Phonemic boundaries floating on phonetic variation: Driving forces in Z devoicing

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Labov (2010: 287) explores "situations where the effects of coarticulation are strong enough to disrupt the unity of a phoneme and searches for evidence of a binding force that resists such disruption." In this search for a binding force, we ask how the sociolinguistic profile of a phonetic variable can inform us about the phonemic grouping of its sounds. We focus our search on /s/ and /z/, which were not phonemically distinct in Old English but later gained their distinction. Recent investigation of voicing-related acoustic phenomena in Appalachia reveal several overlapping acoustic qualities for these sibilants, providing ample evidence in which to search for the effect of Labov's binding force on consonant variation. Phoneticians have known for decades (e.g. Smith 1997) that devoicing was present in English word-final fricatives (e.g. *bees* [bis]). For US English, Purnell, Salmons, Tepeli, and Mercer (2005) demonstrated that voicing is not a singular quality but is instead composed of a set of acoustic qualities, including duration and glottal pulsing of the sibilant, preceding vowel intensity, pitch, and duration.

We ask if there is an on-going sound change that disrupts the phonemic distinction between word-final /z/ and /s/. Additionally, we investigate whether distinctions between word-internal and word-final sibilants illuminate conditioning environments that foster the collapse of phonemic boundaries.

To answer these questions, we investigated /z/ and /s/ for 67 native Appalachians. We conducted an acoustic analysis for seven social variables and ten acoustic qualities in 2,010 tokens of word-final environments (e.g. lose [luz]) and 1,340 tokens of word-internal environments (e.g. losing [luzɪŋ]). The investigated acoustic qualities include preceding segment duration, sibilant duration, percentage of glottal pulsing, preceding vowel pitch and formant changes, changes in intensity, and center of gravity (Gradoville 2011). Mixed effects models were applied to assess the relative strengths of the social and acoustic factors, with speaker and word as random effects.

Results reveal that word-internal and word-final sibilants do not distinguish /s/ and /z/ in the same ways. For example, although sibilants do differ in length word finally and word internally, some speakers do not distinguish word-final /s/ from /z/ for glottal pulsing and sibilant duration. For word-final environments, there is no significant difference in the preceding vowel duration for /s/ and /z/.

Social differentiation can be found with a few acoustic correlates. Two prominent examples involve glottal pulsing. Younger speakers, especially males, use a wide range of glottal pulsing in /z/. In addition, only rurality correlates with glottal pulsing of word-final segments. There is wide variability between individual speakers, but no socially-grouped directionality for any coherent set of voicing qualities. We conclude, at least for the sibilants under study, that Labov's binding force results from a lack of directionally-reinforcing social pressure. Thus, the sociolinguistic profile of a community can inform us about the phonemic status of minimally contrasting sounds and their possible future paths of change.

References:

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