Somatosensory Information Modifies Perception of Speech Sounds

T. Ito, M. Tiede, D.J. Ostry

In the perception of speech sounds, there are a number of types of sensory information, including visual, that are involved along with auditory information. In speech production, somatosensory afferent input concerning articulatory movement is tightly linked to auditory information. Accordingly we considered the possibility that somatosensory information might also influence neural processing in speech perception. To explore this idea, we examined whether the perception of speech sounds could be altered by somatosensory information that varies in a manner comparable to that arising from articulatory movements. We tested native speakers of American English in identification tests using a ten-step synthesized continuum between “head” and “had” sounds. Subjects listened to the stimuli one at a time through headphones and classified each utterance as either as “head” or “had.” For half of the trials, during the presentation of the auditory stimulus, we used a robotic device to stretch the facial skin stretch lateral to the oral angle in order to modulate somatosensory information. The results show a modification of speech perception due to altered somatosensory input, which varied systematically according to the direction of the skin stretch perturbation. This suggests that somatosensory information can modify the neural processing in speech perception.