/s/-aspiration and sound change in two varieties of Andalusian Spanish

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Introduction

Weakening of syllable final /s/: [s] ⟶ [h]

since XVI century (Frago 1993)

/st/ e.g. *pasta*, *pestaña*, *las tazas*

Standard Spanish
[ˈpasta, pesˈtaɲa, las ˈtaθas]

/s/-aspiration

Andalusia, Cuba, Buenos Aires, ...
[ˈpahta, pehˈtaɲa, lah ˈtaθah]

Introduction

http://mapa-de-espana.blogspot.com/

State of the art

/sp, st, sk/ e.g. *pa<u>st</u>a*

Traditional dialectological studies:

[hp, ht, hk]; [pː, tː, kː], [p, t, k]

Recent studies (e.g. Torreira, Parrell, Moya)

Western Andalusian Spanish (WAS, i.e. Seville)

Postaspiration [p^h, t^h, k^h]; [$pː^h$, $tː^h$, $kː^h$], [t^s] Affrication

Eastern Andalusian Spanish (EAS, i.e. Granada)

Preaspiration [hp, ht, hk]; [pː, tː, kː] Gemination

State of the art

State of the art

- Much variation in pronunciation of /sp, st, sk/
- Dialect dependent (Torreira)
- Age as a factor for /st/ in WAS (Moya; Ruch)
  higher occurrence of [t^h] and [t^s] for younger than for older speakers
- Contradictory results for speech rate
  - less preaspiration and more postaspiration with higher speech rate (Parrell, to appear)
  - no effect of speech rate on VOT (Torreira, to appear)

State of the art

- Transcription mode in traditional studies and age differences in /st/-pronunciation: sound change
- Generalization of longer VOT in WAS among younger speakers
- Postaspiration not a robust cue (speech rate; stress) -> not phonologized in WAS,
  rather the result of extensive articulatory overlap (Torreira, to appear)
- Longer VOT also in EA /sp, st, sk/ (Torreira 2006)

Questions

- Sound change from pre- to postaspiration in /sp, st, sk/ in Andalusian Spanish?
- Production and perception; two varieties: Seville (WAS); Granada (EAS)
- Phonetic basis of the sound change [hC] ⟶ [C^h]?
  - place of articulation /sp, st, sk/
  - subsequent vowel /a, i, u/
- Search for a phonetic basis of sound change in EAS: less generalization of postaspiration
- First step: /st/ in Seville Spanish

Production Seville

Hypothesis for /st/

- Young Sevillians produce longer VOT
- Young Sevillians produce less preaspiration
- /s/-aspiration -> longer closure duration
- /s/-aspiration -> longer VOT
- longer VOT -> less preaspiration

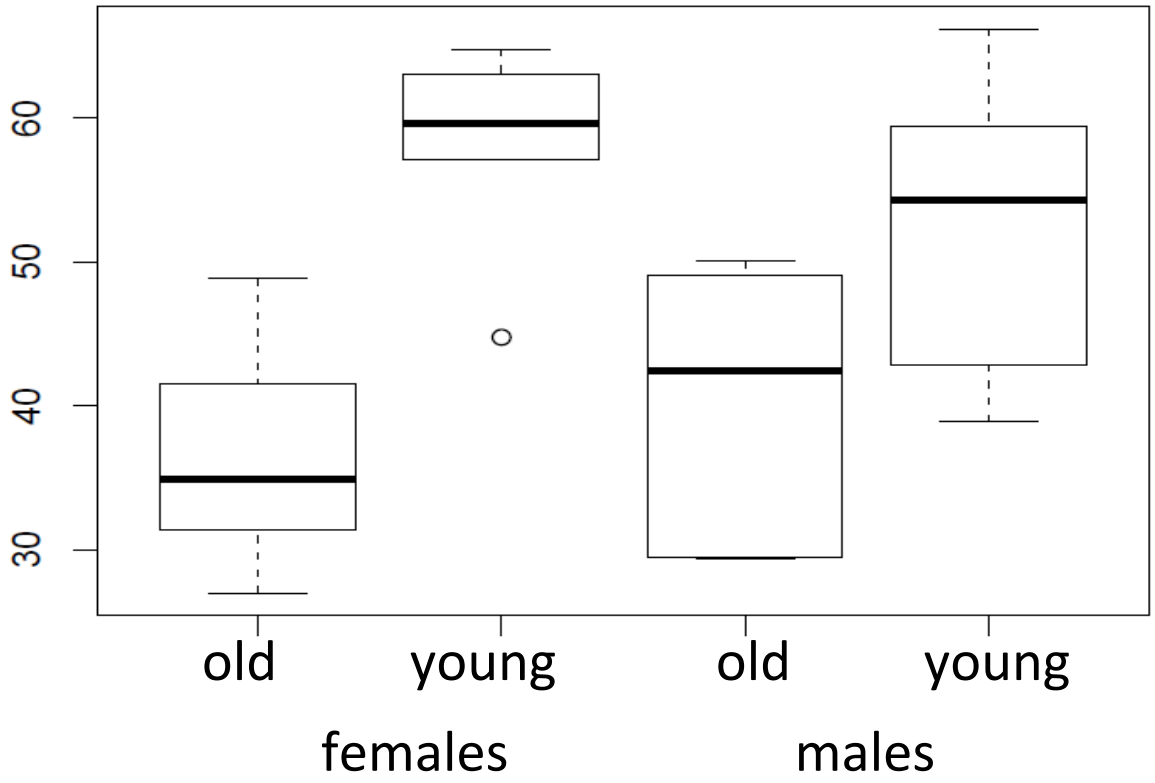
Production Seville

Method

- 24 speakers from Seville
  12 young, 12 old
- seven different /st/-words with a following /a/
  estado, estaba, estanco, pestaña, las tazas, hasta, pasta
  3 repetitions
- eleven different /t/-words with a following /a/ (words and non-words)
  bata, bita, buta, taro, tano, etapa, retara, pata, pita, puta, ata
  3 repetitions
- automatic segmentation (MAuS); manually corrected

