Phonological awareness (PA) in Chinese-English bilingual word decoding (reading)

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Abstract. *Phonological awareness is one of core reading requisites in early reading acquisition. Children develop initial phonemic awareness and phonological awareness, which in turn contribute to their learning-to-read skills, word reading and decoding abilities in particular. This review study synthesized the relationship between phonological awareness and word reading ability in monolingual and Chinese-English bilingual readers to shed light on the universal and language-specific mechanisms of phonological awareness in word reading in two typologically-distant languages. The findings indicate that phonological awareness has different grain sizes (e.g., onset, rime, phoneme, and syllable) in shaping early reading acquisition. More important, the current study highlights the uniqueness of universality and language specificity in Chinese-English bilingual reading acquisition. In addition to general phonological awareness facets, lexical tone awareness has been endorsed as a key predictor of early Chinese-English bilingual word reading*.

Keywords: *Phonological awareness, Bilinguals, Word reading.*

1. Introduction

Phonological awareness refers to a language-universal construct (Ziegler & Goswami, 2005) developed from larger grain sizes like syllables to smaller grain sizes like phonemes. Recent research has shown that phonological awareness can be categorized into two subcomponents: universal phonological awareness and language-specific phonological awareness (Zhang & Lin, 2021).

Universal phonological awareness can be decomposed at different grain sizes such as syllable, onset, rime, and phoneme. Syllable refers to a part of a word that contains a single vowel sound and that is pronounced as a unit. Under the syllable structure, onset is the part of the syllable that precedes the vowel of the syllable whereas rime is the part of a syllable which consists of its vowel and any consonant sounds that come after it. A phoneme is the smallest unit that contrasts meanings in the sound system of a language.

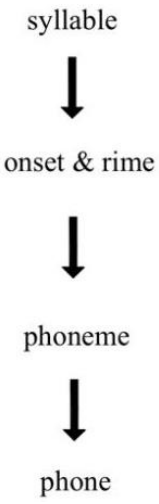


Figure 1. Grain sizes of phonology

On the other hand, language-specific phonological awareness includes suprasegmental lexical prosody and intonation and stress. Segmental features include only vowels and consonants while suprasegmental features include stress and intonation. In Chinese, its language-specific prosody that is lexical specific is a suprasegmental feature: the tone. Tone refers to a pitch element or register

added to a syllable to convey grammatical or lexical information. For example, in Chinese, different tones on rime can cause differences in meaning. “(ma)” “(ma)” “(ma)” “(ma)”all have the same syllable /ma/, yet they differ in meaning and orthography. This is different to English since the intonation or stress is the English prosody. Intonation is the system of levels (rising and falling) and variations in pitch sequences within the speech. Intonation in English, refers to the rise and fall of speech, which could lead to a change of meaning by changing a declarative sentence into a question. Stress, on the other hand, is placed on syllables and can cause changes in the meaning of a word. For example, the word “record” has two ways of pronunciations that differ in stress and result in different meanings.

2. Review of Synthesized Studies

2.1. The Relationship between PA and Monolingual Word Reading

Prior psycholinguistic research has endorsed the relationship between phonological awareness and monolingual word decoding and spelling (Kargiotidis, Mouzaki, Kagiampaki, Marinakis, Vervelaki, Boufachrentin, & Manolitsis, 2022; Ehm, Schmitterer, Nagler, & Lervåg, 2023; Melby-Lervåg, Lyster, & Hulme, 2012; Siok & Tan, 2022). Crosslinguistic findings on Greek, German, English and Chinese word reading were presented as follows.

Kargiotidis, Mouzaki, Kagiampaki, Marinakis, Vervelaki, Boufachrentin, and Manolitsis (2022) examined the nature of both direct and indirect impacts of vocabulary, phonological awareness and morphological awareness on early reading skills in Greek orthography. Greek is a transparent language, meaning that it has a one-on-one relationship between its graphemes and phonemes.

Researchers conducted this investigation by examining a model of early reading development in a sample of 141 first-grade children. Vocabulary, phonological awareness and morphological awareness were assessed in the middle of grade 1, while word reading accuracy and fluency, and reading comprehension skills were measured at the end of the same grade. Statistics from structural equation modeling demonstrated that phonological awareness directly predicted word reading accuracy, which mediated the effects of phonological awareness on reading comprehension and word reading fluency. In addition, phonological awareness indirectly mediated the relationship between morphological awareness and word reading accuracy. The results of this research highlighted the direct and indirect contributions of phonological awareness to word reading among Greek first-grade students.

Another research studied how curvilinear (quadratic) effects impact the current understanding of reading development in German (Ehm, Schmitterer, Nagler, Lervåg2023). This investigation followed a sample of 525 German-speaking children for a 5-year period from kindergarten to fourth grade. Three key elements: phonological awareness (PA), letter knowledge (LK), rapid naming (RAN) and language skills (LS) were assessed in kindergarten whereas reading comprehension and decoding were examined in elementary school. Analysis was based on latent growth models with curvilinear effects. The results indicated that PA and LK are important for early reading. Language skills and decoding. Along with the interaction between PA and LK, results also explained variations in reading comprehension skills. A curvilinear effect was found for decoding on reading comprehension growth exclusively. The findings corroborated the predictive effect of phonological awareness on word reading development and further verified the curvilinear effect of decoding on later comprehension development. That is, phonological awareness as well as letter knowledge are the prerequisites shaping early reading skills across time among German children.

The third study investigated the relationship between children’s reading skills and three main measures of phonological skills, including phonemic awareness, rime awareness, and verbal short-term memory. (Melby-Lervåg, Lyster, & Hulme, 2012) This meta-analysis compiled 235 studies and computed 995 effect sizes among the studies. In particular, the development of reading skills of children with dyslexia is studied. 88 independent comparisons on phonemic awareness between children with dyslexia and the control group were made. The studies incorporated a sample of 2,652

children with dyslexia and 3,163 control children. The results showed that children with dyslexia performed poorer on phonemic awareness than the age-matched control group, which indicated the close relationship between phonemic awareness and decoding ability. It is also worth mentioning that in the unselected samples, phonemic awareness was found to be the strongest correlate of decoding ability above and beyond verbal short-term memory and rime awareness.

The last research studied whether a cognitive deficit or phonological deficit is a determinate condition for reading disability in Chinese (Siok & Tan, 2022). To test if this condition is required, researchers examined the cognitive profiles of 521 good readers and 502 dyslexic readers in Chinese primary schools. Dyslexia is a learning difficulty that primarily affects the skills involved in accurate and fluent word reading and spelling (Snowling, Hulme, & Nation, 2020). The researchers then used several behavioral measures which include phonological, visual, orthographic, visual-motor coordination and working memory skills. The results demonstrated that among all cognitive measures, phonological skills correlated more strongly with character reading performance but that poor phonological skills were not necessarily associated with poor decoding in Chinese.

2.2. Universality and Specificity of PA in Chinese-English Bilingual Word Decoding

In this section, the relationship between phonological awareness and Chinese-English bilingual word decoding and spelling is discussed more specifically. Through all investigations discussed, it is observed that Chinese and English phonological skills both have aids in the reading of each other.

Studies have shown that there are shared phonological and morphological processes in bilingual reading acquisition. According to the research (Wang, Yang, Cheng 2009) that examined the contributions of phonology, orthography, and morphology to biliteracy acquisition in a sample of 78 Grade 1 Chinese–English bilingual children, it was observed that crosslinguistic phonological and morphological transfer occurred when acquiring two different writing systems. The Chinese onset awareness significantly contributes to the variance in English pseudoword reading.

Similarly, according to a study (Wang, Perfetti, Liu, 2005) examining the crosslinguistic relationship in the bilingual acquisition of Chinese and English reading, Chinese onset matching skill was highly correlated with English onset and rime matching skills. The investigation selected a sample of forty-six Mandarin-speaking children and examined their first language (L1) Chinese and second language (L2) English reading skills. An alphabetic phonetic system named pinyin is used to assist children while learning to read Chinese characters. It is highly correlated with English pseudoword reading. Furthermore, Chinese tone processing skills contributed a moderate but significant amount of variance in English pseudoword reading.

Another study (Deng, Choi, Tong 2019) examined the roles of L1 Chinese and L2 English phonological skills in English and Chinese reading comprehension, respectively, and their association with reading comprehension difficulties among Hong Kong Chinese-English bilingual children. In this study, a sample of 258 2nd graders was selected and tested on nonverbal intelligence, working memory, phonological skills, word reading, and reading comprehension, in both Chinese and English. Poor readers in both Chinese and English had low levels of lexical tone awareness. Nevertheless, poor Chinese readers performed much better than poor English readers, long with poor readers in both languages on Chinese segmental phonological awareness. The performance of poor Chinese readers performance was comparable to those of readers without reading difficulties.

Other investigations demonstrated that language-specific phonological awareness, especially tone awareness in Chinese, affects word decoding. Wang, Liu, Chung, and Yang (2017) studied how lexical tone awareness develops among Chinese-speaking children with and without dyslexia. A sample of two hundred and seventy children was selected. Among them, ninety children with age equally dispersed in second, fourth, and sixth grades had dyslexia. Two control groups with ninety students each were selected, functioned as age chronical control group and reading-level control group respectively. They were tested on nonverbal intelligence, Chinese character reading, cognitive-linguistic skills, and lexical tone awareness. Statistics proved that the lexical tone awareness of children could be used to discern children with and without dyslexia from any stage in elementary

school. Results also showed that after training, second-grade students with dyslexia improved significantly in lexical tone awareness and character naming, while fourth graders just showed substantial improvement in lexical tone awareness.

Also, a longitudinal investigation on how lexical tone sensitivity of Cantonese helps predict English reading comprehension (Choi, Tong, Cain, 2016) further demonstrated language specificity in PA and its influences. This research used a sample of 133 second-grade students who are unbalanced bilingual in Cantonese and English. They were tested on several measures of Cantonese lexical tone sensitivity, English lexical stress sensitivity, Cantonese segmental phonological awareness, general auditory sensitivity, English word reading, and English reading comprehension. The modeling results showed a transfer from lexical tone sensitivity in Cantonese to reading comprehension of English directly through stress sensitivity in English and indirectly through English word reading.

3. Conclusion

In general, this paper presents an overview on phonological awareness (PA) in Chinese-English bilingual word decoding (reading). Beginning by providing definitions of phonological awareness and listing its components, this paper introduces the essential concepts of this review. It then analyzes the relationship between phonological awareness and monolingual word decoding by discussing the research methodology and results of research based on Greek, German, English, and Chinese. The universality and specificity of phonological awareness in Chinese-English bilingual word decoding are also analyzed. Through discussion of multiple investigations, how universality and language specificity each influences word decoding. It is demonstrated that Chinese tone awareness has profound influences on word decoding in both Chinese and English.

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