
Two hemispheres for better memory in old age: role of executive functioning.

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Abstract

A central challenge facing the cognitive neuroscience of aging is to determine whether age-related changes in brain activity reflect processes that are beneficial, detrimental, or inconsequential to cognitive functions. An intriguing result from brain imaging studies of cognitive aging is evidence of reduced hemispheric asymmetry during aging. This experiment explored the functional significance of this age-related hemispheric asymmetry reduction associated with episodic memory and the cognitive mechanisms that mediate this brain pattern. ERPs were recorded while young and older adults performed a word-stem cued-recall task. We used correlational and regression approaches to investigate directly the relationship between episodic memory performance, executive functioning and the lateralization of the ERP parietal old/new effect (indexed by an individual index of lateralization), in young and older adults. Results confirmed that the parietal old/new effect was of larger latency and reduced magnitude and less lateralized in the older group than the young group. Analyses also indicated that the degree of laterality of brain activity determines the accuracy of memory performance and mediates age-related differences in memory performance among older participants. In addition, they confirmed a cascade model in which the individual level of executive functioning of older adults mediates age-related differences in the degree of lateralization of brain activity, which in turn mediates age-related differences in memory performance.

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