Fearing and Loving: 
Verb Category matters in processing implicit causality

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In comprehending causal relationships between events, the preferred referent of a pronoun varies systematically with the verb in the main clause. These verbs are said to have an ‘implicit causality bias’ (Garvey & Caramazza, 1974).

Previous ERP studies have shown that implicit causality verbs lead to online expectations about upcoming pronouns, with neural processing costs on mismatch pronouns.

These studies, however, have used rich discourse contexts and quite heterogeneous verbs (e.g., Van Berkum et al., 2007).

The ERP current study used only psych verbs (object-experiencer [subject-biased] and subject-experiencer [object-biased] verbs), defined according to semantic classification by Levin (1993) and taxonomy from VerbNet. These verbs had been tested for pronoun resolution bias in a large-scale behavioral study (Hartshorne & Snedeker, 2013).

Methods

<table>
<thead>
<tr>
<th>Congruity</th>
<th>Subject biased verbs</th>
<th>Object biased verbs</th>
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<tbody>
<tr>
<td>congruent</td>
<td>C4</td>
<td>C4</td>
</tr>
<tr>
<td>incongruent</td>
<td>P4</td>
<td>P4</td>
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Pronouns that were inconsistent (vs. consistent) with the implicit causality bias evoked a right lateralized prolonged negativity (between 300ms-700ms) when they followed subject-biased (object experiencer) verbs, but not for object biased (subject-experiencer) verbs.

No effects on the word immediately preceding the pronoun (‘because’)

Conclusion

Semantic verb class matters for online use of implicit causality: subject biased/object experiencer verbs were used to quickly generate expectations regarding the cause of the mental state, leading to costs on mismatched pronouns.

This could be because object experiencer verbs, but not subject experiencer verbs, directly encode causality in their lexical entry (e.g., frighten = cause X to feel fear) (e.g., Pesetsky, 1995).

The prolonged negativity effect can be distinguished from a late positivity effect previously observed with inconsistent IC pronouns (Van Berkum et al., 2007).