Introduction

- In 1984, Kutas et al. found that N400 ERP component is sensitive to Cloze Probability manipulations. 
- Sentence final words with lowest cloze ratings elicited N400s of the highest amplitude 
- Sentence final words with intermediate cloze ratings elicited mid-size N400s 
- Sentence final words with highest cloze ratings elicited N400s of the lowest amplitude

Will this finding extend to the conditions when sentence Plausibility, not Cloze Probability is manipulated?

Predictions

- Least plausible (anomalous) sentences will elicit highest N400s 
- Implausible (but possible) sentences will elicit mid-size N400s 
- Plausible sentences will elicit lowest N400s

Table 1. Plausibility means for each condition

<table>
<thead>
<tr>
<th>Plausibility</th>
<th>Plausibility Rating (1-7, 7=best)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>6.42</td>
</tr>
<tr>
<td>Med</td>
<td>3.94</td>
</tr>
<tr>
<td>Low</td>
<td>1.74</td>
</tr>
</tbody>
</table>

Table 2. Plausibility judgment rates

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Plausible as Implausible</td>
<td>6.0%</td>
</tr>
<tr>
<td>Plausible as Anomalous</td>
<td>0.5%</td>
</tr>
<tr>
<td>Implausible as Plausible</td>
<td>34.0%</td>
</tr>
<tr>
<td>Implausible as Anomalous</td>
<td>21.0%</td>
</tr>
<tr>
<td>Anomalous as Plausible</td>
<td>4.0%</td>
</tr>
<tr>
<td>Anomalous as Implausible</td>
<td>16.0%</td>
</tr>
</tbody>
</table>
Methods

Experiment 1 (Task - Answering simple comprehension questions after each sentence)

- 19 right-handed participants (16 females, ages 18-23)
- Three lists of 240 triplet sentences that were 10 words long and consisted of two clauses interconnected by a conjunction. The first clause always ended with a direct object, which varied in plausibility - (1) plausible, (2) implausible, or (3) anomalous
  1. Tyler cancelled the subscription because she was not entirely satisfied.
  2. Tyler cancelled the birthday because she was not entirely satisfied.
  3. Tyler cancelled the tongue because she was not entirely satisfied.
- Participants were instructed to read each sentence and answer the question that followed by pressing a “YES” or “NO” button on the game pad.

Experiment 2 (Plausibility Judgment Task)

- 20 right-handed participants (16 females, ages 19-23)
- Stimuli were the same as in experiment 1.
- Participants were instructed to press one of the three buttons on the game pad, indicating whether they thought the preceding sentence contained information likely to occur in the real world, not likely to occur in the real world, or impossible to ever occur in the real world.

Findings

- Our findings demonstrate that both N400 and P600 are sensitive to plausibility manipulations and could be elicited by a noun preceded by a semantically unrelated verb.
- We provide further evidence that a plausible semantic relation between a verb and a noun is not necessary for eliciting a P600 effect, and neither is an animacy violation.
- We were able to show that it is not the absence of a preceding context that appears to determine whether or not a P600 will be evoked to unrelated semantic violations.
- Finally, under certain circumstances, P600 causes attenuation of an N400, signaling close interaction between syntactic and semantic processing.
- Both experiments provided evidence that the amplitude of N400 is sensitive to plausibility manipulations but it is not proportional to the degree of plausibility. Neither Experiment 1 nor Experiment 2 showed a difference between the amplitudes of N400 to implausible and anomalous conditions.
- Finally, even though only Experiment 2 evoked a P600 effect, we believe that it is still possible that there was a short-lived neurocognitive process reflected by a P600 in Experiment 1 starting within the 300-500ms time window, but it was not observed at the scalp perhaps because of overlap with the N400.

References


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