I. Introduction

- Casual adult-directed speech (ADS) has copious phonetic variation [e.g., 4].
- In contrast, infant-directed speech (IDS) has been previously argued to be more canonical (faithful to dictionary pronunciation) [5][6].
- However, recent studies find IDS and ADS to be equally variable [2].
- Typically IDS variation examined word-finally.
- But cross-linguistically in adult grammars, onset positions are more phonetically stable and salient [1].

Does the extent of phonetic variation in IDS differ based on segment position in a word?

II. Methods

- IDS from Providence Corpus (longitudinal) [3]
  - 6 monolingual English-speaking 1- to 3-year-olds interacting with parents (usually mothers) at home during everyday activities.
  - Data from two age ranges, 16-18 and 22-24-mo-old.
- Utterances with coronal stops and fricatives (/t/, /d/, /n/, /s/, /z/) identified using orthography.
- Utterances were forced-aligned [7].
- Alignment check, phonetic transcription of allophonic variants by 3 phonetically-trained native speakers of English.
- Automated data extraction, problematic tokens (alignment/transcription error) rechecked by 4 new phonetically-trained native speakers of English.

Examples of phonetic coding of segments

<table>
<thead>
<tr>
<th>Target sound</th>
<th>Phonetic realisation</th>
<th>Position in word</th>
<th>Preceding segment</th>
<th>Following segment</th>
<th>Word</th>
<th>Part of speech</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>?</td>
<td>final</td>
<td>v</td>
<td>n</td>
<td>v</td>
<td>center</td>
</tr>
<tr>
<td>s</td>
<td>z</td>
<td>medial</td>
<td>p</td>
<td>t</td>
<td>t</td>
<td>uppers</td>
</tr>
</tbody>
</table>

- Final corpus: 28,775 segments
- Currently processed: 25,296 segments

III. Results – Variants by position

Initial (7,054 tokens)

- Canonical variant [released stop/fricative] was the most frequent variant for every segment.

<table>
<thead>
<tr>
<th>Percentage of Tokens</th>
<th>Underlying word-initial segment</th>
<th>Underlying word-medial segment</th>
<th>Underlying word-final segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>canonical</td>
<td>70%</td>
<td>60%</td>
<td>70%</td>
</tr>
<tr>
<td>assimilated</td>
<td>10%</td>
<td>15%</td>
<td>10%</td>
</tr>
<tr>
<td>deleted</td>
<td>10%</td>
<td>15%</td>
<td>10%</td>
</tr>
<tr>
<td>glottalized</td>
<td>10%</td>
<td>15%</td>
<td>10%</td>
</tr>
<tr>
<td>tapped</td>
<td>10%</td>
<td>15%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Medial (7,095 tokens)

- Canonical variant was still the most frequent variant for every segment, but to a lesser degree.

Final (1,147 tokens)

- Canonical variant is not the most frequent variant for either /t/ (13%) or /d/ (31%).
- Large differences by segment.

IV. Results – Duration variation by position

- How variable is the production of canonical tokens in different positions?
- Even among canonical tokens, duration of /t/ varies most word-finally; in contrast, there are no differences in duration of canonical /n/ and /s/ across positions.

V. Results – Comparison to ADS

- Comparing a subset of our IDS data in assimilation contexts (word-final /d/, /t/ and /n/, 725 tokens) directly to the ADS study by [4] (4349 tokens).
- Less canonical in current IDS study: /t/ ($\chi^2(2,323, N = 2,324) = 56.77, p < .001$)
- /d/ ($\chi^2(1,308, N = 1,309) = 33.33, p < .001$)
- Similarly variable in current IDS study: /n/ ($\chi^2(1,117, N = 1,118) = 0.03, p = 0.86$)

VI. Summary

- We replicate [2]'s results that IDS is not more canonical than ADS.
- Not all segments are equally variable - /n/ and /s/ are produced mostly canonically. /t/ has many more variants.
- Variation is mostly limited to coda positions.
  - In onsets, the canonical variant is always the most frequent.
  - This is not true for codas.
- This positional difference could be beneficial for category learning:
  - Word-initial segments: acquire canonical forms, support word segmentation.
  - Word-final segments: variation, learn allophonic variants in connected speech.
- Future work: more on acoustic properties of phonetic variants.

Acknowledgements

We would like to thank I. Chou, A. Grigoryan, O. Huang, A. Martirosyan, G. Thohir, A.Y. Yoo and D. Zhang for their help with checking transcriptions, Olivier Wang for help with automated data extraction, and to members of the UCLA Phonetics Lab for comments and discussion. This research was funded by a UCLA COR grant to Megha Sundara.

Selected references


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