

Age-Linked Processes Underlying the Refresh Task: New Data and Theory



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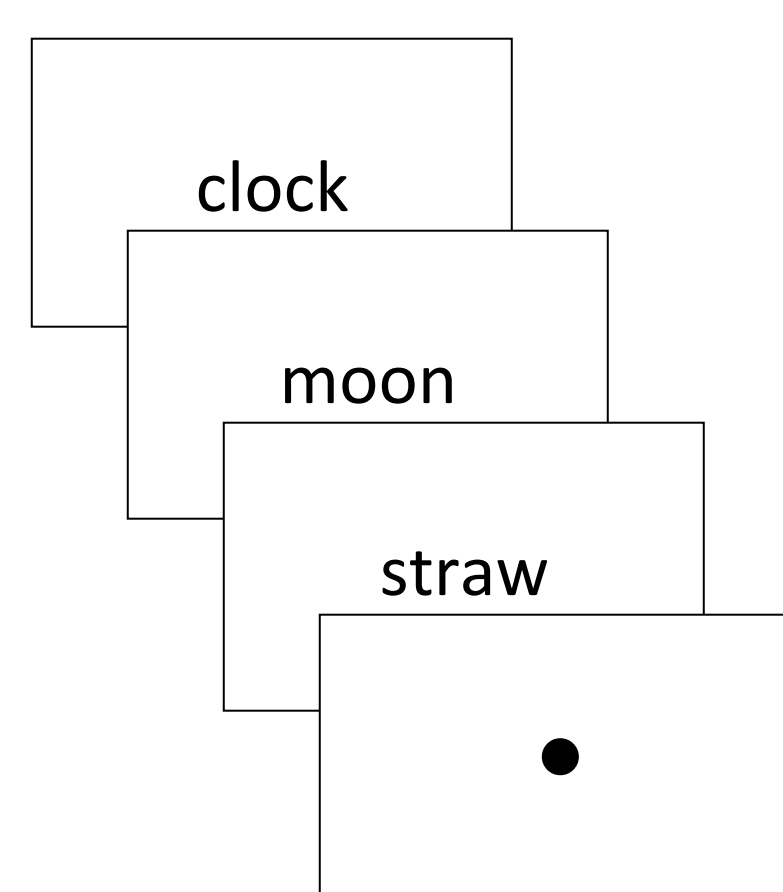
Background

This study tests a new explanation of age-linked processes underlying the refresh task, where participants either read words aloud or respond to dots by retrieving and saying the previously presented word as quickly as possible. In prior research, relative to young adults, older adults were disproportionately slower at retrieving the previous word than re-reading it, suggesting an age-linked deficit in “refreshing” recently activated representations¹. However, under an alternate hypothesis, these results reflect well established age-linked deficits in new learning^{2,3} because reading a word aloud is a familiar, well-practiced task that requires no new learning, whereas responding to a dot with an immediately prior word is an unfamiliar, unpracticed task that requires new learning.

Method

The participants were 31 older adults ($M = 73.6$ years, $SD = 6.0$) and 25 young adults ($M = 21.7$ years, $SD = 3.3$).

Stimuli were 300 common nouns. For read trials, participants were asked to read the word aloud. For refresh trials, participants saw a small dot on the screen, cueing them to say the word from the previous trial as quickly as possible.



New Analysis

To test the “new learning” hypothesis, we reanalyzed data from the refresh task of Mather and Knight⁴, comparing effects of practice on reaction times (RTs) of young versus older adults in the first (relatively unpracticed) half versus the second (relatively practiced) half of the refresh versus read trials.

The present analysis compared RTs for identical words in the read and refresh conditions. For complete RT analyses across all words and trial types, please see the original analysis by Mather and Knight⁴.

Results

In agreement with previous research¹, our analysis revealed significantly slower RTs for refresh than read trials ($p < .001$), marginally slower RTs for older adults than young adults ($p = .073$), and an interaction between age and condition ($p = .007$), with significantly slower RTs for older adults than young adults for refresh trials ($p = .009$) but not read trials ($p = .42$).

Our analysis of the effects of practice revealed significantly slower RTs in the first half than the second half ($p < .001$), along with a three-way interaction between practice, condition, and age ($p = .040$). To explain this three-way interaction, we conducted separate analyses for older and young adults. For older adults, there was a significant interaction between practice and condition ($p = .036$), with less improvement with practice for read than refresh trials. For young adults, practice did not interact with condition ($p = .42$). This suggests that the overall three-way interaction reflected less improvement with practice on read than refresh trials for older but not young adults.

