomas, 1988, 1989; Cummins, 1994). In a recent study, Ramirez, Chen, Geva, and Luo (2011) reported that length of residence in Canada significantly predicted English derivational awareness in Spanish- and Chinese-speaking ELLs in Grades 4 and 7. Due to the close relationship between derivational awareness and vocabulary, it is likely that length of residence is also a significant predictor of English vocabulary for these children.

The present study

To reiterate, the present study investigated the role of two metalinguistic factors, English derivational awareness and English–Spanish cognate awareness, and two sociocultural factors, maternal education and length of residence in Canada, in English vocabulary development in ELLs from Spanish-speaking and Chinese-speaking backgrounds. To our knowledge, it is one of the first studies that integrate cognitive and sociocultural factors in studying children's literacy development. As previously noted, since cognitive and sociocultural factors have been shown to contribute to children's literacy development separately, it is desirable to combine the two to provide a more comprehensive framework. Our study is also one of the first to include ELLs from two different first language backgrounds, in attempts to better represent this diverse population, and to reveal the similarities and differences in vocabulary development in different groups of ELLs.

The participants of the present study were Spanish-speaking and Chinese-speaking ELLs, and monolingual children who were native speakers of English in Grades 4 and 7. The monolingual children were included to provide a baseline for the comparisons. We targeted children in upper elementary and middle school for several reasons. First, research examining ELLs' vocabulary development in these age groups is scarce and thereby is much needed. Second, Grade 4 is considered a critical turning point in literacy development from learning to read to reading to learn (Chall, 1983). Starting in Grade 4, there is a dramatic increment in morphologically complex words in the reading materials of content areas (Anglin, 1993; Stahl & Nagy, 2006). Thus, derivational awareness may play an important role in vocabulary development in these age groups. Furthermore, most previous studies on cognate awareness have examined children in Grade 4 and above (e.g., Hancin-Bhatt & Nagy, 1994) because older children are more likely to have the proficiency levels required in L1 and L2 to use the strategy.

We had several predictions based on previous research. We anticipated that derivational awareness would significantly predict vocabulary in both Spanish-speaking and Chinese-speaking ELLs. We examined this hypothesis with regression analyses, in which we controlled for phonological awareness and word reading due to their importance for literacy development, in addition to controlling for age, grade, and nonverbal ability. We were also interested in exploring whether there would be a difference in the strength of the association between derivational awareness and vocabulary in the two groups of ELLs, reflecting the influence of the morphological features of each group's first language. With respect to cognate awareness, we expected that it would enhance English vocabulary learning in Spanish-speaking ELLs. This hypothesis was examined by comparing Spanish-speaking and Chinese-speaking ELLs' performance on cognate versus noncognate items selected from the PPVT test. We predicted that Spanish-speaking ELLs would outperform their Chinese-speaking peers on English words with Spanish cognates, whereas the two groups would perform more similarly on English only words.

We also expected to see the impact of the two sociocultral factors on ELLs' vocabulary development. Both maternal education and length of residence in Canada should be positively related to ELLs' vocabulary development. The effect of length of residence, however, may vary depending on children's first language background and type of vocabulary. Length of residence may have a smaller effect on cognate vocabulary in Spanish-speaking ELLs because they can transfer vocabulary knowledge from Spanish to learn these words. The effect may be larger on noncognate vocabulary for Spanish-speaking ELLs, and on both types of vocabulary for Chinese-speaking ELLs. These observations, if confirmed, would demonstrate an interaction between the cognitive and sociocultural factors.

Method

Participants

Participants of the study included 260 fourth and seventh graders from 22 schools located in a large multicultural Canadian city. The children were participating as a part of a larger study on bilingual reading development. Eight children were excluded from the sample because they scored below the 10th percentile on nonverbal reasoning or had a known learning disability. Eight children were excluded because they had resided in Canada for less than 2 years. The final sample included 244 children, of which 42% were boys and 58% were girls. There were 89 Spanish-speaking ELLs (39 fourth graders, 20 girls; 50 seventh graders, 25 girls), 77 Chinese-speaking ELLs (36 fourth graders, 22 girls; 41 seventh graders, 21 girls), and 78 monolingual English-speaking children (39 in each grade, 24 girls in Grade 4 and 25 girls in Grade 7). English was the language of instruction for all the children. The mean age by grade for each group of children is reported in Table 1.

According to the family questionnaire (see *Measures* for more information about this instrument), 48% of the Spanish-speaking children were born outside Canada. These children came from 13 different Latin-American countries. Eighty-three percent of the Chinese children were born outside Canada and the majority came from Mainland China. The age of arrival in Canada ranged from 14 to 111 months for the Spanish-speaking ELLs ($M = 31.58$ months, $SD = 41.2$) and from 2 to 120 months for the Chinese-speaking ELLs ($M = 80$ months, $SD = 34.9$). On average, the Spanish-speaking ELLs have lived in Canada for 104 months ($M = 94.79$ months for the fourth graders and $M = 112.42$ months for the seventh graders). The Chinese-speaking ELLs have lived in Canada for 63 months ($M = 73.47$ months for the fourth graders and $M = 53.86$ months for the seventh graders). Approximately 75% of the Spanish-speaking ELLs and 65% of the Chinese-speaking ELLs used first language to communicate with their parents at home. About 48% of the Spanish-speaking ELLs and 87% of the Chinese-speaking attended heritage language classes offered at no cost by their school boards for 2.5 hours per week. The average maternal education was high school for the Spanish-speaking ELLs, and college for the monolinguals and the Chinese-speaking ELLs. The demographic information is summarized in Table 1.

