ROLE OF MORPHOLOGICAL AWARENESS IN BILITERACY DEVELOPMENT: WITHIN- AND CROSS-LANGUAGE PERSPECTIVES AMONG KOREAN ESL/EFL LEARNERS IN GRADES FIVE AND SIX

A Dissertation

by

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ABSTRACT

This dissertation consists of three studies that explored the role of morphological awareness (MA) in biliteracy development among upper elementary students who learn to read two languages (English and Korean) in different language learning contexts (ESL and EFL). Participants included 50 Korean ESL learners in the southern Texas and 257 Korean EFL learners in Seoul, Korea. They were administered English and Korean measures of MA, vocabulary, and reading comprehension, in addition to phonological and orthographic measures.

Study I examined 50 Korean ESL learners' MA and its effect on their vocabulary and reading comprehension. Within-language path analysis provided evidence that MA was the most significant predictor for the learners' vocabulary and reading comprehension in English and in Korean, after controlling for phonological awareness (PA) and orthographic awareness (OA). Cross-language path analysis indicated that the learners' L1 (Korean) MA facilitated their L2 (English) vocabulary and reading comprehension. The extent of cross-language transfer was greater from Korean compound MA to English vocabulary and reading comprehension compared to that from Korean derivational MA.

Study II included 257 Korean EFL learners and explored the within- and cross-language perspectives. As in the first study, MA was the most positive predictor of vocabulary and reading comprehension in both English and Korean. However, differing from the first study, cross-language transfer was found only in vocabulary levels, from

L2 (English) MA to L1 (Korean) vocabulary. More English derivational MA was transferred to Korean vocabulary than English compound MA.

Study III explored whether the role of MA in vocabulary and reading comprehension would vary across different language learning contexts (ESL and EFL). The multiple-group path analysis showed that the positive role of MA in vocabulary and reading comprehension in English and in Korean was not statistically different across the Korean ESL and the Korean EFL groups. However, the difference in the direction of the cross-language transfer proved statistically significant between groups.

This dissertation provided evidence to support the language-universal role of MA in literacy development among upper elementary students. This is the first evidence to show that positive cross-language transfer of MA occurred in passage-level reading when Korean and English languages are included.

DEDICATION

살아계신 나의 주, 예수 그리스도,

존경하는 배우자, 성충현,

사랑하는 아들, 치윤,

그리고, 아낌 없이 주는 나무, 부모님께.

To my living God, Jesus Christ

My dear husband, Choonghyun Sung

My beloved child, Chiyoon,

And the Giving Tree, my parents.

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CHAPTER I

INTRODUCTION AND LITERATURE REVIEW

Over two billion people in the world use English as a second language (ESL) or as a foreign language (EFL) (Graddol, 2007; Xiaoqiong & Xianxing, 2011). These individuals use English in a particular communicative context, along with using their first language (L1) (Graddol, 1997). Second language (L2) studies have put considerable emphasis on finding effective English instruction for ESL and EFL students who live in very different linguistic communities from their monolingual English speaking counterparts (Geva & Siegal, 2000; Geva & Wang, 2001; Grabe, 2009). Contemporary L2 reading scholars, for example, are particularly interested in two questions (Dressler & Kamil, 2006; Koda, 2005; Koda & Zehler, 2008; Snow, Porche, Tabors, & Harris, 2007; Verhoeven, 2000): first, whether the essential components of reading for monolingual English speaking students would be as important for ESL and EFL learners' English reading development; and second, whether ESL and EFL learners' L1 reading ability would be beneficial in learning to read English.

Regarding the first question, one interesting point from recent studies is that learners' ability to manipulate morphemes to make a complex word (i.e., morphological awareness, MA) may be one of the universal skills for English reading acquisition across different language learning contexts (Geva &Wang, 2001; Zhang & Koda, 2013). In fact, there are several studies showing that MA plays a facilitative role in developing vocabulary and reading comprehension in English across monolingual English speaking students (Carlisle, 2000; Deacon & Kirby, 2004; Nagy, Berninger, & Abbott, 2006),

ESL learners (Goodwin, Huggins, Carlo, August, & Calderon, 2013; Kieffer & Box, 2013; Kieffer & Lesaux, 2008, 2012a), and EFL learners (Jeon, 2011; Zhang & Koda, 2012, 2013). However, the majority of these studies were conducted in the *inner circle* countries such as the U.S. and Canada (Kachru, 1989), and the relative role of MA in English vocabulary and reading comprehension has not yet been fully investigated in relation to other important components of lower-level language processing skill (Nassaji, 2014), such as phonological awareness (PA) and orthographic awareness (OA).

Note that the recent attention to the importance of MA in vocabulary and reading comprehension is largely based on the research findings from one language sample (i.e., English). Share (2008) pointed out that English-only based reading models may not be fully adaptable to explain reading mechanisms across different languages. Since different languages use their own writing systems to encode spoken language (e.g., alphabetic, syllabic, and morphosyllabic), it is reasonable to expect that essential components of reading across different writing systems may not be identical. Even though several studies have provided evidence that MA plays a significant role in reading across different languages, such as Arabic (Mahfoundhi, Elbeheri, Al-Rashidi, & Everatt, 2010), Chinese (McBride-Chang et al., 2005a), and Hebrew (Ravid & Mashraki, 2007), more extensive analysis of other languages is still needed.

Another topic in L2 reading research has been investigated from the perspectives of cross-language transfer (Cummins, 1979, 1981, 2000; Gass & Selinker, 1983; Koda, 2008a; Krashen, 1983; Lado, 1957; MacWhinney & Bates, 1989; Perfetti, 2003). Recent cross-language transfer studies have shown that L2 learners' MA in one language

facilitates the learners' literacy development in another language, including word recognition, vocabulary learning, spelling, and reading comprehension (Cho, Chiu, & McBride-Chang, 2011; Hu, 2013; Pasquarella, Chen, Lam, Luo, & Ramirez, 2011; Ramirez, Chen, Geva, & Kiefer, 2010; Ramirez, Chen, & Pasquarella, 2013; Wang, Cheng, & Chen, 2006a; Wang, Ko, & Choi, 2009a). However, little consensus has been reached with regards to the degree and direction of cross-language transfer among learners who learn to read two typologically different languages at the same time in various language learning contexts.

The purpose of the present dissertation, therefore, was to contribute to the understanding of the role of MA in vocabulary and reading comprehension among upper elementary students who learn to read two languages (Korean and English) in different language learning contexts (ESL and EFL). In Study I, within- and cross-language MA contribution for the Korean ESL learners' vocabulary and reading comprehension were examined. For within-language perspective, the role of English MA in English vocabulary and English reading comprehension; and that of Korean MA in Koren vocabulary and Korean reading comprehension were examined. Specific focus was given to whether the learners' MA would have a direct effect on vocabulary and reading comprehension, and whether the effect on reading comprehension would be mediated by vocabulary (i.e., indirect effect), once controlled for other predictors of reading (i.e., PA and OA). With regards to the cross-language perspective, reciprocal relations were investigated whether the learners' L1 MA would facilitate their L2 vocabulary and reading comprehension; and whether their L2 MA would enhance their L1 vocabulary

and reading comprehension. The degree and direction of the cross-language transfer were examined in relation to morphological structures of the two languages (English and Korean). Study II followed the same format as the first study to explore the role of MA in vocabulary and reading comprehension among the Korean EFL learners. Study III is a multiple-group path analysis which compares the role of MA in vocabulary and reading comprehension between the Korean ESL and the Korean EFL groups.

The present dissertation consists of four chapters. The first chapter provides an introduction and literature review. Related theories and empirical evidence on the role of MA in vocabulary and reading comprehension are summarized based on within- and cross-language perspectives. Then, Korean and English language structures are briefly introduced along with descriptions about different language learning contexts (ESL and EFL). The second chapter outlines specific details about the research method including study participants' characteristics, procedures, measures and instruments, and data analysis methods. In chapter three, findings from Study I, II, and III are described. In chapter four, general discussions based on the findings from the three studies are provided and educational implications and future directions are suggested along with the conclusions of the present dissertation.

Theoretical Grounds

To investigate within- and cross-language effects of MA on biliteracy development, related theoretical models of reading were examined. For the within-language perspective, these following points were considered to find related theories: what component of reading has been proposed in reading theories; how each theory

explained the relations between the proposed components and reading outcomes; and what theoretical framework can be adapted to explain learning to read typologically different languages. In the present dissertation, four related theoretical points were discussed in detail including the Metalinguistic Hypothesis (Nagy, 2007), the Lexical Quality Hypothesis (Perfetti, 2007; Perfetti & Hart, 2001, 2002), the Component Model of Reading (Joshi & Aaron, 2000; Joshi, Tao, Aaron, & Quiroz, 2012), and the Psycholinguistic Grain Size Theory (Ziegler & Goswami, 2005).

As far as the cross-language perspective is concerned, historical changes in cross-language transfer theories in L2 research were examined with relation to language learning theories. Contemporary issues and theoretical explanations of cross-language transfer are of particular interest when seeking related theoretical grounds. Three major cross-language transfer theories were explained and discussed, the Linguistic Interdependence Hypothesis (Cummins, 1981, 2000, 2005), the Universal Grammar of Reading (Perfetti, 2003), and the Transfer Facilitation model (Koda, 2008a)

The Metalinguistic Hypothesis

To explain the close relationship between vocabulary knowledge and reading comprehension, Nagy (2007) proposed the metalinguistic hypothesis stating that some of the shared variance between vocabulary knowledge and reading comprehension is explained by the role of metalinguistic awareness, which impacts the two outcome variables simultaneously. Metalinguistic awareness is generally defined as an "ability to identify, analyze, and manipulate language forms" (Koda, 2005, p.72). While learning vocabulary, for example, students are required to recognize and process several types of

word structures: phonological (phonemes, syllables, onset-rimes), orthographic (acceptable spelling patterns), and morphological (free-morphemes and affixes). Reading comprehension is more demanding for readers, because they need to be aware of more language forms, such as syntactic (adequate word orders), discourse (type of passage structures), and pragmatic (appropriate language use in a certain situation), in addition to all the sub-skills for vocabulary learning. In short, the metalinguistic hypothesis emphasized that reading is a fundamentally metalinguistic process, and it should be noted that the success of vocabulary and reading comprehension can be effectively predicted by the readers' level of metalinguistic awareness on each of the language forms.

One particular type of metalinguistic awareness, phonological awareness (PA) has been overwhelmingly investigated with regards to its role in reading development. PA refers to the ability to recognize and manipulate phonological units of spoken language such as syllables, onset-rimes, and phonemes (Goswami & Bryant, 1990). A large number of studies have consistently shown that PA is one of the key component skills for predicting early reading development not only for monolingual English speaking children (Bradley & Bryant, 1983; Caravolas & Bruck, 1993; Hulme, Bowyer-Crane, Carroll, Duff, & Snowling, 2012), but also for L2 learners (Branum-Martin, Tao, & Garnaat, 2014; Haigh, Savage, Erdos, & Genesee, 2011). The role of PA in early literacy development was also important in learning to read languages other than English (Hebrew; Schiff, Schwartz-Nahshon, & Nagar, 2011; Chinese; Yeung, Siegel, & Chan, 2013). Interestingly, for those who learn to read two or more languages at the same time,

positive cross-language transfer of PA to reading has been found between languages. For example, young ESL learners' L1 PA had positive correlation with their L2 PA (Branum-Martin, Tao, Garnaat, Bunta, & Francis, 2012) and the learners' L1 PA played a role in predicting their success in L2 word reading (Cho & McBride-Chang, 2005; Wang, Park, & Lee, 2006b).

Relatively little attention has been given to the role of other types of metalinguistic awareness in reading development. For one instance, evidence have shown that orthographic awareness (OA) played an independent role in English word reading and spelling after controlling for PA influence (Cunningham, Perry, & Stanovich, 2001; Cunningham & Stanovich, 1993). According to Treiman and Cassar (1997), OA refers to "children's understanding of the conventions used in the writing system of their language" (p.292). The role of OA in reading languages other than English was also unique and important (e.g., Chinese; Ho, Wong, & Chan, 1999 and Korean; Kim, 2011). Cross-language transfer of OA to reading varied according to the ESL learners' L1 background. For example, Spanish ESL learners' L1 (Spanish) OA was positively transferred to L2 (English) word reading (Sun-Alperin & Wang, 2011), while Chinese ESL learners' L1 (Chinese) OA did not play a positive role in explaining their L2 (English) word reading (Wang, Yang, & Cheng, 2009b).

Current attention has also given to the importance of MA in literacy development. MA represents a metalinguistic ability to manipulate morphemes and use word-formation rules to understand morphologically complex words (Kuo & Anderson, 2006). Morphemes are the smallest unit of a language that can be associated with meaning and

grammatical function. Words can be categorized into mono-morphemic words (e.g., *room*) and multi-morphemic words (complex words, e.g., *bathroom*). There are three types of multi-morphemic words- inflectional, derivational, and compound words. An inflectional word expresses grammatical function (e.g., *cat* vs. *cats*), a derivational word changes parts of speech (e.g., *glad vs. gladly*), and a compound word is composed of two stem morphemes (e.g., *classroom*). A growing number of studies have shown that MA plays a significant role in explaining vocabulary learning across languages (e.g., English; Carlisle, 2000 and Chinese; McBride-Chang et al., 2005a). The MA contribution was also positive to predict reading comprehension for readers in various languages (e.g., English; Nagy et al., 2006, Arabic; Mahfoundhi et al., 2010, and Hebrew; Ravid & Mashraki, 2007). Review of this literature will be explained further in the next sections.

However, most of these studies were not grounded on the metalinguistic hypothesis, and hence did not particularly investigate the causal relations between the metalinguistic awareness (i.e., PA, OA, and MA) and the two reading outcomes (i.e., vocabulary and reading comprehension). Hence, the focus of the present dissertation, the role of MA in vocabulary and reading comprehension, will extend the scope of the previous studies by showing the explanatory power of the metalinguistic hypothesis. In addition, the present dissertation will provide a more comprehensive picture of the hypothesis, by investigating three types of metalinguistic awareness (i.e., PA, OA, and MA), and at the same time examining the relative importance of each with regards to predicting upper elementary students' vocabulary and reading comprehension development.

The Lexical Quality Hypothesis

One particular point from the most current views on reading comprehension is that rapid and accurate lower-level processing skills are critical to comprehension processing (Bell & Perfetti, 1994; Stanovich, 2000; Breznitz, 2006). Lower-level language processing skill refers to automatic word recognition, which requires an accurate and prompt processing of sub-lexical information such as phonological and orthographic forms, whereas higher-level language processing skills include syntactic and semantic skills to figure out text meaning by activating background knowledge and comprehension strategies (Grabe, 2009; Nassaji, 2014). This body of literature does not agree with the notion that reading comprehension is the process of guessing meaning from contexts, as suggested in Goodman's (1996) psycholinguistic guessing game model. Instead, they claim that guessing meaning from context is one kind of compensating strategy for readers who have difficulties manipulating a visual array of small language units. In other words, no matter how skilled readers are at higher-level language processing, efficient reading cannot be possible unless the readers are highly competent at lower-level processes.

The lexical quality hypothesis (Perfetti, 2007; Perfetti & Hart, 2001, 2002) provides a theoretical ground to support the current view on the importance of lower-level language processing skills. According to Perfetti and Hart (2002), lexical quality refers to the extent of reader's knowledge of a given word's form, meaning, and usage. Individual readers are widely varied in their lexical quality, and this variability is not just about the size of the reader's vocabulary, but about his or her consistent knowledge of a

word's form and its meaning across different contexts. The lexical quality hypothesis posits that reading comprehension is strongly dependent on the reader's lexical quality.

The hypothesis proposed three types of word representations that play interactive roles in determining the reader's lexical quality: phonological, orthographic, and semantic constituents. The lexical quality is increased when all the three types of constituents are fully specified and closely bound together. For example, if a reader is able to retrieve a word's spelling (orthographic constituent) along with its correct pronunciation (phonological constituent) and meaning (semantic constituent), it means that the reader has a high lexical quality, which consequently enhances his or her reading comprehension. In particular, rapid and accurate recognition of the three constituents of word representation is key to the reader's lexical quality improvement and reading development. In fact, Richter, Isberner, Naumann, and Neeb (2013) provided empirical evidence to support the causal relationship between lexical quality and reading comprehension. The level of text comprehension among first- through fourth-grade German students was not associated with their grade level, but was determined by their level of accurate and efficient recognition of the three types of lexical representations.

The most current version of the lexical quality hypothesis is embedded in the larger theoretical framework, namely the reading systems framework (Perfetti & Stafura, 2014). In the reading systems framework, the three constituents of lexical representations are replaced with phonological units, orthographic units, and the lexicon. While the first two units are basically the same as those in the earlier lexical quality hypothesis (phonological and orthographic constituent), the lexicon is an extended

version of the previous one (i.e., the semantic constituent). In the reading systems framework, the lexicon comprises three sub-components (morphology, meaning, and syntax) and it is a central connection point between the lower-level language processing (word identification system) and the higher-level language processing (comprehension system). The roles of the lexicon in the two reading systems are explained as follows (Perfetti & Stafura, 2014, p. 26):

> The lexicon sits astride two reading systems: one, the word identification system, requires high-quality linguistic and orthographic information to enable rapid word identification; the second, the comprehension system, takes its input from the word identification system to build meaning units (propositions). Knowledge of written word forms and meanings, then, is central to reading and thus a pressure point for reading comprehension—a prime candidate for a cause of reading comprehension difficulty.

In short, without having lexical quality across different levels of language unit—phonological, orthographic, and lexicon (meaning, morphology, and syntax) —readers cannot be efficient in manipulating the basic cognitive and language processes, such as the word identification and the comprehension systems.

However, the promising role of the lexical quality in reading comprehension has not yet been fully investigated in L2 reading research. More focus has been given to the role of higher-level language processing skills (e.g., using background knowledge or comprehension strategy) on L2 reading comprehension (Bernhardt, 2010; Goodman, 1996; Rizzardi, 1980; Smith, 1994). Furthermore, little has been investigated about the

role of lexical quality in reading comprehension across languages other than English. In the present dissertation, ESL and EFL learners' language processing skills on each component of the lexical quality (phonological, orthographic, and lexicon) were extensively investigated with regards to their effects on predicting learners' L1 (Korean) and L2 (English) reading comprehension. Two sub-components of the lexicon were particularly interesting in the present dissertation: morphology and meaning. The meaning component of the lexicon was regarded as the learners' receptive vocabulary ability in the present dissertation. When all these four variables (i.e., PA, OA, MA, and vocabulary) are highly activated, the learners' lexical quality will be maximized, and consequently their reading comprehension may be largely explained by those factors.

The Component Model of Reading

The simple view of reading (SVR) is one of the widely accepted models to represent how the cognitive components of reading play roles in predicting reading success (Gough & Tunmer, 1986). Two critical cognitive skills in this model are decoding (D) and language comprehension (LC). Decoding is an automatic and accurate word recognition skill. Language comprehension represents an ability to understand the meaning of spoken language, which is often called listening comprehension. These two cognitive skills work jointly to predict reading comprehension, and this is represented by the multiplicative formula of decoding and language comprehension ($R = D \times LC$). That is to say, if readers are not proficient in either of those cognitive skills (i.e., $D = 0$ or $LC = 0$), they may not comprehend texts successfully (i.e., $R = 0$).

A recent view of reading, the component model of reading (Joshi & Aaron, 2000; Joshi et al., 2012), claimed that reading success would be explained well when the readers' psychological and ecological components are also considered along with their cognitive abilities (i.e., decoding and language comprehension). The psychological component of reading represents readers' motivation to read or their interest in topics of given texts. The ecological component comprises home environment (e.g., number of books at home and parental education), parental involvement in reading (e.g., frequency and length of parental book reading to their child), and classroom environment (e.g., classroom resources for book reading and language of instruction). The unique point of this model is that a diminished level in any factor may hinder children's reading comprehension, and hence multiple components should be taken into consideration when defining reasons for their failure in reading.

The foundational research design of the present dissertation was grounded in the component model of reading. Students who learn to read two languages at the same time not only have very different goals of reading in each language, but also experience different types of literacy instruction. Therefore, the present dissertation included multiple components of reading simultaneously in its investigation. For the cognitive component, several types of metalinguistic awareness (i.e., PA, MA, and OA) were specifically considered, because these skills are critical to enhance accurate and automatic word decoding across languages (Carlisle, 2003; Chow, McBride-Chang, & Burgess, 2005; Cunningham et al., 2001; Hulme, Snowling, Caravolas, & Carroll, 2005; Mahony, Singson, & Mann, 2000). For the ecological component, readers' home

language environment (e.g., parental education, language use at home, and parental involvement in reading) was specifically taken into consideration to describe characteristics of language learning contexts across ESL and EFL learners.

The Psycholinguistic Grain Size Theory

Dominant perspectives on literacy development through English language based studies have been questioned and challenged by recent studies conducted across different writing systems (Akamatsu, 2006; Caravolas, 2006; Cheung, McBride-Chang, & Chow, 2006; Cho et al., 2011; Goswami, 2006; Kim, 2009; Kim, 2011; Landerl, 2006). One atypical notion from an English language study was that PA is one of the most crucial factors for reading success, and early elementary students need to have extensive PA instruction in order to develop their reading skills (Caravolas & Bruck, 1993; Hulme et al., 2012; Wimmer, Lander, & Schneider, 1994). However, studies involving children learning other languages—Italian, Greek, and Spanish—showed that the children's PA was already fully developed by the end of the first grade (Goswami, 2006). Share (2008) stated that the English-only perspective is an egocentric one, and hence a more reasonable framework is necessary to explain literacy development across languages.

The psycholinguistic grain size theory (PGST) is a useful theoretical framework incorporating both language-universal and language-specific perspectives (Ziegler & Goswami, 2005). According to this theory, the sequence of phonological development is similar across languages, and starts from larger linguistic units (i.e., syllables), proceeds to smaller units (i.e., onset and rimes), and finishes with the smallest units (i.e., phonemes). However, the rate of literacy development is different across languages

depending on the orthographic depth of the language. Orthographic depth entails the degree of phoneme-grapheme correspondence. If all sounds are represented with written symbols, it means the language allows 1:1 phoneme-grapheme mapping, and we can label the language orthography as transparent or shallow (e.g., Italian). On the contrary, if the phonemes are represented by many graphemes, we would label the language orthography as opaque or deep (e.g., English). Thus, the PGST claims that learners of transparent orthography will more quickly acquire the smallest phonological unit (i.e., phonemes) compared to their counterparts learning opaque orthographies.

While the PGST framework is mainly focused on word-level reading efficiency (i.e., decoding), the present dissertation would extend the scope of the theory by testing whether the orthographic depth across languages would also affect passage-level reading efficiency (i.e., reading comprehension). Korean has very transparent orthography, while English orthography is opaque. The participants in the present dissertation are learning to read Korean and English at the same time; they may have advanced PA in Korean, while their English PA is under-developed. Due to the difference, the students may activate different sources of metalinguistic awareness while reading texts. For Korean reading, the readers may put more emphasis on processing other types of language structures (e.g., orthography and morphology), rather than incorporating phonological processing skills. At the same time, for English reading, they may still utilize phonemic level information processing skill (i.e., PA) along with processing the other two (i.e., MA and OA).

Cross-language Transfer Theories

One of the most central concerns among L2 acquisition researchers has been how learners' L1 plays a role while they learn new languages, namely a cross-language transfer. Before the 1960s, L1 was assumed to inhibit L2 learning, particularly when the two languages shared dissimilar structures. For example, Lado (1957) proposed the contrastive analysis hypothesis, which stated that when learners encounter an unfamiliar or unknown phonological structure in L2 that is different from their L1, they will likely make errors (linguistic interference). Positive transfer will occur only if the two languages share similar phonological structures.

However, in the 1970s and the 1980s, Anderson (1978) and Gass (1988) provided evidence that difficulties in L2 learning are not directly associated with whether the structure exists in the learners' L1. Krashen (1982) claimed that developmental trajectories of L1 and L2 acquisition processes are similar to each other once the learners receive a comprehensible L2 input, known as the natural order hypothesis. At this point, cross-language transfer was described as learners' reliance on previously acquired general L1 ability, which was named *old knowledge* (Krashen, 1983) or *prior linguistic knowledge* (Gass & Selinker, 1983). The developmental interdependence hypothesis (Cummins, 1979) follows this notion that strong L1 reading ability is a pre-determinant of L2 reading success because reading abilities in the two languages are strongly correlated.

After the late 1980s, a wide variety of different information-processing procedures were examined across learners of different L1 backgrounds who learn to read

the same target language (Akamatsu, 1999; Brown & Haynes, 1985; Green & Meara, 1987; Hancin-Bhatt & Nagy, 1994), and this body of research brought out language-specific perspectives on cross-language transfer. In the Akamatsu's study, for example, case alternated words (e.g., cAsE aLtErNaTiOn) were more efficiently recognized by ESL learners whose L1 was an alphabetic language (e.g., Iranians) than by those whose L1 was non-alphabetic (i.e., Japanese and Chinese ESL learners). Not surprisingly, cross-language transfer researchers focused on finding what kind of information-processing skills are deployed across learners of different L1 backgrounds and how those language-specific differences would affect their biliteracy development. The competition model represented this language-specific position (MacWhinney & Bates, 1989; McWhinney, 1987), according to which language learning is basically mapping forms (e.g., subject-verb agreement) and their corresponding functions (e.g., causer), if both L1 and L2 readings require similar mapping skills, then the learners' pre-acquired L1 information-processing skills are transferable to facilitate their L2 reading.

Contemporary understandings of the cross-language transfer contain a more broad and balanced view. First, it is widely acknowledged among L2 researchers that cross-language transfer is not a static outcome of L1 ability (August & Shanahan, 2006; Genesee, Geva, Dressler, & Kamil, 2006). Instead, it has been proposed that cross-language transfer is dynamic and ever-changing information-processing that can vary among individual learners who deploy different linguistic, cognitive, and cultural factors throughout their dual language development (Biyalystok, 2001; Cook & Bassetti, 2005).

Second, a growing number of cross-language studies claimed that both language-universal and language-specific features are important to consider (Koda, 2000, 2005, 2008a; Perfetti, 2003; Ramirez, Chen, Geva, & Luo, 2011; Wang, Koda, & Perfetti; 2003). Reading is a complex information-processing skill which requires various components to be activated simultaneously, and it has been agreed that the universal components of reading are applicable across multiple languages. On the other hand, variations in the pattern of cross-language transfer are expected since individual readers are not identical in their experiences in language learning, cognitive development, and cultural backgrounds.

The following three theories well represent the recent conceptualizations on the cross-language transfer: the Linguistic Interdependence Hypothesis (Cummins, 1981, 2000, 2005), the Universal Grammar of Reading (Perfetti, 2003), and the Transfer Facilitation Model (Koda, 2008a). Meaningful implications from each perspective were considered in building up the theoretical grounds of the present dissertation.

The linguistic interdependence hypothesis. Cummins (1981) reconceptualized his earlier developmental interdependence hypothesis (Cummins, 1979) by using more general terms to describe various conditions of cross-language transfer. The new concept is called the linguistic interdependence hypothesis, and it was formally defined as follows (Cummins, 2005, p.4):

> To the extent that instruction in Lx is effective in promoting proficiency in Lx, transfer of this proficiency to Ly will occur when there is adequate exposure to Ly (either in school or environment) and adequate motivation to learn Ly.

In other words, L1 and L2 language development are interdependent: once L1 is developed, it facilitates L2, and if L2 succeeds, it in turn positively influences L1 development (Kuo & Anderson, 2006). Thus, cross-language transfer is not a static outcome of L1 influence, but a dynamic process which can occur anytime in language development in various directions. Importantly, it should be noted that this hypothesis postulated three required conditions for determining the mutual linguistic interdependency: adequate language proficiency, motivation, and instructional environments. If one of these elements were not met, the bidirectional cross-language transfer would not occur.

One of the compelling points of argument is what exactly the language proficiency means in the hypothesis. According to Cummins (1980), language proficiency was defined as a common underlying competency utilized in both L1 and L2 literacy development, namely cognitive academic language proficiency (CALP). This proficiency is different from the basic interpersonal communicative skills (BICS) such as accent, oral fluency, and sociolinguistic competency. Only the CALP is transferable between languages to facilitate literacy development, whereas the BICS are not. However, it has been claimed that it is ambiguous which linguistic skills are included in the CALP (Grabe, 2009). Furthermore, an increasing number of studies have shown that not all the literacy skills interrelated in two languages are transferred (Aarts & Verhoeven, 1999; Chiappe, Siegal, & Gottardo, 2002; Geva, 2006; Wade-Woolley & Siegal, 1997). For example, L1 phonological awareness was positively transferred to L2 (Chiappe et al., 2002), while L1 receptive vocabulary was not (Ordóñez, Carlo, Snow, &

McLaughlin, 2002). Accordingly, defining the specific components that construct the CALP remains an open question among cross-language transfer studies.

Despite the ambiguity, the linguistic interdependence hypothesis renders very useful theoretical foundations for the present dissertation. The hypothesis sheds light on cross-language transfer as an ongoing process that can happen in various directions throughout the development of biliteracy. Thus, in the present dissertation, cross-language transfer was tested regarding not only the effect from L1 MA to L2 vocabulary and reading comprehension, but also the effect from L2 MA to L1 vocabulary and reading comprehension. Additionally, multiple factors suggested in the hypothesis provide rationales to predict the possibility of cross-language transfer. The Korean ESL and the Korean EFL participants in the present dissertation may not have equivalent levels of literacy input in L1 (Korean) and L2 (English). Due to the difference, they may show different patterns of cross-language transfer even though they are learning to read the same languages (i.e., English and Korean).

The universal grammar of reading. According to Perfetti (2003), the fundamental process of reading is same across languages, and hence learning to read a new language would be facilitated to some extent because of this universality. There are two universalities of reading across languages. First, writing systems encode spoken language (the language constraint on writing system, LCWS). In other words, reading is embedded in two interrelated systems (i.e., the spoken language system and the writing system), and learning to read, in all languages, is learning how to map the two systems (Perfetti & Dunlap, 2008). Second, reading in all languages requires the universal

phonological principle (UPP) for meaning construction (Perfetti, Zhang, & Berent, 1992). The UPP refers to the fact that word-level reading in all languages involves phonological processing at the lower level of language forms which are encoded in the writing system, such as phonemes, syllables, and morphemes. As far as cross-language transfer is considered, therefore, these two basic universalities of reading will be positively transferred to any language that learners learn to read.

However, variations in writing systems render language-specific features, which may or may not play positive roles in learning to read new languages. There are three distinct writing systems to be considered in determining the language-specific features: alphabetic, syllabic, and logographic. First, in alphabetic writing systems, written symbols (i.e., alphabets) contain vowel and consonant phonemes, which are the building blocks for the syllables and words. English, Spanish, Italian, and German orthographies are several visual representations of this writing system. Thus, reading in these languages mainly requires the ability to map each phoneme to its corresponding sound in order to figure out the word meaning. Second, in syllabic writing systems, the basic meaning change unit in the written symbol is a syllable, so it is necessary to efficiently map each syllable to spoken language to read successfully. Japanese *Kana* is an orthographic example of a syllabic writing system. Third, written symbols (i.e., characters or signs) in logographic writing systems directly represent words or concepts. The main focus of reading in this writing system is, therefore, picturing each character as

a whole meaning representation of the word. Chinese[1] and Japanese *Kanji* can be exemplary orthographies in the logographic writing systems. The efficiency of learning to read two or more languages simultaneously may depend on the degree of variation across the writing systems of the languages included.

Focused on structural similarities and differences between languages, the universal grammar of reading proposes that, it is not an overall reading ability in one language that is cross linguistically transferrable, as proposed by Cummins (1981, 2000, 2005) in his linguistic interdependence hypothesis. Rather, specific information-processing skills may be transferable when they are similar from one language to another. Information-processing entails mapping language forms and their corresponding functions. If a reader established automatic skill in a certain form-function mapping in one language (e.g., L1), and the skill is used to process another language (e.g., L2), then the information-processing skill would be transferable between the two languages.

The transfer facilitation model. The transfer facilitation model (Koda, 2008a) suggests metalinguistic awareness as a good indicator of language competency, which is fundamentally an information-processing skill that is transferable across languages.

There are four essential conditions to be considered in estimating the degree of cross-language transfer of metalinguistic awareness between languages: shared metalinguistic awareness, L1 metalinguistic sophistication, language distance, and cross-

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[1] The Chinese orthography does not distinguish speech sounds and meaning within a word, but specifically represents those linguistic properties with morphemes in a syllable unit. Thus, it would be more reasonable to say that Chinese is a morpho-syllabic writing system, rather than either logographic or morphemic.

linguistic variations. First, the shared metalinguistic awareness rule is similar to the language-universal feature in the universal grammar of reading (Perfetti, 2003). Both concepts postulate that if a reader has well-developed L1 metalinguistic awareness, and similar language processing skill is required in L2, then the ability can play a facilitative role in his or her L2 reading. Second, the L1 metalinguistic sophistication rule refers to the variations of mapping form-function across different writing systems which is similar to the language-specific feature posited in the universal grammar of reading. When learners' L1 structure does not correspond to L2, the learners not only need to have extensive print exposures in the new language, but also have to spend more time and effort to learn the target language-specific features. Third, the language distance points out that the degree of the cross-language transfer is determined by the structural similarities between languages included. Fourth, the cross-language variations, therefore, entail that the specific details and rates of cross-language transfer will be different across individual learners who have different L1 backgrounds.

Both the universal grammar of reading (Perfetti, 2003) and the transfer facilitation model (Koda, 2008a) suggest important points to be considered in the investigation of cross-language transfer in the present dissertation. On the one hand, structural similarities between English and Korean morphology may render similar information-processing skills (i.e., MA) which can be positively transferred to increase vocabulary and reading comprehension across the two languages. On the other hand, the degree and direction of cross-language transfer would vary according to distinct morphological structure of each language.

Contrary to the linguistic interdependency hypothesis (Cummins, 1981, 2000, 2005), the transfer facilitation model (Koda, 2008a) did not take into consideration the effect of different language learning contexts on cross-language transfer. In the transfer facilitation model, cross-language transfer variations are mainly determined by the distance of structural similarities between languages included. Since the Korean ESL and the Korean EFL learners' L1 background is the same and they are learning to read the same target language (English; L2), there may be no variations across the two groups with regards to the cross-language transfer pattern. These contradicting points were investigated in the present dissertation by comparing the degree and direction of the cross-language transfer between the Korean ESL and the Korean EFL groups.

Role of MA in Vocabulary

Research has shown that MA is a unique predictor for English vocabulary learning (Carlisle, 2000; Kieffer & Lesaux, 2012a; McBride-Chang et al., 2005b; Zhang & Koda, 2013). For monolingual English speaking children, Carlisle (2000) provided evidence that MA was a statistically significant predictor for third- and fifth-graders' English vocabulary. Interestingly, the MA contribution was higher for the fifth-graders (R^2= 53%), than for the third-graders (R^2= 41%). For kindergarteners and second graders, the positive MA contribution in English vocabulary was unique from other predictors of reading such as word identification and rapid number naming (McBride-Chang et al., 2005b). Kieffer and Lesaux (2012a) showed that MA is a statistically significant predictor for ESL learners' English vocabulary (e.g., Spanish, Vietnamese, and Filipino

ESL learners). The positive role of MA in English vocabulary was also found among Chinese EFL learners (Zhang & Koda, 2013).

In languages other than English, MA has also been suggested one of the effective predictors of vocabulary growth. In a one-year longitudinal study, McBride-Chang et al. (2008) showed that Cantonese, Chinese, and Korean kindergarteners' compound MA in Time 1 predicted their vocabulary growth in Time 2 when controlling for age, nonverbal reasoning, and PA. The increased vocabulary ability was also a significant predictor for the learners' later MA development when controlling for their Time 1 MA. Interestingly, the bidirectional relationship between MA and vocabulary was similar among the three language group students.

These positive roles of MA in vocabulary across languages represent that readers in each language strategically use their ability to recognize meaning oriented sub-lexical unit (i.e., morphemes) while deciphering the meaning of complex words. For example, when readers encounter English complex words such as *methodological* and *similarity*, if they are well-aware of derivational morphology formations they can easily extract those words' meaning with common terms such as *method* and *similar* (Kieffer & Lesaux, 2012a). For readers of Korean, the Korean complex words 대인 /dae.in/ and 소 /so.in/ can be easily deciphered when they know compound morphology formations in those words, where 대 means *adult*; 소 represents *young*; and 인 means *person* (McBride-Chang et al., 2008).

With regards to the cross-language transfer, evidence has been found to support the hypothesis that L2 readers' MA in one language facilitates their vocabulary learning

in another language. Pasqurella et al. (2011) found that Chinese ESL learners showed bidirectional cross-language transfer of MA to vocabulary. The students' L2 (English) compound MA was transferred to predict their L1 (Chinese) vocabulary, and their L1 vocabulary ability was also transferred to their L2 compound MA. Additionally, Ramirez et al. (2013) provided evidence that Spanish ESL learners' L1 (Spanish) derivational MA was positively transferred to predict their L2 (English) cognate vocabulary. These findings suggest that a well-developed ability to process morphological information in one language may facilitate vocabulary growth in additional languages.

Since vocabulary is one of the well-known predictors for reading comprehension (Cunningham & Stanovich, 1997; Stahl & Nagy, 2006), the connections between MA, vocabulary, and reading comprehension should be more comprehensively investigated. However, little has been thoroughly examined with regards to the relationships among those three variables, while controlling for other important predictors of reading (e.g., PA and OA) simultaneously. When it comes to the cross-language transfer, previous studies did not comprehensively investigate whether the transfer from L1 MA to L2 vocabulary and that from L2 MA to L1 vocabulary would occur similarly or not. Thus, further investigations into these issues are needed.

