Do Chinese Readers Set up Priorities for Different Orthographic Units According to the Role(s) They Play in Recognizing the Chinese Character?

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Keywords: word recognition; change detection; orthographic processing

Backgrounds and Method

Chinese is a logographic script that is characterized with rich structural regularities. Most Chinese characters are composed of orthographic units called radicals. They are stroke patterns whose locations within the character are correlated with the function they serve. Phonetic radicals cue the phonology of the character and tend to be located at the right of a horizontally structured character, while semantic radicals cue the semantics and tend to be located on the left. Phonetic radical is also on average larger and more effectively cues the whole character pattern than the semantic radical. Chen and Allport (1995) demonstrated that Chinese readers are capable of selecting either type of radicals according to the demand of the task. It is not clear, however, when the task does not require a lexical response, is the attentional mechanism still invoked (either endogenously or exogenously) to select the appropriate radical(s) according to the role the radical may play in recognition?

Current study examines this question using the change detection task (Simons, 2000; Xu, 2002) in three experiments. Participants detect radical color change across displays. Each display contains two Chinese characters presented at random locations of a 5 x 5 matrix area and the color of each of their composing radical is different. The function and the location of the radical are manipulated along with character frequency. Participants of Experiments 1 and 3 are Chinese readers while Experiment 2 used non-readers. Experiment 3 also asked the participants to make an additional recognition response to the two characters on the change detection display. The difference between Experiments 1 and 2 reveals the effect of orthographic knowledge on the attentional processing of the Chinese character. The results of Experiment 3 indicate how explicit recognition demand may affect attentional processing.

Results & Discussion

Repeated measures ANOVA's are performed on the radical location, radical function and character frequency. Participants detect color changes in phonetic radicals more efficiently than semantic radicals in both Experiment 1 and 2 (Figure 1), indicating the locus of this effect lies in physical features that affect both readers and non-readers. The most likely candidate would be size – detection performance is better for the larger phonetic radicals.

The effect of location is significant in Experiment 1, but not in Experiment 2 (Figure 2). Participants of Experiment 1 detect changes in right radicals more efficiently. Radical location interacts with its function and character frequency in Experiment 3. Phonetic radicals located on the right and semantic radicals located on the left (the most likely locations for them) are detected more effectively, but only when the character frequency is low. These findings indicate that the bias towards right radicals in Chinese readers is related to the use of orthographic knowledge of their familiar language. This bias may turn up as a heuristic for quick recognition that is automatically invoked whenever linguistic materials are encountered. A more sophisticated mode of priority setting emerges when the recognition demand is high (as in Experiment 3) so that the processing of both phonetic and semantic radicals is required.

Figure 1: d's for left and right radicals across three experiments

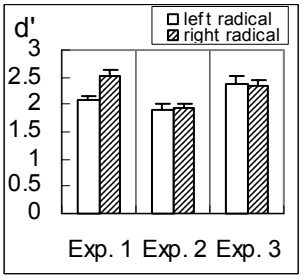
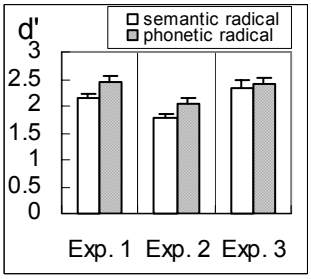


Figure 2: d's for phonetic and semantic radicals across three experiments



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