Measures

Family questionnaire

A family questionnaire was designed by the researchers to collect information about home language use, immigration experience, and parental education. The questionnaire was provided in both English and the child's first language, and parents completed the questionnaire in their preferred language. Maternal education and length of residence in Canada were two variables used in subsequent data analyses. Parents were asked to indicate their education level on a 1 to 6 Likert scale, where 1 = primary school, 2 = junior high school, 3 = high school, 4 = college, 5 = university degree, 6 = graduate degree.

Nonverbal reasoning

Nonverbal ability was measured with the Raven's Standard Progressive Matrices (Raven, 1958; Raven, Raven, & Court, 2000). This test requires the child to complete visual-spatial matrixes by choosing the missing piece from six or eight patterned segments. This test has 60 items.

Table 1 Means and standard deviations for all measures for Spanish-speaking ELLs, Chinese-speaking ELLs, and monolinguals

Measures	Spanish-speaking ELLs			Chinese-speaking ELLs			Monolinguals		
	Grade 4 n = 39 20 female	Grade 7 n = 50 25 female	Combined	Grade 4 n = 36 22 female	Grade 7 n = 41 21 female	Combined	Grade 4 n = 39 24 female	Grade 7 n = 39 25 female	Combined
Demographic/sociocultural variables									
Age in months	117.26 (3.80)	150.76 (5.56)	136.08 (17.41)	114.58 (5.05)	150.78 (4.04)	133.86 (18.73)	116.31 (4.67)	150.69 (4.80)	133.50 (17.93)
Maternal education[a]	3.41 (1.18)	3.09 (1.19)	3.23 (1.19)	4.43 (1.35)	4.51 (1.11)	4.47 (1.22)	4.55 (1.02)	3.94 (1.25)	4.24 (1.17)
Months in Canada	94.79 (29.83)	112.42 (49.93)	104.25 (42.52)	73.47 (33.44)	53.86 (38.79)	63.25 (37.39)	N/A	N/A	N/A
Nonverbal ability	6.11 (12.19)	68.00 (10.16)	62.79 (12.52)	74.95 (10.39)	80.46 (10.29)	77.88 (10.63)	65.64 (10.47)	74.19 (10.94)	69.91 (11.47)
Metalinguistic/literacy variables									
Phonological awareness[b]	9.69 (3.21)	8.66 (3.17)	9.11 (3.21)	10.31 (3.12)	8.22 (3.40)	9.19 (3.41)	10.74 (2.76)	9.67 (3.05)	10.21 (2.94)
Morphological production	62.11 (15.09)	69.70 (19.64)	66.38 (18.10)	64.09 (23.65)	63.32 (29.52)	63.68 (26.77)	72.55 (10.53)	83.38 (12.45)	77.97 (12.68)
Morphological structure	67.05 (17.16)	73.10 (19.45)	70.45 (18.63)	72.50 (20.82)	72.32 (24.59)	72.40 (22.76)	76.54 (13.96)	84.23 (14.98)	80.38 (14.90)
Word reading	68.49 (9.84)	79.63 (8.81)	74.75 (10.77)	71.09 (14.39)	74.90 (13.29)	73.12 (13.86)	74.76 (10.55)	82.35 (9.37)	78.56 (10.62)
Vocabulary	62.99 (7.66)	69.63 (9.33)	66.72 (9.21)	66.34 (11.70)	65.24 (15.08)	65.76 (13.53)	73.12 (6.94)	78.03 (6.26)	75.58 (7.03)
Reading comprehension	61.25 (10.14)	67.22 (11.45)	64.61 (11.23)	69.60 (16.17)	72.70 (17.04)	71.25 (16.60)	76.57 (9.70)	80.77 (12.85)	78.67 (11.51)

[a] Maternal education was measured on a 1–6 scale, where 1 = primary school, 2 = junior high school, 3 = high school, 4 = college, 5 = university degree, 6 = graduate degree

[b] Phonological awareness is reported in standard scores

Phonological awareness

This skill was measured using the Elision subtest of the Complete Test of Phonological Processing (CTOPP) (Wagner, Torgesen, & Rashotte, 1999). Children were asked to delete phonemes (individual sound) from words and give the remaining part. For example, say *cat*, now say it without /k/. The test contains 5 practice items and 20 test items involving initial, middle and last phoneme deletion. The test was discontinued after three consecutive errors.

Word reading

The Letter-Word Identification subtest from the Woodcock Language Proficiency Battery (Woodcock, 1984) was used to assess word recognition skills. Children were required to read 62 words of increasing difficulty. The test was discontinued if the child incorrectly read 6 words in a row.

Morphological production

Adapted from Carlisle (2000), this test evaluated the ability to manipulate derivational suffixes. The child was presented orally with a target word e.g., *magic*, followed by an incomplete sentence, e.g., *The performer was a good*__. The child was then requested to complete the sentence orally with the proper derived form of the target word, e.g., *magician*. There were three practice items and 25 test items. The inter-item reliability was $\alpha = .84$ for the Spanish-speaking ELLs, $\alpha = .94$ for the Chinese-speaking ELLs, and $\alpha = .75$ for the English-speaking monolinguals.

Morphological structure

Adapted from Singson, Mahony, and Mann (2000), this measure assessed the sensitivity to syntactic properties of derivational suffixes in English. The child was asked to complete a sentence with a missing word by choosing from four words with the same stem but different derivational suffixes. Half of the test used low-frequency real words for the answer options, for example, *He likes to* __ (*gratify, gratuity, grateful, gratification*) *his desires.* To reduce the effect of vocabulary knowledge, the remaining half offered pseudo word options consisting of a fake root with a real suffix, for example, *What a completely* __ (*tribacious, tribaism, tribacize, tribation*) *idea*. The test was administered in an oral plus written format to reduce the effect of reading ability and to minimize memory load. Children received a booklet containing instructions, two practice items, and 20 test items. An experimenter read each sentence four times, each time with one of the options, while children read silently along with the experimenter and circled the word that best completed the sentence. The inter-item reliability was $\alpha = .77$ for the Spanish-speaking ELLs, $\alpha = .86$ for the Chinese-speaking ELLs, and $\alpha = .72$ for the English-speaking monolinguals.

