

When Semantics Overrides Phonology: Semantic Substitution Errors in Reading Chinese Aloud

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It is well known that alphabetic orthographies encode phonology in a more transparent way than morphosyllabic orthographies such as Chinese. Only about 25% of Chinese characters contain reliable cues to word pronunciation. Nevertheless, Perfetti and his colleagues (e.g., Perfetti & Tan, 1998) maintain that lexical access in reading Chinese characters involves strong phonological activation, maybe as strong as in alphabetic languages, supporting the position that the reading system configures itself similarly despite differences in the writing system. However, the degree to which alphabetic reading and morphosyllabic reading differ in activating semantic versus phonological information has proven to be controversial and is poorly understood. This study reports a new finding that sheds light on this issue.

Semantic substitution (e.g., reading *shout* if the word is *yell*) is a defining characteristic of deep dyslexia, and is rarely observed for normal readers (Coltheart, 1980). Surprisingly, when reading passages with 3 levels of difficulty aloud, almost all (72 out of 79) Chinese readers made errors such as substituting *wen* “to ask” with *shuo* “to say”. When compared to an English group, Chinese readers made 40 times more semantic substitution errors. We argue that Chinese characters activate phonology so weakly that readers do not maintain a robust image of the target word in working memory while reading. Semantics may be activated so strongly that a word semantically related to the target out-competes the weakly activated phonology of the target.

An alternative explanation is that Chinese readers have a pragmatic strategy of using context when reading aloud. We ruled this out with a condition where the Chinese group read passages in Pinyin or Zhuyin, phonetic scripts used to render pronunciation only. When reading in Pinyin or Zhuyin, the substitution errors made by the Chinese group were reduced from 0.42 to 0.13 per passage.

Would English readers make more substitution errors if they could draw on their memory for the text, thus reducing the need to consult phonology? After performing the read-aloud task, the English group read passages silently 5 times and read them aloud again. They still did not make semantic substitution errors, indicating that they were not access meaning from memory. This suggests that English orthography activates phonology so strongly that they do not bypass grapheme-phoneme recoding. The only condition where English readers made substantial semantic substitution errors occurred when they were asked to recall passages. In recall, they were more like Chinese readers, by accessing meaning first and using meaning to retrieve pronunciation.

Our novel findings about Chinese reading are compatible with theoretical models of the reading system which emphasize flexibility and variability. One such model is the connectionist framework. In connectionist models, visual representations are mapped to phonological and semantic outputs through a gradual learning processing. During learning, statistical regularities are extracted. Consequently, the reading system becomes shaped to the informational properties of the input. The strength and timing of activation of phonology and semantics will thus be determined by the frequency and reliability of phonological and semantic cues in the writing system.

Reference

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