名古屋学院大学論集　言語・文化篇　第 25 巻　第 2 号　pp. 25-37

The Role of Morphological Awareness in L2 Vocabulary Development in Logographic Languages

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Abstract

The aim of this paper is to synthesize how existing research on morphological awareness (MA) contributes to word knowledge development and how this relationship can be extended to second language learners of logographic languages. Three synthesis questions were addressed: 1) to what extent MA contributes to word knowledge development? 2) to what extent research based on findings in the role of MA can be applied to L1 logographic users? 3) and in turn how these findings can be extended to L2 learners of logographic languages? The findings showed some connection between MA and L2 vocabulary development in both alphabetic and logographic languages, and that L2 adult learners of logographic languages can take advantage of MA as native speakers do in terms of vocabulary development.

FORMULATING THE PROBLEM

For adult native speakers of alphabetic languages, learning logographic languages (i.e., Chinese, Japanese) presents greater challenges than learning other alphabetic languages because of the need to learn new writing systems that sharply contrasts with those used in their native alphabetic languages. Unlike learning to speak, learning to read requires understanding how spoken forms of the language map onto written languages. For instance children who are native speakers of English have to learn that each letter/grapheme corresponds to a phoneme. Phonological awareness (PA), one facet of metalinguistic awareness, facilitates children's understanding of which phonological unit is represented by each graphic symbol. It has been shown that lacking this skill impedes learners' development of literacy skills because it prevents them from extracting phonological information from letter strings and forces them to holistically learn novel words. This principle can be extended to reading development in logographic languages. As empirical evidence for this claim, Ho & Bryant (1997) showed that PA significantly contributed to early literacy development among Chinese-speaking children, suggesting that PA serves as a basis for decoding development in typologically diverse writing systems. Interestingly, however, the contribution of MA to literacy development is greater than PA among Chinese-speaking children (Li et al., 2002; McBride-Chang, 2005).

Both PA and MA are types of metalinguistic awareness that are considered to play a significant

role in children. Although PA has been extensively studied over the decades and its importance has been empirically established, there are fewer empirical studies on MA, and most studies examined English-speaking children. Although in theory, MA in logographic languages contributes to reading development more significantly than PA, it is unclear to what extent the findings from English studies can be extended to adult second language learners of logographic languages. The aim of this paper is to synthesize how MA contributes to word knowledge development and how this relationship can be extended to second language learners of logographic languages.

THEORETICAL BACKGROUND

1.1. Morphological Awareness

Morphological awareness refers to learners' sensitivity to morphological features as well as their abilities to manipulate intraword morphological information. Such abilities include recognizing that words can be segmented into smaller, functionally identifiable elements; mapping these elements onto graphic symbols; and assembling and dissembling segmental intraword information (Koda, 2000). English, for instance, is a morpho-phonemic language in which words are represented in both units of sound and meaning. In the English writing system, morphemic information is represented in the same graphic form regardless of pronunciation. For instance, "heal" and "health" share a root morpheme but have different pronunciations. Skilled readers of English are capable of not only segmenting words but also extracting and utilizing morphological information in the process of visual word recognition. Hence, MA is considered to be a major factor in separating more and less proficient readers, and as illustrated above, it is not surprising MA contributes significantly to vocabulary development in English.

However, the contribution of MA to English acquisition is not as useful as MA in Chinese and Japanese. Both Chinese and Japanese writing systems use logography, in which each character provides not only phonological but also semantic information. Many words in Japanese and Chinese are consist of more than one character containing semantic information. Therefore, their writing systems allow readers of Japanese and Chinese to infer the meaning of words without knowing their pronunciations. Furthermore, readers can infer the meaning of unknown characters. Approximately 85% of modern Chinese characters are semantic-phonetic compounds that consist of two main components (Shu et al. 2003; Shu & Anderson, 1997). One is a semantic component (radical) that provides information about the meaning of the character. The other, a phonetic component (phonetic), provides information about its pronunciation.

Radicals contribute meaning to compound characters to varying degrees depending on their semantic transparency. Semantic transparency refers to the contribution of a radical to the meaning of a semantic-phonetic compound. Hence, the more semantic information a radical provides, the more

transparent a character becomes. Highly transparent characters have the same specific meaning as their radicals. Less highly transparent characters belong to the same category as the radical, but do not share the same precise meaning. Sometimes the radical is directly or indirectly related to the meaning of the character. In less transparent characters, the extended meaning of the character is only directly or indirectly related to the radical. In some cases, the meaning of the character is unrelated to that of its radical, and the radical itself may even be difficult to define in certain cases. However, in a large number of characters, the radical provides at least partial, if not precise, semantic information.

