

Short-Term Memory Binding and Semantic Network Strength Reinforce Prospective Memory in Older Adults

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Objective

Prospective memory (Pro-M), or remembering to carry out a future task, is critical to everyday functioning, but is not assessed by traditional neuropsychological measures. In this study, we investigated neurocognitive mechanisms underlying Pro-M ability in older adults.

Participants and Methods

48 nondemented older adults (M age=75.2; SD=2.1) were recruited from the UCSD Alzheimer's Disease Research Center (ADRC). Participants were 60% female and averaged 17.2 years (SD=2.1) of education. The Memory for Intentions Screening Test (MIST; Raskin et al., 2010) and a visual short-term memory (STM) binding task (Parra et al., 2017) were administered in a single session. Results were compared with scores on traditional neuropsychological measures from a recent ADRC annual assessment.

Results

Overall performance on the MIST was significantly correlated with shape-color binding accuracy ($r=0.38$; $p<0.05$) and Animal Fluency ($r=0.29$; $p<0.05$), but was not associated with traditional tests of episodic memory (e.g., CVLT, Logical Memory) or executive functioning (e.g., WCST, Trails B) (all p values > 0.10). Analysis of errors on MIST time-cued tasks revealed the most common error was performing an incorrect task at the prescribed time (61%), whereas performing the prescribed task at the incorrect time was relatively infrequent (13%).

Conclusions

Performance of non-demented older adults on Pro-M was associated with STM binding and category fluency but not episodic memory or executive functioning. These results suggest that Pro-M is a unique aspect of memory functioning that is distinct from episodic memory and requires synthesizing multiple cognitive strategies. Participants with a stronger semantic network may be able to create a strong association for the intention at the time of encoding, while Pro-M failures could be explained by a failure to adequately bind the semantic components of the encoded intention and the future action.