Introduction

- /s/-retraction is the phenomenon by which /s/ is realized approaching [], especially in the context of /t/.
  - 'street' /stɛt/ → [ʃtɛt]
- However, this is less reported for other clusters.
  - 'scream' /skɹɛm/ → [ʃkɹɛm]
  - ‘spree’ /spɹi/ → [ʃpi]

Sociolinguistic overview

- Described as neither regional nor dialectal but a ‘general American innovation’ (Shapiro 1995).
- Observed in varieties of English in USA (Shapiro 1995), Canada (Clarke 2004), UK (Glyfadottir 2013), and New Zealand (Lawrence 2000).
- Observed equally in men and women in Philadelphia (Glyfadottir 2015), but more women than men in North Carolina (Wilbanks forthcoming).
- Perceived as more Southern/hick (Hinrichs et al. 2015).

Phonological overview

- /s/-retraction is a phonological (assimilatory) process and is categorical (Shapiro 1995, Rutter 2011).
- /s/-retraction is a phonetic (coarticulatory) process and is gradient (Mielke et al. 2010, Glyfadottir 2015).

Prosodic strengthening

- Sounds adjacent to a prosodic boundary are lengthened (Fougeron & Keating 1997).
- Sounds adjacent to a prosodic boundary are hyperarticulated and exhibit less coarticulatory effects (Cho 2004).
- Korean fricatives in phrase-initial positions are produced with a lower center of gravity (Jang 2011).

Research questions

1. Is /s/-retraction a gradient or categorical process?
2. To what extent is /s/-retraction phonologically or prosodically conditioned?

Results

- CoG measurements were calculated from 11 equidistant points (40ms Hamming window; preemphasis 80Hz; frequency range 500 to 12000Hz).
- CoG was modeled using lmer() function of lme4 in R.

\[
\text{CoG} = \text{ORDER} + \text{SEX} + \text{CoG} \times /s/ + (\text{POSITION} + \text{TIMEPOINT} + \text{FOLLSEGMENT} + \text{SDURATION}) + (1 + \text{ORDER} + \text{POSITION} + \text{FOLLSEGMENT} + \text{PARTICIPANT})
\]

Figure 1: Left: Effect of phonological environment on CoG (p < 0.001) Right: Effect of prosodic position on CoG (p < 0.01).

- A general dampening in CoG may be observed for the interaction of prosodic position and phonological environment.

Figure 2: Time course of retraction for a non-retractor displaying no effect of the interaction of prosodic position and phonological environment.

Figure 3: Time course of retraction for a retractor displaying no effect of the interaction of prosodic position and phonological environment.

Figure 4: Time course of retraction for an individual displaying a significant effect of the interaction of prosodic position and phonological environment.

Methods

Participants

- 30 participants (20 males, 10 females), ages 18-22 (mean 20).

Procedure

- Stimuli were selected from the form /CC/ in words, using SUBTLEXUS.

<table>
<thead>
<tr>
<th>word onset</th>
<th>WF</th>
<th>word onset</th>
<th>WF</th>
</tr>
</thead>
<tbody>
<tr>
<td>sage /s/</td>
<td>1.75</td>
<td>spray /s/</td>
<td>0.84</td>
</tr>
<tr>
<td>shade /ʃ/</td>
<td>5.96</td>
<td>strain /s/</td>
<td>7.08</td>
</tr>
<tr>
<td>scrape /s/</td>
<td>4.12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Target words and their frequencies (per million words)

Initial

- I don’t know what he said to me.
- Scraper or drake is maybe what he said.

Medial

- I don’t know what he said.
- Maybe scraper or drake is what he said to me.

Table 2: Design of stimuli contrasting initial v. medial phrase positions.

Conclusion

- Following consonant dampen the CoG of /s/.
- Adjacency to a prosodic boundaries also dampens the CoG of /s/.
- Individuals vary significantly in the interaction of these factors.
- These results suggest a role of prosodic position in the actuation of sound change.
- Adjacency to a prosodic boundary creates an ideal articulatory environment for sound change due to CoG dampening.
- But it also creates the ideal locus for target reinterpretation, i.e. the ideal perceptual environment for sound change.
- Segments adjacent to a boundary are lengthened, exhibit less coarticulatory effects and/or are hyperarticulated.
- Hyperarticulated speech may more likely lead to target reinterpretation.
- Target reinterpretation creates a shift from coarticulatory variation to a phonologized sound change.


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