Early Communication Characteristics Across Samples From Two Infant Populations At-Risk for Autism

Hannah Lopez, B.S.1, Shari DeVene, Ph.D., CCC-SLP1, and Anastasia Kyvelidou, Ph.D.2

1Department of Special Education and Communication Disorders, University of Nebraska at Omaha
2Department of Physical Therapy, Creighton University

ABSTRACT

Although no single etiology has been identified for Autism Spectrum Disorders (ASD), two infant populations have emerged as particularly high risk: younger siblings of children diagnosed with ASD and infants born prematurely with low birth weight. A key characteristic differentiating high-risk infants from low-risk peers is early eye gaze fixation behaviors. Early gaze fixation behavior is thought to be predictive of communication and language skills. Consequently, identifying differences in early eye gaze behaviors could lead to early intervention services tailored specifically on counteracting early social withdrawal behaviors. Though few studies have compared eye gaze patterns of these two high-risk infant groups, knowledge of differences between these two groups could inform early interventionists’ service provision approach. The aim of the present exploratory study was to compare eye gaze fixation behaviors across two high-risk groups. The three participants were drawn from a larger pool of participants involved in the Early Diagnostic Signs of Autism Study. One participant was a younger sibling of a child diagnosed with ASD and two were born prematurely with low birth weight. Data was collected using wearable eye gaze technology that captured the infant’s eye movements as well as his/her visual surroundings. Infants were shown three 60-second videos containing social and nonsocial static visual stimuli. Eye gaze behaviors were analyzed to distinguish where the infant’s pupil was directed during viewing and measured according to time spent fixated on social and non-social stimuli and further categorized as two dimensional (static social, status nonsocial) and three dimensional (dynamic social, dynamic nonsocial). The eye gaze patterns observed were similar across two participants, one from each high-risk group, and dissimilar for one participant born prematurely with low birth weight. Findings indicate differences in eye gaze behaviors across participants may reflect factors beyond high-risk group status.

Introduction

ASD: Life-long neurodevelopmental condition that interferes with an individual’s ability to communicate and relate to others (Baio et al., 2018)

- Current dx status: 1 in 59 children diagnosed with ASD (Baio et al., 2018)
- Median age at dx: 50 months (Christensen et al., 2016)
- Average prevalence: 1.2% of population (Christensen et al., 2016)
- Etiology: Unknown; likely a genetic (combination of genetic and environmental factors)

Subgroups

- Consequence, dx primarily based on behavioral features
- Early differences in eye gaze fixation behaviors in high-risk infant groups later diagnosed with ASD compared with low-risk infants
- Rate of diagnosis for high-risk infants:
  - Younger siblings of children diagnosed with ASD: 18.7% (Coxsall et al., 2011)
  - Children born premature and with low birth weight: 10-12% (Joshi et al., 2017)

Early Gaze Behavior Differences in Infants/Toddlers with ASD Compared to Low-Risk Peers

- Focus more on the mouth than other facial features; more easily disengaged from face

ASD risk Infant Groups: Early Differences in Eye Gaze Fixation Behavior

- Infant populations with early attention deficits and delays in social behaviors and communication skills

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