The Association Between Morphological Awareness and Literacy in English Language Learners From Different Language Backgrounds

**Stefka H. Marinova-Todd, Linda S. Siegel, and Silvia Mazabel**

**Purpose:** The main goal of this study was to examine whether the morphological structure of a child's first language determined the strength of association between morphological awareness and reading and spelling skills in English, their second language. **Methods:** The sample consisted of 888 Grade six students who had English as their first language and 244 English Language Learners (ELLs) who came from seven home language backgrounds: Chinese, Filipino, Germanic, Korean, Persian, Romance, and Slavic. Participants were given a series of standardized tests for word reading, reading comprehension, and spelling, and experimental measures of morphological, phonological, and syntactic awareness, as well as reading fluency and reading comprehension. **Results:** The results revealed that children in the ELL groups differed from the English monolingual group mostly on the oral language tasks, but their reading skills were high and equivalent to those of the monolingual group. Moreover, it was confirmed that morphological awareness is important for all aspects of reading and spelling, and its influence is independent of that of phonological awareness and syntactic awareness. **Conclusion:** The associations between morphological awareness and reading and spelling in a second language seem to be influenced by the morphological structure of the home language, such that the association was stronger for children whose home languages were morphologically transparent. **Keywords:** cross-linguistic, ELL, morphological awareness, reading, spelling

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memory and nonverbal cognitive skills, children who are acquiring literacy need to develop an awareness of various patterns in the oral and written language or languages to which they are exposed (Nagy & Anderson, 1999). There is now a substantial body of evidence showing the important role of phonological awareness, or the ability to identify and manipulate segments of sound, in literacy development (e.g., Adams, 1990; Ehri et al., 2001; Lonigan, Schatschneider, & Westberg, 2008; National Reading Panel, 2000; Snow, Griffin, & Burns, 1998). In addition, the size of children's vocabularies, as well as their syntactic awareness, or the ability to recognize and manipulate the morphosyntactic rules of a language, have been shown to contribute to reading (for a review see Marinova-Todd & Uchikoshi, 2010).

More recently, researchers have focused on morphological awareness (MA), or the ability to recognize and manipulate the smallest units of meaning within words and to map them onto graphic symbols (Koda, 2000). For example, someone who has developed MA is able to recognize the words write, rewrite, writer, writing, writes, wrote, and co-wrote, as related to each other (they all have the root write, and their meaning is related to the act of writing). A person with MA also is able to identify the individual prefixes (re-, and co-) and suffixes (-er, -ing, -s) and how they transform the meaning of the root, respectively.

A growing body of evidence has identified MA as an important predictor of reading development in English (e.g., Carlisle, 1995; Deacon & Kirby, 2004; Mahony, 1994; Singson, Mahony, & Mann, 2000). Moreover, studies with English-speaking monolingual children have shown that MA makes a contribution to reading that is independent of that of phonological awareness and orthographic skills (Deacon & Kirby, 2004; Deacon, 2011; Roman, Kirby, Parrila, Wade-Woolley, & Deacon, 2009; Siegel, 2008), and that MA is a significant predictor of skills at the sublexical (pseudoword reading), lexical (word reading, spelling, and vocabulary knowledge), and supralexical level (reading comprehension; for a review, see Bowers, Kirby, & Deacon, 2010).

Some researchers have speculated that the impact of MA might be more prominent on reading comprehension than on word reading, or in the later stages of reading development (e.g., Carlisle, 1995, 2000; Mahony, 1994; Singson et al., 2000); however, empirical studies by Deacon and her collaborators (Deacon, 2011; Deacon & Kirby, 2004; Roman et al., 2009) have shown a significant influence of MA on reading across the full span from Grade one through eight. Other researchers have hypothesized on the direction of the relationship between MA and reading, suggesting that MA and literacy skills are “developmentally interdependent” (Koda, 2000, p. 299), so that MA contributes to the development of reading, but “an extensive exposure to print could lead to better morphological awareness” as well (Kuo & Anderson, 2006, p. 175). A recent longitudinal investigation of this relationship provided an empirical confirmation of the above hypothesis by revealing the bidirectional nature of the relationship between MA and reading accuracy in a sample of English-speaking monolingual children who were tested in Grades two and three (Deacon, Benere, & Pasquerella, 2012).

Increasing evidence (see Table 1 for summary of the relevant studies) also indicates that MA is associated with literacy skills in monolingual students of other languages, such as Chinese (Ku & Anderson, 2003; McBride-Chang, Shu, Zhou, Wat, & Wagner, 2003; Wu et al., 2009), French (Casalis, Deacon, & Pacton, 2011; Casalis & Louis-Alexandre, 2000), Greek (Harris & Giannouli, 1999), and Hebrew (Levin, Ravid, & Rapaport, 1999). Recently, researchers have highlighted the value of cross-linguistic research on the association between MA and literacy (Anderson & Li, 2006; Deacon et al., 2012). Some investigators have compared the within-language associations between MA and reading in two or more groups of children who speak different languages, such as Ku and Anderson (2003), who compared two groups of Mandarin- and English-speaking children in
Table 1. Summary of studies with different languages on the association between MA, PA, and literacy