The concept of a radical family may help native readers form insights into the function of semantic radicals. A radical family is the set of all characters containing the same radical, including the radical when it is used as an independent character. An independent radical has both meaning and pronunciation, though a bound radical has meaning but no pronunciation. The most productive radicals tend to be bound, and most of the largest radical families have bound radicals. Hence, these radicals are highly familiar to native readers.

Any writing system has irregularities and exceptions, but there is indeed a logic and orderly structure to the internal structure of characters. Characters are not randomly drawn but are built up from smaller units (strokes) that comprise larger components (radicals, phonetics, and subcomponents), and these larger components have identifiable regularities that metalinguistically aware readers can use to understand the basic function of characters in terms of where they appear.

However, although the internal structure of characters plays a key role in skilled Chinese reading (Shu & Anderson 1997), few studies have systematically looked at the role of radicals in Chinese reading development (Ho, Ng & Ng 2003). Although the terms "radical awareness" has been used in some studies, its definitions have varied. Radical awareness has been described as encompassing various facets of radical knowledge such as phonetic and structural knowledge and most, if not all, descriptions include semantic radical knowledge (McBride-Chang et al., 2003; Shen & Ke, 2007; Shu & Anderson, 1997). When defined to include knowledge of the semantic radical, radical awareness can be said to be one aspect of MA (McBride-Chang et al. 2003).

1.2. Morphological Awareness and Vocabulary Development

Reading researchers have confirmed the relationship between MA and reading skill. Specifically, it is considered to play a significant role in vocabulary knowledge development (Carlisle, 1995; Ku & Anderson, 2003; Nagy & Anderson, 1984; Sandra, 1994). Vocabulary knowledge is a multifaceted construct defined by researchers in different ways. A word entails multiple forms of linguistic information, such as phonological information, graphic forms (spellings), semantic information and grammatical functions. Among these aspects of vocabulary knowledge, MA is considered to contribute most strongly to the semantic aspect of vocabulary knowledge because if allows readers

to infer the meaning of unknown words by extracting and utilizing morphological information represented in written forms.

Children's abilities to infer the meaning of words are strongly associated with their vocabulary knowledge development. Approximately 60% of the new words English-speaking children encounter in reading material at schools are morphologically complex words. In case of English, about half of the time, readers are successful in inferring the meaning of words based on morphological information provided by the spelling. In this way, readers' capabilities to analyze the internal constituents of words will allow them to extract the semantic information provided in the word. Thus, in turn, will increase the chances of acquiring the meaning of new words (Koda, 2005).

The importance of incidental vocabulary learning lies in the fact that most L1 vocabulary acquisition takes place through reading (Nagy, Herman & Anderson, 1985; Nation & Coady, 1988). Vocabulary acquisition takes place incidentally as a by-product of reading, as this is the place where more difficult or less-frequent words will appear (Paribakht & Wesche, 1997). In turn, in the L2 acquisition area, vocabulary gains have also been mainly associated with reading (Horst et al., 1998, Hulstjin et al., 1996, Nation, 1990; Rott, 1999, Schmitt, 2000). Word meaning can be aided by contextual clues, information from word elements (i.e., lexical inference), or a combination of both (Mori & Nagy, 1999; Nagy & Anderson 1984).

Incidental vocabulary learning has been defined as a by-product of a cognitive activity that involves comprehension (Gass, 1999, Huckin and Coady, 1999). Just as in L1, this kind of acquisition is a gradual process that takes place after repeated exposures to words in different contexts (Gass, 1999). As Nagy (2000) points out, incidental vocabulary learning relies on repeated encounters with a word and contributes to lexical acquisition in small increments. To reiterate, the relationship between incidental vocabulary knowledge development and lexical inference is very close, and morphological awareness contributes to vocabulary development via lexical inference.

Since MA is the focus of this paper, vocabulary knowledge here refers narrowly to the receptive knowledge of at least the semantic component of a word, but may or may not include knowledge of the other aspects of word knowledge, such as phonological knowledge. Accordingly, vocabulary development will be discussed in terms of learners using lexical inference to guess the semantic meaning of new words, how lexical inference contributes to incidental learning of vocabulary in terms of semantic meanings, and how this in turn leads to vocabulary development. Hence, the contribution of MA to vocabulary development will be described as an indirect process of lexical inference and incidental vocabulary learning.

