How vertical stripes affect recognition of Chinese characters

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Stripes have been known to cause visual stress (Wilkins and Evans, 2007). The occurrences of stripes in nature often signify the possibility of poison (e.g., venomous snake, centipede) (Cole and Wilkins, 2011). Most alphabets contain vertical stripes. English and German sentences with words containing more vertical stripes can increase the reading time (Wilkins *et al.*, 2007; Jainta, Jaschinski and Wilkins, 2010). Will a similar effect occur in the reading of Chinese characters, which are logographic? Two studies have been conducted to investigate how the presence of vertical stripes affects the recognition time of Chinese characters, and preliminary data will be presented here. In the first experiment, 3000 commonly used Chinese characters were taken from a published database (Poon and Hong, 2003). The characters were sorted according to their age of acquisition, frequency of use, number of strokes (including vertical, horizontal and diagonal), level of difficulty and the presence of vertical stripes. The presence of vertical stripes was detected and coded automatically by a Matlab^{TM} program modified from Wilkins *et al.* (2007). These 3000 Chinese characters were categorized into three types; (i) characters with high occurrence of vertical stripes, (ii) characters with low occurrence of vertical stripes, (iii) intermediate characters (not used in the experiment). Subjects were instructed to read aloud arrays of Chinese characters, which were grouped by the number of strokes and the character type. The preliminary results of first 7 subjects showed that characters with more vertical stripes took significantly longer time to recognize (p<0.05). Gaze data were collected in the second experiment with similar procedure. Preliminary data indicated a strong positive correlation between binocular fixation time and recognition time and characters with more vertical stripes also took longer time to recognize. Possible relationships between binocular fixation time and vertical stripes will be presented.