Working memory binding and dual-tasking can mark onset and progression of Alzheimer's disease

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Abstract

Background: The temporary retention of conjunctions of features (i.e., working memory binding) and the distribution of cognitive resources during concurrent tasks (i.e., dual tasking) are working memory (WM) functions which appear to be sensitive to Alzheimer's disease (AD). However, recent data collected from asymptomatic carriers of the mutation E280A-PS1 which leads to early-onset familial AD and from patients with full blown AD suggest that these functions are differentially sensitive to the early stages of the disease and to its progression. **Methods:** A WM binding task (Parra et al., 2010) and a dual task (MacPherson et al., 2007) both known to be sensitive to sporadic AD were given to asymptomatic carriers of the mutation E280A-PS1 and to familial AD patients. **Results:** WM binding is impaired earlier, even in the asymptomatic stages of the disease, and deteriorates faster than the dual-tasking ability. When binding performances reach floor, dual-tasking continues to provide a measure of cognitive deterioration. **Conclusions:** These data suggest that WM binding can be a useful cognitive marker for the early detection of the disease whereas dual-task functions could better monitor its progression. These findings have both theoretical and practical implications for early intervention and follow up of AD.