

Morphological awareness and literacy in second language learners: a cross-language perspective

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Morphological awareness refers to the ability to understand morpheme meaning and reflect on morphemic structure of words (Carlisle, 1995). The concept of morphological awareness becomes even more complex when Carlisle's (1995) definition is applied to the three types of morphology: inflection, derivation, and compound. Within each type of morphology, we need to consider both meaning and structural awareness when we examine the role of morphological awareness in literacy development. Morphological systems vary considerably across different languages. For example, English has a relatively developed derivational system but few inflections. Hebrew and Arabic are characterized by rich inflectional and derivational morphology. The majority of words are compounds in Chinese, which contains few derived or inflected words. Furthermore, morphology interacts with orthography in determining how morphological awareness may contribute to literacy outcomes. The English, Hebrew and Arabic writing systems are morpho-phonemic, encoding both phonemes and morphemes. As a result, morphological awareness helps children understand the semantic relations between words despite differences in phonological structure, e.g., *sign-signal* and this understanding in turns facilitates reading comprehension (Kuo & Anderson, 2006). The Chinese writing system is morphosyllabic. Because phonology is not represented systematically by Chinese characters, awareness of morphology is particularly important for reading Chinese (McBride-Chang, Shu, Zhou, Wat, & Wagner, 2003).

In recent years, two central themes have emerged in studies of literacy development of monolingual and bilingual children from diverse language

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backgrounds. The first theme focuses on teasing apart language universal and language specific processes in reading development through comparing monolingual children who acquire literacy in different languages. The second theme examines cross-language and cross-modality transfer of language and literacy skills in bilingual children. This special issue addresses both themes from the perspective of morphological awareness. We present a collection of papers that explore the role of morphological awareness in literacy acquisition in a variety of languages, including English, French, Spanish, Greek, Chinese, Korean, Arabic, and Hebrew, in both monolingual and bilingual populations. We examine the contributions of morphological awareness to literacy outcomes within each of these languages and explore the patterns of cross-language transfer from one language to another in bilingual children.

With respect to the first theme of this special issue, comparing findings across many different languages enables us to separate language universal and language specific processes. There is increasing evidence that morphological awareness contributes to literacy outcomes (word reading, vocabulary and reading comprehension) for monolingual and bilingual children. The evidence comes from many languages, including alphabetic languages such as English and French, Semitic languages such as Arabic and Hebrew, and logographic languages such as Chinese (Chung et al., 2018b; Schwartz, Taha, Assad, Khamaisi, & Eviatar, 2016). In this regard, morphological awareness functions similarly to cognitive skills such as phonological awareness, working memory and rapid automatized naming in that it is universally related to literacy outcomes. On the other hand, morphological processing possesses language specific features because the aspect of morphological awareness that is important appears to be determined by the morphological structure of a language. Studies on English and other alphabetic languages primarily focus on inflectional and derivational awareness, whereas studies on Chinese mostly involve compound awareness. Moreover, because Chinese has few inflected or derived words, studies tend to adopt the meaning-structure dimension in evaluating awareness of compound words (e.g., Chen, Hao, Geva, Zhu, & Shu, 2009; Liu, McBride-Chang, Wong, Shu, & Wong, 2013).

The second theme of the special issue centers on cross-language transfer of morphological awareness. A prominent model addressing cross-language transfer is the transfer facilitation model proposed by Koda (2007, 2008). According to Koda (2008), transfer is “an automatic activation of well-established first-language competencies, triggered by second-language input” (p. 78). Koda maintains that transfer is non-volitional and non-selective in that it takes place regardless of learners’ intent. Notably, the transfer facilitation model applies only to L2 learners with established automaticity in the L1. For these learners, transfer occurs from a highly proficient L1 to a less proficient L2. However, recent studies have demonstrated cross-language transfer of metalinguistic skills from the L2 to L1, or in both directions in emerging bilinguals acquiring two languages simultaneously (e.g., Chen, Xu, Nguyen, Hong, & Wang, 2010; Chung, Chen, & Deacon, 2018a). To expand the scope of the transfer facilitation model, Chung, Chen, and Geva (2018b) proposes an interactive framework, which identifies key factors that influence transfer in both directions in bilingual learners of different levels of

proficiency. While findings of this special issue are largely consistent with the prediction of the transfer facilitation model (transfer from the L1 to L2), several studies also support the interactive transfer framework by demonstrating transfer from the L2 to L1. The special issue also identifies novel factors that influence the transfer process, including the developmental trajectory of morphological awareness, language learning environment, and Social Economic Status (SES).

