

Title: The Association Between Expressive and Receptive Language and Joint Attention in Infants at Risk for ASD

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Introduction: Children with autism spectrum disorders (ASD) have delays in social communication development that manifest across a variety of domains such as joint attention (Sullivan et al., 2007; Kasari, Freeman, & Paparella, 2006; Mundy, Sigman, & Kasari, 1994). Multiple studies show that joint attention is significantly associated with variance in language amongst children with ASD (Dawson et al., 2004; Thurm, Lord, Lee, & Newschaffer, 2007). Several studies have looked at the differential relationship between response to joint attention (RJA), which involves information processing of others' signals, and initiating joint attention (IJA), which refers to the generation of goal related behavior and have found associations between RJA and both receptive language and expressive language while IJA has been linked strongly with expressive language (Mundy, Sigman, Ungerer, & Sherer, 1987; Anderson et al., 2007). However, impairments in RJA become less evident as cognitive development advances while impairments in IJA remain consistent throughout adolescence (Mundy et al., 2009). This indicates that a more nuanced look at these constructs is needed across different developmental ranges. Given that current research has focused largely on older language learning children, the current study will address this gap by measuring the association between RJA, IJA, and language in infants at-risk for ASD ages 12-22 months.

Method: This secondary analysis includes 80 infants with ASD (MAge= 17.66 months, 54% non-white, 80% Male) who were enrolled in a clinical trial for children at risk for ASD. All children met for mild to moderate concern on the ADOS Toddler Module (Luyster et al., 2009). Analyses were conducted with baseline data from the trial. Children's receptive and expressive language was assessed using the Mullen Scales of Early Learning and their percentage of RJA and frequency of IJA using the Early Social Communication Scales (ESCS). Pearson's correlations were used to assess the relationship between receptive language, expressive language, RJA and IJA. Two separate linear regressions were fit with receptive and expressive language as the dependent variables and RJA, IJA, visual receptive scores and chronological age as independent variables.

Results: There was a medium correlation between RJA and receptive (.48) and expressive (.35) language and a small correlation between IJA and receptive ($r=.09$) and expressive ($r=.21$) language. The regression equations for receptive language and expressive language were statistically significant, $F(4, 63) = 11.01, p < .001$ and $F(4, 63) = 12.35, p < .001$. RJA is significantly associated with both receptive ($t(63) = 4.17, b = .44, p < .001$) and expressive ($t(63) = 3.10, b = .32, p = .002$) language scores. IJA was not associated with either receptive ($t(63) = -.96, b = -.10, p = .34$) or expressive ($t(63) = .732, b = .07, p = .46$) language scores.

Discussion: Overall, infants at risk for ASD who displayed higher RJA had significantly higher receptive and expressive language while there was no association between IJA, expressive, and receptive language. These results highlight an interesting developmental phenomenon where RJA is a strong prognostic indicator of language in this young sample. While RJA is often associated with language in preschool aged children, IJA is a more consistent and robust predictor of language in older children (Mundy et al., 2009; Kasari et al., 2012). The discrepancy between the associations seen here and those in older children may be driven by measurement issues (an overall low rate of IJA in the sample and its cross sectional nature) or may suggest that targeting RJA could lead to an increase in language skills, especially receptive language in infants at-risk for ASD. If so, these data may inform the development of early interventions. Future directions will involve exploring predictors of RJA development to further understand targets that are potentially amenable to intervention in very young children.

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