Morphology-based cross language transfer from Korean to literacy acquisition in English and Chinese

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ABSTRACT

This study examined the nature of morphology-based cross language transfer from Korean to reading and writing acquisition in English and Chinese among Korean-speaking 9th graders who had studied English for seven years and Chinese for one year as foreign languages. One hundred and sixty students were administered a set of comparable Korean (L1), English (L2), and Chinese (L3) tasks tapping into morphological awareness, vocabulary, reading comprehension, and writing. Correlation and hierarchical regression analyses revealed that (a) morphological awareness strongly correlated with reading comprehension and writing in all three languages; (b) morphological awareness in Korean significantly contributed to reading comprehension in English and Chinese; and (c) the transfer from Korean morphology to English reading was more likely to occur in students with more advanced English reading skills. No significant transfer was observed in morphological awareness in Korean to writing in English or Chinese. These findings point to the unique morphology-based transfer that facilitated reading comprehension across different orthographies and the importance of proficiency in the target language that determines the occurrence of such transfer in third language acquisition. Finally, learners in an L1 dominant setting are able to apply their general knowledge about shared morphological structure from L1 to reading, not only in L2, but in L3 as well. The empirical results were discussed within the theoretical framework of the Contrastive Analysis Hypothesis and Interdependence Hypothesis.

Keywords: *cross language transfer, morphological awareness, Korean, English, Chinese*

1. INTRODUCTION

The number of living languages spoken throughout the world is estimated to be approximately 6,909 (Lewis, 2009). In many countries such as Switzerland and Canada, there are more bilingual or multilingual individuals than monolinguals and at some stage of their formal education, many students in these countries are reported to have learned a second or a later-acquired language, with such number increasing at a faster rate than the number of monolingual learners (Tucker, 2003). As a result, research in second language (L2) and third language (L3) acquisition is desired to provide a clear understanding of the nature of such acquisition so as to inform language teaching. Although handful studies have been conducted addressing the importance of phonological and orthographic awareness in reading, the role of morphological awareness in learning to read is less investigated, mainly due to the fact that the effect of morphological awareness is more complicated and it requires longer period of time to acquire skills in morphology in comparison to phonology in a given language (Wang, Cheng, & Chen, 2006). Further, cross language transfer has been examined extensively, mostly in an English-as-

second-language (ESL) environment, with the focus on two typologically similar languages, such as English and Spanish (e.g., Lindsey, Manis, & Bailey, 2003; Ramirez, Chen, Geva, & Kiefer, 2010; Sun-Alperin & Wang, 2011); whereas less is known about the transfer that occurs between two typologically distant languages, such as Korean and English, and even less is known about transfers among three languages in a first language (L1)-dominant linguistic setting. Therefore, the purpose of this study is to explore morphology-based cross language transfer from Korean as L1 to literacy acquisition in English and Chinese as L2 and L3, respectively among 160 ninth graders in Korea.

Theoretical Framework

Theories on Cross Language Transfer
Although cross language transfer plays an important role in L2 acquisition, researchers have not yet reached a consensus in regard to its definition and supporting theories. According to Chen and Wang (2011), on one hand transfer is viewed as a reliance on L1 knowledge when L2 is not sufficiently developed (Gass & Selinker, 1983; Krashen, 1983), and is influenced by the structural similarities and differences between L1 and L2 (Odlin, 1989); on the other hand, transfer is not restricted to typological differences and is defined as the ability to use prior learning experiences as a source of knowledge and skills when learning to speak and read in a new language (Genesee, Geva, Dressler, & Kamil, 2006).
Chen and Wang (2011) further noted that research on language transfer may be characterized by two theories: the Contrastive Analysis Hypothesis and Interdependence Hypothesis. The Contrastive Analysis Hypothesis (Lado, 1964) involves identifying the structural similarities and differences between learners' L1 and L2. In other words, transfer from L1 can facilitate L2 development when the two languages are structurally similar to each other, but interference will occur when the structural components of L2 are different from those in L1 (Genesee et al., 2006). Therefore, an analysis of the similarities and differences between two languages enables one to predict difficulties in learning the target language.
The Interdependence Hypothesis, which encompasses two theories: the Competition Model (MacWhinney & Bates, 1993) and the Developmental Interdependence Hypothesis (Cummins, 1979), asserts that all language processing takes place in a common, interactive network of cognitive structures and it is possible that all aspects of L1 can be transferred to L2 (MacWhinney, 2005). Further, the Developmental Interdependence Hypothesis holds that the level of L2 competence a child acquires is partly dependent on the level of competence already achieved in L1, and hypothesizes that transfer will not occur if the child has not reached a certain level of L1 proficiency in which mapping skills have been internalized and automaticized (Koda, 2007). Therefore, while the Contrastive Analysis Hypothesis supports cross language transfer based on linguistic typology, the Interdependence Hypothesis interprets such transfer based on mapping skill, not only in two typologically similar languages (e.g., English and Spanish), but also in two typologically distant languages (e.g., Chinese and English, Korean and English).