Vocabulary

Peabody Picture Vocabulary Test, Third Edition, Form III A (PPVT-III A) (Dunn & Dunn, 1997) was used to assess children's oral vocabulary. To save testing time, every third item from the original test was selected to create a shortened version of 60 items. This test was conducted in a group format in which all 60 items were administered. Each child received a booklet with pictures depicting the four options for each test item and a scoring sheet. The experimenter read each item twice and children selected the picture that represented the word heard. The inter-item reliability was $\alpha = .77$ for the Spanish-speaking ELLs, $\alpha = .89$ for the Chinese-speaking ELLs, and $\alpha = .68$ for the English-speaking monolinguals.

To examine Spanish-speaking ELLs' cognate awareness, we divided the 60 items in the vocabulary test into English words with Spanish cognates, e.g., *indigent-indigente* and words that are unique to English, e.g., *awarding*. The 60 items consisted of 35 cognates and 25 non-cognates. In the next step, 24 cognate and 24 noncognate items matched on frequency were selected for further analysis. The frequency index we employed was the Standard Frequency Index (SFI) values in the Educator's Word Frequency Guide (EWFG, for more details, see Zeno, Ivens, Millard, & Duvvuri, 1995). A t test revealed no significant difference in frequency between the two types of words, t (46) = 1.26, n.s. The inter-item reliability was $\alpha = .76$ for cognate items and $\alpha = .70$ for noncognate items. The list of the selected cognate and non-cognate items is provided in the Appendix.

Procedure

The participants were assessed in a quiet room at their schools during school hours. The two morphological awareness tests and the word reading test were administered individually in one 30–45 min session. All the other tests were administered in groups of 5–15 children under the supervision of two to three trained research assistants in two group-testing sessions of about 60 min each. Testing at each school was completed within a period of 2–3 weeks.

Results

The means and standard deviations of all measures are displayed in Table 1. The numbers of boys and girls in each group of children are also reported in the table. There was no significant difference in the number of boys and girls, $\chi^2 = .60$, $p = .833$. Children's age and length of residence in Canada are reported in months, phonological awareness is reported in standard scores. Maternal education is reported on a six-point scale. Scores for all the other tests are reported in percentages.

The ELL status of the Spanish- and Chinese-speaking ELLs was confirmed by their performance on the vocabulary test. Both groups scored significantly lower than the monolinguals, $MD = 9.26$, $p < .001$, for the Spanish-speaking ELLs, and

$MD = 9.78$, $p < .001$, for the Chinese-speaking ELLs. There was no difference between the two ELL groups. A similar pattern was revealed for English word reading, morphological production and morphological structure. Specifically, monolingual children significantly outperformed both ELL groups on English word reading, $MD = 3.81$, $p = .038$ for the Spanish-speaking ELLs, and $MD = 5.44$, $p = .004$ for the Chinese-Speaking ELLs, on morphological production, $MD = 11.58$ for the Spanish-speaking ELLs, and $MD = 14.28$ for the Chinese-Speaking ELLs, $ps < .001$; and on morphological structure, $MD = 9.94$, $p = .003$ for the Spanish-speaking ELLs, and $MD = 7.98$, $p = .028$ for the Chinese-Speaking ELLs, but no difference was found between the two ELL groups on any of the three measures. Differences were also found in nonverbal ability among the three groups of children. The Chinese-speaking ELLs scored the highest, followed by the monolinguals, $MD = 7.79$, who in turn scored higher than the Spanish-speaking ELLs, $MD = 15.65$, all ps $< .001$. The performance of the three groups on phonological awareness did not differ statistically, $F(2, 239) = 1.95$, $p = .146$.

Bivariate correlations for the Spanish-speaking ELLs, Chinese-speaking ELLs, and monolinguals are presented in Table 2. Significant correlations were found between the two morphological measures across the three language groups, $r = .21$ for the Spanish-speaking ELLs, $r = .65$ for the Chinese-speaking ELLs, and $r = .43$ for the monolinguals, all ps $< .05$. Across the three groups, both the morphological production test and the morphological structure test had medium to high correlations with vocabulary, $r = .33$ and $r = .48$ for the Spanish-speaking ELLs, $r = .55$ and $r = .78$ for the Chinese-speaking ELLs, and $r = .41$ and $r = .53$ for the monolinguals, all ps $< .01$. The phonological awareness measure was also significantly correlated with vocabulary in all three groups, $r = .43$ for the Spanish-speaking ELLs, $r = .74$ for the Chinese-speaking ELLs, and $r = .47$ for the monolinguals, all ps $< .01$.

Effect of derivational awareness on vocabulary

To examine whether derivational awareness predicted vocabulary in the three groups of children, we carried out a hierarchical regression analysis for each group separately. In the regression model, we entered age and grade in Step 1, nonverbal ability in Step 2, phonological awareness in Step 3, word reading in Step 4, and the two morphological awareness measures in Step 5. In the initial analyses, we included interactions between grade and each of the two morphological measures in Step 6. Because the interaction terms were not significant in any of the models, they were excluded from the final analyses. The results of the final regression models are presented in Table 3.

