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Testing a New Memory Task Sensitive to Early Entorhinal/Perirhinal Atrophy in Alzheimer's Disease

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Abstract Text:

Background: In Alzheimer's disease (AD), cognitive decline is known to start a dozen years before the clinical diagnosis of dementia is made. Given that standard neuropsychological tests lack the ability to detect such decline, new tasks are needed. Specifically, in order to identify the earliest selective cognitive deficit of AD, a task must be sensitive to the initial cerebral changes characteristic of AD. Notably, the entorhinal and perirhinal cortices (ERC/PRC) are the earliest cortical sites of pathology in AD. Recent cognitive neuroscience data suggest that ERC/PRC support familiarity-based memory for objects based on a representation of the conjunction of their perceptual features and of their meaning. The aim of the current study was to develop a memory task that evaluates this function and to check that performance on the task correlate with ERC/PRC atrophy. **Methods:** Thirty older participants with variable degree of ERC/PRC atrophy (15 healthy controls, 8 individuals with subjective cognitive decline and 7 patients with MCI, 58-85 y.o.) underwent a T2-weighted MRI scan optimized for the application of automatic segmentation of hippocampal subfields and ERC/PRC (ASHS). Participants performed a recognition memory task in which studied objects had to be distinguished from unstudied objects using rapid familiarity judgments. Three conditions varied the extent to which memory for the objects required a perceptual and conceptual conjunctive representation. The 'perceptual condition' contained old objects and unrelated new distractors. The 'perceptual/conceptual condition' contrasted old objects with distractors that are new exemplars from the same subordinate categories. In the 'integrative condition', distractors were as in the 'perceptual/conceptual condition', but targets were presented in a different orientation, size and luminance than at study. **Results:** After controlling for age and intracranial volumes, the volumes of the PRC and ERC were found to correlate with performance in the 'perceptual/conceptual condition'. Preliminary group comparisons indicated impaired memory performance in all 3 conditions in MCI patients, with performance reaching floor in the 'integrative condition'. **Conclusions:** These results suggest that developing such tasks assessing familiarity-based memory for objects may supply new tools specifically probing the contribution of the first cortical site of neurodegeneration in AD, i.e. PRC and ERC.

Title:
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Diagnosis and Prognosis

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Neuropsychology

Sub Topic:
Early detection of cognitive decline with neuropsychological tests

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