

## Is /u/-fronting in Southern British English simply hypocorrection?

Ohala illustrated in several studies (e.g., Ohala 1971, Ohala 1974, Ohala 1981) that sound change can originate in speech perception. Hypocorrection, for instance, occurs when an inexperienced listener is unable to correlate coarticulatory effects with the context. As a result, a new phoneme category can emerge. One of Ohala's examples for hypocorrection is the fronting effect that coronal consonants have on an adjacent /u/, causing a raising of the second formant (F2) in the transitions from the vowel. When listeners fail to associate the raised F2 with the coronal context, they interpret the vowel as [ʊ] or /y/, since both have higher F2 values than /u/.

The process of /u/-fronting in Southern British English (SBE) seems to be such a case of hypocorrection: younger speakers realise the high, back rounded vowel as [ʊ], i.e. with a much higher F2 than older speakers. Harrington, Kleber & Reubold (2008) found that younger SBE speakers do not perceptually compensate for coronal coarticulation of the vowel, whereas older SBE speakers do. This inability to correlate contextual factors with the context provides evidence for an interpretation of SBE /u/-fronting as hypocorrection (as proposed by Harrington et al.).

Harrington et al. also looked at the production of /u/ and /i/ by the two SBE age groups. The data shows that there is large variation in the realisations of /u/ for the older generation, but no overlap with realisations of /i/. For the young speakers, the realisations of /u/ are much less spread, but fronted to such a degree that they partly overlap with the realisations of /i/.

The near-merger of /u/ and /i/ for young SBE speakers is puzzling for two reasons. These speakers produce a considerable part of their /u/ tokens in a region where their perceptual input (the productions of the older speakers) never had tokens of /u/. It is thus not clear why younger speakers should go that far in their fronting. In addition, the overlap of /i/ and /u/ tokens in younger speakers causes perceptual confusion. A state of perceptual confusion, however, is usually avoided or even resolved via sound change, as the so-called dispersion effects illustrate (see e.g. Liljencrantz & Lindblom 1972, Lindblom 1986).

An explanation in terms of hypocorrection, i.e. a re-association of the high F2 from coronal context to the back vowel, cannot account for these observations. The present study proposes instead that SBE /u/-fronting took place for two reasons. First, younger speakers of SBE pay no or only little attention to F2 and employ other cues such as F1, F3 and duration to distinguish /i/ from /u/. If they distinguished between /i/ and /u/ on the auditory dimension of F2, their own production data would mirror this and would display no overlap of the two categories. Second, an articulatory bias caused /u/ to be fronted: the production of a back rounded [u] requires much more articulatory effort than the production of [ʊ] and is hence avoided. This articulatory bias can only apply because its result does not cause perceptual confusion on the auditory dimensions that the younger speakers employ.

A computer simulation similar to the one employed in Boersma & Hamann (2008) supports this explanation. Learners were taught statistical distributions of /i/ and /u/ tokens along three auditory dimensions, F1, F2 and duration, together with their phonological category labels (assuming lexically-guided acquisition). Based on this input, the learners constructed connections with differing strength between values on the three dimensions and the category labels. The same connections and their strengths were used in production (where one of the labels was activated), with additional articulatory inhibitions (on back high vowels and vowels outside the assumed vowel space). Distributions along the F2 dimension with large variation or overlap led to less stable results in the learning process and more mistakes in a subsequent categorisation task. Exclusion of this F2 dimension, on the other hand, led to a strong influence of the articulatory bias and resulting fronted articulations of /u/ as [ʊ].