Production Seville

VOT length of aspirated /st/



ANOVA

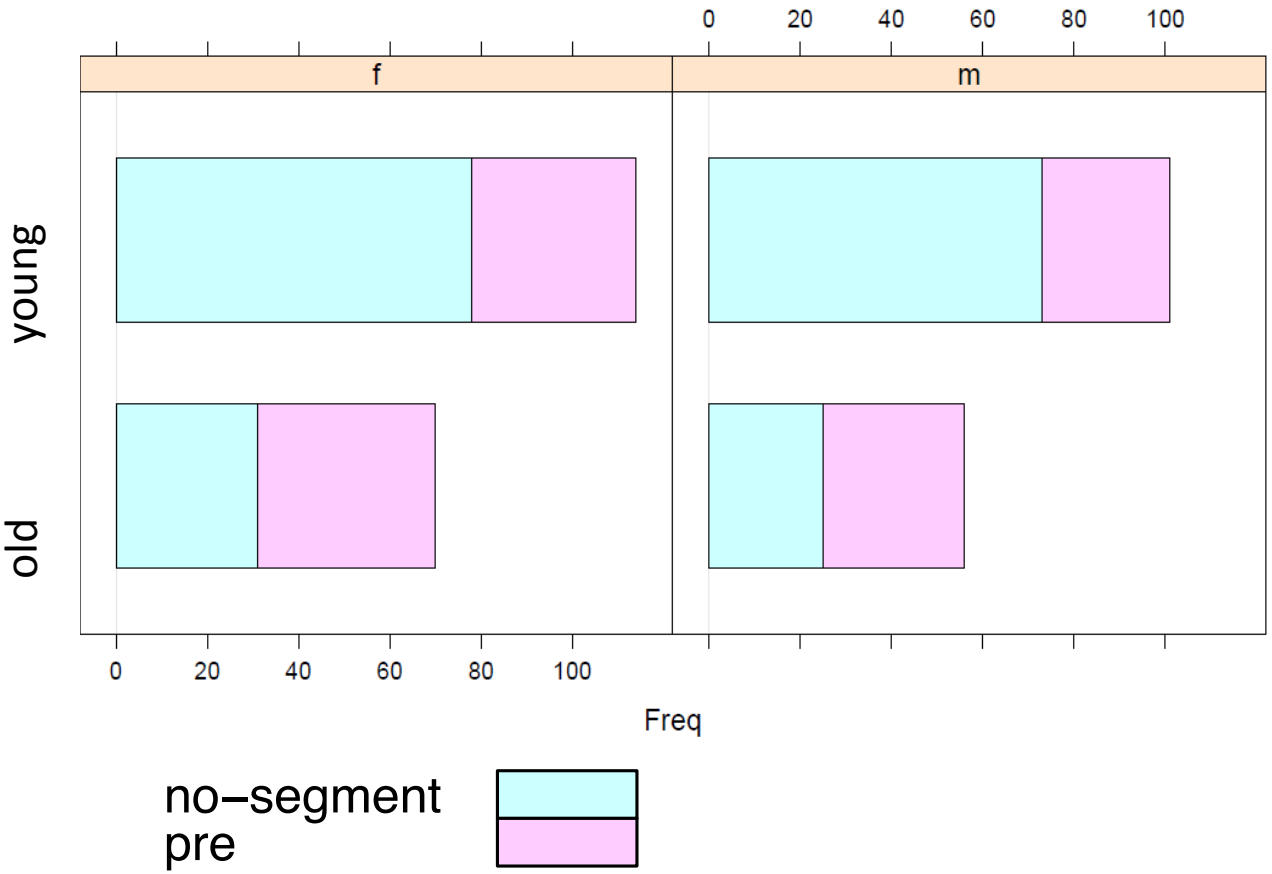
independent variable:
VOT

dependent variable:
age, gender

highly significant:
age ($F[1.16] = 19.5$, $p<0.001$)

Production Seville

Young Sevillians produce less preaspiration



GLMM

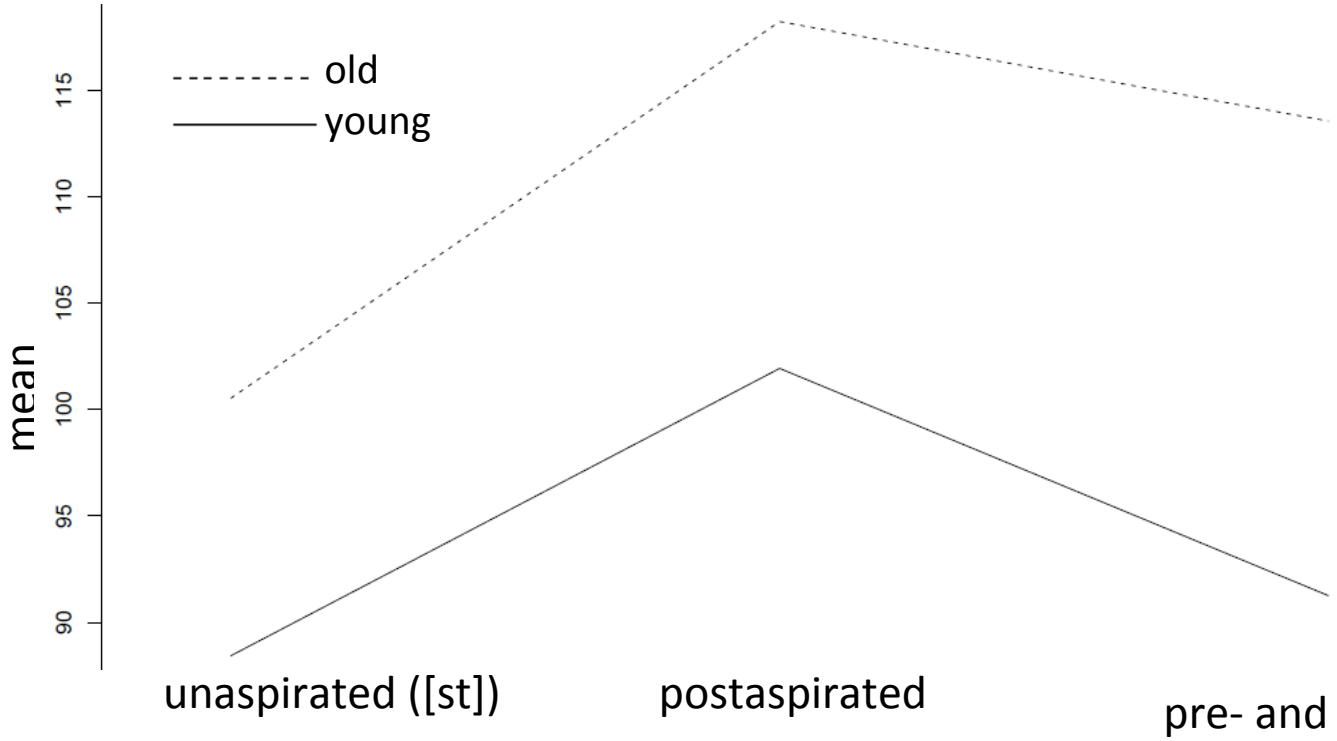
fixed factor:
existence of preaspiration

