Andalusian pre-to-postaspiration and the life cycle of sound change

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From post-lexicality to phonologization: Andalusian /s/-aspiration at the word boundary

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Description

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Abstract: We analyse the change from pre- to post-aspirated /sp, st, sk/ clusters in Andalusian Spanish at the word boundary and within-word to assess whether post-aspiration has been lexicalised. The clusters were represented by voicing probability and high-frequency energy signals, i.e. proxies for the glottal and oral gestures needed to produce aspirated voiceless plosives. The main modes of variation in the signals' shapes were analysed with FPCA, which showed greater post-aspiration for young than old speakers for within-word clusters, but not across word boundaries (with the exception of /st/). The results are discussed with respect to modular feed-forward and exemplar models.



The long way of coda /s/in Andalusian Spanish



Introduction

Lenitive changes in codas in Spanish

• The varieties of Spanish show a considerable amount of lenitive sound changes in syllabic coda position:

Aspiration:	alcohol	[al'koʰ]
	esto	['eh.to]
• Elision:	columna	[koˈlu.na]
	casco	[ˈka.ko]
 Vowel lengthening: 	carne	[ˈkaː.ne]
	alto	[ˈaː.to]
• Gemination:	golpe	['gop.pe]
	perla	['pel.la]

Real Academia Española. 2011. Nueva gramática de la lengua española. Fonética y fonología. Madrid: Espasa Calpe.

Coda /s/ lenition in Andalusian

- Lenition of coda /s/ is geographically spread:
 - South America
 - Caribbean
 - Canary Islands
 - Center-South of the Iberian Peninsula (including Andalucía)
- Lenitive changes are widespread in Andalusian.
 - → Probably started with /s/ aspiration.

Canfield, L. 1981. Spanish pronunciation in the Americas. The University of Chicago Press.

Gerfen, C. 2002. Andalusian codas. Probus 14, 247–277.

Lipski, J. 1984. On the weakening of /s/ in Latin American Spanish. Zeitschrift für Dialektologie und Linguistik 51, 31–43.

Mason, K.W. 1994. Comerse las eses: A selective bibliographic survey of /s/ aspiration and deletion in dialects of Spanish. Tesis doc., Univ. Michigan. Villena-Ponsoda, J.A. 2008. Sociolinguistic patterns of Andalusian Spanish. International Journal of the Sociology of Language 193/194, 139–160.

Coda /s/ lenition in Andalusian

- Coda /s/ debuccalization (_.C).
 - → aspa > [ahpa], pasta > [pahta], asco > [ahko]

- At least from the 18th century.
- For some authors, early 16th.
- Or even 14th.
- Unconvincing early attestations.

Mondéjar Cumpián, J. 1991. *Dialectología Andaluza: Estudios*. Terrell, T.D. 1980. In D. Sankoff & H. Cedergren (eds.), 115–124. Menéndez Pidal, R. 1962. *Misc. Hom. a A. Martinet* vol. 3, 99-165 Boyd-Bowman, P. 1975. In Milan, Staczek & Zamora (eds.), 1-11 Lapesa, R. 1980. *Historia de la lengua española*, 387-389.

Frago García, J.A. 1983. Lingüística Española Actual 5, 153-171.

Torreblanca, M. 1989. *Thesaurus* 44:2, 281-303.

Sound changes in /S.T/ clusters

- At the end of the 20th c., pre-aspiration results in post-aspiration.
- Intermediate phase: pre- and post-aspiration.
- All places of articulation: /s.p/, /s.t/, /s.k/.

e.g.
$$pasto > [pahto] > [pahtho] > [patho]$$

 $casco > [kahko] > [kahkho] > [kakho]$
 $caspa > [kahpa] > [kahpha] > [kapha]$

Sound changes in /S.T/ clusters

- Early in the 21st century, post-aspiration results in affrication.
- Only the (very) aspirated dental stop is affected.
 - It could be currently spreading to other contexts.

