Metalinguistic contribution to writing competence:

A study of monolingual children in China and bilingual children in Singapore

Abstract

This study investigated the concurrent contributions of three components of metalinguistic awareness (i.e., phonological awareness, morphological awareness, and syntactic awareness) to the writing competence of Primary-3 English-Chinese bilingual children in Singapore (n = 390) and monolingual Chinese-speaking children in Mainland China (n = 190). Hierarchical regression analyses found that the three components of metalinguistic awareness differed in their contributions to writing competence across the languages and between the two groups of children, with morphological awareness and syntactic awareness explaining markedly more variance than phonological awareness. Furthermore, SEM results revealed a robust cross-linguistic association between English and Chinese metalinguistic awareness in the bilingual children, which appeared to jointly undergird and support writing competence in both languages. Finally, home language use significantly predicted not only the bilingual children's English metalinguistic awareness but also their writing performance in Chinese. These findings lend support to Cummins's Common Underlying Proficiency and Developmental Interdependence Hypotheses, and underscore the importance of language context, formal instruction, and language features in children's literacy development.

Keywords: metalinguistic awareness; morphological awareness; phonological awareness; syntactic awareness; writing competence; biliteracy

Formatted: Left

Introduction

In recent years, a substantial body of theoretical and empirical research has consistently shown that the various components of metalinguistic awareness (i.e., phonological awareness, morphological awareness, and syntactic awareness) have differential effects on literacy development in alphabetic languages (e.g., Adams, 1990; Bowey, 1988; Ku & Anderson, 2003) and logographic languages such as Chinese (e.g., Apel, Wilson-Fowler, Brimo, & Perrin, 2012; Kuo & Anderson, 2008~~; Apel, Wilson-Fowler, Brimo, & Perrin, 2012~~). Research has also demonstrated that children who are learning to read in two languages are able to utilize knowledge or skills gained from one language in learning the other (Bialystok, Luk, & Kwan, 2005; Cummins, 2007; Swanson, Rosston, Gerber, & Solari, 2008). As a result, language curricula in many educational systems (e.g., Australia, England, and the USA) are paying increasing attention to the development of students' metalinguistic awareness (see Australian Curriculum Assessment and Reporting Authority, 2009; Department of Education in England, 2014; Common Core State Standards Initiative, 2012). The bulk of extant research, however, has focused on the relationship between metalinguistic awareness and reading development. How metalinguistic awareness relates to other cognitively demanding language and literacy skills, such as writing, has not been systematically examined. While writing has been a central component of language curricula for school systems such as those of Singapore and Mainland China, where children are usually required to complete a number of compositions each year from Primary 3 onwards (Chinese Ministry of Education [MOE], 2001; Singaporean MOE, 2007~~; Singaporean MOE~~, 2010), little is known about what effects metalinguistic awareness may have on writing development. To extend our current understanding of children's literacy development across languages and its underlying cognitive mechanisms, the present study examines and compares how various components of metalinguistic awareness contribute to the writing competence of English-Chinese bilingual children in Singapore and monolingual Chinese-speaking children in China.

Metalinguistic Awareness and Monolingual Children's Writing Competence

Metalinguistic awareness refers to "the ability to reflect on and manipulate the structural features of languages" (Nagy & Anderson, 1998, p.155). Metalinguistic awareness not only helps children see how oral language relates to written language, but also provides a basis for them to acquire

Formatted: Left

a deeper understanding of important features of linguistic input. Three components of metalinguistic awareness have been identified~~proposed~~ as playing a crucial role in children's literacy development: phonological awareness, morphological awareness, and syntactic awareness (Bialystok, 2012; Kuo & Anderson, 2008). Phonological awareness (PA) refers to the ability to reflect upon and manipulate sub-lexical phonological units, such as syllables, onsets, rimes, and phonemes (Bruck & Genesee, 1995). Morphological awareness (MA) comprises a conscious knowledge of the morphological structure of words and the ability to manipulate that structure (Kuo & Anderson, 2006). Syntactic awareness (SA) describes the ability to understand how words are organized to make meaningful and well-formed sentences, as well as the ability to figure out syntactic rules that govern well-formed sentences (Gombert, 1992).

Research on the relationship between metalinguistic awareness and writing in English, though rather limited in size, has suggested that different components of metalinguistic awareness are closely associated with writing development (Shu, Anderson, & Wu, 2000; Wang & Wang, 2013). First, PA has been found to play a critical role in spelling competence, because it helps children to establish systematic correspondence between speech sounds and graphemes (Nagy & Anderson, 1998; Swanson et al., 2008). Because of its opaque alphabetic orthography, however, the grapheme-phoneme correspondence in English is often indirect or unpredictable. For instance, the letter *a* can be /æ/ in *apple*, /ə/ in *above*, and /ei/ in *cake*. Therefore, learners cannot depend merely on phonological processes in learning to write. Second, research on English MA has indicated that, as children grow older, MA can play an important role over and beyond that of PA in writing development by facilitating an understanding of the semantic relationship between words regardless of their phonological features. For example, Apel et al. (2012) reported that children's MA uniquely contributed to spelling, after PA was controlled. In a longitudinal study, Berninger and colleagues (2010) found that MA showed the greatest growth in the first three or four grades of schooling and significantly predicted spelling in subsequent school years, over and beyond PA. Third, the availability of SA has also been found to constitute a crucial condition for the development of English writing competence because it allows learners to analyse and determine grammatical relations among structural constituents and produce sentences that are both semantically plausible and syntactically well-formed (Kuo & Anderson, 2006; Nation &

Formatted: Left

Snowling, 2000). Specifically, results from the small number of extant studies showed that SA could facilitate writing at both word level (Rego & Bryant, 1993) and text level (Andrews et al., 2006; Chen & Jones, 2012; Wang & Wang, 2013). In a study involving a group of students in Grades 1-4, Jongejan, Verhoeven, and Siegel (2007) assessed their PA, SA, rapid naming, and spelling. SA was found to explain the most variance in spelling. Moreover, Andrews et al. (2006) reported that instruction designed to enhance awareness of syntactical relations through sentence-combining helped students synthesize simple sentences into compound and complex ones. In a more recent study investigating young children's metalinguistic understanding of writing, Chen and Jones (2012) found that having a knowledge of clause constituents in functional terms expanded young children's repertoire of resources for~~to~~ representing their experience in their writing.

Compared to English literacy acquisition, different components of metalinguistic awareness appear to vary substantially in their importance for Chinese literacy development, due to the phonological features and the orthography of the Chinese language (Ho & Bryant, 1997; McBride-Chang, Cheung, Chow, Chow, & Choi, 2006). First, Chinese is often regarded as a "morphographic" language, where graphemes represent morphemes rather than phonemes. Chinese learning thus entails the acquisition of grapheme-morpheme correspondence. Second, there are approximately 7000 characters representing morphemes in Chinese, but only about 1300 different spoken syllables (Li, Anderson, Nagy, & Zhang, 2002). As a result, Chinese has a large number of homophones, and a spoken syllable may represent several different morphemes. Hence, analysing characters in spoken Chinese into morphemes is not a straightforward task. For instance, without the assistance of written Chinese, it is virtually impossible for learners to distinguish the *hong* in *honghua* (红花, red flower) from that in *hongshui* (洪水, flood), *hongwei* (宏伟, magnificent), and *caihong* (彩虹, rainbow), if they are not familiar with these morphemes or when the morphemes are presented in isolation without context. Third, Chinese is a relatively semantically transparent language, as the majority of words (over 75%) are compounds comprising two or more morphemes, where the constituent morphemes often contribute directly to the meanings of the compounds (Chung & Hu, 2007). Hence, MA can greatly facilitate the deciphering of the meaning of multi-morpheme words. Some researchers (Nagy & Anderson, 1998;

Formatted: Left

Wu et al., 2009) propose that while PA is critical to literacy development for alphabetic languages, MA plays a primary role in Chinese literacy learning.