In theory, MA in logographic languages should contribute to reading development more significantly than PA. However, it is unclear to what extent the findings from English studies can be extended to adult second language learners of logographic languages. The aim of this paper is to examine how MA contributes to word knowledge development and how this information can be extended to second

language learners of logographic languages. Three research questions were created accordingly:

Research Questions

1. To what extent does MA contribute to word knowledge development in L1 speakers of non-logographic languages?
2. To what extent does MA contribute to word knowledge development in L1 speakers of logographic languages?
3. How can findings on the contributions of MA to word knowledge development in both non-logographic and logographic languages be extended to L2 learners of logographic languages?

METHOD

1.1. Inclusion and Exclusion Criteria

A database search of literature was conducted to locate relevant studies. Inclusion criteria for relevant studies were experimental, quantitative studies involving MA. Exclusion criteria were non-experimental, qualitative studies; studies not written in English; technical reports, book chapters, unpublished theses and disserations; and studies that did not examine the relationship between MA and word knowledge development. Databases searched included ERIC, MLA, and PsychINFO. General keywords (e.g., Chinese, Japanese, kanji, logographic languages, morphology, orthography, vocabulary development, vocabulary knowledge, and word development) and more specific terms (e.g., morphological awareness, semantic radical, and word recognition) were used in the search. An initial search of databases yielded 41 relevant studies. However, most of these did not meet the inclusion and exclusion criteria, so multiple refined searches with varying combinations of the above general and specific keywords were conducted to reach the final number of studies used in this synthesis.

1.2. Coding Schema

A coding system was created for analysis of all relevant studies screened from the database search according to the inclusion and exclusion criteria given above. Coding was utilized to further divide the remaining studies into three categories corresponding to their relevance to the three research questions. Each study was coded by the L1 and/or L2 of the participants in the study, the ages of the participants in the study, the facets of MA examined the tasks used in the study to measure MA, the outcome measures, the type of word knowledge examined and the results achieved relevant to MA in terms of the specific research question addresses.

DISCUSSION

1.1 Research Question 1

Research question 1 asks to what extent MA contributes to word knowledge development in L1 alphabetic readers. Five studies were identified for this. Three of the studies focused on English (Carlisle, 2000; Mahony et al., 2000; McBride-Chang et al., 2005), one on Dutch the (Ripens et al., 2008), and one on English-Arabic bilingual speakers (Saiegh-Haddad & Geva, 2008). All the studies found a significant contribution of MA to early literacy development, but to varying degrees. In addition, the results require careful interpretation since different aspects of word knowledge were tested among these studies.

Carlisle (2000) used two MA tasks, segmentation and, derivation. In the segmentation task, participants were asked to remove inflectional affixes from words; in the derivation task, participants were asked to add inflectional affixes. The combined MA scores were entered in a regression model to predict children's abilities to define morphologically complex words, their vocabulary, and reading comprehension skills. When the composite of MA score was entered into the regression model, it significantly explained both third-and fifth-graders' ability to define morphologically complex words and reading comprehension. However, MA did not significantly contribute to vocabulary in either grade.

Mahony et al (2000) studied children in grades three through six. For MA test, children were asked whether 20 pairs of words were related (e.g., happy-happiness). After controlling for vocabularly and grade, the scores of this MA test were significantly associated with children's decoding skills. Further analysis showed that MA contributed significantly to decoding skills, but the size of its unique contribution is numerically smaller than PA (MA expained 5% of the variance in decoding, whereas PA explained 13% of the variance).

Saiegh-Haddad and Geva (2008) examined English Arabic bilingual children in third and sixth grades. They used two MA tasks: segmentation and relatedness. In the segmentation task, children were asked whether pairs of words could be segmented into smaller parts, and then they were asked to say what parts these words were made from. In a relatedness task, children were asked to say whether pairs of words were morphologically related or not. The combined scores of these MA tests were entered in the hierarchical regression model. The results showed that MA significantly contributed to children's decoding abilities in English after partialling out PA and age. However, they could not find a significant relationship in the Arabic data, concluding that the contribution of MA to word reading is smaller in languages with morphologically opaque writing systems (e.g., Arabic) than those with morphologically transparent ones (e.g., English).