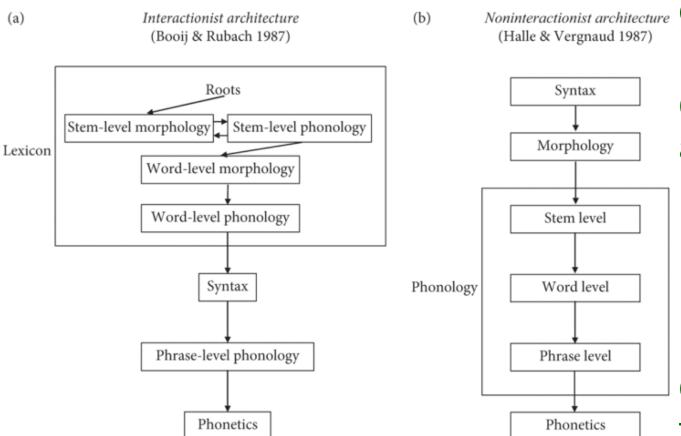
e.g.
$$pasta > [pahta] > [pahta] > [patha] > [patha] > [patsa]$$

Sound changes in /S.T/ clusters

	debuccalization	metathesis	affrication
/asta/	[ahta]	[a ^h t ^h a] > [at ^h a]	[atsa]
/aspa/	[ahpa]	$[a^hp^ha] > [ap^ha]$	n.a.
/asma/	[ahma]	n.a.	n.a.

Theoretical frameworks

Theories of modular feed-forward architecture



Grammar is composed by independent modules.

Only adjacent modules can be accessed through restrictive interfaces.

Information flows unidirectionally between modules.

→ In each cycle: morphology > phonology > phonology > phonetics.

Cycles apply iteratively from the bigger to the smaller domain.

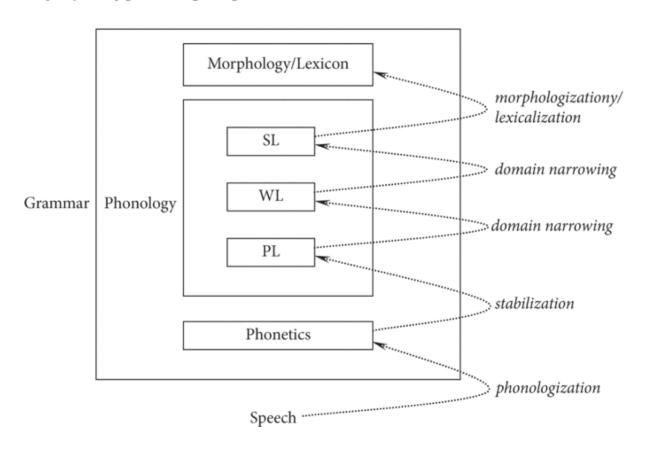
Bermúdez-Otero, R. 2007. In P. de Lacy (ed.), 497–517. Bermúdez-Otero, R. 2015. In P. Honeybone, & J. Salmons (eds).

Bermúdez-Otero, R. & G. Trousdale. 2012. In Nevalainen & Traugott (eds).

Fruehwald, J. 2017. *Annual Review of Linguistics* 3, 25-42. Kiparsky, P. 1982. In H. van der Hulst and N. Smith (eds.), 131-175. Kiparsky, P. 2015. In P. Honeybone and J. Salmons (eds). Ramsammy, M. 2015. *Language and Linguistics Compass* 9, 33-54.

The life cycle of phonological processes

The life cycle of phonological processes (Bermúdez-Otero and Trousdale 2012: 700)



Sound change proceeds in the cycles' opposite direction, strictly bottom-up.

- → Starts as post-lexical.
- Then applies in increasingly abstract domains until lexicalized.
- →If /sp, st, sk/ are post-aspirated also across word boundaries as in

las tapas 'the tapas' [lathapah]

→ Sound change is still post-lexical.

