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Effects of aging on the neural correlates of successful item and source memory encoding

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Abstract

To investigate the neural basis of age-related source memory (SM) deficits, young and older adults were scanned with fMRI while encoding faces, scenes, and face-scene pairs. Successful encoding activity was identified by comparing encoding activity for subsequently remembered versus forgotten items or pairs. Age deficits in successful encoding activity in hippocampal and prefrontal regions were more pronounced for SM (pairs) as compared with item memory (faces and scenes). Age-related reductions were also found in regions specialized in processing faces (fusiform face area) and scenes (parahippocampal place area), but these reductions were similar for item and SM. Functional connectivity between the hippocampus and the rest of the brain was also affected by aging; whereas connections with posterior cortices were weaker in older adults. Taken together, the results provide a link between SM deficits in older adults and reduced recruitment of hippocampal and prefrontal regions during encoding. The functional connectivity findings are consistent with a posterior-anterior shift with aging previously reported in several cognitive domains and linked to functional compensation.

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