It has long been established that people are able to make rapid use of contextual information to assist in the processing of language (e.g. Tanenhaus et al., 1995). The questions of exactly how this is done, particularly, how quickly it happens, however, are still being examined (e.g. Sereno et al., 2003).

Duffy et al. (1988) used lexical ambiguity to investigate the interface between context and lexical processing. Importantly, they drew distinction between lexical items which were ambiguous with a dominant meaning (biased), and those where each meaning was considered equal (balanced). They posited the re-ordered access model; an interactive account of lexical access which predicts that, when no supportive context is present, balanced ambiguous words are slower to access than biased ambiguous words due to there being little frequency difference between interpretations. Supportive context constitutes addition information to re-order and boost one of the competing interpretations, and so speeds up lexical access.

In this study, we look not only at fixation durations on the critical word (as Duffy et al. did) but also skipping rates of the critical word. Studies have shown effects of predictability and lexical variables on skipping rates (see Brysbaert et al. (2005) for a review), but there have been fewer studies showing effects of higher level variables (such as context) on skipping. Such effects would show evidence for extremely early contextual integration, and would challenge eye-movement models that limit the amount of lexical processing that can occur in the parafovea.

Using a combination of Wordnet / Semcor and our own norming study we produced balanced ambiguous items with lexical frequency and word-length matched unambiguous controls. Neutral and supportive (for the slightly subordinate meaning of the ambiguous words) contexts were generated to provide us with a 2x2 design crossing context (neutral / supportive) and ambiguity (unambiguous / ambiguous).

<table>
<thead>
<tr>
<th>Context</th>
<th>Supportive</th>
<th>Neutral</th>
<th>Ambiguity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unambiguous</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Ambiguous</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. The woman was unhappy with the way things were going. It was no good, the fragment would have to be removed.
2. The woman was unhappy with the way things were going. It was no good, the *appendix* would have to be removed.
3. The woman was complaining of abdominal pain. It was no good, the fragment would have to be removed.
4. The woman was complaining of abdominal pain. It was no good, the *appendix* would have to be removed.

We find that people are more likely to fixate on the critical word if it is ambiguous and unsupported by the context, than if it is contextually supported (and therefore disambiguated).
Additionally, when the context is supportive there is no difference in the probability of fixation of unambiguous and ambiguous words. This interaction is reliable (p < 0.01)

Thus some level of lexical processing is occurring prior to the fixation of the word and contextual information is being brought to bear on ambiguity resolution at a very early stage.

The findings of our study speak to models of lexical access, and more generally to the interactivity / modularity debate. Seemingly they fit best with the interactive re-ordered access model but the time-course is much faster than even Duffy et al might predict. Our findings also impact the reading model literature, with implications for E-Z Reader, SWIFT and other models of eye-movement control.

References:


