

Sensorimotor influences on infant speech perception: phonemes, stress and intonation

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Recent advances on the perception-production link in early development revealed sensorimotor influences on auditory speech perception in English-learning pre-babbling infants. Sensorimotor influences were shown to modulate phoneme discrimination, highlighting the integration of sensorimotor information and auditory speech prior to production. Although the perception of prosody is multimodal, sensorimotor influences on prosody perception have not been investigated. We examined the selectiveness, generalizability and potential cross-domain impact of sensorimotor influences, by testing a novel (native) phoneme contrast (/da/-/za/), a stress contrast (trochaic/iambic stress) and an intonation contrast (statement/question intonation). In three experiments, Portuguese-learning 6-month-old infants listened to the speech contrasts without and with oral-motor impairments induced by two teething toys: a gummy teether and a flat teether. A modified version of the visual habituation paradigm was used to test discrimination of the phoneme contrast (P), and of the intonation contrast (I). The anticipatory eye movement paradigm, implemented with eye-tracking, was used to test perception of the stress contrast (S). Three groups of infants (no object in the mouth, with gummy teether, and with flat teether) performed P, I and S, with experiment order counterbalanced across participants. 71 infants were included in the study. Infants discriminated the phoneme contrast only in the absence of a teething toy. Similarly, the stress contrast was discriminated without a teether, while both teethers disrupted discrimination. Discrimination of the intonation contrast was found both in the absence of the teething toys and in the gummy teether condition, but not in the flat teether condition. Our results are the first to suggest that sensorimotor influences modulate speech perception beyond phoneme discrimination. Their effects on infants' prosody perception were different for stress and intonation, pointing to specificity in the sensorimotor influence. These findings offer new insights into the significance of the perception-production link in language acquisition.