Use of Contextual Constraint among Adults with Varying Age and Literacy Skill
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Rationale
- Proficient readers are facilitated in word-level processing by semantic constraints especially for older adults (e.g., Stine-Morrow et al., 2008), but little is known about development among those who do not acquire strong literacy skills.
- Among good readers, age effects in sentence processing and the use of contextual constraints have been found to depend on experience and verbal skills (Federmeier & Kutas, 2005; Payne et al., 2012).
- We measured eye-movements as younger and middle-aged adults varying in literacy skill read grade-level appropriate sentences to examine age differences in the use of contextual constraint as a function of literacy level.

Method

Participants

<table>
<thead>
<tr>
<th>Condition</th>
<th>Sentence</th>
<th>Cloze Probability</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Constrained - Expected</td>
<td>As soon as they reached the sand, he stopped to take off his shoes.</td>
<td>0.70 – 1.00</td>
<td>Did he take off his shoes?</td>
</tr>
<tr>
<td>Weakly Constrained - Expected</td>
<td>They had to shampoo the new rug after the accident with the wine.</td>
<td>0.20 – 0.65</td>
<td>Did they have to clean the rug?</td>
</tr>
<tr>
<td>Strongly Constrained - Unexpected</td>
<td>As soon as they reached the sand, he stopped to take off his shoes.</td>
<td>0.00 – 0.14</td>
<td>Did he take off his watch?</td>
</tr>
<tr>
<td>Weakly Constrained - Unexpected</td>
<td>They had to shampoo the new rug after the accident with the tray.</td>
<td>0.00 – 0.14</td>
<td>Did they have to clean the rug?</td>
</tr>
</tbody>
</table>

Comprehension

Regardless of age or literacy levels, readers allocate extra effort to process words that are unexpected (Figure 1).
- Regardless of age, adults with lower literacy skills allocate more effort than higher literacy adults to resolve meaning for concepts that are unexpected (Figures 3 & 4).
- Middle-aged readers, regardless of literacy level, allocate differentially less effort to resolving meaning when the context is weakly constraining relative to the unexpected condition (Figures 3 & 4), which may alternately reflect:
  - an advantage in the use of more subtle contextual cues, or
  - insufficient attentional allocation to resolve meaning in this condition (consistent with the comprehension data).
- The dissociation of the effects of constraint and expectancy on comprehension and eye-gaze, respectively, highlights the value of using both online and offline measures of reading.

Conclusions

Results (continued)

Reading Time Measures

Reading time measures did not differ across the two unexpected conditions and so they were combined for analysis. All eye-tracking measures showed main effects of expectancy, though effects were larger for later pass measures. Differences between weak and strong conditions only emerged at later pass measures (left). Those with lower reading level showed longer gaze durations and regression path durations than those with higher reading level (right).

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Results

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REFERENCES


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