

## Perceptual Grammars and Sound Change

*Patrice Speeter Beddor*

University of Michigan

Listeners' perceptual grammars may differ in the weights they assign to the multiple acoustic properties contributing to the percept of a feature or segment in the context of a given word. Of special interest in this paper are the perceptual weights listeners assign to properties intrinsic to a target segment relative to those assigned the coarticulatory effects of that target. I present data from offline and online behavioral studies demonstrating that the relative weights of coarticulatory source (target) and effect are context- and listener-specific.

I have previously shown (Beddor, 2009, *Language* 85.4) that, in production, some types of coarticulation exhibit an inverse relation between the duration of the target segment and the temporal extent of that target's coarticulatory effects. In these cases, the relevant gesture—e.g., a velum lowering gesture—is temporally stable but is variably aligned relative to other articulators. I have argued that such covariation in production, which can result in very short or even absent target segments (but concomitantly extensive coarticulatory effects) is compatible with multiple perceptual grammars. For coda nasals in English, for example, these grammars may include VN,  $\tilde{V}$ , 'nasal' (in the rhyme), or different analyses for different contexts. Offline data from identification and discrimination of  $\tilde{V}$ NC sequences provide across-listener evidence of this range of perceptual assessments.

Recent data from online perceptual measures, as the acoustic signal unfolds over time, further elucidate the context- and listener-specific weightings of coarticulatory source and effect. In this work (conducted in collaboration with Kevin McGowan, Julie Boland, and Andries Coetzee), participants' eye movements are monitored as they hear instructions to look at one of two pictured objects on a computer screen. In the trials of interest here, listeners hear a word with a nasalized vowel (e.g., *send*) and see pictures of two objects whose vowels are expected to differ in nasality (e.g., *send* and *said*). Visual fixation patterns show that all listeners use vowel nasalization as information about an upcoming nasal consonant; moreover, listeners tend to use these anticipatory effects as soon as they become available in the acoustic stream. However, listeners also *reassess* their judgments in real time when their initial expectations are not upheld, and they do so in ways that depend on their own perceptual weightings (e.g., some, but not all, listeners look away from *send* to *said* if [ɛ̃] is followed directly by [d], with no [n]).

These data are interpreted in terms of a theoretical approach to sound change in which listeners are accurate perceivers who attend to the dynamics of coarticulation, yet whose grammars can come to differ from the speaker's—and from those of (some) other listeners—with respect to the perceptual importance of coarticulatory source and effect. A listener who weighs coarticulatory effect heavily in perception may nonetheless, in production, faithfully produce the source. Alternatively, consistent with Labov's (2007, *Language* 83.2) process of incrementation, that listener may produce variants in which the source is less reliably present.