An Investigation of Andalusian Stop Cluster Post-aspiration in Naturalistic Speech

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PLC 39
March 21st, 2014
Introduction

- /s/-aspiration
- Andalusian sC clusters

Current study

- Data
- Separation approach

Inadequacy of AP

Phonological reanalysis proposal

Further work
Widespread phenomenon found in the Caribbean, Central America, coastal South America, the Southern Cone, the Canary Islands, and Andalusia
/s/-aspiration

- Widespread phenomenon found in the Caribbean, Central America, coastal South America, the Southern Cone, the Canary Islands, and Andalusia
- Blanket term for the weakening or loss of /s/ in coda positions
Figure 1: Andalusia in red
/s/-aspiration

Word-final /s/
/lunes/ 'Monday' → [lunes] ~ [luneh] ~ [lune]

/s/ in stop clusters
/gusta/ 'pleases' → [gusta] ~ [guhta]
/musgo/ 'moss' → [muzgo] ~ [muñgo] ~ [muggo]
An additional variant of /s/ before voiceless stops was first mentioned in Alvar and Prieto (1975):

Andalusian post-aspirated voiceless stop clusters

/gusta/ → [guhta] ~ [gutha] ~ [gutsa]

Sibilant: pasta 'pasta'
Preaspirated: de estar fuera 'of being outside'
Postaspirated: me gusta 'I like it'
Affricated: estuve 'I was'
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The last two variants have attracted significant attention in the last decade.
Example segmented tokens

Figure 2: Token with post-aspiration, produced by Rocio
Figure 3: Eastern Andalusia (EAS)

Figure 4: Western Andalusia (WAS)
Andalusian sC clusters

Why the interest in this variant?

- Unique in the large area showing /s/-aspiration
Andalusian sC clusters

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- Unique in the large area showing /s/-aspiration
- Represents a loss of pre-aspiration, analogous to Scandinavian dialects
- Cited as an example of purely phonetic change and as a clear case for Articulatory Phonology
Previous observations

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- Is there anything going on besides just lengthened VOT?
Figure 5: Taken from Parrell (2012)
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- Are speakers consistent in their productions of this variant?
- Is there evidence for social awareness of this variable?
Data for 10 speakers came from sociolinguistic interviews from three sources:

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Data

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- Three individual interviews, one from the Granada corpus and two from the Málaga corpus collected as a part of the Project for the Sociolinguistic Study of Spanish from Spain and America (PRESEEA 2010) between 2004–2009.
Measurements done by hand.

- VTT (Voice termination time)
- VOT (Voice onset time)
- Closure
Figure 6: Token with long pre-aspiration and short VOT, produced by Laura
Every speaker in this study measured produced at least one token of /st/ with VOT exceeding 50 ms.
VOT by speaker for /t/ and /st/
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Median VOT lengths vary considerably more among speakers for /st/ with a range of 25 ms, than median VOT for /t/, with a range of 12.5 ms.
Closure length

- Closure lengthening was clearly present in this data, with closure lengths as long as 170 ms occurring.
- The range was large, with many tokens showing closure lengths of the same length as that of /t/. 
Closure duration by speaker for /t/ and /st/

<table>
<thead>
<tr>
<th>Closure in ms</th>
<th>/t/</th>
<th>/st/</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.10</td>
<td></td>
<td></td>
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<tr>
<td>0.15</td>
<td></td>
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</tbody>
</table>

Closure in ms region east west
02 H31 Laura 16 Irene Juan Rocio Samuel Elisa Carlos
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- High variability in the data, both inter- and intra-speaker.
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- Conflicting results from previous studies.
- Collapsing all observations together may cloud the picture.
Coding

Closure > 60% of total duration?

VOT > 40% of total duration?

PRE

CLOS

POST
Introduction

Present study

Results

Conclusions

References

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**Closure length by strategy type for /t/ and /st/**

<table>
<thead>
<tr>
<th>Strategy type</th>
<th>Closure length in ms</th>
</tr>
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<tbody>
<tr>
<td>clos</td>
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</tr>
<tr>
<td>pre</td>
<td></td>
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<tr>
<td>post</td>
<td></td>
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<tr>
<td>t</td>
<td></td>
</tr>
</tbody>
</table>

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0.00
0.05
0.10
0.15
Total segment length by strategy type for /t/ and /st/
The Penn participants were asked specifically about their associations with the variable, aided by a recording of a clearly post-aspirated token of *gusta*.

Two of the four interviewees (the ones from WA) in 2014 identified the sound as being produced by someone from Seville and make an explicit association between the quality of the /t/-release and Seville province.
Other observations

- With vowel-initial tokens, sometimes the vowel is entirely elided.
Figure 7: Spectrogram of ‘está bien’ with elided /e/ produced by Carlos from Seville province

*está bien* 'It’s good'
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- sC clusters are not licit onsets in Spanish
Other observations

- With vowel-initial tokens, sometimes the vowel is entirely elided.
  - sC clusters are not licit onsets in Spanish
- A number of tokens showed affrication.
Phonological simplification account

An analysis involving underlyingly post-aspirated stops was proposed by O’Neill (2010) for Seville speakers, based on the evidence that tokens with long VOT were shorter in duration overall, corroborated here.

Torreira (2012) claims that variability in the production of WAS sC clusters is evidence against a set of post-aspirated stops, but this reasoning dismisses out of hand the possibility of variation between two distinct variants.
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- The vowel-deletion phenomenon described above
- The systematic overall length difference that exists between strongly post-aspirated sC clusters and those that show pre-aspiration and/or closure lengthening.
Discussion

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If this is the case, we expect to find many speakers that show variants at the extreme ends of a continuum.
Further work

- Investigate style-shifting
- Add more speakers
- Control for speech rate
- Look at /p/ and /k/
- Perception
Thank you!

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Figure 8: Voice onset time as a function of pre-aspiration length
Figure 9: Closure duration as a function of voice onset time