For the Spanish-speaking ELLs, age, grade, and nonverbal ability explained 20% of the variance in vocabulary. Phonological awareness entered in Step 3 was not a significant predictor. Word reading accounted for additional 5% of the variance in step 4, and the two morphological awareness measures in the last step contributed 16% of unique variance in vocabulary. For the Chinese-speaking ELLs, variables in the first two steps accounted for 18% of the variance in vocabulary. Phonological

Table 2 Correlations among all measures for Spanish-speaking ELLs, Chinese-speaking ELLs, and monolinguals

	1	2	3	4	5	6	7	8	9
Spanish-speaking ELLs (*n* = 89)									
1. Age in months	1								
2. Maternal education	−.19	1							
3. Months in Canada	.18	−.07	1						
4. Nonverbal ability	.46**	−.07	.16	1					
5. Phonological awareness	.39**	.19	.07	.34*	1				
6. Morphological production	−.17	.20	−.06	.08	.08	1			
7. Morphological structure	.22*	.19	.27*	.31**	.56**	.21*	1		
8. Word reading	.21*	.18	.02	.31**	.43**	.22	.57**	1	
9. Vocabulary	.52**	.10	−.04	.36**	.43*	.33*	.48**	.43**	1
10. Reading comprehension	.27*	.15	.16	.40**	.50**	.28**	.57**	.52**	.51**
Chinese-speaking ELLs (*n* = 77)									
1. Age in months	1								
2. Maternal education	.03	1							
3. Months in Canada	−.26*	.08	1						
4. Nonverbal ability	.26*	.21	.09	1					
5. Phonological awareness	−.04	.25*	.53**	.40**	1				
6. Morphological production	−.34**	.30**	.29*	.17	.49**	1			
7. Morphological structure	.00	.35**	.46**	.54**	.86**	.49**	1		
8. Word reading	−.01	.36**	.44**	.50**	.76**	.52**	.81**	1	
9. Vocabulary	.14	.35**	.37**	.51**	.74**	.55**	.78**	.76**	1
10. Reading comprehension	.08	.37**	.40**	.59**	.80**	.40**	.81**	.72**	.71**
English monolinguals (*n* = 78)									
1. Age in months	1								
2. Maternal education	−.24*	1							
3. Months in Canada	.96**	−.23*	1						
4. Nonverbal ability	.35**	.26*	.33**	1					
5. Phonological awareness	.37**	.25*	.39**	.50**	1				
6. Morphological production	−.17	.28*	−.12	.29**	.36**	1			
7. Morphological structure	.46**	.27*	.43**	.57**	.66**	.43**	1		
8. Word reading	.22	.23*	.23*	.49**	.58**	.48**	.51**	1	
9. Vocabulary	.32**	.08	.31**	.44**	.47**	.41**	.53**	.63**	1
10. Reading comprehension	.20	.37**	.23	.58**	.61**	.47**	.61**	.58**	.52**

* $p < .05$; ** $p < .01$

Table 3 Regressions examining the role of morphological awareness in vocabulary for Spanish-Speaking ELLs, Chinese-speaking ELLs, and monolinguals

Step and predictor	Spanish-speaking ELLs				Chinese-speaking ELLs				Monolinguals			
	General model summary		Coefficients		General model summary		Coefficients		General model summary		Coefficients	
	ΔR^2	ΔF	β	t	ΔR^2	ΔF	β	t	ΔR^2	ΔF	β	t
1. Age	.16	8.03**	.43	1.35	.00	.06	−.23	−.93	.14	6.07**	.39	1.17
Grade			−.22	−.68			.20	.80			−.30	−.89
2. Nonverbal ability	.04	3.63	.06	.63	.18	16.33***	−.11	−1.49	.16	17.27***	.09	.87
3. Phonological awareness	.01	1.45	−.02	−.17	.16	18.32***	.00	.01	.08	10.02**	.02	.20
4. Word reading	.05	5.00*	.06	.48	.23	38.88***	.18	1.59	.02	2.41	.00	.01
5. Morphological production	.16	10.98***	.42	3.75***	.19	28.31***	.69	5.92***	.12	9.25***	.39	3.15**
Morphological structure			.10	.87			.12	1.13			.31	2.66*

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

Table 4 Adjusted means (standard errors) of cognate and non-cognate items selected from the PPVT test for Spanish-speaking ELLs, Chinese-speaking ELLs, and monolinguals

Measures	Spanish-speaking ELLs			Chinese-speaking ELLs			Monolinguals		
	Grade 4 n = 39	Grade 7 n = 50	Combined n = 89	Grade 4 n = 36	Grade 7 n = 41	Combined n = 77	Grade 4 n = 39	Grade 7 n = 39	Combined n = 78
Cognate	75.02 (2.24)	76.34 (1.88)	75.68 (1.45)	67.66 (2.11)	64.01 (2.01)	65.84 (1.54)	79.82 (2.02)	82.07 (2.01)	80.94 (1.41)
Non-cognate	77.05 (1.52)	79.13 (1.20)	78.12 (1.00)	77.84 (1.43)	74.84 (1.43)	75.68 (1.4)	84.07 (1.37)	87.22 (1.37)	85.72 (.96)

awareness in Step 3 added 16% of the variance. Word reading explained additional 23% of the variance in Step 4. Above and beyond these controlled variables, the two morphological awareness measures in Step 5 uniquely contributed 19% of the variance to vocabulary. For the monolinguals, the variables in the first two steps explained 30% of the variance, phonological awareness in Step 3 explained 8% of the variance, whereas word reading entered in Step 4 was not a significant predictor. The two morphological awareness measures entered in the last step explained additional 12% of the variance in vocabulary knowledge.

The final beta weights reported in Table 3 indicated that morphological production was the only significant predictor of vocabulary for both the Spanish-speaking ELLs, $t = 3.75$, $p < .001$, and the Chinese-speaking ELLs, $t = 5.92$, $p < .001$. Both morphological production and morphological structure were significantly predictive of vocabulary for the monolinguals, $t = 3.15$ and $t = .2.66$, respectively, $ps < .01$.