<table>
<thead>
<tr>
<th>Studies</th>
<th>Grade of Participants</th>
<th>Languages Examined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casalis et al. (2011)</td>
<td>Grades 3 and 4</td>
<td>French\textsuperscript{a,b}</td>
</tr>
<tr>
<td>Casalis &amp; Louis-Alexander (2000)</td>
<td>K, Grades 1 and 2</td>
<td>French\textsuperscript{a,b}</td>
</tr>
<tr>
<td>Deacon (2011)</td>
<td>Grades 1 and 3</td>
<td>English\textsuperscript{a,b}</td>
</tr>
<tr>
<td>Harris &amp; Giannouli (1999)</td>
<td>Grade 1</td>
<td>Greek\textsuperscript{a,b}</td>
</tr>
<tr>
<td>Ku &amp; Anderson (2003)</td>
<td>Grades 2, 4, and 6</td>
<td>Mandarin\textsuperscript{a}, English\textsuperscript{a}</td>
</tr>
<tr>
<td>McBride-Chang et al. (2003)</td>
<td>K and Grade 2</td>
<td>Cantonese\textsuperscript{a}</td>
</tr>
<tr>
<td>McBride-Chang et al. (2005)</td>
<td>Grade 2</td>
<td>Mandarin\textsuperscript{a}, Cantonese\textsuperscript{a}, Korean\textsuperscript{a,b}, English\textsuperscript{b}</td>
</tr>
<tr>
<td>Levin et al. (1999)</td>
<td>K and Grade 1</td>
<td>Hebrew\textsuperscript{a}</td>
</tr>
<tr>
<td>Roman et al. (2009)</td>
<td>Grades 4, 6, and 8</td>
<td>English\textsuperscript{a,b}</td>
</tr>
<tr>
<td>Saiegh-Haddad &amp; Geva (2008)</td>
<td>Grades 3, 4, 5, and 6</td>
<td>Arabic\textsuperscript{a,b}, English\textsuperscript{a,b}</td>
</tr>
<tr>
<td>Siegel (2008)</td>
<td>Grade 6</td>
<td>English\textsuperscript{a,b}</td>
</tr>
<tr>
<td>Wu et al. (2009)</td>
<td>Grades 1, 2, and 3</td>
<td>Cantonese\textsuperscript{a}</td>
</tr>
</tbody>
</table>

\textsuperscript{a}MA (morphological awareness) made a significant contribution in reading.

\textsuperscript{b}PA (phonological awareness) made a significant contribution in reading (if studied).

Grades two, four, and six, and McBride-Chang et al. (2005), who compared four groups of children in Grade two who were speakers of either Mandarin, Cantonese, Korean, or English. In the first case, Ku and Anderson (2003) reported that for both language groups, MA (measured with a compound morphology and derivational morphology tasks) accounted for a significant amount of variance in reading comprehension beyond the amount accounted for by vocabulary knowledge. In the second study, McBride-Chang et al. (2005) found different patterns of association: in the two Chinese groups, MA, and not phonological awareness, significantly predicted word reading (on a character recognition task); in the Korean group, both MA and phonological awareness were positively associated with word reading; and in the English group, only phonological awareness, and not MA, made a significant contribution to word reading. In the McBride-Chang et al. (2005) study, the English MA tasks measured compound morphology and inflectional morphology.

The findings in the English group were in contrast with recent research by Deacon and her collaborators (Deacon, 2011; Roman et al., 2009) who have shown that MA (primarily of inflections and some derivations) and phonological awareness independently influence reading and spelling skills in English. Therefore, it seems that the influence of MA on reading could vary depending on the languages examined (in terms of their morphological structure) and the methods used (the type of MA tested). Thus, a more formal approach to cross-linguistic research, whereby the morphological structure of the languages is examined and the same types of MA tasks are used, is necessary.

The association between MA and reading across languages has been found in elementary school-age students from a variety of first (L1) and second language (L2) combinations, including English speakers learning French as an L2 (Deacon, Wade-Woolley, & Kirby, 2007), English speakers learning Arabic as an L2 (Saiegh-Haddad & Geva, 2008), English speakers of Hebrew as an L2 (Bindman, 2004), and Chinese speakers learning English as an L2 (Cheng, Wang, & Chen, 2005; Pasquarella, Chen, Lam, Luo, & Ramirez, 2011; Wang, Cheng, & Chen, 2006).
results from these studies showed that whether MA in one language would be associated with reading (or spelling) skills in the other depends on the characteristics of the languages involved. When the two languages were alphabetic, such as the case of English (L1) and French (L2) (Deacon et al., 2007), MA in each language had an effect on literacy skills in the other. When the two languages had different morphological and writing systems, the MA in one language, usually the L2, had an influence on the other, but not vice versa. Specifically, only MA in Arabic (L2) explained a significant portion of the variance in English reading (L1) (Saiegh-Haddad & Geva, 2008), and only MA in English (L2) was associated with word reading (Cheng et al., 2005; Wang et al., 2006) and reading comprehension in Chinese (L1) (Pasquella et al., 2011; Wang et al., 2006). Therefore, it is possible that not only the nature of a language is what determines the direction of the transfer of MA, but the morphological system of each language may play a role as well.

Morphological units vary by type and point of development at which they emerge. A child who has developed MA is able to separate the word teacher into its two components, the root word teach, and the suffix -er. This is an example of derivational morphology, where the bound suffix -er changes the meaning and the part of speech of the root teach. Inflectional morphemes typically mark syntactic and semantic relationships between different words in a sentence and do not change the meaning or part of speech of the root (Kuo & Anderson, 2006). For example, the suffix -ed indicates that the verb is in past tense, as in jump–jumped. Derivational awareness develops later than inflectional awareness, and it is argued to play a more important role in vocabulary and reading in the higher grades (Kuo & Anderson, 2006). MA allows children to recognize the smaller parts of words, and to quickly identify them, thus research has shown the role of MA in word reading (Carlisle, 2003; Deacon & Kirby, 2004). Moreover, MA has shown to contribute to reading comprehension by helping children to break down complex words into their constituents, and thus recognize more easily their meaning and or the syntactic role they play in a sentence (Carlisle, 2003). Beyond the early elementary grades, when readers are exposed to a greater number of academic words (e.g., chronology, hypothesize, or mesozoic), which tend to be morphologically complex and less common in oral language, the role of MA on reading comprehension is expected to increase (Kuo & Anderson, 2006). And finally, the role of MA in spelling has been also confirmed with previous research (Deacon, Kirby, & Bell-Casselman, 2009; Kemp, 2006; Masterson & Apel, 2007).

To date, cross-linguistic comparisons of the role of MA on literacy development are very few, only a limited number of languages have been considered within each study, the methods for testing MA have varied greatly, and focus on the morphological characteristics of languages has been limited. Therefore, researchers have highlighted the need for more cross-linguistic research on MA “before we can delineate a comprehensive framework to capture the relationship between morphological awareness and learning to read languages with different orthographies” (Kuo & Anderson, 2006, p. 176). Therefore, the main goal of the present study was to add to this body of research by comparing the MA and literacy skills in English of several groups of children who have different L1s, and to explore whether there are any differences in the relationship between MA and reading and spelling skills based on the child’s L1. The language groups, with the individual languages included in brackets, represented in this study were: Germanic (English, German, Afrikaans, Swedish, Norwegian, Danish, and Dutch), Chinese (Cantonese and Mandarin), Filipino (Pilipino and Tagalog), Romance (Spanish, Italian, and French), Slavic (Serbian, Croatian, Czech, Polish, Slovak, Bulgarian, and Russian), Korean, and Persian. Due to the variety of their morphological structures, a comparison of the morphology of each language or group of languages is warranted.

After reviewing studies that have examined the morphosyntactic awareness of students from specific language backgrounds
who were learners of English as a second language, Lipka, Siegel, and Vukovic (2005) found that there was an effect of the L1 on the outcomes in L2. Thus, they hypothesized that, either children need more time to develop full proficiency in the L2 morphosyntax, or that “there is a positive transfer when the grammatical system of the first language has a more heavily inflected structure than English, such as Arabic or Italian” (p. 45). The languages, or groups of languages, represented in our sample vary in their morphological structure, and Figure 1 shows the distribution of the languages included in the study based on their morphological structures. The languages could be placed on a continuum from morphologically reduced (analytic) languages (e.g., Chinese), to morphologically rich (synthetic) languages (e.g., Korean and Filipino). Of the synthetic languages in the sample, English is closest to Chinese, as its morphological system is more reduced than that of the remaining languages in that group.

Synthetic languages could further be divided based on the degree of their morphological transparency, “which is the degree to which the sound (and the meaning) of a complex word may be recovered from its internal morphological structure” (Saiegh-Haddad & Geva, 2008; p. 484). In morphologically transparent languages (also known as agglutinative) each affix typically represents only one meaning and affixes are strung together with little or no change in their phonological structures (i.e., they remain regular; Payne, 1997). For example, in English the stem “consider” is phonologically and orthographically the same as in “reconsider” and in “reconsidering.” Agglutinative languages tend to have a high rate of affixes per word (i.e., they are morphologically rich). Korean, Filipino, and, to an extent, Persian, are agglutinative languages in our sample. In morphologically opaque languages (also known as fusional) one affix may represent more than one meaning, and often through a derivational process the stems could undergo phonological and/or orthographic change (Payne, 1997; Saiegh-Haddad & Geva, 2008). For example, in English, there is phonological change in the stem between the words “celebrate,” “celebratory,” and “celebration”; there is both a phonological and orthographic change between “decide” and “decision.” In our sample, fusional languages are English and the rest of the languages in the Germanic, the Slavic, and the Romance groups. Saiegh-Haddad and Geva (2008) hypothesized that MA would have

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**Figure 1.** Distribution of the languages included in the study based on their morphological structures.
a stronger positive association with reading in languages that are at the morphologically transparent end of the scale, and less, or no association, in languages that are more morphologically opaque.

Based on the research evidence reviewed above, it became clear that MA is positively associated with most literacy skills in a variety of different languages, including word reading, pseudoword reading, spelling, and reading comprehension. It also is expected that MA would have a greater association with reading comprehension and spelling in the higher elementary grades. Finally, in terms of cross-linguistic influence, several researchers have argued that the morphological structure of the languages involved may predict the degree of association between MA and literacy skills. In particular, in morphologically transparent languages the association is expected to be stronger than in morphologically opaque and analytic languages. However, little research to date has been done in a cross-linguistic context, which highlights a need for more research that systematically examines the role of MA on literacy skills across different languages. The present study aimed to address this need by answering the following two research questions:

(a) How do groups of English-speaking and students learning English as a second language (English Language Learners, or ELLs) compare on measures of metalinguistic and reading and spelling skills in English?
(b) Does the association between MA and different reading and spelling skills in English vary among the different groups based on the morphological characteristics of the L1s?

As the children in this study were in Grade six, we focused our analysis on the connection between MA and reading comprehension and real word and pseudoword spelling, as those were deemed to be skills that are most important for academic success for children at that age. Also, we expected that the association between MA and those literacy skills would be strongest in the groups of children whose L1s are more morphologically transparent.

**METHOD**

**Participants**

The participants were children in Grade six from 30 schools in one urban school district in Canada, which is culturally and socioeconomically diverse. Of this sample, 888 children had English as their first language and 244 had English as a second or additional language (ELLs). The ELLs came from homes where 41 different languages were spoken. As the number of participants coming from some of the languages was very small (less than 10), languages that were structurally and etymologically similar were grouped into their language families. Ultimately, 24 different languages (or language groups) were represented in the sample. Supplemental Digital Content Table 2 (available at http://links.lww.com/TLD/A12) shows the number of children in each language group that were included in the analyses. In addition to the Korean and Persian/Farsi language groups, the Chinese group consisted of both Cantonese and Mandarin; the Filipino group included children who identified Pilipino and Tagalog as their home language; the Germanic group included children who were speakers of German, Afrikaans, Swedish, Norwegian, Danish, and Dutch; the Romance group included children who speakers of Spanish, Italian, and French; and the Slavic group included children who identified Serbian, Croatian, Czech, Polish, Slovak, Bulgarian, and Russian as their home language. Most children attended after-school classes where they learned to read and write in their respective L1.

The ELL students were defined as those whose first spoken language and the language they used almost exclusively at home with their parents, siblings, and grandparents was not English. Most ELLs were immigrants to Canada, although some were born in Canada but did not speak English until they first attended school in Canada. The ELLs receive
the same classroom instruction as their native English-speaking peers, and all the participating schools within the school district were following the same curriculum in English. All participants in this study had been educated in English for at least five years and were deemed to be fluent in English by their teachers. The students came from homes where the socioeconomic status (SES) of the families varied greatly. Students from various SES backgrounds were included in the sample in order to be fully representative of the population that was targeted. Moreover, previous research with this population consistently showed that the association between SES and literacy skills in kindergarten was significant, but it systematically declined and was nonsignificant by Grade three (D’Angiulli, Siegel, & Hertzman, 2004), which was true for both English-monolingual children and ELL children (D’Angiulli, Siegel, & Maggi, 2004).

Students who had a standard score of 85 (1 SD) or lower on the Wide Range Achievement Test—Third Edition (WRAT-3; Wilkinson, 1993) Reading subtest, and/or the Woodcock-Johnson Word Identification task and/or the Woodcock-Johnson Word Attack subtest (Woodcock, 1987) were considered poor readers and were removed from the analysis. The rationale for this decision was twofold. First, in the upper elementary grades, children are expected to be good decoders, and reading comprehension is the primary focus of literacy instruction; therefore, we wanted to control for decoding skills and include only children who met criteria as proficient decoders, in order to examine their reading comprehension skills. Second, as a consequence of the previous point, we treated English word-reading measures as a proxy for vocabulary knowledge. This was based on the rationale that only children who are familiar with the words presented would be able to recognize them quickly and easily. By removing the children who were poor at decoding of English texts, we reasoned that we also were controlling for English language proficiency.

**Tasks**

**Meta-linguistic awareness**

**Morphological awareness**

Morphological awareness skills were measured with two tasks that were originally developed by Singson et al. (2000). Each task consisted of 10 items. The child was asked to select one of four alternative words (or pseudowords) as the correct item that was missing in a sentence. In both experimental tasks the children were asked to read the sentences and then to circle their selections on the answer sheet. A full list of the items is available in Siegel (2008). The Guttman split-half reliability coefficient was .60 (for real words) and .68 (for pseudowords).

**Syntactic awareness**

Syntactic awareness skills were measured with an oral cloze task (Siegel & Ryan, 1988; Willows & Ryan, 1981). The examiner read 20 sentences out loud to the child, each with a missing word. The child was asked to provide a word that created a semantically and syntactically well-formed sentence. The class of the missing words varied, and the test included nouns, adjectives, prepositions, and verbs. The complete task is available in Siegel (2008). The Guttman split-half reliability coefficient was .64.

**Phonological awareness**

Phonological awareness skills were measured with an experimental task of pseudoword sound deletion. The participants were first asked to repeat a pseudoword. Then they were told that they will have to repeat the nonword again, but this time they will have to remove a particular sound from it. For example, the examiner would say “Say mab. Now, say mab without the /b/ sound,” in which case the child’s response should be “ma.” And for a more difficult item, the examiner would say “Say reprepen. Now, say reprepen without /prep/,” in which case the child’s response should be “rement.” Children were asked to remove sounds from the beginning, middle, and end of words. The
test was composed of 30 items and the Cronbach alpha was .82.

**Reading**

**Word reading**

Word reading was tested with two separate standardized measures. The first one was the reading subtest, blue form, of the *Wide Range Achievement Test–3* (WRAT-3; Wilkinson, 1993). Children were asked to read as many words as possible from a list containing words with increasing difficulty (e.g., *in, cat, stretch, triumph*). The task administration was discontinued when 10 consecutive words were read incorrectly. The publisher reported internal consistency reliability coefficient for this subtest was .90. The second test was the word identification subtest of the *Woodcock Reading Mastery Tests–Revised* (WRMT-R; Woodcock, 1987). The subtest consists of a list of words of increasing difficulty (e.g., *is, find, mathematician*) and children were asked to read as many words as possible from the list. The task administration was discontinued when the child failed on six consecutive items within a set. The publisher reported an internal consistency reliability coefficient for this subtest was .90. The second test was the word identification subtest of the *Woodcock Reading Mastery Tests–Revised* (WRMT-R; Woodcock, 1987). The subtest consists of a list of words of increasing difficulty (e.g., *is, find, mathematician*) and children were asked to read as many words as possible from the list. The task administration was discontinued when the child failed on six consecutive items within a set. The publisher reported an internal consistency reliability coefficient for this subtest was .90.

**Pseudoword reading**

Pseudoword decoding skills were tested with the word attack subtest of the WRMT-R (Woodcock, 1987). The subtest consisted of a list of pseudowords with increasing difficulty (e.g., *dee, ap, straced*). Children were required to decode as many pseudowords as possible from the list. The task administration was discontinued when the child failed on six consecutive items within a set. The publisher reported an internal consistency reliability coefficient for this subtest was .91. In the experimental reading comprehension test, the children were given two passages to read and then were asked to answer several multiple-choice questions for each passage. All the information necessary for the child to successfully answer the questions was given in the text; therefore, no background knowledge was required in order for the child to answer the questions correctly.

**Word reading fluency**

Word reading fluency was measured with an experimental task, which used the items from the word identification subtest of the WRMT-R (Woodcock, 1987). Children were presented with the list of real words with increasing difficulty (e.g., *as, because*) and were asked to read as many words as possible within a 1-min period. The number of words correctly read by the child within the 1-min period was used as the score for this task.

**Pseudoword reading fluency**

Pseudoword reading fluency was measured in a manner equivalent to that of real word fluency. Children were presented with a list of pseudowords (e.g., *yee, dreek*) and asked to read as many words as possible within a 1-min period. The list of words was taken from the Word Attack subtest of the WRMT-R (Woodcock, 1987) and the number of words read correctly determined the score for this task.

**Reading comprehension**

Reading comprehension was measured with two tasks, a standardized measure, the reading comprehension subtest of the *Stanford Diagnostic Reading Test–4th edition* (Karlsen & Gardner, 1996), and an experimental measure. The Stanford reading comprehension subtest was administered in groups in each of the participating Grade six classrooms. Each child was asked to read short passages within a booklet and to provide responses to multiple-choice questions within a prescribed time limit. The test measures students’ reading skills in the areas of vocabulary, comprehension, and scanning for information. The publisher’s reported internal consistency reliability coefficient for this subtest was .91. In the experimental reading comprehension test, the children were given two passages to read and then were asked to answer several multiple-choice questions for each passage. All the information necessary for the child to successfully answer the questions was given in the text; therefore, no background knowledge was required in order for the child to answer the questions correctly.

**Spelling**

**Real word spelling**

Real word spelling skills were measured with the spelling subtest of the WRAT-3. This test was administered in groups. The
examiner read aloud real words with increasing difficulty and the children were required to write the words down correctly (Wilkinson, 1993). The publisher reported an internal consistency reliability coefficient for this subtest of .91.

**Pseudoword spelling**

The spelling of pseudowords was measured with the spelling of sounds subtest of the *Woodcock Johnson III Tests of Achievement* (Woodcock, McGrew, & Mather, 2001). This test was also administered in groups. The examiner read aloud pseudowords and the children were asked to write them down. Any acceptable phonetic equivalent was scored as correct. The publisher’s reported internal consistency reliability coefficient for this subtest was .88.

**Procedure**

The complete set of individual tasks, other than the spelling and reading comprehension tasks, was administered in one 30–45 min session and the order of the test presentation was kept constant. Trained graduate students conducted individual assessments in the schools. Each child was assessed individually in a quiet room provided by the school. The spelling and reading comprehension tasks were administered in a group setting in the classrooms. The scoring of the experimental measures was conducted by trained graduate students. For reliability purposes, on each measure, 10% of the scoring was done by two raters independently, and the consistency in the raters’ scores was at least 90%, which was deemed high. The remainder of the scoring was independently completed by each rater.