Role of MA in Reading Comprehension

Within-Language Contribution

Studies have consistently shown that MA is an important metalinguistic skill for reading comprehension in English among monolingual English speakers. Carlisle (2000),

in one of the pioneering studies, found that derivational MA was a statistically significant predictor of reading comprehension for fifth-graders. A four-year longitudinal study by Deacon and Kirby (2004) showed that the contribution of inflectional MA to reading comprehension not only was statistically significant for students from second to fifth grade, but also made a unique contribution after controlling for PA and verbal- and non-verbal intelligence. Similarly, Nagy et al. (2006) found that the latent construct of derivational and inflectional MA was a statistically significant predictor of reading comprehension for students from fourth to ninth grade. The study provided further evidence that the contribution of MA to reading comprehension was both direct (i.e., from MA to reading comprehension) and indirect (i.e., from MA to reading comprehension via vocabulary).

For ESL learners, it has also been found that MA is a unique predictor for their reading comprehension in learning to read English. According to Goodwin (2010) and Kieffer and Lesaux (2008), fifth grade Spanish ESL student's English derivational MA was unique in predicting their English reading comprehension. Kieffer and Lesaux (2012a) compared sixth graders with different language backgrounds, including Spanish-, Filipino-, and Vietnamese-speaking ESL students, in addition to monolingual English-speaking children. Based on multiple group SEM analysis, similar patterns were found across different language groups, which showed both the direct (i.e., from MA to reading comprehension) and indirect (i.e., from MA to reading comprehension via vocabulary) effects of derivational MA to reading comprehension in English. Recently, the same

patterns of direct and indirect effects have been found among fifth-grade (Goodwin et al., 2013) and sixth-grade (Kieffer & Box, 2013) Spanish ESL students.

A longitudinal study from Lam, Chen, Geva, Luo, and Li (2012) pointed out that both compound and derivational MA were important predictors for Chinese ESL students' reading comprehension in learning to read English. Relative contribution of derivational MA to reading comprehension was higher than that of compound MA for the student. In addition, the positive role of derivational MA for predicting reading comprehension increased from kindergarten to second grade. Similar results have been found from other language groups (e.g., monolingual English speaking, Spanish-, Filipino-, and Vietnamese-speaking ESL learners), demonstrating the importance of MA for reading comprehension in English. A study with Arabic-speaking students (third-, fourth-, and fifth-graders) showed slightly different results, which indicated that the student's English MA was not a statistically significant predictor for their English reading comprehension (Farran, Bingham, & Matthews, 2012). However, the measure of English MA in the study showed a ceiling effect which might explain the non-significant result.

Based on the above review of the literature, it is reasonable to conclude that MA is one of the important cognitive skills that predict success in learning to read English, not only for monolingual English speakers but also for ESL students. In addition, for both monolingual English-speaking and ESL learners, the positive role of MA in predicting English reading comprehension was independent (i.e., direct effect) from other variables such as PA and vocabulary, and was mediated by vocabulary (i.e.,

indirect effect). However, due to the limited number of studies with different language backgrounds, it is questionable whether the positive contribution of MA to reading comprehension in English can be generalized to all ESL learners whose L1 is Korean, Turkish, Hebrew, etc.

Additionally, Kieffer and Lesaux (2012a) suggested that the relative magnitude of the indirect effect (i.e., from MA to reading comprehension via vocabulary) was different according to the student's L1 background. In their study, the MA variable was constructed by the measured scores of derivational tasks, and path coefficients from MA to reading comprehension via vocabulary were the highest for Filipino-speaking ESL students, but lowest for Vietnamese-speaking ESL learners. It should be noted that Filipino language has more derivational words while Vietnamese has more compound words. Thus, for studies of ESL learners, the students' L1 morphological system should be considered as an important factor for explaining why and how the students activate a specific type of MA for learning to read English.

Another important point is that the contribution of derivational MA to reading comprehension increased according to the student's grade level (Carlisle, 2000; Lam et al., 2012) and derivational MA was key for reading comprehension in English speaking older elementary students (Carlisle, 2000; Goodwin, 2010; Goodwin et al., 2013; Kieffer & Box, 2013; Kieffer & Lesaux, 2008, 2012a). However, almost all of these studies included only derivational tasks for measuring MA, and other types of morphological tasks (e.g., inflectional and compound) were not included. Lam et al. (2012) included both derivational and compound MA in their study, but the participants of the study were

younger students, from kindergarten to second grade. Thus, further investigation is needed to fill the gap with studies that include multiple types of MA to explain older elementary students' reading comprehension in English.

With respect to EFL learners, several studies have been conducted to investigate the contribution of MA to reading comprehension in English. Jeon (2011) provided evidence that tenth-grade Korean EFL students' derivational MA showed a unique contribution for predicting their reading comprehension in English after controlling for PA, vocabulary, and listening comprehension. Zhang and Koda (2013) also found positive contributions of MA to reading comprehension among sixth-grade Chinese EFL learners. The participants' derivational and compound MA independently showed direct contributions to reading comprehension in English, but derivational MA accounted for more variance in reading comprehension than did compound MA. These findings are very similar to the results of studies with monolingual English-speaking and ESL learners, showing positive contributions of MA to reading comprehension in English as well as representing the more important role of derivational MA in reading comprehension in English when the students were above fifth-grade.

When it comes to the direct and indirect effect of MA on reading comprehension in English among EFL learners, however, Zhang and Koda (2012) provided slightly different findings from the previous studies. Chinese EFL students in the study showed only indirect effects of derivational MA on reading comprehension in English which was mediated by English vocabulary. The direct effect of derivational MA on reading comprehension in the study was not statistically significant, whereas monolingual

English speaking and ESL learners consistently showed both direct and indirect effects of derivational MA on reading comprehension in English (Goodwin et al., 2013; Kieffer & Box, 2013; Kieffer & Lesaux, 2008, 2012a; Nagy et al., 2006; Ramirez et al., 2013). However, the participants in Zhang and Koda (2012) were university level students, while most of the other studies were conducted with students in upper elementary grades (fifth and sixth grades). Thus, more investigation with older elementary EFL learners is needed to see whether the contribution of MA to reading comprehension has both direct and indirect effects among that age group.

In languages other than English, MA has been found to be an important factor in reading development. For example, Mahfoudhi et al. (2010) found that monolingual Arabic speaking students' MA contributed unique variance for explaining their reading comprehension in Arabic after controlling for PA and non-verbal ability. Similarly, Ramirez et al. (2010) showed that, for fifth grade Spanish-speaking ESL learners, derivational MA was important for word reading in Spanish. For fourth-grade Korean EFL learners, compound MA was one of the most significant predictors of word reading and spelling in Korean (Cho et al., 2011). For fifth-grade Taiwanese EFL learners, compound MA made a unique contribution to word reading in Chinese (Hu, 2013). However, only Mahfoudhi et al. (2010) investigated the contribution of MA to reading comprehension. Therefore, more empirical studies are needed with students learning to read languages other than English, in order to get a better picture of the contribution of MA to reading comprehension from a within-language perspective.

Cross-language Contribution

Regarding the cross-language contribution of MA to reading comprehension, one noteworthy point from studies on ESL learners is that positive cross-language transfer occurs regardless of whether L1 and L2 have similar or different writing systems. For example, both English and Spanish are alphabetic writing systems where phonemes are mapped onto graphemes or letters. The Chinese writing system, however, is morpho-syllabic, where combinations of signs in syllabic units represent words or concepts. Empirical evidence to support positive cross-language transfer has been found not only in Spanish ESL children (Ramirez et al., 2013), but also in Chinese ESL children (Pasquarella et al., 2011; Wang et al, 2006a).

According to Ramirez et al. (2013), Spanish derivational MA of fourth- and seventh-grade ESL students indirectly predicted their English reading comprehension, which was mediated by English cognate vocabulary and English MA. However, the study did not investigate whether English derivational MA would also be transferred to Spanish reading comprehension. Both Pasquarella et al. (2011) and Wang et al. (2006a) investigated cross-language transfer of compound MA to reading comprehension among younger (first, second, and fourth grade) Chinese ESL students, and found a unidirectional transfer, showing that Chinese ESL students used their English compound MA on their Chinese reading comprehension, but that their Chinese compound MA did not help in increasing their English reading comprehension. However, it is questionable whether the result would be the same if the study had been conducted with upper elementary Chinese ESL students.

Wang et al. (2009a) conducted one of the few studies that examined cross-language contribution of MA to reading in Korean ESL students. The learners' derivational MA was transferred to word reading cross-linguistically (i.e., from Korean MA to English word reading and from English MA to Korean word reading), but did not show any statistically significant effect on their reading comprehension. However, the participants in Wang et al. study (2009a) were students from grades two to four who might not have mastered the concept of derivational morphology. Studies by Berninger, Abbott, Nagy, and Carlisle (2010) and Kieffer and Lesaux (2008) have shown that both monolingual English-speaking and ESL students exhibited a similar developmental trend in MA, which indicated that derivational MA may develop in upper elementary grades (fifth-grade), while inflectional- and compound-MA may develop in the early grades.

With regards to EFL learners, recent studies showed that MA in one language was positively transferred to literacy skills in another language (Cho et al., 2011; Hu, 2013). For example, Korean EFL learners' L1 (Korean) MA was positively transferred to their L2 (English) word reading (Cho et al., 2011). Taiwanese EFL learners activated their L1 (Chinese) MA for L2 (English) word reading (Hu, 2013). However, the scope of these studies was limited in word-level reading investigation, and therefore it is hard to say that EFL learners' MA in one language can be transferable to reading comprehension in another language. Moreover, none of these EFL studies investigated the directionality of cross-language MA transfer to literacy outcomes. Therefore, further examination of cross-language MA contribution to passage-level reading (reading

comprehension) among older elementary EFL learners is required with emphasis on determining the direction of the cross-language transfer.

Methodological issues should be more seriously considered in investigating the cross-language transfer effect. On the one hand, equivalent types of L1 and L2 measures should be administered. For example, if L1 reading comprehension measures consist of expository and literary passage readings, L2 reading comprehension measures must also include those two types of reading texts. If L1 tasks are administered orally, L2 measures must be tested in the same manner. On the other hand, the majority of the cross-language transfer studies examined the learners' L1 effect on learning to read English (L2), but not vice versa. The most current conceptualization of cross-language transfer claims that language transfer is ever changing processes that can occur at any point in biliteracy development (Biyalystok, 2001; Cook & Bassetti, 2005). This bidirectional cross-language transfer effect should be empirically tested.

Language Structures: Korean and English

Korean and English writing systems have both similarities and differences. A writing system refers to how speech and meaning are consistently and logically represented in written language. The main classification rule of a writing system is which linguistic units are represented by written symbols. On the one hand, both Korean and English have specific written symbols, alphabets (i.e., vowels and consonants), as the basic unit of representing spoken language. On the other hand, the smallest unit of written symbol in Korean is at a syllable level, while English is at a phoneme level. Thus, Korean is often called an alpha-syllabic, while English is called an alphabetic writing

system. For example, a Korean word 감 /kam/ (persimmon), consists of two consonants (ㄱ/k/ and ㅁ/m/) and one vowel (ㅏ/a/), and if one of the symbols is altered, the meaning of the word will be changed (e.g., 밤/bam/ [chestnut]). However, to represent the designated sound and meaning of the word, it should be written as a syllable block (e.g., 감), not as separate symbols (e.g., ㄱ ㅏ ㅁ). In English, each symbol in a word *cat* /kat/ is a basic building block that represents a sound in the spoken language.

Orthography

Specific visual representation of a writing system is known as an orthography, and Korean and English orthographies are distinct from each other. Korean *Hangul* is a particular visualization of an alpha-syllabic writing system. There are 14 basic consonants (ㄱ,ㄴ,ㄷ,ㄹ,ㅁ,ㅂ,ㅅ,ㅇ,ㅈ,ㅊ,ㅋ,ㅊ,ㅍ,ㅎ) and 10 basic vowels (ㅏ, ㅑ, ㅓ, ㅕ, ㅗ,ㅛ,ㅜ,ㅠ,ㅡ, ㅣ) in Korean *Hangul* (Cho et al., 2011). Rather than appearing in a linear arrangement, these basic Korean alphabetic symbols are combined together and represented as a syllable-block (Kim, 2007). In addition, each alphabetic symbol is positioned in the block in a specific order (e.g. from left to right and from top to bottom). For example, vowels and consonants in a word 감기 /kam. ki/, meaning cold, are not arranged linearly (e.g., ㄱ ㅏ ㅁ ㄱ ㅣ), but fitted into each syllable block (감기). The order of putting each alphabetic symbol into the syllable block is from left to right (e. g, ㄱ → ㅏ) and top to bottom (e.g., 가→ㅁ), but never any other order (e.g., ㅏ→ ㄱ or ㅁ→ 가). The written English is a special orthography of the alphabetic writing system. There are 26 English alphabetic symbols (i.e., 21 consonants and 5 vowels) and

the combinations of the consonants and vowels are linearly arranged from left to right. Accordingly, reading in English mainly requires processing the linear horizontal arrangement of the written symbols, while Korean reading mainly involves packaging and un-packaging syllable blocks by analyzing written symbols that are aligned either horizontally or vertically (Park, 2008).

The orthographic transparency between Korean and English is not the same, and this orthographic property generates differences in reading across the two languages. The orthographic transparency is determined based on the degree of phoneme-grapheme correspondence. For example, in Korean, the phoneme /k/ is only represented as ㅋ, but in English, the written representations of the sound are various (e.g., *c*, *k*, *ck*, and *ch*). Thus, Korean *Hangul* is often regarded as a transparent orthography, whereas English is called an opaque orthography. Most Korean children master reading Korean *Hangul* before starting formal schooling (i.e., approximately by four or five years old), and can easily decode words after mastering the Korean alphabet. Kim (2011) provided empirical evidence that young Korean children around four or five years old indeed utilize their phonemic awareness in word reading. On the contrary, while learning to read English, decoding words based on the phoneme-grapheme correspondences is one of the critical challenges for young children, and it takes children longer to learn the mapping skills, compared to learning to read other transparent orthographies (e.g., Italian and Greek; Goswami, 2008). Accordingly, English learners utilize other information-processing skills such as whole-world strategies and rhyme analogy strategies to compensate for their difficulties in decoding graphemes with phonemes.

Phonology

There are salient differences between Korean and English with regards to the three different units of phonology: syllable, onset-rime, and phoneme. First, the syllabic unit in Korean is fairly simple compared to English syllable structure. Korean syllables can be formed as CV (e.g., 가 /ga/), CVC (e.g., 남 /nam/), and CVCC (e.g., 닭 /dak/), but the CV and CVC structures occur most commonly (Kang, 2012). English is more complex in syllable structure than Korean, and several consonant clusters are allowed in one syllable. The maximum syllable in English is CCCVCCCC (e.g., *strength*). Second, while the onset-rime unit is the most salient boundary of English words (Durgonoglu & Oney, 1999; Treiman & Zukowski, 1991), Korean intra-syllabic units are more dominant in body-coda structure (Kim, 2007, 2008; Yoon & Derwing, 2001). For example, in English, the word *cat* has various rime neighbors such as *bat, fat, hat, mat, rat,* and *sat*, whereas very limited body neighbors (e.g., *can* and *cap*). For the Korean word 달/dal/, even though there exist more possible rime neighbors (e.g., 알/al/, 갈/kal/, 날/nal/, 말/mal/, 발/bal/, 살/sal/, 잘/jal/, 칼/k^hal/, 탈/t^hal/, 팔/p^hal/, 딸/ttal/, and 쌀/ssal/), its body neighbors occur more frequently (e.g., 다/ta/, 닭/tak/, 단/tan/, 닻/tat/, 담/tam/, 답/tap/, and 당/tang/; Kim, 2007). Third, while some phonemes are identical between the two languages (e.g., /m/ and /n/), Korean does not have several English phonemes (e.g., /θ/, /ð/, /f/, and /v/), nor does it distinguish /l/ and /r/ sounds (Wang et al., 2006b).

Due to these variations, learning to read Korean involves different phonological processing skills from those in English reading. For example, evidence showed that

young Korean children's syllabic awareness was a strong determining factor for their growth rates in Korean word reading (Kim & Petscher, 2011), while phonemic awareness was the most important phonological processing skill in English reading (Muter, Hulme, Snowling, & Stevenson, 2004). Additionally, the contribution of syllabic awareness in Korean word reading remained significant after controlling for other print-related skills such as letter-name knowledge, letter-sound knowledge, and repaid naming skills (Kim, 2011). Not surprisingly, Korean learners' body-coda understanding showed more prominent influence on Korean reading, while onset-rime awareness most influential on English reading (Lee & Taft, 2009).

Morphology

Morphological systems of Korean and English are structurally and functionally comparable (Koda, 2000). There are three major types of morphemic structures in both languages: inflections, derivations, and compounds (Wang et al., 2009a). First, similar to English, words are inflected in Korean by adding suffixes on the stem word. However, in Korean, inflected words are not considered complex words because the formation does not contribute to forming new words (Cho et al., 2011). Second, derivations are possible in both languages (Koda, 2000; Wang et al., 2009a). In English, *depth* can be derived from *deep* and *-th* which is a derivational noun suffix. In Korean, 깊이 /gip.i/, meaning depth, is derivative from 깊다 /gip.da/, which means deep, and –이, which is a derivational noun suffix. Prefixes can also be attached to the stem word to make derivational words in both English and Korean, but the number of prefixes in Korean is very small. Third, compound formation is right-headed in Korean as well as in English.

The free morpheme on the right is the head, and the one on the left is a modifier (Ramirez et al., 2011). For example, the outer area of river is not called a *sideriver*, but a *riverside,* in English. The compound word for riverside is 강가/kang.ga/ in Korean, in which 강 /kang/ means river and 가 /ga/ represents side.

Differences also exist in morphemic structures, which bring out variations in reading development across the two languages. For example, Korean is productive in making compound words (Cho, McBride-Chang, & Park, 2008), whereas English words are more often produced by derivational formations (Ramirez et al., 2011). Approximately, 50 to 70 % of Chinese loan words in Korean are based on compounding formations, and the formation rule is also prevalent for creating native Korean words (Kim, 2010). Evidence showed that older elementary (i.e., from fourth to sixth grades) Korean students' awareness of the Korean compound MA was actually a strong predictor for their Korean word reading (Cho et al., 2011), while English derivational MA informed English word reading for English-speaking counterparts (Deacon & Kirby, 2004). Additionally, compound MA played a significant role in second-grade Korean learners' Korean vocabulary development, but it was not a good predictor for the same grade English speakers' English vocabulary growth (McBride-Chang et al., 2005a).

Language Learning Contexts: ESL and EFL

The environmental context of learning English is not the same across countries, but there is no preferred method of categorizing those differences. One of the well-approved approaches is Kachru's three circles (1989): inner, outer, and expanding circles. The inner circles represent countries that use English as a first language such as

Australia, Canada, New Zealand, the U. K., and the U. S. The outer circles consist of multilingual countries such as Hong Kong, India, Singapore, and Rwanda where English is used as a second language. The expanding circles include countries where English is used as a foreign language for specific academic or business purposes (e.g., China, Denmark, Germany, Japan, Korea, and Norway).

Recent views on categorizing English learning contexts does not distinguish national or political boundaries, but rather uses a more general approach to describe the communicative function of using English. For example, Carter and Nunan (2001) define the ESL environment as referring to countries, contexts, and cultures where English is a predominant language of communication, while EFL refers to areas where English is neither a medium of communication nor a language of instruction. In addition, according to Ellis (2008), in ESL environments, English plays an institutional and social role in the community; in EFL conditions, English plays no major role in community and is primarily learned only in the classroom.

The present dissertation primarily categorized ESL and EFL contexts based on multiple factors, such as language of communication and institutional and societal language. First, English is a dominant language of communication and instruction for the Korean ESL learners, while it is Korean for the Korean EFL learners. Second, the Korean ESL learners use English as their institutional and social language; the Korean EFL learners, use Korean. Accordingly, the amount of print exposure in each language may not be equivalent between the two groups: dominant L2 (English) literacy input for the ESL group; prevalent L1 (Korean) literacy input for the EFL group.

Due to unbalanced literacy input in learning to read L1 and L2, the two groups of students may need additional support from home. As component model of reading proposed (Joshi & Aaron, 2000; Joshi et al., 2012), home language environment is one of the important ecological components of reading. Research has shown that parental education level and parental participation in literacy activities at home would affect children's reading development (Adams, 1990; Bus, 2001; Ortiz, Stowe, & Arnold, 2001; Snow, Burns, & Griffin, 1998; Wells, 1985). Thus, information about home language environment may provide meaningful points to describe the ESL and the EFL learners' language learning contexts. In particular, parental education, language use at home, and parental involvement in reading were carefully examined in the present dissertation.

As Kuo and Anderson (2010) suggested, one benefit of learning to read two languages at the same time is that learners can easily notice and manipulate structural similarities and differences across languages (i.e., the structural sensitivity theory). However, ESL and EFL learners have distinct amount of L1and L2 literacy input while learning to read two languages in very different language learning contexts, and they may not have equivalent ability to process language forms in each language. Even though current research has shown MA is a unique predictor for both ESL and EFL students' literacy development (Goodwin et al, 2013; Jeon, 2011; Kieffer & Box, 2013; Kieffer & Lesaux, 2008, 2012a; Zhang & Koda, 2012, 2013), none of these studies have included both groups of students simultaneously and compared whether the MA effect on vocabulary and reading comprehension is equally important in learning to read their L1 and L2. For a more comprehensive understanding of the role of MA in biliteracy

development, contextual differences of language learning must also be taken into consideration in order to be empirically investigated.

The Statement of Purpose

The purpose of the present dissertation, therefore, was to investigate how one particular type of metalinguistic awareness (MA) plays a role in vocabulary and reading comprehension among students who learn to read two languages (Korean and English) in different language learning contexts (ESL and EFL). As a within-language perspective, the role of English MA in English vocabulary and English reading comprehension; and Korean MA in Korean vocabulary and Korean reading comprehension were examined, when controlling for other types of metalinguistic awareness such as PA and OA. Particular attention was given to finding any direct effect of MA on vocabulary and reading comprehension or indirect effect of MA on reading comprehension mediated by vocabulary. For a cross-language perspective, the reciprocal role of MA in one language to vocabulary and to reading comprehension in another language was explored. The possibilities and determining factors of the cross-language transfer pattern were specific focus of the investigation. Differences between ESL and EFL groups on these within- and cross-language MA effect were also statistically tested.

Research Hypotheses

Based on the literature review, five research hypotheses were established:

H1. As reading is an essentially metalinguistic process which requires language forms to be recognized and manipulated, the Korean ESL and the Korean EFL learners' MA played a unique role in their L1 (Korean) and L2 (English) reading, after controlling

for PA and OA: English MA for English vocabulary and English reading comprehension; and Korean MA for Korean vocabulary and Korean reading comprehension.

H2. Because the three types of metalinguistic awareness (PA, MA, and OA) and vocabulary are essential constituents of lexical quality, when all these variables are fully specified and closely bound together, the variance of reading comprehension would be well explained in English and in Korean.

H3. The role of MA in vocabulary and reading comprehension may not be equivalent across the Korean ESL and the Korean EFL learners, because the two language groups have different language learning contexts with various home supports.

H4. No matter what language learning contexts are (ESL and EFL), due to orthographic transparency, the upper elementary grade Korean ESL and the Korean EFL learners would show better PA in Korean than in English; and the learners' PA would remain a critical element for vocabulary and reading comprehension in English, not for Korean vocabulary and reading comprehension.

H5. The Korean ESL and the Korean EFL learners' MA in one language would be transferred to vocabulary and reading comprehension in another language because their L1 (Korean) and L2 (English) share similar morphological structure. However, due to language-specific features in Korean and English morphology and due to different language learning contexts (ESL and EFL), the participants would show various patterns of the cross-language transfer.

CHAPTER II

METHOD

Participants

Research participants were recruited based on a "convenience sampling*"* (Gall, Gall, and Borg, 2007, p.175) with volunteer Korean ESL and Korean EFL learners, who are in grades five and six. The Korean ESL learners are *inner circle* country (i.e., the U. S.), while the Korean EFL learners are *expanding circle* (i.e., Korea). In the U.S., English is a dominant language of communication and it is used as a societal and institutional language, while Korean is one kind of ethnic group language. On the contrary, in Korea, social and institutional communication is based on Korean, whereas English is taught and learned for specific academic or business purposes (e.g., university entrance exam or job interview).

Korean ESL Learners

All the Korean ESL learners were recruited from eight Korean language schools (KLS) in the southern Texas area. Initially 52 children voluntarily participated with consent of their parents. Two children were excluded because they had been in the U.S. for less than six months. The final sample was 50 Korean ESL learners - 23 fifth and 27 sixth graders (17 boys and 33 girls). On week days, the Korean ESL learners attend English schools, but on weekends, they attend KLS. The KLS is a volunteer community school and its main curriculum is mostly based on the textbooks provided by the Educational Foundation for Koreans Abroad. Units of the textbook consist of communicative functions such as greeting, asking help, shopping, suggesting, comparing,

and planning schedules. Each unit includes short paragraph or dialogue reading, listening and speaking games and activities, and composition practices (e.g., writing a letter, a diary, a descriptive or reflective journal). These Korean instructions are provided about two or three hours in a week in the KLS and other special activities (e.g., club activities or field trips) are opened as an extra curriculum.

A parental questionnaire was obtained to examine information about the participants' demographics, time of language learning, and home language environment. Unanswered items in the questionnaire were regarded as missing data. There were more participants who were born in the U.S. (54.0%) than in Korea (40.0%). The mean age of the participants was 140.5 months (*SD* = 7.6 months) and they resided in the U.S. for 111.4 months (*SD* = 30.6 months) on average. The average length of studying English (*M* = 76.8 months and *SD* = 25.0 months) was longer than that of studying Korean (*M* = 49.3 months and *SD* = 34.1 months).

Korean EFL Learners

Due to cultural differences in conducting research in Korea, the waiver of parental consent form was obtained based on the letter of cultural authority, and potential Korean EFL participants of the present study were recruited with consent to the assent form. Approximately 300 students in grades five and six across four public elementary schools in Seoul, Korea were asked to participate in the study, and 257 students voluntarily consented to participate. There were 130 fifth and 127 sixth graders (130 boys and 127 girls). The participants had at least two years of English instruction at school previously, because English is a required subject from third grade in Korean

elementary schools. At the time of the present study conducted, the participants have 120 minutes English lessons in a week at school, but many of them take additional private English lessons after school. Not surprisingly, therefore, Korean EFL learners' English reading skills are widely varied across individual students (Cho et al., 2011). The language of instruction in English class is typically Korean but teachers use a lot of classroom English (e.g., greetings, directions, classroom management, etc.).

A student survey was administrated to obtain background information about the Korean EFL participants. The items in the survey were similar to those in the parental questionnaire in the Korean ESL sample, but were presented with student-friendly language and the student participants were asked to complete it. Unanswered items in the questionnaire were regarded as missing data. Most of the participants were born in Korea (98.4%) and the mean age of the participants was 138.0 months (SD = 7.6 months). The average length of studying Korean (M = 95.1 months and SD = 38 months) was longer than that of studying English (M = 53.1 months and SD = 28.2 months).

Home Language Environment: Korean ESL Learners vs. Korean EFL Learners

The participants' home language environment was extensively compared in three points: parental education, language use at home, and parental involvement in reading. First, both groups' parents were highly educated. For the Korean ESL learners, 76.6 % of mothers and 82.6 % of fathers had university and graduate school level education. Similarly, the majority of the Korean EFL learners' mothers (59.5%) and fathers (67.8%) had completed higher than university level education (see Figure 1a and 1b).

Second, the two groups showed very different pattern in home language use (Table 1). Most of the Korean ESL students used both English and Korean at home (80.9%), while their parents mostly spoke Korean only (61.7% of mothers and 52.2% of fathers). However, for the Korean EFL learners, Korean was dominant home language: 76.9% of the students, 82.9% of their mothers, and 82.4% of their fathers spoke only Korean at home.

Third, the participants' parents rarely involved shared-book reading with their child (see Figure 2a and 2b). The majority of the Korean ESL learners' parents (69.5 %) spent less than several days in a year for Korean book reading, the. For English book reading, about 76.1% of the parents were involved the same amount of time per year. With regard to the Korean EFL learners, the majority of their parents spent less than several days a year for reading Korean books (62.1%) and English books (73.3%).

Accordingly, the Korean ESL and the Korean EFL learners in the present dissertation may not have strong supports from home language environment to learn to read both L1(Korean) and L2 (English). Even though the participants' parents are highly educated, their parents' commitment in language use at home and shared-book reading was very limited to provide extensive literacy input in both languages. For the ESL learners, they need to have intentional print exposures of Korean at home due to the language of communication and societal and institutional language is dominant to English in the U.S. However, their home supports for Korean learning is limited to the spoken language only, and their parents do not actively participate in Korean book reading with their child. For the EFL learners, additional English literacy input at home

is critical because Korean is dominant language of communication and societal and institutional language in Korean. However, the Korean EFL learners' home language environment was not supportive of learning to read English in that they have less opportunity to speak English and to read English books with their parents.

Table 1

Percentages of Home Language Use among the Korean ESL and the Korean EFL Learners

	ESL			EFL		
Home lg	Child (*N*=47)	Mother (*N*=47)	Father (*N*=46)	Child (*N*=251)	Mother (*N*=251)	Father (*N*=250)
E	8.5	0.0	0.0	0.0	0.0	0.0
E & K	80.9	38.3	47.8	21.9	15.9	15.6
K	10.6	61.7	52.2	76.9	82.9	82.4
Other	0.0	0.0	0.0	1.2	1.2	2.0

Note. ESL = the Korean ESL learners, EFL = the Korean EFL learners, Home lg = spoken language at home, E = speak English only at home, E &K = speak English and Korean at home, K = speak Korean only at home, and Other = speak languages other than English and Korean.

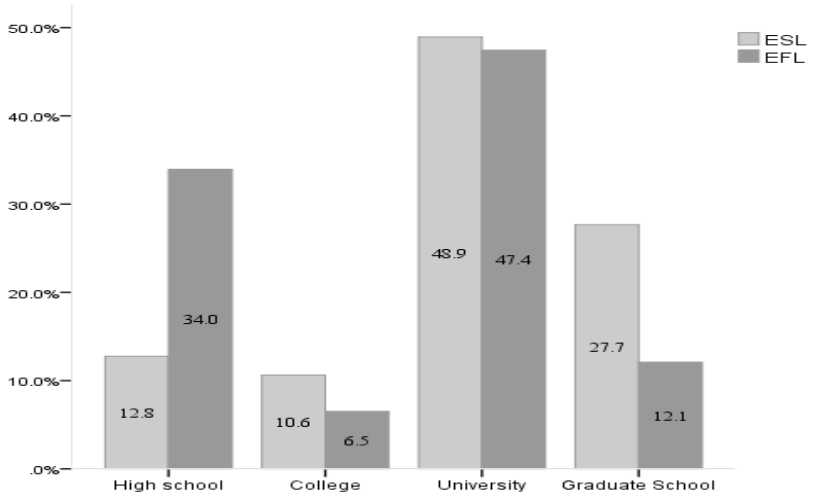

Fig. 1a. Percentages of mother's level of education (N_{ESL} = 47 and N_{EFL} = 215)

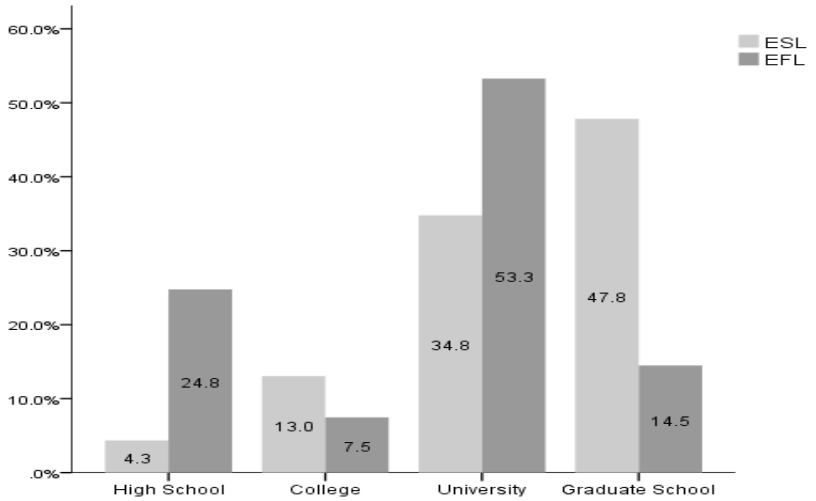

Fig. 1b. Percentages of father's level of education (N_{ESL} = 46 and N_{EFL} = 214)

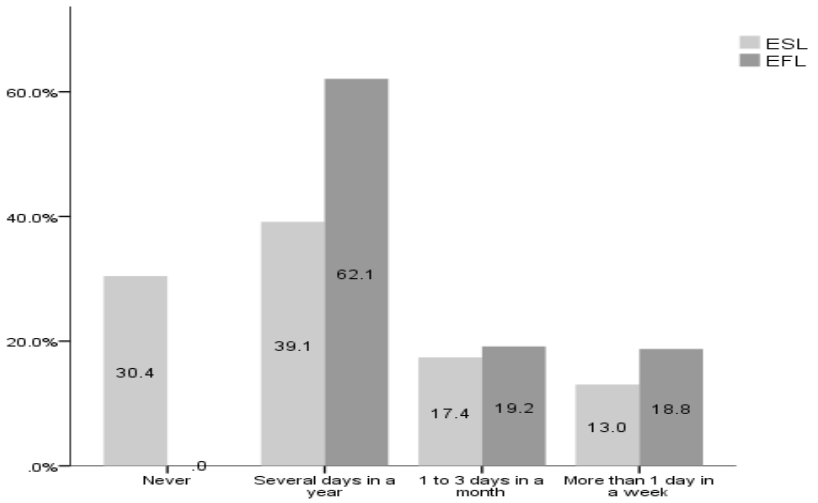

Fig. 2a. Percentages of parental involvement in Korean book reading (N_{ESL} = 46 and N_{EFL} = 240)

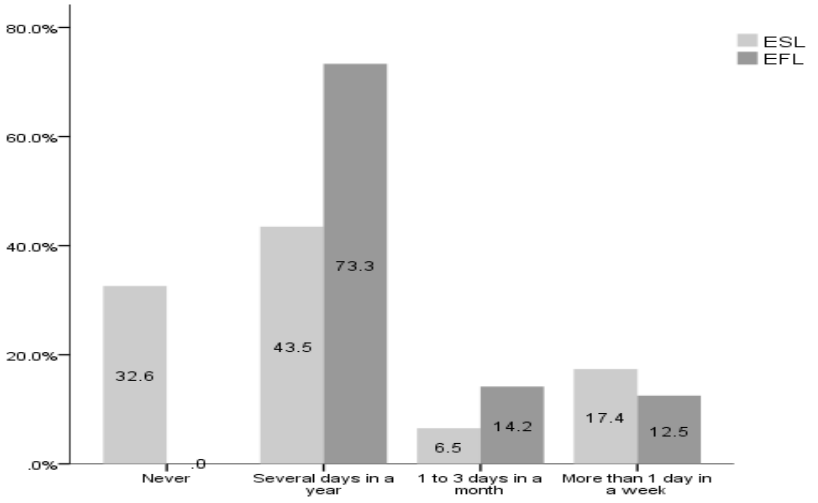

Fig. 2b. Percentages of parental involvement in English book reading (N_{ESL} = 46 and N_{EFL} = 240)

Measures

To test the participants' metalinguistic awareness (i.e., PA, OA, and MA), vocabulary, and reading comprehension ability, various measures were administered (Appendix A). Each of the measures consists of English and Korean tasks and the specific details of the instruments are explained below.

English PA (EPA)

To evaluate EPA, we tested the participants' awareness of the smallest unit of phonological forms (i.e., phonemes). Awareness of the phonemic unit[2] is one of the most significant factors for predicting word reading and reading comprehension among elementary students (Gottardo, Stanovich, & Siegel, 1996; McBride-Chang, 1996; Wagner, Torgesen, & Rashotte, 1994). Two types of phonemic-unit-processing tasks were used in the present study to construct the participants' PA: phoneme deletion and phoneme segmentation. These two tasks are among the most difficult commonly used phonemic awareness tasks, such as recognition or identification, blending, and isolation (Pufpaff, 2009; Stahl & Murray, 1994; Stanovich, Cunningham, & Cramer, 1984; Vandervelden & Siegel, 1995; Yopp, 1988). For the phoneme deletion task, the participants listened to a monosyllabic non-word item and were asked to delete one phoneme from the word and choose the appropriate number (i.e., 1, 2, or 3) on the answer sheet (Now listen, *mab*. How would this word sound without /b/? ; 1. /ab/, 2. /mab/, or 3. /ma/?). For the phoneme segmentation task, participants were asked to listen

[2] The ability to process phonemes is typically called *phonemic awareness*, whereas *phonological awareness* is general term referring to the ability to manipulate several units of spoken languages such as syllables or onsets and rimes in addition to phonemes.

to a real word item and count and write the number of phonemes of the word on the answer sheet (The word *cat* has 3 speech sounds /k/, /a/, /t/). There were 20 total items (i.e., 10 phoneme deletion and 10 phoneme segmentation tasks) and the internal consistency reliability (Cronbach's alpha) was .75.

English OA (EOA)

For testing EOA, eight pairs of test items were randomly selected from the non-word choice tasks in Wang, Perfetti, and Liu (2005). The non-word choice task is one of the most widely used in testing young children's English orthographic awareness (Cassar & Treiman, 1997; Siegel, Share, & Geva, 1995; Treiman, 1993). The test items were presented on the answer sheet, and the participant was asked to circle one word from each pair that looks more like a real word (e.g., *clid – cdil, cd* does not occur at the beginning of a word in English). The internal consistency reliability was .63.

English MA (EMA)

Two morphological production tasks were adapted from previous studies for evaluating the EMA: derivational- and compound-production (EDMA and ECMA; Carlisle, 2000; McBride-Chang et al., 2005b). To measure the EDMA, 10 test items were selected from Carlisle's derivational and decomposing tasks. This task has been commonly used across studies to measure ESL learners' EDMA (Pasquarella et al., 2011; Ramirez et al., 2010, 2011, 2013; Wang et al., 2009a), and several studies provided evidence for the validity of the task (Carlo et al., 2004; Kieffer & Lesaux, 2012b; Wagner, Muse, & Tannenbaum, 2007). The EDMA task asked students to fill the blank sentence by deriving a given root word (*farm*. My uncle is a ___ ; 1. *farming,* 2. *farmer,*

or 3. *farms*) or by decomposing a given derived word to find the root word (*farmer*. My uncle has a huge _____; 1. *farming,* 2. *farms*, or 3. *farm*). For the ECMA task, nine test items were randomly selected from McBride-Chang et al. (2005b). This task asked the participants to listen to the definition of a compound word and to make a new compound word based on the question (Early in the morning, we can see the sun rising. This is called a *sunrise.* At night, we might also see the moon rising. What could we call this? 1. a *moonrise,* 2. a *risemoon,* or 3. a *sunmoon*). All the EDMA and the ECMA test items were orally presented, and the participants were asked to choose appropriate number (i.e., 1, 2, or 3) on the answer sheet. The internal consistency reliability was .67.

English Vocabulary (EVocab)

Receptive vocabulary testing items were selected from two standardized vocabulary tests such as the Peabody Picture Vocabulary Test (PPVT-IVA; Dunn & Dunn, 2007) and the Gates-MacGinitie (G-M) vocabulary test (MacGinitie, MacGinitie, Maria, & Dreyer, 2000). First, the starting point of the test item selection from the PPVT-IVA corresponded to the participants' age (i.e., Set 9 for starting age 10). Twelve odd-number test items from the starting point were selected for the present study. The participants were asked to listen to a word and to choose an appropriate picture on the answer sheet that represents the word's meaning. Second, eight total test items were selected from the G-M vocabulary test Level 4. The participants were asked to read a phrase or a sentence and to find an appropriate vocabulary meaning from multiple choices (the good physician. 1. *medicine*, 2. *exercise, or* 3. *doctor*). While the majority

of the PPVT-IVA tasks included simple words, all the G-M test items consisted of morphologically complex words. The internal consistency reliability was .81.

English Reading Comprehension (ERC)

Five paragraphs were selected from G-M reading comprehension test Level 4 (MacGinitie et al., 2000). There were three narrative texts and two expository texts, and the participants were asked to read a paragraph and answer multiple-choice questions about the text. The total number of questions was 10 and the internal consistency reliability was .71.

Korean PA (KPA)

A parallel format of the EPA task was used for testing KPA. First, the researcher created a Korean phoneme deletion task, which consisted of 12, one-syllable pseudo-Korean words. The student was asked to delete first and last consonants of the Korean word (Now listen, 집/jip/ [a house], how would this word sound without ㅈ/j/; 1.지/ji/, 2. 입/ip/, or 3. ㅇ|/i/?). Second, 12 Korean phoneme segmenting items were selected from Kim (2009). The participants were asked to count the number of speech sounds of one- and two-syllable words (A word 감/kam/ [a persimmon] has 3 sounds, /k/, /a/, and /m/). The internal consistency reliability of the KPA was .84.

Korean OA (KOA)

The Korean OA task was similar to the English non-word choice task, but consisted of different subcategories: vowel position (e.g., ㅇㅣ [legal], ㅣㅇ [illegal]); simple vowel combination (e.g., 위 [legal], 우ㅏ [illegal]); initial consonant

requirement (e.g., 와 [legal], 느나 [illegal]); and final consonant cluster (e.g., 안흥 [legal], 안응 [illegal]) (Wang et al., 2006b). Participants were asked to choose an orthographically proper word from pseudo-word pairs on the answer sheet. There were 12 test items in total, and the internal consistency reliability was .62.

Korean MA (KMA)

Similar to the English task, both derivational and compound production tasks were used for evaluating the participants' KMA, which were created by the researcher. The Korean derivational tasks (KDMA) consisted of both derivational task (*사과* [an apple]. 아직 덜 익은 사과를 _____라고 한다 [A codling is an _____]. ; 1. *햇사과* [a new-apple], 2. *날사과* [an uncooked-apple], or 3. *풋사과* [an unripe-apple]) and decomposition task(*헛고생* [a futile-training]. 젊어서 _____은 사서도 한다 [Early training means more than late learning]. ; 1. *고난* [pain], 2. *고민* [worry], or 3. *고생* [training]). The Korean compound production task (KCMA) asked the students to choose proper compound words after listening to the descriptions (e.g., 우리는 강의 가장자리 부근을 *강가* 라고 말해요. 그럼, 바다의 가장자리 부근은 무엇이라고 말할까요? [We say the area of land by the bank of a river, a *river-side*. What do you call the area of land by the bank of an ocean?] ; 1. *가바다* [a side-ocean], 2. *바닷가* [an ocean-side], or 3. *강바다* [a river-ocean]). All test items were orally presented, and the participants were asked to choose appropriate number (i.e., 1, 2, or 3) on the answer sheet. Each task has 12 test items, and the total test items were 24. The internal consistency reliability was .79.

Korean Vocabulary (KVocab)

A similar method of receptive vocabulary testing in English was administered for evaluating KVocab. First, 12 test items were selected from the PPVT-IVA (Dunn & Dunn, 2007) and translated into Korean. The test items were distinct from the English test since only even-number test items were selected this time. The participants listened to words and were asked to choose the correct picture to represent the words. Second, a researcher-developed Korean vocabulary meaning inference task was administered. There were 10 total items for the task and all the items were morphologically complex words. The participants were asked to choose appropriate word meanings from multiple choices based on context (남의 전화를 *엿듣다*. ; 1. *옆에서 듣다* [listen beside], 2. *여러번 듣다* [listen several times], or 3. *몰래 듣다* [eavesdrop]). The internal consistency reliability was .81.

Korean Reading Comprehension (KRC)

Five paragraphs were selected from the With Books, Korean Ability Test–Level 3 (Korean Broadcasting Station, 2012) for evaluating the KRC. The test is a nationwide standardized assessment tool for testing Korean elementary and middle school students' general reading comprehension. There were three narrative texts and two expository texts, and the total number of questions was 10. The participants were asked to read a short paragraph and answer multiple-choice questions. The internal consistency reliability was .72.

The researcher-developed Korean measures (i.e., KPA, KOA, KMA, and Korean vocabulary meaning inference task) were initially examined by one of the KLS school

teachers to make sure the test items were appropriate for the fifth- and sixth-grade Korean ESL students. Eight students in the school were pilot tested, and no floor effects were found across those tasks.

Procedures

Equivalent procedures were adapted for implementing the measures across the Korean ESL and Korean EFL learners. First, all the measures were administered as audio-based tests with provision of the answer sheet. The students listened to the descriptions of each task through CD-ROM and were asked to circle an appropriate number on the answer sheet. Second, testing procedures were from EPA, to EMA, to EOA, to EVocab, to KPA, to KMA, to KOA, to KVocab, to ERC, and to KRC. Third, the participants were allowed to ask whenever they need a clarification with regards to the direction of each test material. Fourth, data collection was completed in 2013: from April to June for the Korean ESL group; from July to September for the Korean EFL group.

Due to testing time and place restrictions, however, there were slightly different testing conditions across the groups. For the ESL participants, a medium-large group of children (i.e., five to ten participants at a time) were tested in the KLS classroom after school. Approximately one hour was taken for the test administration, with five minute breaks between Kvocab and ERC test. For the EFL participants, a large number of students (i.e., approximately 20 or 25) were assembled in a classroom during or after school. The test materials were administered for 50 minutes without break. To avoid the participants' cognitive load, several test items were randomly deleted from the original

measure: three EPA, one EMA, six KPA, and six KMA items were subtracted (see Appendix A for the detail). Hence, the total numbers of test items for the Korean EFL group were: 17 EPA, 18 EMA, 8 EOA, 20 EVocab, 10 ERC, 18 KPA, 18 KMA, 12 KOA, 22 KVocab, and 10 KRC items.

Data Analysis

Preliminary Analysis

The internal consistency reliability (Cronbach's Alpha, α) of all the measured variables were initially analyzed based on the if-item-deleted statistics. According to Cortina (1993), if a reliability coefficient for the if-item-deleted is higher than the Cronbach's alpha for scores on the full scale, the item is harmful to the reliability of the measure. For the present dissertation, therefore, the harmful items in each measure were deleted and the reliability based on the if-item-deleted analysis was used for final analysis of Study I, II, and III (see Appendix B).

Multivariate normality on the two endogenous variables (i.e., vocabulary and reading comprehension) was tested. All the distributions in each study were statistically significantly different from the multivariate normality assumption (all *p*s < .05). The Q-Q plots for the variables in each study were not arranged in the linear line (see Appendix C). Thus, instead of using a normal theory method (i.e., maximum likelihood estimation; ML), the present dissertation used a corrected normal theory method for continuous but non-normal outcomes. The corrected normal theory method in the present dissertation used robust standard errors and corrected model test statistics (i.e., maximum likelihood robust estimation; MLR), which is vital to detect nonnormality problem (Kline, 2011).

Path Analysis

Path analysis is a conceptual representation of direct and indirect contribution of measured variables to other measured variables (Thompson, 2006) and it is a specific case of SEM. A path diagram is a visual representation of the relations among measured variables. Exogenous variables in path analysis are those that are not caused by another variable, whereas endogenous variables are caused by one or more variables. In the present dissertation, measured variables of PA, MA, and OA in English and Korean were regarded as exogenous variables, while Vocab and RC measures constructed the endogenous variables. In path analysis, it is generally assumed that exogenous variables are perfectly reliable and are hypothesized to covary (Kline, 2011). Disturbance is an unexplained variance in endogenous variable, and it is scaled constant in path analysis.

To investigate within- and cross-language contribution of MA to vocabulary and reading comprehension, the present dissertation followed basic steps of SEM in Kline (2011), including specification, identification, estimation, respecification, and reporting the results. These steps are iterative because if a problem is found at a later step, it is required to returen to a previous step. For Study I and II, two within-language and four cross-language path models were specified; and for Study III, four multiple-group path models were specified. Particular details about model specification procedures will be explained in the method section of each study.

CHAPTER Ⅲ

RESULTS

Study I

Study I investigated within- and cross-language aspects of MA contribution to vocabulary and reading comprehension among the Korean ESL learners in grades five and six. Research questions that were addressed in the study are;

1. Does the unique contribution of English MA to English vocabulary and reading comprehension and Korean MA to Korean vocabulary and reading comprehension remain when simultaneously controlling for other literacy skills among the Korean ESL learners in grades five and six?
2. Does MA make a unique contribution to vocabulary and reading comprehension cross-linguistically among the Korean ESL learners in grades five and six?
3. Which type of MA (derivational or compound) will explain more variance in the cross-language contribution of MA to vocabulary and reading comprehension in the same group of participants?

Method

Data descriptions. The ESL group data was used for Study I. The total number of participants was 50, 23 fifth-graders and 27 sixth graders (17 boys and 33 girls). Based on the preliminary reliability analysis, several items in each measure were deleted to increase the internal consistency reliability (α). The deleted items were two EMA, two EOA, two EVocab, one ERC, two KPA, three KOA, and two KVocab. Hence, the final item numbers for each measure were; 20 EPA, 17 EMA, 6 EOA, 18 EVocab, 9 ERC, 22

KPA, 24 KMA, 9 KOA, 20 KVocab, and 10 KRC. The preliminary reliability analysis results are provided in the Table B1 in Appendix B.

Path model specification. For the ESL group analysis, two within-language and six cross-language path models were used as a baseline model (Appendix D). All the specified within-language models (the English language model and the Korean language model) were saturated models, which included all possible parameters among variables. Two cross-language path models were initially specified either by adding the KMA variable to the English language model or by including the EMA variable in the Korean language model (the KMA→ERC model and the EMA→KRC model). After that, the other four cross-language models were specified by separating each of the additional MA variables into two categories-either by constructing the measured scores of derivational MA task or compound MA task. The four cross-language models were labeled as the KDMA→ERC, the KCMA→ERC, the EDMA→KRC, and the ECMA→KRC models, respectively.

Next, all the baseline models were identified not only by the counting rule ($df \geq 0$; Kaplan, 2009) but also by the recursive rule (i.e., no reciprocal causes among endogenous variables; Bollen, 1989). Then, several model fit indices were considered for the model estimation, such as chi-square test of fit (χ^2), standardized root mean square residual (SRMR), and comparative fit index (CFI). The model is considered representing a good fit when χ^2 is not statistically significant ($p > .05$), the value of SRMR is below 0.05 and CFI is above 0.95 (Kline, 2011). After that, each of the baseline models was sequentially respecified by deleting one path at a time. The

respecified models were nested in the baseline model, and the final path models for the present study were determined based on the chi-square difference test (χ^2) between the nested models.

Results

Descriptive statistics. The descriptive statistics (α, Max, *M*, and *SD*) were summarized in Table 2. All the internal consistency reliability of measured variables was acceptable (α > .70) except for EOA (α = .65), which indicated the measures were generally reliable. Descriptive discriminant analysis (DDA) results in Table 3 provided that there were no statistically significant group differences between the fifth and sixth graders on all the English tasks (F [5, 44] = 3.50, p = .62 > .05, Wilks' Λ = .93, R_c^2 = 7.4 %) and the Korean tasks (F [5, 44] = 6.51, p = .26 > .05, Wilks' Λ = .87, R_c^2 = 13.32 %). Thus, to increase the statistical power of the present study, pooled data from the two grades were used for the subsequent analysis. In Table 4, paired-sample *t* test showed that the participants' EVocab and ERC scores were better than that in Korean, while their scores of EPA and EOA were lower than those scores in Korean (all *p*s < .05) There was no statistically significant difference between EMA and KMA scores (p = .33 >.05). In short, the Korean ESL learners had better reading ability in English than in Korean, while their metalinguistic awareness was generally better in Korean than in English.

Table 2

Descriptive Statistics of All Measured Variables, Study I

			Grade 5 (N = 23)		Grade 6 (N = 27)		All Grade (N = 50)	
Variable	α	Max	*M*	*SD*	*M*	*SD*	*M*	*SD*
EPA	.75	20	10.96	3.47	10.30	3.68	10.60	3.56
EMA	.73	17	15.87	2.03	16.41	0.75	16.16	1.49
EOA	.65	6	5.30	1.30	5.52	0.64	5.42	0.99
Evocab	.83	18	16.61	2.25	17.07	2.15	16.86	2.19
ERC	.74	9	7.96	1.89	8.26	1.10	8.12	1.51
KPA	.86	22	13.96	5.28	16.44	4.60	15.30	5.03
KMA	.80	24	15.70	3.54	17.59	4.54	16.72	4.18
KOA	.71	9	7.91	1.41	8.56	1.22	8.26	1.34
KVocab	.72	20	11.96	3.28	13.30	3.42	12.68	3.39
KRC	.72	10	2.74	1.74	4.41	2.86	3.64	2.53

Note. α = internal consistency reliability (Cronbach's Alpha); Max = maximum score of the measured variable; EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EVocab= English vocabulary; ERC = English reading comprehension; KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension.

Table 3

Summary of Descriptive Discriminant Analysis Results, Study I

Variables		Function							
		β	r_s	r_s^2 (%)	R_c^2 (%)	Λ	*F*	*df*	*p*
English Tasks	EPA	-0.88	-.33	10.89	7.40	.93	3.50	5	.62
	EMA	0.81	.65	42.25					
	EOA	0.24	.39	15.21					
	EVocab	0.40	.38	14.44					
	ERC	-0.19	.36	12.96					
Korean Tasks	KPA	0.15	.66	43.56	13.32	.87	6.51	5	.26
	KMA	0.03	.60	36.00					
	KOA	0.38	.64	40.96					
	KVocab	-0.05	.52	27.04					
	KRC	0.74	.90	81.00					

Note. . Function = canonical function for discriminating fifth- and sixth-grades, β = standardized canonical discriminant function coefficient, r_s = structure coefficient, r_s^2 = squared structure coefficient, R_c^2 = squared canonical correlation coefficient, Λ = Wilk's lamda, and *F* = chi-square difference statistic. R_c^2 is analogous to variance-explained effect size (η^2) in MANOVA testing.

Table 4

Summary of Paired Sample T-test Results, Study I

Pairs	Mean Difference	*SD*	*t*	*p*
EPA and KPA	- 4.70	5.15	- 6.45	.00
EMA and KMA	- 0.56	4.0	- 0.99	.33
EOA and KOA	- 2.84	1.25	- 16.05	.00
EVocab and KVocab	4.18	3.33	8.88	.00
ERA and KRC	4.48	2.66	11.91	.00

Note. EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EVocab= English vocabulary; ERC = English reading comprehension; KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension

Bivariate correlations among all the measured variables are presented in Table 5. First, measures of metalinguistic awareness (PA, MA, and OA) were positively correlated with each other in both languages. For English, the correlation between MA and OA ($r = .52$, $p < .01$) was the highest; and for Korean, PA and MA ($r = .59$, $p < .01$). Second, all measured metalinguistic awareness were highly correlated with vocabulary in each language. The correlations between MA and Vocab were the highest in English ($r = .58$, $p < .01$) and Korean ($r = .71$, $p < .01$), compared to other metalinguistic awareness. Third, all measured variables (PA, MA, OA, and Vocab) had statistically significant correlations with reading comprehension in both languages. The correlations ranged from .52 to .76 for English (all *p*s < .01) and from .31 to .54 for Korean (all *p*s < .05). The highest correlation was found between EVocab and ERC ($r = .76$, $p < .01$) in English, whereas it was between KMA and KRC ($r = .54$, $p < .01$) in Korean.

Positive correlations were also found cross-linguistically. First, three Korean measures (KMA, KOA, and KVocab) showed statistically significant correlation with EVocab ($r = .48$, .29, and .35, respectively, all *p*s < .05), and the correlation between KMA and EVocab was the highest among those. Second, most of the Korean measures-KPA, KMA, KOA, and KVocab-were highly correlated with ERC ($r = .40$, .46, .56, and .44, respectively, all *p*s < .01). Third, however, there were no statistically significant correlations between English metalinguistic awareness measures and KVocab and KRC.

Table 5

Correlations among All Measured Variables, Study I

Variable	1	2	3	4	5	6	7	8	9	10
1. EPA	1									
2. EMA	.40**	1								
3. EOA	.40**	.52**	1							
4. EVocab	.51**	.58**	.55**	1						
5. ERC	.52**	.70**	.65**	.76**	1					
6. KPA	.32*	.16	.24	.24	.40**	1				
7. KMA	.28*	.29*	.27	.48**	.46**	.59**	1			
8. KOA	.20	.33*	.46**	29*	56**	.53**	.41**	1		
9. KVocab	.09	.25	.21	.35*	.44**	.52**	.71**	.47**	1	
10. KRC	-.02	.08	.09	.13	.21	.48**	.54*	.31*	.45**	1

Note. Blue represents the correlations among the three types of metalinguistic awareness (i.e., phonological, morphological, and orthographic awareness); green, the correlations between each of the metalinguistic awareness and vocabulary; orange, the correlations between each of the metalinguistic awareness and reading comprehension; and red, the cross-linguistic correlations between each of the metalinguistic awareness and vocabulary or reading comprehension. EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EVocab= English vocabulary; ERC = English reading comprehension; KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension.
* $p < .05$, ** $p < .01$

The English language model. Model fit indices of the English Language model represented a good fit (see Appendix E). The chi-square test of the model was not statistically significant ($\chi^2 = 1.22, df = 1, p = .27 > .05$), and the value of CFI was larger than .95 and SRMR was smaller than .05 (CFI = 1.00 and SRMR = 0.02). Approximately 71% variance of ERC (R^2_{ERC}) and 48% variance of EVocab (R^2_{EVocab}) were explained in the English language model (see Table 6).

There were positive contributions of each measured variable to predict EVocab and ERC in the English language model (Fig 3 and Table 6). First, all metalinguistic awareness (EPA, EMA, and EOA) played a unique and a positive role in explaining EVocab. The contribution of EMA to EVocab was statistically significant and the path coefficient was the highest among the three metalinguistic awareness ($\beta = 0.33, p = .01 < .05$). The role of EPA to EVocab was the second, where the value was 0.28 ($p = .02 < .05$). There was also a statistically significant effect of EOA to EVocab ($\beta = 0.27, p = .03 < .05$).

Second, all measured variables (EPA, EMA, EOA, and EVocab) contributed to explaining ERC. First, the sum of direct and indirect effects of EMA on ERC was 0.46 (0.32 + 0.14 = 0.46) and this total effect was statistically significant ($p = .00 < .01$). The direct effect was represented by the coefficient of the direct path from EMA to ERC ($\beta = 0.32, p = .00 < .05$). The indirect effect was calculated by the multiplication of the path coefficient from EMA to EVocab and that from EVocab to ERC (0.32 x 0.44 = 0.14). Path coefficient for the indirect effect was estimated as the product of direct effects that comprise them (Kline, 2011, p.164). The sobel test showed that the indirect effect was

statistically significant (p = .02 < .05). Second, the total effect of EOA on ERC was 0.36 (p = .00 < .01), which summed up the direct effect 0.24 (p = .01< .05) and the indirect effect 0.12 (0.27 x 0.44 = 0.12, p = .05). Third, there was only indirect effect of EPA on ERC and the path coefficient was 0.12 (0.28 x 0.44 = 0.12), which was statistically significant (p = .04 < .05). Fourth, the direct contribution of EVocab to ERC was 0.44 and it was statistically significant (p = .00 < .01). In short, for English vocabulary and reading comprehension, all metalinguistic awareness (EPA, EMA, and EOA) played unique and positive roles simultaneously, but EMA was the most critical predictor among them. The contribution of EMA to ERC was even larger than that of EVocab.

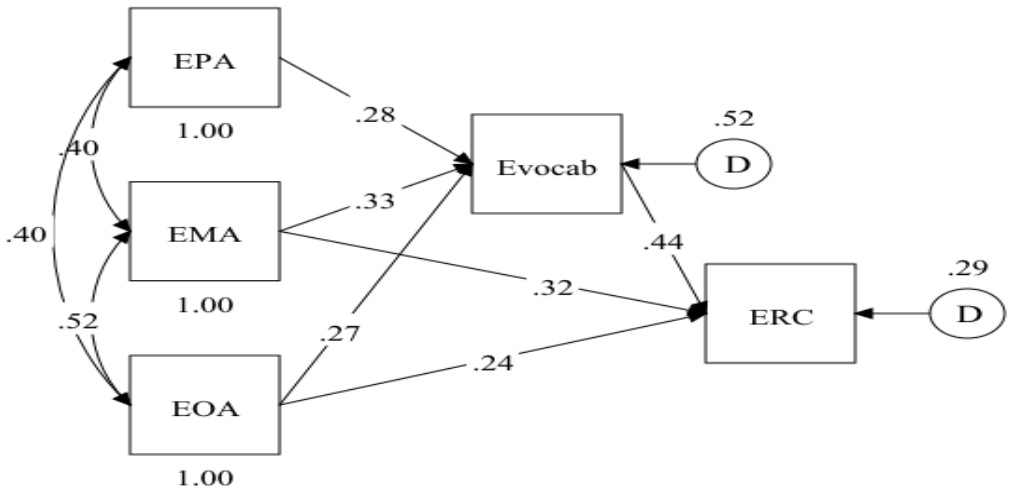

Fig. 3. The English language model, Study I. Single-headed arrows represent statistically significant path coefficients (β) and double-headed arrows indicate statistically significant correlations (r) between exogenous variables (all ps < .05). The disturbance (D) is an unexplained variance in the endogenous variables which can be calculated by $1 - R^2$. EPA = English phonological awareness; EOA = English orthographic awareness; EMA = English morphological awareness; EVocab= English vocabulary; and ERC = English reading comprehension.

Table 6

Summary of Parameters in the English Language Model, Study I

Parameter		Standardized	SE
Path Coefficient (β)			
EVocab on EPA		0.28*	0.11
EVocab on EMA		0.33*	0.12
EVocab on EOA		0.27*	0.12
ERC on EPA			
	Direct	.	.
	Indirect	0.12*	0.06
	Total	0.12*	0.06
ERC on EMA			
	Direct	0.32**	0.10
	Indirect	0.14*	0.06
	Total	0.46**	0.10
ERC on EOA			
	Direct	0.24**	0.10
	Indirect	0.12*	0.06
	Total	0.36**	0.10
ERC on EVocab		0.44**	0.10
Correlation (r)			
	EPA with EMA	0.40**	0.12
	EMA with EOA	0.52**	0.10
	EOA with EPA	0.40**	0.12
R-square (R^2)			
	EVocab	0.48**	0.10
	ERC	0.71**	0.07

Note. EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EVocab= English vocabulary; ERC = English reading comprehension.

* $p < .05$, ** $p < .01$

The Korean language model. The final Korean language model represented a good fit (see Appendix E). The chi-square test of the model was not statistically significant ($\chi^2 = 3.07, df = 3, p = .38 > .05$), and the value of CFI was 1.00 and SRMR was .04. In the Korean language model, about 53 % of KVocab (R^2_{KVocab}) and 29 % variance of KRC (R^2_{KRC}) were explained (see Table 7).

In Fig 4 and Table 7, only MA played a positive role in explaining vocabulary and reading comprehension in the Korean language model. The direct path from KMA to KVocab was statistically significant ($p = .00 < .05$) and the value was very high ($\beta = 0.62$). Regarding the contribution of KMA to KRC, only direct effect was found in the model and the path coefficient was 0.54 ($p = .00 < .05$). Contrary to the English language model, no statistically significant direct path was found between vocabulary and reading comprehension and between OA and reading comprehension in the Korean language model. In short, KMA was the unique and the most significant contributor for KVocab and KRC in the Korean language model when KPA, KOA, and KVocab were considered simultaneously.

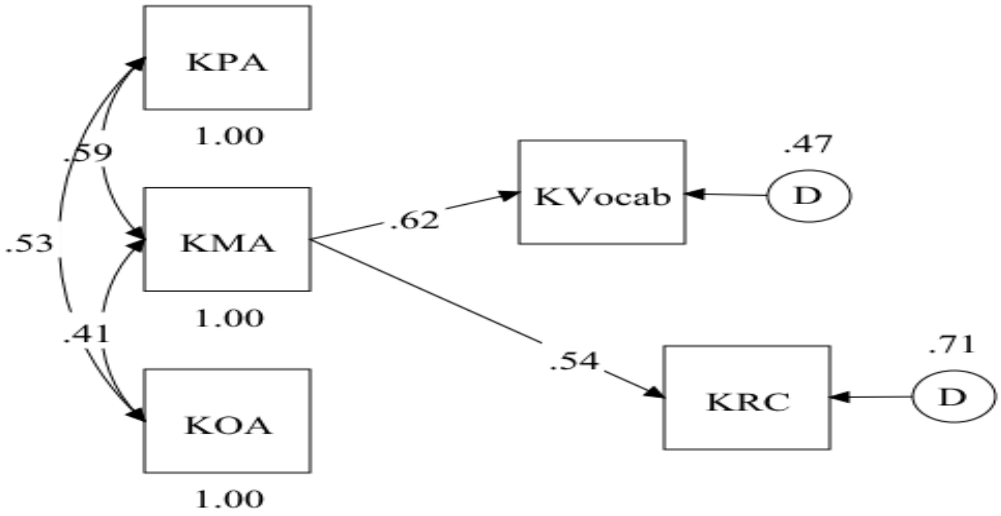

Fig. 4. The Korean language model, Study I. Single-headed arrows represent statistically significant path coefficients (β) and double-headed arrows indicate statistically significant correlations (*r*) between exogenous variables (all *p*s < .05). The disturbance (D) is an unexplained variance in the endogenous variables which can be calculated by $1 - R^2$. KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension.

Table 7

Summary of Parameters in the Korean Language Model, Study I

Parameter		Standardized	SE
Path Coefficient (β)			
KVocab on KPA		.	.
KVocab on KMA		0.62**	0.09
KVocab on KOA		.	.
KRC on KPA			
	Direct	.	.
	Indirect	.	.
	Total	.	.
KRC on KMA			
	Direct	0.54**	0.10
	Indirect	.	.
	Total	0.54**	0.10
KRC on KOA			
	Direct	.	.
	Indirect	.	.
	Total	.	.
KRC on KVocab		.	.
Correlation (*r*)			
	KPA with KMA	0.59**	0.09
	KMA with KOA	0.41**	0.12
	KOA with KPA	0.53**	0.10
R-square (R^2)			
	KVocab	0.53**	0.10
	KRC	0.29*	0.11

Note. KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension.

* $p < .05$, ** $p < .01$

The cross-language contribution of MA to vocabulary and reading comprehension was not found among the EMA→KRC, EDMA→KRC, and ECMA→KRC models. Instead, statistically significant cross-language transfer of MA to vocabulary and reading comprehension was only found from path models which specified the transfer from MA in Korean to vocabulary and reading comprehension in English (i.e., the KMA→ERC, KDMA→ERC, and KCMA→ERC models). These three cross-language models showed a good model fit (see Appendix E).

The KMA→ERC model. There were positive cross-language transfer effect from KMA to Evocab and ERC (Fig. 5 and Table 8). First, the direct path from KMA to EVocab was statistically significant and the value was 0.27 ($p = .01 < .05$). Second, the total effect from KMA to ERC was 0.22 and it was statistically significant ($p = .01 < .05$). Even though the direct path from KMA to ERC was not statistically significant ($\beta = 0.12$, $p = .15 > .05$), the indirect path from KMA to ERC via EVocab was statistically significant ($p = .03 < .05$). For the indirect effect, the product of the two paths (i.e., from KMA to EVocab and from EVocab to ERC) was calculated, 0.27 x 0.38 = 0.10. The total cross-language effect from KMA to ERC was the sum of the direct and indirect effects, which would be 0.22 (0.12 + 0.10 = 0.22) and it was statistically significant ($p = .01$). In addition, the explained variances of endogenous variables (R^2_{Evocb} and R^2_{ERC}) in the KMA→ERC model were slightly higher than that in the English language model, R^2_{Evocb} was increased from 48% to 54%; and $R^2_{\text{ERC,}}$ from 71% to 72%.

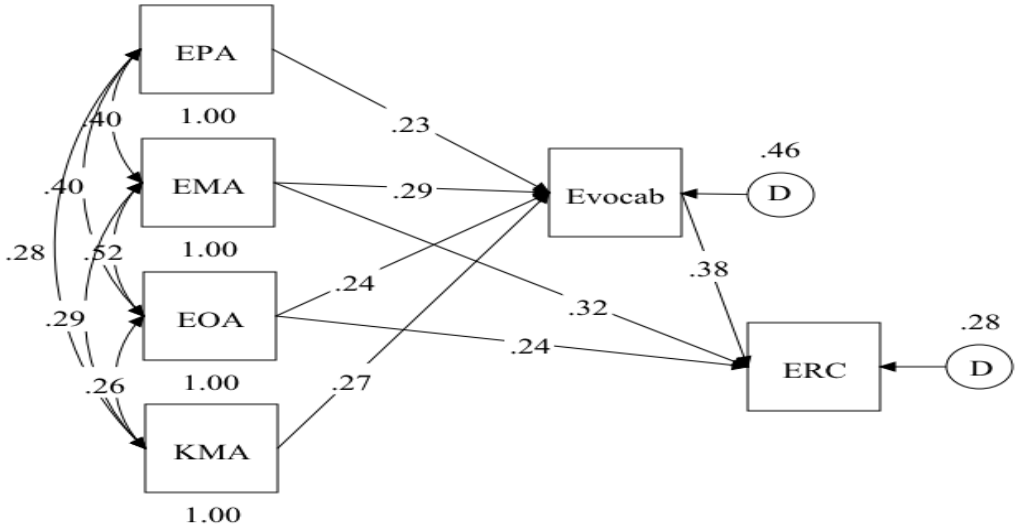

Fig. 5. The KMA → ERC model, Study I. Single-headed arrows represent statistically significant path coefficients (β) and double-headed arrows indicate statistically significant correlations (*r*) between exogenous variables (all *p*s < .05). The disturbance (D) is an unexplained variance in the endogenous variables which can be calculated by $1 - R^2$. EPA = English phonological awareness; EOA = English orthographic awareness; EMA = English morphological awareness; EVocab= English vocabulary; ERC = English reading comprehension; and KMA = Korean morphological awareness.

Table 8

Summary of Parameters in the KMA → ERC Model, Study I

Parameter		Standardized	SE
Path Coefficient (β)			
EVocab on KMA		0.27*	0.10
ERC on KMA			
	Direct	0.12	0.09
	Indirect	0.10*	0.05
	Total	0.22*	0.09
Correlation (*r*)			
	KMA with EPA	0.28*	0.13
	KMA with EMA	0.29*	0.13
	KMA with EOA	0.27*	0.13
R-square (R^2)			
	EVocab	0.54**	0.10
	ERC	0.72**	0.07

Note. EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EVocab= English vocabulary; ERC = English reading comprehension; and KMA = Korean morphological awareness.

* $p < .05$, ** $p < .01$

The KDMA→ERC model vs. the KCMA→ERC model. The amount of positive contribution of KMA to EVocab and ERC was different across the two types of MA (KDMA and KCMA). First, the path coefficient from KCMA to EVocab was 0.28 (p = .01 < .05) in the KCMA→ERC model, while it was 0.26 (p = .01< .05) in the KDMA→ERC model (Fig. 6 and Fig. 7). Second, when it comes to the cross-language effect on ERC, the relative contribution of different types of MA was very distinct (Table 9). On the one hand, in the KDMA→ERC model, the sum of direct and indirect effects of KDMA to ERC was 0.18 (0.08 + 0.10 = 0.18) and it was statistically significant (p =.05). Even though the direct path from KDMA to ERC was not statistically significant (β = 0.08, p = .40 > .05), the indirect path from KDMA to ERC via EVocab was statistically significant (p = .04 < .05), which was 0.10 (0.26 x 0.41 = 0.10). On the other hand, in the KCMA→ERC model, the direct path from KCMA to ERC was 0.14 (p = .08 > .05) and the indirect path from the KCMA to ERC via EVocab was 0.10 (0.28 x 0.37= 0.10, p = .05). Even though the p value of the direct effect was larger than the critical value of the present study (α = .05), the total effect, 0.24 (0.14+ 0.10 = 0.24), was statistically significant (p = .01 < .05). In short, the cross-language contribution of KCMA to ERC (β = 0.24) was higher than that of KDMA to ERC (β = 0.18).

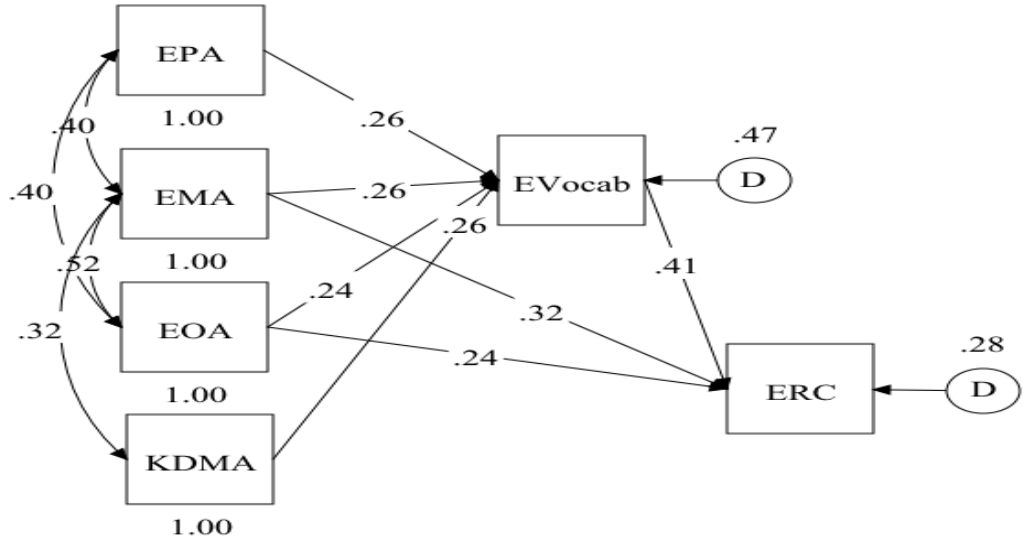

Fig. 6. The KDMA → ERC model, Study I. Single-headed arrows represent statistically significant path coefficients (β) and double-headed arrows indicate statistically significant correlations (*r*) between exogenous variables (all *p*s < .05). The disturbance (D) is an unexplained variance in the endogenous variables which can be calculated by $1 - R^2$. EPA = English phonological awareness; EOA = English orthographic awareness; EMA = English morphological awareness; EVocab= English vocabulary; ERC = English reading comprehension; and KDMA = Korean derivational morphological awareness.

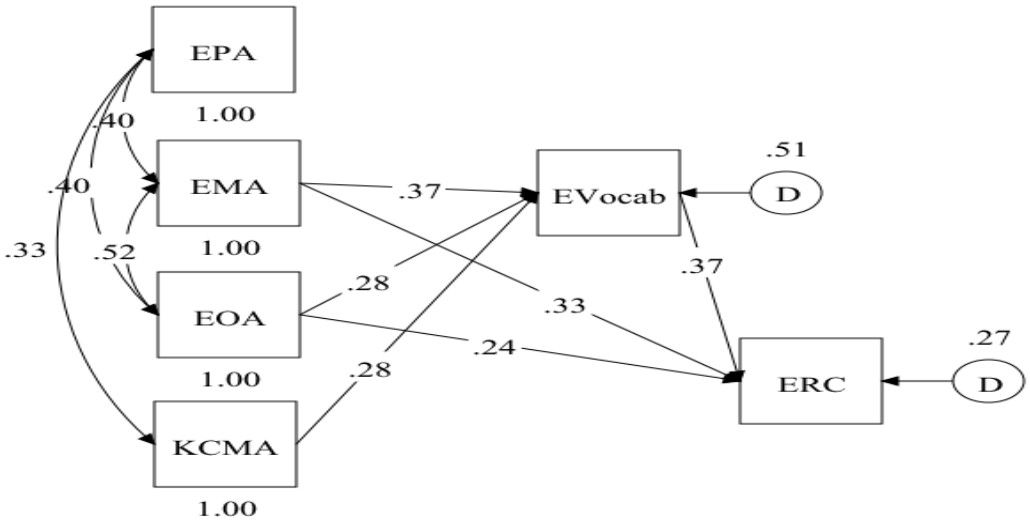

Fig. 7. The KCMA → ERC model, Study I. Single-headed arrows represent statistically significant path coefficients (β) and double-headed arrows indicate statistically significant correlations (*r*) between exogenous variables (all *p*s < .05). The disturbance (D) is an unexplained variance in the endogenous variables which can be calculated by $1 - R^2$. EPA = English phonological awareness; EOA = English orthographic awareness; EMA = English morphological awareness; EVocab= English vocabulary; ERC = English reading comprehension; and KCMA = Korean compound morphological awareness.

Table 9

Summary of Parameters in the KDMA → ERC and the KCMA → ERC Model, Study I

Model	Parameter		Standardized	SE
KDMA → ERC	*Path Coefficient* (β)			
	EVocab on KDMA		0.26*	0.10
	ERC on KDMA			
		Direct	0.08	0.09
		Indirect	0.10*	0.05
		Total	0.18*	0.09
	Correlation (*r*)			
		KDMA with EPA	0.20	0.14
		KDMA with EMA	0.32*	0.13
		KDMA with EOA	0.25	0.13
	R-square (R^2)			
		EVocab	0.53**	0.10
		ERC	0.72**	0.07
KCMA → ERC	*Path Coefficient* (β)			
	EVocab on KCMA		0.28*	0.10
	ERC on KCMA			
		Direct	0.14	0.08
		Indirect	0.10*	0.05
		Total	0.24*	0.09
	Correlation (*r*)			
		KCMA with EPA	0.33*	0.13
		KCMA with EMA	0.20	0.14
		KCMA with EOA	0.24	0.13
	R-square (R^2)			
		EVocab	0.49**	0.10
		ERC	0.73**	0.07

Note. EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EVocab= English vocabulary; ERC = English reading comprehension; KDMA = Korean derivational morphological awareness; and KCMA = Korean compound morphological awareness. * $p < .05$, ** $p < .01$

Discussion

Results of the present study provided strong evidence to support positive within- and cross-language contributions of MA to vocabulary and reading comprehension among upper elementary Korean ESL learners. First, MA played a unique and positive role in explaining vocabulary and reading comprehension in English as well as in Korean. In particular, there were direct effects of MA on vocabulary and reading comprehension in both languages (i.e., EMA on EVocab, EMA on ERC, KMA on KVocab, and KMA on KRC). Additionally, for English reading comprehension, the role of MA also showed an indirect effect which was mediated by vocabulary (i.e., EMA on ERC via EVocab). Second, there was positive cross-language transfer from L1 (Korean) MA to L2 (English) vocabulary and reading comprehension, but not from L2 MA to L1 vocabulary and reading comprehension (i.e., from KMA to EVocab and ERC, but not from EMA to KVocab and KRC). Third, the amount of cross-language transfer was different according to the typological difference of MA: more significant effect was found from KCMA to EVocab and ERC than from KDMA.

English reading vs. Korean reading. While other types of metalinguistic awareness (i.e., PA and OA) were important along with MA in the English language model, MA was the only unique contributor in the Korean language model. As explained in the psycholinguistic grain size theory, one reasonable explanation is orthographic depth of the two languages. English orthography is opaque, where phonemes can be represented by one or more graphemes (e.g., /k/ can be spelled as *c*, *k*, *ck*, and *ch*), and hence English learners typically take longer to learn to the phoneme-grapheme

correspondences. Even though the participants in the study were upper elementary students, they may still utilize the particular information-processing skill for decoding words while reading English texts. However, Korean learners master phonological information during the early grades (e.g., first grade; Cho et al., 2011), because Korean orthography is very transparent in sound and letter correspondences. Similar to other languages of transparent orthography such as Spanish and German, the PA contribution for reading in Korean gradually decrease, while the contribution of MA increase along with the developmental continuum of reading (Ramirez et al., 2010; Share, 2008). Accordingly, these orthographic differences may render different strategic approaches for the participants who learn to read English and Korean at the same time.

Additionally, with regards to the explained variance of reading comprehension, there were also clear differences between the English language model and the Korean language model. The explained variance of reading comprehension in the English language model was over 70 %, whereas it was approximately 30% in the Korean language model. This difference can be explained by the lexical quality hypothesis. In the English language model, various constituents of the lexical quality (PA, OA, MA, and vocabulary) were fully specified, which represented a high lexical quality. However, in the Korean language model, only MA played a role, and other constituents of the lexical quality (i.e., PA, OA, and vocabulary) were not activated. Hence, this low lexical quality might not maximize the explained variance of reading comprehension in the Korean language model.

Note that vocabulary did not play a role for predicting reading comprehension in the Korean language model, while it was the second highest contributor of reading comprehension in the English language model. The KMA and KVocab were highly correlated to each other ($r = .71$, $p < .01$), and hence the two variables may share a large amount of common variance. Due to the commonalities between the two variables, the role of MA in KRC may be overestimated in the Korean language model, while the contribution of KVocab to KRC was not clearly detected. The left portion of the KRC variance in the Korean language model may be additionally explained by including a different construct of KVocab (e.g., productive vocabulary).

Cross-language transfer patterns. The unidirectional cross-language transfer in the present study—from L1 (Korean) MA to L2 (English) vocabulary and reading comprehension—can be explained by considering multiple theoretical underpinnings. As the universal grammar of reading (Perfetti, 2003) and transfer facilitation model (Koda, 2008a) hypothesized, there should be reciprocal relationships between Korean and English, because they share similar morphological structure. However, according to the interdependence hypothesis (Cummins, 1981, 2000, 2005), other factors should also be considered such as adequate competency in one language and adequate language input and motivation in another language. Participants in the present study were exposed to more L2 (English) literacy input than L1 (Korean). The average length of study English was substantially more than Korean. The students' home language environment was not supportive of reading Korean. Even though the participants' L2 MA competency was adequate, it might not be transferred to L1 vocabulary and reading comprehension due to

the lack of L1 literacy input. Conversely, the participants' L1 MA competency was adequate enough to be transferred because they have extensive L2 literacy support.

Additionally, even though both derivational and compound MA in Korean (KDMA and KCMA) was positively transferred to predict vocabulary and reading comprehension in English (EVocab and ERC), the relative contribution of the two was not identical. The extent of cross-language transfer from KCMA to EVocab and ERC was greater than that from KDMA to EVocab and ERC. Korean words are more productive in making compound words rather than derivational words, and hence these particular information-processing skills were more likely transferred to process reading in English. This point supports the universal grammar of reading (Perfetti, 2003) and the transfer facilitation model (Koda, 2008a), which posited cross-language transfer pattern may differ according to language-specific features.

Study II

Study II examined the Korean EFL learners' MA contribution to vocabulary and reading comprehension. Both within- and cross-language aspects were investigated based on the similar methodological format of the study one. Research questions of the study are:

1. Does the unique contribution of English MA to English vocabulary and reading comprehension and Korean MA to Korean vocabulary and reading comprehension remain when simultaneously controlling for other literacy skills among the Korean EFL learners in grades five and six?

2. Does MA make a unique contribution to vocabulary and reading comprehension cross-linguistically among the Korean EFL learners in grades five and six?
3. Which type of MA (derivational or compound) will explain more variance in the cross-language contribution of MA to vocabulary and reading comprehension in the same group of participants?

Method

Data descriptions. The Korean EFL learners' data was used for Study II. The 257 participants consisted of 130 fifth graders and 127 sixth graders (130 boys and 127 girls). Due to testing time and place restrictions in the Korean schools, several test items were randomly deleted from the measures of Study I: three EPA, one EMA, six KPA, and six KMA items were subtracted (see Appendix A for the detail). Hence, the total numbers of test items in the present study were initially 17 EPA, 18 EMA, 8 EOA, 20 EVocab, 10 ERC, 18 KPA, 18 KMA, 12 KOA, 22 KVocab, and 10 KRC items. Based on the preliminary reliability analysis, two EPA, one EOA, two EVocab, one KPA, one KMA, and two KVocab items were deleted to increase the internal consistency reliability of measures (see Appendix B). Accordingly, the total of 15 EPA, 18 EMA, 7 EOA, 18 Evocab, 10 ERC, 17 KPA, 17 KMA, 12 KOA, 20 KVocab, and 10 KRC items were included for the final analysis of the present study.

Path model specification. The baseline path model in Study II was the same as that in Study I. There were two within-language and six cross-language path models: the English language model, the Korean language model, the KMA→ERC model, the EMA→KRC model, the KDMA→ERC, the KCMA→ERC, the EDMA→KRC, and the

ECMA→KRC model, respectively (Appendix D). The procedures of model identification and respecification were equivalent to Study I. The final path model was determined based on chi-square difference test (χ^2) between the nested models. Several fit statistics (i.e., χ^2, SRMR, and CFI) were considered to verify the final model estimation.

Results

Descriptive statistics. The descriptive statistics (α, Max, *M*, and *SD*) summarized in Table 10. Most of the measured variables were reliable (α > .70) except for EPA (α = .63) and ERC (α = .65). In Table 11, the result of MANOVA testing showed that there were no statistically significant group differences between the fifth- and sixth-graders on all the English tasks (F [5, 251] = 6.93, p = .23 > .05, Wilks' Λ = .97, R_c^2 = 2.69 %) and the Korean tasks (F [5, 251] = 8.30, p = .14 > .05, Wilks' Λ = .97, R_c^2 = 0.58 %). Hence, data from both grades data were pooled together for the subsequent analysis. A paired-sample *t* test indicated that the participants had higher Korean ability than English (Table 12). Scores in all Korean measures (KPA, KMA, KOA, KVocab, and KRC) were statistically significantly higher than those in English (all ps < .05).

Table 10

Descriptive Statistics of All Measured Variables, Study II

			Grade 5 (N = 130)		Grade 6 (N = 127)		All (N = 257)	
Variable	α	Max	*M*	*SD*	*M*	*SD*	*M*	*SD*
EPA	.63	15	5.07	2.37	5.69	2.95	5.38	2.69
EMA	.80	18	7.19	4.07	7.91	4.15	7.54	4.12
EOA	.85	7	5.26	2.21	5.57	1.99	5.42	2.11
EVocab	.77	18	6.08	3.44	6.20	4.07	6.14	3.76
ERC	.65	10	2.38	2.08	2.80	2.21	2.59	2.15
KPA	.86	17	12.48	3.64	11.41	4.31	14.85	3.24
KMA	.84	17	14.57	2.57	14.39	3.66	14.48	3.15
KOA	.98	12	11.25	2.75	10.72	3.35	10.99	3.06
KVocab	.82	20	16.78	2.95	16.02	4.68	6.62	3.89
KRC	.76	10	6.03	2.42	6.09	2.91	6.06	2.67

Note. α = internal consistency reliability (Cronbach's Alpha); Max = maximum score of the measured variable; EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EVocab= English vocabulary; ERC = English reading comprehension; KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension.

Table 11

Summary of Descriptive Discriminant Analysis Results, Study II

Variables		Function							
		β	r_s	r_s^2 (%)	R_c^2 (%)	Λ	*F*	*df*	*p*
English Tasks	EPA	-0.66	.70	49.00	2.69	.97	6.93	5	.23
	EMA	0.43	.52	27.04					
	EOA	0.15	.45	20.25					
	EVocab	-0.90	.09	0.81					
	ERC	0.56	.58	33.64					
Korean Tasks	KPA	0.95	.74	54.76	0.58	.97	8.30	5	.14
	KMA	-0.63	.15	2.25					
	KOA	0.27	.48	23.04					
	KVocab	0.47	.53	28.09					
	KRC	-0.34	-.06	0.36					

Note. . Function = canonical function for discriminating fifth- and sixth-grades, β = standardized canonical discriminant function coefficient, r_s = structure coefficient, r_s^2 = squared structure coefficient, R_c^2 = squared canonical correlation coefficient, Λ = Wilk's lamda, and *F* = chi-square difference statistic. R_c^2 is analogous to variance-explained effect size (η^2) in MANOVA testing.

Table 12

Summary of Paired Sample T-test Results, Study II

Pairs	Mean Difference	*SD*	*t*	*p*
EPA and KPA	- 6.57	3.90	- 27.00	.00
EMA and KMA	- 6.94	4.38	- 25.40	.00
EOA and KOA	- 5.57	3.26	- 27.39	.00
EVocab and KVocab	- 10.27	4.04	- 40.72	.00
ERA and KRC	-3.47	3.03	- 18.35	.00

Note. EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EVocab= English vocabulary; ERC = English reading comprehension; KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension

Bivariate correlations among all the measured variables are presented in Table 13. First, all measured metalinguistic awareness variables (PA, MA, and OA) were positively correlated with each other. The correlations ranged from .45 to .53 in English; and from .34 to .60 in Korean. The highest correlation was found between PA and MA in both languages (r =.53 in English and r =.60 in Korean). Second, there were high correlations between each metalinguistic awareness variable and Vocab in both languages. The correlation between MA and Vocab was the highest in English (r = .66, p < .01) as well as in Korean (r = .53, p < .01); the second was PA and Vocab (r =.51 and .43, ps < .01); and the third was OA and Vocab (r =.40 and .37, ps < .01). Third, all measured variables (PA, MA, OA, and Vocab) had statistically significant correlations with reading comprehension in both languages. EVocab and EMA were correlated with ERC (r =.53 and .48, ps < .01), while KMA and KPA were with KRC (r =.38 and .35, ps < .01). Interestingly, the correlation between OA and RC was the lowest in both languages (r = .29, p < .01 in English and r = .15, p < .05 in Korean).

Positive cross-language correlations were found. There were moderate correlations between all English measures (EPA, EMA, EOA, EVocab, and ERC) and KRC (r = .35, .35, .42, .31, and .22, respectively, all ps < .01). Relatively small correlations were found between several Korean measures (KPA, KVocab, and KRC) and ERC (r = .13, .22, and .22, respectively, all ps < .01).

Table 13

Correlations among All Measured Variables, Study II

Variable	1	2	3	4	5	6	7	8	9	10
1. EPA	1									
2. EMA	.53**	1								
3. EOA	.45**	.48**	1							
4. EVocab	.51**	.66**	.40**	1						
5. ERC	.38**	.48**	.29**	.53**	1					
6. KPA	.38**	.34**	.43**	.36**	.13*	1				
7. KMA	.35**	.30**	.42**	.28**	.10	.60**	1			
8. KOA	.23**	.24**	.25**	.31**	.07	.34**	.35**	1		
9. KVocab	.48**	.42**	.49**	.45**	.22**	.43**	.53**	.37**	1	
10. KRC	.35**	.35**	.42**	.31**	.22**	.35**	.38**	.15*	.32**	1

Note. Blue represents the correlations among the three types of metalinguistic awareness (i.e., phonological, morphological, and orthographic awareness); green, the correlations between each of the metalinguistic awareness and vocabulary; orange, the correlations between each of the metalinguistic awareness and reading comprehension; and red, the cross-linguistic correlations between each of the metalinguistic awareness and vocabulary or reading comprehension. EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EVocab= English vocabulary; ERC = English reading comprehension; KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension.

* $p < .05$, ** $p < .01$

The English language model. Model fit indices of the English language model represented a good fit (see Appendix E). The chi-square test of the model was not statistically significant ($\chi^2 = 3.48, df = 3, p = .32 > .05$), and the value of CFI was larger than .95 and SRMR was smaller than .05 (CFI = 1.00 and SRMR = 0.02). Approximately 48 % variance of EVocab (R^2_{EVocab}) and 31% variance of ERC (R^2_{ERC}) were explained in the English language model (see Table 14).

The standardized path coefficients were examined to explain the contribution of each measured variable in explaining vocabulary and reading comprehension (Fig.8 and Table 14). First, both EPA and EMA played positive roles in explaining EVocab. The path from EMA to EVocab ($\beta = 0.55, p = .00 < .01$) showed a much larger value than that from EPA to EVocab ($\beta = 0.22, p = .00 < .01$) Second, both EPA and EMA showed statistically significant contribution to explain ERC, but the effect was much larger from EMA to ERC compared to that from EPA to ERC. The direct effect from EMA to ERC was 0.22 ($p = .00 < .01$) and the indirect effect was 0.21 ($0.55 \times 0.38 = 0.21, p = .00 < .01$), which was represented by the path from EMA to ERC via Evocab. Hence, the total effect of EMA to ERC was 0.43 ($0.22 + 0.21 = 0.43, p = .00 < .01$). On the contrary, the EPA contribution was very small, the indirect effect of 0.08 ($0.22 \times 0.38 = 0.08$), but it was statistically significant ($p = .00 < .01$). Third, the direct path from EVocab to ERC was also statistically significant and the value ($\beta = 0.38, p = .00 < .01$) was larger than the EPA effect. Fourth, unlike the Korean ESL learners in Study I, there was no statistically significant contribution of EOA to EVocab and ERC for the Korean EFL learners. Thus, both EPA and EMA played positive roles in explaining vocabulary and

reading comprehension in the English language model, but it was largely explained by EMA rather than by EPA.

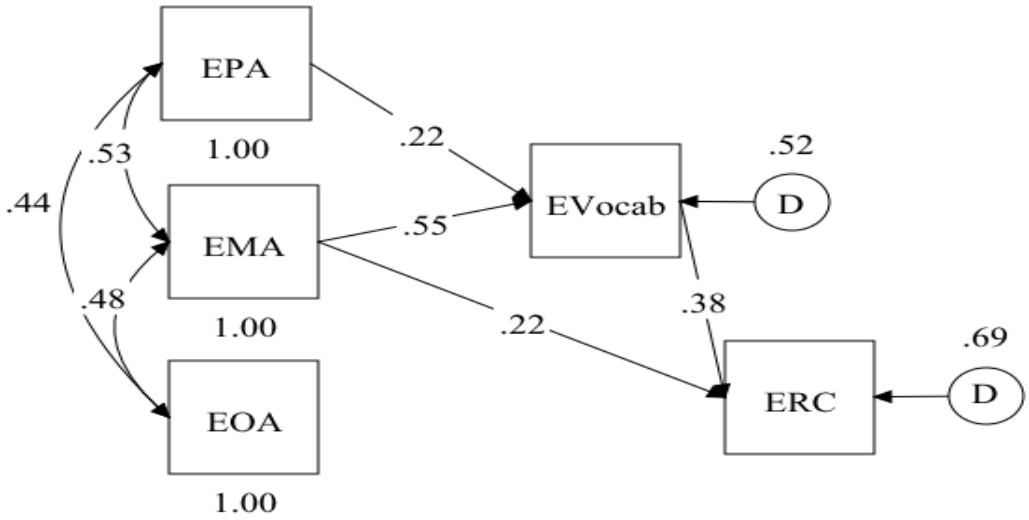

Fig. 8. The English language model, Study II. Single-headed arrows represent statistically significant path coefficients (β) and double-headed arrows indicate statistically significant correlations (*r*) between exogenous variables (all *p*s < .05). The disturbance (D) is an unexplained variance in the endogenous variables which can be calculated by $1 - R^2$. EPA = English phonological awareness; EOA = English orthographic awareness; EMA = English morphological awareness; EVocab= English vocabulary; and ERC = English reading comprehension.

Table 14

Summary of Parameters in the English Language Model, Study II

Parameter		Standardized	SE
Path Coefficient (β)			
EVocab on EPA		0.22**	0.05
EVocab on EMA		0.55**	0.05
EVocab on EOA		.	.
ERC on EPA			
	Direct	.	.
	Indirect	0.08**	0.03
	Total	0.08**	0.03
ERC on EMA			
	Direct	0.22**	0.07
	Indirect	0.21**	0.04
	Total	0.43**	0.05
ERC on EOA			
	Direct	.	.
	Indirect	.	.
	Total	.	.
ERC on EVocab		0.38**	0.07
Correlation (r)			
	EPA with EMA	0.53**	0.05
	EMA with EOA	0.44**	0.05
	EOA with EPA	0.48**	0.05
R-square (R^2)			
	EVocab	0.48**	0.05
	ERC	0.31**	0.05

Note. EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EVocab= English vocabulary; and ERC = English reading comprehension.

* $p < .05$, ** $p < .01$

The Korean language model. The final Korean language model represented a good fit (see Appendix E). The chi-square test of the model was not statistically significant ($\chi^2 = 1.91, df = 2, p = .38 > .05$), and the value of CFI was 1.00 and SRMR was .03. In the Korean language model, about 30 % variance of KRC (R^2_{KRC}) and 31 % of KVocab (R^2_{KVocab}) were explained.

In Fig.9 and Table 15, both KMA and KOA showed a significant effect on KVocab and KRC. First, the direct paths from KMA to KVocab and from KOA to KVocab were statistically significant (ps = .01 < .05), and the KOA effect (β = 0.44) was larger than the KMA effect (β = 0.38). Second, the direct path from KMA to KRC was statistically significant and the path coefficient was the highest in the model (β = 0.51, p = .00 < .01). The direct effect of KOA on KRC was relatively smaller than the MA effect (β = 0.26, p = .02 < .05). However, there was no statistically significant effect from KVocab to KRC and from KPA to KRC. Notably, the KMA and KOA contribution in KRC did not show any indirect effect. Accordingly, both MA and OA showed a unique impact on predicting vocabulary and reading comprehension in the Korean language model, but the relative MA contribution to reading comprehension was much larger than that of OA.

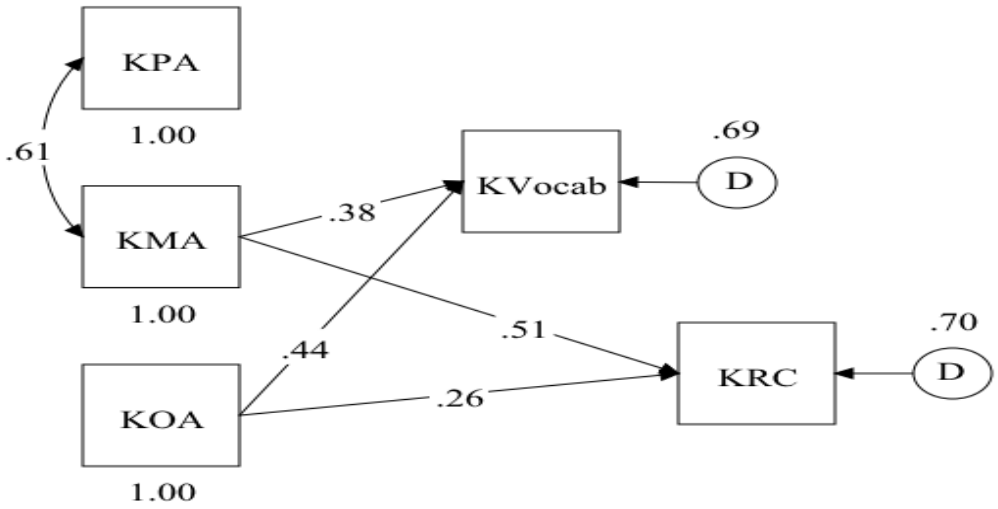

Fig. 9. The Korean language model, Study II. Single-headed arrows represent statistically significant path coefficients (β) and double-headed arrows indicate statistically significant correlations (*r*) between exogenous variables (all *p*s < .05). The disturbance (D) is an unexplained variance in the endogenous variables which can be calculated by $1 - R^2$. KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension.

Table 15

Summary of Parameters in the Korean Language Model, Study II

Parameter		Standardized	SE
Path Coefficient (β)			
KVocab on KPA		.	.
KVocab on KMA		0.38**	0.11
KVocab on KOA		0.44*	0.11
KRC on KPA			
	Direct	.	.
	Indirect	.	.
	Total	.	.
KRC on KMA			
	Direct	0.51**	0.10
	Indirect	.	.
	Total	0.51**	0.10
KRC on KOA			
	Direct	0.26*	0.12
	Indirect	.	.
	Total	0.26*	0.12
KRC on KVocab		.	.
Correlation (*r*)			
	KPA with KMA	0.61*	0.09
	KMA with KOA	- 0.09	0.14
	KOA with KPA	0.15	0.14
R-square (R^2)			
	KVocab	0.31**	0.11
	KRC	0.30*	0.11

Note. KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension.

* $p < .05$, ** $p < .01$

Cross-language path models. There was no positive cross-language transfer of MA to reading comprehension across all the specified models, but one interesting point was found with regards to the cross-language MA contribution to vocabulary. In the EMA→KRC model (Fig. 10 and Table 16), the direct path from EMA to KVocab was statistically significant and the value was 0.29 ($p = .01 < .05$). In particular, the EDMA→KRC model and the ECMA→KRC model showed very distinct point of the positive cross-language transfer (Fig. 11, Fig 12, and Table 17). The path coefficient from EDMA to KVocab was 0.30 ($p = .01 < .05$), while it was 0.04 ($p > .05$) from ECMA to KVocab. This result was very different from the finding in Study I, which showed that the cross-language transfer was from L1 MA to L2 vocabulary and to reading comprehension (i.e., from KMA to EVocab and from KMA to ERC), and more compound MA was transferred cross-linguistically than derivational MA.

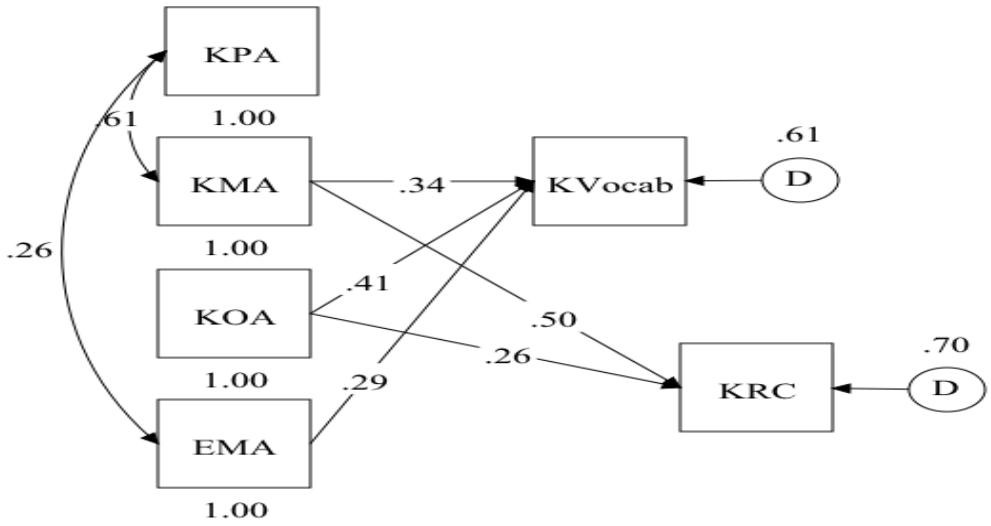

Fig. 10. The EMA → KRC model, Study II. Single-headed arrows represent statistically significant path coefficients (β) and double-headed arrows indicate statistically significant correlations (*r*) between exogenous variables (all *p*s < .05). The disturbance (D) is an unexplained variance in the endogenous variables which can be calculated by $1 - R^2$. KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; KRC = Korean reading comprehension; and EMA = English morphological awareness.

Table 16

Summary of Parameters in the EMA → KRC Model, Study II

Parameter		Standardized	SE
Path Coefficient (β)			
	KVocab on EMA	0.29*	0.11
Correlation (*r*)			
	EMA with KPA	0.26*	0.13
	EMA with KMA	0.14	0.14
	EMA with KOA	0.10	0.14
R-square (R^2)			
	KVocab	0.39**	0.11
	KRC	0.30**	0.11

Note. EMA = English morphological awareness; KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension.

* $p < .05$, ** $p < .01$

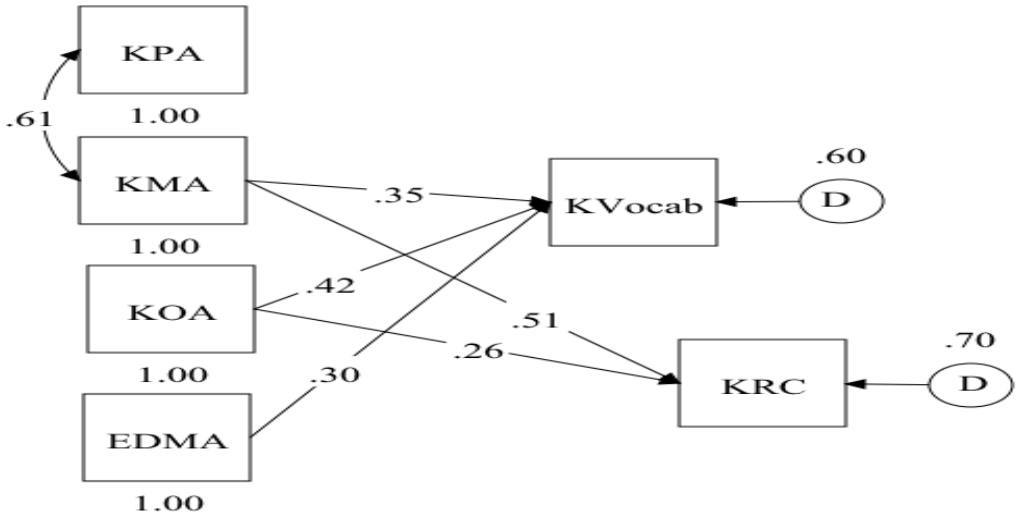

Fig.11. The EDMA → KRC model, Study II. Single-headed arrows represent statistically significant path coefficients (β) and double-headed arrows indicate statistically significant correlations (*r*) between exogenous variables (all *p*s < .05). The disturbance (D) is an unexplained variance in the endogenous variables which can be calculated by $1 - R^2$. KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; KRC = Korean reading comprehension; and EDMA = English derivational morphological awareness.

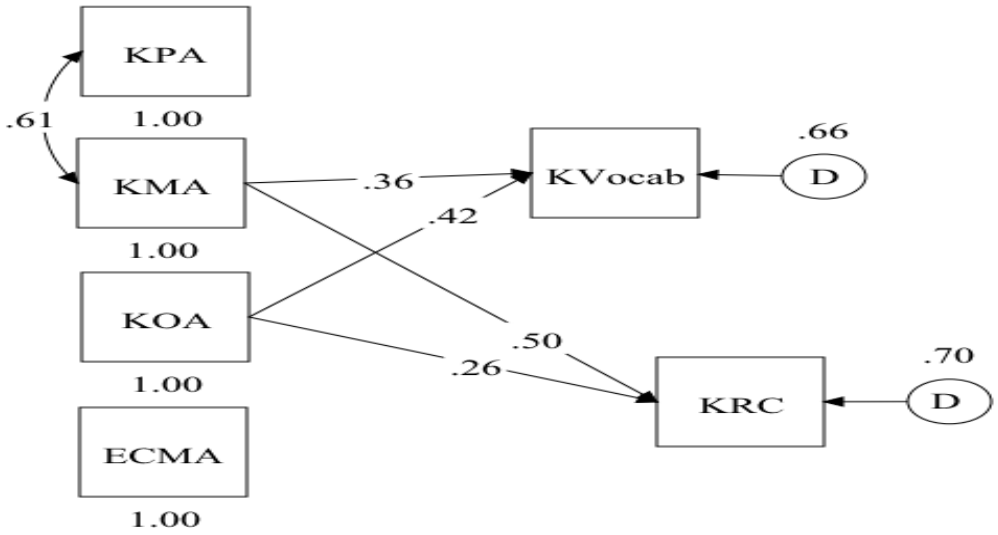

Fig.12. The ECMA → KRC model, Study II. Single-headed arrows represent statistically significant path coefficients (β) and double-headed arrows indicate statistically significant correlations (*r*) between exogenous variables (all *p*s < .05). The disturbance (D) is an unexplained variance in the endogenous variables which can be calculated by $1 - R^2$. KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; KRC = Korean reading comprehension; and ECMA = English compound morphological awareness.

Table 17

Summary of Parameters in the EDMA → KRC and the ECMA → KRC Model, Study II

Model	Parameter	Standardized	SE
EDMA → KRC	*Path Coefficient* (β)		
	KVocab on EDMA	0.30*	0.11
	Correlation (*r*)		
	EDMA with KPA	0.19	0.14
	EDMA with KMA	0.11	0.14
	EDMA with KOA	0.07	0.63
	R-square (R^2)		
	KVocab	0.40**	0.11
	KRC	0.30*	0.12
ECMA → KRC	*Path Coefficient* (β)		
	KVocab on ECMA	0.04	0.12
	Correlation (*r*)		
	ECMA with KPA	0.23	0.13
	ECMA with KMA	0.12	0.14
	ECMA with KOA	0.09	0.14
	R-square (R^2)		
	KVocab	0.34**	0.11
	KRC	0.30*	0.11

Note. KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; KRC = Korean reading comprehension; EDMA = English derivational morphological awareness; and ECMA = English compound morphological awareness;

* $p < .05$, ** $p < .01$

Discussion

The results of the present study showed that MA plays a significant within- and cross-language role in explaining Korean EFL learners' vocabulary and reading comprehension. First, the positive contribution of MA was unique and the most effective to predict vocabulary and reading comprehension in English and in Korean. The MA effect on vocabulary was direct in both languages. The MA contribution for reading comprehension was both a direct and an indirect effect (i.e., mediated by vocabulary) in English, while it was only a direct effect in Korean. Second, cross-language transfer of MA was only found in a vocabulary level. That is, the participants' L2 (English) MA facilitated L1 (Korean) vocabulary learning, not L1 (Korean) reading comprehension. Third, there was a distinct difference in the cross-language transfer effect across different MA. The transfer from English derivational MA to Korean vocabulary was greater than that from English compound MA.

English reading vs. Korean reading. Even though MA played a significant role in both English and Korean reading, the role of PA in each language model was very different. In the English language model, PA was activated along with MA in explaining vocabulary and reading comprehension. On the contrary, in the Korean language model, PA did not show any statistically significant contribution. This difference can be explained by the psycholinguistic grain size theory. Because of the orthographic depth in English, it typically takes a longer time to master manipulating phonemic information in English. Even though the Korean EFL learners in the present study were upper elementary students (i.e., fifth- and sixth-grade), they might have been still be

developing automatic decoding skills by connecting phonemes and their corresponding graphemes in English. On the contrary, since Korean orthography is very transparent, the learners may have already mastered automatic phonological processing skills in Korean, and hence PA was not activated in the Korean language model.

The amount of explained variance of reading comprehension in the English language model was only 31 %, and the variance explained in the Korean language model was 30 %. As the lexical quality hypothesis postulates, to maximize the explained variance of reading comprehension, all constituents of the lexical quality such as PA, MA, OA, , and vocabulary should be highly activated. However, in the English language model, OA was not activated, while PA, MA, and vocabulary played a role in explaining ERC. In the Korean language model, only MA and OA were facilitated, whereas PA and vocabulary did not play a role. This low lexical quality may cause a large portion of the variance unexplained in both languages. One possible reason that OA was not activated in the English language model is the Korean EFL learners' limited print exposures in English. With regards to not activating PA in the Korean language model, the orthographic transparency of Korean language may be the reason. In addition, the high correlation between KVocab and KMA (r =.53, $p < .01$) may underestimate the role of KVocab in KRC, while overestimating the KMA contribution in the Korean language model.

Cross-language transfer patterns. The present study provided evidence that the Korean EFL learners' MA in one language positively transferred to predict vocabulary learning in another language. Even though the cross-language transfer effect was not

found in passage-level reading (reading comprehension), the positive cross-language MA contribution in vocabulary learning was worth noticing. One atypical notion on explaining the cross-language transfer effect has been the learners' relative language proficiency level, which proposed that stronger language proficiency is transferred to facilitate the learners' reading success in the language of weaker proficiency (Deacon, Wade-Woolley, & Kirby, 2007). The participants in the present study had statistically significantly higher scores in all Korean measures than in English measures, which represent the participants have better L1 (Korean) proficiency than L2 (English). Accordingly, it was initially expected that the learners' L1 MA may facilitate their L2 vocabulary and reading comprehension. However, the direction of the cross-language transfer in the present study was only from L2 MA to L1 vocabulary, not from L1 MA to L2 vocabulary. Thus, the present study findings suggested that even the learner's information-processing skill in the language of weaker proficiency can be transferable for learning to read the language of stronger proficiency. More importantly, this finding is in line with the most contemporary understandings on cross-language transfer, which states that language transfer is not a static influence of L1 effect on L2 reading development (August & Shanahan, 2006; Genesee et al., 2006), but an ever changing process that can occur at any point in the biliteracy development (Biyalystok, 2001; Cook & Bassetti, 2005).

The unidirectional cross-language transfer in the present study can be explained by multiple theoretical points. As the universal grammar of reading (Perfetti, 2003) and the transfer facilitation model (Koda, 2008a) hypothesiz, since Korean and English

sharing similar morphological structures, there should be reciprocal relationships between the two. However, as the interdependence hypothesis (Cummins, 1981, 2000, 2005) postulates, the learners' language competency in one language and adequate language input and motivation in another language should also be considered. The Korean EFL learners in the present study were more exposed to L1 (Korean) literacy input than L2 (English). The participants' length of learning to read Korean was much longer than that for English. Their home language environment was not supportive of their English reading. Therefore, the Korean EFL learners' L1 MA may not be utilized for facilitating their L2 vocabulary due to the lack of L2 literacy input. Instead, their L2 MA was used as one of facilitative factors for learning to read L1 vocabulary with extensive exposures to L1 literacy input.

Notably, the extent of cross-language transfer from EDMA to KVocab was much greater than that from ECMA to Kvocab. This difference may be caused by the language-specific effect. There are more derivational words than compound words in English. Thus, the more productive information-processing skill in English (EDMA) more likely transferred cross-linguistically to process Korean vocabulary, compared to that of less productive skills in English (ECMA).

Study III

Study Ⅲ compared within- and cross-language path models of Study I and II to investigate whether the contributions of MA to vocabulary and reading comprehension were different across the Korean ESL and the Korean EFL groups. Research questions that were addressed in the study are;

1. Does the contribution of MA to vocabulary and reading comprehension in the English language model represent statistically significant differences between the Korean ESL and the Korean EFL groups?
2. Does the contribution of MA to vocabulary and reading comprehension in the Korean language model represent statistically significant differences between the Korean ESL and the Korean EFL groups?
3. Does the cross-language contribution of MA to vocabulary and reading comprehension show statistically significant differences between the Korean ESL and the Korean EFL groups?

Method

Data descriptions. Both the Korean ESL and the Korean EFL learners' data were used in Study III. The total number of participants was 307 (50 Korean ESL and 257 Korean EFL students) including 153 fifth graders and 154 sixth graders. According to the preliminary reliability analysis, several items were deleted. (i.e., one EPA, one EOA, two KPA, and one KMA items). Accordingly, there were 16 EPA, 18 EMA, 7 EOA, 20 EVocab, 10 ERC, 17 KPA, 17 KMA, 12 KOA, 22 KVocab, and 10 KRC items for the data analysis. The item analysis statistics are provided in the Appendix B.

Multiple-group path model specification. Multiple-group path analysis is useful to compare how a hypothesized model differs across specific group of students (Kieffer & Lesaux, 2012a) and the particular procedures are as follow. First, in a baseline multiple-group path model, all paths were freely estimated across the ESL and the EFL groups (see Appendix D for the base line multiple-group path models). Second,

to examine the group differences in the multiple-group model, the path of interest was allowed to be fixed one at a time, and a chi-square difference test was conducted. Third, if the chi-square difference test ($\Delta\chi^2$) was statistically significant at $\alpha = 0.05$ level, it meant that the two groups are different for the differed path. If it is not, the effect of the differed path between two groups are the same.

To compare the English language model between the ESL and the EFL groups, each of the direct path was allowed to be fixed one at a time (e.g., from EPA to EVocab, from EMA to EVocab, from EOA to EVocab, from EPA to ERC, from EMA to ERC, and from EOA to ERC, respectively). The chi-square difference between each of the fixed path models and the baseline model was tested. The indirect path from EPA to ERC via EVocab, from EMA to ERC via Evocab, and from EOA to ERV via EVocab was also differed one at a time, and compared the chi-square difference from the base line model. For the Korean language model comparison between the two groups, a parallel sequence of multiple-group path analysis was administered. For the cross-language model comparison, the path from MA in one language to vocabulary, to reading comprehension, and to reading comprehension via vocabulary in another language was varied and tested respectively.

Results

Descriptive statistics. The descriptive statistics (α, Max, *M*, and *SD*) are summarized in Table 18. The internal consistency reliability (α) of all measured variables was high and ranged from .71 to .96. In Table 19, DDA test results indicated that there were no statistically significant differences between fifth- and sixth-grades with regards to the scores in English tasks (F [5, 299] = 7.85, p = .16 > .05, Wilks' Λ = .97, R_c^2 = 2.56 %) and Korean tasks (F [5, 299] = 4.69, p = .45 > .05, Wilks' Λ = .99, R_c^2 = 1.44 %). However, there were statistically significant differences between the ESL and the EFL groups on all the English tasks (F [5, 299] = 325.64, p < .01, Wilks' Λ = .34, R_c^2 = 65.61 %) and all the Korean tasks (F [5, 299] = 79.57, p < .01, Wilks' Λ = .77, R_c^2 = 23.04 %). The group difference in the English tasks were mainly explained by EVocab, ERC, and EMA variables (β = 0.64, 0.48, and 0.23, respectively and r_s^2 = 73.96, 62.41, and 44.89 %, respectively). For the Korean tasks, the ESL and the EFL group difference was due to KMA, KRC, and KVocab measures (β = 0.80, 0.51, and 0.29, respectively and r_s^2 = 42.25, 38.44, and 25.00 %, respectively).

Table 18

Descriptive Statistics of All Measured Variables, Study III

			ESL ($N = 50$)		EFL ($N = 257$)		All ($N = 307$)	
Variable	α	Max	*M*	*SD*	*M*	*SD*	*M*	*SD*
EPA	.71	16	8.88	3.19	5.32	2.66	5.90	3.05
EMA	.89	18	17.10	1.49	7.54	4.12	9.10	5.20
EOA	.84	7	6.40	0.95	5.42	2.11	5.58	2.00
EVocab	.90	20	18.50	2.35	6.62	3.89	8.56	5.73
ERC	.84	10	8.76	1.67	2.59	2.15	3.59	3.09
KPA	.85	17	12.16	4.21	11.95	4.01	11.98	4.04
KMA	.84	17	11.42	3.429	14.48	3.15	13.98	3.39
KOA	.96	12	10.68	1.61	10.99	3.07	10.94	2.88
KVocab	.80	22	13.56	3.52	16.40	3.91	15.94	3.99
KRC	.78	10	3.62	2.51	6.06	2.67	5.66	2.79

Note. α = internal consistency reliability (Cronbach's Alpha); Max = maximum score of the measured variable; EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EVocab= English vocabulary; ERC = English reading comprehension; KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension.

Table 19

Summary of Descriptive Discriminant Analysis Results, Study III

Variables		Function_Grade							
		β	r_s	r_s^2 (%)	R_c^2 (%)	Λ	*F*	*df*	*p*
English Tasks	EPA	0.40	.58	33.64	2.56	.97	7.85	5	.17
	EMA	0.78	.56	31.36					
	EOA	0.28	.51	26.01					
	EVocab	-1.52	.21	4.41					
	ERC	0.90	.57	32.49					
Korean Tasks	KPA	0.74	.55	30.25	1.44	.99	4.69	5	.45
	KMA	-0.57	-.01	0.01					
	KOA	0.27	.44	19.36					
	KVocab	0.58	.42	17.64					
	KRC	-0.62	-.36	12.96					
		Function_ Group							
English Tasks	EPA	-0.12	.35	12.25	65.61	.34	325.64	5	< .01
	EMA	0.23	.67	44.89					
	EOA	-0.35	.13	1.69					
	EVocab	0.64	.86	73.96					
	ERC	0.48	.79	62.41					
Korean Tasks	KPA	-0.79	-.04	0.16	23.04	.77	79.57	5	< .01
	KMA	0.80	.65	42.25					
	KOA	-0.13	.07	0.49					
	KVocab	0.29	.50	25.00					
	KRC	0.51	.62	38.44					

Note. . Function_Grade = canonical function for discriminating fifth- and sixth-grades, Function_Group = canonical function for discriminating the Korean ESL and the Korean EFL groups, β = standardized canonical discriminant function coefficient, r_s = structure coefficient, r_s^2 = squared structure coefficient, R_c^2 = squared canonical correlation coefficient, Λ = Wilk's lamda, and *F* = chi-square difference statistic. R_c^2 is analogous to variance-explained effect size (η^2) in MANOVA testing.

In Table 20, two correlation matrices for all measured variables were presented: below the diagonal represents the ESL group matrix; and above the diagonal, the EFL group matrix. On the one hand, there were similar inter-correlations among variables between the two groups. First, three types of English metalinguistic awareness (EPA, EMA, and EOA) were positively correlated in both groups. For the ESL group, the correlation ranged from .36 to .54 (ps < .05); and for the EFL group, the range was from .43 to .53 (ps < .01). Second, positive correlations between the Korean metalinguistic awareness (KPA, KMA, and KOA) were also similarly found across the groups. The correlation coefficients ranged from .43 to .61 (ps < .01) in the ESL group and from .35 to .60 (ps < .01) in the EFL group. Third, both the ESL and the EFL groups represented high correlations between MA and vocabulary. In English measures, the correlation between EMA and EVocab was .62 for the ESL group, .67 for the EFL group (ps < .01). In Korean measures, the correlation between KMA and KVocab was .66 for the ESL group and .53 for the EFL group (ps < .01). Fourth, all measured variables were positively correlated with RC in the ESL group as well as in the EFL group. For English measures, both groups showed the correlation between EVocab and ERC was the highest (r = .74 and .53, ps < .01), and that between EMA and ERC was the second highest (r = .68 and .48, ps < .01). For Korean measures, the highest correlation was between KMA and KRC (r = .53 and .38, ps < .01). The correlations between KVocab and KRC were the second highest in the ESL group (r = .47, p < .01) and the third highest in the EFL group (r = .32, p < .01).

On the other hand, a few differences were found across the two groups. First, the cross-language correlations between Korean metalinguistic awareness (KPA, KMA, and KOA) and English reading measures (Evocab and ERC) in the ESL group were very distinct from those in the EFL group. Only KMA showed statistically significant correlation with EVocab in the ESL group ($r = .45$, $p < .01$), while all three metalinguistic awareness in Korean (KPA, KMA, and KOA) were positively correlated with EVocab in the EFL group ($r = .37$, .29, and .32, respectively, all ps $< .01$). Interestingly, this pattern was widely different for reading comprehension. All the correlations between KPA and ERC, KMA and ERC, and KOA and ERC in the ESL group were statistically significant ($r = .38$, .47, and .54, respectively, all ps $< .01$), while only KPA and ERC was significant in the EFL group ($r = .13$, $p < .05$).

Second, the correlations between English metalinguistic awareness (EPA, EMA, and EOA) and Korean reading measures (KVocab and KRC) were not similar across the two groups. In the ESL group, there were no statistically significant correlations between English metalinguistic awareness (EPA, EMA, and EOA) and KVocab. No statistically significant correlations were found between those and KRC in the ESL group. Conversely, in the EFL group, all the correlations were statistically significant ranged from .42 to .49 (all ps $< .01$) for KVocab and from .34 to .42 for KRC (all ps $< .01$).

Table 20

Correlations among All Measured Variables, Study III

Variable	1	2	3	4	5	6	7	8	9	10
1. EPA	1	.53**	.43**	.49**	.37**	.33**	.33**	.23**	.46**	.34**
2. EMA	.36*	1	.48**	.67**	.48**	.34**	.30**	.24**	.42**	.35**
3. EOA	.40**	.54**	1	.41**	.29**	.43**	.42**	.25**	.49**	.42**
4. EVocab	.46**	.62**	.53**	1	.53**	.37**	.29**	.32**	.46**	.31**
5. ERC	.49**	.68**	.64**	.74**	1	.13*	.10	.07	.22**	.22**
6. KPA	.25	.24	.22	.22	.38**	1	.60**	.34**	.43**	.35**
7. KMA	.25	.26	.22	.45**	.47**	.61**	1	.35**	.53**	.38**
8. KOA	.09	.32*	.42**	.27	.54**	.53**	.43**	1	.37**	.15*
9. KVocab	.02	.24	.23	.27	.40**	.55**	.66**	.54**	1	.32**
10. KRC	-.07	.10	.03	.07	.17	.45**	.53**	.29*	.47**	1

Note. Blue represents the correlations among the three types of metalinguistic awareness (i.e., phonological, morphological, and orthographic awareness); green, the correlations between each of the metalinguistic awareness and vocabulary; orange, the correlations between each of the metalinguistic awareness and reading comprehension; and red, the cross-linguistic correlations between each of the metalinguistic awareness and vocabulary or reading comprehensionThe ESL group is below and the EFL group is above the diagonal. EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EVocab= English vocabulary; ERC = English reading comprehension; KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension. * $p < .05$, ** $p < .01$

The multiple-group English language model. Sequential pair-wise comparisons between the freely-estimated models and the fixed-path of interest models provided the MA effect on vocabulary and reading comprehension in English was unique and positive not only in the ESL group but also in the EFL group (Fig. 13 and

Table 21). First, in both the Korean ESL and the Korean EFL groups, the direct path from EMA to EVocab was statistically significant and the value was the largest among other metalinguistic awareness variables (β = 0.43 for the ESL group and β = 0.54 for the EFL group, *p*s < .01). Second, the direct effect of EMA on ERC was also statistically significant in both groups (β = 0.27 for the ESL group and β = 0.19 for the EFL group, *p*s < .01). These direct paths did not show any statistically significant between group differences ($\Delta\chi^2$ = 0.67 and 2.56, *p*s > .05).

However, a distinct group difference was found in the direct effect of EOA on ERC and in the indirect effect of EMA on ERC. First, the direct path from EOA to ERC showed a statistically significant group difference. For the ESL group, the value of the effect was 0.25 and it was statistically significant ($p = .01 < .05$). For the EFL group, the value was small (β = 0.08) and was not statistically significant ($p = .77 > .05$). The chi-square difference test showed statistical significance ($\Delta\chi^2 = 4.68$, $df = 1$, $p < .05$), which means the two groups are differ when it comes to the EOA effect on ERC. Second, the indirect path from EMA to ERC via EVocab was slightly larger in the EFL group (β = 0.19, $p < .01$) than in the ESL group (β = 0.17, $p < .05$). The chi-square difference test showed that this between group difference was statistically significant ($\Delta\chi^2 = 26.25$, $df = 3$, $p < .05$). In short, for English reading comprehension, the ESL group students use more orthographic processing skill to extract meaning from texts, while the EFL learners rely more on their vocabulary knowledge which was activated by their morphological processing skill.

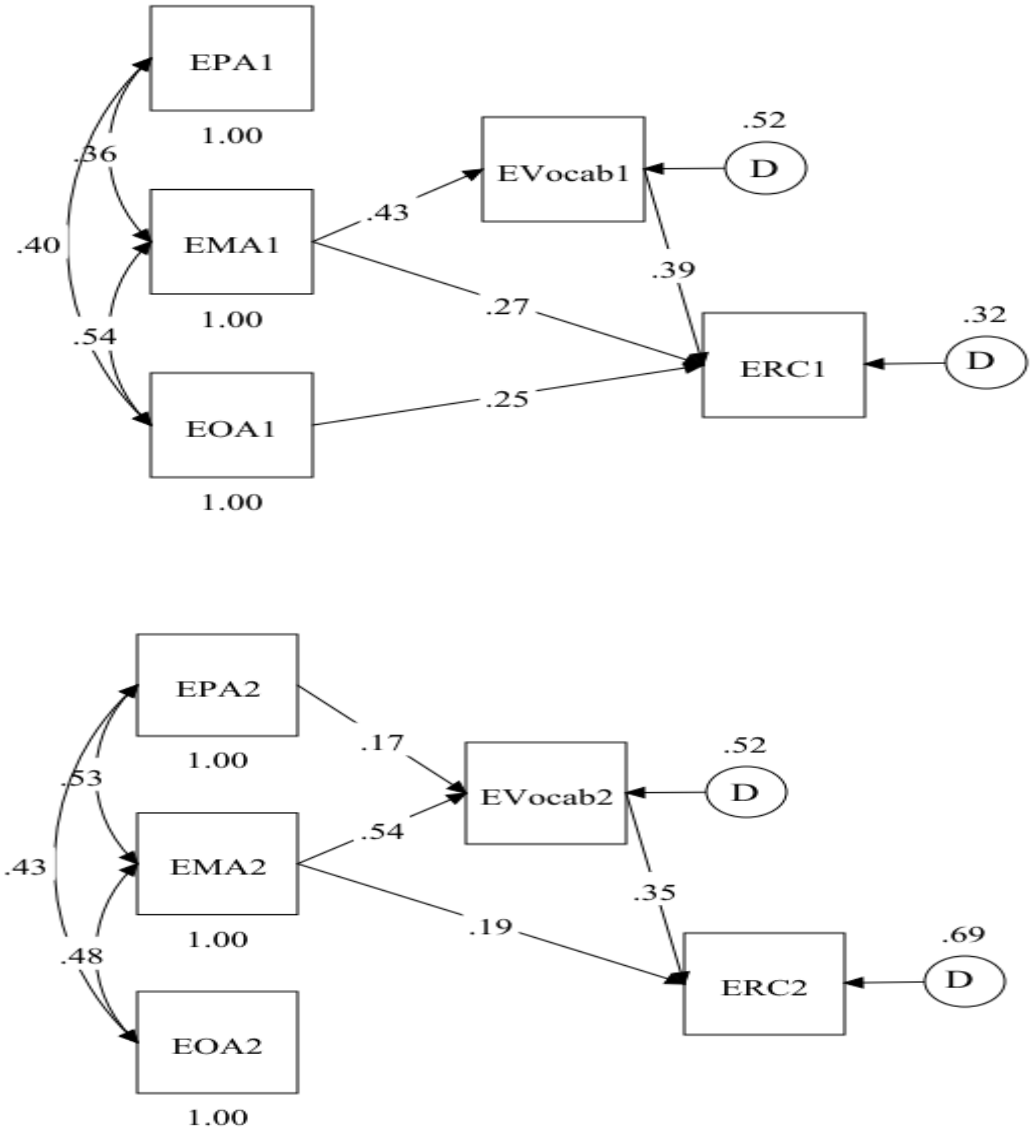

Fig. 13. The multiple-group English language model. The subscription 1 represents ESL group; 2 indicates EFL group. Single-headed arrows represent statistically significant path coefficients (β) and double-headed arrows indicate statistically significant correlations (*r*) between exogenous variables (all *p*s < .05). The disturbance (D) is an unexplained variance in the endogenous variables which can be calculated by $1 - R^2$. EPA = English phonological awareness; EOA = English orthographic awareness; EMA = English morphological awareness; EVocab= English vocabulary; and ERC = English reading comprehension.

Table 21

Summary of Parameters in the Multiple-group English Language Model

Parameter	Group 1		Group 2		Comparison to fixed model	
	Standardized	SE	Standardized	SE	$\Delta\chi^2$	*df*
Path Coefficient (β)						
EVocab on EPA	0.22	0.11	0.17**	0.05	0.61	1
EVocab on EMA	0.43**	0.12	0.54**	0.05	0.67	1
EVocab on EOA	0.22	0.12	0.07	0.05	1.42	1
ERC on EPA						
Direct	0.11	0.09	0.09	0.06	0.05	1
Indirect	0.08	0.05	0.06*	0.02	1.50	3
Total	0.19*	0.09	0.15*	0.07		
ERC on EMA						
Direct	0.27*	0.11	0.19*	0.08	2.56	1
Indirect	0.17**	0.07	0.19**	0.04	26.25**	3
Total	0.44**	0.10	0.38**	0.06		
ERC on EOA						
Direct	0.25*	0.10	0.02	0.06	4.68*	1
Indirect	0.08	0.05	0.03	0.02	2.42	3
Total	0.33**	0.11	0.05	0.06		
ERC on EVocab	0.39**	0.11	0.35**	0.07	0.89	1
Correlation (*r*)						
EPA with EMA	0.36**	0.12	0.53**	0.05		
EMA with EOA	0.40**	0.12	0.43**	0.05		
EOA with EPA	0.54**	0.10	0.48**	0.05		
R-square (R^2)						
EVocab	0.48**	0.10	0.48**	0.05		
ERC	0.68**	0.07	0.31**	0.05		

Note. Group 1 = the ESL group, Group 2 = the EFL group, $\Delta\chi^2$ = chi-square difference between freely estimated model and fixed-path of interest model, *df* = degrees of freedom, EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EVocab= English vocabulary; and ERC = English reading comprehension.

* $p < .05$, ** $p < .01$

In addition, the explained variance of EVocab in the ESL group was equal to the EFL group ($R^2_{\text{Evocab in ESL}} = R^2_{\text{Evocab in EFL}} = 48\%$). However, the variance of ERC in the EFL group was remained largely unexplained ($R^2_{\text{ERC in EFL}} = 31\%$), while the majority of variance of ERC in the ESL group was explained well by the measured variables ($R^2_{\text{ERC in ESL}} = 68\%$).

The multiple-group Korean language model. In Fig. 14 and Table 22, there were no statistically significant between-group differences in the direct effect of MA on vocabulary and reading comprehension in the Korean language model. First, KMA played the most significant role in both groups in predicting KVocab and KRC. The direct path from KMA to KVocab in each group showed statistically significant effect (β = 0.47 in the ESL group and 0.38 in the EFL group, *p*s= .00 <.01). The direct path from KMA to KRC was also statistically significant in the two groups which represented the value of 0.31(p = .06) and 0.21(p = .01 < .05). The chi-square difference test did not show any statistical significance between-group differences among those values ($\Delta\chi^2$ = 0.11 and 0.13, *p*s > .05).

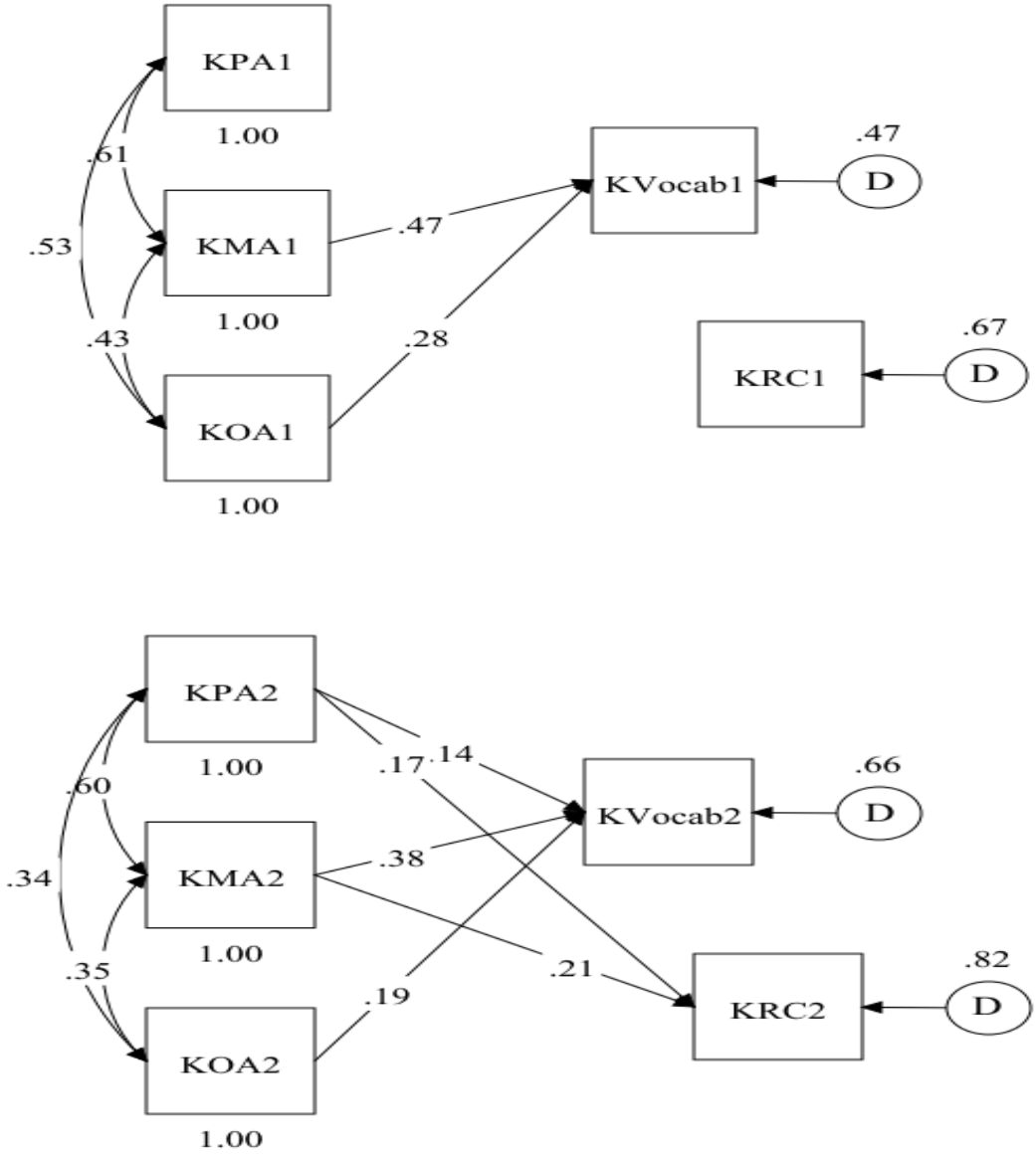

Fig. 14. The multiple-group Korean language model. The subscription 1 represents ESL group; 2 indicates EFL group. Single-headed arrows represent statistically significant path coefficients (β) and double-headed arrows indicate statistically significant correlations (*r*) between exogenous variables (all *p*s < .05). The disturbance (D) is an unexplained variance in the endogenous variables which can be calculated by $1 - R^2$. KPA = Korean phonological awareness; KOA = Korean orthographic awareness; KMA = Korean morphological awareness; KVocab= Korean vocabulary; and KRC = Korean reading comprehension.

Table 22

Summary of Parameters in the Multiple-group Korean Language Model

Parameter	Group 1		Group 2		Comparison to fixed model	
	Standardized	SE	Standardized	SE	$\Delta\chi^2$	*df*
Path Coefficient (β)						
KVocab on KPA	0.12	0.13	0.14*	0.06	0.11	1
KVocab on KMA	0.47**	0.12	0.38**	0.06	0.01	1
KVocab on KOA	0.28*	0.11	0.19**	0.05	1.91	1
KRC on KPA						
Direct	0.18	0.16	0.17*	0.07	0.00	1
Indirect	0.02	0.03	0.02	0.01	0.35	3
Total	0.20	0.16	0.19*	0.07		
KRC on KMA						
Direct	0.31	0.16	0.21*	0.08	0.13	1
Indirect	0.09	0.08	0.05*	0.03	20.75**	3
Total	0.40*	0.14	0.26**	0.07		
KRC on KOA						
Direct	-0.04	0.15	-0.03	0.06	0.03	1
Indirect	0.05	0.05	0.03	0.02	6.46	3
Total	0.01	0.14	0.00	0.06		
KRC on KVocab	0.19	0.17	0.14*	0.07	0.09	1
Correlation (*r*)						
KPA with KMA	0.61**	0.09	0.60**	0.04		
KMA with KOA	0.43**	0.12	0.35**	0.06		
KOA with KPA	0.53**	0.10	0.34**	0.06		
R-square (R^2)						
KVocab	0.53**	0.10	0.34**	0.05		
KRC	0.33**	0.11	0.18**	0.04		

Note. Group 1 = the ESL group, Group 2 = the EFL group, $\Delta\chi^2$ = chi-square difference between freely estimated model and fixed-path of interest model, *df* = degrees of freedom, KPA = Korean phonological awareness; KOA = Korean orthographic awareness; KMA = Korean morphological awareness; KVocab= Korean vocabulary; and KRC = Korean reading comprehension.

* $p < .05$, ** $p < .01$

However, with regards to the indirect effect of KMA on KRC, there was a statistically significant between-group difference. The effect was larger in the ESL group than the EFL group ($\beta = 0.09$ for the ESL group and $\beta = 0.05$ for the EFL group). When the indirect path (i.e., from KMA to KRC via KVocab) was fixed to be the same across the two groups, the chi-square difference was statistically significant from the original model that the path was freely estimated in each group ($\Delta\chi^2 = 20.75$, $df = 3$, $p < .05$). Compared to the Korean EFL learners, therefore, the Korean ESL learners are more likely to use their Korean MA to infer Korean vocabulary meaning, which in turn increases their Korean reading comprehension.

Similar to the English language model, the Korean language model showed different amount of variance explained in each group. The explained variance of Kvocab in the ESL group ($R^2_{\text{Kvocab in ESL}}$) was 53 %, while it was 34% in the EFL group ($R^2_{\text{Evocab in EFL}}$). Approximately 33% of variance of ERC in the ESL group was explained, and much smaller variance was explained in the EFL group ($R^2_{\text{KRC in EFL}} = 18$ %).

The multiple-group cross-language models. Both the Korean ESL and the Korean EFL groups showed positive cross-language transfer, but the direction was different (Fig. 15, Fig. 16, and Table 23). The Korean ESL learners' L1 (Korean) MA represented a statistically significant total effect on their L2 (English) vocabulary (β = 0.26, $p < .05$) and reading comprehension (β = 0.26, $p < .05$). However, their L2 MA did not show any statistically significant contribution for their L1 vocabulary and reading comprehension. On the other hand, the Korean EFL learners' L2 (English) MA played a positive role in L1 (Korean) vocabulary (β = 0.23, $p < .05$) and reading comprehension (β = 0.25, $p < .05$), while their L1 MA did not show any positive influence on their L2 vocabulary and reading comprehension.

There were statistically significant between-group differences in cross-language models. First, in the multiple-group KMA → ERC model, the direct path from KMA to ERC was positive and statistically significant in the ESL group (β = 0.18, $p < .05$), but the path in the EFL group was negative (β = -0.11, $p < .05$). This between group difference was statistically significant ($\Delta\chi^2 = 8.19$, $df = 1$, $p < .05$). Second, in the multiple-group EMA → KRC model, the indirect path from EMA to KRC via KVocab showed a statistically significant group difference. For the ESL group, the indirect effect was negligible (β = 0.00, $p > .05$), while it was positive in the EFL group (β = 0.02, $p > .05$). Even though the value was too small, these two coefficients represented a statistically significant between-group difference ($\Delta\chi^2 = 7.65$, $df = 3$, $p < .05$). In short, cross-language transfer of MA to vocabulary and reading comprehension was not

equivalent across learners in different language learning contexts (ESL and EFL) even though they learn to read the same two languages (i.e., Korean and English).

Furthermore, compared to the within-language models, the cross-language model explained more variance in each group. For the Korean ESL group, the multiple-group KMA → ERC model explained more variance of EVocab (from 48 % to 54%) and ERC (from 68% to 71%) than those in the multiple-group English language model. For the EFL group, more variance was explained in the multiple-group EMA → KRC model than in the multiple-group Korean language model. The explained variance of KVocab increased from 34% to 39%, and that of KRC from 18% to 22%. Accordingly, these increased variances represent that MA in one language played a facilitative role in developing vocabulary and reading comprehension in another language.

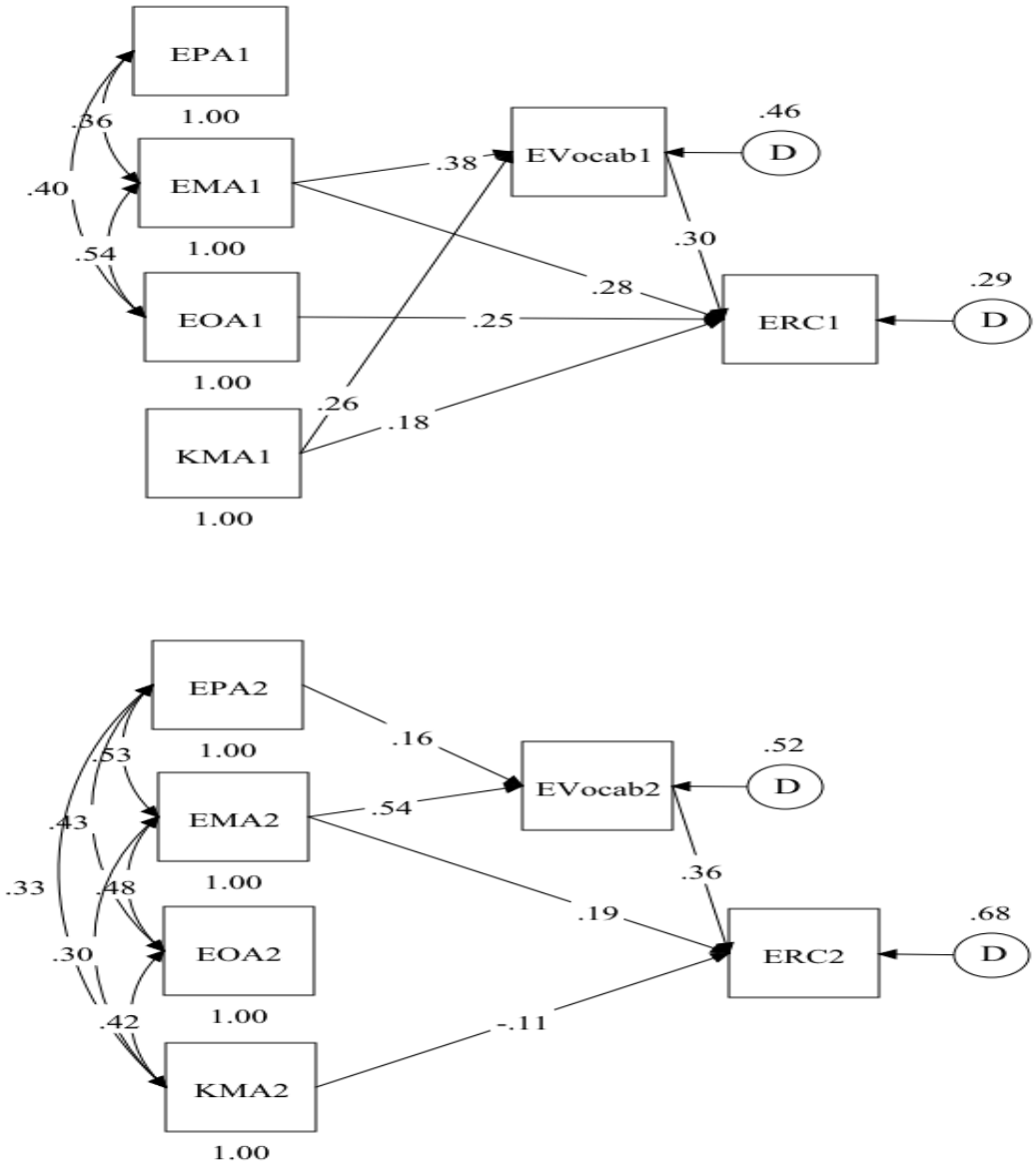

Fig. 15. The multiple-group KMA → ERC model. The subscription 1 represents ESL group; 2 indicates EFL group. Single-headed arrows represent statistically significant path coefficients (β) and double-headed arrows indicate statistically significant correlations (*r*) between exogenous variables (all *p*s < .05). The disturbance (D) is an unexplained variance in the endogenous variables which can be calculated by $1 - R^2$. EPA = English phonological awareness; EOA = English orthographic awareness; EMA = English morphological awareness; EVocab= English vocabulary; ERC = English reading comprehension; and KMA = Korean morphological awareness.

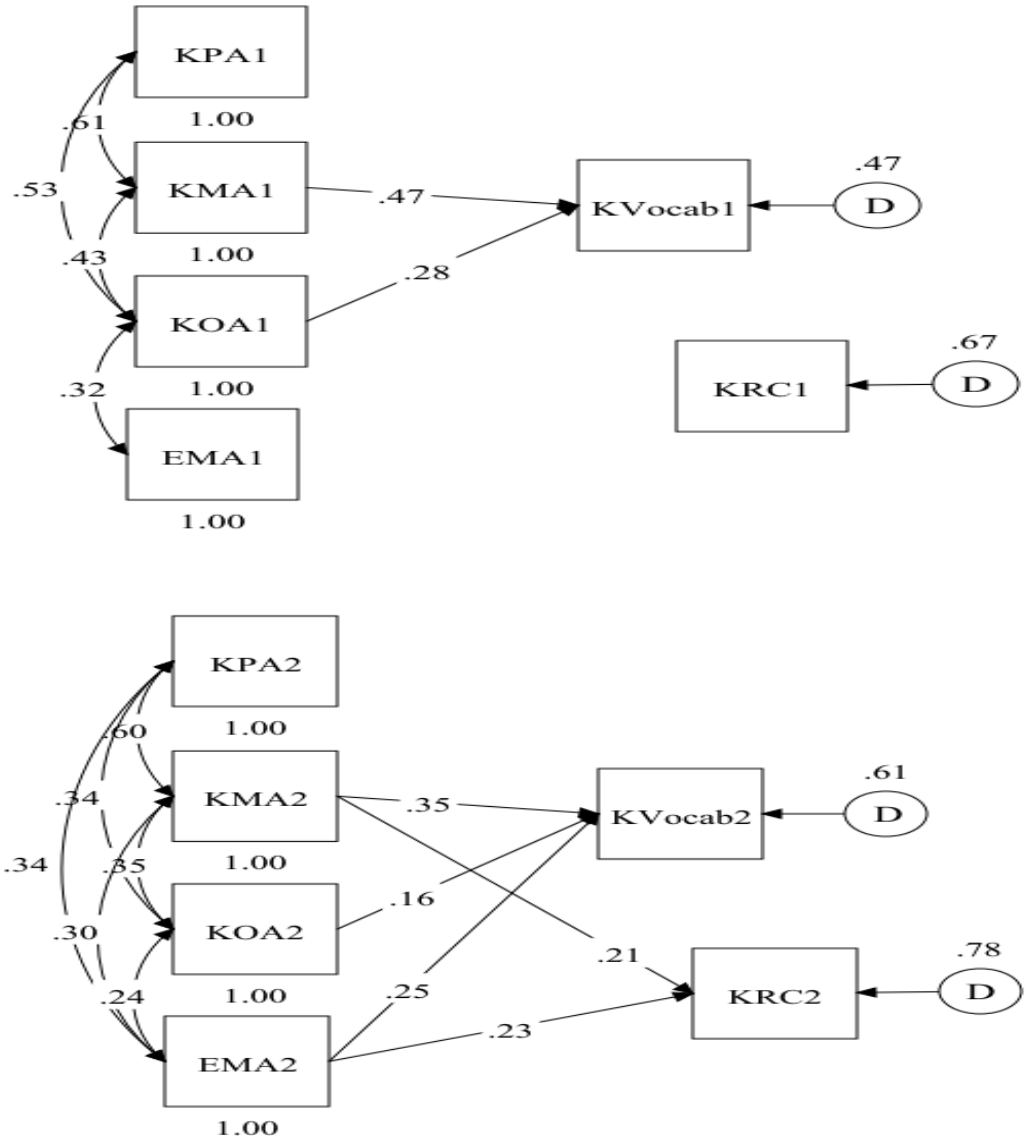

Fig. 16. The multiple-group EMA → KRC model. The subscription 1 represents ESL group; 2 indicates EFL group. Single-headed arrows represent statistically significant path coefficients (β) and double-headed arrows indicate statistically significant correlations (*r*) between exogenous variables (all *p*s < .05). The disturbance (D) is an unexplained variance in the endogenous variables which can be calculated by $1 - R^2$. KPA = Korean phonological awareness; KOA = Korean orthographic awareness; KMA = Korean morphological awareness; KVocab= Korean vocabulary; KRC = Korean reading comprehension; and EMA = English morphological awareness.