Bermúdez-Otero, R. 2007. In P. de Lacy (ed.), 497–517. Bermúdez-Otero, R. 2015. In P. Honeybone, & J. Salmons (eds). Bermúdez-Otero, R. & G. Trousdale. 2012. In Nevalainen & Traugott (eds). Fruehwald, J. 2017. *Annual Review of Linguistics* 3, 25-42. Kiparsky, P. 1982. In H. van der Hulst and N. Smith (eds.), 131-175. Kiparsky, P. 2015. In P. Honeybone and J. Salmons (eds). Ramsammy, M. 2015. *Language and Linguistics Compass* 9, 33-54.

Episodic models of speech

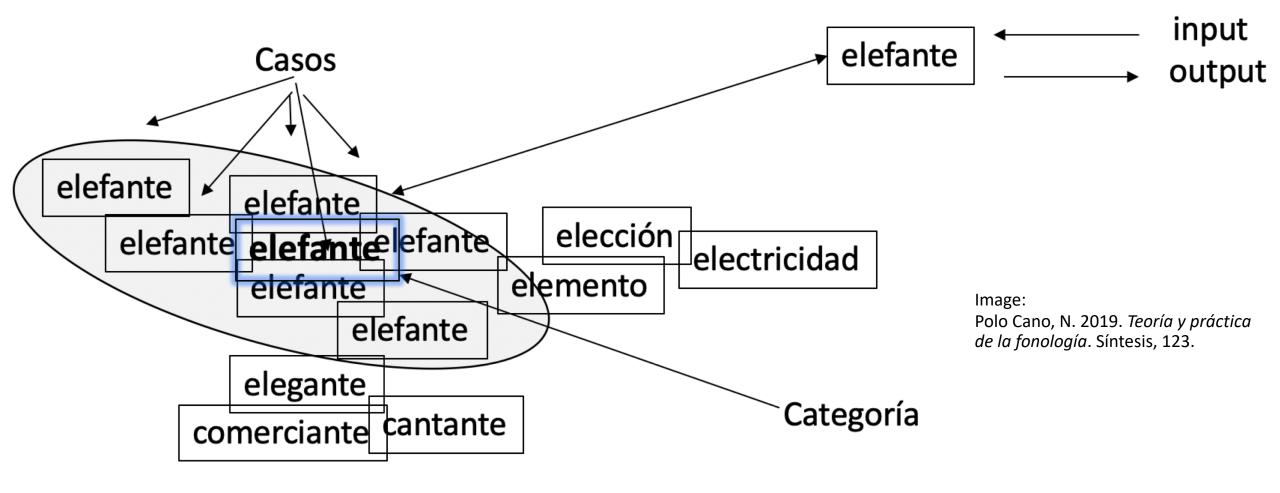
The lexicon:

A huge collection of highly detailed memory traces of previously experimented phonetic episodes \rightarrow Exemplars.

- Connected with one another based on their similarities.
- Phonological categories generalize from these exemplars.

- Categories: 2 perspectives.
 - Implicit: exemplar connection patterns ('clouds').
 - Explicit: 'labels' of these exemplars; can be accessed by rules.

Episodic models of speech



Bybee, J. 2001. Phonology and language use. Cambridge, CUP.

Bybee, J. 2002. Word freq. and context of use in the lexical diffusion of phonetically cond. sound change. *Lang. Var. and Change* 14, 261–90. Pierrehumbert, J. 2002. Word-specific phonetics. In C. Gussenhoven & N. Warner (eds.), *Laboratory phonology* 7. De Gruyter, 101–139. Pierrehumbert, J. 2003. Probabilistic phonology: discrimination and robustness. In Bod, Hay, & Jannedy (eds), *Probabilistic Linquistics*, 177–228.

Episodic models of speech

- The phonetic properties of each lexical item change with each new exemplar experimented during the use of language.
 - Phonetically gradual change.

- Each lexical item has its own pattern (recorded in its cloud).
 - Lexically gradual change.
- Many —all?— changes are gradual, both lexically and phonetically.

Some questions to answer

- Is the pre- to post-aspiration change lexicalized in Andalusian?
 - If so, since when?
 - If not, in which phase is it?

