Perceptual similarity modulates context effects in online compensation for phonological variation
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Background

• How important is context in recognizing phonological variants in online word recognition?

<table>
<thead>
<tr>
<th>Type of variant</th>
<th>Context matters?</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canonical forms</td>
<td>No</td>
<td>e.g. Pitt et al., 2011, Random &amp; Connine, 2007</td>
</tr>
<tr>
<td>Assimilated forms</td>
<td>Yes</td>
<td>e.g. Gaskell &amp; Marslen-Wilson, 1996</td>
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<tr>
<td>Glottal stop [ʔ]</td>
<td>Yes</td>
<td>Pitt et al., 2011</td>
</tr>
<tr>
<td>Deletions</td>
<td>Yes</td>
<td>Pitt et al., 2011</td>
</tr>
<tr>
<td>Tap (word-medial)</td>
<td>Yes</td>
<td>Pitt et al., 2011</td>
</tr>
<tr>
<td>Tap (word-final)</td>
<td>No</td>
<td>Random et al., 2009</td>
</tr>
<tr>
<td>Other variants of /t/</td>
<td>No</td>
<td>Chong &amp; Sundara, 2014; in prep</td>
</tr>
</tbody>
</table>

Canonical forms:
• Context does not seem to matter even though canonical forms may not be the most frequent variant in a given phonological context.
• Presumably because of perfect match to lexical representation.

But how close a perceptual match does it have to be for context to be ignored?
• Bayesian models like Shortlist B (Norris & McQueen, 2008) suggest that contextual information is less important the closer a perceptual match a surface form is compared to what is represented in the lexicon.

• [d] and [ɾ] are perceptually very similar (De Jong, 1998; Herd et al., 2010).
• Q: Given that [d] and [ɾ] are perceptually very similar, do listeners ignore a mismatch context in word recognition?

Methods

Expt. 1: Word identification

• Listeners asked to click on the word they heard.
• % Word responses:
  1. Tap condition: Match = Mismatch
  2. Tap condition: Match > Mismatch

Expt. 2: Eye-tracking

• Listeners asked to look at the word they heard.
• Compare to /t/ words (Chong & Sundara, 2014; in prep):
  1. Tap condition: Match = Mismatch
  2. Tap (mismatch) > Mispronunciation

Summary

1) Context does not matter for canonical stop variants
2) Context does not matter for non-canonical tap variants of /d/
3) Compare: tap variants of /N/ (Chong & Sundara 2014; in prep)

Discussion

Is the failure to find an effect due to inability to discriminate [d] and [ɾ]?
• No: Boomer et al. (2008) found that English listeners could discriminate [d] and [ɾ] significantly above chance

What does it mean for phonological representations?
• Problematic for abstractionists accounts (e.g. inference account, e.g. Gaskell & Marslen-Wilson, 1996)
  • An unviable context should have a disruptive impact on word recognition.

• Exemplar account (Goldsinger, 1996; Johnson, 1997)
  • Context information would have to be stored for some variants but not others:
    • Have to explain context effect for tapped /t/ words but not tapped /d/ words

• Lexical access is based on the perceptual similarity of input and stored representation.

• [d] and [ɾ] are perceptually very similar – little cost to recognition

Future directions

• If there is a similarity bias, at what level does this operate?
  • We suggest that it might be at the prelexical level.

• Why do infants without a lexicon also show this bias?
  • (Sundara, Kim, White & Chong, submitted)

• Planning on investigating this with auditory priming

Selected References