

Poster presentation

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The reverse connectivity pattern between Broca's area and the left visual word form area in the processing of Chinese words and English characters

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Background

A recent notable controversy in language processing is whether there is a particular brain area specialized for visual word recognition within the visual ventral stream. Some researchers proposed that the left middle temporal fusiform gyrus is particularly responsible for visual word processing and then named this area as the Visual Word Form Area (VWFA) [1], while others disagreed [2]. Three types of stimuli in Chinese and English – Real characters (semantic and orthographic), Pseudo characters (orthographic), and Artificial characters (similar part feature) – were examined in a reading task. Fourteen Subjects (seven females, seven males), all aged 19–22 years, with a university education, and fully right-handed, participated in the study. We recruited a 1.5T fMRI GE scanner to acquire imaging data. Data analysis was performed with SPM99. After being realigned, normalized, smoothed (6*6*8 mm), and low-pass filtered, a random-effect group analyses was conducted by using a one-sample t-test in the basic model toolbox. The within-condition interregional covariance analysis (WICA) method for Region of Interest (ROI)-based functional connectivity analysis was used to demonstrate the connectivity pattern between Broca's area and the left visual word form area in the processing of Chinese words and English characters [3,4]. We hypothesized that the left VWFA may orchestrate with Broca's area to respond to the different task demands.

Results and conclusions

The activation map was consistent with the previous findings with Chinese words and English characters processing while the connectivity analysis between Broca's area and the left VWFA indicated a reverse pattern. Our results provide strong evidence for VWFA in processing Chinese characters similar to that found in alphabetic scripts and hence support the hypothesis that left VWFA cooperates with Broca's area to respond to the different task demands [5].

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