Does phonetic reversal lead to phonological reversal?

Since the study of Martha's Vineyard (Labov 1963), sociolinguists have documented numerous cases of social factors driving sound change, and even reversing the direction of historical change. The impact of social factors on phonetic change raises an important question about the relation of social factors to phonologization. If social factors lead to a reversal of a sound change, will they likewise reverse the phonological change that triggered it?

A striking case study of a socially motivated reversal of sound change can be found in the case of the back upgliding vowels /ow/ (as in *goat*) and /uw/ (as in *goose*) in Philadelphia English. As reported in Labov et al. (2013), both of these vowel classes undergo an allophonic split, whereby tokens preceding /l/ (as in *goal, ghoul,* henceforth: /owl/ and /uwl/) remain phonetically back while tokens not preceding /l/ (henceforth: /ow/ and /uw/) begin to front for speakers born between 1888 and 1960. Beginning with speakers born around 1960, however, both /ow/ and /uw/ begin a surprising reversal in acoustic space (Figure 1). Evidence that a fronted /ow/ is stigmatized by Philadelphian speakers suggests that this astonishing reversal in F2 is a socially motivated retreat from a stigmatized front production. This sociolinguistic reversal results in /ow/ and /uw/ returning to encroach on the phonetic space of /owl/ and /uwl/. This leads in turn to an important phonological question: does the sociophonetic reversal of /ow/ and /uw/ result in a corresponding collapse in the phonological distinction between /ow/ and /owl/ or /uw/ and /uwl/?

To answer this question, we turn to Bhattacharyya's Affinity (BA) score as a measure of vowel class similarity, following Johnson (2016). BA scores are a nonparametric measure of similarity bounded mathematically by 0 (completely distinct) and 1 (completely similar). In practical terms, a wide phonemic vowel distinction such as the difference between /iy/ (*fleece*) and /ae/ *(cat*) receives on average a BA score of 0.4. We analyze the speech of all speakers in the Philadelphia Neighborhood Corpus (PNC) who produce at least 5 tokens of /ow/, /owl/, /uw/, and /uwl/, resulting in 275 speakers ranging in dates of birth from 1888 to 1993. BA scores were calculated for each speaker between their /ow/ and /owl/ classes as well as /uw/ and /uwl/ classes. We find that as /ow/ and /uw/ begin to overlap /owl/ and /uwl/ in phonetic space after 1960, the BA scores for these vowels do not subsequently increase. Instead, we find that BA scores for both vowel classes continue to steadily decrease ($p = 0.006$), meaning that even as the vowel means get closer, speakers retain and even *increase* the phonological distinction between these two classes.

We find no evidence of phonological collapse between the two allophones for either vowel category, in spite of the striking collapse in F2 distinctions. Our findings suggest that once a change has been phonologized, as in the case of /ow/ and /uw/ splitting from /owl/ and /uwl/, a phonetic reversal will not easily affect the phonology.

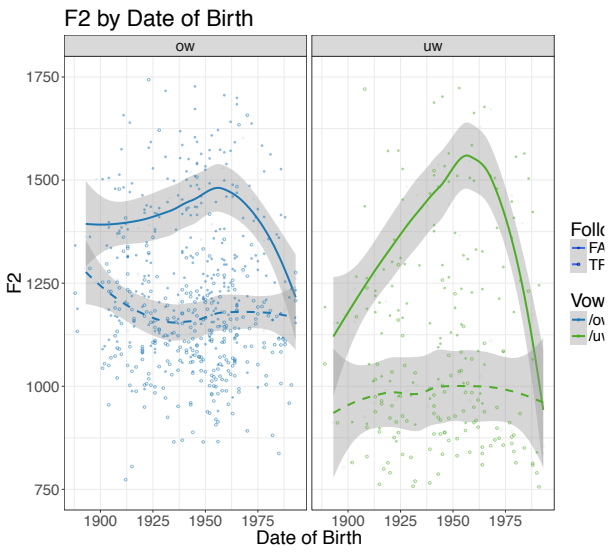

Figure 1: Reversal of /ow/ and /uw/ F2 beginning in the 1960s

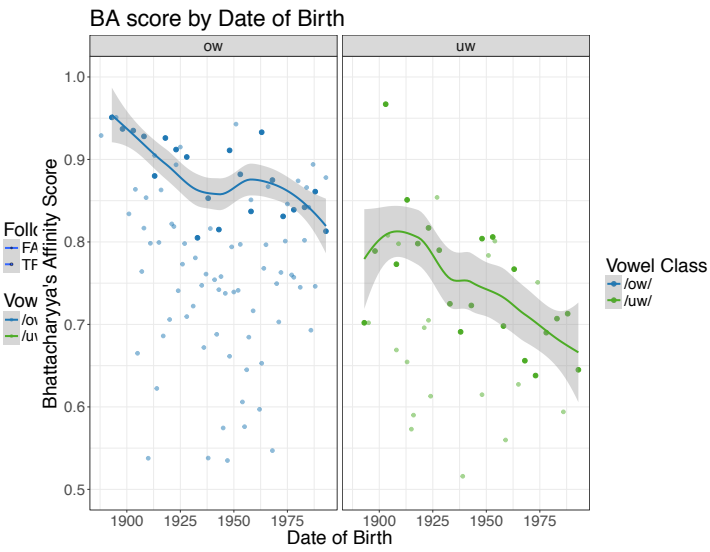

Figure 2: BA score for /ow/ and /uw/ steadily decreases as DOB increases

References

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