



Adult Age Differences in Associative Memory for Word Pairs: Evidence for Levels of Specificity in the Verbal Domain

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Background

- Explicit episodic memory declines that occur with aging are, in part, due to decreased ability among older adults to encode and/or retrieve associations among components of an event (Naveh-Benjamin, 2000).
- This age-related decline has been widely documented in the literature (Old & Naveh-Benjamin, 2008).
- Relative to younger adults, older adults are deficient at retrieving associative episodic memories at highly specific levels but can successfully do so at lower levels of specificity, i.e. remembering the “gist” as demonstrated through face-scene pairs (Greene, Naveh-Benjamin, 2020).
- Given that this was effectively shown through face-scene pairs (i.e. the visual domain), the question is whether it can also be extended to the verbal domain through word pairs.
- **Current study:** Younger and older adults studied word pairs and were administered associative recognition tests in order to extend levels of retrieval specificity in the verbal domain.

Method

- Participants were 30 younger adults between the ages of 17 and 21 and 11 older adults between the ages of 66 and 72. Data collection was interrupted due to COVID-19.
- Participants studied word pairs (e.g. Doctor - Cedar) on a computer then were given associative recognition tasks on three different types of test probes:

Same (Test pair is exactly the same as studied pair: e.g., Doctor-Cedar)

Similar (Second word in test pair has representational overlap with the studied pair: e.g., Doctor – Willow)

Dissimilar (Second word in test pair is completely unlike studied pair: e.g. Doctor – Pastor)

- Participants were then instructed to indicate whether they believed each test probe to be “same,” “similar,” or “dissimilar.”

Analytic Plan: Logistic Regression

- For each probe type (Same, Similar, Dissimilar), we fit one binomial logistic regression model to analyze age-related differences in accuracy as well as response tendency.
- In each model, there was one correct response (e.g., responding “same” to a Same probe) and two incorrect responses (e.g., responding “similar” or “dissimilar” to an Intact probe) with the between subject factor of Age being coded as 0 for younger adults and 1 for older.
- All parameters are given on the log-odds scale, so we took the exponent of each parameter to return more easily interpretable odds-ratios (OR).

For the accuracy model, the OR conveys the odds of older adults responding as accurately as younger adults to that particular probe (e.g., 1: older adults were as likely as younger to respond “same” to Same probes, >1: older were more likely than younger to respond “same” to Same probes, <1: older less likely to respond “same” to Same probes).

For the categorical regression model, the OR conveys how much more likely older adults were to give a particular response than younger adults (e.g., 1: older were as likely as younger to respond “similar” to Same probes, >1: older are more likely than younger to respond “similar” to Same probes, <1: Older adults less likely than younger to respond “similar” to Same probes).

Discussion

Age differences in retrieving associative episodic memory in the verbal domain showed general trends toward levels of retrieval specificity.

Same Probe Responses showed insufficient evidence of an age effect in both accuracy and response tendency. This could be due to preserved gist memory in older adults leading to older adults performing equivalently as younger adults on these probes.

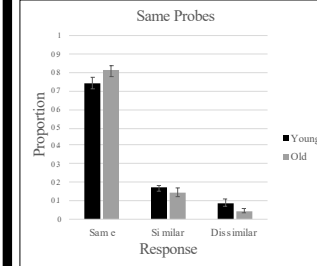
Similar Probe Responses showed a general trend toward an age effect of younger adults responding more accurately than older ones. They also showed a higher tendency of older adults to respond “same” to this probe. This can be explained by a lack of retrieval specificity as older adults were remembering only the “gist” of the word pair, allowing the representational overlap to affect their response.

Dissimilar Probe Responses showed insufficient evidence of an age effect in both accuracy and response tendency. This is explained by retrieval specificity as it only requires them to remember at a lower level of specificity.

References

- Greene, N.R. & Naveh-Benjamin, M. (2020). A specificity principle of memory: Evidence from aging and associative memory. *Psychological Science*, 31(3), 316-331.
- Naveh-Benjamin, M. (2000). Adult age differences in memory performance: Tests of an associative deficit hypothesis. *Journal of Experimental Psychology: Learning, Memory, & Cognition*, 26, 1170-1187.
- Old, S., & Naveh-Benjamin, M. (2008). Differential effects of age on item and associative measures of memory: A meta-analysis. *Psychology and Aging*, 23, 104-118.

Results: Same

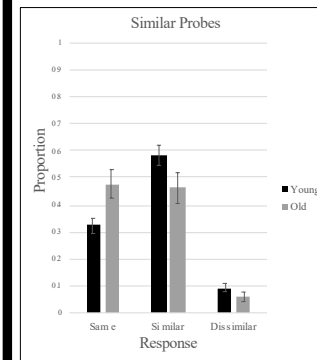


- For the Same probe accuracy logistic regression model, OR = 1.39 (95% Bayesian CI: [0.71, 2.72])
- For the categorical logistic regression model:

“similar” response, OR=0.79 (95% CI: [0.46, 1.35])

“dissimilar” response, OR=0.58 (95% CI: [0.19, 1.73])

Results: Similar



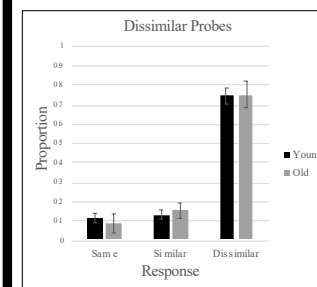
- For the Similar probe accuracy logistic regression model, OR = 0.55 (95% CI: [0.27, 1.07])
- For the categorical logistic regression model,

“same” response, OR = 1.99 (95% CI: [1.11, 3.71])

This OR indicates older adults were more likely than younger to respond “same” to Similar probes.

“dissimilar” response, OR = 0.81 (95% CI: [0.28, 2.25])

Results: Dissimilar



- For the Dissimilar probe accuracy logistic regression model, OR = 1.01 (95% CI: [0.33, 3.06])
- For the categorical logistic regression model,

“same” response, OR = 1.20 (95% CI: [0.39, 3.45])

“similar” response, OR = 0.59 (95% CI: [0.13, 2.66])