Brain potentials of expressive content: New evidence for semantic theory

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Background

Literature

- Def: Speaker-oriented, not-at-issue (NAI) entailments
  - e.g. swearing, honorifics, formal/familiar distinction
  - Expressives processed as separate speech act → Fast
  - Speech Acts are processed automatically (Hilgard & Ashley, 2001) and rapidly at ~200 ms (Galadari et al., 2015)
- Left angular gyrus and temporo-parietal areas (Enginovski et al., 2016)
- Unidimensional direct update to Common Ground (Schlenker, 2010)
  - NAI content (expressives) is processed before the at-issue content
  - All things being equal, NAI content is processed early
  - Semantic frameworks of continuations (Bernard, 2010)
  - Once NAI content (expressives) has been launched, its composition is ‘ballistic’, not affected by surrounding material
  - Expressives do not depend on the discourse context
  - Multidimensional (Bernard, 2010)
    - Expressives have 6 properties including immediacy and independence
      - The damn dog is on the couch
      - descriptive: the dog is on the couch
      - expressive: the dog is held in low regard

Research Question: With respect to these competing theoretical accounts, how and when are expressives processed?

- Most theories predict rapid processing for NAI content

Hypothesis

- Despite being secondary, NAI content, expressives are processed relatively quickly

Methods

- Participants. 18 native English-speaking students, right handed, 9 females, ages 18-34
- Materials. 28 swear words, 28 emotional words with negative valence, 28 neutral words, 28 closed class words, 112 pseudowords.

<table>
<thead>
<tr>
<th>Word properties</th>
<th>Letter Length</th>
<th>Subtext Freq.</th>
<th>Log Subtext</th>
<th>Ortho N</th>
<th>Num Phonemes</th>
<th>Valence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swear Words (adult)</td>
<td>4.96</td>
<td>119.93</td>
<td>3.39</td>
<td>8.24</td>
<td>3.84</td>
<td>3.38</td>
</tr>
<tr>
<td>Negative Valence Words (adult)</td>
<td>4.89</td>
<td>119.47</td>
<td>3.59</td>
<td>6.18</td>
<td>4.14</td>
<td>2.45</td>
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<tr>
<td>Open Class Neutral Words (adult)</td>
<td>5.00</td>
<td>116.69</td>
<td>3.25</td>
<td>6.39</td>
<td>4.04</td>
<td>6.15</td>
</tr>
<tr>
<td>Closed Class Words (adult)</td>
<td>4.97</td>
<td>113.45</td>
<td>3.36</td>
<td>6.37</td>
<td>3.83</td>
<td>X</td>
</tr>
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<td>p values in t-tests comparing</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>swear with all others</td>
<td>.95</td>
<td>.56(.99</td>
<td>.55</td>
<td>.91</td>
<td>.51</td>
<td>NA</td>
</tr>
</tbody>
</table>

Results

- Lexical decision task.

- Procedure

  Sequence of one trial of the lexical decision task.

  - EEG. Continuous EEG recorded from 64 Ag-Ag/Cl channels
  - Data referenced online to vertex electrode (Cz); re-referenced offline to algebraic average of L and R mastoids, analyzed with Brain Vision Analyzer 2.0

  - Event Related Potentials: 145-165 ms

  - Swear words are more effortful in processing than Neutral words. Late positive component (LPC) challenges early processing accounts, e.g. Potts’ principle of immediacy. NAI content contributes information, but appears to do so only later

  - ERPs provide support for independence; Swear words contribute a dimension of meaning separate from the descriptive content of classes like Neutral words

  - Both Negative words and Swear words elicited larger LPC than Neutral words, but the neural generators are at least partially dissociable

  - Results support modified multidimensional account (Potts, 2007)

Discussion

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References


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