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Consonant Context Effects on Sensorimotor Adaptation of Vowel Production

Jeffrey J. Berry

Marquette University, jeffrey.berry@marquette.edu

John Jaeger IV

Marquette University, john.jaeger@marquette.edu

Brittany A. Bernal

Marquette University

Rachael Hefel

Julia Wesley

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Speech sensorimotor adaptation is the short-term learning of modified articulator movements evoked through auditory-feedback perturbations. Adaptation-based learning methods have been developed for rehabilitation applications for limb movement and hemiplegia, and may hold potential for speech rehabilitation. A common experimental method manipulates acoustic parameters, such as formant frequencies, using real time resynthesis of the participant's speech. While some studies have examined phrases comprised of vowels, diphthongs, and semivowels, the bulk of research on auditory-feedback driven sensorimotor adaptation in speech has focused on vowels in neutral contexts (/hVd). The current work investigates the coarticulatory influence of adjacent consonants on sensorimotor adaptation of vowel production. The purpose of this work is to evaluate differences in adaptation magnitude and direction for vowels in consonant environments that vary by place of articulation. In particular, we addressed the hypothesis that contexts with greater intra-articulator coarticulation (alveolars) would offer greater resistance to vowel adaptation than contexts with primarily inter-articulator coarticulation (bilabials or labiodentals). Participants completed formant perturbation driven vowel adaptation experiments for varying CVCs. Results were generally consistent with the hypothesis, suggesting that coarticulatory context influences the magnitude of vowel adaptation. Contexts with less intra-articulatory coarticulation support larger adaptive changes in articulation.