Working Memory Effects on Higher-order Language Processing: An fMRI Study

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Abstract

With an event-related functional magnetic resonance imaging (fMRI) design, I studied the role of working memory capacity (WMC) in Mandarin–English bilinguals' higher-order language processing, metaphoric and metonymic computations, in Taiwan. Adopting the English stimuli that consisted of five daily contextualized conditions: systematic literal, circumstantial literal, metaphor, systematic metonymy, and circumstantial metonymy, I also explored the neural correlates between metaphoric and metonymic comprehension. The findings revealed that general fronto-temporal patterns existed for both metaphoric and metonymic processing in Mandarin–English bilinguals' mind, yet bilinguals with better WMC seemed to recruit more neural resources and demonstrate more significant neural strategies. For instance, putamen, one of the working memory areas, as well as cingulate gyrus were particularly activated in bilinguals with better WMC, demonstrating their inhibitory control use in different categories of metonymy and their mental flexibility toward critical figurative items with self-control.

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