Compensation for coarticulation in prosodically weak words

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1. Introduction
- hyperarticulation in prosodically strong or accented words vs. hypoarticulation in prosodically weak or unaccented words (Lindblom, 1990)
- magnitude of coarticulation is greater in hypoarticulated, unaccented words than in hyperarticulated words (Fowler, 2005; Cho, 2004)
- listeners compensate perceptually for the effects of coarticulation (Mann & Repp, 1980)
- mismatch between how coarticulation in production and perception are parsed provide the conditions for sound change (Ohala, 1993), e.g. diachronic /u/-fronting in RP (Harrington et al., 2008)
- sound change occurs frequently in prosodically weak contexts (Beckman et al., 1992), e.g. Old English muneceas → present-day English monks

Research question: Do listeners undercompensate for a higher degree of coarticulation in prosodically weak words?

2. Predictions
1. There is more C-on-V coarticulation in prosodically unaccented words.
2. Listeners compensate perceptually for the effects of C-on-V coarticulation.
3. Listeners compensate less for C-on-V coarticulation in prosodically weak words.

3. Method
Participants: 15 speakers of Standard German participated in two experiments
- target CVC non-words /p_p/, /p_p/, /t_t/, /t_t/ produced in two conditions
- spectral slope and curvature by applying DCT over a frequency range of 260-2320 mel
- log. Euclidean distance ratio: measurement of relative distance of vowel trajectories to /u, y/ (per speaker and accentuation condition)

4. Results

<table>
<thead>
<tr>
<th>Production</th>
<th>Perception</th>
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<tbody>
<tr>
<td>Accented</td>
<td><a href="#">Log Euclidean distance ratio</a></td>
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<tr>
<td>Unaccented</td>
<td><a href="#">Log Euclidean distance ratio</a></td>
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</tbody>
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Prediction 1: YES
• more /u/-fronting in unaccented than in accented /t_t/
• greater F2-target undershoot in prosodically weak /u/ in alveolar context

Prediction 2: YES
• more /u/-responses in alveolar context
• perceptual compensation for coarticulation

Prediction 3: NO
• listeners do not compensate to a lesser extent for coartuclatory effects in prosodically weak words
• the /t_t/-response in /t_t/-context was right shifted in the unaccented condition, i.e., listeners are very sensitive to the expected greater increase of /u/-fronting in the production of unaccented words and compensate for it

5. Discussion and Conclusion
- no differences in (compensation for) coarticulation in prosodically weak vs. strong /CVC/ → perception and production match
- /u/ in alveolar context is fronted to a greater extent in the production of unaccented vs. accented words and listeners are sensitive to this predicted shift in production, i.e. they perceptually compensate to a greater extent for coarticulation in prosodically weak words
- No mismatch between the perception and production of coarticulation in prosodically weak words.

6. References