The Role of Allophonic Variation in Speech Segmentation

Sara Mackenzie¹, Erin Olson¹, Meghan Clayards¹ & Michael Wagner¹
McGill University¹, Memorial University²

Methodology


Table 1

<table>
<thead>
<tr>
<th>Nonce string</th>
<th>Predicted Parse</th>
<th>Predicted Choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light [l]</td>
<td>dasiledu</td>
<td>Early Boundary</td>
</tr>
<tr>
<td>Dark [l]</td>
<td>dasiledu</td>
<td>Late Boundary</td>
</tr>
<tr>
<td>pause + n</td>
<td>dasinedu</td>
<td>Early Boundary</td>
</tr>
<tr>
<td>n + pause</td>
<td>dasinedu</td>
<td>Late Boundary</td>
</tr>
</tbody>
</table>

58 subjects heard a nonce string and chose between two orthographies:

- Stimuli were produced by one of the authors reading aloud without a pause
- Sound files were cross-spliced; the dark [l] condition consists of a CVCVC₃C₄ string containing a dark [l] followed by a VC originally produced following a light [l] and vice versa
- Latin square design, 8 items per condition heard by each subject

Results

- Mixed model logistic regression found a significant effect of dark vs. light /l/
- Error bars indicate 95% confidence intervals
- Light /l/ was a particularly strong cue to word-initial position with subjects choosing early boundary orthography at a rate of over 90% when presented with light /l/

Conclusions

- Evidence from speech segmentation and production suggests that light /l/ cues morpheme-initialness
- Perception: listeners make use of the allophonic distribution in segmenting speech with light /l/ being a strong cue to word initial position
- Production: Word-initial /l/ is lighter than word-final ones; word-internal /l/ are lighter morpheme-initially than finally and morpheme-externally
- These differences cannot be reduced to stress placement, vowel length, vowel quality, or syllabification, which were controlled for
- Contrary to Hayes (2000), we found no difference in /l/ darkness between morpheme final /l/ (knee-ing) and morpheme-internal ones (ceiling)
- The data is compatible with Standard North American English being a dark-l language with initial clearing (Lehiste 1964, Recasens, 2012).

References: