The effect of continuance on the L2 production of onset clusters

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Key principles

- Sonority
  - Sonority Distance (SD)
- Continuance
  - Obligatory Contour Principle (OCP)

Sonority and onset clusters: L2

- Broselow and Finer (1991)
  - speakers attend to the Minimal Sonority Distance parameter in onset clusters
- Eckman and Iverson (1993)
  - speakers are sensitive to sonority distance in onset clusters
- Carlisle (2006)
  - clusters with a large sonority distance are produced correctly more often than those with a small sonority distance
- Cardoso and Liakin (2009)
  - markedness vs. frequency
  - markedness (sonority distance) has a much greater impact on production than frequency of input

Continuance and onset clusters

- Morelli (2003)
  - s-stop clusters violate Sonority Sequencing Principle, but nevertheless are quite common among the world's languages
  - typological implications – fricative-stop clusters are the least marked (obst-obst) typologically, despite being a violation of the SSP
  - clusters that violate OCP[+cont] are more marked than those that do not

Continuance and onset clusters

- Yavaş and Someillan (2005)
  - s-clusters can be grouped according to the continuance of C2
  - /sl/, /sw/ group together, and s-stop, s-nasal group together.
- May be due to sonority distance
  - /sw/ and /sl/ have a much larger sonority distance than s-stop and s-nasal.
  - s-stop and s-nasal clusters violate MSD.

Continuance and onset clusters

- Two universals, markedness (SD) and OCP, make opposite predictions about s-cluster production.
- Yavaş and Someillan study bilingual Spanish-English children. OCP[+cont] is freely violated in English and Spanish.

Sonority

- definitions of sonority vary; consequently sonority scales vary
- Hogg and McCully (1987)
  - Clements (1990)
    - 5 point sonority scale
    - combines stops and nasals into "obstruent"

Hogg and McCully (1987)

Sounds	Sonority Index (S.I.)
Low vowels	10
Mid vowels	9
High vowels	8
Flaps	7
Laterals	6
Nasals	5
Voiced fricatives	4
Voiceless fricatives	3
Voiced stops	2
Voiceless stops	1

Continuance vs. Sonority

- [kl]: SD 5, obeys OCP[+cont]
- [fl]: SD 3, violates OCP[+cont]

- [sw]: SD 5, violates OCP[+cont]
- [st]: SD -2, obeys OCP[+cont]

- OCP[+cont] and sonority distance make opposite predictions regarding s-cluster acquisition/production

The current study

- The study examines the role of OCP[+cont] in the production of L2 onset clusters
- The study examines both s-clusters and non s-clusters

Method

- 8 participants
- 5 native speakers of Mandarin Chinese, 1 Cantonese, 2 Japanese
- enrolled in English Language Institute
- All L1s are languages that do not allow onset clusters
- Word list: 83 test words (CCVC), 37 distracter words

Results

- No difference between L1 groups
- Most common repair strategy – internal vowel epenthesis
  - 131 instances
  - 66% of errors
  - 20% of productions
- Deletion of C2 was very rare - 2 occurrences
- No C1 deletion
- Substitution
  - 51 instances
  - 4 involve l, 2 involve ɹ

Results: s-clusters

- Sonority is negatively correlated with correct production*
- No difference between s-stop and s-nasal clusters (obey OCP)
- No difference between sl and sw (violate OCP)
- Clusters that obey OCP[+cont] are produced correctly more often than those that violate OCP[+cont] *

*statistically significant, $p<.05$

Results: correct production of s-clusters by sonority distance (in %)

Participant	s-stop (SD -2)	s-nasal (SD 2)	sl (SD 3)	sw (SD 5)
1	90	67	17	20
2	60	44	100	20
3	80	89	17	40
4	100	100	83	60
5	100	100	33	60
6	100	100	67	20
7	80	44	100	20
8	80	89	67	100
mean	86	79	61	43

Results: correct production of s-clusters by continuance (in %)*

Participant	clusters obeying OCP	clusters violating OCP
1	79	18
2	53	64
3	84	27
4	100	73
5	100	45
6	100	45
7	63	45
8	84	82
mean	83	50

*statistically significant, $p<.05$

Results: non s-clusters

- Sonority does not correlate with correct production
- Continuance does not affect correct production

Results: correct production of non s-clusters by SD (in %)

Participant	SD 7	SD 6	SD 5	SD 4	SD 3
1	88	25	75	100	73
2	100	0	33	67	47
3	38	0	83	83	53
4	100	100	92	92	73
5	75	25	75	67	67
6	88	25	83	67	100
7	38	25	75	75	60
8	88	0	100	92	67
mean	77	25	77	80	68

Results: non s-clusters

- Clusters that obey OCP[+cont]
  - tw, kw, pɹ, pl, kl, tɹ, kɹ, bɹ, bl, gl, gɹ, dɹ
- Clusters that violate OCP[+cont]
  - fɹ, fl, ʃr, θ ɹ

Results: correct production of non s-clusters by continuance (in %)

Participant	clusters obeying OCP	clusters violating OCP
1	81	73
2	56	47
3	64	53
4	94	73
5	67	67
6	72	100
7	64	53
8	83	67
mean	73	67

Discussion: /l/

- /l/ is +continuant
  - following Yavaş and Someillan (2005), *SPE* (Chomsky and Halle, 1968)
- It is possible that difficulty with [sl] 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

Discussion: SD 6

Participant	SD 7	SD 6	SD 5	SD 4	SD 3
1	88	25	75	100	73
2	100	0	33	67	47
3	38	0	83	83	53
4	100	100	92	92	73
5	75	25	75	67	67
6	88	25	83	67	100
7	38	25	75	75	60
8	88	0	100	92	67
mean	77	25	77	80	68

Discussion: SD 6

- [dw], [gw]
  - rare in English
  - few tokens
  - infrequent (Google Ngram)
- even without these tokens, sonority results and continuance results are not significant

Discussion

- Participants are not deleting (Weinberger 1994)
- Sonority distance is not a factor
- Results are the opposite of Yavaş and Someillan's results
  - L1 vs L2
  - evidence of OCP violations from Spanish and English

Discussion: similar findings in previous research

- Major (1996)
- 4 Brazilian Portuguese speakers learning English. "#FL (fricative-liquid) promotes error, #FS (fricative-stop) is least likely to do so." (p.87)
  - Major attributes the result to positive transfer for s-stop clusters.
- Abrahamsson (1999)
- longitudinal case study of 1 Spanish speaker learning Swedish. Speaker modified /sl/ more often than s-stop and s-nasal clusters.
  - Abrahamsson attributes this to the small number of /sl/ tokens in the study.
- I suggest that OCP[+cont] plays a role in these results

Discussion

- L1s do not allow onset clusters.
- English freely violates OCP[+cont].

- Participants' behavior is not like the L1 or the L2. They show OCP effects in a new domain.

Discussion: s-clusters

- Learners are more sensitive to continuance in s-clusters
- OCP[+cont] may be another domain in which s-clusters behave differently from non-s-clusters
- Data support Yavas and Someillan's grouping of s-clusters by continuance of C2

Limitations of the research

- Cantonese – allows obstruents in coda position, possible segment contact
- Japanese fast speech – results in s-stop clusters

Future Research

- account for word frequency
- look at lower proficiency English speakers

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