**RESULTS**

**Group comparisons**

First, the eight language groups were compared on their performance on all of the meta-linguistic, reading, and spelling measures. A series of one-way analyses of variance (ANOVA) with language group as the between-subjects variable was conducted on all the measures included in the study. The descriptive statistics and the individual ANOVA F-test results are reported in Supplemental Digital Content Table 2 (available at http://links.lww.com/TLD/A12).

An examination of the results in Supplemental Digital Content Table 2 (available at http://links.lww.com/TLD/A12) indicated that there were group differences on the measures of syntactic awareness, the two MA tasks, the two spelling tasks, the two reading comprehension tasks, and only on one of the reading tasks, namely the word identification task. Post hoc tests, using the Tukey’s HSD, revealed five relationships of interest.

First, on the syntactic awareness measure, the English and the Germanic group were similar in that they both had significantly higher scores than the Chinese, Filipino, Korean, and Persian groups. The Korean group had significantly lower scores than all the other groups, and the Slavic group had higher scores than the Persian group. All other group comparisons were not significantly different.

Second, on the MA measure with real words, only the Korean group again had scores that were significantly lower than those of all the other groups. On the MA measure with pseudowords, the English group had significantly higher scores than the Persian group only, and the Slavic group had significantly higher scores than the English, Romance, Korean, and Persian groups. However, an examination of the individual scores of the Slavic group, revealed the presence of a possible ceiling effects, especially on the MA measure with real words, where all the scores, but one, were 9 or 10 (the maximum), therefore, these comparisons should be interpreted with caution.

Third, on the Stanford reading comprehension measure, the English group had higher scores than the Korean and Persian groups, the Chinese group had higher scores than the Filipino, as well as the Korean and Persian groups, and the Slavic group had higher scores than the Persian group only. On the Experimental reading comprehension measure,
the Persian group again had lower scores than the English and Chinese groups.

Fourth, on the real word spelling measure, the Chinese group had higher scores than the Persian group, and on the pseudoword spelling measure, the English group had higher scores than the Korean group.

Fifth, on the only reading measure that yielded significant differences, word identification, the Korean group had lower scores than both the English and Slavic groups.

To summarize, the group comparison across all the measures that yielded significant results, revealed that the English group tended to have higher scores than some of the other groups on seven out of the eight measures, and the next group to follow was the Slavic group, which had higher scores than at least one other group on five of the eight measures. On the other end of the spectrum, the Persian group had lower scores than at least one other group on five out of the eight measures, and the Korean group had low scores on six out of the eight measures.

The influence of morphological awareness on reading and spelling

Next, a series of Pearson correlations were calculated among the different measures for the English group and all the ELL groups together. All the correlations were statistically significant at the .05-level for both groups, and they were of small to medium magnitude. The correlation between the word and pseudoword morphological tasks was .58 for the ELL groups combined and .48 for the English group, indicating that these tasks were related but were still measuring somewhat different abilities. Therefore, the two measures will be analyzed separately.

Next a series of multiple regression analyses were performed where the phonological awareness and MA tasks for real words tasks were regressed on the reading and spelling outcome variables for the ELL groups combined. The results are presented in Supplemental Digital Content Table 3 (available at http://links.lww.com/TLD/A12). The predictor for phonological awareness was entered first, and then in a separate step the predictor for MA was entered in the model. As can be seen from the table, MA made an independent contribution to all the reading and spelling tasks that was over and above the contribution of phonological awareness skills.

Supplemental Digital Content Table 4 (available at http://links.lww.com/TLD/A12) shows the equivalent multiple regression results when syntactic awareness was entered first, and in a separate step MA was entered second. In all cases, MA contributed significant independent variance to reading and spelling tasks over and above the contribution of syntactic awareness.

As we were interested in differences among the various ELL groups in the sample, we calculated a series of Pearson correlations between each of the two morphological tasks on one hand, and the Stanford reading comprehension test and the real word spelling test, on the other hand, for each language group separately (the results are presented in Table 5). The reading comprehension and the real-word and pseudoword spelling tests were chosen, because they measure skills that are core literacy skills expected of the students in Grade six, namely to be able to successfully comprehend a written text, and to be able to spell words in English.

From Table 5 it became apparent that MA was significantly associated with reading comprehension in almost all of the groups, but the Slavic group. In terms of strength of the association, the values of the Pearson r’s were relatively weak, with the exception of the Filipino, Germanic, Korean, and Persian groups, where the values of at least one of the MA tasks were moderately correlated (r > .50) with reading comprehension.

The patterns in the associations between MA and real word spelling were similar. In terms of strength of association, the values of the Pearson r’s were highest in the Filipino group, and there was no association in the Slavic group. Finally, the correlations between one of the MA tasks and pseudoword spelling were at least moderate in the Filipino and Persian groups, and there were no
Table 5. Correlations between morphological awareness measures, and reading comprehension and spelling tests for all language groups

<table>
<thead>
<tr>
<th></th>
<th>English</th>
<th>Chinese</th>
<th>Filipino</th>
<th>Germanic</th>
<th>Korean</th>
<th>Persian</th>
<th>Romance</th>
<th>Slavic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$N = 888$</td>
<td>$N = 46$</td>
<td>$N = 21$</td>
<td>$N = 18$</td>
<td>$N = 44$</td>
<td>$N = 57$</td>
<td>$N = 37$</td>
<td>$N = 21$</td>
</tr>
<tr>
<td>Stanford reading comprehension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA real words</td>
<td>.39***</td>
<td>.35*</td>
<td>.62**</td>
<td>.39</td>
<td>.51***</td>
<td>.68***</td>
<td>.39*</td>
<td>.07</td>
</tr>
<tr>
<td>MA pseudowords</td>
<td>.41***</td>
<td>.46**</td>
<td>.49**</td>
<td>.70**</td>
<td>.60***</td>
<td>.51***</td>
<td>.27</td>
<td>.15</td>
</tr>
<tr>
<td>Real word spelling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA real words</td>
<td>.41***</td>
<td>.59***</td>
<td>.71***</td>
<td>.53*</td>
<td>.60***</td>
<td>.59***</td>
<td>.61***</td>
<td>-.10</td>
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<tr>
<td>MA pseudowords</td>
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<td>.41**</td>
<td>.72***</td>
<td>.64**</td>
<td>.44**</td>
<td>.45**</td>
<td>.30</td>
<td>.45*</td>
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<tr>
<td>MA real words</td>
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<td>.36*</td>
<td>.64**</td>
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<td>.48**</td>
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<td>.46**</td>
<td>.31</td>
<td>.19</td>
<td>.39**</td>
<td>.24</td>
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</tr>
</tbody>
</table>

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

significant associations in the Slavic and Germanic groups.

DISCUSSION

The main goal of this study was to compare the performance of ELL children who came from a variety of L1 backgrounds on various meta-linguistic and literacy measures, and to reveal the potential role that the morphological structure of the L1 could have on the association of MA and literacy skills across the different language groups. In answering the first research question, it was apparent that the English monolingual group had higher scores than most of the other language groups only on the syntactic awareness measure. Although there were no group differences on the phonological awareness task, the Korean group, and to some extent, the Persian group, had lower scores on the MA tasks. Finally, of all the ELL groups, the Slavic group tended to score higher than some of the other groups on most of the measures.

These results suggest that by Grade six, students may have reached equivalent levels on phonological awareness, and it is only syntactic awareness and MA that is still developing in some of the ELL groups. This finding supports the hypothesis put forward by Lipka et al. (2005), and is also consistent with previous research suggesting that phonological awareness skills peak before MA and syntactic awareness (Kuo & Anderson, 2006). Despite the group differences on some of the meta-linguistic tasks, it was striking that on the standardized measures of reading, the children in all groups were doing very well, scoring within the average range, and generally well above the mean. On the literacy measures that revealed group differences, only the Korean (on word identification, Stanford reading comprehension, and pseudoword spelling tasks), and Persian group (on the Stanford reading comprehension task) had lower scores than the English monolinguals.

The generally high performance of the ELLs could be explained with the school system in which the children are being educated. In the early grades within this school district, a high-quality phonological awareness and oral language development program is being used for all students, along with an extensive program for teaching reading comprehension skills in the later grades. It is possible that the children in the Korean and Persian groups had lower oral proficiency in English, but also these results might reflect the influence of the morphological structure of the students' L1s (both Korean and Persian are agglutinative languages) being different from English (a
fusional language). It may be possible, as well, that the presence of different writing systems (Persian is an alphabetic language which uses predominantly an Arabic script, and Korean has a syllabary-like writing system) contributed to the students' weaker performance, albeit within the normal range.

Based on their review of the literature, Kuo and Anderson (2006) established that MA is more important for reading comprehension than for decoding, and that “the development of different aspects of morphological awareness is language-specific, varying with the productivity of different types of word formations in a language” (p. 178). Therefore, the MA skills developed by children who are also exposed to an agglutinative language are likely to be somewhat different than the MA skill developed by children exposed to a fusion language, as the word-formation processes in the languages would be different. In order to provide further evidence in support of this argument, future studies should aim to test MA skills in the L1, as well as in the L2 of ELLs.

The observed influence of MA on all of the literacy measures included in the study, after controlling for the effect of phonological awareness and the effect of syntactic awareness, confirmed the findings from previous research showing that MA has an independent and significant association with literacy skill in English (Deacon, 2011; Deacon & Kirby, 2004; Roman et al., 2009). This study extended these findings to a diverse sample of ELL students, and confirmed the findings by Siegel (2008) who observed the similar patterns in a combined group of English monolingual and ELLs. As the MA tasks in the present study tested for sensitivity to derivational morphology, it is now clear that this type of MA is indeed helpful in the segmentation and recognition of words, especially for children in the upper elementary grades, who need to read academic texts with more complex and rare words. Moreover, the ability to segment words into their morphological constituents may further ease the load on working memory, and thus facilitate spelling and reading comprehension (Siegel, 2008). However, there were differences among the groups in terms of the strength of the association between MA and reading comprehension and real word and pseudoword spelling, with one likely explanation for these differences being the varied morphological structure of the L1s.

