

From compensation to adoption: the medium-term dynamics of sound change

A conundrum in the literature on adults' adoption of sound change concerns the role of perceptual compensation and its translation to production. In the short term, an abundance of psycholinguistic work has established that listeners adapt their phonological categories in on-line recognition to match any speaker idiosyncrasies (e.g. perceptual learning; Norris, McQueen, & Cutler 2003). This makes them "robust" to variation, and hence to phonological reanalysis: if the speaker's production can be successfully mapped onto the listener's phonological categories, then clearly the latter are not in need of any reanalysis. In the long term, however, an equivalent abundance of historical phonological work has shown that such reanalysis *does* eventually happen: for example, the [k]>[s] shift from Latin [k]aelum to Italian [tsj]ielo and French [s]iel has been convincingly analyzed as the long-term result of Ohalan misperception (Guion 1998). It thus seems that listeners *compensate* for variation in the short term, and yet *use* the same variation to enact long-term historical sound change.

I present data from a four-year project set out to investigate this paradox from a phonological, sociolinguistic, and cognitive perspective. The project investigated an ongoing vowel shift in Dutch. Dutch is not commonly studied as much as English is for cases of ongoing sound change (although cf. Pinet 2015), but lends itself well for the study of sound change using laboratory methods, because the ongoing diachronic changes coincide with stable synchronic variation, making experimental investigation feasible. Dutch is spoken in both The Netherlands and in Flanders (the northern half of Belgium). In The Netherlands, a vowel shift is currently ongoing whereby the tense mid vowels /e:,ø:,o:/ are changing into phonologically-conditioned diphthongs [ei,øy,ou]. The phonological conditioning is that these vowels remain monophthongs before a coda approximant, but are realized as diphthongs elsewhere. Importantly, this exact same phonological conditioning applies (and has always done so) to the three preexisting diphthongs /ei,œy,au/, which also lose their upglide before a coda approximant. Thus, the tense mid vowels /e:,ø:,o:/ are undergoing a phonological recategorization towards /ei,øy,ou/. In contrast to this situation in The Netherlands, in Flanders the tense mid vowels have remained [e:,ø:,o:]. This coincidence of diachronic and synchronic variation makes it possible to operationalize adults' adoption of sound change through their adoption of regional differences. Specifically, the project investigated the process of Flemish ('conservative') individuals' adoption of the Netherlandic ('innovative') phonological system, in which unconditional [e:,ø:,o:] should be reanalyzed as conditioned [ei,øy,ou].

Two experiments will be reported: one longitudinal experiment with 20 participants and one cross-sectional experiment with 106 participants. Both experiments compared Flemish 'sociolinguistic migrants' with suitable controls, using laboratory-phonological experiments to probe their production and perception of the relevant vowels preceding coda /l/ (this being the only Dutch approximant that is free from annoying phonotactic restrictions) as well as elsewhere. The longitudinal experiment tracked ten Flemish sociolinguistic migrants, all first-year university students who had recently moved to The Netherlands to start their studies there (similar to Evans & Iverson 2007), over the course of nine months; they participated in the experiments three times, and were compared to ten Netherlandic controls each time. The cross-sectional experiment compared 45 Netherlandic controls, 43 Flemish controls who had never moved outside of Flanders, and 18 Flemish sociolinguistic migrants who had lived in The Netherlands for a very long time (years to decades). Thus, one experiment investigated the medium term, and the other investigated the long term. Both experiments used a word-list reading task to elicit participants' productions, and a phoneme-decision task (disguised as 'rhyme decision') with manipulated auditory stimuli to investigate participants' category boundaries in perception.

For the longitudinal experiment, the hypotheses were that the Flemish sociolinguistic migrants would, at least initially, produce unconditional monophthongs [e:,ø:,o:]. Conversely, due to them not being used to diphthongal realizations [ei,øy,ou], in their perception they were hypothesized to place the category boundary between /e:,ø:,o:/ and /ei,æy,au/ closely to the former set, i.e. with little diphthongization they would already perceive a diphthong phoneme. For the Netherlandic controls, by contrast, the hypotheses were that they would produce upgliding diphthongs [ei,øy,ou] in the non-/l/ context, and would require more diphthongization to be present in an auditory stimulus before judging it to be a token of a diphthongal phoneme. In the coda-/l/ context, however, these group differences were expected to vanish, because there neither participant group should be expecting a diphthong. Finally, it was expected that the Flemish group would quantitatively move closer to the behavior after spending more time in The Netherlands, i.e. over the course of the sampled nine months. For the cross-sectional experiment, the hypotheses were analogous; the main difference is that the cross-sectional experiment sampled a migrant group that had lived in The Netherlands for much longer than nine months.

Results from the longitudinal experiment showed clear and expected differences between the two groups, with the Flemish group producing and expecting more monophthongs and the Netherlandic group producing and expecting more diphthongs. However, the Flemish group could not be shown to adopt the Netherlandic system over the studied time. The cross-sectional experiment *did* show changes in that experiment's sociolinguistic-migrant group, but with important subtleties. At the group level, both in production and in perception, the sociolinguistic migrants in that experiment were positioned in between the Flemish and Netherlandic controls. However, in production only, the reason for this was found to lie in individual differences: an analysis of the by-participant random effects revealed that the group effect was not due to the migrants having adopted the Netherlandic system as a group, but rather that *some* individuals had changed a lot, and other individuals had done so only barely. In perception, by contrast, no individual differences of such magnitude were borne out. This corroborates and extends previous findings by Evans & Iverson (2007) on differences between perception and production, and results by authors such as Baker, Archangeli, & Mielke (2011) on the key role for individual differences in sound change.

These results demonstrate *both* perceptual compensation (in the short term) *and* the adoption of sound change (in the long term). Crucially, the results from the longer-term cross-sectional experiment provide a major piece of evidence in resolving the aforementioned conundrum: the change from compensation to adoption is strongly mediated by individual differences. Implications for theories of sound change as well as models of cognitive processing will be discussed.

References

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