

L2 production of English onset sC and CC clusters

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L2 onset cluster production

- Several studies have shown that onset clusters with a large sonority distance (SD) between the first and second consonant are less marked than those with a small (or negative) SD between C1 and C2
 - Broselow & Finer (1991)
 - Eckman & Iverson (1993)

L2 production of sC clusters

- Among sC clusters, [st] >> [sn] >> [sl]
 - Carlisle (2006) – L1 Spanish, L2 English
 - Cardoso & Liakin (2009) – L1 Brazilian Portuguese, L2 English
- [st], [sn] >> [sl], [sw]
 - Yavaş & Someillan (2005) – Spanish/English bilingual children

L2 production of sC clusters

- Spanish and Brazilian Portuguese have onset clusters, but not sC clusters
- The current study examines L2 English learners whose L1s do not have any onset clusters.

Research Question

- What is the effect of markedness in terms of sonority distance on production of sC clusters and CC clusters among L2 English speakers whose L1s do not have onset clusters?

The Study

- 8 participants
- Native speakers of Mandarin Chinese, Cantonese, Japanese
 - all L1s lack onset clusters
- All enrolled in English Language Institute

Procedure

- Word list reading
 - self-paced
 - no carrier phrase
 - recorded in a quiet room
- 83 test items, all CCVC
 - filler items all CVCC
- tokens of all English sonority distances, e.g. “twin” (SD 7), “fresh” (SD 3), “star” (SD -2)
- Hogg and McCully (1987) sonority scale

Hogg and McCully sonority scale

Sound	Sonority Index
Low vowel	10
Mid vowel	9
High vowel	8
Flap	7
Lateral	6
Nasal	5
Voiced fricative	4
Voiceless fricative	3
Voiced stop	2
Voiceless stop	1

Results

- 664 total tokens produced
- All tokens analyzed in Audacity
- 70% (466 tokens) of all onset clusters were produced correctly
- Non-target like productions were coded as:
 - C1 deletion
 - C2 deletion
 - internal epenthesis
 - prothesis
 - substitution

Results

- Of the non-target like productions:
 - 131 occurrences of internal epenthesis (66% of non-target like productions)
 - swim → s[ə]wim
 - 2 occurrences of C2 deletion, 0 instances of C1 deletion
 - swim → sim
 - 0 occurrences of prothesis
 - swim → [ə]swim
 - 51 occurrences of substitution
 - swim → slim

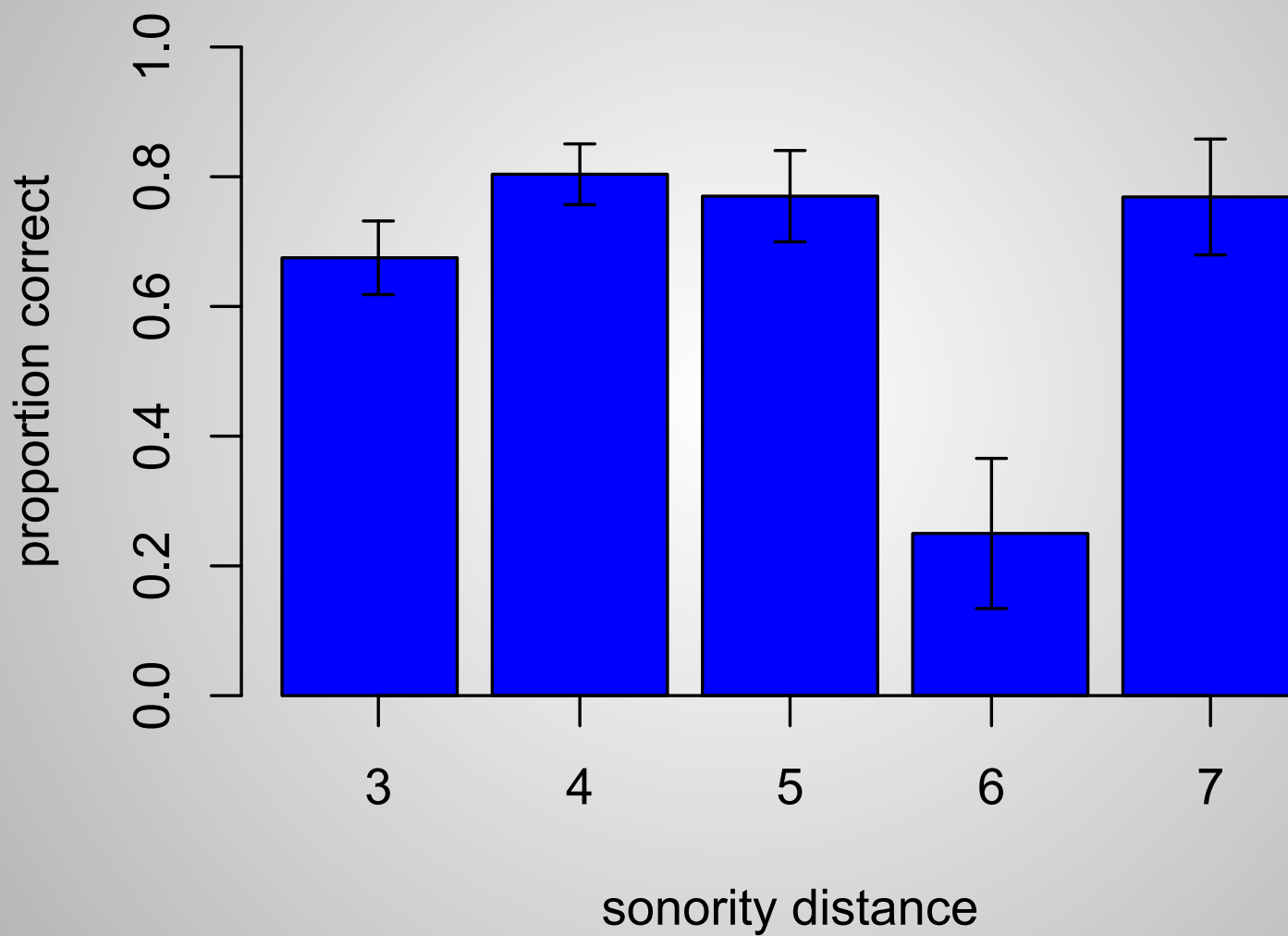
Results

- sf
 - only 2 tokens
 - 1 token did not follow the CCVC pattern (sphinx)
 - higher rate of modification than any other cluster
 - most common modification strategy is substitution $f \rightarrow p$
 - sphere \rightarrow s[p]ere
 - sf is not included in the data analysis

Results

- Participants treat sC clusters differently from CC clusters.
- Sonority distance is negatively correlated with correct production among sC clusters
(Pearson correlation, $r(32) = -.511$, $p = .003$)
- Sonority distance is not correlated with correct production among CC clusters
(Pearson correlation, $r(40) = -.176$, $p = .278$)