Research on Chinese reading development has repeatedly generated evidence that, when examined together with other variables including PA, MA is significantly associated with reading comprehension in Chinese monolingual children in primary school (Li et al., 2002; McBride-Chang et al., 2005). However, there is a notable lack of empirical research on the relationship between metalinguistic awareness and learning to writeing texts in Chinese, though several studies examined the contributions of PA and MA to early Chinese word spelling/dictation in the context of Hong Kong. For example, Yeung et al. (2011) found that MA predicted Chinese writing to dictation (i.e., spelling) in 290 Chinese first graders. Tong, McBride-Chang, Shu, and Wong (2009) also reported that MA was uniquely associated with word spelling in 171 Chinese kindergarteners. In another 2-year longitudinal study (Tong et al., 2011), however, PA (as measured by a syllable deletion test) rather than MA significantly predicted word dictation in 187 Hong Kong kindergartners. Both PA and MA were found to predict word spelling in Yeung et al. (2013), albeit in different grades: PA in Grades 2 and 4, and MA in Grade 1. In an intervention study that involved year-long morphologically-enhanced instruction on characters and words for a group of Chinese monolingual children aged 7-9, Wu et al. (2009) found that morphological instruction substantially improved the children's performance on reading and spelling tasks. The only study of SA's contribution to Chinese writing we located was Yeung, Ho, Chan, and Chung (2013), which found that SA significantly predicted text writing (describing a happy birthday scene) by 340 Chinese primary students in Grades 1-4.

Taken together, though limited in scope and quantity, the existing literature indicates that the various components of metalinguistic awareness differ in their importance for writing development in English and Chinese. However, most of the studies only examined one or two components of metalinguistic awareness; no study has included all three components of metalinguistic awareness – i.e., PA, MA, and SA. Moreover, the relationship between SA and writing development is particularly under-researched. Even though research has shown that children grasp the core syntax of their native language by age 6 (Crain & Thornton, 1998), they usually do not perform perfectly on SA tasks by this age. Hence, there is a pressing need to uncover the role that SA plays in children's literacy development.

Formatted: Left

In addition, most of the measurements adopted in previous studies of metalinguistic awareness focused only on decoding skills (such as word recognition and spelling), whereas the importance of metalinguistic awareness for different aspects of writing development has not been explored. Clearly, more research is needed to further our theoretical understanding of the metalinguistic contribution to children's writing competence.

Metalinguistic Awareness and Bilingual Children's Writing Development

According to Bialystok (1996), children growing up in different language environments may follow different routes in literacy development. Linguistic context and language exposure may vary greatly, depending on whether a language is learnt as a first language, a second language or a foreign language. Thus, bilingual children may diverge in their literacy acquisition processes from their monolingual peers, and it is important to understand the challenges and opportunities that children have when learning two languages. There is a small but emerging body of research on the relationship of metalinguistic awareness to bilingual children's writing development. In a study of younger (8–9 years) and older (11–12 years) children from different language backgrounds (English monolingual children from Australia and English-Chinese bilingual children from Singapore), Yeong, Flecher, and Bayliss (2014) found that while only orthographic processing predicted word spelling for the monolingual children, PA was a significant predictor of spelling for the younger bilingual children. However, the bilingual children were only assessed in English, and it was not clear whether and how their metalinguistic awareness in the two languages interacted and influenced writing in both languages. There is, however, good reason to hypothesize such interrelations and influences in view of previous research which has shown that bilingual children may use skills acquired in one language to ~~in~~ learn~~ing~~ another. According to Cummins's Common Underlying Proficiency (CUP) Hypothesis and Developmental Interdependence Hypothesis (1989, 2000), although the surface features (e.g., pronunciation, word order) of any two languages may be different, proficiency in the two languages are interdependent because they draw on the same CUP supported by shared concepts/knowledge derived from learning and experience. With adequate linguistic exposure and experience in the two languages, learners will develop those CUP components that can be transferred from one language to the other.

Formatted: Left

Existing research has provided preliminary evidence that bilingual children's experience of learning to write in one language is a potential facilitator for writing development in another language (Cummins, 1989; Lanauze & Snow, 1989; Sasaki, 2004; Li, McBride-Chang, Shu, & Wong, 2012; Wolfersberger, 2003). When investigating the relation between Spanish (L1) and English (L2) writing skills in a group of Spanish-English bilingual children, Lanauze and Snow (1989) found them transferring writing skills from their L1 to their L2 when composing essays. Wolfersberger (2003) found that Japanese college students transferred their Japanese writing strategies to their English writing tasks. In their study of 10-year-old Hong Kong children learning English as a second language, Li et al. (2012) found that spelling in Chinese as a first language was highly correlated with spelling in English (r = .64) and that in the context of other literacy variables, spelling in one language was uniquely associated with spelling in the other language. These studies, however, pointed to only the correlation of writing competence across languages. Exactly what skills need to be drawn on or what cognitive machinery is involved is not entirely clear and need to be further researched.

An important factor that has been missing from the above-mentioned studies is home language use, which has been found to influence bilingual children's metalinguistic and literacy development. For example, Warren-Leubecker and Carter (1988) found that lower-socioeconomic-status (SES) kindergartners and first graders in the USA lagged behind their higher-SES counterparts in metalinguistic development because of differences in informal language and literacy practices at home that impacted on lower-level skills such as receptive vocabulary and oral language comprehension. Cummins (2000) synthesizes a number of studies which demonstrated that bilingual children's metalinguistic development was related to their level of bilingualism, which depended crucially on the use of both languages at home and beyond. As for the effects of home language use on literacy development, Zhang and Koda's (2011) study of immigrant Chinese-English bilingual children in the USA found that vocabulary breadth was significantly associated with parental home language use. In a study of factors influencing bilingual children's command of English and Welsh, Gathercole and Thomas (2009) noted that the participating children's proficiency in Welsh was directly correlated with the amount of input in Welsh at home. The studies reviewed above suggest that home language use may have a direct effect on bilingual children's writing development in the two languages and an indirect

Formatted: Left

effect through its influence on metalinguistic awareness. To date, however, no empirical study has directly addressed the relationship among home language use, metalinguistic awareness, and writing development in bilingual children.

While the extant studies have contributed to our broad understanding of metalinguistic awareness and its possible influences on literacy development, much still remains to be explored. First, as pointed out earlier, the nature of the relationship between metalinguistic awareness and learning to write has not been adequately examined and understood. In particular, little research examines how various components of metalinguistic awareness may concurrently contribute to writing development and whether their contributions differ between bilingual and monolingual children. Second, there is a paucity of research on Chinese metalinguistic awareness and its relationship with learning to write in Chinese. Third, the majority of bilingual studies have investigated pairs of languages with similar orthographies, such as English and French or English and Spanish, with insufficient attention given to language pairs that use different orthographies. Fourth, there is a paucity of research~~research caveat that~~ investigating~~es~~ the interrelations of home language use, metalinguistic awareness, and writing development. Finally, in terms of research population, most attention has been given to sequential bilingual children (such as immigrant children) who receive formal instruction in only one language in school. As a result, our knowledge of metalinguistic awareness and its relationship with writing acquisition is far from complete, and our current understanding needs to be verified and extended for typologically distant languages, such as English and Chinese, and simultaneous bilingualism. To this end, the present study was designed to compare simultaneous English-Chinese bilingual children from Singapore with monolingual Chinese-speaking children from Mainland China to investigate the within- and cross-linguistic contribution of metalinguistic awareness to writing development. Specifically, it was guided by the following research questions:

(1) How does Chinese/English PA, MA, and SA relate to Chinese/English writing competence for monolingual and bilingual children, respectively?

