Age Differences in the Effects of Pre-Exposure on Reading Text

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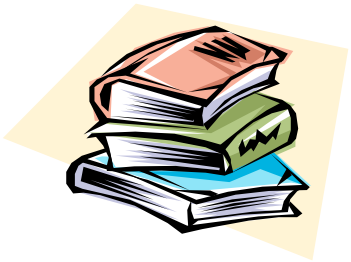

RATIONALE

Learning from a text involves the use of prior knowledge to understand and use the new information (Kintsch, 1998). Some research suggests that older readers differentially rely on knowledge-based processes in language understanding (e.g., Miller et al., 2004). Our study investigated this issue by randomly assigning subjects to prior knowledge conditions varying in the degree of structural overlap with the target text, a manipulation designed to evoke effort toward learning (i.e., "desired difficulty"; Schmidt & Bjork, 1992).

Participants

☑ Younger (M=21.19, n=31) and older (M=66.87, n=31) adults were randomly assigned to one of three conditions varying in the type of pre-exposure:

- **Consistent Pre-exposure (CP): Pre-exposure materials were in the same organization as the target text.**
- **Inconsistent Pre-exposure (IP): Pre-exposure materials were in a different organization from the target text.**
- **No Pre-exposure (NP): During the pre-exposure period, participants performed unrelated tasks.**

☑ Within age group, random assignment produced groups that did not significantly differ in ability.
☑ Education level was higher for older (M=16.03) than younger adults (M=14.23).
☑ Working memory capacity was higher for younger (M=5.24) than older adults (M=4.44) (Stine & Hindman, 1994).
☑ Younger and older adults did not differ in verbal ability (Wechsler, 1987).

REFERENCES

Kintsch, W. (1998). *Comprehension: A paradigm for cognition.* Cambridge: Cambridge University Press.
Miller, L. M. S., Stine-Morrow, E. A. L., Kirkorian, H., & Conray, M. (2004). Age differences in knowledge-driven reading. *Journal of Educational Psychology, 96,* 811-821.
Schmidt, R. A., & Bjork, R. A. (1992). New conceptualizations of practice: Common principles in three paradigms suggest new concepts for training. *Psychological Science, 2,* 207-217.

We are grateful for support from the National Institute on Aging (Grant R01 AG13935)
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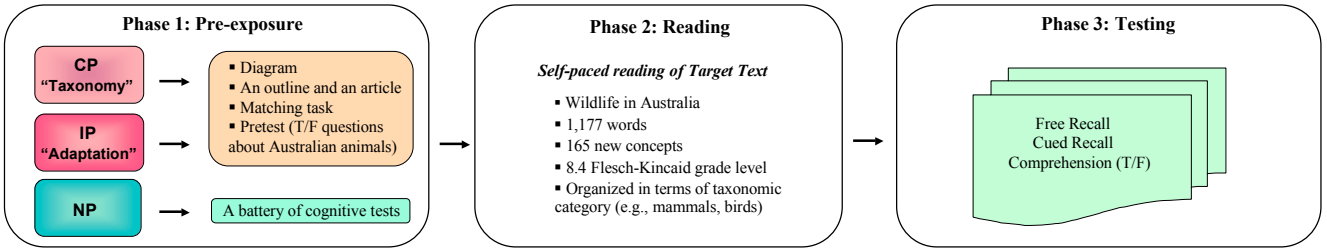
METHODS



RESULTS

Reading Time

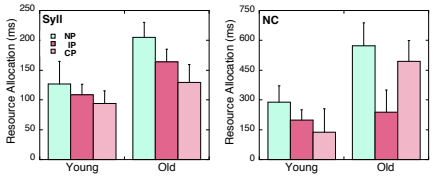
☑ Individual regressions were used to decompose sentence reading times into the resources allocated to word, textbase, and discourse-level features.