In isolated words:

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pasta [paʰta] → [patʰa, pat⁵a]
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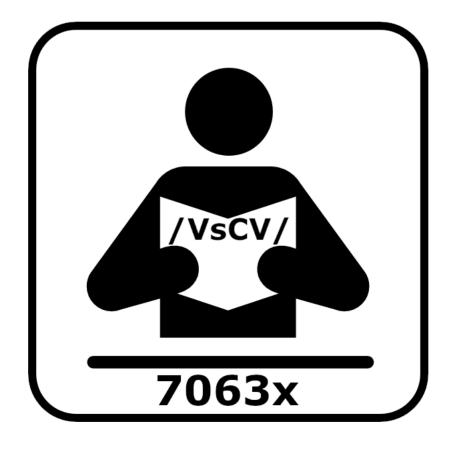
At the word boundary?

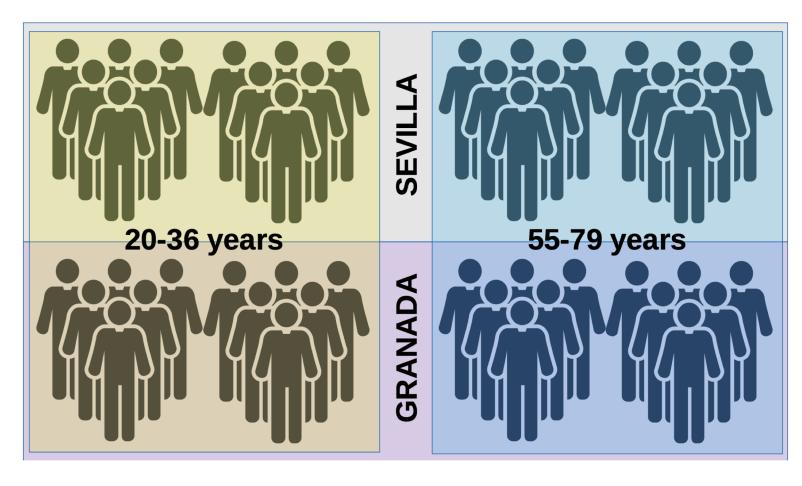
- *las tapas* → [lathapah, latsapah]?
- If we observe post-aspiration also through the word boundary:
 - → Pre- to post-aspiration is still post-lexical.

- Which theoretical framework better accounts for this process?
 - Is it necessary to combine elements of both?

