Listeners’ social attributes influence sensitivity to coarticulation in the perception of sibilants in nonce words

The relationship between sound change and perceptual boundaries has been robustly examined by phoneticians, with researchers proposing that sound change emerges when listeners do not compensate for extreme coarticulation (e.g., Ohala 1993). Similarly, sociolinguists have found that listeners shift their perceptual boundaries in response to perceived social attributes, like gender and gender typicality (e.g., Strand 1999; Campbell-Kibler forthcoming). The present study seeks to combine these two lines of research, examining the interplay of sensitivity to coarticulation and social attributes in the perception of /s/-retraction, an English sound change in process by which /s/ is approaching /ʃ/ in /str/ clusters, but rarely in /spr/ and /skr/ clusters.

The current study asks two questions: Firstly, do individuals compensate for coarticulation in /str/ clusters but not /s{p,k}r/ clusters? And secondly, does perceived speaker masculinity or orientation to masculine stereotypes affect phoneme categorization? Jointly, these questions seek to better understand if /s/-retraction as a change in progress serves to index masculinity.

The experiment took the form of a nonce word lexical decision task. Two college-aged white male speakers from Iowa recorded s{p,t,c}rimble, the target of this study, as well as the prevocalic equivalents simble and shimble. The onsets from the prevocalic contexts were extracted and digitally mixed to create a seven-step continuum from /s/ to /ʃ/. Each step was cross-spliced onto the preconsonantal target word, creating a continuum from /s{p,t,k}rimbol/ to /ʃ{p,t,k}rimbol/. Thirty-one participants listened to each step of the continuum for both speakers four times, paired with a different face, contrasted for perceived masculinity. Participants additionally completed a short survey, containing basic demographic identifications and questions concerning their orientation toward various stereotypes of masculinity, including toughness, (Pleck et al. 1993).

Listeners’ responses were modeled using a logistic mixed effects regression with TargetCluster, Step, Speaker, FaceType, and the listener’s gender, sexuality, urban/rural alignment and their ToughnessOrientation. Additionally, random intercepts for listener and by-listener random slopes for Target improved model likelihood, suggesting significant individual variability.

With regards to coarticulation, listeners are significantly more likely to perceive /s/ in /str/ clusters at higher steps than in /s{p,k}r/ clusters (p < 0.001), suggesting that individuals are sensitive to coarticulatory information and compensate for it. Furthermore, individuals exhibited a high degree of variation, with some individuals exhibiting no compensation for retraction and others exhibiting such extreme compensation that they never perceive /ʃ/ in /str/ clusters, even at the highest steps, as in Figure 1. With regards to social information, the perceived masculinity in the faces did not have a significant effect in shifting the boundary for /str/ clusters, perhaps suggesting that retraction in these clusters does not index masculinity for listeners. However, for individuals who have a stronger alignment toward masculine stereotypes of toughness, masculine faces resulted in more /s/ responses, suggesting that these individuals are especially sensitive to coarticulation when it aligns with their expectations, that is, when speakers are perceived as more masculine (p < 0.05). Taken together, these results suggest significant individual variation in the perception of /s/-retraction, with additional variation in its indexed social meaning.