Table 23

Summary of Parameters in the Multiple-group Cross-language Models

	The Multiple-group KMA→ ERC Model					
	Group 1		Group 2		Comparison to fixed model	
Parameter	Standardized	SE	Standardized	SE	$\Delta\chi^2$	*df*
Path Coefficient (β)						
EVocab on KMA	0.26*	0.10	0.05	0.05	1.86	1
ERC on KMA						
Direct	0.18*	0.09	-0.11*	0.06	8.19*	1
Indirect	0.08	0.04	0.02	0.02	4.24	3
Total	0.26**	0.09	-0.09	0.06		
Correlation (*r*)						
KMA with EPA	0.25	0.13	0.33**	0.06		
KMA with EMA	0.26*	0.13	0.30**	0.06		
KMA with EOA	0.22	0.14	0.42**	0.05		
R-square (R^2)						
EVocab	0.54**	0.10	0.48**	0.05		
ERC	0.71**	0.07	0.32**	0.05		
	The Multiple-group EMA→ KRC Model					
Path Coefficient (β)						
KVocab on EMA	0.00	0.10	0.23**	0.06	0.80	1
KRC on EMA						
Direct	-0.07	0.12	0.23**	0.06	1.51	1
Indirect	0.00	0.02	0.02	0.02	7.65*	3
Total	-0.07	0.12	0.25**	0.06		
Correlation (*r*)						
EMA with KPA	0.24	0.13	0.34**	0.06		
EMA with KMA	0.26*	0.13	0.30**	0.06		
EMA with KOA	0.32*	0.13	0.24**	0.06		
R-square (R^2)						
KVocab	0.53**	0.10	0.39**	0.05		
KRC	0.33**	0.11	0.22**	0.05		

Note. Group 1 = the ESL group, Group 2 = the EFL group, $\Delta\chi^2$ = chi-square difference between freely estimated model and fixed-path of interest model, *df* = degrees of freedom, EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EVocab= English vocabulary; ERC = English reading comprehension; KPA = Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab= Korean vocabulary; and KRC = Korean reading comprehension.

* $p < .05$, ** $p < .01$

Discussion

Results of the present study showed both similarities and differences between the Korean ESL and the Korean EFL students regarding the role of MA in vocabulary and reading comprehension. First, MA played a unique role in explaining vocabulary and reading comprehension in English, not only for the ESL group but also for the EFL group. The indirect effect of MA on reading comprehension in the English language model was greater for the EFL group than for the ESL group.

Second, MA was both unique and the most important predictor in Korean vocabulary and reading comprehension for both the ESL and the EFL groups. Unlike the English language model result, the indirect effect of MA on reading comprehension in the Korean language model was greater for the ESL group than for the EFL group.

Third, the cross-language transfer pattern was very distinct between the two groups: for the ESL group, it was from L1 MA to L2 vocabulary and reading comprehension (i.e., from KMA to EVocab and ERC); and for the EFL group, from L2 MA to L1 vocabulary and reading comprehension (i.e., from EMA to KVocab and KRC). In particular, between-group differences on the direct effect of KMA on ERC, and the indirect effect of EMA to KRC were statistically significant.

English reading vs. Korean reading across different language learning contexts. The Korean ESL and the Korean EFL group showed very different patterns with regards to the role of OA in reading English. That is, the ESL students' awareness of English orthographic rules played an important role in ERC, while it did not for the EFL group students. Distinct orthographic features between Korean and English can be

one possible reason for the difference. Visual representation of Korean orthography (i.e., Korean *Hangul*) is different from English orthography (i.e., English alphabet). Phonemes in Korean are put together in a syllable block, while these are linearly arranged in English. Korean orthography transparently encodes sound with letters, while English orthography is opaque in those connections; hence, grapheme-phoneme connections in Korean orthography are simpler to master than grapheme-phoneme connections in English. Due to these language-specific features in orthographies, learners who learn to read English and Korean at the same time may require more extensive practice to develop their English orthographic processing skills. However, contrary to the ESL learners, the EFL learners in the present study had very limited print exposure to English print outside of the classroom environment. The EFL learners' length of studying English, frequency of English instruction, and home language supports in English literacy were not equivalent to those of their ESL counterparts. Due to these limited exposure to English, the EFL learners may not have fully acquired adequate orthographic awareness in English, and consequently this undeveloped ability may have played a role in explaining their lower English reading comprehension levels.

Cross-language transfer patterns across different language learning contexts. According to the multiple-group comparisons, the present study showed that the direction of the cross-language transfer can be different according to the learners' language learning contexts. The positive transfer from L1 (Korean) MA to L2 (English) vocabulary and reading comprehension was only found in the ESL group, not in the EFL group. Conversely, the opposite direction transfer was found in the EFL group, not in the

ESL group: from L2 (English) MA to L1 (Korean) vocabulary and reading comprehension. In particular, the direct effect from L1 MA to L2 reading comprehension and the indirect effect from L2 MA to L1 reading comprehension showed statistically significant between-group differences.

As proposed in the linguistic interdependence hypothesis (Cummins, 1981, 2000, 2005), the learners' unbalanced experiences in literacy input may be one reason for the difference. The ESL learners have had extensive L2 literacy instruction without than having equivalent supports for L1 literacy development. Because of the limited L1 instructional experience, the ESL learners may not have enough chances for activating their L2 MA while learning to read their L1, even though their L1 and L2 shared similar morphological structure and their L2 MA proficiency was adequate to be transferable cross-linguistically. On the contrary, the EFL learners' literacy experiences were dominant in L1, but they had very limited L2 print exposures. Hence, the learners may have little choice but to apply their L1 MA in learning to read L2. These unidirectional cross-language transfer patterns may turn to be bidirectional, if the two groups of students had balanced literacy instructions in both languages.

CHAPTER IV

DISCUSSION AND CONCLUSIONS

There were three major purposes of the present dissertation: first, to investigate whether MA is a unique predictor for vocabulary and reading comprehension in English (L2) for learners of ESL and EFL; second, to examine whether MA plays a role in developing the learners' Korean (L1) vocabulary and reading comprehension; and third, to explore whether the learners' MA in one language would facilitate vocabulary and reading comprehension in another language, to test similarities or differences, if any, of the cross-language transfer between learners in different language learning contexts (i.e., ESL vs. EFL).

Those questions were examined in three interrelated studies and several important points were found with regards to the role of MA in biliteracy development. In Study I, for the Korean ESL learners, MA played a unique role in explaining the learners' English and Korean vocabulary and reading comprehension. In particular, the MA contribution to reading comprehension in English was both direct and indirect effect (mediated by vocabulary), while it was only direct effect in Korean. The learner's L1 (Korean) MA facilitated their L2 (English) vocabulary and reading comprehension, while their L2 MA did not play a cross-language role in explaining their L1 reading outcomes. To the extent that there was cross-language transfer, the information-processing skill for the L1 language structure (KCMA) was more likely to be transferred to L2 vocabulary and reading comprehension than that of the less productive structure (KDMA).

In Study II, the facilitative role of MA in vocabulary and reading comprehension was found not only in the English language model, but also in the Korean language model. The MA contribution to reading comprehension in English was through both a direct effect and an indirect effect, while it was only through a direct effect in Korean. The cross-language effect was only found in vocabulary level and it was unidirectional (from EMA to KVocab). The degree of cross-language transfer was different according to the language-specific feature: EDMA was more likely to transfer to explain KVocab than ECMA, because English is more productive in derivational word formations.

In Study III, the Korean ESL and the Korean EFL groups were compared, and similar patterns as well as statistically significant between-group differences were found. First, the direct effect of MA on vocabulary and reading comprehension in English and in Korean was the same across the two language groups. Second, the indirect effect of MA on reading comprehension (mediated by vocabulary) showed statistically significant between-group differences. The ESL learners use more Korean MA to decipher vocabulary meaning in Korean, which in turn increases their Korean reading comprehension. The EFL learners utilize more English MA to infer English vocabulary meaning, which consequently enhance their English reading comprehension. Third, the direction of the cross-language transfer was from L2 MA to L1 vocabulary and reading comprehension for the ESL group, while it was from L1 MA to L2 vocabulary and reading comprehension for the EFL group. In particular, the direct path from L2 MA to L1 reading comprehension, and the indirect path from L1 MA to L2 reading comprehension showed statistically significant between-group differences.

General Discussion

Based on these findings, the key issues which were hypothesized in the present dissertation were discussed as follows.

H1. As reading is an essentially metalinguistic process which requires language forms to be recognized and manipulated, Korean ESL and Korean EFL learners' MA played a unique role in their L1 (Korean) and L2 (English) reading, after controlling for PA and OA: English MA for English vocabulary and English reading comprehension; and Korean MA for Korean vocabulary and Korean reading comprehension.

The present study results provided extensive evidence to support the hypothesis. As a particular type of metalinguistic awareness, MA played a significant role not only in English reading but also in Korean reading. MA directly explained the variance of vocabulary and that of reading comprehension in English as well as in Korean. In particular, for English reading, MA also showed an indirect effect on reading comprehension (mediated by vocabulary). These within-language effects of MA on reading outcomes were similarly found across learners in very different language learning environments (ESL and EFL) who learn to read the two languages (English and Korean) at the same time.

Additionally, other types of metalinguistic awareness (PA and OA) also played a unique role in explaining the two reading outcomes (i.e., vocabulary and reading comprehension). In English reading, PA was activated in explaining vocabulary and reading comprehension. EPA showed a direct effect on EVocab and an indirect effect on ERC, and these effects were found in not only the Korean ESL learners but also in the

Korean EFL learners. On the other hand, for Korean reading, KOA played a unique role in explaining KVocab across the two groups. However, when it comes to the relative role across PA, OA, and MA, the total effect of MA on vocabulary and reading comprehension was much larger in each language than the other two.

These results confirmed and extended the scope of previous research by adding empirical evidence that MA may be a language-universal skill for literacy development for upper elementary students. In previous studies, PA was the main skill investigated and it was highlighted as a language-universal skill to be developed for early literacy learning across languages (Bradley & Bryant, 1983; Branum-Martin et al., 2014; Caravolas & Bruck, 1993; Haigh et al., 2011; Hulme et al., 2012; Schiff et al, 2011; Yeung et al., 2013). However, recent studies on reading development in Arabic (Mahfoundhi et al., 2010), Chinese (Hu, 2013), English (Deacon & Kirby, 2004; Nagy et al., 2006), and Spanish (Ramirez et al., 2010) consistently showed that MA was one of the most important skills for older elementary students when controlled for the PA effect. In line with these findings, the present dissertation provided evidence that the unique role of MA for older elementary students' reading was similarly found both English and Korean reading. Therefore, it seems reasonable to conclude that the critical component of reading across languages gradually shifts from PA to MA as readers reach the upper-elementary school grades.

H2. Because the three types of metalinguistic awareness (PA, MA, and OA) and vocabulary are essential constituents of lexical quality, when all these variables are

fully specified and closely bound together, the variance of reading comprehension would be well explained in English and in Korean.

The path model analysis in the present study confirmed this hypothesis. In Study I, the English language model for the Korean ESL learners showed that all measured variables (PA, MA, OA, and Vocab) were activated and played a role in explaining reading comprehension. The explained variance of reading comprehension in the model was 71%. Conversely, the Korean language model in the study showed that only 29 % of reading comprehension variance was explained. The lexical quality was very low in this model, because only MA was specified, while the other lexical constituents (PA, OA, and Vocab) were not activated. In Study II, the explained variances of reading comprehension in the English language model and the Korean language model were similar, approximately 30 %. In both language models, the constituents of the lexical quality were not fully specified. Due to this low lexical quality, a large portion of reading comprehension variance remained unexplained in the study.

With regards to the low lexical quality in the Korean language models, there are several possibilities to consider. First, PA in the Korean language models might not be activated due to orthographic transparency in the Korean language. Similar to other transparent orthographies (i.e., Italian and Greek), the upper-elementary participants in the present study may already have mastered how to connect phonemes and their visual representations (graphemes) in Korean. Hence, the greater concern for readers may not be processing phonological information, but inferring text meanings based on other language form processing skills such as OA and MA. Second, the role of vocabulary in

reading comprehension might be underestimated due to the instrumental limitation of the present dissertation. The high correlation between KMA and KVocab in Study I (r = .71, p < .01) and Study II (r = .53, p < .01) show that the two variables shared too much variance. In that only receptive vocabulary tasks were included for constructing the Vocab variable in the present study, it is questionable whether the high correlation would also be found when productive vocabulary tasks are taken into consideration, and hence whether the role of vocabulary in reading comprehension would be independent from MA in the Korean language model.

Regarding the English language model in Study II, the only unspecified constituent of the lexical quality was OA. Since the Korean EFL learners have had very limited English print exposure and were given little instruction about acceptable English spelling patterns, they might be challenged as to how to process English orthographic information. Instead of using the language-specific processing skill (OA), the students might utilize more language-universal processing skills such as PA and MA during English reading. The two group comparisons in the study three support this explanation. The relative role of OA in reading comprehension for the Korean ESL learners was higher than that for the Korean EFL learners, and the group difference was statistically significant. The OA contribution in the EFL group was negligible, while other constituents were highly activated.

Note that over 70% of the English reading comprehension variance was explained by lower-level language processing skills for the ESL learners. This finding contradicts the dominant position in L2 reading research that emphasizing higher-level

language processing skills such as using background knowledge and comprehension strategy (Goodman, 1996; Smith, 1994) will aid reading comprehension. Without including those higher-level language processing skills in the investigation, however, the English language model in Study I showed the promising role of lower-level processing skills in predicting reading comprehension. As hypothesized in the lexical quality hypothesis, if all the lower-level processing skills were fully activated in the Korean language model, the explained variance would be increased.

H3. The role of MA in vocabulary and reading comprehension may not be equivalent across the Korean ESL and the Korean EFL learners, because the two language groups are different language learning contexts with various home supports (ecological component).

This hypothesis was partially supported by the results from the present dissertation. On the one hand, the multiple-group path analysis in Study III showed that there was no statistically significant group difference with regards to the direct effect of MA on vocabulary and reading comprehension. In English reading, the direct contribution of MA to vocabulary and reading comprehension was positive not only in the ESL group, but also in the EFL group. Even though the ESL group showed more direct effect on reading comprehension than the EFL group, and the EFL group had more direct effect on vocabulary than their ESL counterparts, these differences were not statistically significant. In Korean reading, the direct effects from MA on vocabulary and reading comprehension for the ESL group were higher than those in the EFL group, but no statistically significant between group differences were found.

However, as far as the indirect effect of MA on reading comprehension is concerned, the two groups showed distinct differences. For English reading, the indirect effect of EMA on ERC was larger for the EFL group than the ESL group. For Korean reading, the ESL group students' KMA played a more indirect role in explaining KRC, compared to their EFL counterparts. These between-group differences were statistically significant. In short, the Korean ESL and the Korean EFL learners mainly utilized MA while learning to read their less-skilled language, in order to decipher vocabulary meaning, and this strategic language processing skill affected their success at reading comprehension in that language.

H4. No matter what language learning contexts are (ESL and EFL), due to orthographic transparency, the Korean ESL and the Korean EFL learners would show better PA in Korean than in English; and the learners' PA would remain a critical element for vocabulary and reading comprehension in English, not for Korean vocabulary and reading comprehension.

Clear evidence for the hypothesis was provided in the present dissertation. For one, regardless of contextual differences in language learning, the participants had better phonological processing skills in Korean than in English. In Study I, even though the ESL learners had better scores in English vocabulary and reading comprehension, the learners' KPA score was higher than EPA, and the difference was statistically significant. In Study II, the Korean EFL learners had statistically significantly higher proficiency in all Korean measures than in English measures. Additionally, the participants' PA played a unique role in English reading, but not in Korean reading. In studies I and II, EPA

played a unique role in EVocab and ERC, not only for the ESL students but also for the EFL participants. However, for Korean reading, KPA did not show any statistically significant effect on KVocab and KRC across the two groups.

These results can be mainly explained by the PGST (Ziegler & Goswami, 2005). Since Korean orthography is very transparent, representing phonemes with their corresponding graphemes, Korean readers have little problem with decoding words. Conversely, due to English's opaque phoneme-grapheme connections, English readers typically take longer to accurately and quickly decode words. More than processing syllables and onset-rime units, phonemic information is one of the most challenging points for the English readers. Because of the variant orthographic transparency, rates of mastering the smallest grain size (i.e., phonemes) are different across the two languages. This difference might cause the participants to utilize different strategies while reading English and Korean texts. The present dissertation provided empirical evidence that the PGST framework can be adapted to explain passage-level reading (reading comprehension) across languages.

H5. The Korean ESL and the Korean EFL learners' MA in one language would be transferred to vocabulary and reading comprehension in another language because their L1 (Korean) and L2 (English) share similar morphological structure. However, due to language-specific features in Korean and English morphology, and due to different language learning contexts (ESL and EFL), the participants would show various patterns of the cross-language transfer.

The results of the present dissertation provided empirical evidence to support the research hypothesis. First of all, throughout the three interrelated studies in the present dissertation, positive cross-language transfer of MA to vocabulary and reading comprehension was found. In Study I, the Korean ESL learners' MA in one language was positively transferred to predict vocabulary and reading comprehension in another language (i.e., from KMA to EVocab and from KMA to ERC). In Study II, the Korean EFL learners' MA in one language facilitated vocabulary learning in another language (i.e., from EMA to KVocab). In Study III, when the two groups' data were simultaneously compared, both student groups' MA in one language positively transferred to reading in another language not only for vocabulary learning but also for reading comprehension. These positive cross-language transfers were mainly explained by the structural similarities between Korean and English morphology. As the universal grammar of reading (Perfetti, 2003) and the transfer facilitation model (2008a) proposed, since derivational and compound word formation rules are similar across the two languages (English and Korean), learners in each language may require similar morphological information-processing skill (i.e., MA), which may in turn provide a facilitative strategy for learning to read both languages at the same time.

Second, as far as the degree of the cross-language transfer is concerned, language-specific features across English and Korean morphology brought out distinct differences. On the one hand, there was more transfer from Korean compound MA to English vocabulary and reading comprehension, than that from Korean derivational MA to English reading. Korean morphology is more productive in making compound words

than derivational words. Upper elementary grade Korean readers typically encounter many compound words borrowed from Chinese and they are asked to infer the meaning of the words without any contextual or visual aids. A longitudinal study from Cho et al. (2011) provided evidence that Korean students' awareness of compound word formation became more important predictors for Korean word reading and spelling as the students grew older, from fourth- to six-grades. The fifth- and sixth-grade Korean ESL learners in Study I, therefore, might activate more knowledge in processing compound word structures than derivational forms while reading Korean texts. Korean compound MA in Korean reading was more likely to predict English vocabulary and reading comprehension, than the less activated morphological processing skill (Korean derivational MA) in Korean reading.

On the other hand, more English derivational MA was transferred to Korean vocabulary and reading comprehension, than English compound MA. Complex words in English are very productive in derivational formations (Ramirez et al., 2011) and research has shown that awareness of derivational word formation is a key predictor for upper elementary English readers' vocabulary and reading comprehension (Carlisle, 2000; Goodwin et al., 2013; Kieffer & Box, 2013; Kieffer & Lesaux, 2008), while MA for compound and inflectional structure is developed at younger ages (e.g., early and mid-elementary grades, Anglin, 1993). The upper elementary Korean EFL learners in Study II might infer meaning from English texts using derivational word structure, rather than utilizing compound MA. Hence, the more activated derivational MA in English might play a more facilitative role in predicting Korean vocabulary and reading

comprehension, compared to the cross-language transfer from the less triggered compound MA in English reading to Korean reading. In short, even though Korean and English share similar morphological structures in both derivational word formations and in compound formations, the degree of cross-language transfer was not the same, according to the productivity of morphological structure in each language (language-specific feature): the more activated information-processing skill in one language was transferred more to reading in another language.

Third, with regards to the directionality of the cross-language transfer, there were distinct between-group differences across learners in different language learning contexts. For the Korean ESL learners, the cross-language transfer was from L1 (Korean) MA to L2 (English) vocabulary and reading comprehension. For the Korean EFL leaners, the direction was from L2 (English) MA to L1 (Korean) vocabulary and reading comprehension. These cross-language transfers were unidirectional only, and no bidirectional influences were found even though Korean and English share similar morphological structures. Adequate theoretical principles have not yet been established for explaining directional variations across cross-language studies (Koda, 2008b). Some of the studies proposed that if students have better proficiency in one language, then the students' MA in the former language can be transferred to reading in the latter language **(**Deacon et al., 2007; Zhang, Anderson, Li, Dong, Wu, & Zhang, 2010). However, Study I in the present dissertation did not show any positive cross-language transfer of L2 MA to L1 vocabulary and reading comprehension, even though the Korean ESL learners' L2 proficiency was better than L1. Some studies have claimed that the direction is

determined by morphological complexity of the languages included (Bindman, 2004; Saiegh-Hadadd & Geva, 2008). However, even when the same languages were investigated (English and Korean) in the present dissertation, the direction of the cross-language transfer was not identical across learners who learn to read the two languages at the same time.

To recapitulate the interdependence hypothesis (Cummins, 1981, 2000, 2005), there are necessary conditions for the positive cross language transfer: adequate competency in one language and adequate language input and motivation in another language. The Korean ESL participants in the present dissertation were exposed to more L2 (English) literacy input than L1 (Korean), when the weekly instruction time and total length of study are considered. Their L1 input at home was highly focused on spoken language rather than written language. Accordingly, even though the participants had adequate L2 competency, their L2 MA could not be transferred to L1 reading due to the lack of L1 literacy input. In a similar matter, the Korean EFL participants in the present dissertation have had very limited L2 literacy input even though they have highly competent L1 proficiency. Due to the lack of L2 literacy support, the participants' L1 MA could not be utilized for their L2 reading.

Taken together, the degree and direction of cross-language transfer may be determined by multiple factors. As the universal grammar of reading (Perfetti, 2003) and the transfer facilitation model (Koda, 2008a) suggested, structural similarities and differences between languages would be a pre-condition for the transfer to occur. Further, in line with the linguistic interdependence hypothesis (Cummins, 1981, 2000, 2005),

language proficiency in one language, and literacy input in another language should be considered.

Educational Implications

Based on the findings of the present dissertation, several educational implications can be suggested. First of all, educators in English need to be informed of the important role of MA in literacy development, especially for upper elementary ESL and EFL learners. Morphological units (i.e., free morphemes and affixes) and their formation rules for making complex words have been regarded as difficult to master, and hence they are not traditionally included in literacy instruction for elementary students (Rasinski, Padak, Newton, & Newton, 2011). However, consistent research findings (Goodwin et al., 2013; Kieffer & Box, 2013; Kieffer & Lesaux, 2008; Zhang & Koda, 2013) and results from the present dissertation have provided evidence that MA is a unique predictor for upper elementary students' vocabulary and reading comprehension in English, even though the students were learning English as a second or foreign language (ESL or EFL). Similar to the result of Kieffer and Lesaux (2007), the present dissertation also provided evidence that the role of MA in reading comprehension was even more important than that of vocabulary. Note that these positive roles of MA in English reading were not only effective for the ESL learners but also for the EFL learners. In particular, for the EFL learners who have limited vocabulary knowledge in English, morphological information-processing was a critical strategy to infer vocabulary meaning, which in turn increases their reading comprehension.

Practically, in determining what kind of morphological unit should be taught in what order, frequency and transparency are useful frameworks to consider. When it comes to frequency, Rasinski et al. (2011) suggested that teachers should start with familiar two-syllable compound words (e.g., *bedroom* or *birthday*), and then move to teach common prefixes (e.g., *un-*, *de-*, or *re-*) and suffixes (e.g., *-er*, *-est*, *-ful*, or *-less*). With regards to transparency, Carlisle and Stone (2005) recommend that words with phonological shifts when making morphologically complex words (e.g., *wide* - *width*) are more difficult to recognize than phonologically transparent words (e.g., *classic* - *classical*). Accordingly, teachers need to organize the sequence of teaching morphologically complex words for upper elementary English learners based on these exemplary principles.

Second, in Korean reading, educators also need to consider MA as an effective strategy for vocabulary and reading comprehension development in Korean. Even though relatively little attention was given to critical components of reading languages other than English, the present dissertation provided compelling evidence that MA is not only an important predictor for reading in English, but also significant for explaining reading success in Korean. Importantly, the role of MA for vocabulary, and for reading comprehension in Korean were both direct effects, which means that increasing Korean MA would directly enhance the Korean readers' ability to infer meaning from words and texts. Thus, for upper elementary Korean readers, giving more chances to identify and manipulate morphological structures would be meaningful in facilitating their Korean literacy development.

Third, teachers of upper elementary ESL and EFL learners should know that the students' L1 MA benefits their L2 reading development; and that the learners' L2 MA is a facilitative component for their L1 reading development. Because language development between L1 and L2 is interdependent (Cummins, 1981, 2000, 2005), students' improved knowledge in one language would enhance their literacy development in another language, as long as they have adequate literacy input for learning to read the additional language. Thus, for those students who learn to read two languages at the same time, extensive print exposures and instructional supports in both languages should be maintained. Importantly, the ability to process similar language structures across languages (e.g., MA between English and Korean) can be positively transferable to facilitate literacy development in each language. Therefore, educators of ESL and EFL learners should give more attention to understanding what structural points would be similar or different between the learners' L1 and English (L2) and they should encourage the learners to work information-processing skills in one language, which will then be positively transferable to learn to read another language.

Limitations and Future Directions

There were some limitations in the present dissertation. First, the present dissertation did not include word reading and motivation in its investigation. Even though research has shown that the contribution of MA to word reading is unique controlling for other variables such as PA and vocabulary (Nagy, Berninger, Abbott, Vaughan, & Vermeulen, 2003), little is known about the multiple relations among MA, word reading, vocabulary, and reading comprehension. In addition, while motivation is

one of necessary conditions for cross-language transfer in the linguistic interdependence hypothesis (Cummins, 1981, 2000, 2005), it has been largely under-investigated how it is related to MA and reading comprehension. By adding these variables in future analysis, a more comprehensive understanding of MA contribution to vocabulary and reading comprehension can be possible.

Second, note that there is one more important constituent of the lexicon in the reading systems framework (Perfetti & Stafura, 2014), the syntax, which was not included in the present investigation. The syntax refers to how to order words in a language to make sentences. The largely unexplained variance of reading comprehension in the Korean language model may be explained more if the participants' syntactic awareness were included as a predictor in the model. With regards to the cross-language transfer aspect, it is questionable whether positive transfer would have occurred in syntactic level between English and Korean reading. Unlike morphological structure, Korean and English are dissimilar in syntactic structure. The basic sentence structure in Korean is subject (S) + object (O) + verb (V), while it is subject (S) + verb (V) + object (O) in English (Wang et al., 2009a). Hence, investigating cross-language transfer between dissimilar language structures between English and Korean is a good example of future work for the present dissertation.

Third, quality of instruction should be considered in future work. In the present dissertation, the environmental aspects of learning to read languages were generally considered to categorize the instructional differences between the ESL and the EFL contexts. Even though the two language learning contexts are distinct from each other

with regards to societal and instrumental language use, language of instruction, and amount of literacy input in each language, it should be noted that there may also be variations of instructional quality between the two groups. For example, as far as English instruction is concerned, the Korean ESL learners learn to read English from native English teachers with many English-only interactions with teachers and peers. They read texts of various genres (e.g., narrative and expository) and reading books at school is often accompanied by writing reading logs or journals. The English reading instruction for the Korean EFL learners, however, is limited to reading short sentences or phrases which are mainly used for simple communications (e.g., invitations, daily journals, and time tables). If these aspects were to be included in future investigation, the reason for the within- and cross-language differences between the two groups may be better explained.

Conclusions

The present dissertation provided empirical evidence to support the importance of MA in biliteracy development for upper elementary students. Particular examples from the Korean ESL and the Korean EFL learners showed that MA made a unique within- and cross-language contribution in explaining the learners' vocabulary and reading comprehension. .

As far as the within-language perspective is concerned, the participants' MA in English successfully predicted their English vocabulary and reading comprehension; and their MA in Korean effectively explained their Korean reading outcomes (i.e., vocabulary and reading comprehension). Importantly, the participants strategically use

MA in less-skilled language to decipher vocabulary meaning, which in turn help their reading comprehension in that language. However, due to orthographic differences between the two languages, the pattern of activated metalinguistic awareness in each language was not the same. For English reading, PA was activated along with MA, whereas for Korean reading it was a negligible predictor. Additionally, the ecological component of reading (i.e., language learning contexts) specifically influenced the degree of OA contribution in English reading comprehension across the two groups.

When it comes to the cross-language perspective, the participants' MA in one language positively transferred to predict their vocabulary and reading comprehension in another language. The pattern of the cross-language transfer was influenced by multiple factors: structural similarities and differences between languages and the linguistic interdependency. The former factors were useful to explain the degree of cross-language transfer between Korean and English, showing that more compound Korean MA was transferred to English reading, while more derivational English MA was transferred to Korean reading. The latter factor, the linguistic interdependency, provided rationales to explain between-group differences in cross-language transfer. For the Korean ESL learners, the cross-language transfer was from L1 MA to L2 vocabulary and reading comprehension, while for the Korean EFL learners, it was from L2 MA to L1 vocabulary and reading comprehension. The present dissertation showed, perhaps for the first time, that there is a positive cross-language contribution of MA to vocabulary and reading comprehension among the Korean ESL and the Korean EFL learners. This

finding was contradictory to the result of Wang et al. (2009a), and suggests the cross-language MA contribution becomes more salient at the upper elementary grades.

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APPENDIX A

MEASURES (RECORDING SCRIPTS)

* represent the EPA, EMA, KPA, and KMA measures for Study II and III.

EPA

[A-1] Phoneme Deletion

[Directions]

I am going to say a made-up word and then tell you which sound to take off.

For example, now listen, *mab*.

How would this word sound without /b/? 1) /æb/, 2) /mæb/, 3) /mæ/. The answer is 3) /mæ/.

And, how would *mab* sound without /m/? 1) /æb./, 2) /mæb/, 3) /mæ/. The answer is 1) /æb/.

Now, please listen to the following questions and circle the appropriate number on your answer sheet.

[Test Items]

A1_1. [A1_1]*

Now listen, *tky*. How would this word sound without /t/? 1) /kɪ/ 2) /tkɪ/ 3) /kaɪ/

A1_2. [A1_2]*

Now listen, *plik*. How would this word sound without /p/? 1) /lik/ 2) /pli/ 3)/ik/

A1_3. [A1_3]*

Now listen, *trest*. How would this word sound without /r/? 1) /est/ 2) /test/ 3)/tre/

A1_4. [A1_4]*

Now listen, *mtick*. How would this word sound without /t/? 1) /mik/ 2) /tik/ 3)/mi/

A1_5. [A1_5]*

Now listen, *doat*. How would this word sound without /t/? 1) /oʊ/ 2) /doʊ/ 3)/oʊd/

A1_6. [A1_6]*

Now listen, *nake*. How would this word sound without /k/? 1) /eɪn/ 2) /neɪ/ 3) /eɪ/

A1_7. [A1_7]*

Now listen, *dest*. How would this word sound without /s/? 1) /des/ 2) /tet/ 3) /det/

A1_8. [A1_8]*

Now listen, *sling*. How would this word sound without /n/? 1) /slig/ 2) /ling/ 3)/sig/

A1_9.

Now listen, *sisp*. How would this word sound without /p/? 1) /sɪs/ 2) /ɪsf/ 3) /sɪ/

A1_10.

Now listen, *tunk*. How would this word sound without /k/? 1) /ʌn/ 2) /tʌk / 3) /tʌn /

[A-2] Phoneme Segmentation

[Directions]

Please count how many speech sounds are in the word that I'm going to tell you.

For example, the word *cat* has **3** speech sounds /k/, /a/, /t/.

Now, please listen to the following questions and write the number of speech sounds in the blank.

[Test Items]

No.	Items	Answer	No.	Items	Answer
A2_1 [A2_1]*	ship	3	A2_6 [A2_61]*	Tuesday	5
A2_2 [A2_2]*	grass	4	A2_7 [A2_7]*	sale	3
A2_3[A2_3]*	moon	3	A2_8 [A2_8]*	basket	6
A2_4 [A2_4]*	brush	4	A2_9 [A2_9]*	market	5
A2_5 [A2_5]*	whether	4	A2_10	cooked	4

EMA

[B-1] Derivational Production

[Directions]

I'm going to say one word and a sentence missing a word. Please choose the appropriate word form to complete the sentence.

For example, *farm*. My uncle is a _____. 1) farming 2) farmer 3) farms

The answer is *2) farmer.* Here is another example,

farmer. My uncle has a huge ___. 1) farming 2) farmer 3) farm

The answer is 3*) farm*

Now, please listen to the following questions and circle the appropriate number on your answer sheet.

[Test Items]

B1_1. *warm*. He chose the jacket for its _____. 1) warmth 2) warming 3) warm

B1_2. *teach*. He was a very good _____. 1) teaching 2) teachable 3) teacher

B1_3. *permit*. Father refused to give _____. 1) permitted 2) permission 3) permeable

B1_4. *appear*. He cared about his _____. 1) appealing 2) appearance 3) appeared

B1_5. *express*. 'OK' is a common _____. 1) expressing 2) expressible 3) expression

B1_6. *width*. The mouth of the river is very _____. 1) widen 2) wide 3)widening

B1_7. *density*. The smoke in the room was very _____. 1) denseness 2) denser 3) dense

B1_8. *discussion*. The friends have a lot to _____. 1) discuss 2) discussable 3) discussed

B1_9. *famous.* The actor would achieve much _____. 1) familiar 2) fame 3) family

B1_10. *strength*. The girl was very _____. 1) stronger 2) strong 3) strongest

[B-2] Compound Production

[Directions]

I'm going to say an example of making a new word. Based on the example, please choose the appropriate number of the new word.

For example, early in the morning, we can see the sun rising. This is called a sunrise.

At night, we might also see the moon rising. What could we call this?

1) a moonrise 2) a rise moon 3) a sun moon

The answer should be *1) a moonrise.*

Now, please listen to the following questions and circle the appropriate number on your answer sheet.

[Test Items]

B2_1. Here's a flower that is big and red. We call that a big red flower. Now here's a flower that is big and purple, what do we call it?

1) a purple big flower 2) a flower big purple 3) a big purple flower

B2_2. Here's an animal that lives in the sea and looks like a star. It's called a sea-star. Here's an animal that lives in the sea and looks like a horse. What do we call it?

1) a sea-horse 2) a sea-like-horse 3) a horse-sea

B2_3. A cup that is used to hold coffee is called a coffee cup. What do we call a cup that is used to hold tea?

1) a cup tea 2) a tea coffee 3) a tea cup

B2_4 A glass that is used to hold wine is called a wine glass. What do we call a glass that is used to hold milk?

1) a wine glass 2) a glass milk 3) a milk glass

B2_5. Some people wear rings on their ears and they are called earrings. Some people wear rings on their nose, what should we call that?

1) nose-rings 2) rings-nose 3) nose-earings

B2_6. Many people wear laces on their neck called a necklace. Some people wear laces on their foot, what should we call that?

1) a lace-foot 2) a neck-foot 3) a foot-lace

B2_7. There is a kind of train that runs under the ground. We call that an underground train. There is another kind of train that runs over the ground. What do we call that?

1) a ground-over train 2) an over-ground train 3) an over-under train

B2_8. A box used to store mail is called a mailbox. Some people use a tray to store mail. What should we call that?

1) a mail-tray 2) a tray-mail 3) a tray-box

B2_9. Parents' work in the house is called a house-work. What should we call teachers' work at school?

1) a school-house 2) a work-school 3) a school-work

EOA

[C]

[Directions]

I'm going to show you a list of non-word pairs. Please read each pair and choose the word which looks more like a real word.

For example, read the following words. 1) clid 2) cdil

Which one would be more like a real word?

The answer is *1) clid* because *cd-* does not occur at the beginning of a word.

Here is another example. Read the following words. 1) hifl 2) hift

Which one would be more like a real word?

The answer is *2)hift* because *-ifl* does not occur at the end of a word.

Now, please read the following none-word pairs and circle a number of the word which looks more like a real word.

(Test Items will not be recorded.)

C1. 1) ffeb 2) beff

C2. 1) dalled 2) ddaled

C3. 1) dacker 2) ckader

C4. 1) bei 2) bey

C5. 1) daw 2) dau

C6. 1) gri 2) gry

C7. 1) vism 2) visn

C8. 1) chym 2) chim

EVocab

[D-1] Matching Meaning

[Directions]

I'm going to say a word. Listen carefully and find the proper picture on your answer sheet and circle the number.

[Test Items]

No.	Question (Answer)	No.	Question (Answer)
D1_1	pigeon (1)	D1_7	luggage (2)
D1_2	flaming (4)	D1_8	vine (1)
D1_3	aquarium (1)	D1_9	dissecting (2)
D1_4	safe (4)	D1_10	hydrant (4)
D1_5	reptile (2)	D1_11	palm (1)
D1_6	athlete (4)	D1_12	valley (1)

[D-2] Meaning Inference

[Directions]

Read the following sentences or phrases and write a number of correct meaning that explain the underlined word. There are two examples provided.

e.g., a big garage 1) place for cars 2) machine 3) sidewalk

e.g., They will close it. 1) begin 2) stay near 3) make

[Test Items]

D2_1. She should complete them.	1) finish	2) send	3) fix
D2_2. a quick action.	1) snack	2) vacation	3) movement
D2_3. He did receive them.	1) send for	2) not the price of	3) get
D2_4. It is flexible.	1) easily bent	2) long-lasting	3) not straight
D2_5. It was corrected.	1) made right	2) done again	3) put away
D2_6. a large numeral	1) bus station	2) number symbol	3) room for babies
D2_7. She is genius.	1) generous person	2) very smart person	3) serious person
D2_8. the good physician	1) medicine	2) exercise	3) doctor

ERC

[E]

[Directions]

From now on, I'm going to give you several English paragraphs. Please read each paragraph and answer questions.

(Test Items will not be recorded.)

> Genny rode her bike down the sidewalk of Fletcher Street. When she passed underneath the big elm tree, a crisp brown leaf fell right on her shoulder and sat there for just a second before it blew away. It had to mean good luck. Nobody had ever told her that being picked for a leaf to rest on was good luck. She just knew it.

E1. What made Genny think the leaf meant good luck? ( )

1) It blew away. 2) It was crisp. 3) It landed on her shoulder. 4) It looked like a four-leaf clover.

E2. Where did the leaf come from?

1) The grass. 2) A tree overhead. 3) The sidewalk. 4) Genny's imagination.

> Just before a baby bird hatches, it starts to roll around inside its eggshell. It takes slow breaths and begins to cheep. Then the bird uses a special tooth on the end of its bill to peck a hole in the egg. It slowly chips a groove all the way around the top of the eggshell. A special neck muscle helps the bird push the shell off, and out it comes!

E3. The baby bird makes a groove by ( )

1) using its sharp claws. 2) using a tooth on its bill. 3) rolling around. 4) using a special muscle.

E4. The last thing a baby bird does before it hatches is to ( )

1) roll around. 2) begin to cheep. 3) push off the top of the eggshell. 4) begin to take slow breaths.

> Yingtao tells school in China and how school here was different. Each morning, as soon as the teacher came into the room, I jumped to my feet and stood stiffly at attention. That was how we showed our respect to the teacher in China. The first time I did it here, the teacher asked me whether I needed something. I looked around and saw that nobody else was standing up. Feeling foolish, I shook my head and sat down. When I did it again the next day, a couple of kids behind me started to snicker me. After that, I remembered not to jump up, but I half rose a few times.

E5. When did Yingtao stand up? ( )

1) When he needed something.
2) When the teacher came into the room.
3) When the other children started to laugh.
4) When the teacher asked him a question.

E6. When Yingtao stood up, the teacher asked him ( )

1) to sit down. 2) where he was from. 3) if he wanted anything. 4) why he was standing up.

E7.You can tell from the passage that in China, students were expected to ( )

1) keep quiet. 2) stay lined up. 3) help each other. 4) honor their teachers.

Children have made important finds. In 1879, a man and his nine-year-old daughter, Maria, entered a cave at Altamira, Spain. The two had often explored this cave near their castle. As her father dug for tools and bones, Maria became bored. She took a candle and went to a corner of the cave. Looking up at the ceiling, Maria saw paintings of animals. The cave paintings-made more than twelve thousand years ago-are among the oldest art works ever discovered.

E8. Had Maria been in the cave before?

1) No, never. 2) Yes, many times. 3) Yes, once many years ago. 4) Yes, once, just the day before.

E9. Why did Maria walk away from her father?

1) She was angry. 2) She had decided to go home.

3) He didn't need her help anymore. 4) She was tired of watching him work.

E10. What was most important about the paintings?

1) They were on the ceiling. 2) They were pictures of animals.

3) They were very old. 4) Maria found them.

KPA

[Ka1] Phoneme Deletion

[지시문(Directions)]

선생님이 가짜 낱말을 한 개 말해 줄 거예요. 그 낱말의 첫 소리 또는 받침소리를 한 개 빼면 무슨 소리가 남을까요? (I am going to say a made-up word. How can you read the word when first or last sound of the word to be taken off?)

예를 들어 (For example), "쿤"에서 첫 자음 "ㅋ" 소리를 빼면 무슨 소리가 남을까요? (How would "쿤/ku:n/" sound without "ㅋ" /k/?) 1) 운 /u:n/ 2) 쿠 /ku:/ 3) 우 /u:/

정답은 1)운 이예요. (The answer is 1)운 /u:n/.)

또, "쿤"에서 마지막 자음 "ㄴ" 소리를 빼면 무슨 소리가 남을까요? (How would "쿤/ku:n/" sound without "ㄴ" /n/ ?) 1) 운 /u:n/ 2) 쿠 /ku:/ 3) 우 /u:/

정답은 2)쿠 예요. (The answer is 2)쿠/ku: /.)

자, 지금부터 다음 질문들을 잘 듣고 적절한 답을 골라 번호에 동그라미 하세요 (Now, please listen to the following questions and circle the appropriate number on your answer sheet).

[질문 (Test Items)]

Ka1_1. [Ka1_1]*

"항" 에서 "ㅎ" 소리를 빼면 무슨 소리가 남을까요? (How would /ha:ŋ/ sound without /h/?)

1) 아 /a:/ 2) 하/ha:/ 3) 앙 /a:ŋ/

Ka1_2. [Ka1_2]*

"찰"에서 "ㅊ" 소리를 빼면 무슨 소리가 남을까요? (How would /cha:l / sound without /ch/?)

1) 아 /a:/ 2) 차 /cha:/ 3) 알 /a:l/

Ka1_3. [Ka1_3]*

"셜"에서 "ㅅ" 소리를 빼면 무슨 소리가 남을까요? (How would /ʃyʌl / sound without /ʃ/?)

1) 열 /yʌl/ 2) 여 /yʌ/ 3) 셔 /ʃʌ/

Ka1_4. [Ka1_4]*

"명"에서 "ㅁ" 소리를 빼면 무슨 소리가 남을까요? (How would /kyoŋ / sound without /k /?)

1) 염 /yʌm/ 2) 여/yʌ/ 3) 영 /yʌŋ/

Ka1_5.

"습"에서 "ㅅ" 소리를 빼면 무슨 소리가 남을까요? (How would /sɨp/ sound without /s /?)

1) 으/ɨ/ 2) 읍/ɨp/ 3) 스 /sɨ/

Ka1_6.

"댑"에서 "ㄷ" 소리를 빼면 무슨 소리가 남을까요? (How would /dæp/ sound without /d/?) 1) 앱 /æp/ 2) 애/æ/ 3) 앵/æŋ/

Ka1_7.

"람"에서 "ㄹ" 소리를 빼면 무슨 소리가 남을까요? (How would /la:m / sound without /l /?)

1) 아 /a:/ 2) 암 /a:m/ 3) 알 /a:l/

Ka1_8. [Ka1_5]*

"갈"에서 "ㄹ"소리를 빼면 무슨 소리가 남을까요? (How would /ka:l/ sound without /l//?)

1) 라 /la:/ 2) 가 /ka:/ 3) 알 /a:l/

Ka1_9. [Ka1_6]*

"캄"에서 "ㅁ" 소리를 빼면 무슨 소리가 남을까요? (How would /sa:m/ sound without /m/?)

1) 카 /ka:/ 2) 아 /a:/ 3) 암 /a:m/

Ka1_10. [Ka1_7]*

"민"에서 "ㄴ" 소리를 빼면 무슨 소리가 남을까요? (How would /min / sound without /n /?)

1) 미/mi/ 2) 밍/miŋ/ 3) 이 /i/

Ka1_11.

"쾁"에서 "ㅂ" 소리를 빼면 무슨 소리가 남을까요? (How would /kɛp/ sound without /p/?)

1) 뵈 /pɛ/ 2) 괴 /kɛ/ 3) 외 /yɛ/

Ka1_12. [Ka1_8]*

"잭"에서 "ㄱ" 소리를 빼면 무슨 소리가 남을까요? (How would /Jɛk / sound without /k /?)

1) 재 /Jɛ/ 2) 애 /ɛ/ 3) 개 /kɛ/

[Ka2] Phoneme Segmentation

선생님이 말하는 낱말이 몇 개의 소리로 이루어져 있는지 생각해 보세요. (I'm going to say a word and please count how many speech sounds are in the word.)

예를 들어 (For example), 낱말 "감" 은 "/ㄱ/" "/ㅏ/" "/ㅁ/" 3 개의 소리로 이루어져 있어요 (A word "감/kam/(persimmon)" has 3 sounds, /k/, /a/, and /m/).

또 다른 예로, 낱말 "수박" 은 "ㅅ", "ㅜ", "ㅂ", "ㅏ","ㄱ" 5 개의 소리로 이루어져 있어요. (Another example, a word "수박/soobak/(watermelon)" has 5 sounds, /s/,/ u:/, /b/, /a/, and /k/.)

자, 지금부터 다음 낱말들을 잘 듣고 몇 개의 소리로 이루어져 있는지 그 숫자를 빈칸에 쓰세요.

순서 (No.)	낱말 (Question)	정답 (Answer)	순서 (No.)	낱말 (Question)	정답 (Answer)
Ka2_1 [Ka2_1]*	자	2	Ka2_7 [Ka2_5]*	모자	4
Ka2_2 [Ka2_2]*	밤	3	Ka2_8 [Ka2_6]*	딸기	5
Ka2_3 [Ka2_3]*	풀	3	Ka2_9 [Ka2_7]*	책상	6
Ka2_4	빵	3	Ka2_10 [Ka2_8]*	강남	6
Ka2_5 [Ka2_4]*	씨	2	Ka2_11 [Ka2_9]*	나무	4
Ka2_6	개	2	Ka2_12 [Ka2_10]*	전구	5

KMA

[Kb1] Derivational Production

[지시문(Directions)]

선생님이 한 개의 낱말과 빈칸이 있는 문장을 말해 줄 거예요.

주어진 낱말을 알맞게 바꾸어 문장을 완성하기에 적절한 낱말을 보기 중에 골라 보세요. (I'm going to say one word and a sentence missing a word. Please choose the appropriate word form of the given word to complete the sentence.)

예를 들어(For example), 과학 (science). 민호는 ___가 되고 싶다. (Minho wants to be a ___.)

1) 과학자 (a scientist) 2) 과학님 (Sir. Scientist) 3) 과학꾼 (science-favor)

정답은 *1) 과학자* 예요. (The answer is *1) 과학자.)*

한 가지 더 예를 들어 볼게요. (Here is another example.),

과학자 (a scientist). 민호가 제일 좋아하는 과목은 _____이다. (Minho's favorite subject is a _____.)

1) 과학하기 (do a science) 2) 과학 (a science) 3) 과학 (a subject)

정답은 *2) 과학* 이예요. (The answer is *2) 과학.)*

자, 지금부터 다음 질문들을 잘 듣고 적절한 답을 골라 답안지에 번호를 동그라미 하세요. (Now, please listen to the following questions and circle an appropriate number on your answer sheet.)

[질문(Test Items)]

Kb1_1. [Kb1_1]*

사과 (an apple). 아직 덜 익은 사과를 _____라고 한다. (A codling is an unripe-apple.)

1) 햇사과 (a new-apple) 2) 날사과 (an uncooked- apple) 3) 풋사과 (an unripe-apple)

Kb1_2. [Kb1_2]*

달리다 (run) . 경미는 _____를 잘한다. (Kyung-mi is good at running.)

1) 달림 (being run) 2) 달리기 (running) 3) 달리개 (a running machine)

Kb1_3. [Kb1_3]*

도둑 (a robber). 다른 사람의 물건을 훔치는 ____을 해서는 안된다. (We shouldn't do a robbery to rob other's properties.)

1) 도둑질 (a robbery) 2) 도둑쟁이 (a robber) 3) 도둑님 (a robber)

Kb1_4. [Kb1_4]*

넓다 (wide). 직사각형의 가로와 세로의 길이를 곱하면 _____가 된다. (When we multiply the length of a vertical and a horizontal line of a rectangular, we can get its area.)

1) 넓이 (area) 2) 넓히기 (widening) 3) 넓음 (being wide)

Kb1_5. [Kb1_5]*

뜨다 (open). 선호는 화가나서 눈을 위쪽으로 ____. (Sunho was angry and sharply opened up his eyes.)

1) 헛떴다 (falsely opened) 2) 치떴다 (sharply opened up) 3) 갓떴다 (newly opened)

Kb1_6.

시원 (coolness). 나는 _____ 날씨가 좋아요. (I like _____ weather.)

1) 시원한 (cool) 2) 시린 (cold) 3) 시큼한 (sour)

Kb1_7. [Kb1_6]*

멋부리다 (preen). 정민이는 ____ 내는데 시간을 많이 쓴다. (Jeongmin spends lots of time preening.)

1) 맛 (a taste) 2) 멋 (preening) 3) 못 (a nail)

Kb1_8. [Kb1_7]*

헛고생 (a futile-training). 젊어서 _____은 사서도 한다. (Early training means more than late learning)

1) 고난 (pain) 2) 고민 (worry) 3) 고생 (training)

Kb1_9. [Kb1_8]*

노래하다 (sing). 내가 가장 좋아하는 ____ 는 이 책에 없다. (My favorite song is not in this book.)

1) 노래 (a song) 2) 놀이 (a play) 3) 놀래기 (a surprise)

Kb1_10.

새로운 (new). 서점에서 ____ 책을 사니 기분이 좋다. (I feel good to buy a new book at a bookstore.)

1) 새 (new) 2) 셈 (calculation) 3) 쇠 (iron)

Kb1_11. [Kb1_9]*

가난한 (poor). ____ 은 부끄러운 것이 아니다. (Poverty is not shameful.)

1) 가여움 (poorness) 2) 가녀림 (slimness) 3) 가난 (poverty)

Kb1_12. [Kb1_10]*

탐스러운 (attractive). 남의 것을 ___ 하지 말라. (Don't be avid for other's possession.)
1) 탓 (blame) 2) 탐 (avid) 3) 택 (choose)

[Kb2] Compound Production

[지시문(Directions)]

선생님이 새로운 낱말을 만드는 방법을 말해 줄 거예요. 설명을 잘 듣고, 새롭게 만들어진 낱말이 무엇일지 생각해 보세요. (I'm going to say an example to make a new word. Based on the explanation, please think of what the new word would be.)

예를들어 (For example), 우리는 강의 가장자리 부근을 "강가" 라고 말해요. 그럼, 바다의 가장자리 부근은 무엇이라고 말할까요? (We say the area of land by the bank of a river, a "river-side". How do you call the area of land by the bank of an ocean?)
1) 가바다 (a side-ocean) 2) 바닷가 (an ocean-side) 3) 강바다 (a river-ocean)
정답은 *2) 바닷가* 예요. (The answer should be *2) an ocean-side.)*

자, 지금부터 질문을 잘 듣고 적절한 낱말을 보기 중에서 골라 번호에 동그라미 하세요. (Now, please listen to the following questions, choose an appropriate new word, and then circle the number on your answer sheet.)

[질문 (Test Items)]

Kb2_1. [Kb1_1]*
밤이 열리는 나무를 밤나무라고 해요. 배가 열리는 나무는 무엇이라고 할까요? (Here's a tree bearing chestnuts, we call it a chestnut-tree. Now, here's a tree bearing pears, what do we call it?)
1) 나무배 (a tree-pears) 2) 배나무 (a pear-tree) 3) 배밤나무 (a pear-chestnut-tree)

Kb2_2. [Kb1_2]*
옷에 꼽는 핀을 옷핀이라고 해요. 머리카락에 꼽는 핀은 무엇이라고 할까요? (Here's a pin for clothes, we call it a clothes-pin. Now, here's a pin for hairs, what do we call it?)
1) 머리핀 (a hair-pin) 2) 핀머리 (a pin-hair) 3) 옷머리 (a clothes-hair)

Kb2_3. [Kb1_3]*
금으로 만든 방울은 금방울이예요. 쇠로 만든 방울은 무엇이라고 할까요? (Here's a bell made of gold, we call it a golden-bell. Now, here's a bell made of iron, what do we call it?)
1) 방울쇠 (a bell-iron) 2) 쇠방울 (an iron-bell) 3) 쇠금방울 (an iron-golden-bell)

Kb2_4.
눈에서 나는 물은 눈물이라고 하지요. 그럼, 코에서 나는 물은 무엇이라고 할까요? (Here are watery drops from the eye, we call it watery-eyes. Here are runny drops from the nose, what do we call it?)
1) 콧물 (a runny-nose) 2) 코눈물 (a nose-watery-eyes) 3) 물코 (a watery-nose)

Kb2_5. [Kb1_4]*
유리병의 뚜껑을 덮어 두는 것을 덮어놓다 라고 해요. 유리병의 뚜껑을 열어 두는 것은 무엇이라고 할까요? (Here's a jar the lid being opened, we call it openset. Now, here's a jar the lid being closed, what do we call it?)
1) 놓아열다 (a set-open) 2) 열어덮다 (an opened-close) 3) 열어놓다 (a close-set)

Kb2_6. [Kb1_5]*

높고 높은 하늘을 묘사할 때 높디높다 하고 하지요. 넓고 넓은 바다를 묘사할 때는 무엇이라고 할까요? (When we describe height of the sky, we say highly-high. Now, when we describe width of the ocean, what do we call it?)

1) 높디넓다(highly-wide) 2) 넓디높다 (widely-high) 3) 넓디넓다 (widely-wide)

Kb2_7. [Kb1_6]*

한 개와 두개를 합쳐서 말할 때 한 두개라고 하지요. 두개와 세개를 합쳐서 말할 때는 무엇이라고 할까요? (When we say one and two together, we say one-two. Now, when we say two and three together, what do we call it?)

1) 세 두개 (three-two) 2) 두 세개 (two-three) 3) 한 두 세개 (one-two-three)

Kb2_8. [Kb1_7]*

열고 닫는 문을 여닫이문 라고 말해요. 밀고 닫는 문은 무엇이라고 할까요? (When we describe a door which can be hinged, we say a hinged-door. Now, when we describe a door which can be sliding, what do we call it?)

1) 미닫이문(a sliding-door) 2)닫밀이문(a closed-sliding door)

3)밀어열기문(a sliding-hinged door)

Kb2_9. [Kb1_8]*

물로 닦는 걸레를 물걸레 라고 해요. 기름으로 닦는 걸레는 무엇이라고 할까요? (Here's a mop cleaning with water, we call it a water-mop. Now, here's a mop cleaning with oil, what do we call it?)

1) 기름물 (oil-water) 2) 걸레기름 (mop-oil) 3) 기름걸레 (an oil-mop)

Kb2_10

가죽으로 만든 신발을 가죽신이라고 하지요. 고무로 만든 신발은 무엇이라고 할까요? (Here's a pair of shoes made of leather, we call it a pair of leather-shoes. Now, here's a pair of shoes made of rubber, what do we call it?)

1)고무신(a pair of rubber-shoes) 2)고무가죽(a rubber-leather)

3)고무가죽신(a pair of rubber-leather-shoes)

Kb2_11.

쇠로 만들어진 못은 쇠못이예요. 나무로 만든 못은 무엇이라고 할까요? (Here's a nail made of iron, we call it an iron-nail. Now, here's a nail made of wood, what do we call it?)

1) 못나무 (an iron-tree) 2) 나무못 (a wooden-nail) 3) 쇠나무못 (an iron-wooden-nail)

Kb2_12.

밥을 볶아 먹으면 볶음밥이라고 하지요. 비벼 먹는 밥은 무엇이라고 할까요? (When we bake rice, we call it baked-rice. When we mix rice, what do we call it?)

1) 밥비빔(rice mix) 2) 볶음비빔밥 (bake-mixed-rice) 3) 비빔밥(mixed-rice)

KOA

[Kc]

[지시문(Directions)]

선생님이 두 가지의 글자를 보여줄 거예요. 글자를 잘 보고 두 개 중에서 한글의 맞춤법에 맞는 글자를 찾아 보세요. (I'm going to show you a list of non-word pairs. Please read each pair and choose the word which looks more like a real word.)

예를들어 (For example), 다음 글자를 읽어 보세요 (read the following words.).

1) ㅣㅜ 2) ㄲ

어떤 글자가 더 진짜 글자처럼 보이나요? (Which one would be more like a real word?)
정답은 *2) ㄲ* 예요.
1) 은 한글 맞춤법에 맞지 않지요. (Number 1) does not correspond to the Korean spelling rule.)

다른 예를 말해 볼께요 (Here is another example.)
다음 글자를 읽어 보세요.(Read the following words.)

1) 앎 2) 앎

어떤 글자가 더 진짜 글자처럼 보이나요? (Which one would be more like a real word?)
정답은 1) 앎 이예요.
2)의 ㅁㄹ받침은 한글 받침 종성에는 쓰이지 않아요. (The consonant clusters in Number 2) does not possible in Korean spelling rule.)

자, 그럼 지금부터 아래의 글자들을 잘 보고 한글 맞춤법에 맞는 글자를 골라서 번호에 동그라미 해 보세요. (Now, please read the following word pairs, and choose one word from the pair which is corresponding to Korean spelling rules.)

(질문 내용은 녹음되지 않습니다. (Test Items will not be recorded.)

번호 (No.)	문제 (Question)	정답 (Answer)	번호 (No.)	문제 (Question)	정답 (Answer)
Kc1.	1) [redacted] 2) [redacted]	2	Kc 7.	1) 얘 2) 걔	1
Kc 2.	1) 여 2) 녀	1	Kc 8.	1) 눠 2) 외	2
Kc 3.	1) 워 2) 뭐	2	Kc 9.	1) [redacted] 2) [redacted]	1
Kc 4.	1) 야 2) 와	2	Kc 10.	1) [redacted] 2) [redacted]	2
Kc 5.	1) 유 2) 우	2	Kc 11.	1) [redacted] 2) [redacted]	1
Kc 6.	1) 나 2) 와	2	Kc 12.	1) [redacted] 2) [redacted]	2

KVocab

[Kd1] Matching Meaning

[지시문 (Directions)]

선생님이 낱말을 말해 줄 거예요. 잘 듣고 그 낱말을 표현하는 그림을 골라 답안지의 번호에 동그라미 하세요. (I'm going to say a word. Listen carefully and find the proper picture on your answer sheet and circle the number.)

[질문 (Test Items)]

번호 (No.)	문제 (정답) (Question [Answer])	번호 (No.)	문제 (정답) (Question [Answer])
Kd1_1	발목 ankle (2)	Kd1_7	지시 directing (2)
Kd1_2	렌치 wrench (1)	Kd1_8	디지털 digital (3)
Kd1_3	연료교체 refueling (2)	Kd1_9	포식성의 predatory (3)
Kd1_4	바위 boulder (3)	Kd1_10	놀란 surprised (3)
Kd1_5	카누 canoe (2)	Kd1_11	클라리넷 clarinet (4)
Kd1_6	끌기 towing (1)	Kd1_12	키위 kiwi (4)

[Kd2] Meaning Inference

[지시문 (Directions)]

다음 문장이나 어구를 읽고 밑줄 친 낱말의 뜻에 해당하는 번호를 골라 O 해 보세요. 아래의 예를 참고해 보세요. (Please read a sentence or a phrase and choose a correct number to represent the meaning of the underlined word. Here are two examples,)

[예 1 (Example 1)]

굳센 주먹(a strong fist) 1) 딱딱한(hard) 2) 강건한(strong) 3) 아픈 (harsh)

[예 2 (Example 2)]

갑자기 말이 날뛰는 바람에 말에서 떨어졌다. (Suddenly the horse leaped and I felled off.)

1) 날 듯이 껑충껑충 뛰다 (leap) 2) 날 듯이 펄럭거리다 (flutter)
3) 날 듯이 휘청거리다 (stagger)

[질문 (Test Items)]

Kd2_1. 남의 전화를 엿듣다. (eavesdrop other's phone call)

1) 옆에서 듣다(listen beside) 2) 여러번 듣다 (listen several times) 3) 몰래 듣다 (eavesdrop)

Kd2_2. 이튿날 새벽 (the next day dawn)

1) 그 다음 날 (the next day) 2) 그 전 날 (the previous day) 3) 그 날 (the day)

Kd2_3. 아버지는 아들과 어깨동무하고 천천히 걸어오고 계셨다. (The father and the son walked putting arms on each other's shoulder)

1) 어깨에 서로 팔을 얹고 (putting arms on each other's shoulders)
2) 어깨를 서로 붙이고 (attaching each other's shoulders)
3) 어깨를 서로 밀고 (pulling each other's shoulders)

Kd2_ 4. 이 마을은 지난 여름에 홍수로 물난리를 겪었다. (The village was suffered a flood damage last summer)

1) 수리(a repair) 2) 수술 (a surgery) 3) 수해 (a flood damage)

Kd2_5. 그는 맨손으로 시작하여 부자가 되었다. (He set a business with bare hands and finally came to wealth.)
1) 매서운 손 (harsh hands) 2) 빈 손 (bare hands) 3) 매끄러운 손 (soft hands)
Kd2_6. 동생은 어머니가 시키는 일에 이러쿵저러쿵 군소리하는 법이 없었다. (My brother never complained whatever my mother commanded to him.)
1) 쓸데 없는 말 (complained) 2) 크게 하는 말(talked loudly) 3) 구수한 말 (talked sweetly)
Kd2_7. 손위 시누이 (older sister-in-law)
1) 남편의 어머니 (a sister-in-law) 2) 남편의 누나 (a sister) (3) 남편의 형 (a brother)
Kd2_8. 내 동생 정희는 잠보다. (My sister Jung-hee is a sleepyhead)
1) 잠자리 (in bed) 2) 잠꼬대 (a sleep-talking) 3) 잠꾸러기 (a sleepyhead)
Kd2_9. 덮개를 씌운 마차. (a wagon with a cover)
1) 뚜껑(a cover) 2) 받침(a prop) 3) 칸막이 (a wagon with a partition)
Kd2_10. 화살이 목표를 빗나가다. (The arrow missed the target)
1) 관통하다 (hit) 2) 비껴가다(missed) 3) 비틀다 (twisted)

ERC

[Ke]

[지시문(Directions)]
지금부터는 읽고 푸는 문제들이예요. 다음 이야기들을 잘 읽고 질문에 적절한 답을 골라 답안지의 번호에 동그라미 하세요. (From now on, I'm going to give you several Korean paragraphs. Please read each paragraph and answer questions.)
(질문 내용은 녹음되지 않습니다. [Test Items will not be recorded.])

다음 글을 읽고 물음에 답하세요. Please read the following paragraphs and answer the question.

율리아의 엄마는 여행사에서 일하시고, 아빠는 보험회사에서 일을 하신다. 아빠네 회사는 콘크리트와 유리로 된 고층 건물 안에 있다. 율리아가 유치원에 다닐 때는 아빠가 그런 휘황찬란한 건물에서 일한다는 사실이 무척 자랑스러웠다. 오랫동안 그랬다. 시간이 흐르면서, 율리아는 그 동화 속 궁전이 아주 일반적인 사무실 건물이며, 아빠는 매일 835 호 자기 책상에 앉아 일하는 것을 알게 되었다. 무슨 일을 하는지는 어떤 상상도 할 수가 없었다.
"맨 꼭대기 층에서도 일하세요, 아빠?" 언젠가 율리아가 그렇게 물은 적이 있었다.
"아니, 항상 8 층에서만." 아빠는 율리아가 무슨 생각을 하는지 알지 못하는 것처럼 무심히 대답했다.
율리아는 돈을 많이 버는 자비네의 아빠에 대해서 이야기했다. 자비네의 아빠가 사장만큼 직위가 높다고 하자, 아빠는 그에 비하면 자신은 훨씬 낮은 직급이라고 설명해 주었다. 율리아가 슬프지 않냐고 묻자 아빠는 이렇게 대답했다.
"아니, _____ ㉠ _____. 높은 직위가 반드시 행복을 가져다 준다는 생각은 들지 않거든."

Yulia's mother works for a travel company; father, for an insurance company. Her father's company is in a tall building of concrete and glass. One day in last winter, her father's office building was beautifully glimmered like a glass-palace in a fairy tale. When she was a kindergartner, Yulia was so

proud of the fact that her father worked in such a luxurious office. It was so for a long time. As time goes by, Yulia was realized that the fairy taled palace is just an ordinary office building and that her father worked at the same spot in room 835. She had no idea what her father works look like.
"Do you also work at the top of the building, dad?" There was once Yulia asked her father like that.
"No, only in 8th floor." Yulia's father answered as if he didn't know anything about her concern.
Yulia talked about Javi's father who earned lots of money. When Yulia told that Javi's father is in such a high rank like a CEO, her father said that he is in the far below level. When Yulia asked that he felt sorry, the father answer like the following.
"No, _____@_____. I wouldn't think that holding high position always give us happiness. "

Ke1. 윗글에서 알 수 있는 내용으로 알맞지 <u>않은</u> 것은 어느 것입니까? ( ) Which statement is not correct based on the above passage?

1) 율리아의 아빠는 보험회사에서 일을 한다. Yulia's father works for an insurance company.

<u>2) 율리아의 아빠가 자비네 아빠보다 직급이 높다.</u> Yulia's father holds the higher position that Javi's father.

3) 율리아는 아빠가 무슨 일을 하는지 자세히 몰랐다. Yulia didn't know much about her father's work.

4) 율리아는 어렸을 때 아빠가 멋진 건물에서 일하는 것을 자랑스러워했다. When Yulia was young, she was proud of her father working in a nice building.

Ke2. 윗글의 흐름으로 보아 ㉠에 들어갈 아빠의 대답으로 가장 알맞은 것은 어느 것입니까? ( ) Which is the appropriate statement to fill in the blank <u>@?</u>

1) 낮은 직급이어서 속상할 때가 많단다. I feel often sorry that I'm in a low level.

<u>2) 행복은 직급이 높은 것과는 상관이 없단다</u>. Happiness doesn't have much to do with holding a high position.

3) 행복은 돈을 얼마나 많이 버느냐에 따라 달라진단다. Happiness is determined by how much you earn money.

4) 사람들이 높은 직급을 받으려고 하는 이유를 생각해보렴. Think about why people want to have a higher position.

미르는 무엇이든 트집을 잡고 싶었다. 아니, 지금 자신에게 일어나는 일들을 아무것도 인정하고 싶지 않았다. 보지 않으면 없어질 일인 것처럼 미르는 숫제 눈을 감아 버렸다. 눈뿐만 아니라 엠피쓰리 플레이어의 이어폰으로 귀도 틀어 막았다. 외사촌 오빠가 넣어 준 노래가 흘러나왔다. 지금 미르에게 익숙한 것이라곤 오빠와 함께 부르던 그 노래뿐이었다. 그러곤 모두 낯설었다. 미르는 의자에 더욱 깊숙이 몸을 파묻었다. 귀에 익은 노래는 지금 눈앞에서 일어나는 일들을 잠시 잊게 해 주었다. 엄마와 아빠가 헤어졌다는 것도, 이제부턴 월전진료소 소장이 된 엄마와 이곳에서 단 둘이 살아야 한다는 것도. 봄 방학 동안 도망이라도 친 것처럼 시골로 가 버린 것을 알고 수군거릴 친구들의 모습이 떠올라 미르는 마구 고개를 흔들었다.
'싫어. 싫어.' ㉠ <u>작별 인사를 하지 않겠다고 고집을 부린 건 미르 자신이었다</u>. 엄마 아빠의 이혼을 친구들에게 알리긴 죽기보다 싫었다.

Mir wanted to complain about everything. In fact, she didn't want to admit anything that happened to her. She closed her eyes as if she couldn't see anything. Beside her eyes, she closed her ears by putting on earphones of her MP3 players. She listened to music that one of her cousins had recorded for her. The song which she had used to sing together with her cousin was the only comfortable thing for Mir now. Everything was strange to her.
Mir lied back on the chair. The familiar songs made her forget about things happened to her for a while. That her mom and dad had divorced and that she should live only with her mom in the new built hospital where her mother is the leader. Mir shook her head because she realized that her friends may talk in whispers about her before she suddenly disappeared without notice during spring break. 'No, No.' @It was Mir who was stubborn not to say goodbye to her friends. She hated to open the fac t that her parents were divorced.

Ke3. 윗글에 대한 내용으로 알맞지 않은 것은 어느 것입니까? ( ) Which statement is not correct based on the above passage?
1) 미르는 엄마와 단 둘이 살아야 한다. Mir should live only with her mother.
2) 미르는 친구들과 사이가 안 좋아 이사를 했다. Mir moved due to bad relationship with her friends.
3) 미르는 봄 방학동안 시골로 가게 되었다. Mir moved in spring break.
4) 미르의 엄마는 이제 월전진료소 소장이다. Mir's mother is the leader of the hospital.

Ke4. '미르'가 ㉠ 과 같이 행동한 까닭은 무엇입니까? ( ) Why did Mir act like that on the line @?
1) 부모의 이혼을 말하는 것이 싫어서 Because she didn't want to talk about her parents' divorce.
2) 친구들과 헤어지기가 무척 싫어서 Because she didn't like to be parted from her friends.
3) 월전진료소에 살게 되는 게 싫어서 Because she didn't like to live in the building of the "Woljeon Medical Clinic"
4) 외사촌 오빠와 헤어지는 게 싫어서 Because she didn't like to be separated from her cousin.

Ke5. 위와 같은 글을 일을 때 유의할 점으로 알맞은 것은 어느 것입니까? ( ) What is the most important point of reading the above passage?
1) 사물의 공통점과 차이점을 비교하며 읽는다. To find similarities and differences.
2) 인물의 말과 행동을 통해 마음의 변화를 생각하며 읽는다. To find the character's feeling based on his or her acts and words.
3) 글 속에 담긴 주장과 그 근거가 적절한지 파악하며 읽는다. To find opinions and supporting ideas.
4) 시간의 흐름에 따른 인물의 생애와 업적을 파악하며 읽는다. To find the character's chronical life histories and accomplishments.

㉠ . 우선 김홍도의 그림 속에 등장하는 사람들은 동네 청년들이나 아낙네들로 매우 평범하고 친숙한 이들이었어요. 그 모습을 담아내는 붓에는 강한 힘이 실려 있어서 사람들이 일하고 노는 모습은 마치 살아 있는 것처럼 생생하였지요. 뿐만 아니라 김홍도는 관찰력이 뛰어나서 그림이 완성된 후, 그곳에 있던 사람들이 옹기종기 모여 앉아 그림을 본다면 자기가

어디에 앉아 있었고, 무엇을 하고 있었는지 알아챌 수 있을 정도였어요.

신윤복의 그림에 등장하는 인물들로는 양반과 기생이 많았어요. 또 가늘고 얇은 선을 주로 사용했지요. 마치 고운 여인이 다소곳이 그린 그림처럼 그 선 안에 채워 넣은 색깔도 매우 아리따웠답니다. 그래서 화폭에 등장하는 미인들의 아름다움을 한껏 북돋아 주었어요. 이렇듯 신윤복은 김홍도와 달리 여성적인 눈과 선으로 그림을 대했어요.

____@_____. People in Hongdo Kim's paintings were ordinary man and woman. His touch was so strong and vivid that it made the people who worked and played in the paintings seemed real. In addition, Hongdo Kim's paintings were so realistic that people who were drawn in the painting could easily find themselves in the picture.

Younbok Shin's paintings were full of nobleman and geisha. He drew very thin and faint lines in his pai ntings. He used very beautiful colors inside those lines and it seemed like a women painter's picture. His d rawing methods helped to vitalize the beauties in his paintings. Unlike Hongdo Kim, Younbok Shin had fe minine sense of drawings.

Ke6. 윗글을 통해 알게 된 점을 바르게 말한 것은 무엇입니까? ( ) Which statement is correct based on the above passage?

1) 김홍도는 여성적인 선으로 그림을 섬세하게 그렸다. Hongdo Kim had a feminine sense of drawings.

2) 신윤복이 그린 그림의 소재는 평범하고 친숙한 것이었다. Younbok Shin's drew common people.

3) 김홍도는 붓에 힘을 실어 서민들의 삶을 생생하게 표현했다. Hongdo Kim's touch was very strong and vivid.

4) 신윤복은 뛰어난 관찰력으로 동네 청년이나 아낙네를 그렸다. Younbok Shin drew ordinary man and woman.

Ke7. 윗글의 ㉠에 가장 어울리는 문장은 어느 것입니까? ( ) Which is the appropriate statement to fill in the blank @?

1) 조선을 대표하는 풍속화가로는 김홍도와 신윤복이 있었답니다. There were two famous painters in Chosun Dynasty: Hongdo Kim and Younbok Shin.

2) 조선 후기는 양반들의 취향에 맞춘 풍속화가 유행이었어요. In the late period of Chosun Dynasty, custom paintings were popular among nobleman.

3) 풍속화란 서민들이 사는 이야기를 담고 있는 그림이랍니다. Custom paintings are the picture which describes common people's life story.

4) 옛날에는 카메라가 없어서 화가들이 그림을 그릴 수 밖에 없었어요. In ancient time, artists should draw paintings due to they didn't have a camera.

(가)

콜럼버스가 아시아를 향해 항해를 시작했을 때, 그는 두 가지 오류를 범했죠. 하나는 지구의 둘레가 실제보다 훨씬 작다고 생각한 거였고, 다른 하나는 유라시아의 동서 길이가 실제보다 훨씬 길다고 생각한 거예요. 공교롭게도 콜럼버스가 계산한 아시아까지의 거리는 서인도 제도에 도착했을 때 항해한 거리와 거의 일치해서, 그가 아시아에 도착했다고 착각하게 된 거예요.

놀라운 것은 콜럼버스가 먼저 미지의 세계로 출발하겠다고 용기를 낸 것이죠. 콜럼버스는 특정 위치와 거리에서 육지에 도착할 것이라고 생각하고 서쪽으로 항해했어요. 그의 생각은 틀렸지만 항해 끝에 결국 새로운 세계에 도착한 것은 콜럼버스 자신에게뿐 아니라 대양 탐험에 있어서도 굉장한 발전이 되었죠.

(A)

When Columbus set sail towards Asia, he committed two errors. One was that he thought the circumference of the Earth was much smaller than the actual one; and the other, that he thought the length of Eurasia's east-west was much longer than the actual size. When he arrived at the West Indies, the calculated distance to Asia was incidentally almost identical with the distance that he had sailed. Thus, he thought he reached to the Asia.