Comparing the three groups' performance on cognate and noncognate vocabulary

To examine the role of cognate awareness in Spanish-speaking ELLs' acquisition of vocabulary knowledge, we compared the performance on cognate and non-cognate items selected from the PPVT test across the three groups of children. Table 4 presents the adjusted means and standard errors on cognate and non-cognate items as a function of language and grade after controlling for nonverbal ability. As displayed in the table, the Spanish-speaking ELLs performed better than the Chinese-speaking ELLs on cognate items, while the two groups scored similarly on non-cognate items. However, both ELL groups scored lower than the English-speaking monolinguals on either type of items.

A 2 (type of item: cognate vs. non-cognate) × 3 (language background: Spanish vs. Chinese vs. English) × 2 (grade: 4 vs.7) repeated measure ANCOVA was performed on the selected English vocabulary items. Nonverbal ability was used as a covariate. The results showed a significant main effect of type of item, F (1, 237) = 26.85, $p < .001$. Overall, children performed better on non-cognates than on cognates. Although the cognate and non-cognate items were matched on frequency based on the Educator's Word Frequency Guide (Zeno et al., 1995), the mean frequency of non-cognates was descriptively higher, which may provide an explanation for the better performance on these items. The main effect of language background was also significant, F (2, 237) = 30.81, $p < .001$.

The main effects of item type and language background were subject to a significant interaction between the two factors, F (2, 237) = 10.81, $p < .001$. Follow-up analyses revealed that for cognates, monolinguals scored higher than both the Spanish-speaking ELLs, $MD = 1.26$, $p < .001$, and the Chinese-speaking ELLs, $MD = 3.63$, $p < .01$. The Spanish-speaking ELLs also scored higher than the Chinese-speaking ELLs on cognates, $MD = 2.36$, $p < .001$. For non-cognates, the monolinguals performed better than either the Spanish-speaking ELLs, $MD = 1.82$, $p < .001$, or the Chinese-speaking ELLs, $MD = 2.25$, $p < .001$, with no significant difference between the two ELL groups. The main effect of grade was not significant, neither was the interaction between grade and type of item or between grade and language background.

Effect of sociocultrual factors on cognate and noncognate vocabulary

We then investigated the effects of maternal education and length of residence in Canada on ELLs' performance on cognate items and noncognate items, and on the overall performance on the PPVT test through three separate hierarchical regressions. These analyses were only conducted for the Spanish-speaking ELLs and the Chinese-speaking ELLs. In all models, we entered age and grade in Step 1, nonverbal ability in Step 2, maternal education in Step 3, and months in Canada in Step 4. Initially, we included the interactions between grade and maternal education and between grade and months in Canada in Step 5. These interaction terms were subsequently removed from the final models because they were not significant. The models are summarized in Table 5.

Table 5 Regressions examining the effect of nonverbal ability, maternal education and months in Canada on cognate items, non-cognate items, and PPVT for Spanish-speaking ELLs, Chinese-speaking ELLs, and monolinguals

Step and predictor	Spanish-speaking ELLs				Chinese-speaking ELLs			
	General model summary		Coefficients		General model summary		Coefficients	
	ΔR^2	ΔF	β	t	ΔR^2	ΔF	β	t
Cognate vocabulary								
1. Age	.12	5.13**	.67	1.83	.01	.20	.30	.78
Grade			−.52	−1.42			−.19	−.50
2. Nonverbal ability	.09	8.47**	.35	2.94**	.12	9.25**	.22	2.12*
3. Maternal education	.00	.34	.06	.57	.01	.94	−.01	−.14
4. Months in canada	.00	.01	−.01	−.09	.27	29.91***	.58	5.47***
Noncognate vocabulary								
1. Age	.14	6.32**	.36	1.00	.01	.29	−.11	−.30
Grade			−.13	−.36			.10	.26
2. Nonverbal ability	.04	3.69	.24	2.09*	.15	11.87**	.29	2.90**
3. Maternal education	.02	2.14	.16	1.57	.06	5.07*	−.16	−1.66
4. Months in Canada	.05	4.52*	.22	2.13*	.24	28.30***	.54	5.32***
PPVT								
1. Age	.14	6.53**	.50	1.37	.00	.06	.02	.06
Grade			−.24	−.64			.06	.17
2. Nonverbal ability	.03	3.13	.23	1.92	.13	9.55**	.22	2.21**
3. Maternal education	.01	1.13	.11	1.06	.02	1.56	−.04	−.42
4. Months in Canada	.00	.01	.01	.08	.31	36.43***	.61	6.04***

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

As shown in Table 5, for the Spanish-speaking ELLs, maternal education was not a significant predictor of any of the three regressions, when it was entered in step 3 after age, grade, and nonverbal ability. Months in Canada, entered in the last step, predicted 5% of unique variance in non-cognate items. However, this variable was not a significant unique predictor of either cognate items or the overall performance on PPVT. For the Chinese-speaking ELLs, maternal education entered after age and grade was not a significant predictor of any of the three regressions, whereas months in Canada, entered in the next step, explained 20–30% of the unique variance in cognate and non-cognate items, as well as in the overall performance of PPVT.