Rispens et al (2008) is the only study involving a language other than English. The participants were Dutch first and sixth graders. Four MA tasks were administered: 1) inflectional morphology, 2)

derivational morphology task, 3) lexical compounding task, 4) providing examples of and producing compound nouns. This resulted in four findings: 1) MA plays a more important role in learning to read and spell for sixth graders than for first graders, 2) inflectional MA contributes to reading in first grade and spelling in six grade, 3) lexical compounding MA was not significantly associated with reading or spelling in either grade, and 4) derivational MA plays significant role in reading and spelling in sixth grade.

Despite the preceding findings, it is unclear from the results of these studies how MA affected English speaking children's vocabulary due to the task types used in these studies. Mahony et al. (2000) and Saiegh-Hadded & Geva (2008) used naming tasks as outcome measures to examine participants' word reading abilities, whereas in other two studies (Carlisle, 2000; McBride-Chang et al, 2005) used vocabulary tests as outcome measures. Mahony et al. (2000) used two subtests (a word identification subtest and a word attack subtest) from Woodcock's Reading Mastery Test as outcome measures. Saiegh-Hadded & Geva (2008) adapted three types of naming tasks: real word, pseudo-word, and morphological complex word. The word recognition subtest came from the Wide Range Achievement Test-Revised; the word attack sub test came from Woodcock's Reading Mastery Test. These were used to measure children's abilities to decode real and pseudo-words respectively. For morphologically complex words, only phonologically transparent bi-morphemic words were selected. All naming tests in the two studies were designed to assess participants' abilities to predict the pronunciation of words. However, different types of word-reading abilities are required in these tests depending on the types of words used in the two tests. Participants are required to access their mental lexicons when real words with irregular pronunciations are used, whereas such access is not required for reading pseudo-words. Surprisingly, both studies found MA contributed significantly to word-reading abilities, which may or may not involve semantic processing of word identification. In Mahony et al. (2000)'s study, MA significantly contributed to decoding skills among English-speaking children in grade three through six although its impact is quantitatively smaller than that of PA (MA explained 5% of the variance in decoding, whereas PA explained 13%). Saiegh-Hadded & Geva (2008) found that the composite scores for MA significantly predicted decoding skills among English-Arabic bilingual children. A possible explanation for the absence of an MA benefit is that the vocabulary test (The Vocabulary subtest from the Comprehension Testing Program III from the Educational Records Bureau) in the Carlisle study may not have included morphologically complex words. Since the advantages of MA are limited to words having more than one morpheme, all the studies examined young children (kindergartners to sixth graders) and none of these studies investigated adult readers. It is unclear to what extent their findings of these studies can be extended to cognitively mature adult L2 learners. Adult L2 learners are typically equipped with sophisticated reading skills in their L1.

In summary, the results of these studies showed that MA contributes to word reading in morphologically transparent alphabetic languages; however, the older and more experienced the

learner, the bigger the contribution: That is, older children benefit more from MA than younger children. Therefore, the MA contributes less to literacy in morphogically opaque languages. The only non-alphabetic language in these studies is Arabic, which is also the only morphogically opaque language mentioned. In both English and Dutch, a strong association between MA and vocabulary size is also found.

1.2. Research Question 2

Research question 2 asks to what extent MA contributes to word knowledge development in L1 speakers of logographic languages. Seven relevant studies were identified for this question, all of which examined Chinese native speakers. Like the studies examined for question 1, those for question 2 examined different aspects of word knowledge. To examine how MA affects to each aspect of word knowledge, the, studies were categorized by the type of outcome measure. After recording the type of outcome measure, the seven studies were classified into three groups: 1) decoding (naming), 2) vocabulary knowledge (vocabulary size), and 3) meaning inference skills.

First, the studies by McBride-Chang et al. (2003; 2005) and Chung & Hu (2007) examined the relationship between MA and decoding skills. McBride-Chang et al. (2003) examined kindergartners and second graders whose first language is Chinese. Two MA tests were used: a morphological identification test and a morphological construction test. The outcome measure was Chinese character recognition in which children were asked to read aloud Chinese characters and words consisting of two characters. Hierarchical regression analysis confirmed the contribution of MA to character identification after controlling for PA, oral vocabulary size, visual recognition ability, and rapid number/object naming. A similar design was used by McBride-Chang et al. (2005) to examine the role of MA, PA, and vocabulary in word reading among speakers of Chinese, English, and Korean. Surprisingly, two of the three studies found a significant relationship between MA and real Chinese character/word decoding. Moreover, although PA is more strongly correlated with decoding in Korean-and English-speaking children's data, there was no significant contribution of PA in the Chinese-speaking children's data. The result provides robust empirical evidence that analytical skill with radicals is a more powerful predictor for reading Chinese characters than PA.

Chung and Hu (2007), on the other hand, did not find a relationship between MA and decoding skills. They examined preliterate Chinese-speaking children's MA, they performing three tests related to MA. In the first one, participants heard a spoken bisyllabic word then were asked to choose a word with the same morpheme from a another pair of words. The result showed that MA was evident in the preliterate children even though they had not receive any formal instuction in reading. Moreover, the character-learning task further revealed that MA correlated to character identification in words that were just taught but not to character identification in pseudo-words or words that were not taught, suggesting a lack of causality between MA and character decoding skills. However,

this is not a surprising result considering the ages of the children tested. A substantial amount of reading experience is required to fully develop MA. The children in this study were too young to have developed substantial MA, and more importantly, they had not received formal instruction in reading. To sum up, MA can be said to contribute to Chinese character/word decoding, and this can be extended to all logographic languages including Japanese.

Ku & Anderson (2003) looked at vocabulary knowledge as an outcome measure. They examined children in second, fourth, and sixth grades divided into two main groups: L1 Chinese-speaking and L1 English-speaking children in Taiwan and the United States, respectively. Taiwanese children who developed better MA skills became more proficient readers as they gained reading experience. As predicted, more proficient readers outperformed less-proficient readers on four MA tests1: 1) morphological relatedness, 2) discrimination, 3) radical knowledge application (lexical inference), and 4) radical knowledge application (lexical judgement). The results showed that MA was strongly correlated with vocabulary as well as reading comprehension skill in all age groups, indicating reading proficiency and MA are associated with vocabulary and reading acquisition. Further analysis showed that MA also contributed significantly to reading comprehension after partialling out vocabulary. However, it is premature to conclude a direct relationship between MA and vocabulary size with one empirical instance from a correlational study.

Two studies, Ho et al. (2003) and Ku & Anderson (2001), used a lexical inference test as an outcome measure. Ho et al. (2003) used five MA tasks: 1) character decision task measures character structure knowledge, 2) radicial position judgement task (measuring explicit knowledge of semantic radical position), 3) semantic-relatedness judgement task (measuring knowledge of function of semantic radicals that provide semantic cues for characters), 4) semantic category judgement task (it measures knowledge of semantic categories encoded by semantic radicals), and 5) Pseudocharacter meaning judgement task (measuring overall knowledge of position, function & semantic category of semantic radicals). The participants of their study were children in first, third, and fifth grades. The analysis found that in the third and fifth graders data, MA task scores significantly explained their character meaning inferencing skills. Not surprisingly, however, for first-grade children, only the semantic-relatedness judgement task was highly correlated with word reading. This could be due to their limited reading experience, and accordingly, their not yet fully developed MA.

Ku & Anderson (2001) revealed mixed results for the influence of MA on meaning inference. In the radical awareness test, children were shown two character words and asked to select the correct character among four choices to replace phonetic symbols used in their place for the target character. Results showed that children could incidentally learn characters during normal reading. Children who had more radical awareness understood more characters, especially when the character contained a semantically transparent radical. However, contrary to expectations, radical awareness and phonetic regularity did not contribute to character learning. Characters were easier to learn only when the

participants felf contextual support was strong.

Morphological awareness is belived to be a key element in Chinese and Japanese reading (Ku & Anderson 2003, pp. 401). From the results of the studies examined so far, if seems that in order for children to develop MA, a substantial amount of reading experience is necessary. The results of these studies suggest that, children have already developed substantial MA by the third grade. The relationship between character and word decoding skills and MA seems to be strong, whereas its direct relationship with vocabulary was not yet been confirmed. In theory, the association between MA and vocabulary is mediated by meaning inferencing skills. Although the studies in question 2 generally suggested a causal relationship between MA and inferencing skills, MA alone does not provide reliable information to readers. A combination of character/word internal information and contextual information will produce more adequate information about the meaning of unknown words.