LEVEL	VARIABLE		THEORETICAL PROCESS
WORD	SYLL	Number of syllables	Orthographic decoding
TEXTBASE	NC	Number of new concepts	Conceptual processing
DISCOURSE	SP	Serial position	Structural building
	SP_T	SP within a topic	Building a new line of arguments
	NEW_DE	Dummy (0/1) for introduction of a new animal	Instantiating a new discourse entity

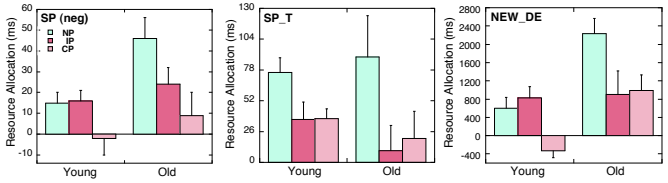
☑ Resource allocation parameters were analyzed in a 2(Age) X 3(Pre-Exposure) X 5(Text Process) repeated measures ANOVA, which showed that age differences in the effects of pre-exposure depended on the type of processing, $F(8, 212)=2.81$, $p = .06$, for the marginally significant three-way interaction.

☑ Compared to younger adults, older adults showed:

- greater responsiveness to orthographic coding (Syll), $F(1, 53)=7.21$, $p < .05$, and conceptual processing (NC), $F(1, 53)=7.24$, $p < .01$



- enhanced structure building (SP), $F(1, 53)=6.14$, $p < .05$
- similar allocation to construct a new line of argument (SP_T), $F< 1$
- disproportionate allocation to process new discourse entities when reading text for the first time, $F(2, 53)=3.24$, $p < .05$.

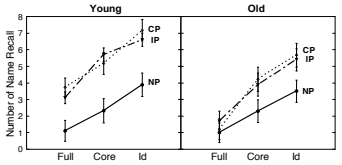


Recall

NAME RECALL

☑ An Age x Pre-exposure x Stringency (Full: Leafy Sea dragon; Core: Sea dragon; Identifiable: Leafy something) ANOVA showed:

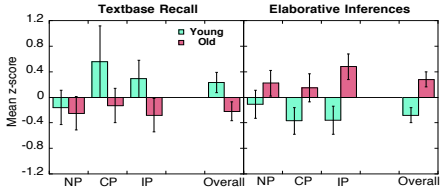
- older adults recalled fewer names than did younger adults, $F(1, 53)=4.87$, $p < .05$.
- pre-exposure (both CP and IP) groups disproportionately increased performance for leniently scored names, $F(2, 53)=7.95$, $p < .01$.



TEXTBASE RECALL AND ELABORATIVE INFERENCES

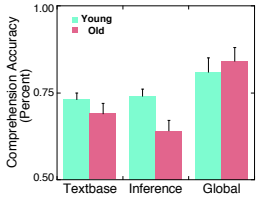
☑ The Age x Type of Production interaction, $F(1, 51) = 12.76$, $p < .01$, suggested:

- Younger adults recalled more textbase content than did older adults, $F(1, 51)= 4.24$, $p < .05$.
- Older readers produced more knowledge-based elaborations than did younger readers, $F(1, 51)=10.61$, $p < .01$.



Comprehension

☑ While younger and older readers did not significantly differ in answering questions probing global ideas and textbase content, older readers performed more poorly on questions regarding inferences, $F(2, 108)=3.45$, $p < .05$, for the Age X Question Type interaction.



CONCLUSIONS

☑ Older adults were generally more highly responsive to discourse-level features, showing a large effect of serial position and allocating more time to process discourse entities through the text but this was not particularly enhanced by our "desired difficulty" manipulation.
☑ Pre-exposure enabled enhanced retrieval of key concepts among young and older adults; the semantic representation of these concepts was strengthened more than that of the surface form.
☑ Older adults generated more knowledge-based elaborative inferences in recall than did younger adults, but performed more poorly when inference was constrained so as to require textbase retrieval.