(2) For bilingual children, a) is there a cross-linguistic relationship between metalinguistic awareness and writing competence? and b) given the importance of home language input for bilingual children's literacy development, does home language use predict metalinguistic awareness and

writing competence in both languages?

Method

Participants

The participants were 418 Primary-3 English-Chinese bilingual children from three government schools in Singapore and 200 Primary-3 monolingual Chinese-speaking children from a government school in Tianjin, a city in northern China. Of these children, 28 bilingual children and 10 monolingual children failed to complete every task due to illness or ~~for~~ other factors~~reasons~~. The final sample consisted of 390 bilingual children (181 girls and 209 boys, mean age = 9.1 years, SD = 0.20) and 190 monolingual children (92 girls and 98 boys, mean age = 9.1 years, SD = 0.19). A t-test found no difference in age between the bilingual and monolingual children, $t(578) = 0.76$, $p = .23$, $d = 0.08$.

In Singapore, the bilingual children received instruction in English for all subjects except the Chinese Language, which was taught entirely in Chinese. In China, all the subjects (including English) were taught in Mandarin, and the children used Mandarin to communicate in and outside of class. Text writing is an important instructional component in the language curricula of Singapore and Mainland China. Formal instruction in text writing typically starts in Grade 2, and children are taught to write simple recounts or narratives in Chinese in China and in both Chinese and English in Singapore. As part of practice, they are often asked to write a recount based on pictures. The scenarios and events depicted in the pictures are familiar to the children and relevant to their everyday lives.

At the time of the study, the monolingual children had been learning English as a foreign language for two and a half years. As pointed out in Zhang et al. (2010) that involved a similar but older sample of Chinese children, the quality of English instruction in ordinary primary schools in China was far from optimal. Instruction time consisted of only two 45-minute English lessons per week, which were typically taught by teachers with limited English competence. Based on their English curriculum, the children participating in this study had been introduced to fewer than 400 English words. They had little exposure to or use of English beyond their English classrooms, and their English proficiency was rudimentary. When spoken to in English during the data collection, they could only understand short sentences found in their textbooks, and their answers were rote-memorized. Thus, they did not fit the widely accepted definition of bilinguals as individuals having "access to more than one linguistic code

Formatted: Left

Formatted: Left

as a means of social communication" (Hamers & Blanc, 2000, p.25).

To control potential confounding variables, effort was made to ensure that the monolingual participants spoke Mandarin but no other Chinese dialects. Given the recognized influences of SES on children's literacy development (Authors, 2013a), the demographic backgrounds of available monolingual children were carefully examined, and only those with SES backgrounds similar to those of their Singaporean peers were sampled. The parents of the bilingual children were asked to fill out a short demographic survey, and the relevant demographic information of the monolingual children was obtained from their school. Table 1 presents the parents' education levels and occupations by language group. Chi-square tests did not find significant differences (*p*s = .55 - .84) between the monolingual and bilingual groups in parents' educational levels or professions.

[Insert Table 1 here]

Tasks

Phonological awareness tests

English PA was assessed with the Elision Subtest of the Comprehensive Test of Phonological Processing (CTOPP) (Wagner, Torgesen, & Rashotte, 1999). The test comprised 20 items, assessing whether an individual can say a word and then say what is left after removing designated sounds. Two trial items were given, and corrective feedback was provided. The test was stopped when a child made three consecutive mistakes.

Chinese PA was assessed with a syllable deletion and onset deletion test developed by McBride-Chang et al. (2005). The test was modelled on the CTOPP Elision Subtest to assess whether a child could say a word in Chinese and then say what was left after leaving out designated sounds. Twenty-two items appropriate for the age group in this study were chosen. Two trial items and corrective feedback were provided. The test was stopped when a child made three consecutive mistakes.

Morphological awareness tests

Two MA tests were adapted from Ku and Anderson (2003): a Discriminate Morphemes test and a Select Interpretations test. Each test comprised both derivatives and compounds and had an English and a Chinese version. To minimize the potential influences of the children's word-reading ability on their performance ~~on these tests~~, the test items were read aloud by the test administrators.

The Discriminate Morphemes test was an odd-man-out task assessing whether the children would understand that a shared part of complex words may have different meanings. There were 20 groups of three words having a common part, which had the same meaning only in two words. The participating children were asked to circle the word where the common part had a different meaning. For instance, in the English test, *hallway, doorway,* and *anyway* were presented as one group of compounds, and *way* means "a street, lane, passage or path" in the first two words but "a manner or method" in the third word. Words used in the tests were familiar to the participating children from their oral language. Two trial items were given.

The Select Interpretations test assessed whether the children could draw on their morphological knowledge about compounds and derivatives to select correct interpretations for low-frequency complex words containing high-frequency base words. There were 16 items presented in the form of multiple-choice questions, and the children are asked to choose the correct interpretation of each word among four choices given. For instance, in the Chinese test, the following four interpretations were provided for the target word 射手 (shooter): 1) 举起手把箭射出去 (raise your arm to shoot); 2) 一个很会射箭的人 (a person who is good at shooting); 3) 射到很远的地方去 (to shoot very far); 4) 手被箭射伤了 (the hand is wounded by an arrow~~a hand hurt by shooting~~). To answer this question correctly, the children needed to understand that 手 is an agentive suffix denoting a person with certain skills/abilities. All the base words in the test appear frequently in children's textbooks; only complex words that occur fewer than five times per million characters were included. Two trial items were given. A composite score of the two tests in each language was used in the final analyses.

Syntactic awareness tests

The English and Chinese SA tests were developed by the authors based on an oral test used in Galambos and Goldin-Meadow (1990) and a written test designed by Author (2002). Given the large sample size of this study, the test was modified for administration in written form. Upon reading each sentence, the children were asked to accomplish three subtasks and write their answers down. The first

Formatted: Left

Formatted: Font: (Default) Times New Roman, 11 pt

Formatted: Font: (Default) Times New Roman, 11 pt

Formatted: Font: (Default) Times New Roman

Formatted: Left

subtask (i.e. the Grammaticality Judgment subtask) required them to judge whether the sentence was correct. The second subtask (i.e., the Error Correction subtask) asked them to correct the error in a sentence judged to be incorrect. The last subtask (i.e., the Error Explanation subtask) required them to state the syntactic rule violated by the error, placing a high demand on analytical ability.

