Effects of Conflict and Grammatical Class on LIFG Activation During Action and Object Naming

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Background
- Left Inferior Frontal Gyrus (LIFG) is active during language and semantic memory tasks -- e.g. lexical decision, conjugation, semantic triad and picture naming.
- Lesion and imaging studies report LIFG specialization for verbs and Left Temporal specialization for nouns. Thus, many have concluded that these areas encode separate domains of semantic knowledge.12
- Other studies refute this claim with evidence for domain general functions.3-5
- Previous studies have confounded conflict on verbs.

Manipulation

<table>
<thead>
<tr>
<th>Condition</th>
<th>Mismatched</th>
<th>Matched</th>
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</thead>
<tbody>
<tr>
<td>Noun</td>
<td>&quot;Chew&quot;</td>
<td>&quot;Wheat&quot;</td>
</tr>
<tr>
<td>Verb</td>
<td>&quot;Playing&quot;</td>
<td>&quot;Pushing&quot;</td>
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- Use name agreement to define noun- or verb-bias and manipulate conflict by altering the naming task.

Behavioral Results

- Interaction between bias and conflict (p = 0.011). Main effect of conflict (p < 0.001).

FMRI Results

- Mean activity in LIFG ROI higher for nouns than verbs.
- Interaction between bias and conflict (p = 0.031).

Task

- Mean LIFG ROI for high conflict condition in verb-biased: 2.5
- Mean LIFG ROI for high conflict condition in noun-biased: 3.5
- Interaction between bias and conflict (p = 0.06).

Group Analysis

- Group analysis of high vs. low conflict conditions for verb-biased items (High - Low, N = 12).

Conclusions & Directions

- Naming pictures with verbs is NOT associated with higher activation in LIFG than naming them with nouns.
- LIFG responds to conflict in items that norm as verb-biased.
- What aspect of verb-biased pictures is driving activation?
- How do other manipulations of conflict affect LIFG response?

References


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*References include: