

Poster presentation

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The cerebellum connectivity in mathematics cognition

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Introduction

It has been reported that cerebellum plays an important role in cognition [1-3], but the material function of cerebellum in cognition is still in debate. Previous studies have mainly focused on cerebellum activation during different cognitive processing and few studies have addressed the function of cerebellum in math cognition using connectivity analyses between the cerebellum and cerebral cortex. The within-condition interregional covariance analysis (WICA) is a novel method for ROI-based functional connectivity analyses which has been applied in language and math processing [4,5]. In this study, we applied WICA to research the functional connectivity between cerebellum and cerebrum using the single digit addition and comparison tasks of math cognition. Fifteen native Chinese undergraduates participated in the experiment and a 1.5 T MRI scanner (GE_SIGNA, Milwaukee, WI) was recruited for brain imaging. We found that the activation of the cerebellum in math cognition had a tendency for left laterality and was modulated by the task difference and difficulty. Moreover, the cerebellum had strong connections with several brain regions in the frontal lobe using WICA, and the connections were also task sensitive.

Conclusion

Our results indicate that the cerebellum plays an important role in single digit addition and comparison tasks of math cognition, but the function of cerebellum in math cognition cooperates with the frontal lobe to perform the simple math task.

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