

Hybrid visual and memory search is preserved in older age

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Attention and long-term memory (LTM) are considered to be prone to age-related decline. Attentional control and episodic recollection are more vulnerable than bottom-up selection and familiarity-based recognition. Visual attention and LTM can be manipulated and measured within a “hybrid search” task, in which observers look through visual displays for instances of any of several types of targets held in memory. Hybrid search thereby resembles many real-world search tasks and constitutes a promising tool to assess hallmarks of normal cognitive aging.

We compared younger and older observers in several hybrid search tasks. In Experiment 1, observers memorized 1-16 photorealistic objects and then searched for these targets in visual displays containing 1-16 new (unfamiliar) distractor objects. Apart from general slowing of response time (RT), older observers produced linear RT x visual setsize and logarithmic RT x memory setsize functions very similar to younger observers. Notably, relative costs of increasing visual and memory load were comparable across age groups, indicating no age-related decline. In Experiment 2, we prevented familiarity-based recognition of targets by presenting targets and distracters with the same frequency over search trials. Surprisingly, distracter-familiarity did not affect RT functions or error rates in either age group, indicating that hybrid search is not based on item-familiarity. Again, the only effect of age was generalized slowing. In Experiment 3, items were targets in one context, but incorrect lures in another context. RTs and errors indicated modest interference by lures; however, again, these costs were comparable between age groups.

Our results show that hybrid search is preserved in older age, even though attentional demands are relatively high and recollection from episodic memory is involved. This contradicts contemporary theories of cognitive aging and raises questions about standard neuropsychological measures of age-related decline, particularly with regard to predicting elderly's performance in real-world search task.