

How do low-literacy adults read and how much do they retain? A reading-time and recall study.

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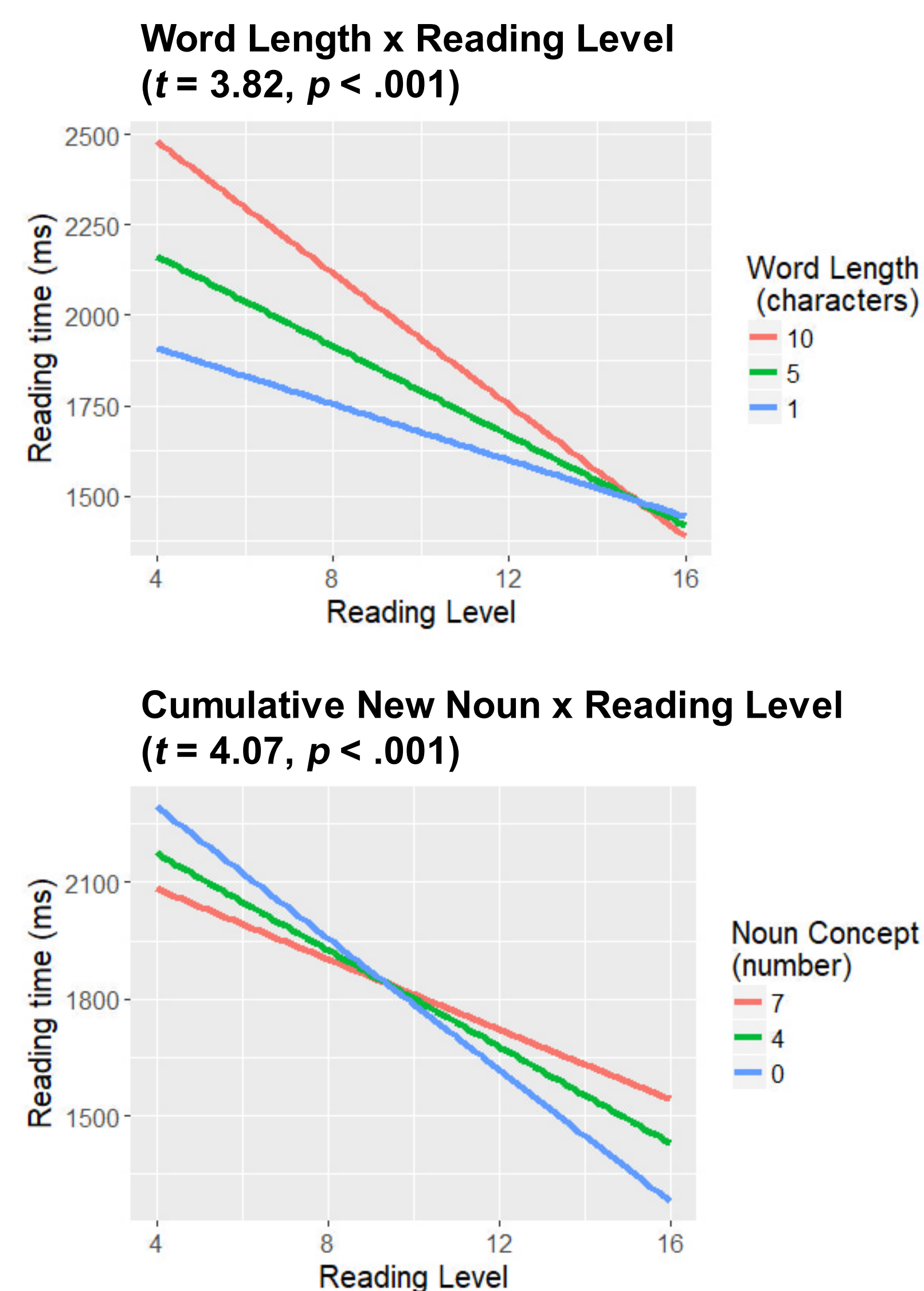
Introduction

Fluent reading depends on both incremental processing, in which meaning is activated and sculpted as the text unfolds; and segmental processing, in which concepts are integrated and the message-level representation is consolidated. Behaviorally, segmentation is reflected in prolonged reading times on words at syntactic boundaries, a phenomenon called “wrap-up” (Just & Carpenter, 1980). Previous literature has shown a predictive relationship between wrap-up time and text memory among proficient readers (Payne & Stine-Morrow, 2016; Stine-Morrow et al., 2008; Stine-Morrow & Payne, 2015), suggesting that conceptual integration supports good text memory. Little is known, however, about these processes among adults with underdeveloped literacy skills, which is a barrier to the creation of effective reading instruction for this population (NRC, 2012). Lower literacy adult readers can experience difficulty rapidly using context information to detect the semantic fit of a word (Ng et al., 2017), suggesting that their conceptual integration may be impaired. To test this idea, we examined wrap-up patterns and recall in a self-paced reading task.

Model 1

Q: How sensitive were adults with different literacy skills to word-level and text-level features?

Findings: Adults with lower levels of literacy skill were more sensitive to word-level features but less sensitive to text-level features.

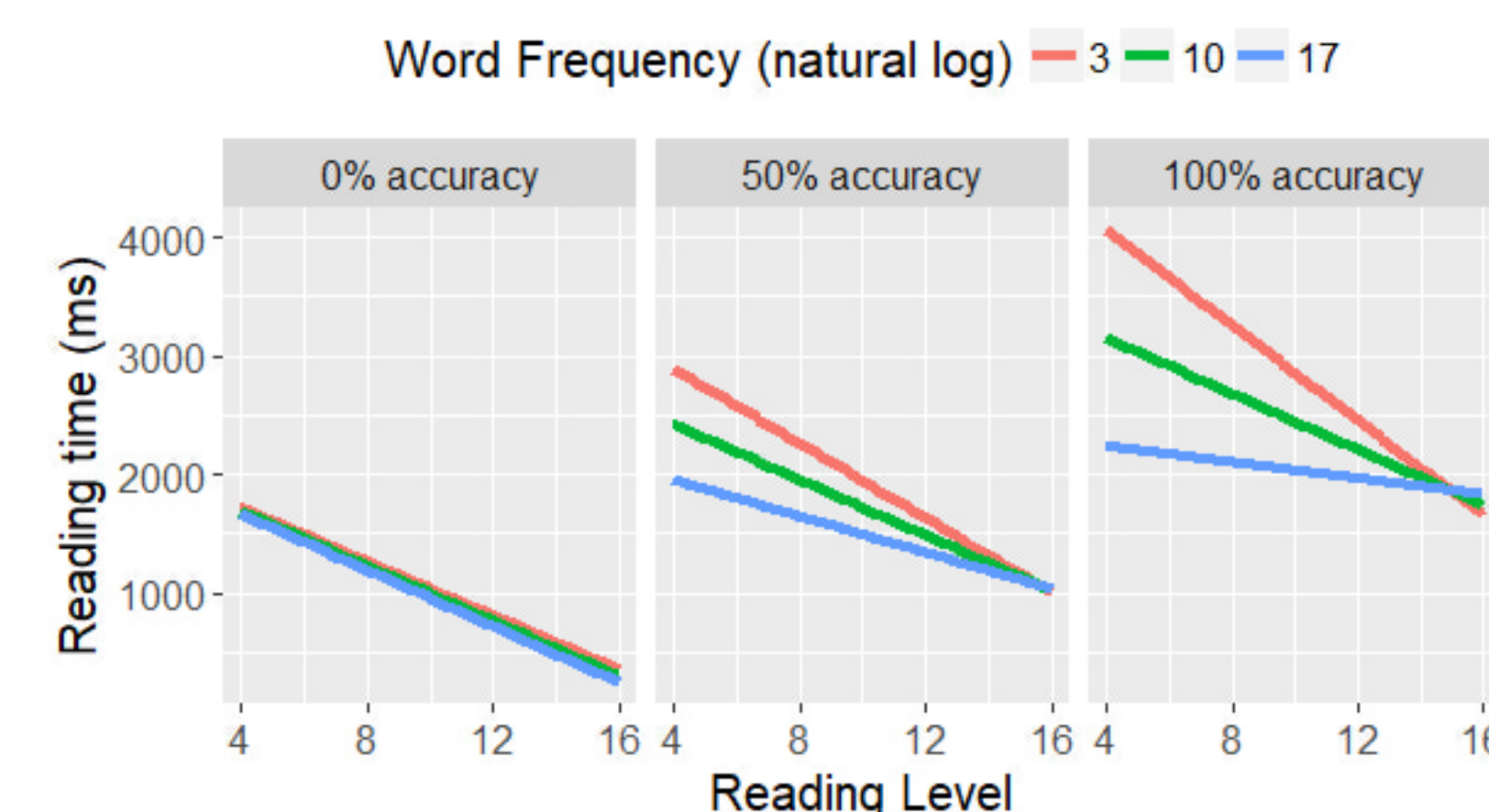


Model 2

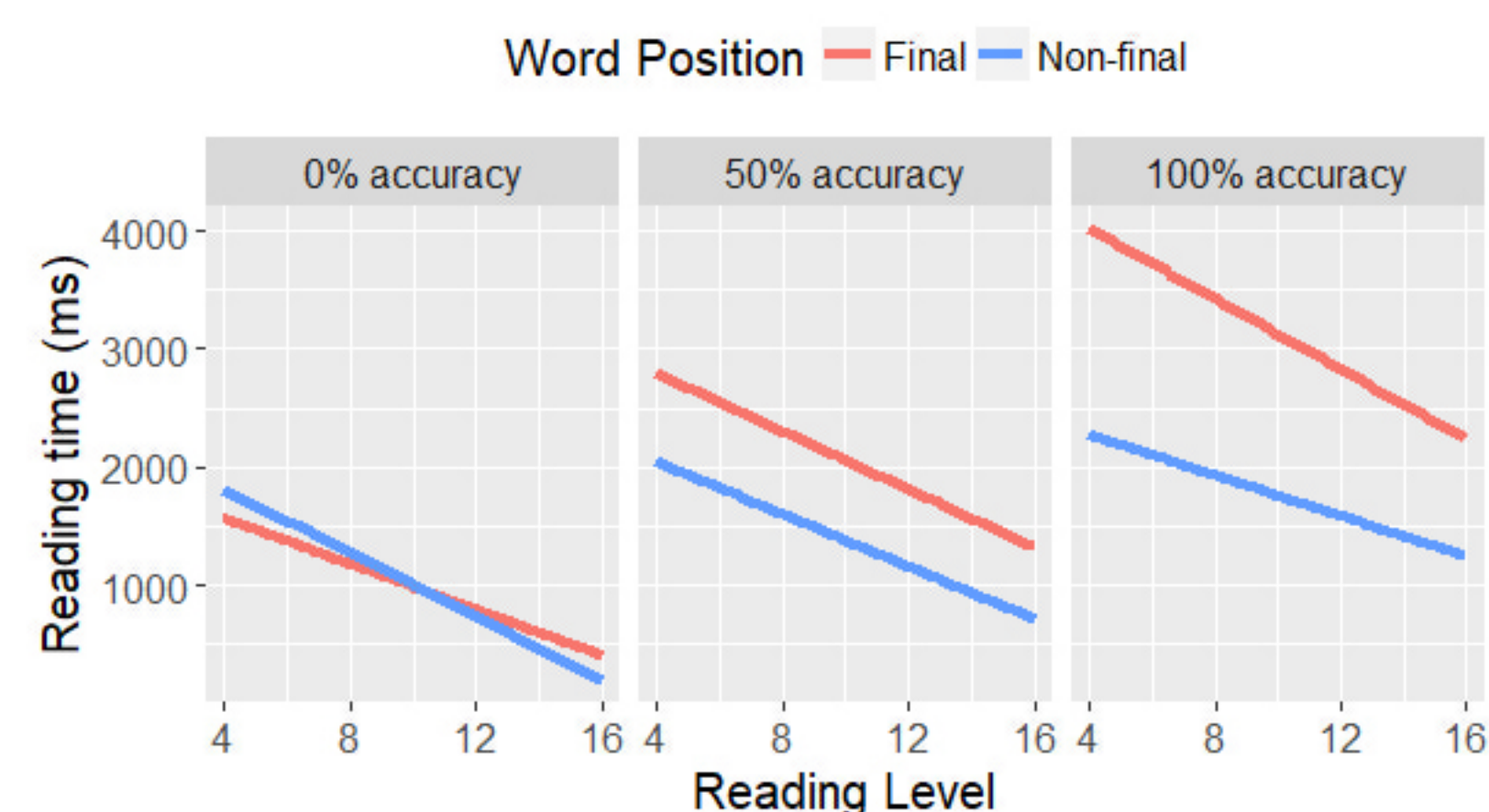
Q: Did adults with stronger and weaker literacy skills achieve better text memory in different ways?

