Title: Links between Looking and Vocal Development in Infants at High and Low Risk for Autism Spectrum Disorder

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Introduction: Many children with autism spectrum disorder (ASD) experience difficulties in learning language that impact their long-term outcomes. Prelinguistic vocal development has been identified as a predictor of language, and thus as a potentially important target of early interventions that aim to achieve distal effects on language skill, in children affected by ASD. Unfortunately, at present we know little about the mechanisms that underlie prelinguistic vocal development. Identifying such mechanisms may help us to identify earlier on which children are at risk for language impairments and help us determine how to best intervene for children who do not seem to be making progress on the path to spoken language development. Theory and recent research suggest that looking behavior may be useful for predicting prelinguistic vocal development. Typically developing children begin looking to the mouth of a speaker, presumably to access audiovisual cues that support speech processing, early in life (i.e., by approximately 6 months of age). This shift has been theoretically linked with qualitative changes in prelinguistic vocal development, such as the onset of canonical babbling. The present project tests this theory in infants at high risk (i.e., HR; siblings of children diagnosed with ASD) and relatively low risk (i.e., LR; siblings of TD children) for ASD. Specific research questions are as follows: (a) Are there between-risk group differences in looking to audiovisual speech?, (b) Are individual differences in looking to audiovisual speech associated with prelinguistic vocal development?, and (c) Do the aforementioned associations vary according to risk group?

Methods: Participants were recruited from a larger, longitudinal study of HR and LR infants from primarily English-speaking households. Twenty-two infants aged 6-18 months have completed the study to date (15 LR, \( M_{\text{age}} = 12.3 \) months, 9 males; 7 HR, \( M_{\text{age}} = 9.6 \) months, 4 males). Infants’ looking to mouth and broader face regions during audiovisual speech was measured via a remote eye tracking task wherein infants viewed a video of a woman producing a 50s monologue in infant-directed speech in their native language (English). Concurrent vocal complexity was measured in the context of the Communication and Symbolic Behavior Scales (CSBS). A partial interval coding system was utilized to code audiofiles of CSBS samples for the presence/absence of communication acts, vocalizations including canonical syllables, and selected consonants. Two metrics of vocal complexity were derived: (a) canonical syllabic communication (i.e., the proportion of intentional communication acts that included a canonical syllable), and (b) consonant inventory (number of different consonants used in communication acts). A t-test was conducted to test between-group differences. A series of multiple regressions were carried out to test associations and possible moderated effects.

Results: There are presently no significant between-group differences in looking towards the mouth during audiovisual speech \( (d = 0.04, t = 0.08, p = 0.94) \). Individual differences in looking to audiovisual speech, however, are associated with both indices of prelinguistic vocal development. Across groups, time looking to the mouth correlated with canonical syllabic communication and consonant inventory (zero-order correlations = 0.60, \( p = 0.004 \) and 0.55, \( p = 0.011 \), respectively). Associations are not moderated by risk group \( (p \text{ values for group*predictor product terms in models testing moderated effects} > .05) \). Data collection on HR infants is ongoing but will be complete prior to the Gatlinburg conference (expected \( N = 30 \)).

Discussion: Preliminary findings provide some empirical support for the theory that looking to audiovisual speech is linked with prelinguistic development in infants at high- and low-familial risk for ASD. Additional work is needed to ascertain the direction and causal nature of this association. Nonetheless, results suggest that early eye gaze patterns may have some potential for predicting vocal development in at-risk infants. Limitations, implications, and future directions for this line of research will be discussed.
References/Citations:

