INTRODUCTION

- It has been suggested that older adults are exceptionally attuned to situation model processing, whereas they tend to neglect proposition-based semantic analysis, so that the result is a less distinctive textbase representation (e.g., Radavanci et al., 2001, Stine-Morrow et al., 2008).
- However, very few studies have explored age differences on textbase and situation model representations that are constructed during comprehension.
- Eye tracking methodology enabled us to study online reading processes and examine whether younger and older readers construct and integrate textbase and situation model representations differently.
- In the current study, we compared younger and older readers’ eye movements when encountering a target sentence that was inconsistent either with an idea explicitly given in the text (textbase inconsistency) or the implied narrative situation (situation model inconsistency).

HYPOTHESES

- If older readers are less likely than younger readers to construct the textbase representation, we expected older adults to slow down and show more regressive eye movements to textbase-inconsistent targets relative to older adults.
- If older readers are more likely than younger readers to construct the situational representation, we expected older adults to slow down and show more regressive eye movements to targets inconsistent with the situation model.

METHOD

Participants

<table>
<thead>
<tr>
<th>Age</th>
<th>Young</th>
<th>Old</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Age Range</td>
<td>19–30</td>
<td>60–90</td>
</tr>
<tr>
<td>Education*</td>
<td>15.18 (1.85)</td>
<td>16.43 (2.66)</td>
</tr>
<tr>
<td>Vocabulary*</td>
<td>48.29 (4.85)</td>
<td>48.12 (7.49)</td>
</tr>
<tr>
<td>Working Memory*</td>
<td>5.00 (1.09)</td>
<td>3.97 (1.29)</td>
</tr>
</tbody>
</table>

* means are provided with standard deviations in parenthesis

- Fifteen short narrative passages were created so as to provide introductory context that was either consistent (neutral condition) or inconsistent with the subsequent target information. Inconsistent versions were: a textbase inconsistency—the explicit detail of the set-up was inconsistent with the target and (b) situational inconsistency—the situation described in the set-up implied inconsistency with the target.

Apparatus and Procedure

- Eye movements were recorded using a head-mounted SR Research EyeLink II system with a sampling rate of 500 Hz. Passages were shown on a 19-inch CRT monitor with a resolution of 1024 x 768 pixels in 16-bit high color; the font was sized so that 2-3 characters equaled to roughly 1 degree of visual angle. Each passage was presented on an entire screen, with 1.5 line spacing.
- The 15 experimental passages were interspersed with 15 filler passages that contain no inconsistency so that each participant read a total of 30 short narratives.
- Participants answered yes/no to comprehension questions after each passage to ensure active comprehension.

RESULTS

Sample Passage

**Inconsistency Condition**

- Old man had gotten ill on a trip to his favorite restaurant.
- Inconsistency Condition (NT): Old man had gotten ill on a trip to his favorite restaurant.
- Younger adults were more likely than older adults to slow down and show more regressive eye movements to textbase-inconsistent targets relative to older adults.
- Older adults were more likely than younger adults to revisit the set-up region and to allocate more effort to resolving the textbase inconsistency when they encountered textbase-inconsistent situations.

Passage Reading Time

- Total passages reading times were longer in both inconsistency conditions than in the NT condition, for a main effect of Inconsistency, F(2, 138)=3.82, p<.05, ηp²=.05.
- A main effect of Inconsistency, F(2, 138)=5.17, p<.01, ηp²=.07, indicated that readers were more likely to revisit the set-up paragraph in the TB inconsistency condition compared to the NT condition.

Reinspection Duration

- A main effect of Inconsistency, F(2, 138)=5.17, p<.01, ηp²=.07, indicated that readers were more likely to revisit the set-up paragraph in the TB inconsistency condition compared to the NT condition.
- A significant Age x Inconsistency interaction, F(2, 138)=3.68, p<.05, ηp²=.06, suggested that age groups were differentially affected by inconsistency conditions.

Design

- 1 Between-Subjects Factor
- 2 Age Groups: Young, Old
- 3 Within-Subjects Factor
- 3 Inconsistency Conditions: Neutral (NT), Textbase (TB), and Situation Model (SM)

CONCLUSIONS

- Counter to the idea that older readers do not construct a distinctive proposition-based representation, we found that older adults were more likely to be affected by textbase inconsistency than were younger adults. Older adults allocated more time to inspecting an earlier text when encountering textbase inconsistency in the target sentence, which led to an increased total fixation duration. Younger adults allocated more time to resolving situational inconsistency as shown by their increased total fixation duration and regression-path duration when detecting situational inconsistency.
- However, there was no evidence that the older adults were more likely than the younger adults to revisit the set-up region and to allocate more effort to resolve the textbase inconsistency than were younger adults. This suggests the possibility that older adults experienced some difficulty in exactly locating the source of the inconsistency during regressions.
- Our data provide evidence that older readers construct an accurate textbase representation that is retained at least over the course of reading short narratives.

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References