1.3. Synthesis Question 3

Questions 1 and 2 reviewed the studies examining the role of MA in monolingual speakers. Question 3 asks how and to what extent the results of L2 studies as well as findings of previous questions can be extended to the question of the relationship between MA and word knowledge development in L2 learners of logographic languages. Five studies were identified for this question, but only one study, Shen and Ke (2007), directly examined learners' MA. Shen and Ke (2007) studied non-native adult learners of Chinese as a second language. Participants with Asian language backgrounds were excluded. They used two MA tasks, a radical perception test (character decomposition) and a (semantic) radical knowledge test. There were two outcome measures, a radical knowledge knowledge test and a radical application test. Results indicated that the longer they studied the language, the better they performed on both the radical knowledge and application tests. Thus, they concluded that radical awareness aids the learning of new semantically transparent compound characters and is positively associated with learners' lexical inference abilities.

The analyses of questions 1 and 2 suggest that radical awareness is a type of MA and that radical awareness contributes to lexical inferencing in L1 logographic users. Wang, Liu & Perfetti (2004) were interested in whether explicit instruction in semantic radicals helped L2 learners of Chinese infer the meaning of unknown characters. The results of their study indicated that sematic radical knowledge, i. e., RA, can be taught to L2 learners of Chinese. The implication of these findings is that MA in the form of RA can be taught to and used by L2 leaners of logographic languages.

Finally, Mori (2003) studied L1 English-speaking college students learning Japanese as an L2. Participants were asked to guess the meaning of novel kanji compounds either in isolation, with contextual clues only, or with both. Results indicated that learners were most successful when using a combination of both word-internal morphological clues and contextual clues. Hence, this finding is consistent with those of Ku and Anderson (2001) discussed under question 2. Information retrieved

from word/character internal components helps L2 learners infer the meanings of unknown words/characters. Mori's study further revealed that contextual and word-internal clues independently contribute to lexical inferencing skills.

Since there are limited number of existing studies on L2 MA, it is difficult to draw firm conclusions based on the currently available empirical evidence. However, the findings of existing studies generally showed that L2 adult learners of logographic languages profit from radical/MA as L1 logographic readers, and that those who are equipped with MA of the target languages are capable of extracting semantic information encoded in characters and words. Presumably, lexical inferencing skills driven by MA increase the chance of L2 adult learners' incidental vocabulary. Hence, it contributes to their L2 vocabulary development. Furthermore, results indicated that L2 adult learners of logographic languages can learn radical awareness through explicit instruction. Yet, as suggested in Mori (2003) and Ku & Anderson (2001), MA itself does not provide reliable semantic information for inferring the meaning of novel characters/words. Learners were more successful in lexical inferencing when using a combination of both word internal morphological clues (i.e., semantic radicals) and contextual clues. This, in turn, suggests that learners' success in lexical inferencing depends on their both MA and reading comprehension skills. However, due to the limited number of existing studies, it is still unclear how L2 adult learners' MA relates to their vocabulary development.

SUMMARY AND FUTURE RESEARCH AGENDA

The present paper examined the role of MA in L1 vocabulary development in both logographic and non-logographic languages. It also discussed how these findings can be extended to L2 adult learners of logographic languages. Studies on MA in alphabetic languages generally demonstrated its significant role in children's vocabulary knowledge development. Correlations connecting MA, word-reading ability (decoding), and vocabulary size are confirmed, although current research does not clearly explain how they are connected. It is also suggested that, in both alphabetic and logographic languages, development of MA lags behind that of PA in young children. Despite the fact that the emergence of MA is evident even among preliterate Chinese-speaking children, its contribution to reading development gradually increases as children gain reading experience. Yet, once it is established, MA contributes to reading development most significantly in Chinese, and presumably in Japanese. Previous studies also suggested that both L1 and L2 learners were more successful in inferring the meaning of novel words when both contextual clues and word-internal information are used, meaning that both MA and reading experience are key factors in predicting L2 learners' vocabulary development.

Only a handful of L1 studies exist on MA in reading development. However, these studies only focused on elementary school children. Thus, more studies are needed on more advanced

adult learners. Adult learners are quite different from children in terms of cognitive maturation and L1 reading experience. L2 reading studies provided robust empirical evidence showing that metalinguistic awareness transfers across languages.

