Sensorimotor response to segmental perturbations of auditory speech feedback: adaptation, generalization, and contrast distance

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The importance of auditory feedback for maintaining accurate speech output is demonstrated by speakers' rapid compensation to real-time perturbations of auditory speech feedback. Recent studies have shown that the magnitude of compensatory responses is not uniform, but varies according to the degree that the perturbation deviates from the intended speech goal. While response modulation has been frequently observed for suprasegmental aspects of speech, less is known about factors that affect compensatory responses at the segmental level. The current study investigates the hypothesis that the central nervous system monitors those features of a phoneme that discriminate that phoneme from neighboring phonemes. In this study, auditory feedback of speakers' first formant frequency (F1) is systematically shifted downwards during production of consonant-vowel-consonant. Comparisons of the adaptation and generalization magnitudes between /i/ vs. /a/ perturbations provide a basis for evaluating whether responses to auditory perturbations are organized to preserve sufficient discrimination among vowels or to preserve auditory targets regions for vowels.