Language universal and language specific features of morphological awareness

Three papers in this special issue address language-universal and language-unique features of morphological awareness with respect to the role it plays in literacy development. They go beyond the previous research in several ways, both in terms of research questions and methodology. By including English-, French- and Greek-speaking children in the same study, Desrochers et al. were able to compare the extent of the contribution of morphological awareness to literacy outcomes across the three languages. Luo et al. chose to study the relationship between morphological awareness and word reading in Chinese and English in the same sample of Chinese–English bilinguals, thus eliminating the cohort effect. Finally, Gottardo et al. presented a more comprehensive framework of reading comprehension in English for Spanish–English bilinguals by including not only vocabulary but also syntactic awareness in the same model. Taken together, these studies provide findings that are largely consistent with those reported in the previous research. These findings will be described in detail below. Moreover, they expand previous research by directly comparing multiple languages within the same study, and by presenting a more comprehensive model of reading comprehension.

In a longitudinal study that included large samples of English-, French-, and Greek-speaking children, Desrochers, Manolitsis, Gaudreau, and Georgiou observed that morphological awareness, measured by tasks containing both inflectional and derivational items, were related to reading comprehension and spelling 1 year later for each of the languages. Interestingly, the strength of the relationship was also similar across the three languages, further confirming the universal contributions of morphological awareness. On the other hand, Desrochers et al. reported language-specific findings—morphological awareness was related to word reading accuracy in English only, and it was related to word reading fluency in English and French, but not Greek. The researchers argue that these findings are consistent with the notion that morphological awareness plays a bigger role in opaque languages (e.g. English, and to a lesser extent, French) than transparent languages (e.g., Greek). Because readers of opaque languages cannot rely solely on grapheme–phoneme correspondences, they also have to take advantage of morphological knowledge.

Similar to Desrochers et al., Luo, Koh, Deacon, and Chen also support the contribution of morphological awareness to literacy outcomes across different languages. They focused on English and Chinese, two languages that are typologically different. The study examined the contributions of phonological awareness and morphological awareness to vocabulary within English and Chinese

in a 1-year longitudinal study. An advantage of the design is that it utilized the same sample of Chinese–English bilinguals to compare the relationships across the two languages, thus ruling out cohort effects. Morphological awareness was assessed based on the morphological features of each language, with inflectional and derivational awareness in English and compound awareness in Chinese. Results showed that morphological awareness contributed to both vocabulary at Time 1 and at Time 2 in English and Chinese, while there were no significant findings for phonological awareness. The results highlight the importance of morphological awareness for vocabulary across typologically different languages. At the same time, the study suggests that the type of morphological awareness that is important in a language is consistent with the features of the language.

While Luo et al. and Desrochers et al. both highlight the importance of morphological awareness for literacy development across different languages, these studies also reveal language specific processes. Because English and Chinese have very different morphological structures, morphological awareness measures in these two languages targeted different aspects—inflectional and derivational awareness in English, and compound awareness in Chinese. By contrast, the same aspects of morphological awareness—inflectional and derivational awareness—were assessed across English, French and Greek, all of which are Indo-European languages. Thus, the type of morphological awareness that functions in a language is constrained by the morphological structure. Considering that morphological structures vary widely across different languages, this notion has implications not only on the relationships between morphological awareness and literacy outcomes within a language, but also on the aspects of morphological awareness that transfer between two languages. We will discuss the impact of morphological features on cross-language transfer in the next section.

Notably, Gottardo, Mirza, Koh, Ferreira, and Javier did not find a direct effect of morphological awareness, specifically derivational awareness, on reading comprehension after controlling for word reading, vocabulary, and syntactic awareness in Spanish-speaking children. All the measures were given in English, the children's L2. These findings are different from those reported in the two studies described above. They are also different from Bae and Malt, who reported both direct and indirect effects of morphological awareness on reading comprehension in English for Korean-speaking children. The discrepancy highlights methodological issues in measuring morphological awareness. First, the tasks in Desrochers et al., Luo et al., and Bae and Malt contained items that measured two types of morphology. The task in Gottardo et al. only assessed derivational awareness and arguably represented a weaker construct. Gottardo et al. also had a smaller and more heterogeneous sample. However, Gottardo et al. conducted a more rigorous analysis by including vocabulary and syntactic awareness in the analysis, while one or both controls were missing from the other studies. Thus, a contribution of Gottardo et al. lies in presenting a more comprehensive framework of reading comprehension.