Data & Methods

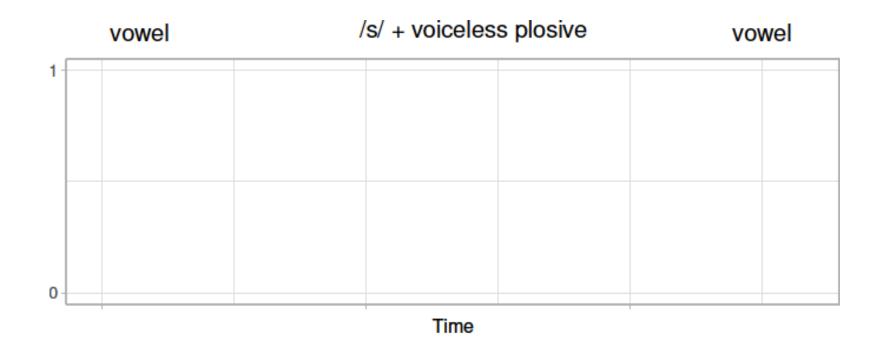
Data

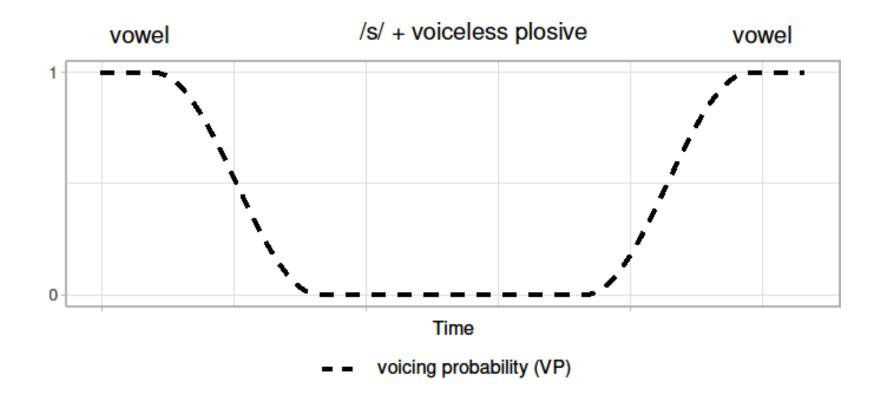


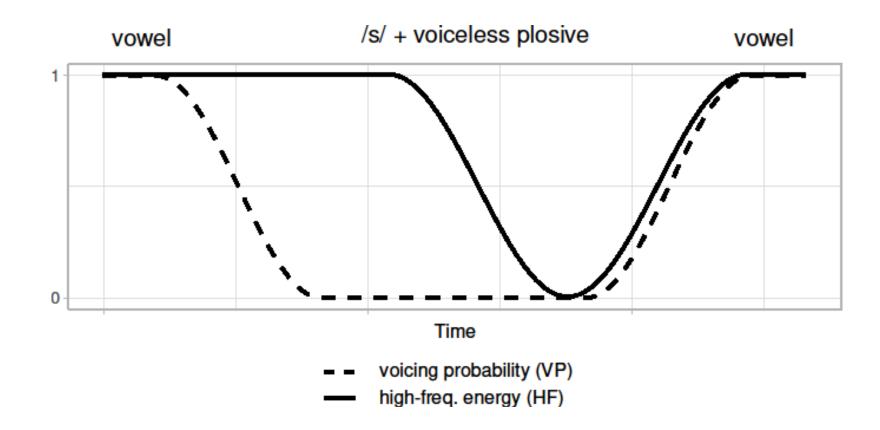


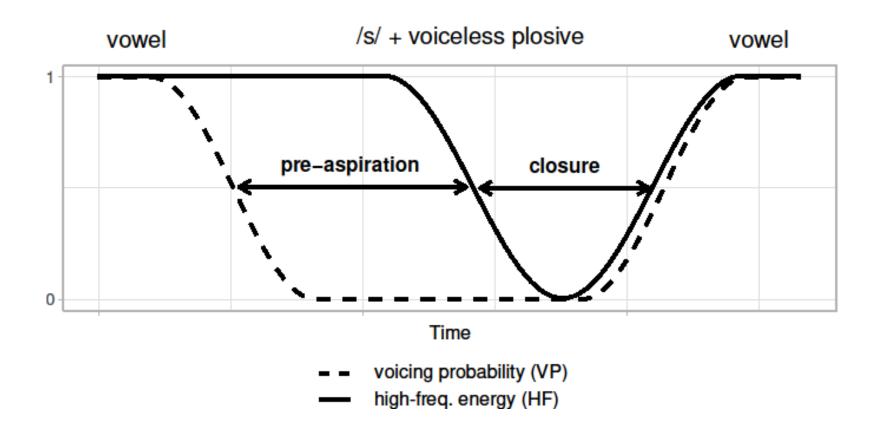
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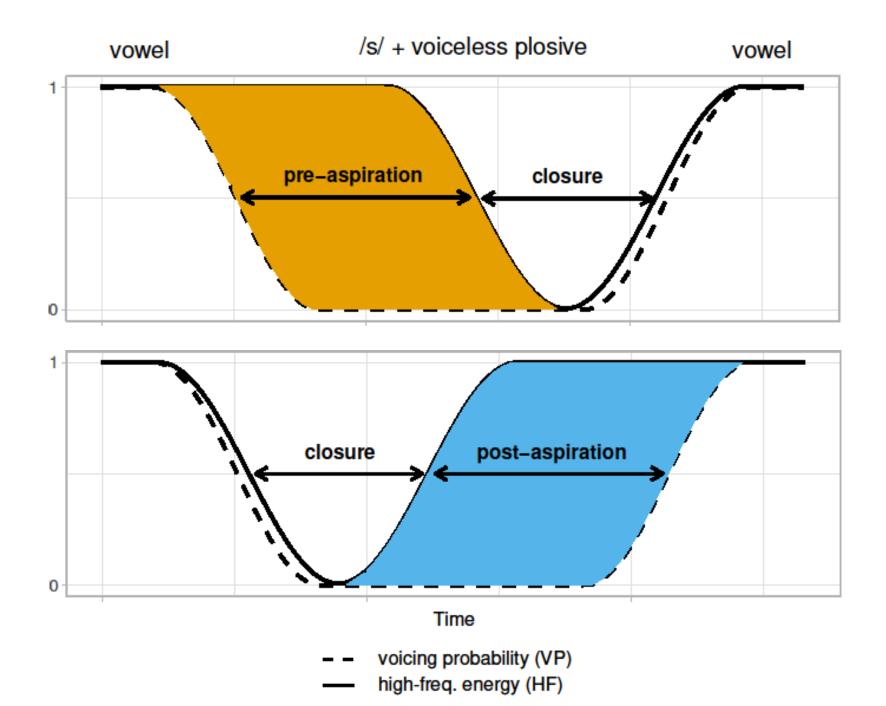
- Our parametrization represents articulatory gestures in acoustic data, given that their re-organization has been argued to be the reason behind pre- to post-aspiration.
 - Re-synchronization of oral closure and glottal opening:
 - Anti-phase [ht].
 - In-phase [t^h].
- Limits the need for vertical segmentation, which does not reflect the fluid nature of speech.
 - Avoids researcher degrees of freedom.
- It does not require articulatory data.
 - Which is expensive time and resource-wise.

