

# Distractor Reactivation with Age: Evidence for Cluttered Memory Representations

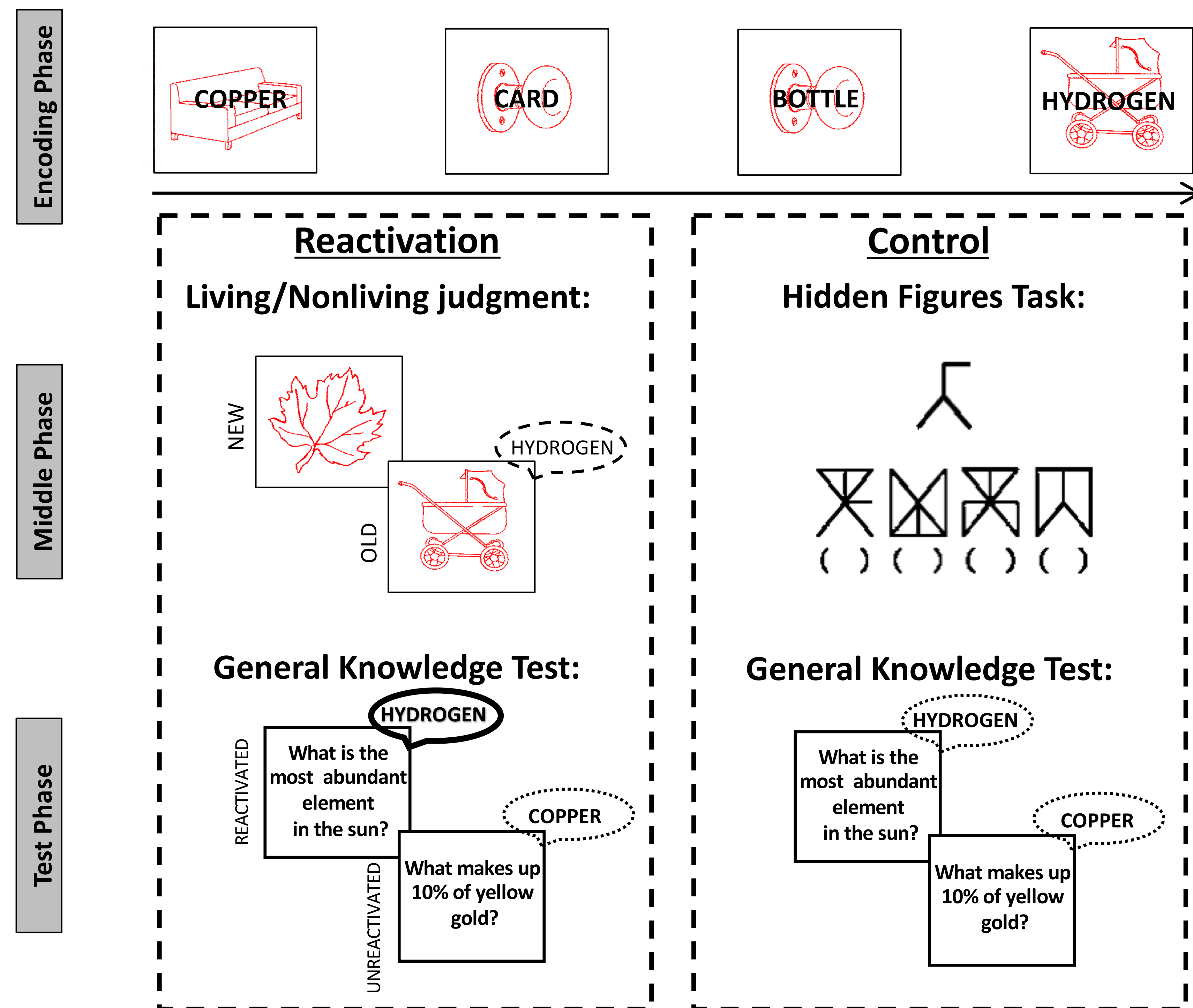
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## Introduction

