

Imitation of non-speech Lip and Tongue Gestures in Infants at the Onset of Babbling

Background and Aims: According to the theory of Articulatory Phonology, the most primitive units of phonology are speech *gestures* or actions of vocal tract constriction (Browman & Goldstein, 1992). For gestures to function as basic phonological units, they need to be discrete. One source of discreteness is the independent constriction of different articulatory organs in the vocal tract (e.g., lips versus tongue tip). Articulatory Phonology hypothesizes that when an infant is able to identify his/her own organs with the organs of a model, vocal tract constrictions of different articulatory organs may be employed for the onset of speech development (Studdert-Kennedy, 2000). Specifically, Articulatory Phonology predicts that infants will show imitative responses with the correct articulatory organs (lips or tongue) when presented with non-speech oral gestures such as lip smacks or tongue smacks. It is suggested that infants are able to do so because their auditory-visual system and their perceptual-motor system make use of the same common metric, the gesture. If this theory holds, infants will show a similar response pattern to an audio-visually as well as to an auditory-only presentation of non-speech gestures (Goldstein, 2003). However, no empirical evidence of such imitation of non-speech oral gestures has been reported to date. The present study aims to fill this gap by investigating infants' oral responses to non-speech oral gestures at the onset of babbling.

Methods: Fifteen 8-month-old and fifteen 6-month-old infants received AV presentations of a female face on a video monitor producing either bilabial smacks or tongue-tip smacks. All infants were tested separately for lip smacks (LIP condition) and tongue smacks (TONGUE condition), with the two experimental sessions scheduled one week apart and presentation conditions counterbalanced. Six sets of repetitions of three gestures were presented in trials of 50 seconds, including a 20-second response period at the end of each trial. Trials were repeated until the infant's attention waned. Prior to the gesture presentation, infants were familiarized with the model's smiling face and presented with a control trial to test for arousal responses. Another group of 8-month-old infants (N=15) received an auditory-only presentation of lip and tongue smacks, in which the model blocks her mouth with her hand (A-only presentation). Infrared video recordings of infants' responses were annotated (ANVIL software) for attention to the monitor, exclusion elements, and oral gestures. The frequency of infants' lip gestures and tongue gestures was measured for both LIP and TONGUE conditions.

Results: Data reduction and analysis are still in progress. However, preliminary Chi-square analysis from the data of eight 8-month-old infants revealed a significant association between type of stimulus and response in the AV-condition, $\chi^2(1, N= 353) = 108.5, p < .001$. Specifically, infants responded to LIP presentations with significantly more lip gestures (88.4%) than tongue gestures (11.6%), and they responded to TONGUE presentations with significantly more tongue gestures (64.8%) than lip gestures (35.2%). On first inspection of the raw videos, 6-month-old infants show less or no imitative responses compared to the 8-month-old infants.

Conclusion: These preliminary results suggest differential responding to AV presentation of lip and tongue gestures by 8-month-old infants, which is in line with predictions from Articulatory Phonology. Stronger evidence for the organ hypothesis may be found in the auditory-only condition. Data for the two different age groups may provide insight into developmental aspects of a gestural perceptual-motor link in infants.

Reference List

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