Introduction

Pre-sonorant voicing, i.e. when a voiceless/devoiced obstruent assimilates to a following sonorant, has raised recurrent interest among phonologist mostly due to the apparent activity of a non-contrastively specified segment acting as a trigger in voicing assimilation.

- Pre-sonorant voicing is restricted to the word- (or syllable) final position.
- Pre-sonorant voicing occurs in languages with final devoicing, (partial) neutralisation.
- Pre-sonorant voicing is triggered either by sonorant consonants as well as vowels, or only by vowels or only by sonorant consonants.
- In a number of cases targets only subclasses of obstruents (mostly fricatives).
- Voiced obstruents are claimed to trigger more voicing than sonorants.
- There is no agreement among phonologists in the gradient or categorical nature of pre-sonorant voicing (or voicing assimilation in general).

/s/ voicing in Spanish

There is no /s/-/z/ contrast. Phonotactic restrictions: few potential devoicing and voicing assimilation (VA)/pre-sonorant voicing positions.

- Romero (1999) EMMA study with one speaker: no difference between within the word and across word-boundary; s-C[voice] inbetween single voice and s-C[less] "Spanish VA is not a categorical phenomenon". Voicing is consistently higher in labials than in velars and alveolars.
- Colina (2009) studies Ecuadorian S where final /s/ is unspecified and targetless vs. Northern Central Peninsular Spanish (NCPS) where it is unspecified, tries to capture the connection btw VA and Coda devoicing. Pre-vocalic /s/-voicing is gradient and variant.
- Schmidt–Willis (2011) study on Mexican Spanish: "the process is far from categorical". Does not treat pre-sonorant and pre-obstruent contexts separately. Does not consider the possibility of a categorical but optional process.
- Campos-Astorkiza (2012): VA is the result of gestural blending, still stress does not influence voicing, predicts that sonorants should trigger more VA than voiced obstruents.
- Strycharczuk (2012) studies Ecuadorian S: */s/ voicing is optional but categorical for some speakers and gradient for others".

Research Questions

- Is there final devoicing in Spanish? (Experiment 1) If so, Spanish fits the above typology.
- Do sonorants trigger more /s/-voicing than voice obstruents? (Experiment 2) If so, this supports gestural blending. (Note that voiced obstruents in this position are realised as narrow or wide approximants in Spanish.)
- Is /s/ voicing in NCPS categorical or gradient?

Methods

- 7 subjects (3 male, 4 female) aged 22-41 students and professors of the University of Oviedo
- Laboratory speech, 5 readings (first familiarisation and discarded)
- SpeechRecorder in randomised order, Sony ECM-M5907 microphone, M-Audio MobilePre USB preamplifier, 44100Hz
- Spectrograms segmented manually, voicing measurements done manually in Praat (v 5.3.12), Statistical analysis in R.

Experiment 1

Test words: pub, virtud, blog and (donut, ketchup) in sentence-final position. All subjects:

All stops are realised as voiceless (90% or more unvoiced frames). Individual strategies for the "violating" final stops: fricativisation, deletion. Spanish IS a final devoicing language, fits the above typology.

Results Experiment 2

/s/ voicing in NCPS all subjects. (W= sentence-final position e.g. autobús, V= intervocalic position e.g. paso, las óperas, T= before voiceless obstruent e.g. espere, las potencias, S= before sonorant consonant e.g. esnobismo, las fotógrafos, D= before voiced obstruent e.g. esbelta, las dotes)

Variable ‘position’, i.e. within word (mismo) vs. across word-boundary (las motos) is not significant: F(1,6) = 3.875, p = 0.097. Fricative length and unvoiced frames ratio: Pearson’s r = 0.30

Variable ‘trigger’ (segment following /s/) is significant; Repeated Measures Anova F(1,46,6.78) = 54.04, p < .001. Tukey’s HSD: no significant difference between W, V and T triggers (as expected), D-S p = .00023

Discussion

Sonorant consonants do not trigger more voicing. /s/ is more voice before voiced obstruents, thus gestural blending is refuted. Subjects 4 and 5 categorically voice /s/ before a sonorant or a voiced obstruent. Subjects 6 and 3 seem (categorically) not to voice before a sonorant, the others voice to some extent. Pre-sonorant voicing seems to be categorical for some speakers and gradient for others. But... Schmidt–Willis (2011) 14-15 ms voicing is purely phonetic due to coarticulation; up to 37 ms even in the expected voiceless contexts is observed.

Voiceless less than 16 ms voicing. In between:16-35 ms (at least 40% voice frames). Voiced: 35+ ms voicing. In the expected voiceless context 15.35% of the cases contain 10-16 ms progressive voicing from the vowel to the bilateral.

Position | Voiceless | In between | Voiced
--- | --- | --- | ---
Expected voiceless | 96.05% | 3.15% | 0.8%
Pre-sonorant | 30.31% | 11.42% | 48.1%
Pre-vd-obstruent | 13.4% | 13.4% | 73.2%

This means that pre-sonorant voicing in NCPS points towards a categorical but optional process. Inter- and intra-speaker variation is due to the optional nature of the process, which on the whole produces a gradient effect.

References

- Bárkányi, Zs. – Z. G. Kiss (2012) On the border of phonetics and phonology: Sonorant voicing in Hungarian and Slovak. 20mmf
- Boersma, P. – D. Weenik. Praat (v 4.3.19)
- Draxler, C. – Jansch. K. SpeechRecorder (v 2.2.1)
- Campos-Astorkiza, R. (2012) Voicing assimilation as gestural blending. 20mmf
- Cyran, E. (2012) Krakow sandhi voicing is neither phonological nor phonetic...