There were 20 grammatically incorrect sentences in each test, and the maximum score for each sentence was 3 points. One point was given when a sentence was judged to be incorrect without correction or explanation. Two points were rewarded when a sentence was both judged to be wrong and corrected. An additional point was given to a correct statement of the syntactic rule violated by the error. The corrections and explanations were classified as "grammar-oriented" and "content-oriented". Only the grammar-oriented responses (see Table 5 for some examples) were given points, whereas the content-oriented responses were coded but received no points. For instance, upon reading a sentence like "My neighbour enjoyed slowly his ice-cream," the children needed to understand that the adverb *slowly* was misplaced, judged the sentence to be incorrect, responded with a grammar-oriented correction such as "My neighbour enjoyed his ice-cream slowly", and provided a statement about the misplacement of the adverb to earn all three points for this item. Content-oriented answers, such as "I enjoyed having ice-cream" or "My neighbour does not like ice-cream", did not earn points. To ensure that the children's performance on the SA tests would not be affected by their reading ability, the test sentences were also read aloud by the test administrators. Two raters scored the tests independently, and the inter-rater agreement was found to be 94%. All disagreements were subsequently resolved through discussion.

Writing tests

To assess their writing competence, the children were asked to write a composition based on a four-picture story in the language being tested. To control for prior exposure, the sets of pictures were not taken from local teaching or assessment materials, but from a British source (Barker & Moorcroft, 2000). No helping words were given. The Stanford Writing Assessment Rubrics (Gardner et al., 1996) was chosen to evaluate the compositions, as it assessed six aspects of writing: (a) ideas and development; (b) organization, unity, and coherence; (c) word choice; (d) sentences and paragraphs; (e) grammar and usage; and (f) writing mechanics. For each aspect, a four-point scale was used, and fine distinctions

Formatted: Left

between score points were provided in the rubrics.

Two qualified and trained raters marked all the compositions independently. To establish inter-rater reliability, 20% of the compositions were randomly chosen and scored independently by the raters. Spearman's rank-order correlation analyses were run to determine the correlation between the two raters for each aspect, and the correlations were found to be acceptable, with ρs (114) = .76 - .83, $p < .001$. Where marked discrepancies existed between the raters, the scores were discussed until a consensus was reached. The remaining 80% of the compositions were then split between the two raters and marked.

Nonverbal Reasoning test

To control the influence of nonverbal reasoning ability on literacy performance, the Nonverbal Reasoning Subtest of the Wide Range Achievement Text-Expanded Edition (WRAT-E, Robertson, 2002) was administered to all the participating children. There were 35 items in total. For each item, there were five symbol/figures, and the children were asked to choose one symbol/figure that was different from the other four. The Chinese and Singaporean children took the same version of the test, except that the instructions were translated into Chinese for the monolingual children.

Demographic and home language use survey

Given the multilingual environment in Singapore, parents of the bilingual children were asked to fill out a demographic and family language use survey to report what language/languages were used between family members (between parents, and between the participating child and other people in the family – parents, grandparents, siblings, and/or domestic helper) and how often (i.e., 0-25%, 26-50%, 51-75%, or 76-100% of the time). The language categories named in the survey included English, Mandarin, Chinese dialects, and others. A composite variable labelled "English Use at Home" was created for the bilingual children based on an exploratory factor analysis of responses to the aforementioned survey questions. The composite measure had acceptable reliability (α = .86). It was used in the subsequent data analysis to explore the relationship of home language use to metalinguistic awareness and ~~to~~ writing development, respectively.

Procedures

After obtaining informed consent from parents of all participating children, the demographic and home language use survey was given to the parents of the bilingual children to gather relevant

Formatted: Left

information. The battery of tests was then administered. For both groups of children, the tests were conducted at the beginning of the second half of the academic year. The class teachers informed the children about the research and clarified that their participation would not affect their academic grades. Written tests were administrated in several sessions, with the duration of each session ranging from 25 to 40 minutes. The scheduling of these sessions was carefully discussed with the schools to avoid interference with school curriculum time. Each written test was administrated to groups of children in their classrooms. The oral tests, each taking 3 to 5 minutes, were conducted individually in a quiet room in the school by trained undergraduates majoring in psychology.

Results

All data were screened for kurtosis and skew, and the normality of distribution assumption was met in each case. Descriptive statistics for all measures are presented in Table 2 by language group. Also presented there are the reliability estimates for all measures except the writing tests. As part of preliminary analyses, the two groups of children were compared on all five common measures. The bilingual children performed comparably with the monolingual children on the Chinese PA test, $t(578) = 0.45$, $p = .65$, $d = 0.04$, and the nonverbal reasoning test, $t(578) = 0.98$, $p = .33$, $d = 0.09$, but scored significantly lower for Chinese MA, $t(578) = 15.60$, $p < .001$, $d = 1.49$, Chinese SA, $t(578) = 9.17$, $p < .001$, $d = 0.81$, and Chinese writing, $t(578) = 8.46$, $p < .001$, $d = 0.78$.

[Insert Table 2 here]

Table 3 presents partial correlations among the measures for both groups of children, with nonverbal reasoning and age being controlled for. A close examination of the within-language partial correlations between the components of metalinguistic awareness and writing competence reveals similar patterns for both groups of children. First, for both groups and both languages, all three components of metalinguistic awareness were significantly correlated (rs = .17 - .49, ps < .01). Second, the within-language partial correlations between the various components of metalinguistic awareness and writing competence were significant (rs = .18 - .40, ps < .01), except for that between Chinese PA and Chinese writing for the monolingual children ($r = .09$, $p = .23$).

[Insert Table 3 here]

Robust cross-linguistic partial correlations were also observed for the bilingual children.

Formatted: Left

Generally, the metalinguistic awareness measures in one language were significantly correlated with those in the other language (rs = .17 - .42, ps < .01), except for that between Chinese MA and English PA (r = .08, p = .32). Moreover, all three components of Chinese metalinguistic awareness were significantly correlated with English writing competence (rs = .11 - .20, ps < .05 or .01), and vice versa (rs = .17 - .32, ps < .01).

Contribution of Metalinguistic Awareness to Writing Competence

A series of hierarchical linear regressions were conducted to address our first research question about the concurrent relationships between the three components of metalinguistic awareness and writing competence. In these regressions, nonverbal reasoning and age were entered first as control variables. As suggested by studies reviewed earlier, English MA may play an increasingly important role over and beyond PA (Apel et al., 2012). Moreover, for language-specific reasons, Chinese PA has been shown to be less critical than Chinese MA in Chinese literacy development (McBride-Chang et al., 2003; Wu et al., 2009). Consequently, PA was entered in Step 2, followed by MA in~~at~~ Step 3. To ascertain its unique contribution to writing competence within each language, SA was entered in~~at~~ the final step. The results of the regression analyses are summarized in Table 4.

[Insert Table 4 here]

Of all three regression analyses, in Step 2, only English PA explained a small but significant amount of variance in English writing competence (ΔR^2 = .06, β = .08, p < .05). In Step 3, while the changes in explained variance were significant for all three outcome variables, the corresponding standardized regression coefficients revealed that Chinese MA was not a significant predictor of Chinese writing for the monolingual group (β = .01, p > .05). In Step 4, SA was found to significantly predict both Chinese and English writing over and beyond PA and MA. Taken together, these results revealed an important difference between the two groups of children: for the bilingual children, both MA (βs = .10 and .21, ps < .05 and .001, respectively) and SA (βs = .29 and .35, ps < .001) significantly predicted writing competence in each language, while for the monolingual children, only SA (β = .43, p < .001) significantly predicted Chinese writing.

