

UNIVERSITY OF CALIFORNIA

Los Angeles

Prosodic prominence in vowel perception and spoken language processing

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by

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# ABSTRACT OF THE DISSERTATION

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This dissertation tests how prosodic prominence mediates the listener’s path from the speech signal to segmental categories in perception. Though prosody and segment can be taken to represent different components of phonological structure, the central idea pursued here is that in processing they must necessarily interact on the basis of the way they jointly shape acoustic information in the speech signal. The experiments contained in this dissertation accordingly address how prominence affects listeners’ categorization of speech sounds, how different prominence-lending contexts impact perception, and how prominence information and segmental information are integrated in online processing. Perception of vowel contrasts is adopted as a test case, in light of the way in which vowel realizations are strengthened phonetically when prominent.

This dissertation finds that prominence-lending context shifts listeners’ perception of vowel contrasts, cued by the first formant (F1) and second formant (F2), such that a more prominent, or “strengthened”, realization of a vowel is expected by listeners when a vowel is contextually prominent. Two ways of lending prominence are tested: (1) a manipulation of accentual/phrasal prominence in which a target bears the nuclear accent in a phrase, or is unaccented following narrow focus, and (2) the presence/absence of glottalization immediately preceding an accented vowel-initial target word, where glottalization can be seen as a manipulation of localized, phonetic prominence cues (with accentual status invariant). The timecourse of listeners’ integration of prominence information is tested using a visual

world eyetracking paradigm. This timecourse assessment finds that both phrasal prominence and glottalization shape listeners' early processing of formant cues, showing a pattern that could be characterized as immediate compensation for contextual influences on the vowel. However, these two manipulations differ in that the effect of phrasal prominence is overall delayed in relation to listeners' use of formant cues, and reaches its maximum later in processing. This outcome is consistent with recent proposals which demarcate phrasal prosodic influences as entering relatively late into processing. In comparison, glottalization shows a near-synchronous timecourse with formant cues in processing, indicating that localized prominence information is integrated rapidly. Comparison of these two effects shows that phonetic prominence information influences processing differently than prominence linked to a more global/phonological structure, though even in the case of phrasal prominence, early effects on formant processing arise as a function of relative phonetic prominence in relation to context.

The dissertation also tests how vowel contrasts varying in height, which are subject to different patterns of prominence strengthening, are perceived based on prominence. It is observed that the perceptual expectations for a prominent vowel vary based on vowel features. Specifically, high front vowels, when prominent, are expected to show more hyperarticulated realizations with peripheral F1 and F2 (lowered F1, raised F2). In contrast, non-high vowels are expected to show more open realizations with less peripheral F1 and F2 (raised F1, lowered F2). This result shows that listeners integrate vowel-specific (or, feature-specific) expectations for how a vowel is realized in a prominent context.

These insights are discussed in light of other recent findings which test the influence of prosodic boundaries in segmental perception, and in relation to a more general model of both pre- and post-lexical contextual influences in spoken language processing. The schematic architecture of a model of prominence and segmental processing called Multistage Assessment of Prominence in Processing (MAPP) is proposed.

The dissertation of Jeremy Andrew Steffman is approved.

Taehong Cho

Megha Sundara

Patricia Keating

Sun-Ah Jun, Committee Chair

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2020

*for my parents*



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