Discussion

The present study evaluated the impact of two metalinguistic factors, derivational awareness and cognate awareness, and the impact of two sociocultural factors, maternal education and length of residence in Canada, on ELLs' vocabulary knowledge. It was among the first efforts to examine the effects of metalinguistic and sociocultural factors on literacy development in the same study. Another unique feature of the study was that we compared the vocabulary development of ELLs from two different first language backgrounds, with English-speaking monolinguals serving as the baseline. We hypothesized that derivational awareness would predict vocabulary in both Spanish-speaking and Chinese-speaking ELLs, whereas cognate awareness would enhance cognate vocabulary for Spanish-speaking ELLs. We also predicted that maternal education and length of residence in Canada would be related to ELLs' vocabulary development. The effect of the latter, however, may be smaller on cognate vocabulary in Spanish-speaking ELLs if they can transfer lexical knowledge from their first language. Evidence for each of these hypotheses is now discussed.

Our study provides strong evidence that derivational awareness is associated with vocabulary learning in ELLs. In both Spanish-speaking ELLs and Chinese-speaking ELLs, derivational awareness made a unique contribution to vocabulary after controlling for age, nonverbal skills, maternal education, phonological awareness, and word reading. The finding regarding the Spanish-speaking ELLs confirms that reported in Kieffer and Lesaux (2008). The finding regarding the Chinese-speaking ELLs extends Lam et al. (accepted) to older children in grades four and seven. In our study, the amount of variance in vocabulary explained by derivational awareness was similar in the Spanish-speaking ELLs (16%) and Chinese-speaking ELLs (19%), despite the fact that Spanish and Chinese are quite different in terms of morphological structure. The similarity lends support to the previous finding that the same set of cognitive and linguistic component skills accounts for reading success in ELLs as in monolingual children, regardless of ELLs' language backgrounds (Geva, 2008; Muter & Diethelm, 2001). While the majority of previous studies have focused on phonological processes (e.g., Lesaux & Siegel, 2003; Lipka & Siegel, 2007), our findings extend the framework to include derivational awareness.

Our results underscore the important role of derivational awareness in vocabulary development in ELLs as compared to monolinguals who are native speakers of

English. We found that the amount of variance in vocabulary explained by derivational awareness was slightly larger in Spanish-speaking ELLs and Chinese-speaking ELLs than in English-speaking monolinguals (12%). There are at least two different ways that children acquire new vocabulary. One way is through extensive exposure to oral and written language, which typically applies to high-frequency words; another way is through morphological analysis, which applies to low-frequency complex words (Bybee 1995). Compared to monolinguals, ELLs have fewer opportunities to learn new words through exposure to English. We speculate that ELLs compensate their lack of exposure by relying more on morphological strategies. This type of learning is more likely to occur in intermediate grades and above, when children have already reached a certain level of morphological awareness. This possibility needs to be investigated by future studies.

Given the prominent role that phonological awareness plays in literacy development and the relatively high correlation between phonological awareness and morphological awareness, it is important to show that morphological awareness contributes to literacy development over and above phonological awareness (Casalis, Colé, & Sopo, 2004; Carlisle & Nomanbhoy, 1993; Fowler & Liberman, 1995; Nagy et al., 2006; Shankweiler et al., 1995). The present study is one of the first efforts to provide this evidence for ELLs—Morphological awareness was a unique predictor of vocabulary in both Chinese-speaking and Spanish-speaking ELLs after controlling for phonological awareness. Morphological awareness represents a deep understanding of the relationship between root words and derived words. As such, the contribution of morphological awareness to vocabulary learning tends to increase with age and reading experience (Phythian-Sence & Wagner, 2007; Stahl & Nagy, 2006). By contrast, phonological awareness did not explain unique variance in vocabulary after controlling for morphological awareness in the present study.

Since this study was cross-sectional, it did not provide evidence about whether a causal relationship exists between morphological awareness and vocabulary. As noted previously, this relationship is likely to be bidirectional (e.g., McBride-Chang et al., 2008; Nagy et al., 2003). McBride-Chang et al. (2008) provides empirical support for the reciprocal relationship in a longitudinal study involving 4-year old children who were native speakers of Cantonese, Mandarin, and Korean, respectively. For all three groups of children, morphological awareness measured at the beginning of the study predicted unique variance in vocabulary knowledge 9 months to 1 year later, and vocabulary knowledge also predicted unique variance in subsequent morphological awareness. Future research needs to examine this relationship among older children and children who are ELLs. Nevertheless, because a reciprocal relationship is likely to be present, enhancing ELLs' morphological awareness may be an effective way to increase their vocabulary.

Our study was among the first to directly test the effect of cognate awareness on vocabulary learning. Notably, in our study, the ELLs regardless of their first language background scored lower than the monolinguals on both cognate and noncognate vocabulary. This gap highlights the challenge faced by ELLs in developing vocabulary knowledge. The most exciting finding, however, is that the difference in cognate vocabulary between the Spanish-speaking ELLs and the monolinguals was smaller than that between the Chinese-speaking ELLs and the monolinguals. In other words, cognate awareness is effective in reducing the gap in vocabulary development for Spanish-speaking ELLs. There are several differences between the present study and Proctor and Mo (2009). While Proctor and Mo compared Spanish-speaking ELLs against monolinguals, our study directly compared two groups of ELLs and yielded stronger evidence for Spanish-speaking ELLs' cognate use. Moreover, Proctor and Mo (2009) examined children with reading difficulties, whereas our study focused on typically developing children. Our results provide clear evidence that cognate awareness facilitates vocabulary learning, at least in typically developing Spanish-speaking ELLs.

An interesting feature of Spanish–English cognates is that many low-frequency English words (e.g., *rapid*) that appear in scientific and academic texts have Spanish cognates (e.g., *rápido*) that are frequently used in daily life (Bravo, Hiebert, & Pearson, 2007; Cunningham & Graham, 2000; Proctor & Mo, 2009). Moss (1992) estimated that 30–40% of English words in scientific texts have Spanish cognates, and the more technical a text is, the higher percentage of cognates it contains. Thus, it is likely that awareness of English–Spanish cognates enables Spanish-speaking ELLs to use vocabulary knowledge already developed in their first language to acquire academic vocabulary in English. However, our study cannot confirm this hypothesis because we employed a general vocabulary measure. Future studies should replicate the present study with more dimensions of vocabulary, including academic vocabulary.

