
# Literacy Development in Chinese as a Heritage Language

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*This chapter addresses biliteracy development among school-age Chinese Heritage Language (CHL) students. These children typically use Chinese (Mandarin or a related dialect) at home, receive primary literacy instruction in English at school, and pursue ancillary literacy in Chinese in a weekend school. As such, their primary literacy tends to build on underdeveloped oral proficiency, and secondary literacy reflects heavily restricted print input and experience. Hence, their literacy learning lacks sufficient linguistic resources in both languages. Despite these inadequacies, however, many children succeed in their primary literacy, and some even in heritage-language literacy. Based on theories of cross-language transfer, reading universals, and metalinguistic awareness, the chapter explores, through an integrative framework of biliteracy development, what additional resources may be available to these children, and how such resources might offset the limited linguistic support. The chapter also presents a brief summary of a preliminary study conducted as partial validation of the proposed model.*

Over the past half century, unprecedented numbers of children and youth have undergone schooling in languages other than their mother tongue. In order to succeed academically in school, these children must develop literacy skills in the societal language, in which they may or may not be proficient. Understanding how they develop reading skills is thus exceedingly important. Many of the children, moreover, pursue additional literacy in their mother tongue, a non-societal language, without adequate print input and experience. Their literacy learning thus involves more than one language, and occurs with restricted linguistic resources. As such, it adds further complexities to monolingual reading development among societal-language speakers learning to read in a single language. Despite its vital significance, however, little information is available regarding the challenge in literacy learning among school-age heritage-language learners.

In an effort to reduce this void, this chapter addresses issues surrounding biliteracy development through a systematic integration of theories in two major research fields: reading and second language acquisition. Specifically, it explores the development of morphological awareness and

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reading skills among school-age Chinese heritage language (CHL) learners. In this context, morphological awareness is operationally defined as the ability to identify, analyze, and manipulate morphological information in print. The significance of this ability lies in its capacity for assisting the learner in identifying the grammatical category of words, inferring meanings of unfamiliar words, and accessing stored lexical information. Hence, morphological awareness is directly, and possibly causally, related to reading development. Since the formation of this awareness necessitates both adequate oral language proficiency and print processing experience, the vital question is what happens to morphological awareness—and subsequently reading development—when neither is sufficient. In this regard, biliteracy development in CHL students offers a unique opportunity to isolate impacts of these factors on their morphological awareness. Inasmuch as these children use their mother tongue at home, receive primary literacy instruction in English at school, and pursue ancillary literacy in Chinese in a weekend school, their primary literacy builds on underdeveloped oral proficiency, and secondary literacy occurs with heavily restricted print input. Hence, inadequate linguistic resources characterize their literacy learning in both languages.

Of greatest moment, however, despite the inadequate linguistic support, many of the children succeed in their primary literacy, and some in both. Logic suggests that other resources must be available to these children, compensating for the insufficient linguistic resources. Second-language research has long recognized that previously established competencies transfer across languages in virtually all aspects of learning. This implies that when learning to read in two languages, reading acquisition in one language could be enhanced, through cross-language transfer, by resources available in another language. Systematic examinations of such resource sharing should yield significant insights into biliteracy development.

## Background

Reading is a complex, multi-dimensional construct involving a large number of sub-component operations, each demanding diverse processing skills. In second-language reading, the complexity increases exponentially, because virtually all operations involve two languages. To understand reading development in a second language, therefore, it is essential to clarify what the "dual-language involvement" means, and how it affects literacy learning in two languages. To address these critical issues, brief summaries of the relevant theories are useful. First, theory of language transfer is vital because it clarifies the mechanism of resource sharing across languages. The concept of reading universals is equally important, because it specifies the reading properties—and associated competencies—invariant across languages. Since the universally demanded competencies, when transferred, should provide substantial facilitation in any language, the theory establishes the basis for identifying the competencies shared across languages. Finally, morphological awareness is directly relevant to the current conceptualization because it plays a critical role in reading acquisition in all languages, and thus is a prime candidate for such resource sharing.

### Cross-language transfer

Transfer has long been a major theoretical concept in second-language research. Despite its centrality, there is little agreement as to what constitutes transfer, partially because of the constantly shifting views of second-language learning—what is learned and how it is learned. Traditionally, for example, transfer has been regarded as a learner's reliance on first-language knowledge to compensate for insufficient second-language knowledge. This belief implies that transfer tends to cease once second-language linguistic knowledge develops, and, more critically,

that after sufficient second-language knowledge is attained, first-language knowledge plays a minimum role in explaining individual differences in second-language learning.