Findings: Yes. Low-literacy readers with good recall allocated disproportionate attention to process low-frequency words and in wrap-up.

Word Frequency x Subject Recall Accuracy x Reading Level ($t = 2.3, p = .022$)



Word Position x Subject Recall Accuracy x Reading Level ($t = 1.99, p = .042$)



Conclusion

- In an absolute sense, low-literacy adults are sensitive to word-level and text-level features when reading texts appropriate to their skill level.
- However, compared to adults with well-developed reading skills, they spend disproportionate resources on word-level features and relatively less on conceptual integration.
- Difficulties with decoding and lexical retrieval may consume attentional resources, which impairs allocation of resources to text-level features.
- Low-literacy adults appeared to be able to achieve better text memory by allocating differentially more resources to lexical elaboration and conceptual integration.

Method

Participants. Community-dwelling adults ($N=80$), all native English speakers.

			Correlations (r)					
	Mean	SD	Ed	RL	SORT	WJ RF	Voc	Fluid
Age	41.0	12.7	0.20	<.01	0.11	-0.07	0.18	-0.23
Education level (yrs)	12.1	1.7	--	0.39	0.36	0.34	0.42	0.16
Reading Level (grade)	9.4	3.0		--	0.85	0.92	0.63	0.45
SORT	9.6	2.9			--	0.58	0.58	0.40
WJ Reading Fluency	9.3	3.8				--	0.54	0.41
WASI Vocabulary	27.8	6.5					--	0.55
WASI Fluid Ability	21.4	8.9						--

Bold text indicates a statistically significant correlation with a p-value less than 0.05.

Stimuli. 25 two-sentence expository passages with a maximum reading level of 4.5 (mean = 3.5). Reading times and recall accuracy were only measured on the first sentence.

Example: *The inner layer of fur on a husky is as soft as goose down. Other dogs would freeze in the cold.*

Procedure. Participants self-paced the presentation word-by-word, for immediate oral recall.

Data Analysis. Proposition recall accuracy was scored for each participant. Linear mixed-effects modelling in R was used to analyze reading times. Lexical-level (i.e., length, frequency) and text-level features (i.e., cumulative new nouns, word position) for each word, and participant recall accuracy and reading level were used as predictors to decompose reading times, so to operationalize attentional allocation to different text demands as a function of reader skill and memory outcome (Stine-Morrow et al., 2006).

Acknowledgments:

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