Cross-language transfer of morphological awareness

Six of the nine papers in this special issue address cross-language and cross-modality transfer of morphological awareness directly. In other words, these papers measured morphological awareness in the L1 and L2 and examined the relationships between morphological awareness in one language and literacy outcomes in the other. Generally speaking, these studies provide support to the interactive transfer framework (Chung et al., 2018b) by demonstrating transfer not only from the L1 to L2, but also from the L2 to L1 (e.g., Tong, et al.). These papers not only address the factors examined by the previous studies, such as morphological structures of the L1 and L2, relative proficiency levels of the two languages, and overlap and distance between the morphological systems (Koda, 2007, 2008; Chung et al., 2018b), but they also add several new factors. For example, Lam and Chen investigated how the developmental trajectory of morphological awareness (i.e., inflection awareness developing before derivation awareness) interacts with transfer. Bae and Joshi, and Kahn-Horwitz and Saba explored the impact of language learning environment by comparing the transfer patterns between English foreign language (EFL) learners and English second language (ESL) learners. Kahn-Horwitz and Saba investigated transfer of morphological awareness in low SES and underachieving adolescents. Choi, Tong, Law, and Cain examined the transfer of awareness of morpheme meaning, an aspect that has not been evaluated before.

In a study focusing on Chinese–English bilinguals, Tong, et al. measured compound awareness in both Chinese and English. Compounding is the most dominant word formation method in Chinese. Compared to other alphabetic languages, English also has a relatively large number of compounds, but compounding is less prevalent than inflection or derivation. The study showed that English compound awareness contributed to Chinese word reading and vocabulary after controlling for Chinese phonological awareness and morphological awareness. This finding suggests that transfer of morphological awareness is conditioned by overlapping morphological features between the L1 and L2, which are shared compounding rules in the case of this study. On the other hand, no transfer was observed from Chinese morphological awareness to English word reading or vocabulary.

The direction of transfer reported in Tong et al. (from English morphological awareness to Chinese but not the other way around) has been observed in several previous studies (Pasquarella, Chen, Lam, Luo, & Ramirez, 2011; Wang, Cheng, & Chen, 2006; Wang, Yang, & Cheng, 2009). Tong, et al. offer two explanations for the uni-directional transfer. First, the direction of transfer is determined by the morphological features of the language of the outcome variable. Because compounding is a crucial way to form words in Chinese, word reading and vocabulary in Chinese are supported by compound awareness not only developed within Chinese but also transferred from English. Reading English requires less compound awareness, hence transfer from Chinese is not necessary. This theory, first proposed by Pasquarella and colleagues (2011), is confirmed by Tong, et al. The researchers also propose a novel notion about compound awareness between

Chinese and English. Compared to English, Chinese has a more complex compounding system. Some of the rules are language universal, while others are language specific. The language-specific elements of the compounding system may prevent compound awareness from transferring from Chinese to English. This notion makes an important theoretical contribution to theory of cross-language transfer. Notably, Pasquarella, Chen, Lam, Luo, and Ramirez (2011), Wang, Cheng, and Chen (2006) and Wang, Yang, and Cheng (2009) involved Chinese–English bilinguals in North America. By focusing on Chinese–English bilinguals in Hong Kong, Tong et al. suggest that similar transfer patterns may be found for Chinese children in different English learning environments.

Choi et al. presented findings that were quite different from those in previous studies. In a study including second, fifth and eighth graders in Hong Kong, they found that Chinese homophone awareness explained unique variance in English word reading in grade two. To our knowledge, this is the only study that has observed transfer of morphological awareness from Chinese to English. Notably, previous studies focused on compound structure, whereas this study assessed homophone awareness, which requires children to differentiate meanings of homophonic morphemes. The two aspects of morphological awareness, morphological structure and morpheme meaning, may exhibit different patterns of transfer. Thus, this finding points to a new direction for studying transfer of morphological awareness. Choi et al. found negative transfer from English compound awareness and derivational awareness to Chinese word reading. These findings deviate sharply from previous research reporting positive transfer from English to Chinese. The researchers attribute these findings to the unique learning environment of Hong Kong children and to overgeneralization of derivational awareness from English to Chinese. The latter led to a misfit because Chinese has few derivations. However, since English morphological awareness measures were actually not negatively correlated with Chinese outcomes, it is possible that the negative regression results were due to suppression and should be taken with caution.