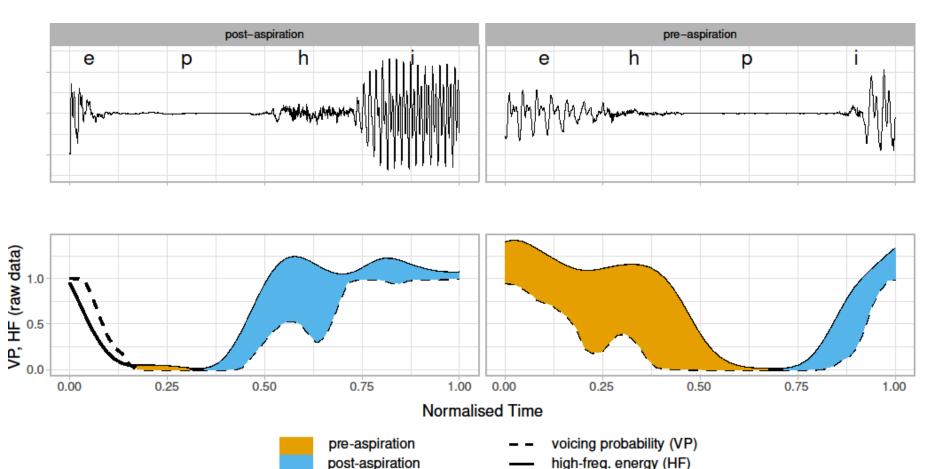






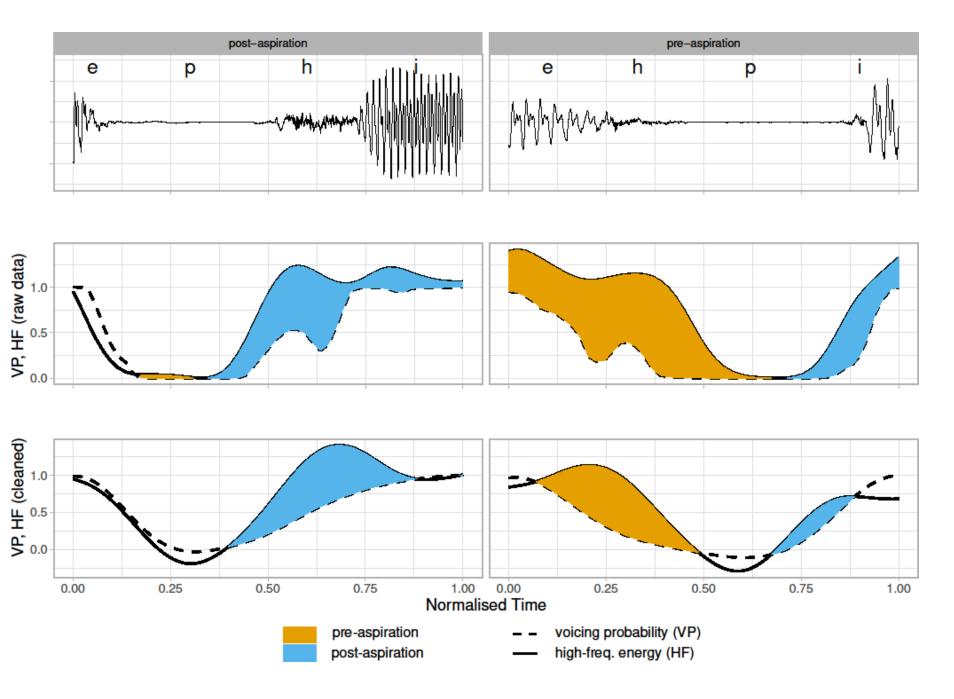






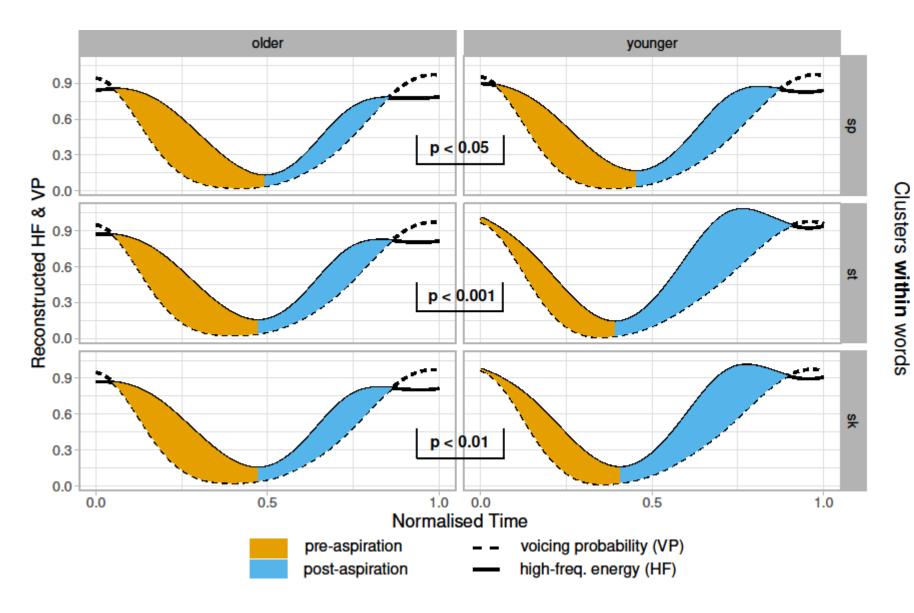
VP & HF of all 7063 tokens

- → Functional Principal Components Analysis
- → Identify dimension of variation that is relevant to change towards post-aspiration

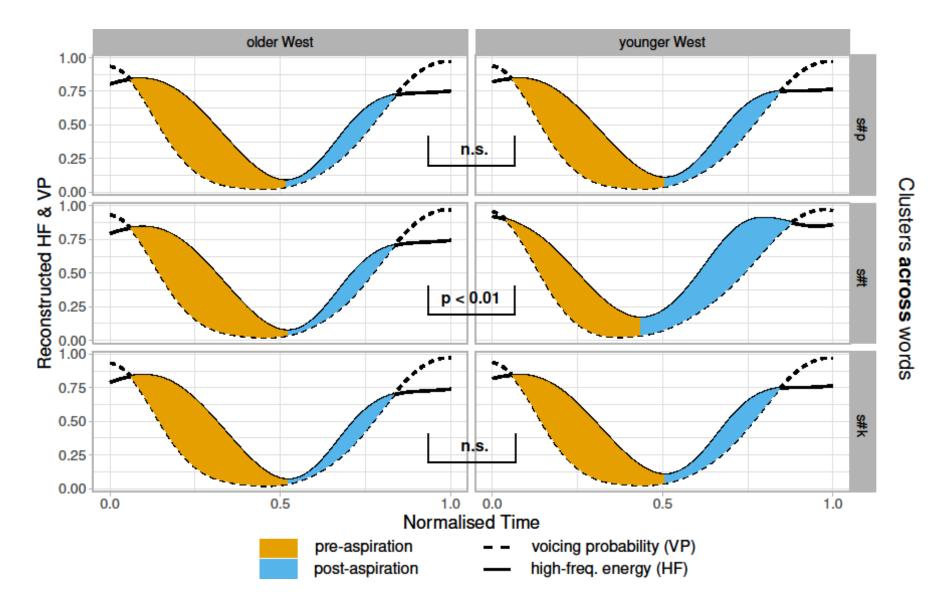


There are differences in regarding the production of aspiration depending on:

- Speaker's age (old vs. young)
- Speaker's regional origin (East vs. West Andalusia)
- Stop place of articulation (/sp/ vs. /st/ vs. /sk/)
- Presence of a word boundary (/sC/ vs. /s#C/)
- → Linear Mixed Models with Imer()



→ Confirms sound change in progress towards post-aspiration



→ Has post-aspiration been lexicalized in /sp, sk/ ahead of /st/?

- Gradualness in the pre- to post-aspiration process.
 - A sound change in progress, with an incremental evolution that will presumably continue in the (near) future.

 Post-aspiration is currently a post-lexical process in the case of /st/ in the younger population of Western Andalucía.

- Nonetheless, this is not the case of /sp/ and /sk/.
 - Has post-aspiration been lexicalized in /sp, sk/ ahead of /st/?
 - Many studies suggest that /st/ leads the change.
 - No evidence of a previous post-lexical phase in our data of older speakers.

- Was the process ever post-lexical in /sp, sk/ clusters?
 - There's no evidence for it in our data.

- Proposal: Pre- to post-aspiration is only natural in the context of /s.t/.
 - In all other cases, it would have developed as some kind of "gradual analogy".
- Could dome of the observed instances of /st/ involve affrication [patsa] instead of post-aspiration [patha]/[patha]?
 - Yes, our method does not currently distinguish between the two realizations.

- A post-aspiration to affrication change is emerging on top of pre- to post-aspiration.
 - Strong post-aspiration seems to be required for the development of [ts]:
 - Only speaker who also produce [th] show occasional [ts].

- A more restrictive context: Only dental stops.
 - No labial or velar affricates:
 /sp/ and /sk/ do not become [pf] and [kx] (or [ts]).

- None of the discussed theories seem to easily accommodate the facts observed in Andalusian.
- Multiple gradually evolving processes in /st/.
 - Phonetically gradual pre- to post-aspiration, currently post-lexical.
 - Post-aspiration to affrication before the preceding process was completed.
- A different kind of evolution in the case of /sp/ and /sk/ clusters.
 - The described evolution does not adhere to the domain restriction proposed by Bermúdez-Otero.

Conclusions (and what to do next)

Conclusions

Main results:

- → The change is still active in /st/ clusters.
- → No evidence of the sound change developing as predicted by the life-cycle theory in the other consonant clusters.
 - → Still, it developed in a gradual, phonetically natural way.
 - → No evidence of a classical analogy.
- → The discussed theories only partially explain the data.

Conclusions

Things to do:

- \rightarrow Acoustically distinguish [ts] and [th]: zero-crossing rate.
- → Check whether there are an specific trends in concrete words.