

Context effects in reading depend on reading speed and print size

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Rationale

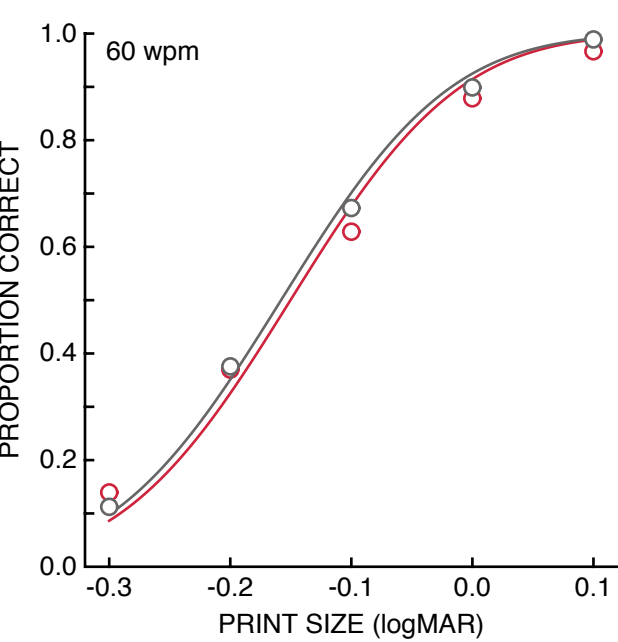
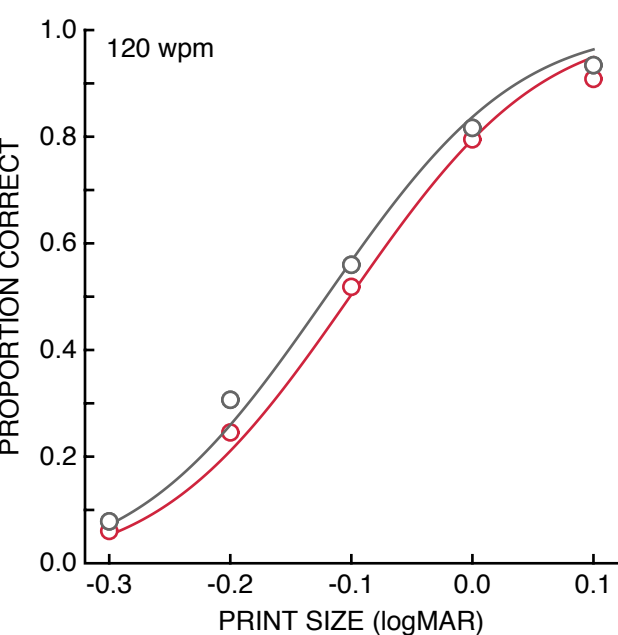
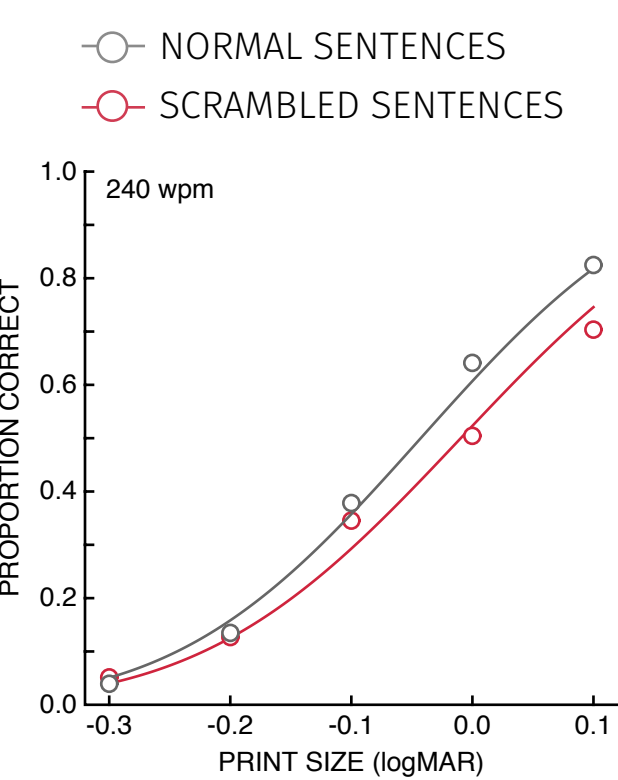
It is well established that sentence context helps us read faster. Reading speeds are 1.4 to 2.5 times faster for sentences than for shuffled sentences or unrelated words.