Although, once influential, this view of transfer is no longer uniformly endorsed. In the Functionalist theory, as an illustration, language is viewed as a set of relations between forms and functions (Van Valin, 1991), and its acquisition is seen as the internalization of these relationships (MacWhinney & Bates, 1989). The language children are learning provides a solid basis for building representations, abstracting patterns, and linking particular forms with their corresponding functions. Under these premises, second-language learning is conceptualized as the process of establishing an additional set of form-function relationships in a new language. In this view, consequently, what transfers is not static transformational rules, as traditionally conceived, but rather, the internalized form-function relationships which have evolved gradually through input processing experience.

Similarly, in second-language reading, a clear consensus as to what actually transfers has yet to emerge, in part because of the polarized views of reading. One faction perceives reading as an indivisible whole, while the other considers it as a constellation of separate components. Proponents of the holistic view posit that since language is acquired as a whole through communication, and communicative use of language is intrinsic in reading, reading is also learned holistically as a meaning-making process (Goodman, 1967, 1969). They contend, moreover, that the ultimate goal of reading is meaning construction, regardless of language, and therefore, there should be little difference in the reading process across languages. The early transfer research, taking this view, focused on two primary issues: the interrelationship between first- and second-language reading abilities (e.g., Cummins, 1979, 1991; Cummins et al., 1981; Legaretta, 1979; Skutnabb-Kangas & Toukomaa, 1976; Troike, 1978) and the conditions that either inhibit or facilitate reading skill transfer from the first to the second language (e.g., Clarke, 1988; Devine, 1987, 1988). By defining reading as a single, unitary construct, these early transfer studies generally disregarded the component skills involved in underlying efficient print information processing. As a result, little attention is given to what precisely is transferred from one language to another, and how the transferred skills contribute to second-language reading development.

In more recent studies, however, reading is seen as a constellation of closely related, yet separate, mental operations—each necessitating a unique set of sub-skills (e.g., Carr & Levy, 1990). Since this view incorporates multiple skills, it allows the tracing of possible relationships between corresponding skills in the two languages involved, as well as functional interconnections among different skills both within and across languages. Biliteracy studies consistently indicate that phonological skills are closely connected between two alphabetic languages (e.g., Abu-Rabia, 1995; Da Fontoura & Siegel, 1995;Durgunoglu, Nagy, & Hancin, 1993; Gholamain & Geva, 1999). a similar cross-linguistic relationship also has been reported in studies involving two typologically unrelated languages, Chinese and English (Bialystok, McBride-Chang, & Luk, 2005; Wang, Perfetti, & Liu, 2005). Although the scope of these studies has been limited, focusing almost exclusively on decoding skills, the approach holds strong promise for examining inter-lingual connections in a variety of component skills and their relation to second-language reading development.

**Reading universals**

For a theory of transfer to inform biliteracy development, it must clarify how prior literacy experience affects second-language learning to read. Such clarification is only possible through systematic comparisons of literacy experiences across languages. The notion of reading universals is

vital in this regard because it specifies the learning-to-read requisites imposed on all learners in all languages.

According to the universal grammar of reading proposed by Perfetti and associates (Perfetti, 2003; Perfetti & Dunlap, in press; Perfetti & Liu, 2005), reading is a dynamic pursuit embedded in two interrelated systems: a language and the writing system that represents the language. Inevitably, learning to read requires a linkage of the two, which entails the acquisition of skills to map between spoken language elements and graphic symbols (e.g., Fowler & Liberman, 1995; Goswami & Bryant, 1992; Nagy & Anderson, 1999). In learning to read, therefore, children must first recognize which language elements are encoded in the writing system (the general mapping principle), and then, deduce precisely how these elements are encoded (the mapping details). For example, children learning to read English must understand that each letter represents a distinct sound (the alphabetic principle), and then, gradually work out the details of sound-symbol correspondences (the mapping details).

To successfully grasp general mapping principles, children must gain several basic insights that (a) print relates to speech; that (b) speech can be segmented into a sequence of sounds; and most critically, that (c) these segmented sounds systematically relate to the graphic symbols in the writing system. Since these insights do not involve language-specific details, once developed in one language, they should be readily available in another language. This, however, is not necessarily the case for mapping details, because their acquisition requires substantial print input and experience in the language in which literacy is learned. The acquired mapping details, therefore, should differ systematically in diverse languages to the extent that sound-symbol, as well as morpheme-symbol, relationships vary. What is common across languages in this task lies only in the task itself. This, in turn, implies that prior literacy experience fosters an explicit understanding of what is to be accomplished in the task, and this, in turn, may expedite the process by allowing learners to be more reflective and strategic.

The clear implication is that biliteracy development entails repeated processes to the extent that the literacy experiences in the two languages are similar. Such similarities should allow bilingual learners to usefully exploit the resources accumulated through prior literacy experience, thereby facilitating reading development in an additional language. Thus, in essence, the concept of reading universals, properly incorporated, significantly contributes to theories of biliteracy development.

**Roles of morphological awareness in learning to read**

Morphological awareness refers to the ability to analyze a word's morphological structure. In learning to read, as noted above, children must understand how language elements are encoded in the writing system. Morphological awareness contributes to this process by enabling children to segment words into their morphological constituents. Beyond the initial stage of learning, moreover, morphological awareness also plays a prominent role in reading. To illustrate, it promotes analytical approaches to word learning and processing in context (Bialystok, 2001; Carlisle, 2003; Koda, 2000, 2002, 2005; Ku & Anderson, 2003). Since concept of word segmentation bolsters the capacity for identifying familiar elements in an unfamiliar word, the awareness allows children to extract partial information from familiar components. Without this competence, lexical inference is seriously hampered, and word learning becomes excessively challenging. Further, lacking lexical inference ability, reading comprehension is also acutely handicapped.

Morphological awareness is a multi-faceted construct, consisting of a range of capabilities reflecting the properties of morpheme functions and structures in a particular language. For

example, in English, word formation generally entails the addition of affixes—either before or after base morphemes—in reasonably systematic and linear fashion. In contrast, the basic unit of character formation in Chinese is radicals, which refer to recurrent stroke patterns (e.g., Chen, Allport, & Marshall, 1996; Shu & Anderson, 1997). In forming characters, moreover, radicals are combined through procedures markedly different from those used in English. For example, the most dominant formation type, phonetic-semantic compounding, involves a non-linear integration of two radicals, to which a distinct function—providing phonetic or semantic information—is assigned. Thus, in short, the basic principles of word formation vary considerably across languages. It follows then that children learning to read two typologically different languages must develop distinct morphological awareness closely attuned to the grapheme-morpheme relations in each language.

**Framework for cross-language resource sharing**

Previous studies have yielded a number of significant insights directly relevant to cross-language resource sharing and its potential role in learning to read in additional languages. Listed below are the critical contentions drawn from the theories described above. They serve as the fundamental premises underlying the current framework within which the specific contributions generated by transferred competencies in biliteracy development are systematically conceptualized.

- Reading is embedded in two interrelated systems: a language and its writing system. Therefore, learning to read inevitably requires all learners in all languages to make links between the two.
- Through its capacity for enabling children to analyze a word's internal structure, morphological awareness underlies the requisite linkage building.
- The awareness is a multi-faceted construct, involving a number of capabilities differentially reflecting the morpheme properties of a particular language.
- The acquisition of the awareness facets closely attuned to the detailed, language-specific, properties necessitates substantial print input and processing experience.
- Once developed, morphological awareness, and other literacy-related, competences transfer across languages.

Under these premises, the current framework gives rise to three specific hypotheses regarding the role of resource sharing via transfer in reading development in Chinese as a heritage language. First, the fundamental awareness facets—such as the concept of word segmentation, as well as recognition of the basic structural regularities—do not entail details of language-specific properties. In principle, therefore, they can develop quickly and serve as a basis for forming more refined facets both within and across languages. It can be hypothesized, therefore, that CHL students develop a basic understanding of the major structural properties of morphemes (radicals) even with heavily restricted input.

Second, the concept of word segmentation and other fundamental awareness facets alone, however, are insufficient for the formation of more refined awareness, because the formation of the latter, language-specific, facets necessitates substantial print input and processing experience. In the absence of adequate input, morphological awareness in Chinese among CHL student is likely to remain fundamental. Lacking the awareness facets closely attuned to the detailed functional properties of Chinese radicals, their awareness is of little use in reading comprehension. Consequently, it can also be hypothesized that Chinese reading skills develop independent of morphological awareness.