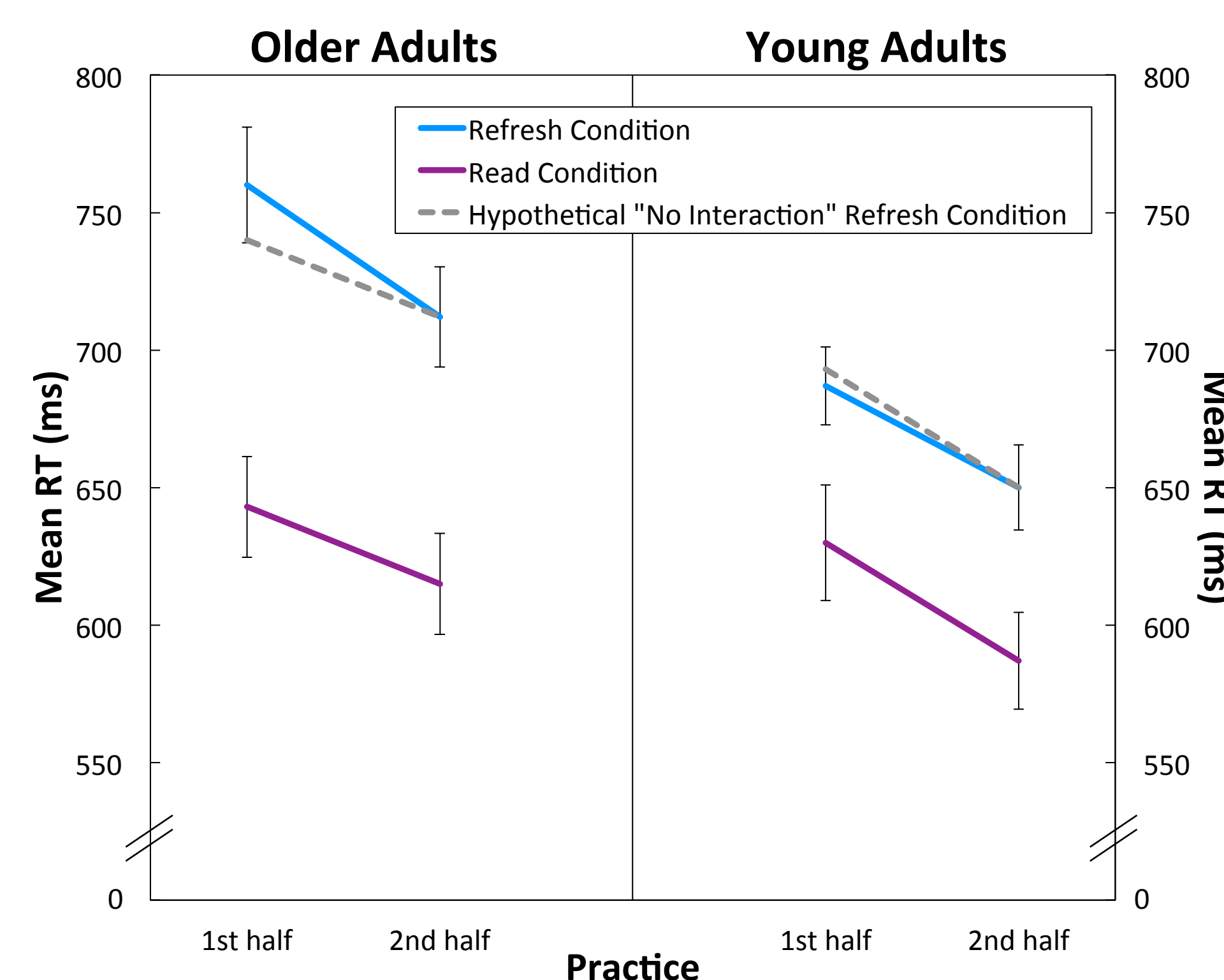


Figure 1. Mean RTs (ms) for refresh and read trials in the first versus second halves of the experiment for older and young adults. The dashed line represents hypothetical data generated under the assumption that refresh versus read RTs do not interact with practice for young or older adults. Error bars indicate standard error of the mean.

Discussion

Our analysis revealed a three-way interaction between age, trial type, and practice, reflecting less improvement with practice for read than refresh responses for older adults. Whereas practice effects did not differ for read versus refresh trials for young adults, older adults initially responded slowly but improved dramatically with practice for refresh trials but not for the already highly-practiced reading trials. A general deficit in learning unfamiliar responses, but not in a fundamental or task-independent refresh process per se, readily explains the present age-linked effects of practice on reading versus refresh trials.

References

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4. Mather, M., & Knight, M. (2005). Goal-directed memory: The role of cognitive control in older adults' emotional memory. *Psychology and Aging*, 20(4), 554-570.

Acknowledgments

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Questions?

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