Auditory Feedback Affects Vocal Production in Autistic Children

Nicole Russo¹, Charles Larson¹, Nina Kraus¹
¹Northwestern University

Hearing provides important sensory feedback for vocal control. Auditory feedback helps to stabilize voice fundamental frequency (F0), which is a major acoustic cue of prosody. Autistic individuals have problems with prosody perception and production, which is necessary for social and emotional communication. This study draws on studies that have shown that people change their own voice F0 in response to perturbations in pitch of voice feedback. Responses are automatic, as indicated by their latencies (< 200 ms). The present study investigated whether children with autism (AUT) show the same pattern of response to auditory feedback as typically developing (TD) children. Our hypothesis was that abnormalities in the auditory feedback loop would affect AUT responses to vocal feedback. We tested this hypothesis by measuring voice F0 responses to pitch-shifted (- 100 cents, 200 ms) voice feedback while children produced an /a/ vowel into a microphone attached to headphones. Averaged voice F0 responses were calculated from approximately 80 randomly timed pitch-shift stimuli delivered during the vocalizations.

As a group, AUT children produced abnormally heightened responses to pitch perturbations compared to TD children. Furthermore a subset of AUT responses was exaggerated even compared to other AUT responses. Data are being further analyzed with respect to the same children's brainstem responses to speech and behavioral measures of auditory perception. Results may offer some explanation for why AUT children often have difficulty regulating and perceiving pitch; quantifying this deficit may inform the development of training paradigms. Finally, there may be a relationship between hypersensitivity to sound, sensory auditory feedback and vocal control in autism.

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