Lastly, once successfully acquired, reading skills in primary literacy in English should be available—through reverse transfer—to compensate for less-developed reading skills in Chinese. Since comprehension skills develop gradually throughout the primary-school years, older students generally possess not only a greater number of transfer-ready skills, but also more higher-order skills, than younger cohorts. Thus, a third and final hypothesis is that Chinese reading comprehension skills among older CHL students are qualitatively different from those among younger students.

## The study

The hypotheses presented above were partially tested in an exploratory study, comparing morphological awareness and reading comprehension sub-skills among Grades 3–5 CHL students. The following three research questions guided the study.

1. Do different facets of morphological awareness among school-age CHL students increase over time?
2. Do different reading comprehension sub-skills among CHL students increase over time?
3. Does morphological awareness affect reading sub-skills development in Chinese as a heritage language?

Fifty-nine CHL students from a weekend Chinese School in the Greater Pittsburgh area participated in the study. These children attended Grade 3 to 5 English-medium classes in local public schools during the week, and Grade 3 to 5 Chinese language classes in the weekend School. Two sets of paper-and-pen tests, designed to measure disparate facets of morphological awareness and distinct reading comprehension sub-skills, were administered in class as part of instructional activities. The specific tasks and the construct each task was purported to measure are listed below.

### Morphological awareness tasks

Five multiple-choice tasks were adopted from Li et al.'s 2002 study with slight modifications.

1. **Radical meaning** measured children's understanding that the meaning of the whole character can be inferred based on the information provided by its semantic radical. The task was presented as a two-character Chinese word, in which the target character was given in Pinyin. It required students to choose an appropriate character from four phonetic-semantic compound characters which share the same phonetic radical, to substitute the Pinyin, and thus form a meaningful word.
2. **Morpheme discrimination** checked the awareness that some Chinese compound words containing the same character do not necessarily share the same meaning. The task presented four two-character words with one character in common. Students were required to select the word with the different meaning.
3. **Radical form** assessed students' discernment of how the meaning of a Chinese character relates to the meanings of its semantic radical. Students were required to identify the semantic radical in a series of semantic-phonetic compound characters.
4. **Radical formation task** tested sensitivity to the structural constraints on radical combinations in forming compound characters. In this task, students were presented with four different placements of two graphic components as the radicals of a compound character, and asked to select the most legitimate placement of the four.

5. **Radical explanation** evaluated students' understanding of subtle changes in meaning when a single-unit character is uses as a radical.

**Reading comprehension tasks**

The reading comprehension test comprised eight grade-appropriate (both lexically and syntactically) passages adapted from children's story books in Mainland China. Each passage was approximately 400 characters in length. After reading each passage, students were asked to answer five multiple-choice comprehension questions, each of which was designed to measure a specific comprehension sub-skill.

1. **Vocabulary choice** measured the ability to identify a context-appropriate, two-character compound word. The task required students to select one word from a pool of four two-character words, sharing one character in common, to fill in the blank in the reading passage.
2. **Lexical inference** assessed the ability to infer the meaning of a word using contextual information. In the task, students were required to select the best sentence, out of four possibilities, describing the target word.
3. **Co-referential resolution** evaluated the ability to identify the referent of a pronoun across sentences.
4. **Text-based inference** measured the ability to infer an unstated text segment based on the information presented in the text.
5. **Gist detection** probed the ability to grasp the main idea of the passage.

**Development of morphological awareness**

Morphological awareness sub-test scores are presented in Table 1. The data demonstrated that CHL students performed well above the chance level (25%) on all tasks but one (radical explanation), showing no signs of random performance. Hence, despite the heavily restricted print input, seemingly, it appears that CHL students are sensitized to the basic properties of semantic radicals by the time they reach the third grade. The data also showed that response accuracy varied widely across tasks, ranging from 24% to 89%. Of the five tasks, the highest accuracy rates occurred in radical formation, designed to measure students' understanding of physical placement of the radicals in compound characters. Accuracy rates declined considerably in the tasks requiring semantic analysis of character components (radical meaning, morpheme discrimination, and radical form), and the lowest scores were found in radical explanation—the task assessing sensitivity to subtle changes in meaning when a single-unit character is used as a semantic radical. These findings clearly suggest that diverse awareness facets mature at disparate rates. Specifically, sensitivity to radicals' structural properties appears to develop more rapidly than recognition of their functional properties.

Importantly, however, the data also demonstrated that virtually no difference existed in morphological awareness among the three grade groups. The finding is astonishing because first-language studies consistently suggest that major growth of morphological awareness occurs between Grades 2 and 6 among native English-speaking children (Carlisle, 2003; Ku & Anderson, 2003), as well as their Chinese counterparts (Shu & Anderson, 1999; Ku & Anderson, 2003). The present findings thus suggest that although CHL students are successful in acquiring the basic awareness facets with heavily limited character input, they seem unable to fine-tune those facets to accommodate details of their grapho-morphological properties. Consequently, their morphological awareness appears to remain basic throughout the school years.

**Table 1. Means and standard deviations (in parentheses) of the morphological awareness sub-test scores (% correct)**

| facet | overall (N=59) | grade 3 (N=23) | grade 4 (N=20) | grade 5 (N=16) |
|---|---|---|---|---|
| radical meaning | .46(.21) | .52(.16) | .44(.20) | .43(.26) |
| morpheme discrimination | .41(.21) | .46(.22) | .40(.22) | .37(.19) |
| radical formation task | .88(.12) | .88(.12) | .86(.12) | .89(.12) |
| radical form | .55(.21) | .59(.17) | .49(.19) | .56(.26) |
| radical explanation | .25(.15) | .24(.17) | .24(.13) | .28(.15) |

### Development of reading comprehension sub-skills

Reading comprehension sub-skill scores are listed in Table 2. Unlike morphological awareness, clear differences existed in comprehension performance across grade levels. Grade 5 students outperformed the younger cohorts on all five sub-skills. However, performance of Grades 3 and 4 students did not differ in any of the tasks with one major exception (coreference). Performance variations were also observable across tasks. Students in all grades scored higher on gist detection. This finding was unexpected because gist detection is supposedly more demanding than the vocabulary and coreference questions, because it was purported to assess the ability to integrate locally constructed meanings (phrases and sentences). Post-hoc analyses revealed, however, that the gist questions may have inadvertently induced a much simpler operation, that is, identifying the passage topic by locating a key word or a sentence introducing the passage topic. Even so, the mean accuracy rate of the gist questions was 39%, pointing up the serious challenge CHL students face in reading Chinese passages for comprehension.

**Table 2. Means and standard deviations (in parentheses) of the reading comprehension sub-test scores (% correct)**

| facet | overall (N=59) | grade 3 (N=26) | grade 4 (N=17) | grade 5 (N=16) |
|---|---|---|---|---|
| vocabulary | .36 (16) | .34 (15) | .29 (09) | .45 (25) |
| coreference | .44 (25) | .29 (22) | .46 (24) | .57 (28) |
| lexical inference | .33 (18) | .29 (15) | .27 (16) | .42 (24) |
| text inference | .33 (22) | .30 (19) | .24 (18) | .46 (28) |
| gist | .39 (24) | .35 (22) | .32 (21) | .49 (30) |
| total | .37 (21) | .31 (19) | .32 (18) | .48 (27) |

Table 3 presents correlations between morphological awareness and reading comprehension. As predicted, no systematic relationship existed between the two constructs in the Grades 4 and 5 data, implying that reading skills among CHL learners develop independently of morphological awareness. Interestingly, however, the correlation was significant in the Grade 3 data. Given the small sample size, it is unclear as to what the discrepant correlational patterns really mean. Clearly, further studies are needed to disentangle the conflicting information regarding the functional connection between reading comprehension sub-skills and morphological awareness.

In view of the minimum variation in morphological awareness among the three grade groups, as well as no systematic relationship between morphological awareness and reading comprehension, it is highly unlikely that the stronger comprehension performance among Grade 5 students is

attributable to their morphological awareness or other component skills in Chinese. Further, the acquisition of comprehension sub-skills measured in the study requires substantial text processing experience. Yet, the majority of participants indicated that they rarely read Chinese books outside of Chinese classes, again implying that the improved comprehension among Grade 5 students does not stem from Chinese literacy experience. What, then, is responsible for their improved comprehension sub-skills? It seems reasonable to suggest that their performance gains may be attributable to more solidly-established reading skills in English. Without data on the students' English literacy, the conjecture, howsoever plausible, cannot be substantiated. Because of their potential utility, this and other related speculations should be tested empirically in future studies.