It is unclear whether sentence context helps us read smaller print. Does context help us identify words that would otherwise be too small to read?

Methods

- We collected psychometric functions of reading accuracy as a function of print size (-0.3 to +0.1 logMAR) for *normal* and *scrambled* sentences.
- The sentences were displayed at RSVP presentation rates of 60, 120, and 240 wpm.
- Data were obtained from 20 readers with normal or corrected-to-normal vision.

Results



Conclusion

Context has no effect when reading is slow and the print size is near the acuity limit. Perhaps it is hard to establish context under these conditions because the text is hard to read. Or possibly the processing advantage due to context is offset by the slow presentation rate.

Either way, context seems to be either unavailable, unhelpful, or unused.

Methods details

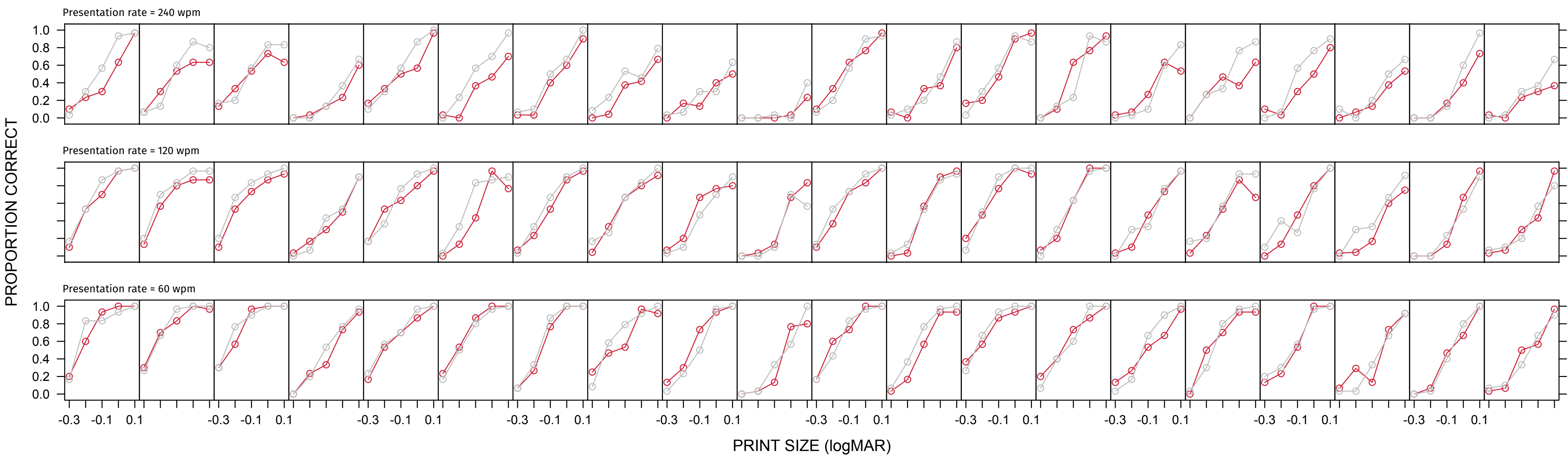
- Sentences: 444 6-word sentences that contained no extra punctuation or repeated words were extracted from novels available at project Gutenberg. The initial capital letter was changed to lowercase — “her breath was faint and hurried”.
- Scrambled sentences were created by randomizing word order — “breath faint and her hurried was”
- Sentences were displayed in Courier New font at a viewing distance of 2m.
- Psychometric functions were collected with 5 sentences per print size (30 words per point).
- Trials for all print sizes, presentation rates, type of sentences were randomly interleaved and run in one block of 180 trials for each participant, preceded by 6 practice trials.
- Data were collected from 25 participants. Data from 5 participant were eliminated because they could not read the largest print at the slowest speed used in this study.
- To verify that context was present in this stimuli, after each trial, the participants reported whether the trial had been a normal or scrambled sentence.

Data analysis details

Psychometric functions were fitted with cumulative Gaussian curves, using a mixed-effects model (fixed effects: threshold, slope, and sentence context; random effects: threshold) as outlined by Knoblauch and Maloney (2012).

D-prime for identifying whether text stimuli were normal or scrambled sentences ranged from 0.0 (for -0.3 logMAR), up to 2.0 (for 0.1 logMAR).

Complete data from all 20 participants are shown below.



References

Knoblauch, K. & Maloney, L. T. (2012), *Modeling Psychophysical Data in R*. New York: Springer.

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