Cross-linguistic Relationships among Metalinguistic Awareness, Writing Competence and Home Language Use

Formatted: Left

A series of SEM analyses were constructed to address our second research question regarding cross-linguistic relationships between the bilingual children's English/Chinese metalinguistic awareness, English/Chinese writing competence, and home language use. Based on Cummins's CUP hypothesis, the initial theoretical model hypothesized a cross-linguistic relationship between the bilingual children's English and Chinese writing competence, with metalinguistic awareness serving as the CUP. That is, metalinguistic awareness of each language would not only predict writing competence in both languages, but would also predict metalinguistic awareness of the other language. Two ~~sets of~~ models constructed to test the hypothesis were assessed using AMOS 20, a structural equation modelling (SEM) program. For both models, there were five latent variables: 1) Chinese metalinguistic awareness with three indicators (Chinese PA, Chinese MA, and Chinese SA), 2) English metalinguistic awareness with three indicators (i.e., English PA, English MA, and English SA), 3) Chinese writing with six indicators (i.e., the six aspects of composition assessment specified in the aforementioned rubrics), 4) English writing with six indicators, and 5) English Use at Home with 3 indicators. In each model, paths were drawn between metalinguistic awareness and writing competence within the same language and across the two languages. English Use at Home was connected with metalinguistic awareness of both languages and with writing competence in both languages by single-headed arrows. The only difference between the two models lies in that the first model examined the cross-linguistic effect of English metalinguistic awareness on Chinese metalinguistic awareness, (i.e., a single-headed arrow was drawn from English metalinguistic awareness to Chinese metalinguistic awareness), and the second model examined how Chinese metalinguistic awareness predicted English metalinguistic awareness (i.e., a path was drawn from Chinese metalinguistic awareness to English metalinguistic awareness).

The models were evaluated by examining multiple fit indices ($X^2/df = 3.43$, RMSEA = 0.08, CFI =.92 for the first model, and $X^2/df = 3.31$, RMSEA = 0.08, CFI =.92 for the second model), and the results showed~~rejected some of the hypotheses by showing~~ four non-significant paths ($ps > .05$) in both models: the path between Chinese metalinguistic awareness and English writing competence, the path between English metalinguistic awareness and Chinese writing competence, the path between English Use at Home and Chinese metalinguistic awareness, and the path between English Use at Home and

English writing competence. Consequently, these paths were removed, and the models wereas evaluated again. Multiple indices indicated good model fit: for the first model, $X^2/df = 2.07$, RMSEA = .05, and CFI=.94, for the second model: $X^2/df = 2.03$, RMSEA = .05, and CFI= .94. The final models with standardized path coefficients and factor loadings of individual tests/indicators on their respective latent constructs are shown in Figure 1 and Figure 2.[1] All the path coefficients and factor loadings were statistically significant.

[Insert Figure 1 here]

[Insert Figure 2 here]

For both languages, metalinguistic awareness was closely related to writing competence in that language. Notably, English metalinguistic awareness indirectly predicted Chinese writing competence via Chinese metalinguistic awareness, with a standardized indirect coefficient of .48, and $p < .01$.[2] Similarly, Chinese metalinguistic awareness contributed indirectly to English writing competence through English metalinguistic awareness (the standardized indirect coefficient = .44, $p < .01$)[2]. Moreover, in both models, English use at home positively predicted English metalinguistic awareness, and was negatively related towith Chinese writing competence. AltThough English use at home did not make a direct contribution to English writing competence, it indirectly predicted English writing competence (standardized indirect coefficients = .12 and .15, $ps < .01$)[2].

Discussion

Within-Language Relationships between Metalinguistic Awareness and Writing Competence

Taking a holistic approach to include various components of metalinguistic awareness, results from this study fills some gaps in the understanding of the role of metalinguistic awareness in literacy development. The hierarchical regression analyses revealed that PA, MA, and SA differed in their importance and contribution to writing competence between the two languages and the two groups of

[1] In response to one reviewer's suggestion, we re-evaluated the models with age and nonverbal reasoning entered as control variables. The significant paths and the values of their coefficients remained unchanged. The regression weights (.003 - .005) revealed that neither age nor nonverbal reasoning was significantly associated with the endogenous variables ($ps = .55$ - .79). For the sake of clarity, the SEM model without the control variables is presented in Figure1.

[2] The *p*-values reported for the indirect effects were computed using bootstrap standard errors, and the number of bootstrap samples was 200.

Formatted: Left

Formatted: Font: Times New Roman, 11 pt

Formatted: Font: Times New Roman, 11 pt

Formatted: Font: 11 pt

Formatted: Justified

Formatted: Font: 11 pt

Formatted: Font: 11 pt

Formatted: Font: 11 pt

Formatted: Font: 11 pt

Formatted: Font: 11 pt

Formatted: Font: 11 pt

Formatted: Left

language learners. The following explanations can be offered for the observed patterns of relationships.

First, because of the orthographic nature of English and the relatively simple phonological structures of Chinese, English PA could be expected to be playing a more important role in writing development in English than Chinese PA was in the development of writing competence in Chinese for the bilingual children. This was consistent with the finding that only English PA significantly predicted writing competence in English. It was also consistent with previous findings about the less critical role of Chinese PA in Chinese literacy development (Li et al., 2002; McBride-Chang et al., 2003). Thus, our study has extended the existing literature by showing that the same patterns of relationships found in monolingual children were also observable in bilingual children. The amount of variance explained by English PA, however, was much smaller than that accounted for by English MA and SA. This is consistent with the view that when children move beyond the first few years of formal education, MA and SA may begin to exert more influence on literacy development than PA (Bowey, 1988; Carlisle, 2003; Cummins, 2000).

Second, our investigation further underscores the importance of MA, a metalinguistic awareness component that has received less research attention than PA. For the Singaporean bilingual children, both English MA and Chinese MA explained substantial amounts of variance in writing, over and beyond PA, a finding similar to those reported by previous studies of reading development in monolingual children (Carlisle & Fleming, 2003; McBride-Chang et al., 2005) and bilingual children (McBride-Chang et al., 2006; Wang, Cheng, & Chen, 2006). The strong association between MA and writing competence may have to do with the fact that recognizing morphological relationships between morphemes and conducting morphological analysis enable children to decompose words into their constituent components and synthesize their meanings, which in turn may help them memorize and retrieve the Chinese characters.

Similar results, however, were not obtained for the monolingual Chinese-speaking children, as their morphological awareness did not significantly predict their text writing. Given the prominence of morphemes in the Chinese writing system, this finding was unexpected. This discrepancy may stem from the difference in the number of characters that these groups of children had learnt. Of the 2,500 commonly used Chinese characters, the Primary-3 Singaporean bilingual children were required to

Formatted: Left

learn 1,300 (Singaporean MOE, 2007), while the Chinese Language Syllabus (Chinese MOE, 2001), adopted for the monolingual children in this study, specifies that Primary-3 children should learn all the 2,500 commonly used characters. Thus, the monolingual children in this study were likely to rely less on morphological clues to retrieve the Chinese characters, as they already mastered the meaning of most characters and words and knew how to write them. Taken together, these findings suggest that once a certain number of characters are learnt, MA may cease to make a significant and unique contribution to composition writing. It would be interesting to see whether such a developmental trajectory can be observed in the bilingual children after they learn a similar number of Chinese characters. Future research needs to include various age groups at different levels of Chinese acquisition to map out the Chinese MA developmental trajectories.

Moreover, the present study produced robust evidence for the critical role of SA in literacy development across languages and language learners, as SA consistently explained significant amounts of variance in writing competence for each language and for both groups of children, over and above PA and, in the case of the monolingual children, MA as well. While previous research on English monolingual children produced evidence for the facilitating role of SA in integrating words at sentence and text levels (Nation & Snowling, 2000; Rego & Bryant, 1993), the present study is the first to report that SA is closely associated with Chinese writing development in monolingual Chinese-speaking children as well as Singaporean simultaneous bilingual children. According to Myhill (2011), writing is a recursive process involving selecting, shaping, reflecting and revising, which is similar to many metalinguistic activities. To complete the writing tasks successfully, the children in our study needed to consciously monitor and manipulate language forms, not only at the phonological and morphological levels, but also at the syntactic level. That is, producing large units of discourse coherently would require the children to analyze and determine the grammatical requirements and retrieve or generate a form of the word/sentence that serves its grammatical role without violating constraints on meaning.

Metalinguistic Awareness, Writing Development and Home Language Use: Cross-linguistic Relationships

Perhaps the most important finding of this study concerns the interconnection between English and Chinese metalinguistic awareness found in the bilingual children, which appeared to jointly

undergird and support writing competence in both languages. Results from the SEM showed that English metalinguistic awareness did not directly influence writing competence cross-linguistically, rather, it had an indirect effect on Chinese writing competence through Chinese metalinguistic awareness, and vice versa. These results not only lend strong support to Cummins's CUP Hypothesis and Developmental Interdependence Hypothesis (1989, 2000), but also offer some insights into the constituents of the CUP: metalinguistic awareness is part and parcel of the CUP, which serves as the conceptual foundation of language acquisition and facilitates the development of certain language skills in one language as a consequence of having acquired these skills in another language. As suggested in previous research (Cummins, 1989; Carlisle, 2003), such transfer is possible because of many deep similarities shared by languages. For example, the bilingual children had received instruction on English and Chinese characters during their preschool years, and Pinyin was introduced only in Primary 1. Given that English has a more complex phonological structure than the regular letter-sound correspondence of the Pinyin system (Ho & Bryant, 1997), it was~~is~~ very likely for the bilingual children to utilize their phonological skills acquired in learning to read English, an alphabetic script, to~~in~~ complet~~eing~~ the Chinese PA task. Similar phonological facilitation has been reported in earlier studies (Gottardo, Chiappe, Yan, ~~,~~ Siegel, & Gu, 2006; Li, Kirby, Cheng, Wade-Woolley, & Qiang, 2012), and the present study adds to this body of research by showing that the bilingual children's Chinese PA was~~is~~ significantly related to their English PA (r = .30, p < .001). Moreover, English compound words function similarly to Chinese compound words; that is, the two stem morphemes in a compound word - for instance, *moonlight* and *sunshine* - contribute meaning independently. Thus, it would be reasonable to expect the bilingual children's MA of Chinese compounds to be well connected with their MA of English compounds. This was supported by the partial correlation of 0.17 (p < .01) found between the two, a result consistent with previous research on morphological transfer (Pasquarella, Chen, Lam, Luo, & Ramirez, 2001; Wang et al., 2006).

To our best knowledge, this study is the first to provide written evidence for the cross-linguistic transfer of SA in bilingual children. This contributes to expanding the existing literature, which has so far mainly focused on cross-linguistic phonological/morphological transfer. Evidence of SA transfer came from the children's responses to the SA tests, which required them to explain errors in the test

Formatted: Left

Formatted: Font: Italic

Formatted: Left

sentences. A detailed analysis of their explanations revealed two distinctive features. The first one was a clear tendency to make cross-linguistic comparisons and references: the bilingual children explained many errors in the Chinese SA test not only by providing the Chinese syntactic rules that were violated but also by comparing and relating these errors to English usage (see Table 5 for some examples). One plausible explanation of this tendency is that learning two languages had given the Singaporean bilingual children ample opportunities to compare and contrast the structural features of the languages, which had been absent from the language experience of the monolingual children. For instance, an attribute in Chinese is always placed before a noun, whereas in English attributes can be placed both before and after nouns. In explaining why the sentence in Example 2 in Table 5 is incorrect, one of the children identified the misplaced attribute (i.e., 学习英文 [for learning English]) and related the structure to its English equivalent by highlighting "(that is the) English way to say it." The child's awareness of the different positioning of attributes in the two languages could be ascribed to his/her bilingual experience, which promoted attention to the abstract relationships of language elements.

[Insert Table 5 here]

The second identified feature was the frequent use of metalingual terms. The bilingual children employed many metalingual terms in their explanations, for example, *noun*, *adjective*, *adverb*, and *exclamation mark*, most of which were written in English. It should be noted that in Singapore, while knowledge of English grammar is introduced explicitly and systematically through different types of spoken and written texts since Primary 1 (Singaporean MOE, 2010), Chinese grammar teaching is non-existent because grammar is not specified in the syllabus or the textbooks (Authors, 2013b). English grammatical terms such as *parts of speech*, *tense*, *subject*, *object*, *clause*, *compound sentence*, and *complex sentence* are among the designated learning points to be introduced in lower primary grades (Singaporean MOE, 2010). In class, teachers are expected to explicitly teach structural patterns of English and how they are used before they introduce students to the related metalingual terms. Activities such as role-play and self-editing of their writing are also included to provide students with opportunities to apply their grammatical knowledge in meaningful contexts. Thus, manipulating and reflecting on the grammatical structure of language was not a new experience to the bilingual children

Formatted: Left

participating in this study. Consequently, they had already acquired a substantial amount of syntactic knowledge through English instruction, though they had received no explicit teaching of Chinese grammar. It was natural for them to capitalize on their English syntactic knowledge when asked to undertake the Error Explanation subtask that required analytic reflection on the underlying linguistic patterns and properties of the Chinese language system.

Last but not least, our study highlights the facilitative role of home language use in biliteracy development. It has been suggested that metalinguistic awarenessMLA develops not only in response to instruction but also as a result ofto language exposure (Carlisle, 2003; Nagy & Anderson, 1998). Earlier research has documented that home environmentss characterized by a lack of extensive and quality oral communication tended to ~~create environments which~~ inhibited the development of metalinguistic competence (Hakes, 1982; Warren-Leubecker & Carter, 1988). The SEM results suggested that in the multilingual context of Singapore, continual exposure to English speech in natural social settings could enhance Primary-3 children's understanding of the English language at the metalinguistic level, and that the predominance of English in ethnic Chinese families had a negative impact on children's Chinese writing competence. Surprisingly, English use at home was not a significant predictor of English writing competence. This result might be explained in two ways. First, English use at home contributed to English writing competence indirectly through its impact on English metalinguistic awareness, which strongly predicted English writing competence. Second, there might be a saturation point for home language use to contribute independently to writing development. As children progress through the grades, they are increasingly required to manipulate language in cognitively demanding and context-reduced situations that differ significantly from everyday conversational interactions (Cummins, 2000, 2007). For example, writing a composition requires a child to come up with language without any prompts that typically come from a conversational partner in oral interactions, and the child must plan and organize ideas rather than just think of what to say. Therefore, the impact of home language exposure on writing development may decrease as children grow older and become more proficient in that language. It was possible that the English proficiency of the bilingual children in this study had reached the level where English use at home ceased to have direct influences on their English writing competence, but their Chinese proficiency was still below the critical level and

Formatted: Left

consequently they continued to benefit from more use of Chinese at home.

Conclusion

In summary, by examining the various components of metalinguistic awareness concurrently, our study has produced empirical evidence of the varying importance of these components in writing development; that is, MA and SA explained more variance in writing competence than PA did for the bilingual children, whereas SA was the sole predictor of writing competence for the monolingual children. Most importantly, our findings contribute to the cross-linguistic transfer literature by suggesting that the robust cross-linguistic interaction of metalinguistic awareness underlay and supported the bilingual children's writing development in both English and Chinese. Our study also highlights the differential importance of home language use in biliteracy development.