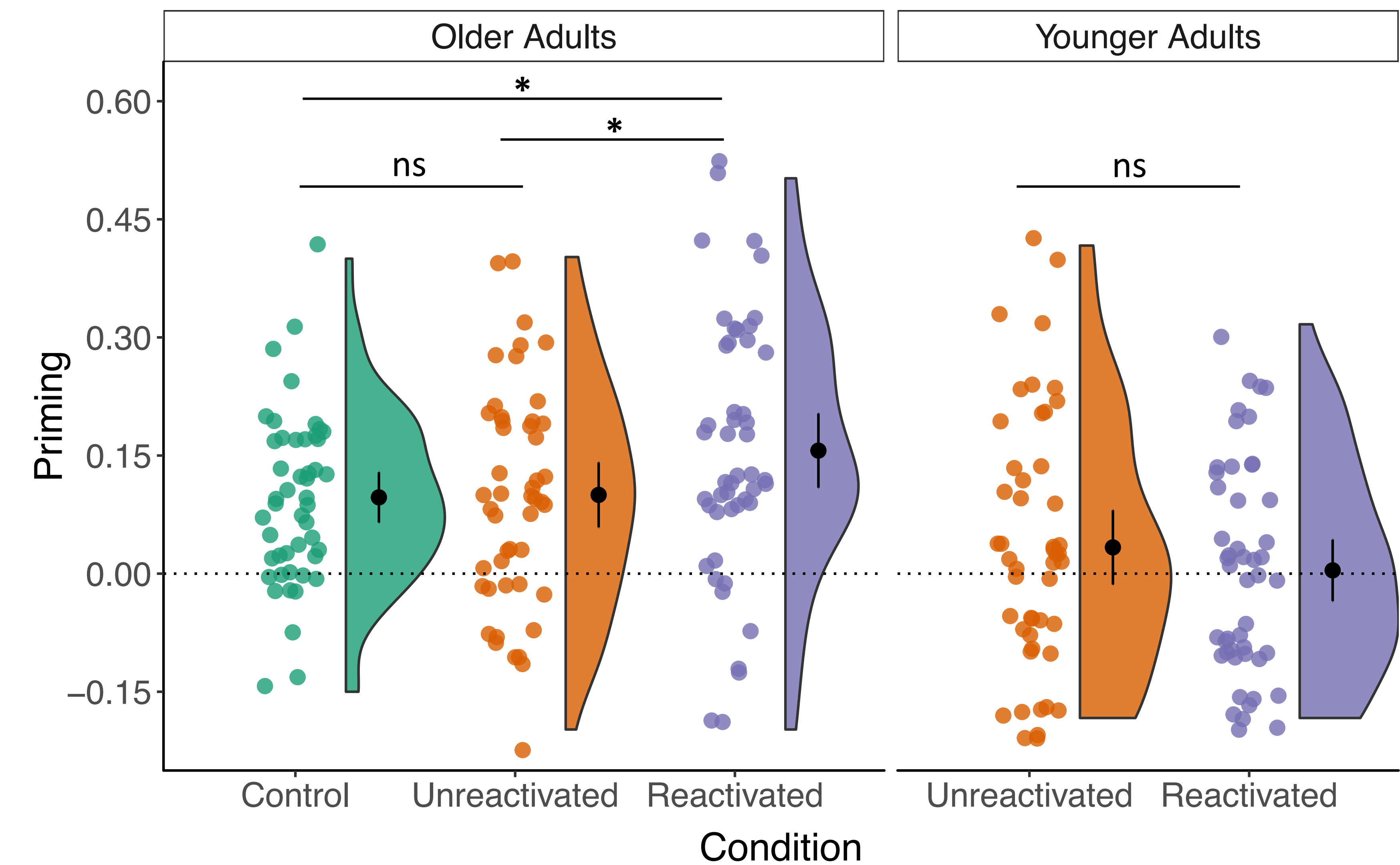
- Reduced attentional control with age is associated with the processing and maintenance of task-irrelevant information in memory.<sup>1,2</sup>
- This age-related processing of irrelevant information does not come at the expense of task-relevant, target information (i.e., older adults do not show a tradeoff in memory between targets and distractors).<sup>3</sup>
- Considering the processing of more information with age, what is the nature of the resulting memory representations? Do older adults show cluttered memory representations containing both task relevant and irrelevant information?

## Methods



- Older adults (OAs) were randomly assigned to the Reactivation (R;  $M = 68.77$  years,  $SD = 6.11$ ) or Control (C;  $M = 66.48$  years,  $SD = 4.28$ ) condition.
- **Encoding phase:** OAs first performed a 1-back task on pictures (identified 2 repeating pictures) while ignoring distractor words.
- **Middle phase:** OAs in the R condition were re-exposed to some of the pictures from the initial phase in an unrelated living/nonliving judgment task (reactivation of previously associated distractor words was expected). OAs in the C condition were not exposed to any pictures and performed a Hidden Figures Task.
- **Test phase:** All OAs performed an implicit general knowledge memory task that tested memory for distractors presented in the first phase. For the R condition, words were reactivated or unreactivated in the middle phase.
- A group of younger adults (YAs;  $M = 20.35$  years,  $SD = 2.67$ ) was also tested in the R condition.

## Results



- Priming was calculated by subtracting the proportion of correctly answered baseline questions from the proportion of correctly answered target questions.
- OAs in both groups showed reliable, above-baseline priming for previous distractor words.
- Critically, priming for reactivated distractor words was high than unreactivated words (within-subjects) and words in the control condition (between-subjects), suggesting successful reactivation in the middle phase.
- YAs showed no reliable priming for distractors and no difference between reactivated and unreactivated words.

## Conclusions

- Consistent with previous reports, OAs, but not YAs, showed evidence of distractor processing and memory.<sup>1,2</sup>
- Presenting a target picture as a partial cue resulted in reactivation of the previously associated distractor, suggesting that OAs store simultaneously presented target and irrelevant information as rich, bound memory representations.
- This “rich” or cluttered memory representation resulted in a memory advantage in the current paradigm, but it can potentially contribute to age-related memory deficits when retrieving target information due to increased interference / competition.<sup>4</sup>

## References

1. Rowe, G., Valderama, S., Hasher, L., & Lenartowicz, A. (2006). Attentional disregulation: A benefit for implicit memory. *Psychology and Aging*, 21(4), 826-830.
2. Amer, T., & Hasher, L. (2014). Conceptual Processing of Distractors by Older but Not Younger Adults. *Psychological Science*, 25(12), 2252-2258.
3. Weeks, J. C., & Hasher, L. (2018). Older adults encode more, not less: Evidence for age-related attentional broadening. *Aging, Neuropsychology, and Cognition*, 25(4), 576-587.
4. Gerard, L., Zacks, R. T., Hasher, L., & Radvansky, G. A. (1991). Age deficits in retrieval: The fan effect. *Journal of Gerontology*, 46(4), 131-136.