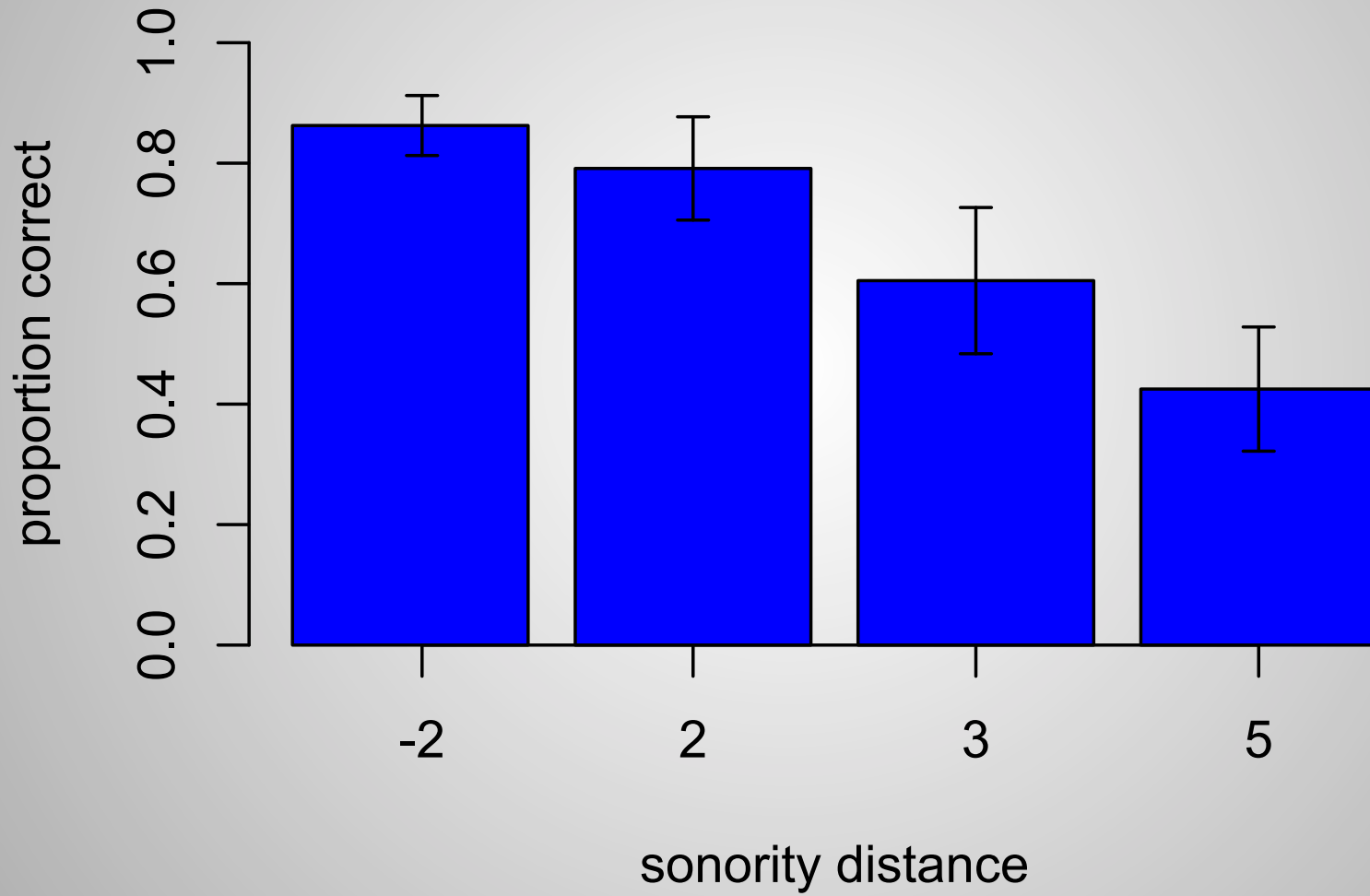
CC cluster production



Results: sC clusters

- Sonority distance is negatively correlated with correct production
- Results show the opposite pattern from that predicted by markedness in terms of sonority distance.
 - SD prediction: s-stop >> s-nasal >> sl >> sw
 - Results: sw >> sl >> s-nasal >> s-stop

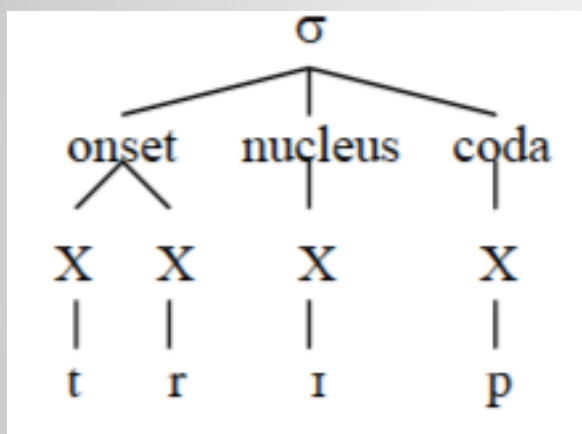
sC cluster production



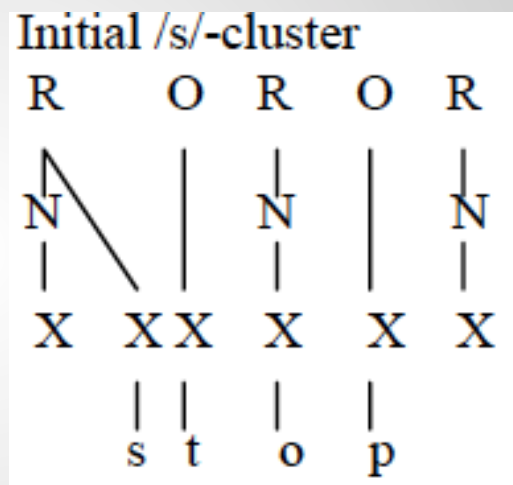
CC vs. sC onsets

- In sC onsets, Barlow (2001) and Goad and Rose (2004) 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.
- If we assume this analysis, then sC onset clusters are really coda-onset pairs.

CC vs. sC onsets



Gierut 1999



Pan & Snyder 2004

Syllable Contact Law

- The SCL states that the greater the sonority drop between coda and following onset, the more harmonic the relationship (Murray & Venneman 1983).
- Among these participants, the most harmonic relationships are likely to be produced correctly; less harmonic relationships are likely to be modified using internal epenthesis.
 - s-t → sonority drop, 86% correct production
 - s-w → sonority rise, 43% correct production

Syllable Contact Law

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

DIST+5 (sw) >> DIST+3 (sl) >> DIST+2 (s-nasal) >> DIST-2(s-stop)

- The results of onset sC production among these participants mirror this harmonic alignment scale

Syllable Contact Law in the L1 grammars

- Mandarin Chinese (Duanmu 2000, 2006)
 - [n] and [ŋ] can occur in coda position
 - [l] and [r] can occur in onset position (among other things)
 - Duanmu (2000) argues that the Chinese [r] is most accurately described as an approximant (p.26)
 - n (5) → r (8) = SD 3
- Japanese (Vance 1987)
 - nasals can occur in coda position
 - [j] and [w] can occur in onset position (among other things)
 - n (5) → w (8) = SD 3
- Cantonese (Matthews and Yip 2011)
 - stops can occur in coda position (among other things)
 - [j] and [w] can occur in onset position (among other things)
 - t (1) → w (8) = SD 7

sC clusters

- Predictions based on L1 grammar:
 - Mandarin Chinese and Japanese: correctly produce [sl], s-nasal, and s-stop but not [sw]
 - Cantonese: correctly produce all sC clusters
- Results:
 - Production mirrors Gouskova's harmonic alignment scale
sw >> sl >> s-nasal >> s-stop

sC production

- Results of onset sC production mirror Gouskova's harmonic alignment scale
- If we assume the /s/ is outside the onset, it follows that sC onsets are sensitive to the SCL
- These participants do not modify sC onsets using prothesis
 - /s/ does not occur in coda position in Mandarin Chinese or Japanese
 - internal epenthesis avoids a less harmonic coda-onset relationship in favor of CVCV structure

[sl]

- It is possible that variability of [sl] production is because of [l]
- Speakers do not show particular difficulty with [l].
 - The high percentage of epenthesis shown in [sl] is not apparent in other clusters, such as [pl], [kl]
 - only 4 occurrences of substituting [l] for another segment, only 1 occurrences of deleting [l]
 - [sl] violates OCP place

CC production

- Among these participants, sonority distance is not a factor in onset CC production
- If we assume /s/ is outside the onset in an sC cluster, then it follows that CC onsets are treated differently because they are true branching onsets and not sensitive to the SCL

SD 6

- SD 6 production is much lower than other SDs
 - clusters [gw] and [dw]
 - tokens of SD 6 are infrequent in English
 - few tokens of SD 6 in the data
 - even without SD 6 tokens, the results are not significant ($r(32) = 0.126$, $p = .49$)

Conclusion

- Participants seem to have linguistic knowledge of the Syllable Contact Law.
- Speakers do not simply transfer L1 rule; they display sensitivity to relative harmony.

Future Research

- Control for token and type frequency
- Look at lower proficiency English speakers

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