These contributions notwithstanding, several limitations of our study need to be acknowledged. First, the correlational nature of the present study does not warrant firm causal conclusions. To overcome this limitation, interventional studies are needed to verify the causal relation of metalinguistic awareness to writing development in bilingual and monolingual children. Second, the cross-sectional design adopted in this study did not allow the mapping of the developmental relationships of the various components of metalinguistic awareness to writing competence. Thus, although this study has found that MA and SA had a closer relationship with writing competence than PA did, it remains an open question whether this finding can be extrapolated to monolingual and bilingual children at other stages of literacy development. A longitudinal research design that follows a group of children through multiple developmental stages is better positioned to map out the trajectories of metalinguistic development and determine the nature of the concurrent relationships between the various components of metalinguistic awareness and growing writing competence. Third, as writing competence was assessed only at the text level in this study, it remains unclear if the differential involvement of PA, MA, and SA observed is true of writing competence at the word/character level. Therefore, future research may consider incorporating measures of writing competence at both text and word levels. Moreover, while the inclusion of six sub-~~sets of~~ scales in the composition scoring rubrics provided~~s~~ a comprehensive ~~framework to assess~~assessment of writing competence, the inter-rater reliability indices~~ies~~ were less than optimal~~tend to be slightly low~~. Measures (e.g, ~~provide~~ more extensive training

for raters~~to the markers~~) need~~s~~ to be taken in~~for~~ future research to enhance~~increase~~ scoring~~the inter-rater~~ reliability~~ies~~. Lastly, since this~~e present~~ study underscores the important role of home language use in children's metalinguistic awareness and writing competence, future research may ~~consider~~ examine~~including~~ other home literacy practices, especially writing activities,~~so~~ to provide a more fine-tuned analysis of children's metalinguistic and biliteracy development.

Formatted: Left

Formatted: Indent: First line: 0 cm

References

Author (2002)

Authors (2013a)

Authors (2013b)

Adams, M.J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.

Andrews, R., Torgerson, C., Beverton, S., Freeman, A., Locke, T., Low, G., Robinson, A., & Zhu, D. (2006). The effect of grammar teaching on writing development. *British Educational Research Journal, 32*, 39-55.

Apel, K., Wilson-Fowler, E.B., Brimo, D., & Perrin, N.A. (2012). Metalinguistic contributions to reading and spelling in second and third grade students. *Reading and Writing: An Interdisciplinary Journal, 25*, 1283-1305.

Australian Curriculum Assessment and Reporting Authority. (2009). *National English Curriculum: Initial advice*. Melbourne, Australia: Australian Curriculum Assessment and Reporting Authority.

Barker, R., & Moorcroft., C. (2000). *Text level: Year 3: Text level activities for the literacy hour.* London: A & C Black Publishers.

Bialystok, E. (1996). Preparing to read: The foundations of literacy. *Advances in Child Development and Behavior, 26*, 1-34.

Bialystok, E. (2012). The impact of bilingualism on language and literacy development. In T. K. Bhatia & W. Ritchie (Eds.), *The handbook of bilingualism and multilingualism* (pp.578-601). Chichester, UK: John Wiley & Sons.

Bialystok, E., Luk, G., & Kwan, E. (2005). Bilingualism, biliteracy, and learning to read: Interactions among languages and writing systems. *Scientific Studies of Reading, 9*, 43-61.

Berninger, V.W., Abbott, R.D., Nagy, W., & Carlisle, J. (2010). Growth in phonological, orthographic, and morphological awareness in grades 1 to 6. *Journal of Psycholinguistic Research, 39*, 141-163.

Bowey, J.A. (1988). *Metalinguistic functioning in children*. Sydney, Australia: UNSW Press.

Formatted: Left

Bruck, M., & Genesee, F. (1995). Phonological awareness in young second language learners. *Journal of Child Language, 22*, 307-324.

Carlisle, J. (2003). Morphology matters in learning to read: A commentary. *Reading Psychology, 24*, 291-332.

Carlisle, J.F., & Fleming, J. (2003). Lexical processing of morphologically complex words in the elementary years. *Scientific Studies of Reading, 7*, 239-253.

Chen, H., & Jones, P. (2012). Understanding metalinguistic development in beginning writers: A functional perspective. *Journal of Applied Linguistics and Professional Practice, 9,* 81-104.

Chinese Ministry of Education. (2001). *Yuwen kecheng biaozhun* [Primary Chinese Language Syllabus]. Beijing, China: Beijing Normal University Press.

Chung, W., & Hu, C. (2007). Morphological awareness and learning to read Chinese. *Reading and Writing: An Interdisciplinary Journal, 20*, 441-461.

Common Core Standards Initiative. (2012). *Common core state standards for English language arts and literacy in history/social studies, science, and technical subject*s. Washington, DC: National Governors Association.

Crain, S., & Thornton, R. (1998). *Investigations in universal grammar.* Cambridge, MA: MIT Press.

Cummins, J. (1989). A theoretical framework for bilingual special education. *Exceptional Children, 56*, 111-119.

Cummins, J. (2000). *Language, power and pedagogy: Bilingual children in the crossfire*. Clevedon, UK: Multilingual Matters.

Cummins, J. (2007). Rethinking monolingual instructional strategies in multilingual classrooms. *Canadian Journal of Applied Linguistics, 10*, 221-240.

Department of Education in England. (2014). *National curriculum in England: English programmes of study*. Retrieved from https://www.gov.uk/government/publications/national-curriculum-in-england-english-programmes-of-study/national-curriculum-in-england-english-programmes-of-study

Galambos, S.J., & Goldin-Meadow, S.G. (1990). The effect of learning two languages on levels of metalinguistic awareness. *Cognition, 34,* 1-56.

Gardner, E.F., Rudman, H., Karlsen, B., & Merwin, J.C. (1996). *Stanford writing assessment program* (3rd ed.). New York: The Psychological Corporation.

Gathercole, V. C. M., & Thomas, E. M. (2009). Bilingual first-language development: Dominant language takeover, threatened minority language take-up. *Bilingualism: Language and Cognition, 12*(2), 213-237.

Gombert, J. (1992). *Metalinguistic development*. Chicago, IL: University of Chicago Press.

Gottardo, A., Chiappe, P., Yan, B., Siegel, L., & Gu, Y. (2006). Relationships between first and second language phonological processing skills and reading in Chinese-English speakers living in English-speaking contexts. *Educational Psychology*, *26*(3), 367-393.

Hamers, J.F., & Blanc, M.H. (2000). *Bilinguality and bilingualism*. Cambridge, UK: Cambridge University Press.

Ho, C.S.H., & Bryant, P.E. (1997). Phonological skills are important in learning to read Chinese. *Developmental Psychology, 33*, 946-951.

Jongejan, W., Verhoeven, L., & Siegel, L.S. (2007). Predictors of reading and spelling abilities in first- and second-language learners. *Journal of Educational Psychology, 99*, 835-851.

Ku, Y-M., & Anderson, R.C. (2003). Development of morphological awareness in Chinese and English. *Reading and Writing: An Interdisciplinary Journal, 16*, 399-422.

Kuo, L-j., & Anderson, R.C. (2006). Morphological awareness and learning to read: A cross-language perspective. *Educational Psychologist, 41*, 161-180.

