Speech Tracking in Infants with (Family History of) Autism

The Relationship of Early Speech Tracking with Language and Autism Development

Katharina Menn (s4313917)[1,2]

[1]Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands

[2]Donders Institute for Brain, Cognition and Behaviour, Nijmegen, The Netherlands

Supervisor: Dr. Tineke M. Snijders

Second Reader: Prof. Dr. James M. McQueen

July 10, 2019

Abstract

Adults with autism spectrum disorder (ASD) show decreases in speech tracking, the brain's ability to take over the rhythm of speech. On an individual level, the amount of speech tracking is directly related to verbal abilities and autism symptoms. In the current study, we investigate whether differences in speech tracking during infancy can explain the deficit in language acquisition often observed in children developing ASD. We measured speech-brain coherence in a total of 22 infants at risk for developing ASD because of family history at either 10 or 14 months of age. They were compared to a control group of 20 infants without family history of autism. We analyzed the relationship between speech-brain coherence in these infants and their vocabulary knowledge at 24 months (measured by the CDI) as well as autism symptoms at 36 months (measured by the ADOS). Our results showed significant speech-brain coherence in infants. Importantly, speech-brain coherence in two distinct frequencies: The stressed syllable rate (1-3 Hz) and the phonological rate (5-15 Hz) predicted later vocabulary knowledge. This effect was stronger for 10-month-old infants than for 14-month-olds. We found no relationship between speech tracking in infancy and autism symptoms in childhood. Thus, early speech tracking is related to language development in childhood. The mechanism behind this relationship as well as generalizability to all infants are discussed.

Keywords: autism, speech processing, neural oscillations, speech segmentation, word learning