**Table 3. Correlations among morphological awareness and reading comprehension**

| | reading comprehension | | |
|---|---|---|---|
| | grade 3 (N=23) | grade 4 (N=17) | grade 5 (N=14) |
| **morphological awareness** | .49* | .01 | .22 |

* $p<.05$

### Implications for theory of biliteracy development

Several important implications can be drawn from the results of the study. First, heritage learners' performance on the morphological awareness tasks—non-random but varied—indicates that they are sensitized to the basic formation regularities in Chinese characters, but not to detailed functional properties of radicals. Hence, it seems reasonable to suggest that although the basic awareness facets develop rapidly even with heavily limited print input and experience, these facets remain basic throughout the school years, without evolving into more refined understanding of language-specific properties. Since it is the latter facets that promote character knowledge expansion and reading comprehension, future research should focus on the factors affecting their acquisition.

Second, given that even Grade 3 students are capable of detecting and using characters' structural regularities, it also seems likely that CHL learners benefit greatly from explicit instruction on the functional and distributional properties of radicals. Moreover, it will be extremely beneficial to determine to what extent such metalinguistic training compensates for heavily limited character input and exposure in character knowledge development among CHL learners.

Third, the study revealed that reading comprehension performance among Grade 5 students was considerably stronger than that among younger cohorts. CHL students, moreover, scored higher on the questions addressing global comprehension than those requiring in-depth analysis of local information. These patterns of performance clearly suggest the involvement of non-language-specific factors—presumably unaffected by limited print exposure and experience—in heritage literacy learning. It is highly plausible that primary literacy in English may have contributed to the attainment of global comprehension sub-skills particularly among Grade 5 students. Undoubtedly, systematic examinations of cross-linguistic relationships in comprehension sub-skills will shed substantial light on biliteracy theory and practice.

In short, literacy learning in a heritage language differs from that in the first language in that it occurs with heavily restricted print exposure and experience. It is also distinct from that in a second language because it typically builds on adequately developed oral language competence. Hence, their literacy learning experiences offer a unique opportunity to dissect the specific

contributions stemming from the two dominant factors—oral language proficiency and print experience—both regarded as critical for reading acquisition. Systematic explorations of literacy development of heritage language learners will likely offer significant new insights into the critical intersection between language development and literacy learning.

**Implications for literacy instruction for heritage language learners**

Weekend-school programs can play a crucial role in encouraging heritage language learners to develop literacy skills in their heritage languages (Cummins, 2005). Our study findings suggest that weekend heritage language schools can provide a metalinguistic foundation necessary for literacy development in the language. It has been reported that metalinguistic foundation building is closely associated with formal schooling experience (Park, 2004). The study has shown that weekend heritage language schools can also serve this function.

In addition, the findings further indicate that the limited print input inhibits CHL students from fine-tuning their basic awareness facets. Although more research-based information is needed to determine any specific recommendations for instructional interventions, the present findings point up three fundamental principles, which, properly incorporated, could substantially improve the effectiveness of literacy instruction: (a) promoting children's ability to detect the structural and functional regularities in characters; (b) ensuring early mastery of the basic characters—those serving as radicals in compound characters; and (c) engaging children in semantic information extraction from characters and radicals in print.

## Summary and conclusions

This study explored the development of morphological awareness and reading comprehension sub-skills among Grade 3–5 CHL students. Three findings are particularly illuminating. First, CHL students performed well above the chance level on the tasks designed to measure disparate facets of morphological awareness, suggesting that they have become sensitized to the basic properties of Chinese morphemes (radicals) even with heavily restricted input. Second, no systematic increment occurred in morphological awareness across grade levels. With limited print input and exposure, however, morphological awareness among CHL student appears to remain fundamental. Lacking the awareness facets closely attuned to the language-specific morphological properties, seemingly, their awareness is of little use in reading comprehension. The generally weak correlation between morphological awareness and reading comprehension seems to suggest their developmental dissociation. Finally, as predicted, reading comprehension in Chinese is significantly better among older, than younger, students. Given that (a) there were virtually no increment in morphological awareness; (b) no systematic connection between morphological awareness and reading comprehension, and (c) the comprehension gains were observed only among Grade 5 students, it seems reasonable to attribute the superior performance of older learners to more firmly established reading skills in English, which become available through reverse transfer. Taken together, these findings suggest a strong possibility that literacy in an additional language can be facilitated by metalinguistic and other related competencies developed through prior literacy learning. Given its potential impacts on biliteracy theory construction, cross-language resource sharing should be more directly addressed in future studies.

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