Kuo, L-j., & Anderson, R.C. (2008). Conceptual and methodological issues in comparing metalinguistic awareness across languages. In K. Koda & A. Zehler (Eds.), *Learning to read across languages* (pp. 39-67). New York: Routledge.

Lanauze, M., & Snow, C. (1989). The relation between first-and second-language writing skills: Evidence from Puerto Rican elementary school children in bilingual programs. *Linguistics and Education, 1*, 323-339.

Li, W., Anderson, R.C., Nagy, W., & Zhang, H. (2002). Facets of metalinguistic awareness that contribute to Chinese literacy. In W. Li, J. Gaffney, & J. Packard (Eds.), *Chinese children's reading acquisition: Theoretical and pedagogical issues* (pp. 87-106). London: Kluwer Academic Press.

Li, M., Kirby, J. R., Cheng, L., Wade-Woolley, L., & Qiang, H. (2012). Cognitive predictors of English reading achievement in Chinese English-immersion students. *Reading Psychology*, *33*(5), 423-447.

Li, T., McBride-Chang, C., Wong, A., & Shu, H. (2012). Longitudinal predictors of spelling and reading comprehension in Chinese as an L1 and English as an L2 in Hong Kong Chinese children. *Journal of Educational Psychology, 104*, 286-301.

McBride-Chang, C., Cheung, H., Chow, B.Y., Chow, C.L., & Choi, L. (2006). Metalinguistic skills and vocabulary knowledge in Chinese (L1) and English (L2). *Reading and Writing: An Interdisciplinary Journal, 19*, 695-716.

McBride-Chang, C., Cho, J.R., Liu, H., Wagner, R.K., Shu, H., Zhou, A., ... & Muse, A. (2005). Changing models across cultures: Associations of phonological awareness and morphological structure awareness with vocabulary and word recognition in second graders from Beijing, Hong Kong, Korea, and the United States. *Journal of Experimental Child Psychology, 92*, 140-164.

McBride-Chang, C., Shu, H., Zhou, A., Wat, C.P., & Wagner, R.K. (2003). Morphological awareness uniquely predicts young children's Chinese character recognition. *Journal of Educational Psychology, 95,* 743-751.

Formatted: Left

Formatted: Left

Myhill, D. (2011). 'The ordeal of deliberate choice': Metalinguistic development in secondary writers. In V. Berninger (Ed.), *Past, present and future contributions of cognitive writing research to cognitive psychology* (pp. 247-274). New York: Psychology Press.

Nagy, W.E., & Anderson. R.C. (1998) Metalinguistic awareness and literacy acquisition in different languages. In D. Wagner, R. Venezy, & B. Street (eds.), *Literacy: An international handbook* (pp. 155-60). Boulder, CO: Westview Press.

Nation, K., & Snowling, M.J. (2000). Factors influencing syntactic awareness skills in normal readers and poor comprehenders. *Applied Psycholinguistics, 21*, 229-241.

Pasquarella, A., Chen, X., Lam, K., Luo, Y.C., & Ramirez, G. (2011). Cross-language transfer of morphological awareness in Chinese–English bilinguals. *Journal of Research in Reading, 34*, 23-42.

Rego, L.L.B., & Bryant, P.E. (1993). The connection between phonological, syntactic and semantic skills and children's reading and spelling. *European Journal of Psychology of Education, 8*, 235-246.

Robertson, G.J. (2002). *Wide range achievement test* (Expanded edition). Odessa, FL: Psychological Assessment Resources.

Sasaki, M. (2004). A multiple data analysis of the 3.5 year development of EFL student writers. *Language Learning, 54*, 525-582.

Shu, H., Anderson, R.C., & Wu, N. (2000). Phonetic awareness: Knowledge of orthography–phonology relationships in the character acquisition of Chinese children. *Journal of Educational Psychology, 92*, 56-62.

Singaporean Ministry of Education. (2007). Chinese language (primary) syllabus. Singapore: Author.

Singaporean Ministry of Education. (2010). English language syllabus for primary and secondary schools. Singapore: Author.

Swanson, H.L., Rosston, K., Gerber, M., & Solari, E. (2008). Influence of oral language and phonological awareness on children's bilingual reading. *Journal of School Psychology, 46*, 413-429.

Tong, X., McBride-Chang, C., Shu, H., & Wong, A.M. (2009). Morphological awareness, orthographic knowledge, and spelling errors: Keys to understanding early Chinese literacy acquisition. *Scientific Studies of Reading, 13*, 426-452.

Tong, X., McBride-Chang, C., Wong, A.M., Shu, H., Reitsma, P., & Rispens, J. (2011). Longitudinal predictors of very early Chinese literacy acquisition. *Journal of Research in Reading, 34,* 315-332.

Wagner, R.K., Torgesen, J.K., & Rashotte. C.A. (1999). *Comprehensive test of phonological processing.* Austin, TX: Pro-Ed.

Wang, G.H., & Wang, S.D. (2013). Roles of metalinguistic awareness and academic extensive reading

in the development of EFL/ESL academic writing skills. *Journal of Arts and Humanities, 2*(9), 47-55.

Wang, M., Cheng, C.X., & Chen, S.W. (2006). Contribution of morphological awareness to Chinese-English biliteracy acquisition. *Journal of Educational Psychology, 98*, 542-553.

Warren-Leubecker, A., & Carter, B.W. (1988). Reading and growth in metalinguistic awareness: Relations to socioeconomic status and reading readiness skills. *Child Development, 59*, 728-742.

Wolfersberger, M. (2003). L1 to L2 writing process and strategy transfer: A look at lower proficiency writers. *The Electronic Journal for English as a Second Language, 7*(2), 1-12.

Wu, X., Anderson, R.C., Li, W., Shu, H., Jiang, W., Chen, X., Packard, J., & Gaffney, J.S. (2009). Morphological awareness and Chinese children's literacy development: An intervention study. *Scientific Studies in Reading, 13*, 26-52.

Yeong, S.H., Fletcher, J., & Bayliss, D.M. (2014). Importance of phonological and orthographic skills for English reading and spelling: A comparison of English monolingual and Mandarin-English bilingual children. *Journal of Educational Psychology, 106*, 1107-1121.

Yeung, P.S., Ho, C.S.H., Chan, D.W.O., & Chung, K.K.H. (2013). Modeling the relationships between cognitive-linguistic skills and writing in Chinese among elementary grades students. *Reading and Writing: An Interdisciplinary Journal, 26*, 1195-1221.

Yeung, P.S., Ho, C.S.H., Chik, P.P.M., Lo, L.Y., Luan, H., Chan, D.W.O., & Chung, K.K.H. (2011). Reading and spelling Chinese among beginning readers: What skills make a difference? *Scientific Studies of Reading, 15*, 285–313.

Yeung, P.S., Ho, C.S.H., Wong, Y.K., Chan, D.W.O., Chung, K.K.H., & Lo, L.Y. (2013). Longitudinal predictors of Chinese word reading and spelling among elementary grade students. *Applied Psycholinguistics, 34,* 1245-1277.

Zhang, J., Anderson, R.C., Li, H., Dong, Q., Wu, X., & Zhang, Y. (2010). Cross-language transfer of insight into the structure of compound words. *Reading and Writing: An Interdisciplinary Journal, 23*, 311-336.

Zhang, D., & Koda, K. (2011). Home literacy environment and word knowledge development: A study of young learners of Chinese as a heritage language. *Bilingual Research Journal, 34*(1), 4-18.

Formatted: Left