L2 onset cluster production

- Onset CC clusters with a small sonority distance (SD) are more marked than onset clusters with a large sonority distance (Broselow and Floor 1991; Elman and Iversen 1993).
  - \[ \text{[n]} \leadsto \text{[kw]} \]
- Among sC clusters...
  - \[ \text{[s]} \leadsto \text{[s]} \leadsto \text{[s]} \]
  - Cardillo (2006) - L1 Spanish, L2 English
  - Cardoso and Lisboa (2013) - L1 Brazilian Portuguese, L2 English
  - \[ \text{[s]}, \text{[n]} \leadsto \text{[s]}, \text{[n]} \]
  - Yavas & Someillan (2005) - Spanish/English bilingual

- Previous L2 studies examining onset sC cluster production study speakers of languages which do not allow sC clusters, but allow other onset clusters.

- Research Question: Are speakers of L1s that do not allow onset clusters sensitive to sonority distance in the production of CC and sC onset clusters?

The Current Study

Procedure:
- Word list reading
- 83 test words, all CCVC
- Tokens of all English sonority distances, e.g. “twin” (SD 7), “true” (SD 3), “star” (SD 2)

Participants:
- 8 participants
- Native speakers of Mandarin Chinese, Japanese, Cantonese
- All enrolled in the English Language Institute, intermediate level

Coding:
- All tokens analyzed in Audacity
- Onset clusters coded as “correct”, “prothesis”, “internal epenthesis”, “deletion”, “other”

Sonority Distance (SD) measured using the Hogg & McCully (1987) sonority scale

<table>
<thead>
<tr>
<th>Sound</th>
<th>Sonority Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low vowel</td>
<td>10</td>
</tr>
<tr>
<td>Mid vowel</td>
<td>9</td>
</tr>
<tr>
<td>High vowel</td>
<td>8</td>
</tr>
<tr>
<td>Fricative</td>
<td>7</td>
</tr>
<tr>
<td>Nasal</td>
<td>6</td>
</tr>
<tr>
<td>Voiceless stop</td>
<td>5</td>
</tr>
<tr>
<td>Voiceless fricative</td>
<td>4</td>
</tr>
<tr>
<td>Voiced stop</td>
<td>3</td>
</tr>
<tr>
<td>Voiced fricative</td>
<td>2</td>
</tr>
<tr>
<td>Voiceless fricative</td>
<td>1</td>
</tr>
</tbody>
</table>

- 70% (466 tokens) of all onset clusters were produced correctly
- Of the non-target like productions:
  - 131 occurrences of internal epenthesis (66% of errors)
  - 2 occurrences of C2 deletion, 0 instances of C1 deletion
  - 9 occurrences of substitution

- SC cluster results show that sonority distance is negatively correlated with correct production (Pearson correlation, r(32) = .511, p < .003). This is the opposite pattern from that predicted by markedness in terms of sonority distance.
  - SD prediction: \[ \text{sd} \leadsto \text{sd} \leadsto \text{sd} \leadsto \text{sd} \]
  - Results: \[ \text{sw} \leadsto \text{sw} \leadsto \text{sw} \leadsto \text{sw} \]

Results

The Syllable Contact Law states that the greater the sonority drop between coda and following onset, the more harmonic the relationship (Murray & Vennemann 1983).

In sC onsets, Barlow (2001) and Goad and Rose (2002) consider /s/ to be outside the onset. Following Kaye (1994) and Pan and Snyder (2004), I consider /s/ to be the coda of the previous syllable. Therefore, sC onset clusters are really coda-onset pairs.

Structure of onset CC clusters Structure of onset sC clusters

Among these participants, the most harmonic relationships are likely to be produced correctly; less harmonic relationships are likely to be modified using internal epenthesis.
- \[ \text{st} \leadsto \text{s} \rightarrow \text{st} \rightarrow \text{s} \rightarrow \text{st} \rightarrow \text{s} \rightarrow \text{st} \]
- Results: \[ \text{sw} \leadsto \text{sw} \leadsto \text{sw} \leadsto \text{sw} \]

Gouskova (2004) proposes a harmonic alignment scale that combines the sonority scale with the Syllable Contact Law’s preference for a sonority rise between coda and onset.

\[ \text{Dist}+6(\text{sw}) \leadsto \text{Dist}+4(\text{sw}) \leadsto \text{Dist}+3(\text{sw}) \leadsto \text{Dist}+1(\text{sw}) \]

This scale mirrors the results of onset sC production among these participants.

The Syllable Contact Law

Participants do not treat sC and CC onsets the same way.

- sC production
  - Gouskova’s harmonic alignment scale mirrors the results of onset sC production
    - sC onsets are sensitive to the SCL because the /s/ is outside the onset
  - These participants do not modify sC onsets using prothesis /s/ does not occur in coda position in Mandarin Chinese or Japanese
  - While internal epenthesis moves /s/ from coda of the previous syllable to onset of the previous syllable, it avoids a less harmonic coda-onset relationship in favor of CCVC structure

- CC production
  - CC onsets are not sensitive to the SCL because they are true branching onsets
  - Among these participants, sonority distance is not a factor in onset CC production
  - SD 6 production is much lower than other SDs
  - Clusters [gw] and [dhw]
  - Tokens of SD 6 are rare in English
  - Few tokens of SD 6 in the data
  - Even without SD 6 tokens, the results are not significant (r(32) = .278, p > .49)

SC production vs. CC production

Among these participants, the most harmonic relationships are likely to be produced correctly; less harmonic relationships are likely to be modified using internal epenthesis.
- \[ \text{st} \rightarrow \text{s} \rightarrow \text{st} \rightarrow \text{s} \rightarrow \text{st} \rightarrow \text{s} \rightarrow \text{st} \]
- Results: \[ \text{sw} \leadsto \text{sw} \leadsto \text{sw} \leadsto \text{sw} \]

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References