Korean and Chinese Typology
The typology among Korean, English, and Chinese are orthographically very different. The Korean typology, the Hangul, was more invented than it was developed, and its letter-phoneme correspondences are completely transparent (Yoon, Bolger, Kwon, & Perfetti, 2000). Wang, Park, & Lee (2006b) described that the nature of Hangul is alpha-syllabic; it maps letters onto phonemes just as English, Russian, and Italian. One significant feature of Hangul is that it is

nonlinear: the composition of letters is shaped into a square like syllable block. The symbols are arranged from left to right and from top to bottom. Each Hangul letter contains between one and eight strokes, compared with English letters that contain between one and four strokes. Taylor and Taylor (1995) pointed out that the uneven visual complexity of Hangul syllable blocks should help recognition because the more varied the visual shapes of graphs, the more easily they are distinguished from one another. In the perspective of the flexibility of morphemes, there is general consensus that L1 or L2 morphemes are more likely to be transferred if they are free rather than bound (Anderson, 1983; Kellerman, 1983). As morphemes of Korean (L1) and English (L2) language are very flexible, this language specific characteristic enables the further discussion on cross language transfer.

On the other hand, Chinese writing system is very unique in many ways. For example, Chinese script follows the morphosyllabic principle for meaning representation, which means each character represents a syllable, a full word or a minimal unit of meaning (morpheme). A character is the smallest units of the Chinese orthography and a visual-spatial unit occupying a fixed amount of space in print, analogous to the English letter in this respect. Nevertheless, rather than being a sound symbol, each character functions as a lexical morpheme carrying a meaning. In other words, characters are primarily meaning symbols, although they can contain phonetic cues; combining them results in words. Because characters are equally spaced, no visual word boundaries can exist (Chen, 1992; 1996). Chinese script has been considered highly opaque, in which the correspondence between characters and sounds is incoherent and inconsistent, contrast with shallow and transparent orthographic systems such as Finnish, Italian, and Spanish, in which phonemes are reliably represented by graphemes (Cheung, McBride-Chang, & Chow, 2006).

Morphological Transfer among English, Korean, and Chinese

Morphology deals with the diverse changes of morphemes, which is the smallest unit of a language that can be associated with the meaning function (Wang, Cheng, & Chen, 2006a). Morphology basically can be categorized into inflectional, derivational, and compound morphology. Inflectional morphology concerns the manner in which words vary to express grammatical contrast in sentences, while derivational morphology focuses on the construction of new words by the use of a prefix, a suffix, and a part of the stem, which matches a morpheme. Compound morphology deals with multi-stem morphemes, unlike inflectional and derivational morphology.

In a comparative study of English, Korean, and Chinese languages, McBride-Chang et al. (2005) examined the roles of phonology and morphology to explain the word recognition skills. It was reported that for Korean, both phonological and morphological skills are important, whereas for Chinese morphological awareness is more important than phonological skills, and for English phonological awareness is more important than morphological skills. However, the importance of morphology in English reading has also been demonstrated by other empirical evidence (Deacon & Kirby, 2004; Wang et al., 2006a). In addition, morphology-based linguistic transfer effects between Korean and English (Wang et al., 2009a) and between Chinese and English (Pasquarella, Chen, Lam, Luo, & Ramirez, 2011; Wang et al., 2006a; Wang, Yang, & Cheng, 2009b; Zhang et al., 2010) have been identified by empirical research.

As was mentioned earlier, despite the fact that cross language transfer in the field of second language learning has been widely studied, its role in third language acquisition still remains relatively unexplored (Cenoz, Hefeisin, & Jessner, 2001), mainly due to the complexity

of the relationships in a three-language acquisition model (De Angelis & Selinker, 2001; Hammarberg, 2001).

Further, the review of literature revealed several limitations that this study sought to address. First, most research has examined linguistic factors in cross language transfer among young learners at the elementary grade level in an English dominant context (e.g., Wang, Cheng, et al., 2006; Wang et al., 2008; Wang, Ko, et al., 2009; Pasquarella et al., 2011). This research, on the other hand, included learners at the secondary school level in a non-English dominant, i.e., EFL learning environment. In an ESL environment, usually a bilingual one, the learner is exposed to English on a daily basis, while most EFL is learned in a monolingual mode in which no linguistic support is provided outside the classrooms. Evidently, the empirical results must be interpreted within a specific context, because cross language transfer is more frequently observed in bilingual settings than in EFL settings, and only at a certain level of learning can one expect the bidirectional transfer to occur (Hammarberg, 2001; Zhang et al., 2010).

Second, few studies have been conducted on cross language transfer between Korean and Chinese, and only limited information is available on simultaneous transfer among Korean, English, and Chinese. The relationships among these three languages are very specific because any combination of two languages is typologically distant.

Thus, the present study is one of the first attempts to investigate morphology-based cross-language transfer within three writing systems, simultaneously. The primary objective was to explore the extent to which morphological awareness in Korean can be transferred to reading and writing in English and Chinese languages among ninth grade Korean speakers in an EFL setting, so as to develop an L3 acquisition model. More specifically, the following questions directed this research:

(1) Can skills in morphological awareness in Korean be transferred to reading and writing in English among ninth grade Korean students?

(2) Can skills in morphological awareness in Korean and English be transferred to reading and writing in Chinese among ninth grade Korean students?

2. METHODOLOGY

Participants

A convenience sampling strategy was implemented to include 160 participants who are 9th graders in Korea, with Korean being their native language. All participants were instructed in Korean, and started to learn English from grade 3 and Chinese from grade 9, with English being a mandatory foreign language, and Chinese a mandatory elective. The average age of these participants was 14 years.

Research Context

In regard to public education, English instruction from third grade in elementary school was instituted as a part of the regular curriculum in 1997. Traditionally, English language education in Korea has focused on grammar, vocabulary, and reading (Lee & Schallert, 1997) with grammar lessons based on syntax, or parts of speech. Therefore, derivational morphological awareness is one of the expected outcomes of the knowledge of grammar in English instruction in Korea.

There are seven other foreign languages (i.e., German, French, Chinese, Spanish, Japanese, Russian, and Arabic) that students can select as a second foreign language in addition to English as they enter secondary school. Recently, however, Korean society has experienced a sweeping zeal for learning Chinese language and schools have also offered more Chinese

language classes than before. According to the Statistical Yearbook of Education (2010), in 2010, 28% of all of public school students chose Chinese as an L3 and this number is expected to continue to increase. Chinese instruction in secondary schools begins in grade nine and continues through grade 11. Normally the class consists of two periods of 45-50 minutes per week devoted to pronunciation, vocabulary, and simple sentences to enhance communication skills. In these classes, students learn simplified Chinese characters and focus on skills in all four language areas, i.e., listening, speaking, reading, and writing. Because more than half of Korean vocabulary is derived from classical Chinese characters, these characters are taught in seventh or eighth grade to facilitate the learning of advanced Korean vocabulary. Chinese language classes and classical Chinese character classes both contribute to the acquisition of compound morphological awareness and vocabulary in Korean and Chinese languages.

Measures

Experimental tasks were designed to evaluate participants' skills in morphological awareness, vocabulary, reading comprehension, and writing in three languages. First, the Standard Test of Proficiency in Korean (S-TOPIK), developed and standardized by the Korea Institute for Curriculum and Evaluation (KICE, 2006) and classified into beginning, intermediate, and advanced levels, was modified to evaluate vocabulary, reading, and writing skills in Korean. Tests of vocabulary and reading in English were adopted from the Woodcock Language Proficiency Battery-Revised (WLPB-R, Woodcock, 1991), which is a standardized battery assessing broad language proficiency in oral language, reading, and written language in English. Tests of vocabulary, reading, and writing in Chinese were developed by the researchers of this study based on school textbook with a format similar to that of the tests of English. Morphological awareness tests were adopted from Wang, Ko, et al. (2009) for Korean and English and from Zhang et al. (2010) for Chinese.

On the contrary to most previous researches on cross language transfer between two similar languages (e.g., English and Spanish), there might be limited shared features to obtain a comparable measurement across three typological distant languages (e.g., English, Korean, and Chinese) since each language has its unique writing system. While Chinese contains many compound words but relatively few inflectional and derivational words, inflection and derivation are known to be very productive in word formation in Western languages (Zhang, Anderson, Li, Dong, Wu, & Zhang, 2010). Korean shares the major types of morphological structures with English and is very productive in derivational word formation (Wang, Ko, & Choi, 2009a). For example, most vocabularies of the Chinese school text book are composed of compounding words. On the other hand, it should be considered three different levels of language proficiency of the participants in this study. For example, considering the proficiency of Korean and English of the ninth grade Korean students, compounding words (e.g., ice + cream = ice cream) are criticized as being too easy, and thus lacking in its assessment function.

Therefore, to obtain a comparable measurement of morphological awareness in Korean, English, and Chinese, we included tasks on derivational morphology in Korean and English, and compound morphology in Chinese. Despite the difference between derivational and compound morphology, both tasks measure an individual's skill in generating morphologically-related words using stable morphemic units of each language. Derivational morphology in Korean and English involves the construction of a new word by adding a morpheme (affix) to change the meaning of a stem morpheme. Compound morphology in Chinese involves two types of structures, i.e., a Noun + Noun and a Verb + Noun. A pilot study was conducted with 20 students,

who were excluded from the subsequent research study, to evaluate all tasks; instructions on English and Chinese tasks were given in Korean.

The overall reliabilities estimates in terms of Cronbach's alpha for all tasks revealed that English and Chinese tasks had higher reliabilities, ranging from .62 to .76, as compared to Korean tasks.

Procedure

All Korean, English, and Chinese language tasks were administered by school language teachers to five classes of 32 students in quiet settings. These 160 students were taught by the same English and Chinese teachers. The administration of the tasks was divided into three sessions, one for each language. Each session lasted approximately 45 minutes devoted to four tasks, including morphological awareness, vocabulary, reading comprehension and writing. Students were given a short break in the middle of each session. The order of the three sessions was counterbalanced among vocabulary, morphological awareness, reading comprehension, and writing. The order of the language tested was also counterbalanced among Korean, English, and Chinese.

Data Collection and Analysis

To answer the two research questions, correlational analysis was conducted first to establish the relationship among measures in all three languages, followed by two sets of hierarchical regression models to examine the cross language transfer from Korean to English and Chinese. The first set included English reading and writing as outcome variables respectively, and English and Korean skills as predictor variables. The second set included Chinese reading and writing as outcome variables respectively, and Chinese, Korean, and English skills as predictor variables. In order to identify the unique contribution of morphological awareness to reading and writing, vocabulary was entered as a predictor variable before morphological awareness. Finally, within each set, comparison analyses were performed between high and low levels of proficiency in L2 and L3.

3. RESULTS

Descriptive statistics are presented in Table 1 with means and standard deviations for Korean, English, and Chinese tasks. In this section, we report findings derived from correlational analysis, followed by regression analysis with English L2 literacy (i.e., reading and writing) and Chinese L3 literacy as dependent variables.

Correlations among Korean, English, and Chinese Measures

As is shown in Table 2, all bivariate correlation coefficients are statistically significant, rs > .33, ps < .001. We observed that consistent within each language, both vocabulary and morphology were more strongly correlated with reading (e.g., $r = .74$ in Chinese) than with writing (e.g., $r = .59$ in Chinese). For cross language correlations, Korean morphology ($r = .72$) and Chinese vocabulary were more strongly correlated with English reading and writing than Chinese morphology ($r = .55$) and Korean vocabulary. Further, English morphology and English vocabulary ($r = .52$) were more correlated with Chinese reading than Korean morphology and Korean vocabulary ($r = .39$), while Korean morphology and Korean vocabulary were more strongly correlated with Chinese writing than English morphology and English vocabulary.