Admittedly, an obstacle in applying the cognate strategy is the existence of false cognates, which are words across two languages that are similar in spelling but unrelated in meaning. For example, the Spanish word *embarazado* looks like the English word *embarrassed*, but it actually means *pregnant*. There is some preliminary evidence that distinguishing between true and false cognates presents a challenge for young bilingual children. Chen, Pasquarella, and Deacon (in preparation) showed that when first graders in Canadian French immersion programs were asked to judge whether a pair of words were cognates in English and French, false cognates were mistaken as true cognates about 40% of the time. The Spanish-speaking ELLs in the present study may encounter the same challenge in using the cognate strategy, although, it is possible that as ELLs' reading level increases, so does their ability to identify false cognates. Nevertheless, since the number of true cognates is quite large (see Nash 1997), cognate use should remain to be an effective strategy for vocabulary learning despite the fact that it may occasionally lead to errors.

Future research needs to take into consideration factors that influence the effect of cognate awareness on vocabulary development. One factor is word frequency. Cognate awareness may be particularly useful for learning low-frequency English words for Spanish-speaking ELLs, as many low-frequency English words have high-frequency Spanish cognates. Another factor that needs to be considered is contextual clues. The role of cognates in lexical activation has been shown to be modulated by levels of semantic constraint, i.e., semantic information provided by words surrounding the target word (Duyck, Van Assche, Drieghe, & Hartsuiker, 2007; Libben & Titone, 2009; Schwartz & Kroll, 2006; Van Hell 1998). Cognate facilitation has only been found in contexts with low semantic constraint.

The research on cognate awareness is still in the beginning stage. Little is known about the developmental trajectory of cognate awareness or factors that affect its development. To date, most studies on cognates have involved children in Grade 4 and above. It is important to involve younger children in future studies because cognate awareness may well develop at an earlier age, as shown by Chen et al. (in preparation). It is likely that at least three factors are related to the development of cognate awareness, individual differences in identifying cognates, ELLs' proficiency in L1, and instruction. Our study has demonstrated that use of the cognate strategy is linked to Spanish-speaking ELLs' vocabulary development. Unfortunately, the design of the study and the heterogeneity of the sample do not allow us to examine the factors that affect cognate use. These factors are certainly worthy of future research.

Another line for new research lies in examining the relationship between morphological awareness and cognate awareness. Hancin-Bhatt and Nagy (1994) found that Spanish-speaking ELLs were better at identifying stems of morphologically complex words that were cognates. Thus, the ability to recognize cognates may accelerate the development of morphological awareness. Additionally, there are systematic mappings between English and Spanish suffixes. For example –*al* is a suffix added to a noun root in both English and Spanish to create an adjective (e.g., *environment-environment**al*** in English; *ambiente-ambient**al*** in Spanish). Spanish-speaking ELLs who are aware of these cross-language connections may use lexical knowledge from their first language to enhance morphological learning in English. For example, building on the research reported in the present study, new studies can test these possibilities by comparing the performance between Spanish-speaking ELLs and Chinese-speaking ELLs on morphological complex words that contain cognate and noncogate roots, as well as shared and unique suffixes.

In addition to the cognitive factors, the present study investigated the impact of two sociocultural factors, length of residence in Canada and maternal education, on ELLs' vocabulary development. There was considerable variability in length of residence in our sample. More than 40% of the Spanish-speaking ELLs and more than 80% of the Chinese-speaking ELLs were born outside of Canada. The age of arrival ranged from 14 to 111 months for the Spanish-speaking children ($M = 31.58$ months, $SD = 41.2$) and from 2 to 120 months for the Chinese-speaking children ($M = 80$ months, $SD = 34.9$). These statistics indicate that our sample consisted of ELLs of diverse immigration experience, with many relatively recent immigrants. With respect to maternal education, the average was college for the Chinese-speaking ELLs but high school for the Spanish-speaking ELLs. The parental education levels of the two ELL groups, especially the high education level of Chinese parents, appear to be representative, as they are similar to those reported in previous research (Louie, 2004; OCA and The Asian American Studies Program, 2008; Wang & Lo, 2004).

This study offers intriguing evidence on the effect of length of residence in an English-speaking country, which roughly resembles exposure to English, on the English vocabulary development of immigrant children. Specifically, we found that this effect varied as a function of ELLs' first language background. For Chinese-speaking ELLs, length of residence in Canada was significantly associated with the performance on the cognate items and the noncognate items selected from the PPVT test, as well as with the overall performance on the PPVT test. For Spanish-speaking ELLs, length of residence in Canada was significantly related to noncognate vocabulary. These significant relationships are consistent with the notion that for second language learners, exposure to a language is crucial for vocabulary development in that language, especially when learners' first language has little overlap with the second language.

Interestingly, length of residence in Canada was not related to either the performance on the cognate items or the overall performance on the PPVT test in Spanish-speaking ELLs. The lack of associations here offers additional support to Spanish-speaking ELLs' use of the cognate strategy. It appears that Spanish-speaking ELLs were able to draw on vocabulary knowledge acquired in their first language to learn English words with Spanish cognates, which diminished the effect of length of residence in Canada on these words. On the other hand, exposure to English was still crucial for acquiring English words without Spanish cognates, because first language vocabulary knowledge was not helpful in this case. Taken together, the results on Chinese-speaking and Spanish-speaking ELLs reveal similarities and differences in English vocabulary learning across groups of ELLs from different first language backgrounds.