Based on the limited evidence from past research (Saiegh-Haddad & Geva, 2008), we predicted that the influence of MA on reading comprehension and spelling would be stronger for children with L1s that are more morphologically transparent (such as the agglutinative languages Korean, Filipino, and Persian). Our study provided tentative support for this hypothesis; that is, the association between MA and reading comprehension and spelling tended to be stronger in the language groups with L1s that have agglutinative morphology, and there was weaker or no association in the language groups with fusional morphology (e.g., those languages in the Slavic, Germanic, and Romance groups). We know, however, that children in the Korean and Persian group tended to have lower MA skills in English relative to the English group and some of the other language groups. As the MA measures in the current study solely tested for sensitivity to derivational morphology, and fusional languages have a greater proportion of derivational processes, one possible explanation for these findings is that children who were exposed to a fusional language (e.g., English and Slavic languages) had developed a greater awareness of derivational processes, and thus performed better on the MA tasks (noting the possibility of a ceiling effect in the Slavic group).

One surprising result of this study was the lack of association between MA and reading comprehension and spelling in the Slavic group, as the Slavic languages are morphologically rich fusional languages. As noted earlier, upon closer examination of the data, it became apparent that the children in the Slavic group were showing a ceiling effect in their performance on the MA tasks, which could explain the observed lack of association between MA and literacy in this group. However, weak associations between the MA tasks
and the pseudoword spelling were observed in the Germanic group as well, which also is a fusional language with rich morphological structures. Similarly to the Slavic languages, all the languages included in the Germanic group differ from English in terms of orthography, they are orthographically shallow languages, where typically each phoneme is represented by a grapheme and the relationship between the two is consistent and predictable. This is not the case for English, which is orthographically deep language, where one phoneme may be represented with several graphemes (e.g., the phoneme /ʃ/ could be presented graphically with “sh” as in “fish,” “t” as in “nation,” and “c” as in “ magician”), and vice versa.

It is possible that children exposed to shallow orthographies may learn to rely less on MA in their spelling, as the expectation is that spelling is predominantly determined by phonology. However, we did not test for degree of literacy in the L1, and we cannot be sure whether orthography had an influence on the children’s performance. However, as others have argued (Deacon, 2011; Roman et al., 2009), orthographic awareness is another important factor influencing reading and spelling, and therefore future studies should incorporate it into their theoretical underpinning and empirical investigation of literacy development across different languages. In addition, future studies should aim to assess language proficiency and literacy ability formally in the L1s of the ELLs, something that was not feasible in the present study, which included groups speaking more than 20 languages.

**Implications**

This study supports the idea that MA plays a unique role in reading at the word and text levels in English by making word pronunciation and spelling consistent and foreseeable, maintaining the semantic relationships between words, offering a meaning-related strategy to understanding texts, and reducing the load on working memory (Deacon, 2011; Deacon, Wade-Woolley, & Kirby, 2007; Kemp, 2006; Siegel, 2008). Consistent with the literature, the present study stresses the need for redesigning reading education by including explicit instruction on the morphological and syntactic structure of English (Bowers et al., 2010; Siegel, 2008). For example, explicit teaching of derivational and inflectional morphology would aid the ongoing development of syntactic and MA experienced by students in upper elementary. Consequently, word recognition, spelling, understanding of texts, and vocabulary would be enhanced both in ELLs and English monolinguals, even when they have been exposed to good-quality reading instruction over 5 years. The present study tentatively supports the idea that ELLs whose first language is agglutinative, along with those who have been exposed to a shallow orthography, would benefit from instruction that raises their awareness of morphosyntax in English (e.g., sensitiveness to derivational morphology).

The present study also highlights the importance of implementing careful and comprehensive assessment practices to understand the relationship between MA and word and text reading performance in ELLs in the upper elementary grades. Ultimately, developing effective instructional designs depends on sound assessment practices. For example, using both expressive and receptive measures of MA, as well measures of derivational and inflectional morphology, both in English and other languages, could better inform the needs of ELLs.

In summary, we have confirmed that MA is important for all aspects of reading and spelling, and we have revealed that its effect is independent of that of phonological awareness and syntactic awareness in a group of ELL children. Moreover, we found some evidence of an effect of the morphological structure of the L1 on the associations between MA and reading and spelling in the L2.

As the sample sizes of the individual language groups were fairly small, we limited our analysis to correlational examinations, thus we echo the statement by Anderson and Li (2006) that there is merit in conducting cross-linguistic research. It would be particularly
important that researchers continue to strive to compare different language groups in order to confirm old and reveal the potential for new transfer effects of MA within and across languages with similar and different morphological structures. Finally, these ELL children developed strong literacy skills in their L2 across a range of L1 types. This is consistent with a view of ELLs as utilizing a variety of strategies when acquiring literacy in the L2, one of which is MA. More research is needed to clarify the exact nature of strategies in the ELL children’s repertoire, and how much their performance in the L2 is limited or supported by the development of both oral and literacy skills in their L1.

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