random factors:
speaker, word

highly significant:
age *(z=3.4, p<0.001)*

Production Seville

Closure duration in unaspirated and aspirated stops



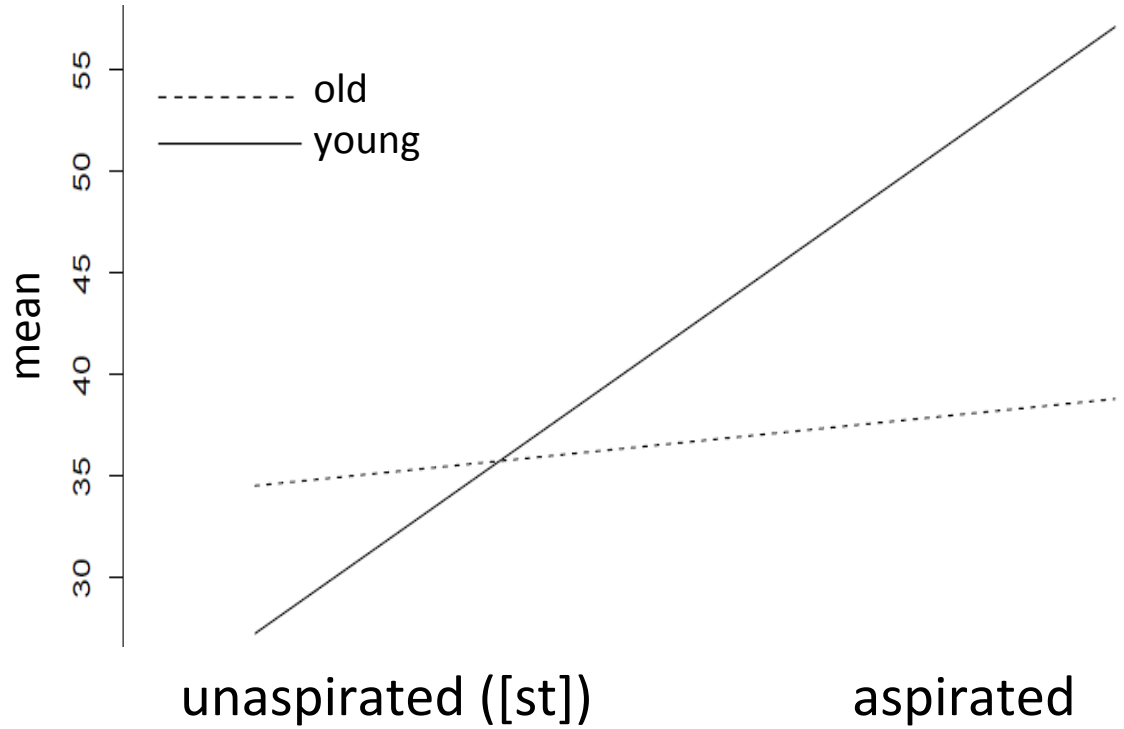
MM

random-factors:
speaker, word
fixed factors:
aspiration, age

highly significant:
aspiration ($\chi^2[1] = 44.0$, $p < 0.001$)
Significant:
age ($\chi^2[1] = 6.5$, $p < 0.05$)

Production Seville

VOT length in unaspirated and aspirated words (/st/)



MM

random-factors:

speaker, word

fixed factors:

aspiration, age

highly significant:

aspiration ($\chi^2[1] = 29.1$, $p < 0.001$)

Significant:

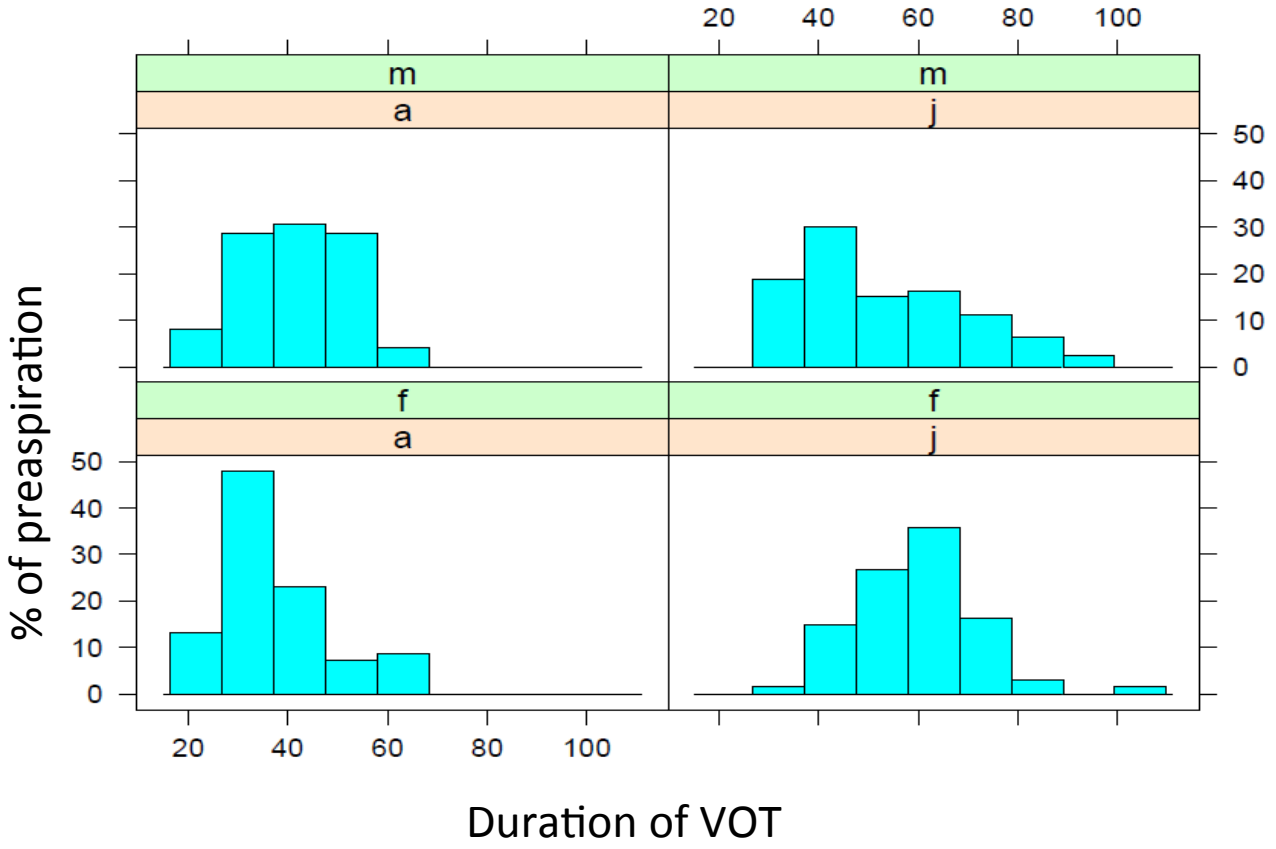
age ($\chi^2[1] = 5.7$, $p < 0.05$)

Interaction highly significant

($\chi^2[1] = 45.9$, $p < 0.001$)

Production Seville

Longer VOT -> less preaspiration



GLMM

fixed factor:
existence of preaspiration

random factors:
speaker, word

significant (young men):
aspiration (z=2.1, p<0.05)

Production Seville

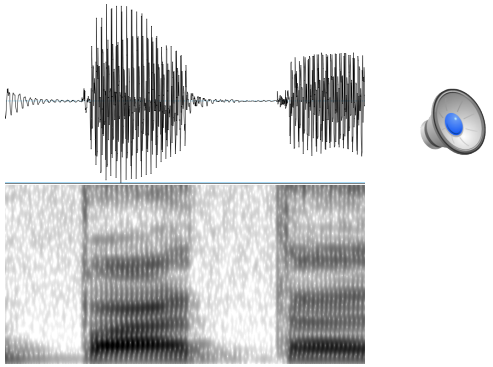
Summary

- Differences in production of /st/ in Seville Spanish
  - Young speakers produce longer VOT
  - Young speakers produce less preaspiration
  - Closure duration in aspirated stops
  - VOT duration seems to affect existence of preaspiration (only in 1 group of speakers)
- No differences between age and gender in /t/

Perception

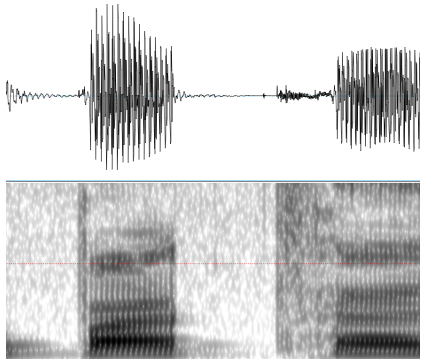
Stimuli - 2 nine-step continua

- endpoints: 15 ms VOT and 60 ms



pata-continuum

/pasta/



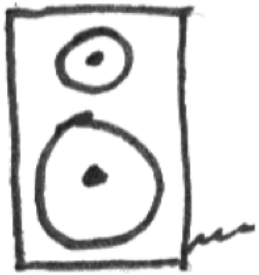
pasta-continuum

/pata/

Perception

Andaluz

Decida para cada frase si ha oído "digo pasta" o "digo pata". Podrá escuchar cada ejemplo sólo una vez.



digo pata digo pasta

X

1/180

- Stimuli: 2 x 9 x 10 = 180, randomised
- 73 subjects:
  Seville (20 young, 18 old); Granada (19 young, 14 old)
- young: 18-49 years, old: 50-87 years

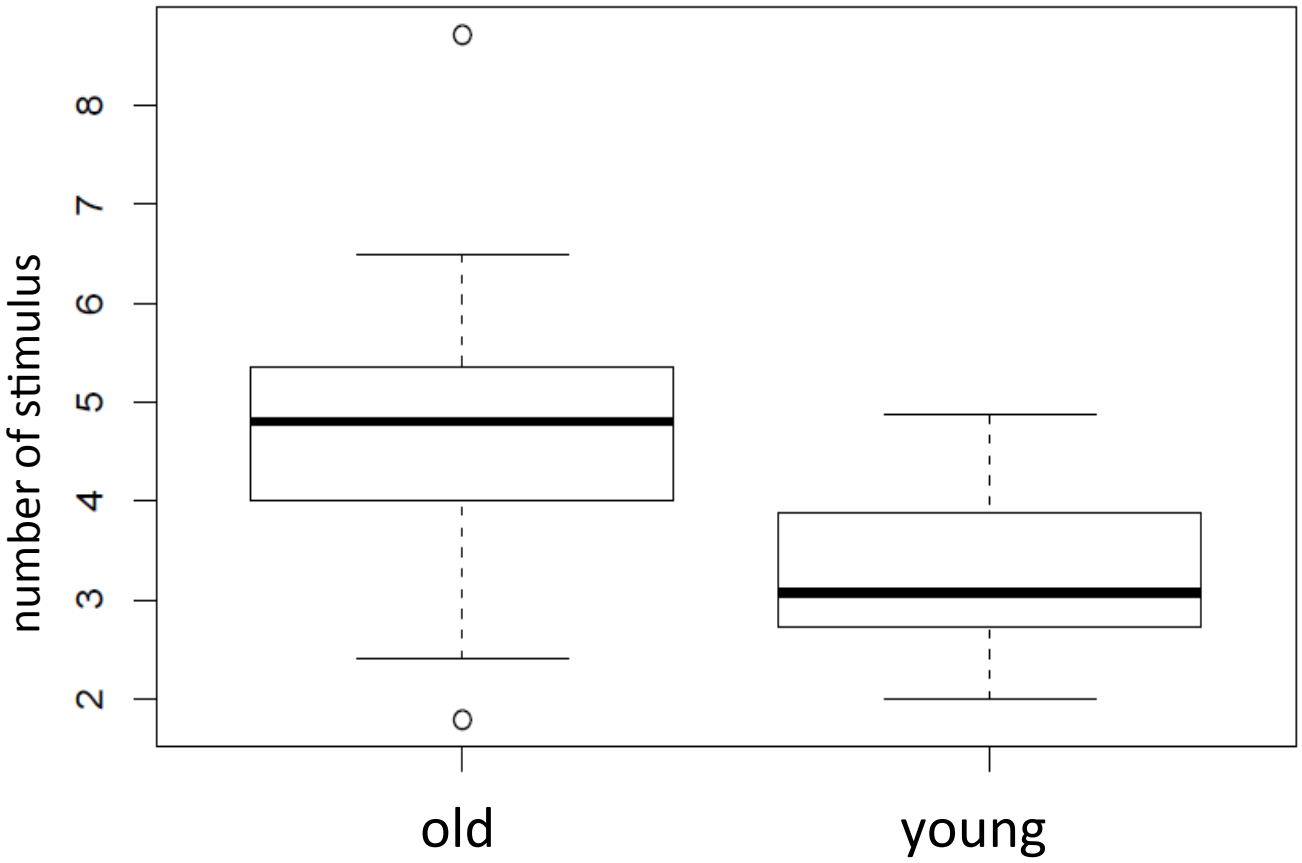
Perception Seville

Hypothesis

- Young Sevillians need a shorter VOT to perceive [pat^{h}a] as *pasta*
- Young Sevillians can distinguish more easily between [pat^{h}a] and [pata]