Surprising thing is that Columbus first made up his mind to depart into unknown world. Columbus was thought to arrive at a specific location and distance from the mainland, and sailed west. It was Columbus himself who finally arrived in the New World as well as played a role in dramatic improvement of ocean explorations.

(나)

1591 년, 마젤란은 아시아로 가는 서쪽 경로를 찾기 위해 출발했어요. 그는 손에 넣을 수 있는 지도를 모두 연구한 후, 남아메리카 부근을 항해하는 것이 가능할 것이라고 생각했지요. 그러나 그는 태평양이 얼마나 큰지 알지 못했어요. 콜럼버스처럼 에라토스테네스의 계산이 아닌 프톨레마이오스가 계산한 지구 둘레를 믿었기 때문에 여행 거리를 너무나 과소평가하고 만 거예요.

마젤란은 남아메리카의 남쪽 끝 부근을 항해하면서, 오늘날 그의 이름을 딴 ㉠___ 을 발견했어요. ㉠___을 통과하는 것은 아마 세계에서 가장 힘든 항해였을 거예요. ㉠___은 남아메리카의 동쪽과 서쪽에서 흐르는 해류가 만나는 곳이기 때문에, 소용돌이치는 파도, 울부짖는 바람, 사나운 날씨 같은 악조건이 항해를 방해했어요.

(B)

In 1591, Magellan's departure was to find the path to the west to Asia. After studying all maps that he could put into the hands, he thought it would be possible to sail around South America. But he didn't know how big the Pacific ocean was. Due to he believed Ptolemy calculated the Earth's circumference, rather than the calculations of Eratosthenes, he too underestimated the travel distance.

Magellan discovered ___@___ which named after his name while sailing near the southern end of Sout h America. It must be the toughest sailing to pass ___@___. Because ___@___ was the meeting place where currents flowing from the east and west of South America, the swirling waves, the howling wind, and wild weather interfered with the sail in there.

Ke8. 윗글 (가)와 (나)에 제시된 '콜럼버스'와 '마젤란'의 항해에서 찾을 수 있는 공통점은 무엇입니까? ( ) What is the common between sailing of "Columbus" and "Magellan"?

1) 먼저 서인도 제도에 도착하였다. They arrived first in the West Indies.
2) 계획한 대로 순조로운 항해가 되었다. They sailed smoothly according to their plans.
3) 잘못된 항해 정보를 가지고 출발했다. They departed with wrong information.
4) 남아메리카를 향해 항해를 시작하였다. They sailed toward the South America.

Ke9. 윗글 (가)에 제시된 '콜럼버스 항해'가 갖는 의의로 가장 적절한 것은 어느 것입니까? ( ) Which statement is appropriate when we say the meaning of the "Columbus Sail"?

1) 아시아로 가는 서쪽 경로를 찾음. The fact that he found the way to the West.
2) 대양 탐험에 대한 도전으로 새로운 세계에 도착함. The fact that he challenged to the exploration of continent and finally arrived in an unknown world
4) 특정 위치와 거리에서 출발하여 육지에 도착함. The fact that he departed from a specific location and distance and finally arrived in a land.
5) 남아메리카의 끝 부분을 항해하면서 해협을 발견함. The fact he found a Strait while sailing end area of the South America.

Ke 10. 윗글 (나)로 보아 ㉠에 공통적으로 들어갈 말은 어느 것입니까? ( ) What is the common word for the blank ___@___ ?

1) 태평양 the Pacific ocean
2) 마젤란 해협 the Strait of Magellan
3) 포클랜드 제도 the Falkland Islands
4) 푼타아레나스 the Punta Arenas

APPENDIX B

RELIABILITY ANALYSIS STATISTICS

Table B1

Summary of Reliability Analysis Statistics, Study I

Measure	Initial Reliability		Item-Total Statistics		Final Reliability	
	Cronbach's Alpha	N of Items	Item	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	N of Items
EPA	.75	20	A1_1	.73	.75	20
			A1_2	.72		
			A1_3	.72		
			A1_4	.74		
			A1_5	.73		
			A1_6	.73		
			A1_7	.72		
			A1_8	.73		
			A1_9	.73		
			A1_10	.74		
			A2_1	.74		
			A2_2	.74		
			A2_3	.74		
			A2_4	.72		
			A2_5	.73		
			A2_6	.74		
			A2_7	.72		
			A2_8	.74		
			A2_9	.74		
			A2_10	.74		
EMA	.66	19	B1_1	.62	.73	17
			B1_2	.66		
			B1_3	.63		
			B1_4	.64		
			B1_5	.66		
			B1_6	***.68***		
			B1_7	.66		
			B1_8	.63		
			B1_9	.63		
			B1_10	.64		
			B2_1	.60		
			B2_2	.63		
			B2_3	.66		
			B2_4	.63		
			B2_5	.66		
			B2_6	.60		
			B2_7	.66		
			B2_8	.66		
			B2_9	***.700***		

Table B1 (Continued)

Measure	Initial Reliability		Item-Total Statistics		Final Reliability	
	Cronbach's Alpha	N of Items	Item	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	N of Items
EOA	.62	8	***C1***	***.64***	.65	6
			C2	.53		
			C3	.61		
			C4	.52		
			C5	.55		
			C6	.61		
			C7	.55		
			C8	***.63***		
EVocab	.80	20	***D1_1***	***.81***	.83	18
			D1_2	.80		
			D1_3	.77		
			D1_4	.78		
			D1_5	.79		
			D1_6	.78		
			D1_7	.78		
			D1_8	.79		
			D1_9	.80		
			D1_10	.78		
			D1_11	.78		
			D1_12	.80		
			D2_1	.80		
			D2_2	.79		
			D2_3	.79		
			D2_4	.79		
			D2_5	.80		
			D2_6	.77		
			D2_7	.79		
			D2_8	***.82***		
ERC	.71	10	E1	.67	.74	9
			E2	.68		
			E3	.68		
			E4	***.74***		
			E5	.67		
			E6	.69		
			E7	.70		
			E8	.68		
			E9	.69		
			E10	.69		

Table B1 (Continued)

Measure	Initial Reliability		Item-Total Statistics		Final Reliability	
	Cronbach's Alpha	N of Items	Item	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	N of Items
KPA	.84	24	ka1_1	.83	.86	**22**
			ka1_2	.83		
			ka1_3	.83		
			ka1_4	.82		
			ka1_5	***.85***		
			ka1_6	***.85***		
			ka1_7	.83		
			ka1_8	.83		
			ka1_9	.83		
			ka1_10	.83		
			ka1_11	.83		
			ka1_12	.83		
			ka2_1	.81		
			ka2_2	.81		
			ka2_3	.82		
			ka2_4	.82		
			ka2_5	.82		
			ka2_6	.83		
			ka2_7	.81		
			ka2_8	.82		
			ka2_9	.81		
			ka2_10	.82		
			ka2_11	.81		
			ka2_12	.81		
KMA	.80	24	kb1_1	.79	.80	24
			kb1_2	.78		
			kb1_3	.77		
			kb1_4	.78		
			kb1_5	.79		
			kb1_6	.78		
			kb1_7	.77		
			kb1_8	.78		
			kb1_9	.78		
			kb1_10	.78		
			kb1_11	.77		
			kb1_12	.79		
			kb2_1	.78		
			kb2_2	.78		
			kb2_3	.77		
			kb2_4	.78		

Table B1 (Continued)

Measure	Initial Reliability		Item-Total Statistics		Final Reliability	
	Cronbach's Alpha	N of Items	Item	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	N of Items
			kb2_5	.78		
			kb2_6	.79		
			kb2_7	.78		
			kb2_8	.78		
			kb2_9	.78		
			kb2_10	.78		
			kb2_11	.79		
			kb2_12	.78		
KOA	.62	12	kc1	.60	.71	9
			kc2	.60		
			kc3	***.65***		
			kc4	.54		
			kc5	***.64***		
			kc6	.60		
			kc7	.60		
			kc8	.55		
			kc9	***.66***		
			kc10	.59		
			kc11	.59		
			kc12	.59		
KVocab	.70	22	kd1_1	.70	.72	20
			kd1_2	.70		
			kd1_3	.70		
			kd1_4	.66		
			kd1_5	.70		
			kd1_6	.69		
			kd1_7	.69		
			kd1_8	.69		
			kd1_9	.68		
			kd1_10	.69		
			kd1_11	.70		
			kd1_12	.70		
			kd2_1	.69		
			kd2_2	.70		
			kd2_3	.69		
			kd2_4	.67		
			kd2_5	.67		
			kd2_6	.66		
			kd2_7	.69		
			kd2_8	.65		
			kd2_9	***.71***		
			kd2_10	***.71***		

Table B1 (Continued)

Measure	Initial Reliability		Item-Total Statistics		Final Reliability	
	Cronbach's Alpha	N of Items	Item	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	N of Items
KRC	.72	10	ke1	.71	.72	10
			ke2	.67		
			ke3	.71		
			ke4	.71		
			ke5	.71		
			ke6	.69		
			ke7	.68		
			ke8	.66		
			ke9	.71		
			ke10	.67		

Note. Bold-italics represent the deleted item in each measure and the final reliability statistics were used for Study I. EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EVocab= English vocabulary; ERC = English reading comprehension; KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension.

Table B2

Summary of Reliability Analysis Statistics, Study II

Measure	Initial Reliability		Item-Total Statistics		Final Reliability	
	Cronbach's Alpha	N of Items	Item	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	N of Items
EPA	.61	17	A1_1	.59	.63	15
			A1_2	.58		
			A1_3	.58		
			A1_4	.61		
			A1_5	.60		
			A1_6	.57		
			A1_7	.56		
			A1_8	.60		
			A2_1	.60		
			A2_2	.60		
			A2_3	.58		
			A2_4	.60		
			A2_5	.59		
			A2_6	.61		
			A2_7	***.63***		
			A2_8	.61		
			A2_9	***.62***		
EMA	.80	18	B1_1	.80	.80	18
			B1_2	.78		
			B1_3	.79		
			B1_4	.79		
			B1_5	.79		
			B1_6	.79		
			B1_7	.80		
			B1_8	.78		
			B1_9	.79		
			B1_10	.79		
			B2_1	.78		
			B2_2	.78		
			B2_3	.78		
			B2_4	.78		
			B2_5	.78		
			B2_6	.78		
			B2_7	.78		
			B2_8	.80		
EOA	.83	8	C1	.80	.85	7
			C2	.80		
			C3	.81		
			C4	.80		
			C5	.80		
			C6	.80		
			C7	***.85***		
			C8	.82		

Table B2 (Continued)

Measure	Initial Reliability		Item-Total Statistics		Final Reliability	
	Cronbach's Alpha	N of Items	Item	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	N of Items
EVocab	.76	20	D1_1	.75	.77	18
			D1_2	.76		
			D1_3	.75		
			D1_4	.76		
			D1_5	.76		
			D1_6	.75		
			D1_7	.76		
			D1_8	.75		
			D1_9	***.77***		
			D1_10	***.77***		
			D1_11	.76		
			D1_12	.75		
			D2_1	.75		
			D2_2	.74		
			D2_3	.76		
			D2_4	.75		
			D2_5	.75		
			D2_6	.76		
			D2_7	.75		
			D2_8	.76		
ERC	.65	10	E1	.61	.65	10
			E2	.62		
			E3	.63		
			E4	.64		
			E5	.63		
			E6	.62		
			E7	.64		
			E8	.65		
			E9	.62		
			E10	.63		
KPA	.84	18	ka1_1	.84	.86	17
			ka1_2	.83		
			ka1_3	.84		
			ka1_4	.85		
			ka1_5	***.86***		
			ka1_6	.84		
			ka1_7	.84		
			ka1_8	.84		
			ka2_1	.83		
			ka2_2	.83		
			ka2_3	.82		
			ka2_4	.82		
			ka2_5	.82		
			ka2_6	.82		
			ka2_7	.82		
			ka2_8	.82		

Table B2 (Continued)

Measure	Initial Reliability		Item-Total Statistics		Final Reliability	
	Cronbach's Alpha	N of Items	Item	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	N of Items
			ka2_9	.82		
			ka2_10	.83		
KMA	.83	18	kb1_1	.82	.84	17
			kb1_2	.82		
			kb1_3	.82		
			kb1_4	.82		
			kb1_5	***.84***		
			kb1_6	.82		
			kb1_7	.81		
			kb1_8	.82		
			kb1_9	.82		
			kb1_10	.83		
			kb2_1	.81		
			kb2_2	.81		
			kb2_3	.82		
			kb2_4	.82		
			kb2_5	.82		
			kb2_6	.82		
			kb2_7	.82		
			kb2_8	.82		
KOA	.98	12	kc_1	.98	.98	12
			kc_2	.98		
			kc_3	.98		
			kc_4	.98		
			kc_5	.98		
			kc_6	.98		
			kc_7	.98		
			kc_8	.98		
			kc_9	.98		
			kc_10	.98		
			kc_11	.98		
			kc_12	.98		
KVocab	.80	22	kd1_1	.80	.82	20
			kd1_2	***.82***		
			kd1_3	***.81***		
			kd1_4	.79		
			kd1_5	.80		
			kd1_6	.80		
			kd1_7	.80		
			kd1_8	.79		
			kd1_9	.80		
			kd1_10	.80		
			kd1_11	.80		
			kd1_12	.79		

Table B2 (Continued)

Measure	Initial Reliability		Item-Total Statistics		Final Reliability	
	Cronbach's Alpha	N of Items	Item	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	N of Items
			kd2_1	.79		
			kd2_2	.79		
			kd2_3	.78		
			kd2_4	.79		
			kd2_5	.79		
			kd2_6	.78		
			kd2_7	.79		
			kd2_8	.78		
			kd2_9	.80		
			kd2_10	.78		
KRC	.76	10	ke1	.73	.76	10
			ke2	.74		
			ke3	.74		
			ke4	.74		
			ke5	.75		
			ke6	.73		
			ke7	.74		
			ke8	.74		
			ke9	.76		
			ke10	.75		

Note. Bold-italics represent the deleted item in each measure and the final reliability statistics were used for Study II. EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EVocab= English vocabulary; ERC = English reading comprehension; KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension.

Table B3

Summary of Reliability Analysis Statistics, Study III

Measure	Initial Reliability		Item-Total Statistics		Final Reliability	
	Cronbach's Alpha	N of Items	Item	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	N of Items
EPA	.70	17	A1_1	.68	.71	16
			A1_2	.67		
			A1_3	.67		
			A1_4	.69		
			A1_5	.68		
			A1_6	.67		
			A1_7	.66		
			A1_8	.68		
			A2_1	.68		
			A2_2	.68		
			A2_3	.67		
			A2_4	.68		
			A2_5	.69		
			A2_6	.69		
			A2_7	.69		
			A2_8	***.71***		
			A2_9	.70		
EMA	.89	18	B1_1	.88	.89	18
			B1_2	.88		
			B1_3	.88		
			B1_4	.88		
			B1_5	.88		
			B1_6	.89		
			B1_7	.88		
			B1_8	.88		
			B1_9	.88		
			B1_10	.88		
			B2_1	.88		
			B2_2	.88		
			B2_3	.87		
			B2_4	.88		
			B2_5	.88		
			B2_6	.87		
			B2_7	.87		
			B2_8	.89		
EOA	.82	8	C1	.79	.84	7
			C2	.79		
			C3	.80		
			C4	.79		
			C5	.80		
			C6	.80		
			C7	***.84***		
			C8	.81		

Table B3 (Continued)

Measure	Initial Reliability		Item-Total Statistics		Final Reliability	
	Cronbach's Alpha	N of Items	Item	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	N of Items
EVocab	.90	20	D1_1	.90	.90	20
			D1_2	.90		
			D1_3	.90		
			D1_4	.90		
			D1_5	.90		
			D1_6	.89		
			D1_7	.89		
			D1_8	.89		
			D1_9	.90		
			D1_10	.90		
			D1_11	.90		
			D1_12	.89		
			D2_1	.90		
			D2_2	.89		
			D2_3	.90		
			D2_4	.90		
			D2_5	.89		
			D2_6	.90		
			D2_7	.89		
			D2_8	.90		
ERC	.84	10	E1	.82	.84	10
			E2	.83		
			E3	.83		
			E4	.84		
			E5	.83		
			E6	.82		
			E7	.83		
			E8	.84		
			E9	.82		
			E10	.83		
KPA	.84	18	ka1_1	.84	.85	17
			ka1_2	.84		
			ka1_3	.84		
			ka1_4	.84		
			ka1_5	***.85***		
			ka1_6	.84		
			ka1_7	.84		
			ka1_8	.83		
			ka2_1	.83		
			ka2_2	.83		
			ka2_3	.82		
			ka2_4	.83		
			ka2_5	.82		
			ka2_6	.82		
			ka2_7	.82		

Table B3 (Continued)

Measure	Initial Reliability		Item-Total Statistics		Final Reliability	
	Cronbach's Alpha	N of Items	Item	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	N of Items
			ka2_8	.82		
			ka2_9	.82		
			ka2_10	.83		
KMA	.83	18	kb1_1	.82	.84	17
			kb1_2	.82		
			kb1_3	.82		
			kb1_4	.82		
			kb1_5	***.84***		
			kb1_6	.81		
			kb1_7	.81		
			kb1_8	.82		
			kb1_9	.81		
			kb1_10	.82		
			kb2_1	.82		
			kb2_2	.82		
			kb2_3	.82		
			kb2_4	.82		
			kb2_5	.82		
			kb2_6	.82		
			kb2_7	.81		
			kb2_8	.81		
KOA	.96	12	kc_1	.96	.96	12
			kc_2	.96		
			kc_3	.96		
			kc_4	.96		
			kc_5	.96		
			kc_6	.96		
			kc_7	.95		
			kc_8	.95		
			kc_9	.96		
			kc_10	.96		
			kc_11	.95		
			kc_12	.95		
KVocab	.80	22	kd1_1	.79	.80	22
			kd1_2	.80		
			kd1_3	.80		
			kd1_4	.78		
			kd1_5	.79		
			kd1_6	.79		
			kd1_7	.79		
			kd1_8	.79		
			kd1_9	.79		
			kd1_10	.79		

Table B3 (Continued)

Measure	Initial Reliability		Item-Total Statistics		Final Reliability	
	Cronbach's Alpha	N of Items	Item	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	N of Items
			kd1_11	.79		
			kd1_12	.79		
			kd2_1	.78		
			kd2_2	.78		
			kd2_3	.78		
			kd2_4	.77		
			kd2_5	.78		
			kd2_6	.77		
			kd2_7	.78		
			kd2_8	.77		
			kd2_9	.79		
			kd2_10	.78		
KRC	.78	10	ke1	.76	.78	10
			ke2	.75		
			ke3	.76		
			ke4	.76		
			ke5	.77		
			ke6	.75		
			ke7	.75		
			ke8	.76		

Note. Bold-italics represent the deleted item in each measure and the final reliability statistics were used for Study III. EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EVocab= English vocabulary; ERC = English reading comprehension; KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension.

APPENDIX C

MULTIVARIATE NORMALITY TEST RESULTS

Study I

Table C1

Summary of Normality Test Results, Study I

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
EVocab	.33	50	.00	.53	50	.00
ERC	.28	50	.00	.59	50	.00
KVocab	.13	50	.03	.95	50	.03
KRC	.20	50	.00	.93	50	.00

Note. EVocab = English vocabulary, ERC = English reading comprehension, KVocab = Korean vocabulary, and KRC = Korean reading comprehension.

a. Lilliefors Significance Correction

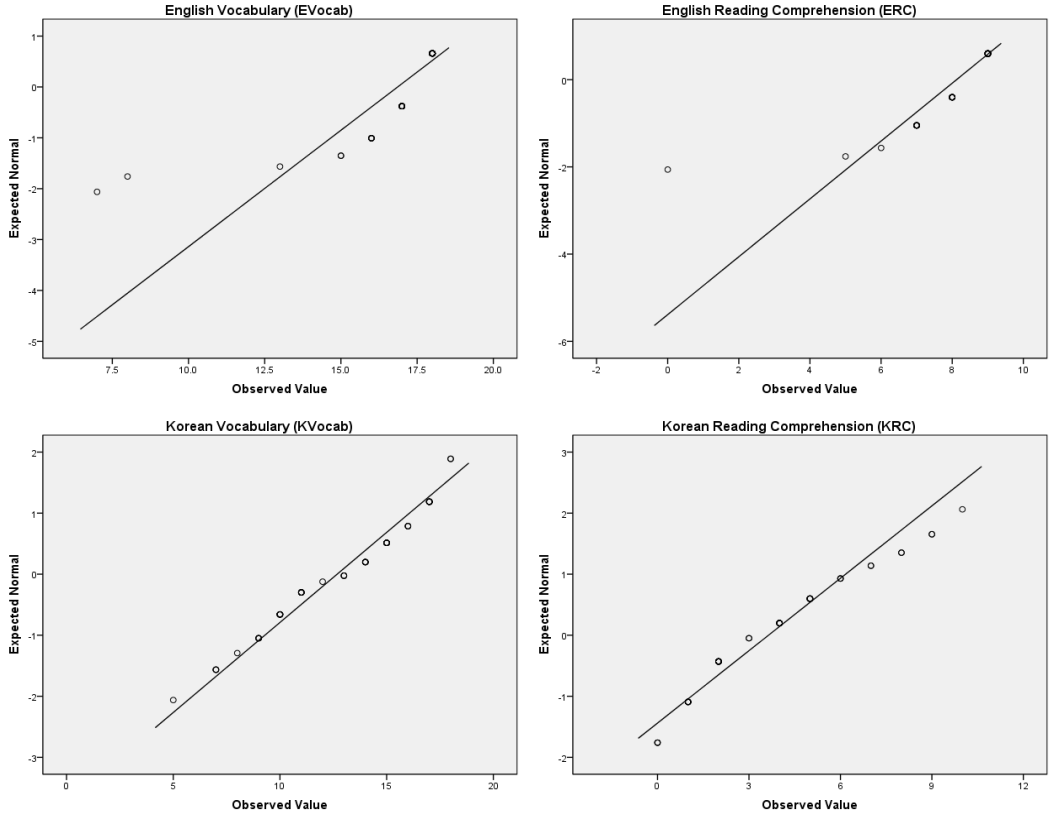


Fig. C1. Normal Q-Q plots, Study I.

Study II

Table C2

Summary of Normality Test Results, Study II

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
EVocab	.11	257	.00	.96	257	.00
ERC	.18	257	.00	.88	257	.00
KVocab	.20	257	.00	.82	257	.00
KRC	.12	257	.00	.95	257	.00

Note. EVocab = English vocabulary, ERC = English reading comprehension, KVocab = Korean vocabulary, and KRC = Korean reading comprehension.

a. Lilliefors Significance Correction

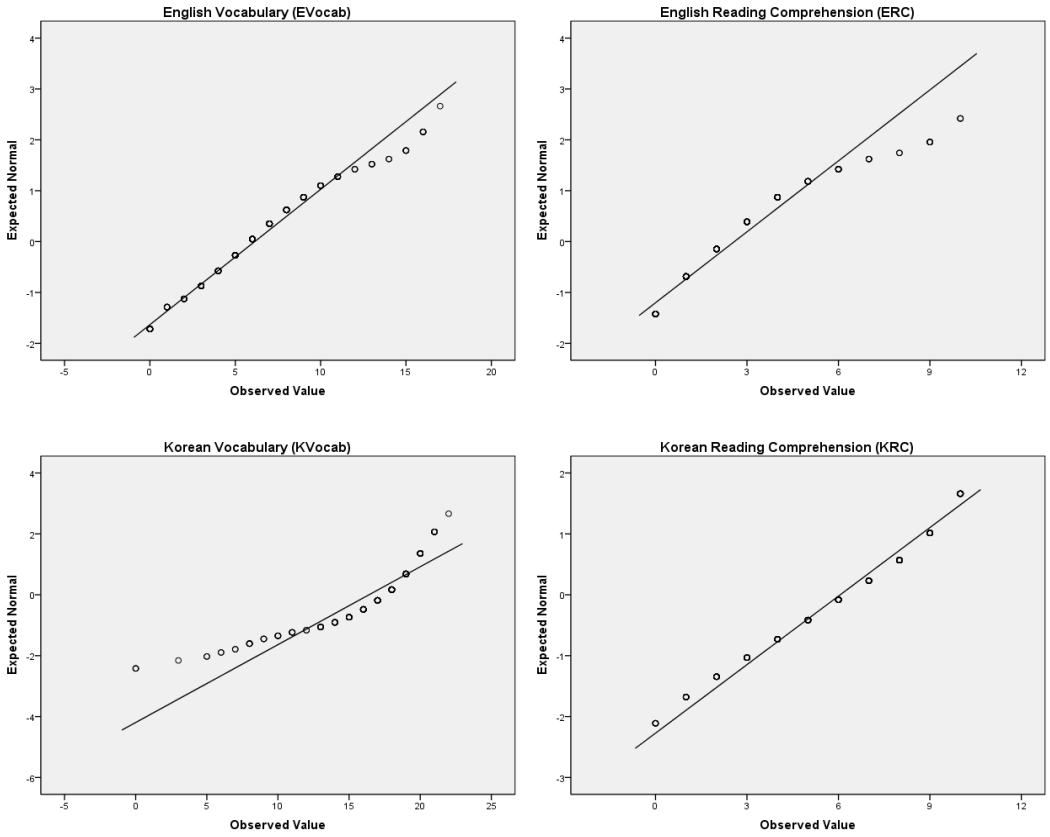


Fig. C2. Normal Q-Q plots, Study II.

Study Ⅲ

Table C3

Summary of Normality Test Results, Study III

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
EVocab	.16	307	.00	.91	307	.00
ERC	.22	307	.00	.87	307	.00
KVocab	.18	307	.00	.86	307	.00
KRC	.11	307	.00	.96	307	.00

Note. EVocab = English vocabulary, ERC = English reading comprehension, KVocab = Korean vocabulary, and KRC = Korean reading comprehension.

a. Lilliefors Significance Correction

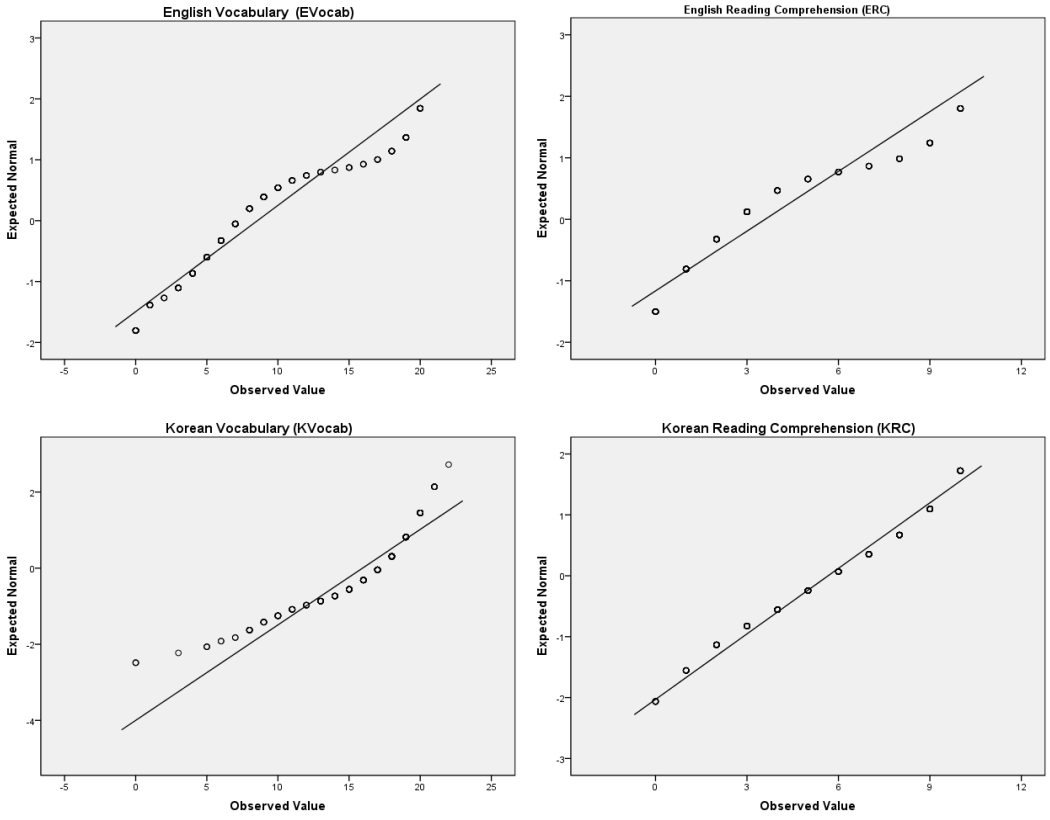
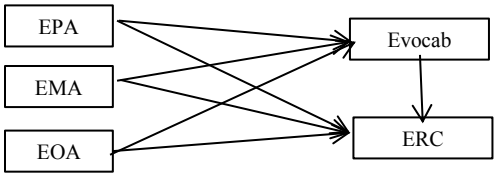


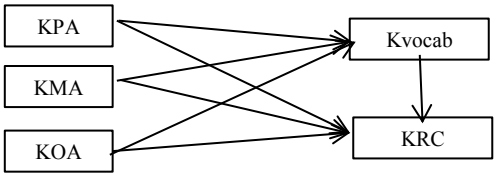
Fig. C3. Normal Q-Q plots, Study III.

APPENDIX D

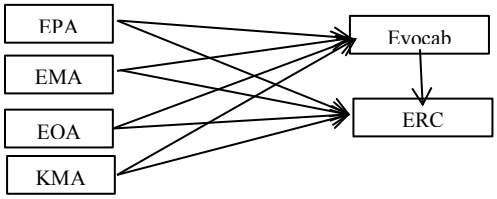
BASELINE PATH MODELS



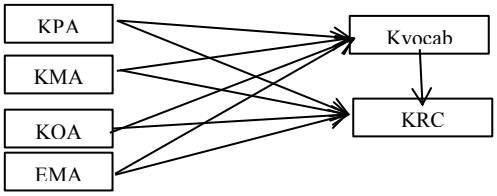
[The English language Model]



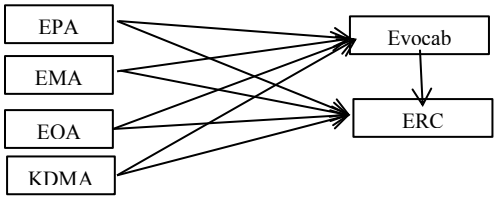
[The Korean language Model]



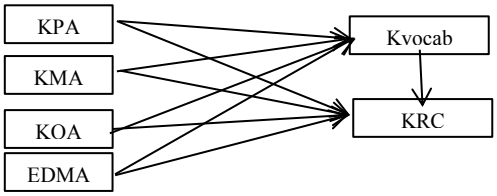
[The KMA →ERC Model]



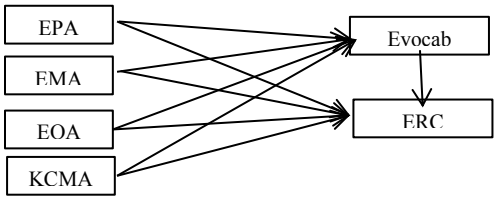
[The EMA →KRC Model]



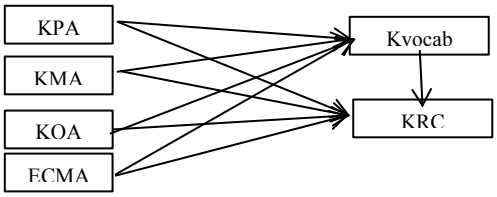
[The KDMA →ERC Model]



[The EDMA →KRC Model]

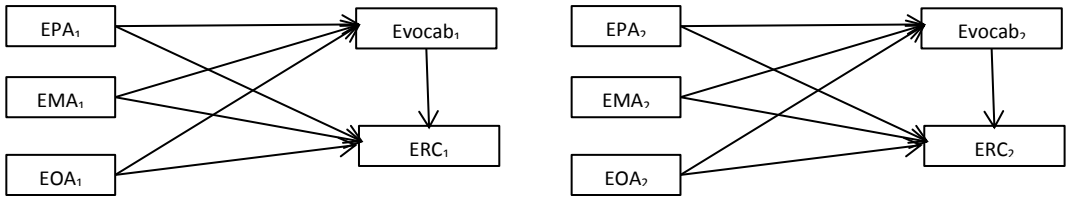


[The KCMA →ERC Model]

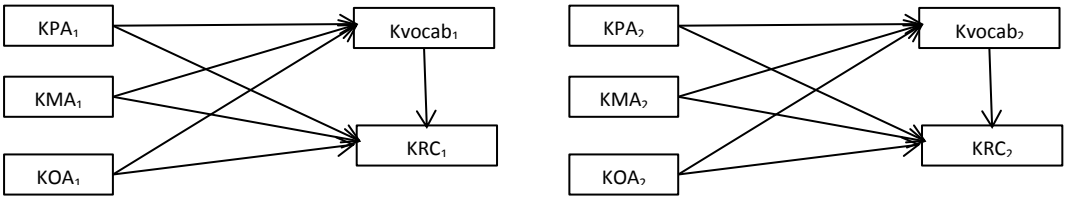


[The ECMA →KRC Model]

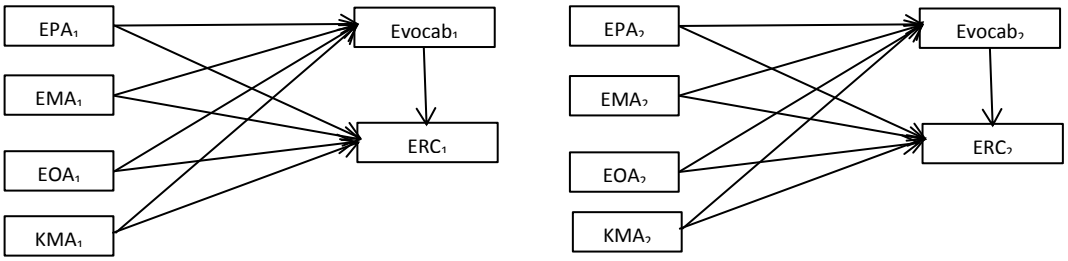
Fig. D1. Baseline path models, Study I and II. Single-headed arrows represent path coefficients (β) in each model. Exogenous variables which are placed at the left side in each model are correlated each other. Double-headed arrows for representing the correlations (*r*) and the disturbance (D) for representing unexplained variance are omitted in each diagram. EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EDMA = English derivational morphological awareness; ECMA = English compound morphological awareness; EVocab= English vocabulary; ERC = English reading comprehension; KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension.



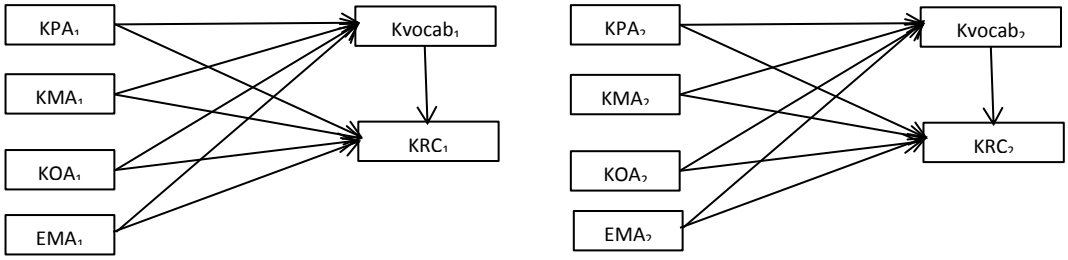
[The Multiple Group English Language Model]



[The Multiple Group Korean Language Model]



[The Multiple Group KMA → ERC Model]



[The Multiple Group EMA → KRC Model]

Fig. D2. Multiple-group baseline path models. The subscription 1 represents ESL group; 2 indicates EFL group. Single-headed arrows represent path coefficients (β) in each model. Exogenous variables which are placed at the left side in each model are correlated each other Double-headed arrows for representing the correlations (*r*) and the disturbance (D) for representing unexplained variance are omitted in each diagram. EPA = English phonological awareness; EMA = English morphological awareness; EOA = English orthographic awareness; EDMA = English derivational morphological awareness; ECMA = English compound morphological awareness; EVocab= English vocabulary; ERC = English reading comprehension; KPA= Korean phonological awareness; KMA = Korean morphological awareness; KOA = Korean orthographic awareness; KVocab = Korean vocabulary; and KRC = Korean reading comprehension.

APPENDIX E

MODEL FIT INDICES FOR THE FINAL PATH MODELS

Table E1

Summary of Model Fit Indices, Study I

Model Name	Chi-square (χ^2)	CFI	SRMR
English language	1.22 (*df* = 1, *p* = .27)	0.99	.02
Korean language	3.07 (*df* = 3, *p* = .38)	1.00	.04
KMA →ERC	1.11 (*df* = 1, *p* = .29)	1.00	.01
KDMA →ERC	1.35 (*df* = 1, *p* = .25)	.99	.01
KCMA →ERC	4.16 (*df* = 2, *p* = .13)	.98	.04

Note. Chi-square (χ^2) = chi-square test of fit; CFI = comparative fit index; and SRMR = standardized root mean square residual.

Table E2

Summary of Model Fit Indices, Study II

Model Name	Chi-square (χ^2)	CFI	SRMR
English language	3.48 (*df* = 3, *p* = .32)	1.00	.02
Korean language	1.91 (*df* = 2, *p* = .38)	1.00	.03
EMA →KRC	1.26 (*df* = 2, *p* = .53)	1.00	.02
EDMA →KRC	1.32 (*df* = 2, *p* = .52)	1.00	.02
ECMA →KRC	1.61 (*df* = 2, *p* = .45)	1.00	.02

Note. Chi-square (χ^2) = chi-square test of fit; CFI = comparative fit index; and SRMR = standardized root mean square residual.