Paradis (2007) found that compared to younger L1 learners, older learners who began learning English as an L2 after onset of the L1 acquisition accumulated English vocabulary at a faster rate, possibly due to their greater cognitive maturity and an existing lexicon in L1 that facilitated the conceptual-lexical mappings between L1 and L2. It is possible, then, that the ELLs in our study also acquired English vocabulary at a faster rate than the monolingual children. Unfortunately, Paradis (2007)'s hypothesis cannot be tested in the present study because we did not have longitudinal data and there was a large variance in length of residence in our ELL participants, which means that they cannot be divided into reasonably sized subgroups according to length of residence in order to examine the rate of vocabulary acquisition of each subgroup. Nevertheless, this hypothesis should be evaluated by future research.

With respect of maternal education, it is unexpected that this variable did not influence vocabulary development in either Chinese-speaking or Spanish-speaking ELLs in our study. However, the relationship between maternal education and vocabulary development can be quite complex in ELLs. In the present study, this relationship seems to be mediated by home language use. A closer examination of our sample reveals that 98% of the Chinese parents and 92% of the Hispanic parents spoke the first language to their children most of time, and the percentage of first language use at home remained largely similar across parents of different education levels. The lack of variation in first language use at home may explain why maternal education was not related to ELLs' vocabulary development. Interestingly, Cobo-Lewis et al. (2002) observed that parents of low and high SES status spoke the first language at home for different reasons. The former did so because their English proficiency was low. For the latter, it was a conscious decision to maintain their language and culture.

The effect of parental education on second language vocabulary development needs to be systematically investigated by future studies. Most research that has demonstrated the impact of maternal education is directed at early literacy development (e.g., Golberg et al., 2008). Our study involved older ELLs, whose language learning environment and experience was likely to be different from those in the previous research. For future directions, it may be useful to examine the effect of maternal education on vocabulary development while holding the percentage of first language use at home constant. Alternatively, one may compare the vocabulary development of children whose parents have similar levels of education, but different degrees of first language use at home.

Finally, it should be pointed out that other than length of residence in Canada and maternal education, there is a range of sociocultural factors that are worthy of future research, such as immigration experience, language dominance and preference, language learning environment at school, and at home (language input and literacy activities at home). These factors may not only affect ELLs' vocabulary development on their own, but also interact with the factors examined by the present study. In order to be feasible, our study had to be limited to the investigation of a small number of variables. The primary interest of the present study lies in combining metalinguistic and sociocultural factors, rather than in examining as many factors as possible in each of the category. Nevertheless, all the factors mentioned above should be examined by future research.

In sum, our study yielded several important findings. First, it confirmed the strong link between derivational awareness and vocabulary knowledge observed in the previous research, and extended this relationship to two groups of ELLs from different first language backgrounds. At the same time, our study unveiled differences in English vocabulary learning between Spanish-speaking and Chinese-speaking ELLs. While Spanish-speaking children were able to utilize the cognate strategy to learn English words, this strategy was not available for Chinese-speaking ELLs. With respect to the sociocultural factors, length of residence in Canada was significantly related to ELLs' vocabulary development. Interestingly, in Spanish-speaking ELLs, length of residence in Canada only influenced the development of noncognate vocabulary, but neither cognate vocabulary nor overall vocabulary as measured by PPVT, which provides additional evidence for these children's use of the cognate strategy. The differences observed between the two groups of ELLs demonstrate that L2 vocabulary learning is a complex process affected by multiple factors, including both L1 characteristics and the learners' experience, and therefore we must be careful when making generalizations. Finally, our study showed that maternal education did not affect English vocabulary development. The effect of this factor needs to be further investigated.

Several educational implications for vocabulary instruction involving ELLs can be extrapolated from this study. Given the facilitating effect of derivational awareness on vocabulary knowledge observed for both Chinese- and Spanish-speaking ELLs, it appears that immigrant children from diverse first language backgrounds will benefit from explicit and systematic instruction on morphological analysis. The differences in cognate awareness between Spanish- and Chinese-speaking ELLs, on the other hand, highlight the importance of differentiated instruction, as immigrant children from different first language backgrounds bring different skill sets to English vocabulary learning. Teachers should make the cognate relationship between Spanish and English words explicit for Spanish-speaking ELLs, while bearing in mind that this instructional strategy is not useful for all ELLs. In sum, our results suggest that instruction in some aspects of metalinguistic awareness, such as derivational awareness, benefits all learners, while instruction in other areas, such as cognate awareness, benefits only ELLs whose L1 is closely related to English.

Appendix

List of cognate and non-cognate items

Cognate		Non-cognate	
Items	SFI	Items	SFI
Bus	59.1	Writing	62.3
Surprised	57.1	Farm	61.4
Castle	54.9	Empty	59.4
Vehicle	52.9	Trunk	54.4
Gigantic	49.6	Measuring	53.9
Astronaut	49.3	Climbing	53.2
Carpenter	48.8	Digging	53.0
Helicopter	48.6	Knee	52.5
Monetary	46.5	Closet	51.9
Pedal	46.0	Feather	51.6
Consuming	44.7	Hook	51.5
Perpendicular	44.3	Diving	51.1
Pillar	43.1	Knight	49.5
Calculator	43.0	Blazing	47.9
Cascade	42.9	Links	47.8
Incandescent	42.7	Parachute	46.5
Solo	42.5	Appliance	45.7
Penguin	42.3	Peeling	44.1
Adjustable	42.1	Upholstery	40.6
Periodical	40.9	Lecturing	38.6
Clarinet	40.4	Embossed	38.3
Tubular	39.8	Syringe	36.8
Flamingo	38.3	Replenishing	35.0
Rodent	38.2	Awarding	32.5

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