Early decomposition effects during visual processing of past tense verbs: MEG masked priming evidence for form-based decomposition of irregular verbs

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**Introduction**

Past Tense Debate

1. Dual Mechanism Theory: regular verbs generated by rule, irregulars memorized and stored as whole forms in the lexicon. (Pinker & Prince, 1988)
2. Single Mechanism Theory: both regulars and irregulars generated by rule from stem and affix, with phonological readjustment of stem as necessary. (Stockall & Marantz, 2006)

**Stimuli**

- 200 real word targets, preceded by related and unrelated primes; 200 non-word targets, preceded by related and unrelated primes; the two types of stimuli were created to ensure that all targets were seen in a single trial incase of pseudo-irregulars (bell-BALL; Crepaldi et al., 2010).

**Experimental Procedure**

- Behavioral evidence for form-based decomposition from masked priming with genuinely affixed words (teacher-TEACH) and pseudo-affixed words (corner-CORNS), but not orthographic controls (brolle-BROTHER, Rastle, Davis, & New, 2004).
- Similar results for irregular items (fell-FALL), Davis, & New, 2004).

**Design**

- MEG studies of single word reading show effects of transition probability from stem to affix on the M170 evoked response (Solomyak & Marantz, 2010).

**MEG/EEG Studies of Visual Word Recognition**

MEG studies of single word reading show effects of transition probability from stem to affix on the M170 evoked response (Solomyak & Marantz, 2010).

**Behavioral Results**

<table>
<thead>
<tr>
<th>Condition</th>
<th>RT Priming</th>
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</thead>
<tbody>
<tr>
<td>Identity</td>
<td>33.3 ms (p = 0.0001)</td>
</tr>
<tr>
<td>Regular</td>
<td>22.5 ms (p = 0.002)</td>
</tr>
<tr>
<td>Irregular</td>
<td>14.2 ms (p = 0.042)</td>
</tr>
<tr>
<td>Pseudo-irregular</td>
<td>14.6 ms (p = 0.083)</td>
</tr>
</tbody>
</table>

**MEG Results**

- MEG analysis of masked priming effects in left fusiform ROI, with genuine affixed words (teacher-TEACH) and pseudo-affixed words (corner-CORNS), but not orthographic controls (brolle-BROTHER, Rastle, Davis, & New, 2004).

**Conclusions**

1. Early M170 effects of masked priming manipulation in left fusiform ROI.
2. M170 priming effects for regular and irregular verbs, supporting notion that all past tense verbs are decomposed into stems and affixes, prior to lexical access.
3. Confirms predictions of Single Mechanism Theory (Stockall & Marantz, 2006), as opposed to Dual Mechanism Theory (Pinker & Prince, 1988) which predicts rule-based decomposition only for regular verbs.

References