

Phonological Activation in Chinese Reading: A Repetition Blindness Study

Hui-wen Cheng

Catherine Caldwell-Harris

Boston University

Whether phonological information is activated in Chinese reading has been a controversial issue. Because Chinese orthography does not contain explicit sound-symbol correspondence, there was an early assumption that reading Chinese is solely meaning-based. This view was refuted by studies of Perfetti and his colleagues, who showed that phonological activation appears at the early stage of Chinese visual word recognition (e.g., Perfetti & Tan, 1998; Perfetti & Zhang, 1991, 1995). However, other researchers found that phonology plays no role or a less important role in Chinese reading (e.g., Chen, Flores d'Arcais, & Cheung, 1995; Shen & Forster, 1999).

We hypothesize that a) phonological activation occurs in reading Chinese, but b) the activation is weaker when reading Chinese than when reading alphabetic orthographies like English. Chinese is a morphosyllabic orthography in which each character represents not only a morpheme but also a syllable (DeFrancis, 1989). Phonological information thus would be activated when reading Chinese. However, according to the Orthographic Depth Hypothesis, the more consistently and transparently phonology is encoded in an orthography, the stronger phonological information the orthography activates (Katz & Frost, 1992). Since Chinese encodes phonology in a less consistent and transparent way than alphabetic orthographies, it would activate weaker phonological information than alphabetic orthographies.

The repetition blindness (RB) paradigm was employed to test our hypothesis. RB is the failure of conscious perception when repeated or similar items are displayed in rapid sequence, caused by a resource limitation during early visual processing. Not all items can be stabilized in working memory, and those that are similar to a prior item are at the greatest disadvantage in accessing resource-limited conscious perception. According to our hypothesis, we expect to find a weaker phonological RB effect in reading Chinese than in reading English.

A total of 93 native Chinese speakers and 40 native English speakers viewed series of four single words displayed on a computer screen in their native language. Each word stayed on the screen for 112 ms. Word 1 served as a prime, Word 3 was a target, and Word 2 and 4 were fillers. Each target (e.g., *half*) was matched with four prime words: a semantic prime (e.g., *partial*), a phonological prime (e.g., *laugh*), an identical repetition (e.g., *half*), and an unrelated prime (e.g., *queen*). Four material sets were constructed so that participants saw each target only once. Participants immediately orally reported all words they saw after each trial.

Results supported our hypothesis. Although identity RB and phonological RB occurred for both English and Chinese readers (all $ps < .001$), the amount of phonological RB was twice as great for English (20% reduction in accuracy of reporting targets in the phonological condition compared to the unrelated condition) as it was for Chinese (10% reduction in accuracy). We conclude that phonological activation occurs in Chinese reading, but is reduced in strength compared to English reading.

References

- Chen, H. C., Flores d'Arcais, G. B., & Cheung, S. L. (1995). Orthographic and phonological activation in recognizing Chinese characters. *Psychological Research*, 58, 144-153.
- DeFrancis, J. (1989). *Visible speech: The diverse oneness of writing systems*. Honolulu: University of Hawaii Press.
- Katz, L., & Frost, R. (1992). Reading in different orthographies: the Orthographic Depth Hypothesis. In R. Frost & L. Katz (Eds.), *Orthography, phonology, morphology, and meaning. Advances in Psychology*, pp. 67-84. Amsterdam: Elsevier.
- Perfetti, C. A., & Tan, L. H. (1998). The time course of graphic, phonological, and semantic activation in Chinese character identification. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 24, 101-118.
- Perfetti, C. A., & Zhang, S. (1991). Phonological processes in reading Chinese characters. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 17, 633-643.
- Perfetti, C. A., & Zhang, S. (1995). Very early phonological activation in Chinese reading. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 21, 24-33.
- Shen, D., & Forster, K. I. (1999). Masked phonological priming in reading Chinese words depends on the task. *Language and Cognitive Processes*, 14, 429-459.