English (L2) Reading and Writing as Outcomes

In this regression model, English vocabulary, English morphology, Korean vocabulary, and Korean morphological awareness were used to explain the unique variance in English reading and writing. As shown in Table 3, Korean tasks were entered after English tasks to

examine the unique variance exhibited by Korean tasks over and above the English tasks. For both within and cross language predictors, morphological tasks were entered after vocabulary tasks in order to explore the unique variance explained by morphological tasks after the effect of vocabulary task was controlled for. Results indicated that for within language predictors, English morphological awareness significantly contributed to the variance in English reading and writing, respectively (8%, $p < 0.001$ and 8%, $p < 0.001$). For cross language predictors of English reading, Korean derivational morphology awareness explained a unique and significant amount of variance in English reading (3%, $p < 0.001$) after English vocabulary, English morphology, and Korean vocabulary were accounted for; however, Korean morphology was not a significant predictor on English writing.

Transfer in groups with higher and lower reading proficiency.

Based on the findings in cross language transfer of morphological awareness in Korean to English reading comprehension, we extended the analysis of such transfer by comparing high and low levels of proficiency in L2, e.g., English reading comprehension. The students were divided into two groups of above and below average in English reading (above average group, $n = 99$, Mean = 7.04, $SD = 0.79$; below average group, $n = 61$, Mean = 3.16, $SD = 1.47$). Results of the hierarchical regression on English reading are presented in Tables 4. There was a statistically significant contribution of morphology transfer in Korean to English reading among high-level reading group (3%, $p < .05$) whereas the R square change was not significant for low-level reading group.

Chinese (L3) Reading and Writing as Outcomes

Because the students in this study started learning English in third grade and Chinese in the ninth grade, in the regression model predicting Chinese reading and Chinese writing skills, the order of entry was Chinese vocabulary, Chinese morphology, Korean vocabulary, Korean morphology, English vocabulary, and English morphology. Korean tasks were entered after the Chinese tasks to examine the unique variance exhibited by Korean tasks over and above the Chinese tasks. English tasks were then entered after the Chinese and Korean tasks to examine the unique variance explained by English tasks over and above the Chinese and Korean tasks. For both within and cross language predictors, morphological tasks were entered after vocabulary tasks in order to explore the unique variance explained by morphological tasks after the effects of vocabulary tasks were taken into account.

Results in Table 5 showed that for within language predictors, Chinese morphological awareness clearly contributed a unique and significant amount of variance in Chinese reading and writing (2%, $p < 0.01$ and 8%, $p < 0.001$, respectively). For cross language predictors of Chinese reading, the Korean morphology task significantly contributed to the variance in Chinese reading (6%, $p < 0.001$), while there was no transfer to Chinese writing, after Chinese vocabulary, Chinese morphology, and Korean vocabulary were controlled for. The English morphology task was not a significant cross language predictor on Chinese reading or writing after Chinese and Korean tasks were taken into consideration.

Transfer in groups with higher and lower levels of reading proficiency.

Based on the findings in cross language transfer of morphological awareness in Korean to Chinese reading comprehension, we extended the analysis of such transfer by comparing high and low levels of proficiency in L3, e.g., Chinese reading comprehension. The students were divided into two groups with above and below average abilities in Chinese reading (above average group, $n = 75$, Mean = 7.52, $SD = 0.70$; below average group, $n = 85$, Mean = 3.73, $SD = 1.23$). An examination of Table 6 revealed that there was evidence of transfer from Korean

morphology to Chinese reading in both high and low level groups and that the magnitude of transfer was similar between these two groups (high-level group, 9%, $p < 0.01$; low-level group, 8%, $p < 0.01$).

4. DISCUSSION

The purpose of this study was to explore the extent to which morphological awareness in Korean can be transferred to reading and writing in English and Chinese languages among ninth grade Korean students in an EFL setting, so as to develop an L3 acquisition model. The findings derived from correlational and hierarchical regression analyses are discussed within the framework of the Contrastive Analysis and Interdependence Hypotheses.

Within Language Transfer

When within language transfer was examined, correlational analysis suggested that students' performance in reading and writing were both related with vocabulary and morphological awareness of all three languages. It was found that English morphological awareness significantly accounted for the variance in both English reading and writing acquisition after the effect of vocabulary was taken into consideration. Such contribution of morphology to reading and writing is also applicable to Chinese acquisition in this sample of Korean speakers. Although the Korean and English tasks involved derivational morphology and the Chinese tasks used compound morphology, these tasks in all three languages measured an individual's skills in extending relatively stable morphemic units to morphologically-related complex words, such as derived words or compound words. These findings corroborate with previous studies in which Chinese morphological awareness was reported to predict Chinese word reading, and derivational morphology in English contributed to English reading comprehension and word reading among Chinese-English bilinguals (Wang, Cheng, et al., 2006; Wang, Yang, et al., 2009).

Cross Language Transfer in Second Language Acquisition

When the cross language model was examined with two languages, i.e., Korean (L1) and English (L2), we observed that morphological awareness in Korean uniquely predicted English reading, controlling for English variables (vocabulary and morphology) and Korean vocabulary. This finding was not in accordance with Wang, Ko, et al.'s (2009) study, in which morphological awareness in Korean was identified to transfer to English word naming, instead of English reading comprehension, among second to fourth grade Korean-English bilinguals. We believe this discrepancy may be due to participants' age differences and their corresponding level of sentence comprehension in English. This discrepancy may also be a result of heavy focus on reading comprehension over other areas (such as speaking, listening, and writing) in traditional English language teaching in Korea. Even though Korean and English share a similar derivational morphological structure at word level, the sentence structure is very different between the two languages, i.e., S (subject) + V (verb) + O (object) in English, and S + O + V in Korean (Wang, Ko, et al., 2009). Therefore, the Contrastive Analysis Hypothesis, which supports transfer in languages with similar linguistic typology, does not apply to the interpretation of the results of transfer of morphological awareness in Korean to English reading in our study. Instead, the Interdependence Hypothesis provides a better explanation because ninth grade Korean students are expected to have sufficient mapping skills in their L1 especially in an L1 dominant environment. In addition to mapping skills in the source language, the proficiency of the target language is also a critical factor in cross language transfer, as was the case in our study that the transfer of morphological awareness from Korean to English occurred

among students who were more proficient in their L2 reading. This finding mirrors that in Lee and Schallert (1997) who concluded that reading performance in L1 (Korean) and L2 (English) was positively correlated for Korean learners with more advanced levels of L2 (English).

However, no significant cross language transfer effects were observed from Korean morphological awareness to English writing. Such finding may be accounted for by two explanations. First, writing in English entails not only morphological skills but also a sufficient understanding of the orthography and sentence structure of a language, which implies that the transfer is not likely to occur when the learners have not yet attained a certain level of target language proficiency in writing. This can be interpreted in the same context with the result of Wang, Ko, et al.'s (2009) study in which cross language transfer of morphological awareness was found to be limited to word reading level, not to reading comprehension which is consisted of sentence and passages level understanding, for Korean-English bilingual children, because the fundamental grammatical differences between Korean and English may also cause more cognitive resources allocated to sentence level understanding compared to word level understanding in comprehending a text (Wang, Ko, et al., 2009). Another possible reason is that the small sample size in our study resulted in relatively limited statistical power to detect any potential effects.

Cross Language Transfer in Third Language Acquisition

When variables in all three languages were included, results from the regression analysis demonstrated that morphological awareness in Korean significantly contributed to Chinese reading, even after the effect of within language predictors were controlled for. This unique contribution of L1 morphological awareness on L3 reading can be interpreted by the Contrastive Analysis Hypothesis because of the perceived typological proximity between Korean and Chinese. However, English (L2) morphological awareness was not a significant predictor on Chinese (L3) reading after within language (L3) variables and previously-learned language (L1) variables were taken into account. This finding of lack of transfer is in contrast to the results yielded from previous researches on transfer between Chinese and English (e.g., Wang, Yang, et al., 2009; Pasquarella et al., 2011), in which English morphological awareness was found to contribute to Chinese word reading and Chinese reading comprehension. Such discrepancy may be related to participants' proficiency in the source and target languages. More specifically, in our study, students had been exposed to Chinese, as an L3, for one academic year, and English, as an L2, for seven years in an EFL environment, whereas in Wang, Yang, et al.'s (2009) and Pasquarella et al.'s (2011) studies, all of the participants were Chinese-English bilingual with heavy exposure to English (L2), and more rapid improvement in English reading skills compared with Chinese as L1. As proposed by Hammarberg (2001), for transfer to occur from an L2 to an L3, the speaker must reach a certain degree of L2 competence.

