Investigating the perceptual hypocorrection hypothesis with sibilant harmony

Avery Ozburn, University of British Columbia, avery.ozburn@alumni.ubc.ca

Ohala (1993) claims that phonological harmony processes result from perceptual hypocorrection: sounds have coarticulatory effects on each other, even at a distance, and these effects become phonologized as harmony because listeners, on occasion, fail to correct for them. However, a large body of literature suggests that listeners are in fact quite good at correcting for coarticulatory influences, including between vowels across a consonant (Beddor, Harnsberger, and Lindemann 2002). More importantly, while Ohala suggests that dissimilation processes result from perceptual hypercorrection, as the opposite of assimilation, recent evidence suggests that listeners in fact tend towards hypocorrection in long-distance liquid...liquid sequences, categorizing ambiguous [l]/[ɻ] tokens as identical to a nearby [l] or [ɻ], even though liquids typologically tend to dissipate (Abrego-Collier 2013). This could perhaps be taken as support for the view advocated by Garrett and Johnson (2012) that long-distance dissimilation does not originate from misperception, but rather from motor-planning errors.

The present study addresses a gap in the existing literature, by looking at perceptual effects in contexts in which long-distance consonant assimilation is typologically common. Such cases are crucial because in the existing literature, two factors are unclear: whether correction for coarticulatory influences is specific to environments that are known to have strong coarticulatory effects (i.e. local contexts, and vowels across intervening consonants, as compared to consonants across an intervening vowel), and whether hypocorrection is a general perceptual effect with consonants at a distance, or is specific to liquids as in Abrego-Collier (2013). To address these issues, this study examines perceptual effects in sibilant harmony, which is the most common type of consonant harmony cross-linguistically (Hansson 2010). The mechanisms by which languages develop consonant harmony are under-investigated; it has been suggested that such patterns may arise from phonologized speech errors (e.g. Hansson 2010) or that they are synchronically the result of articulatory coarticulation (Gafos 1999). However, there has been little investigation into whether consonant harmony could be affected by listener-driven factors (see e.g. Hansson 2008 for an overview). Even so, given Abrego-Collier’s (2013) liquid results, sibilant harmony could originate diachronically in hypocorrection for coarticulatory influences of consonants on each other across an intervening vowel, along the lines of Ohala’s hypothesis for vowel harmony and assimilation more generally. In particular, if harmony patterns are in part determined by misperceptions, then we expect pairs of consonants that contrast in a harmonic feature to be perceived differently in typologically common harmony contexts than in contexts where harmony is less common. However, existing literature makes varying predictions about whether that difference should be hypocorrection or hypercorrection.

To investigate these questions, a forced choice categorization task was conducted using 11-step sVCV-[ʃ]VCV continua (C1 condition) and CVsV-CVʃV continua (C2 condition). The experiment tested whether three common properties of sibilant harmony are mirrored by asymmetries in how perceptually ambiguous stimuli are categorized, as we might expect if sibilant harmony originates from hypocorrective sound changes. These properties are the fact that more (featureally) similar segments are more likely to interact harmonically, that post-alveolar sibilants are more likely to trigger harmony, and that harmony is more often regressive (see e.g. Hansson 2010). As such, in each continuum, one of the consonants belonged to a [s]-[ʃ] continuum and the other was one of the following: sibilants [s] and [ʃ] that are highly similar to the consonant being categorized; sibilants [z] and [ɻ] that are less similar; or non-sibilant nasals [n] and [m]. Both spliced stimuli, in which an identical [sa]-[ʃa] continuum was spliced into each __CV or CV__ context, and non-spliced stimuli, created from whole-word [sʃ]VCV or CV[sʃ]V endpoints and thus containing natural coarticulation, were used. 80 participants were split into 4 conditions based on the position of the continuum consonant (C1 or C2) and the nature of the stimuli (spliced or non-spliced). Participants were asked to categorize the ambiguous consonant by selecting a button corresponding to a word with either “s” or “sh”. The speaker who produced the stimuli and the participants were all native English speakers, who do not have sibilant harmony in their native language to affect their judgements. Results were analyzed to determine the extent to which the 50% crossover point in the categorization of continuum consonants as [s] or [ʃ] depends on the position of the continuum in the word, the identity of the context consonant, and whether the stimulus was spliced or non-spliced.
Results differ greatly depending on whether the target (continuum) consonant is in C1 or C2 position. Specifically, when presented with the [__a] context, participants heard more of the continuum as [s] as compared to neutral [__ama] or [__ana] contexts; in other words, they appear to have ‘hypocorrected’ any (real or perceived) coarticulatory influences of the following sibilant. In contrast, with a continuum in C2 position, participants heard more of the continuum as [ʃ] in the [ʃa__a] context compared to the neutral contexts [ma__a] or [na__a]; this directionality seems to show ‘hypercorrection’. In the C1 condition, the ‘hypercorrection’ effect was even stronger with [ʃ], for which participants gave significantly more [s] responses than for any of the other contexts. The contexts with [s] ([__asa], [sa__a]) were more similar to the neutral nasal contexts than the contexts with [ʃ] were. The same generalizations held for both spliced and non-spliced versions of both the C1 and C2 conditions; spliced and non-spliced stimuli produced nearly identical results.

These results have multiple implications for our understanding of the motivations behind long-distance segmental interactions. First, the effect of [ʃ] but not [s] on perception of ambiguous sibilants corresponds to the observed typological asymmetry in the relative ability of these consonants to be harmony triggers. As such, this aspect of consonant harmony may be perceptually motivated. However, other results of this study are puzzling. In particular, both Abrego-Collier’s (2013) liquid study and the present sibilant experiment suggest a perceptual categorization bias that is opposite to typologically prevalent sound patterns for these types of consonants: liquids tend to dissimilate, but show assimilatory perceptual effects (Abrego-Collier 2013), whereas sibilants tend to assimilate (e.g. Hansson 2010), but (at least in the C1 condition) were found here to show dissimilatory effects in perception. The directionality differences are also contrary to expectations; we would expect harmony effects in the C1 condition and no effect in the C2 condition based on the typological preference for regressive harmony, but instead we see a dissimilatory effect in the C1 condition and a harmony effect in the C2 condition. On this criterion too, then, we see the opposite result from expectations. These results are particularly puzzling under Ohala’s (1993) view of sound change. Moreover, while the patterns found here have been described above in Ohala’s terms of hypo- and hypercorrection, there is reason to be skeptical of such terminology. Indeed, the equivalence between the spliced and non-spliced conditions suggests that perception of these continua is not driven by under- or overcompensation for coarticulatory effects. If that were the case, we would expect major differences between results for stimuli in which any natural coarticulation was included (non-spliced items) compared to those in which any such coarticulation was absent (spliced items). Instead, these conditions patterned similarly, suggesting that whatever motivated the effect of [ʃ] and [ʃ] on the perception of an ambiguous sibilant was not related to actual coarticulation between sibilants across an intervening vowel. Overall, these results suggest that phonologized misperception of coarticulation alone is unlikely to explain the development of sibilant harmony, and that the relationship between perception and phonological sound patterns is more complicated than previously believed.

References


