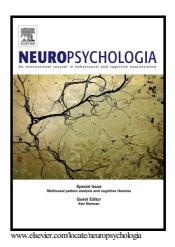# Author's Accepted Manuscript

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Activation of writing-specific brain regions when reading Chinese as a second language Effects of training modality and transfer to novel characters

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ABSTRACT

We examined the implication of training modality on the cortical representation of Chinese words in adult learners of Chinese. In particular, we tested the implication of the neural substrates of writing in a reading task. The brain network sustaining finger writing was defined neuroanatomically based on an independent functional localizer, and brain activations during reading were analysed according to the position of the activation peaks in this localizer. We compared the brain activation elicited by Chinese words learned via writing vs. pronunciation. Our results in the reading task showed that activations of the brain network were in close vicinity to the main activation peaks of the finger writing localizer. Notably, common activation peaks were found in the left superior frontal sulcus, right middle temporal gyrus, bilaterally for superior parietal lobule/intraparietal sulcus, the right cerebellum and thalamus. Moreover, the response of several parts of the writing network varied according to training modality and type of character (learned vs. novel). Finally, the response of the left mid-fusiform region, known to be elicited during orthographic processing, was also affected by training modality and the linguistic properties of stimuli. At the behavioral level, global handwriting quality during the training sessions was correlated to the final translation performance. Our results demonstrate substantial overlap in the