Some connection is present between lexical inference and MA, but the direct connection between MA and L2 vocabulary development among leaners or logographic languages has not yet been firmly established. To examine whether MA facilitates vocabulary development in L2 logographic languages, some measure needs to devised to separately assess MA, lexical inference, and vocabulary.

References

Carlisle, J. (2000). Awareness of the structure and meaning of morphologically complex words: impact on reading. Reading and writing: an interdisciplinary journal, 12, 169–190.

Carlisle, J. (1995). Morphological awareness and early reading achievement. In L. B. Feldman (Ed.), Morphological aspects of language processing (pp. 189–209). Hillsdale, New Jersey: Erlbaum.

Chung, W. & Hu, C. (2007). Morphological awareness and learning to read Chinese. Reading and writing, 20 (5), 441–461.

Ho, C., Ng, T., & Ng, W. (2003). A "radical" approach to reading development in Chinese: the role of semantic radicals and phonetic radicals. Journal of literacy research, 35 (3), 849–878.

Koda, K. (2005). *Insights into Second Language Reading. A Cross-Linguistic Approach*. Cambridge: Cambridge Applied Linguistics.

Koda, K. (2000). Cross-linguistic variations in L2 morphological awareness. Applied psycholinguistics, 21 (3), 297–320.

Ku, Y., & Anderson, R. (2001). Chinese children's incidental learning of word meanings. Contemporary Educational Psychology, 26 (2), 249–266.

Ku, Y., & Anderson, R. (2003). Development of morphological awareness in Chinese and English. Reading and writing: an interdisciplinary journal, 16 (5), 399–422.

Kuo, L., & Anderson, R. (2008) Conceptual and methodological issues in comparing metalinguistic awareness across languages. In K. Koda & A. Zehler (Eds.) Learning to read across languages (pp. 39–46). Lawrence Erlbaum: Philadelphia.

Laufer, B., & Paribakht, T. (1998). The relationship between passive and active vocabularies: Effects of language learning contexts. Language Learning, 48 (3), 365–391.

Mahony, D., Singson, M., & Mann, V. (2000). Reading ability and sensitivity to morphological relations. Reading and Writing: an interdisciplinary journal, 12 (3), 191–218.

McBride-Chang, C. et al. (2005a). The role of morphological awareness in children's vocabulary acquisition in English. Applied psycholinguistics, 26 (3), 415–435.

McBride-Chang, C. et al. (2005b). Changing models across cultures: associations of phonological awareness and morphological structure awareness with vocabulary and word recognition in second graders from Beijing, Hong Kong, Korea, and the United States. Journal of Experimental Child Psychology, 92 (2), 140–160.

McBride-Chang, C. et al. (2003). Morphological awareness uniquely predicts young children's Chinese character recognition. Journal of educational psychology, 95 (4), 743–751.

Mori, Y. (2003). The roles of context and word morphology in learning new kanji words. Modern language journal, 87 (3), 404–420.

Mori, Y. (1999). Beliefs about language learning and their relationship to the ability to integrate information from word parts and context in interpreting novel kanji words. The Modern language journal, 83 (4), 535–547.

Mori, Y. & Nagy, W. (1999). Integration of information from context and word elements in interpreting novel kanji compounds. Reading research quarterly, 34 (1), 80–101.

Rispens, J., McBride-Chang, C. & Reitsma, P. (2007). Morphological awareness and early and advanced word recognition and spelling in Dutch. Reading and writing, 21 (6), 587–607.

Saiegh-Haddad, E. & Geva, E. (2007). Morphological awareness, phonological awareness, and reading in English-Arabic bilingual children. Reading and writing, 21 (5), 481–504.

Sandra, D. (1994). The morphology of the mental lexicon: Internal word structure viewed from a psycholinguistic perspective. Language and cognitive processes, 9 (3), 227–269.

Shen, H. & Ke, C. (2007). Radical awareness and acquisition among nonnative learners of Chinese. Modern language journal, 91(1), 98–111.

Shu, H. et al. (2003). Properties of school Chinese: implications for learning to read. Child development, 74 (1), 27–47.

Wang, M., Liu, Y. & Perfetti, C. (2004). The implicit and explicit learning of orthographic structure and function of a new writing system. Scientific studies of reading, 8 (4), 357–379.

Wesche, M. & Paribakht, T. S. (1999). Introduction: Incidental L2 vocabulary acquisition: Theory, current research and instructional implications. Studies in second language acquisition, 21, 175–180.