Perception Seville

Results cross-over point



GLMM

dependent:
response,

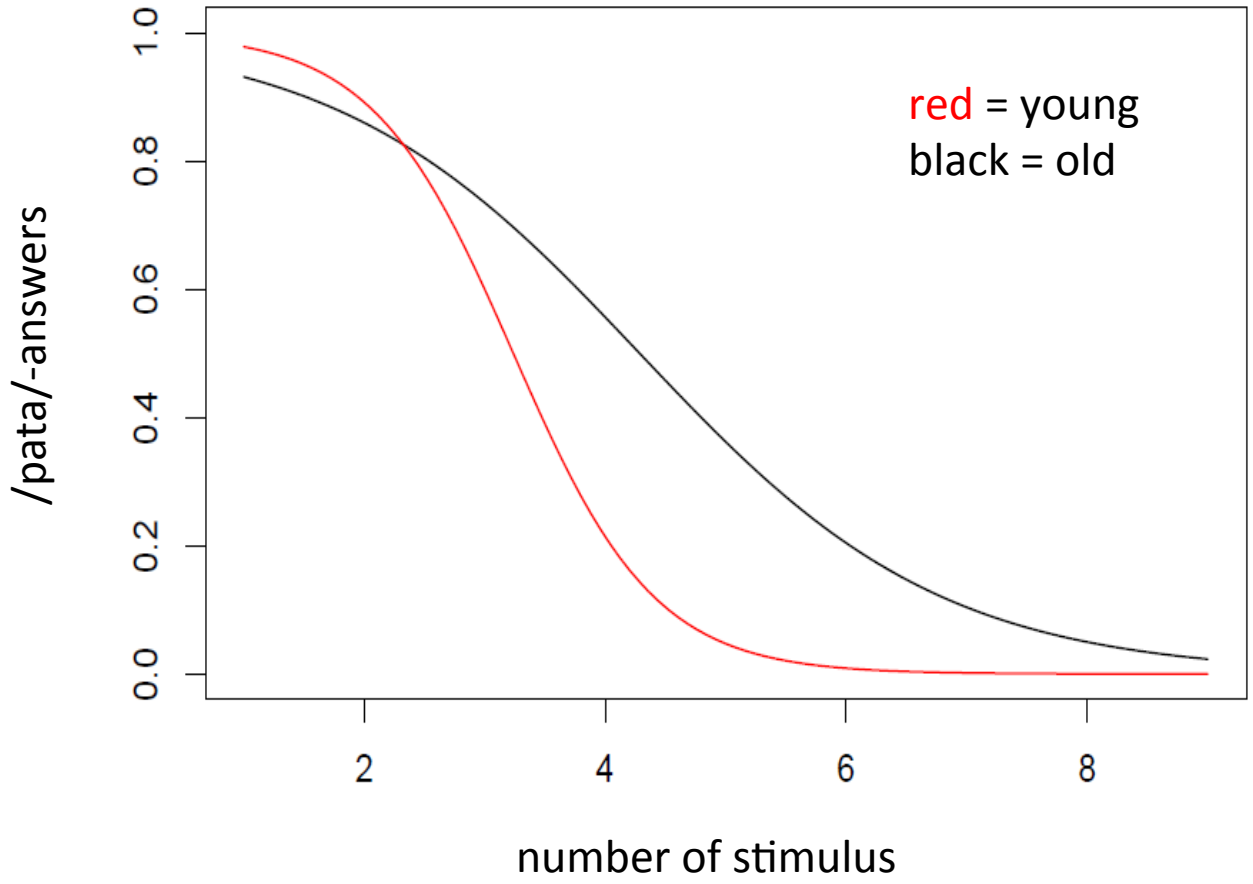
fixed factor:
step

random factors:
speaker,
continuum

highly significant:
age ($F[1.37] = 15$, $p<0.001$)

Perception Seville

Results slope



GLMM

dependent:
response,

fixed factor:
step

random factors:
speaker,
continuum

highly significant:
age ($F[1.37] = 39.9$, $p<0.001$)

Perception Seville

Summary

- Differences between old/young in perception
  - Old listeners need a longer VOT to hear [pat^{h}a]
  - Young listeners can separate more easily between [pat^{h}a] and [pata]
  - Young subjects make a more categorical distinction between long and short VOT than older ones.

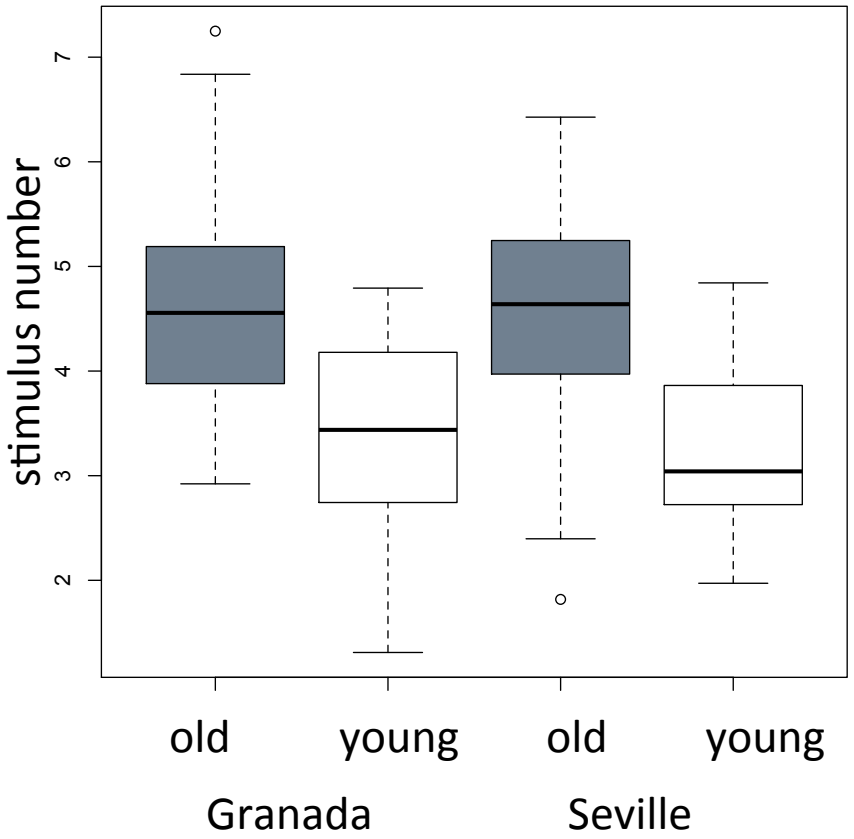
Perception Seville-Granada

Hypothesis

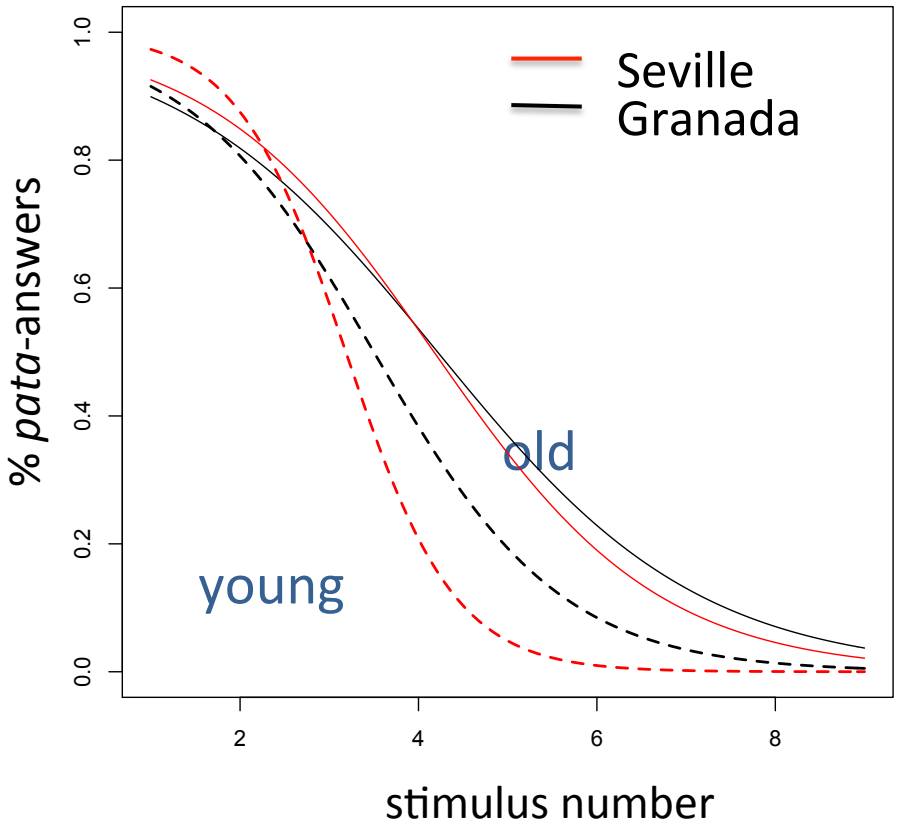
- Listeners from Granada need longer VOT to hear /pasta/ [pat^{h}a]
- SE listeners distinguish more categorically
- Granada: differences among age
  - previous studies: no (EAS: preaspiration)
  - informal observations

Perception Seville-Granada

Cross-over point



Slope



Perception Seville-Granada

- Younger listeners are more sensitive to longer VOT
- Young Sevillians dinstinguish more categorically between [t^h] and [t] than young Granadians
- Older listeners perceive VOT-differences more gradually than younger ones
- Other cues for /st/-/t/ contrast in Granada?
  - total duration
  - closure duration
  - duration of preceding vowel
- Sound change in progress also in Granada!
- Speech production?

Production Seville-Granada

Sound change in progress also in Granada?

- Differences in VOT according to age in GR
- Shorter VOT-duration in /st/ for Granada
- More preaspiration in GR than in SE

Differences /st/-/t/

- VOT: SE:young > GR:young > SE:old, GR:old
- other cues?
  - existence of preaspiration
  - closure duration

Production Seville-Granada

Method

- Same procedure as for Seville data
- 2 age groups, 2 dialects, 12 subjects/group
  = 48 speakers
- 5 /st/-words *estado, estaba, estanco, pestaña, las tazas*
  2 /t/-words *etapa, retara*
- Automatic segmentation, manual correction

Statistics

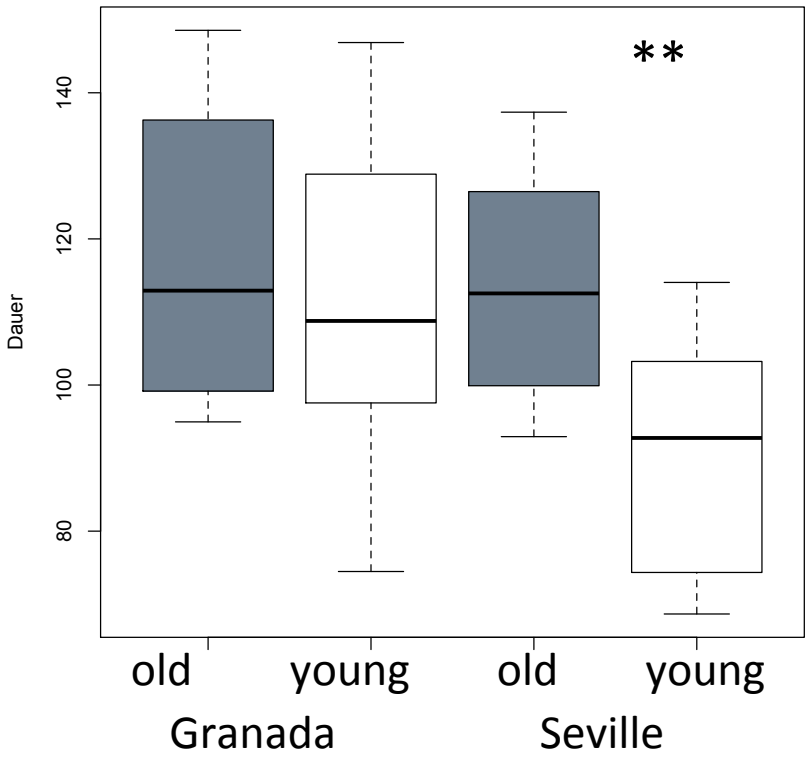
- Anova (speaker-wise mean values)
- GLMM (frequency of preaspiration)

Production Seville-Granada

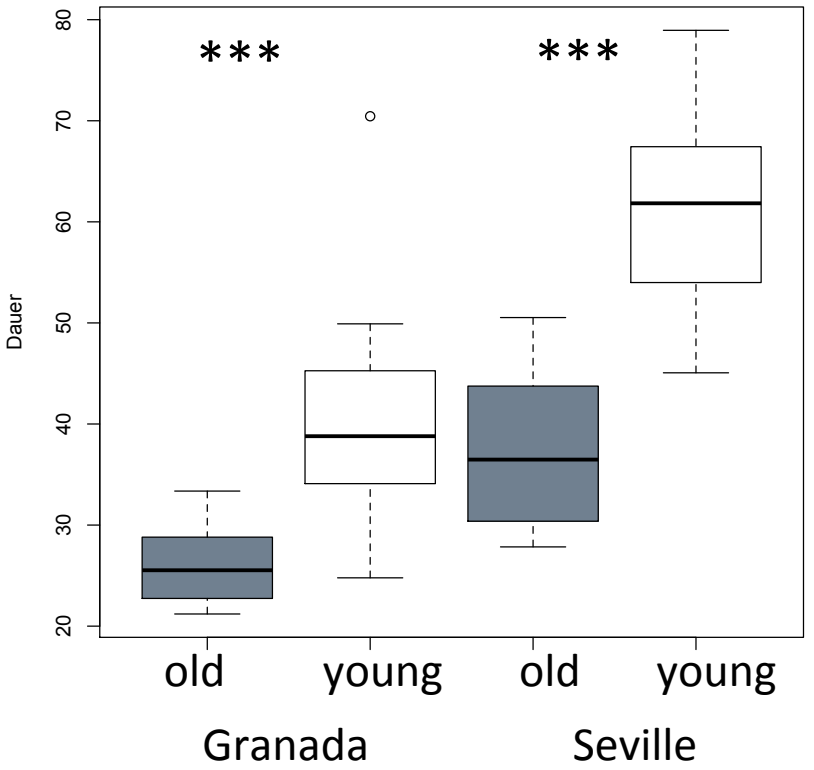
/st/ in 3-syllabic words

pestaña, estanco, estaba, estado, las tazas

Closure duration

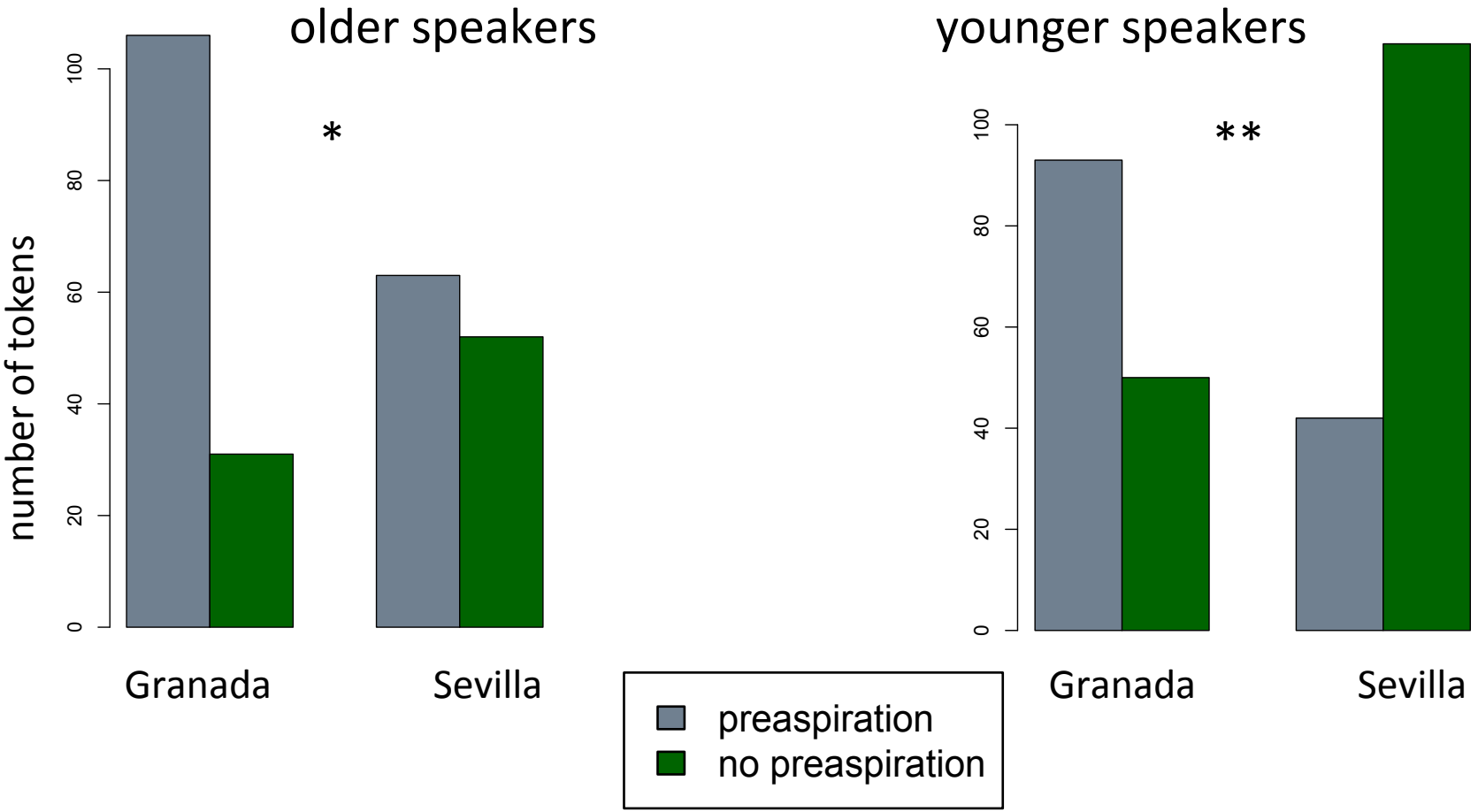


VOT duration



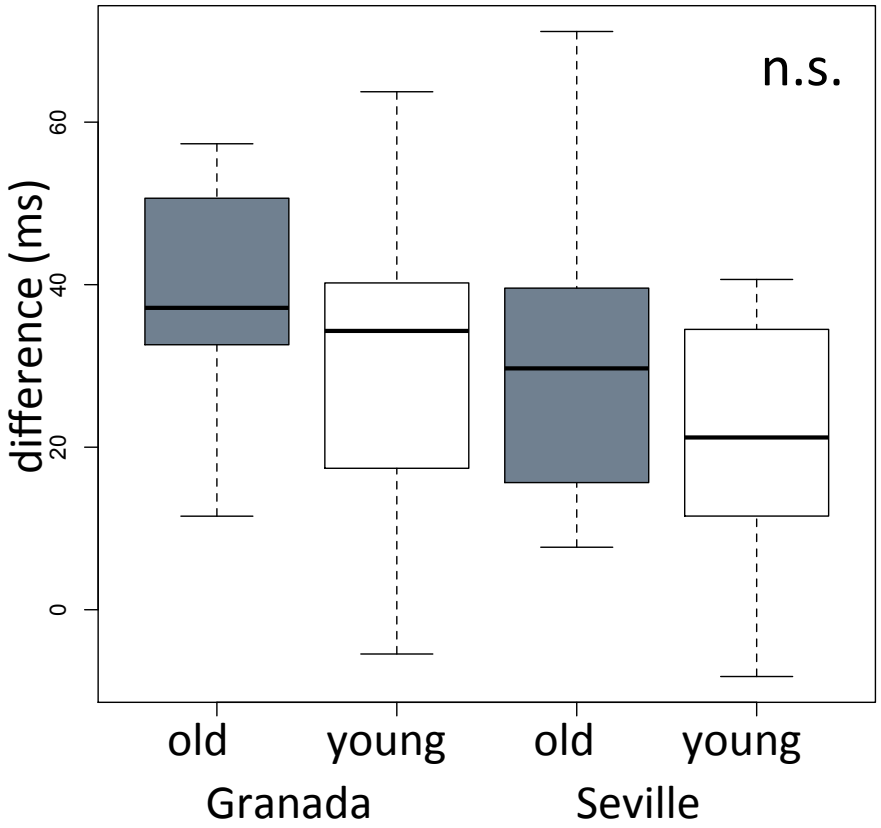
Production Seville-Granada

Occurrence of preaspiration (voiced and voiceless)

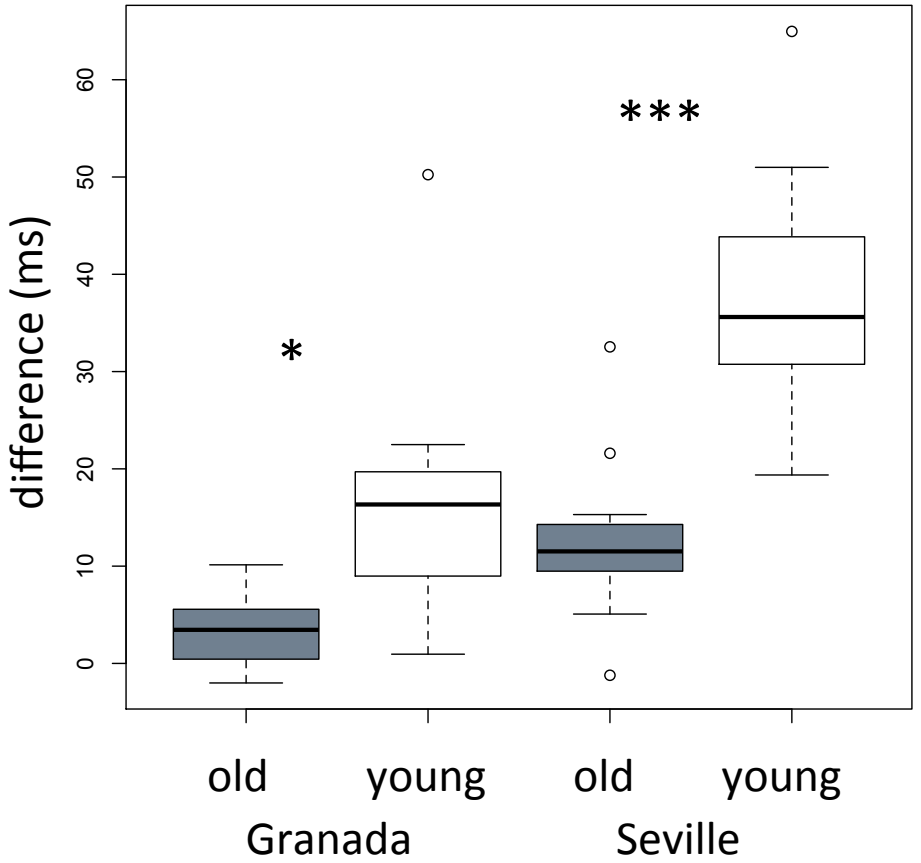


Production Seville-Granada

Closure difference /st/-/t/



VOT difference /st/-/t/



Production Seville-Granada

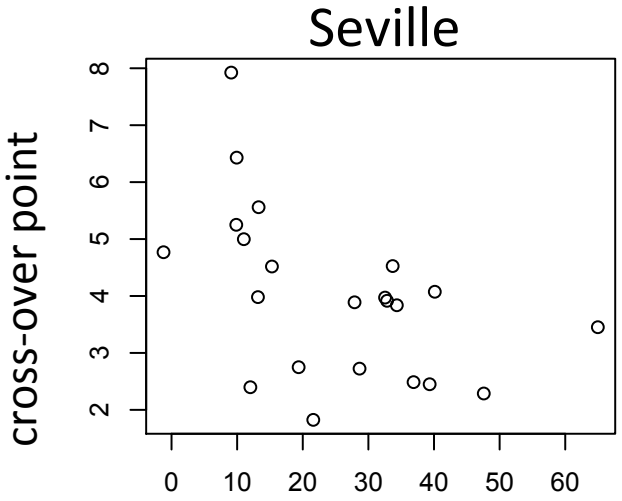
Discussion

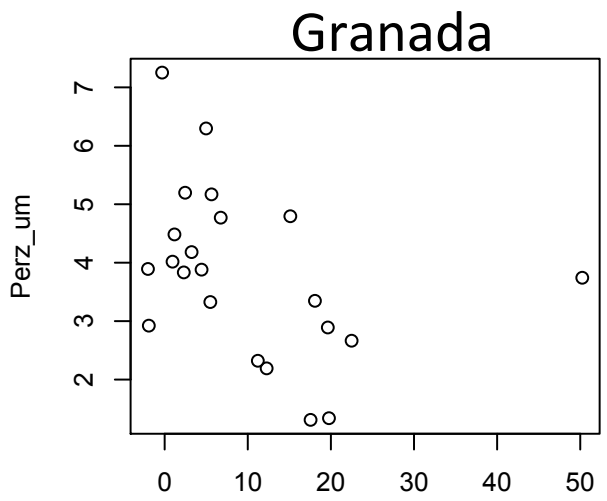
- Sound change in progress also in Granada
- VOT difference between /st/ and /t/ strongest for young Sevillian speakers
- Other cues (closure duration, preaspiration) for older and Granada speakers stronger than for young Sevillians
- Only 3-syllabic words, not for /pasta, hasta/!

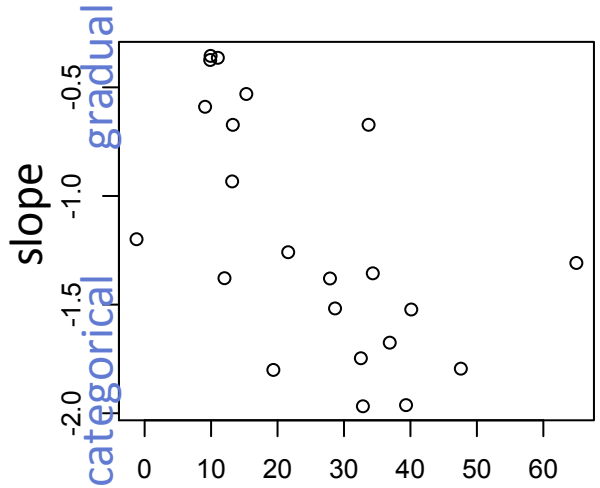
Discussion

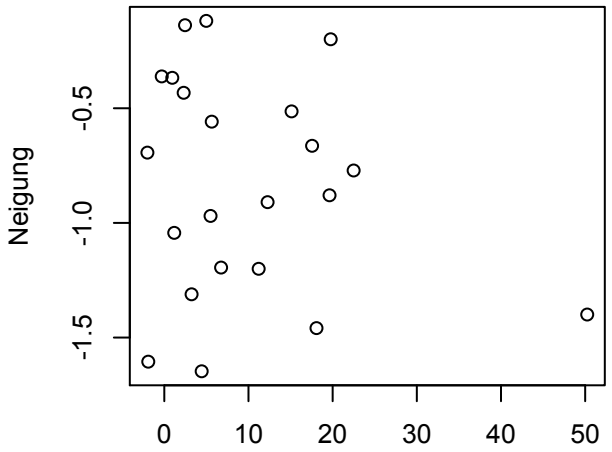
- VOT-differences between dialects and age groups seem to be stronger in production than in perception -> production-based sound change?
- Postaspiration as phonetic consequence of preaspiration - phonologized in WAS but not (yet) in EAS?
- Why do young GR listeners much better than old SE listeners, although in production they do the same?

Production-Perception









Next steps

Production-perception relationship

/st/-/t/	production	perception cross-over point	slope
VOT	long	low	abrupt
preaspiration	frequent	high	flat
closure duration	high	high	flat

Comparisons between speakers

or between tokens?

Literatur

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Thank you
for your attention!