Bae and Joshi reported a rare study that compared transfer of morphological awareness between Korean and English in both ESLs and EFLs. The participants were in Grades 5 and 6 in the US and Korea, respectively. Different from Chinese, which has very few derived words, Korean shares both derivational and compounding features with English. Bae and Joshi observed transfer of morphological awareness, measured with compound and derivational items, from Korean to English word reading in the ESL sample. In contrast, transfer was not found in the EFL sample. The significant finding based on the ESL sample strengthens the notion that transfer of morphological awareness is based on overlapping morphological features between the two languages. The researchers attributed the lack of transfer for the EFL sample to their low English proficiency. This study suggests that transfer patterns may be influenced by language learning environment as well as level of proficiency in the novel language. The patterns of data not only support previously examined factors that influence transfer of morphological awareness (Koda, 2007, 2008; Chung et al., 2018b), but also highlight a novel factor, learning environment, which may facilitate transfer or hinder it. Unfortunately, the study did not examine transfer from English to Korean.

Another study focusing on EFLs was conducted by Kahn-Horwitz and Saba. The researchers examined cross-language transfer of morphological awareness in Arabic speakers enrolled in a technological school. The participants came from low SES backgrounds and were considered to have low English proficiency compared to their peers. However, the participants in this study were also much older (eleventh grade) than in Bae and Joshi and other studies in this collection. Results showed that morphological awareness, specifically derivational awareness, in Arabic was related to both word reading and reading comprehension in English. Notably, there are a couple of limitations to the design. First, the study did not control for morphological awareness or other reading related variables in English. Second, vocabulary was not controlled in either language when English reading comprehension was predicted. As a result, we cannot directly compare the findings of this study to those of Bae and Joshi or any transfer studies with within-language controls. Despite the limitations, the study provides preliminary evidence for transfer of morphological awareness between Arabic and English, two typologically different languages. The study is also innovative in the sense that it focused on low SES populations. Indeed, the researchers found that household density was negatively related to English word reading.

Eviatar, Taha and Schwartz explored the effects of morphological complexity on development of morphological and literacy skills. The study followed Hebrew (L1)-Arabic bilinguals, Arabic (L1)-Hebrew bilinguals, and Hebrew- and Arabic-speaking monolinguals from kindergarten to Grade 1. The bilingual groups showed accelerated development of morphological awareness in the L1 compared to their monolingual peers. Notably, exposure to Arabic led to growth of Arabic morphological awareness for the Hebrew–Arabic bilinguals, whereas exposure to Hebrew did not result in similar improvement in Hebrew morphological awareness for the Arabic–Hebrew bilinguals. This asymmetry in development may be caused by differences in morphological complexity between the two Semitic languages. Because morphology is more complex in Arabic than Hebrew, exposure to Arabic has a larger effect in Hebrew–Arabic bilinguals. Different patterns were also observed in regressions predicting spelling. For Hebrew (L1) speakers, both language experience (being bilingual or not) and morphological awareness in kindergarten were significant predictors of spelling at the end of the first grade. For Arabic (L1) speakers, parental education was the strongest predictor. The visual complexity and the diglossic situation of Arabic may have reduced children's ability to utilize morphological awareness in kindergarten to acquire the written language in the first grade.

Lam and Chen presented an innovative study that examined how the development of morphological awareness interacts with cross-language of transfer in English–French bilinguals. Research has established that children typically develop inflectional awareness before derivational awareness in English (e.g., Carlisle, 2003). As expected, the patterns of transfer were consistent with the developmental trajectory of morphological awareness. In the younger cohort, English inflectional awareness measured in the fall term of Grade 1 predicted French vocabulary 7 months later. By contrast, English derivational awareness did not predict French vocabulary. In the older cohort, both English inflectional and derivational awareness

measured in Grade 2 predicted French vocabulary measured in Grade 3. Remarkably, these relationships remained significant after controlling for other reading related variables and the autoregressor (French vocabulary in Grade 2), suggesting that morphological awareness contributes to gains in vocabulary overtime. Transfer was also observed from French morphological awareness to English vocabulary, but it was more limited and disappeared after controlling for the autoregressor. This study highlights the value of considering development in studying transfer. At the same time, the findings corroborate those of Desrochers et al. in showing that inflectional and derivational awareness are important for literacy development in both English and French, and thus transfer between the two languages.

Conclusion

To recapitulate, the editors believe that this special issue makes two contributions to the field. First, it confirms the language universal and language specific features of morphological awareness reported in the previous research. On the one hand, morphological awareness is found to contribute to all literacy outcomes, including word reading, vocabulary, and reading comprehension. As Carlisle (2003) points out, morphological awareness is a complex construct that requires multiple skills, including phonological, orthographic, semantic, and syntactic skills. The multifaceted nature of morphological awareness explains why it is important for all literacy outcomes. The universality of morphological awareness is also reflected in the findings that morphological awareness is related to literacy outcomes across alphabetic, Semitic, and logographic languages. On the other hand, the current issue stresses the language-specific features of morphological awareness. Nagy, Carlisle, and Goodman (2014) provide a detailed and convincing account of how morphological awareness and knowledge are related to literacy outcomes in English. Taking a cross-language perspective, our special issue illustrates how morphological processes in other languages may be similar to and different from those in English. These similarities and differences are determined by overlapping and unique features of morphological systems across languages.

Another contribution of the special issue is that it advances the theory of cross-language transfer. As mentioned earlier, the transfer facilitation model proposed by Koda (2007, 2008) focuses on L2 learners with high levels of proficiency in the L1. The interactive framework proposed by Chung et al. (2018b) expands the scope of transfer to emergent bilinguals who are learning two languages simultaneously. Transfer often occurs in both directions for these young bilinguals. The findings of several studies included in the special issue confirm those reported in the previous research and provide further support to the interactive framework. Specifically, the aspect of morphological awareness that transfers between two languages is determined by the overlapping features of the morphological systems. The direction of transfer is influenced by both the relative complexity of the morphological systems and the characteristics of the language of the outcome variable. Importantly, our special issue also examines factors influencing transfer that were

not included in previous research. These factors address how patterns of transfer are influenced by the multifaceted nature of morphological awareness (morpheme meaning vs. morphological structure), its developmental trajectory (inflectional awareness before derivational awareness), language learning environment (ESL vs. EFL) and SES. These novel findings point to the need of continuously advancing the theoretical framework of cross-language transfer.

The contributions of the special issue must be considered together with the limitations of its studies. Bilingual studies involve populations from diverse backgrounds. For example, the learning environment of Arabic–Hebrew bilinguals in Israel is very different from that of Chinese–English bilinguals in Hong Kong. As a result, it may not always be feasible to generalize findings across different studies. Another challenge faced by the field is that studies tend to adopt different designs and analytical methods. While some cross-language analyses control for within language variables, others do not. Even within the same language, different control variables are used in models of reading comprehension. Based on the simple view of reading model (Hoover & Gough, 1990), it is common practice to control for both word reading and vocabulary when studying the contribution of morphological awareness to reading comprehension. However, some studies do not have these key control variables in the analyses. The effects of other metalinguistic variables, such as phonological awareness, orthographic processing, and syntactic awareness should also be considered, but rarely does a study offer such a comprehensive model of reading comprehension. Finally, a critical limitation of the field is that there is currently no theory which accurately predicts the extent and direction of cross-language transfer. While research has documented the effects of an increasing number of factors, it is not clear exactly how these factors interact with each other. The dynamic and interactive nature of cross-language transfer needs to be further investigated.

With respect to educational implications, this special issue highlights the significant role of morphological awareness in literacy development in diverse bilingual populations. Field implications suggest that when considering children's literacy instruction in the L2, their linguistic background needs to be taken into account. Even if policy makers and educational practitioners are not proficient in the children's L1, they should familiarize themselves with L1 linguistic features in order to understand similarities and differences between children's two languages. In particular, teachers should offer explicit and systematic instruction in morphological awareness to facilitate children's vocabulary and literacy development in the novel language. In addition, drawing on data on cross-linguistic and cross-modality transfer of morphological awareness, explicit instruction in L1 morphological structure may facilitate L2 literacy acquisition and development. Similarly, in the context of an immersion program, instruction in L2 morphological structure may in turn facilitate L1 literacy.

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