Similar to the finding from two-language model, no significant results were obtained in morphology-based transfer of L1 and L2 to L3 writing in this three-language model. There are two possible explanations. First, the lack of transfer indicates that morphological awareness in L1 is more important in learning to read than to write in third language acquisition. It is agreed that writing requires higher levels of orthographical awareness, vocabulary knowledge, and understanding of the sentence structure of any given language. Writing-on-reading effects in alphabetic systems are less robust and thus less consistently observed. As Packard, Chen, Li, Wu, Gaffney, Li, and Anderson (2006) stated, reading and writing might be linked through some third variable, such as cognitive ability (e.g., orthographic knowledge, phonological memory, etc.), which affects both skills independently. As these three languages use completely different

writing systems, morphological awareness of an L1 or L2 could not be expected to overcome orthographical differences in predicting writing performance in L3. The second explanation is based on the Interdependence Hypothesis that in our study students' writing skills in Chinese are not yet fully developed for transfer to occur.

It is important to address that in this study we only examined one-way transfer from L1 to L2 and L3 instead of bidirectional. This forward pattern, as pointed out by Wang, Cheng, et al. (2006), was the most common transfer among late bilinguals with little experience in their L2. Analogously, participants in our study can be considered late trilingual who rely heavily on their skills in L1 to process L2 and L3.

In regards to implications for future practice and research, we acknowledge that due to the scope of this study no oral tasks from a standardized measure was included to account for the reading demands of the morphological awareness tasks. Therefore, further research on linguistic awareness including phonology, morphology, and orthography, would be helpful in identifying the unique effect of each type of linguistic awareness.

To summarize, the present study examined the contribution of morphological awareness in L1 to reading and writing in L2 and L3 in a group of ninth grade Korean speakers. Conceptually comparable tasks in morphological awareness, vocabulary, reading and writing were designed and administered in Korean L1, English L2, and Chinese L3. The findings of our study point to the unique cross language transfer of morphological skills in Korean to English and Chinese reading. This result suggests that learners in an L1 dominant setting are able to apply their general knowledge about shared morphological structure from L1 to reading, not only in L2, but in L3 as well. Little empirical evidence is available regarding cross language transfer among three typologically distant languages. Hence, this study contributed to the knowledge base of the importance of morphological awareness in second and third language learning and supported the two main hypotheses that have guided research in cross language transfer. The results of this study underscores the need to teach reading and probably writing of an L2 and L3 by focusing on the active use of morphological transfer in an L1-dominant environment, and to utilize the structural similarities between a source language and a target language to facilitate cross-language transfer in students' language learning.

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APPENDICES

Table 1. *Means and Standard Deviations (SDs) of all measures*

Variables	Total possible score	*M*	*SD*
Korean tasks			
Vocabulary	8	6.01	1.42
Morphology	8	6.15	1.38
Reading	8	5.47	1.68
Writing	10	8.45	1.24
English tasks			
Vocabulary	8	4.48	2.24
Morphology	8	4.48	2.06
Reading	8	5.56	2.19
Writing	10	8.40	1.21
Chinese tasks			
Vocabulary	8	5.24	2.26
Morphology	8	3.82	1.97
Reading	8	5.51	2.15
Writing	10	7.82	1.70

Table 2. *Correlations among Korean, English and Chinese Tasks*

Variables	1	2	3	4	5	6	7	8	9	10	11	12
Korean tasks												
1. Vocabulary	-											
2. Morphology	.51***	-										
3. Reading	.63***	.53***	-									
4. Writing	.35***	.45***	.32***	-								
English tasks												
5. Vocabulary	.33***	.63***	.39***	.37***	-							
6. Morphology	.38***	.68***	.37***	.40***	.67***	-						
7. Reading	.45***	.72***	.44***	.38***	.74***	.71***	-					
8. Writing	.54***	.62***	.55***	.56***	.65***	.65***	.69***	-				
Chinese tasks												
9. Vocabulary	.43***	.67***	.42***	.55***	.60***	.68***	.67***	.64***	-			
10. Morphology	.36***	.60***	.31***	.42***	.52***	.62***	.55***	.49***	.64***	-		
11. Reading	.39***	.71***	.40***	.49***	.51***	.60***	.55***	.56***	.74***	.59***	-	
12. Writing	.40***	.49***	.37***	.51***	.36***	.38***	.47***	.49***	.52***	.56***	.45***	-

*** $p<.001$

Table 3. *Hierarchical Regression Analyses Predicting English Reading and Writing Skills Using English and Korean Tasks*

Variables	Multi R	Adjusted Mult R^2	R^2 change	F change
Predicting English reading				
Step 1: E vocabulary	.74	.55	.55	192.44***
Step 2: E morphology	.80	.63	.08	36.15***
Step 3: K vocabulary	.81	.65	.02	10.89**
Step 4: K morphology	.83	.68	.03	15.25***
Predicting English writing				
Step 1: E vocabulary	.65	.42	.42	114.23***
Step 2: E morphology	.71	.50	.08	27.49***
Step 3: K vocabulary	.77	.58	.08	31.14***
Step 4: K morphology	.77	.58	.00	1.67

Note. Multi R = multiple correlation, ***$p<.001$; *$p<.05$; **$p<.01$

Table 4. *Hierarchical Regression on English Reading by Comparing Two Groups (High & Low Level English Reading Skills)*

Variables	Multi R	Adjusted Mult R^2	R^2 change	F change
Predicting English reading (High English reading skills, $n = 99$)				
Step 1: E vocabulary	.48	.22	.22	29.28***
Step 2: E morphology	.62	.38	.16	24.57***
Step 3: K vocabulary	.62	.37	-.01	.00
Step 4: K morphology	.65	.40	.03	6.48*
Predicting English reading (Low English reading skills, $n = 61$)				
Step 1: E vocabulary	.50	.23	.23	19.28***
Step 2: E morphology	.60	.33	.10	9.70**
Step 3: K vocabulary	.63	.36	.03	3.64
Step 4: K morphology	.63	.35	-.01	.33

Note. Multi R = multiple correlation, ***$p<.001$; *$p<.05$; **$p<.01$

Table 5. *Hierarchical Regression Analyses Predicting Chinese Reading and Writing Using Chinese, Korean, and English Tasks*

Variables	Multi R	Adjusted Mult R^2	R^2 change	F change
Predicting Chinese reading				
Step 1: C vocabulary	.74	.55	.55	195.21***
Step 2: C morphology	.76	.57	.02	8.98**
Step 3: K vocabulary	.76	.57	.00	1.52
Step 4: K morphology	.80	.63	.06	27.12***
Step 5: E vocabulary	.80	.63	.00	1.03
Step 6: E morphology	.80	.63	.00	.05
Predicting Chinese writing				
Step 1: C vocabulary	.52	.27	.27	58.50***
Step 2: C morphology	.60	.35	.08	22.17***
Step 3: K vocabulary	.62	.37	.02	6.28*
Step 4: K morphology	.62	.37	.00	.67
Step 5: E vocabulary	.62	.37	.00	.40
Step 6: E morphology	.63	.38	.01	2.52

Note. Multi R = multiple correlation, ***$p<$.001; *$p<$.05; **$p<$.01

Table 6. *Hierarchical Regression on Chinese Reading by Comparing Two Groups (High & Low Level Chinese Reading Skills)*

Variables	Multi R	Adjusted Mult R^2	R^2 change	F change
Predicting Chinese Reading (High Chinese Reading Skills, $n = 75$)				
Step 1: C vocabulary	.50	.24	.24	24.51***
Step 2: C morphology	.54	.27	.03	4.17*
Step 3: K vocabulary	.55	.27	.00	.73
Step 4: K morphology	.63	.36	.09	11.00**
Step 5: E vocabulary	.63	.35	-.01	.23
Step 6: E morphology	.63	.34	-.01	.05
Predicting Chinese Reading (Low Chinese Reading Skills, $n = 85$)				
Step 1: C vocabulary	.49	.24	.23	27.32***
Step 2: C morphology	.49	.23	-.01	.25
Step 3: K vocabulary	.51	.24	.01	1.38
Step 4: K morphology	.60	.32	.08	11.49**
Step 5: E vocabulary	.60	.32	.00	.30
Step 6: E morphology	.60	.31	-.01	.18

Note. Multi R = multiple correlation, ***$p<$.001; *$p<$.05; **$p<$.01