Proactive Interference and Judgments of Learning Among Older and Younger Adults

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RATIONALE

Models of self-regulation (cf., Carver & Scheier, 2000; Dunlosky & Hertzog, 1998) suggest that individuals engage in a series of memory monitoring activities (e.g., judgments of learning, JOLs) and allocate their study time accordingly to maximize memory performance. Although research has investigated various factors that affect the allocation of study time (e.g., Dunlosky & Thiede, 1998), little research has specifically examined phenomena that impede the effective functioning of these processes, such as proactive interference. In light of research demonstrating that age differences in inhibitory mechanisms may be responsible for poorer memory performance among older adults (Hasher & Zacks, 1988) we examined the effect of proactive interference on both younger and older adults' allocation of study time, judgments of learning, and recall performance.

METHODS

Participants

Note. Means are provided with standard deviations in parentheses. * p < .05
1 WAIS-R (Wechsler, 1987)
2 Extended Range Vocabulary Test (KRFT; Ekstrom, et al. 1976)
3 Loaded Reading Span (Stine & Hindman, 1994)
4 (Interference - Control) / Control (Earles et al. 1997)

Procedure

A modified PI paradigm (Wickens et al., 1976) incorporating memory monitoring (JOLs; Dunlosky & Connor, 1997) was used. Individuals studied 18 12-word lists drawn from Battig and Montague (1969) category norms, presented across 4 trials of 3 words each. After study, participants made JOLs (0, 1, 2, or 3), and then recalled the words. Distractor tasks were inserted after study and after the JOLs were made. Study time for each trial was measured.

Sample Word List

Trial 1	Trial 2	Trial 3	Trial 4 (No Shift)	Trial 4 (Shift)
orange	grapefruit	banana	prunes	iron
pear	pineapple	lime	plum	brass
cherry	lemon	grape	apple	gold

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RESULTS

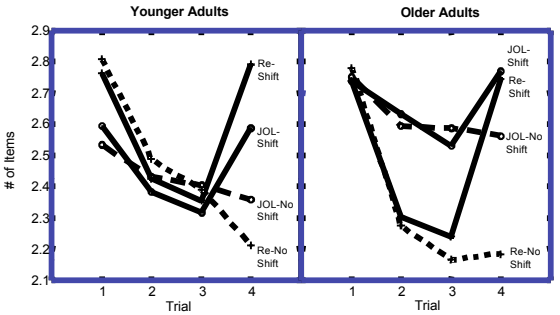

Figure 1. Judgments of Learning (JOLs) and Recall Performance (Re) as a function of Age, Shift, and Trial.

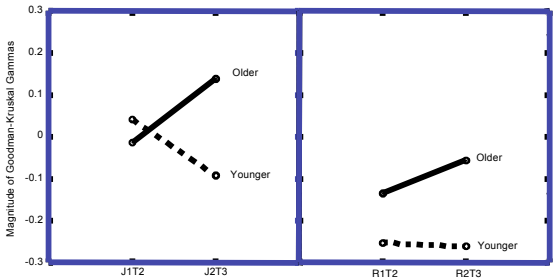

Figure 2. Allocation gammas as a Function of Trial and Age for Perceived Learning (left) and Actual Learning (right).

Recall performance (Figure 1)

- As expected, participants exhibited both a build-up and release from PI, $F(3, 171) = 46.83$, $p < .001$, $\eta^2 = .45$, for the Shift x Trial interaction.
- The interaction of Age and Trials, $F(3, 171) = 2.59$, $p = .055$, $\eta^2 = .04$, showed that older adults were more susceptible to PI.
  - Younger and older adults did not differ substantially on their recall for Trial 1 or Trial 4, both ts < 1.
  - Younger adults recalled more than did the older adults on Trial 2, $t(57) = 4.10$, $p < .05$, and on Trial 3, $t(57) = 9.02$, $p < .01$.

Absolute Accuracy of JOLs (Figure 1)

- The three-way interaction between Age (Young, Old), Type of Measure (JOL, Recall), and Trials was reliable, $F(3,171) = 25.53$, $p < .001$, $\eta^2 = .05$.
  - Among the younger adults, there was a reliable difference between predicted performance and actual performance on Trial 1, $t(29) = 3.00$, $p < .01$; this was eliminated on subsequent trials (all ts < 1), suggesting that younger adults were able to effectively monitor their memory performance despite the build-up of PI
  - Although no differences existed on Trial 1, older adults predictions for performance reliably exceeded their actual performance on subsequent trials, $3.29 < t(28) < 4.64$, $p < .01$.

Relative Accuracy of JOLs

- Goodman-Kruskal gamma correlations between individual JOLs and recall performance were used to estimate monitoring accuracy.
  - The gammas for both the younger adults ($MY = .52$, $SD = .37$) and the older adults ($MO = .38$; $SD = .55$) were reliably different from zero; $t(29) = 7.65$, $p < .001$ and $t(20) = 3.17$, $p < .01$, respectively, suggesting that both were accurate in monitoring their memory across trials.
  - None of the main effects or interactions were significant, all $p > .15$, suggesting that both younger and older adults were comparable in their memory monitoring and monitoring

Allocation of Study Time on Subsequent Trials (Figure 2)

Models of discrepancy reduction (Dunlosky & Hertzog, 1998) suggest a negative relationship between learning and study on subsequent trials.

- *JOLs and Study Time Allocation (left panel)*
  The significant interaction, $F(1,44) = 4.30$, $p < .05$, suggests that older adults' ability to self-regulate was differentially impaired by PI.

- *Recall and Study Time Allocation (right panel)*
  The magnitude of the gammas was greater for younger adults than for older adults, $F(1,49) = 4.70$, $p < .05$, $\eta^2 = .09$. However, the interaction of Age and Trial was not reliable, $F(1, 49) < 1$.

CONCLUSIONS

Proactive interference may differentially impede older adults' ability to self-regulate, creating age differences in the ability to effectively allocate study time.

Consistent with the inhibition hypothesis, our data suggest that older adults may be more susceptible to proactive interference than younger adults.

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