

Early Intervention Improves Social Processing in Infants at High Familial Risk for ASD

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Background:

Infants with older siblings with ASD have a 20% chance of developing ASD themselves (Ozonoff et al., 2011), and developing early interventions that can prevent or ameliorate the later emergence of symptoms is critical. Such interventions may be most effective when applied in the first year of life, prior to the emergence of behavioral symptoms. However, testing the effects of such interventions is challenging because behavioral measures may not be sensitive to mechanisms of underlying change. In this project, we test the sensitivity to intervention-related change of three measures designed to measure social processing in early infancy.

Objectives:

To assess the effects of an early parent-mediated intervention (Promoting First Relationships) on early social processing measured with electroencephalography (EEG), visual attention and visual preference tasks.

Methods:

Participants were $n = 39$ infants with an older sibling with a community clinical diagnosis of ASD. After a research visit at 6 months, infants were randomized into an early intervention program (Promoting First Relationships; PFR), or a treatment as usual control group. PFR is a parent-mediated approach that recognizes that early social-emotional wellbeing is rooted in the development of early caring relationships, and that responsive and sensitive caregiving is the foundation for future learning in social-emotional, language and cognitive domains (Kelly et al., 2008). Infants received 8 weekly sessions visits over approximately 10 weeks, administered by a trained interventionist. The post-intervention assessment occurred at 12 months by researchers blind to treatment allocation.

Tasks administered at both 6 and 12 months included three experimental assessments of social processing (EEG Videos; Habituation and Visual Preference tasks). EEG Videos were videos of women telling nursery rhymes (Social) and toys moving (Nonsocial); the key dependent measure was frontal theta power (an index of attentional engagement). Habituation involved repeated presentation of a face or object until looking time dropped to a preset criterion; the key dependent measure was habituation speed (faster indicates better learning). Visual Preference tested preference for female versus male and own- versus other-race faces (the faces that are most common in the infants' visual environment); stronger preferences for normative faces may indicate better social learning or memory.

Results:

Relative to infants who did not receive intervention, at 12 months infants who received PFR during the first year of life habituated more rapidly to faces (but not toys); showed an increase in frontal theta power to social and nonsocial stimuli; and showed enhanced preferences for normative social (but not nonsocial) categories. These effects were significant at the $p < 0.05$ level, and were absent during the baseline assessment.

Conclusions:

The changes observed in the treatment group are consistent with better engagement of attention, and faster social learning in infants who received the PFR treatment. These changes should be treated as highly preliminary until longer-term outcomes of this group are known. However, results suggest that experimental measures of social attention may be sensitive to the effects of early treatment for infants at high risk for ASD.