

# Maximizing the potential for infants at-risk for autism spectrum disorder through a parent-mediated verbal behavior intervention

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The human brain undergoes the most transformative development period in all post-natal life from birth to 36 months, going from simple connections to complex connections responsible for social behavior, communication and cognition (Courchesne & Pierce, 2005). Over the past five years, an increase in pre-diagnostic intervention for Autism Spectrum Disorder (ASD), also known as pre-emptive intervention (prior to 18 months of age), has been noticed. During this time, neuroplasticity is at its peak, allowing for more rapid changes in development and ultimately more effective intervention (Bradshaw, Steiner, Gengoux, & Koegal, 2015). It is essential to begin intervention while these connections are still being formed rather than trying to change maladaptive neural connections once they are established (Pierce et al., 2016). In fact, findings from previous studies indicated that children diagnosed with ASD who began behavioral intervention prior to two years of age were 60% more likely to make significant gains in their first year of intervention compared to those who began after 30 months of age (MacDonald et al., 2014).

Research studying the efficacy of pre-emptive interventions utilized early screening tools and a parent-mediated service delivery model that aims to improve key parental skills that can mitigate ASD symptoms. Target behaviors selected for increase included among others: joint attention, responsivity to parent, social smiling and social orienting along with receptive and expressive language, while the severity of prodromal autism symptoms have been targeted for a decrease.

The present study assessed the effectiveness of a 12-week parent-mediated pre-diagnostic intervention program aiming to reduce autism symptoms and increase appropriate social communication and play behaviors in high risk infants.

## Method

The research design was a multiple baseline design across five parent-child dyads. The intervention consisted in twelve 1-hour coaching sessions delivered by a Board Certified Behavior Analyst (BCBA®), followed by a 1 and 3-month follow-up session.

Child participants were between 12 and 16 months of age and comprised three girls and two boys, while the primary parent participant of each dyad was the child's biological mother. Three of the five children were an "only-child", while two were "high-risk siblings" (they had an older sibling with a confirmed ASD diagnosis).

### ***Intervention***

A BCBA® conducted all coaching sessions following a Behavior Skills Training (BST) protocol incorporating instruction, modelling, rehearsal and feedback into each session. At the end of each session, specific goals were selected for parents to practice during the upcoming week. Topics were framed using Skinner's analysis of verbal behavior (Skinner, 1957) with target behaviors including verbal operants such as mands, tacts and echoics, as well as imitation and play skills.

### ***Measurement***

For data collection, three primary and four secondary variables were measured. Primary variables included parental and infant behaviors. Parental target behaviors were: (1) the number of learning opportunities the parent presented by providing the infant with an opportunity i) to respond to a discriminative stimulus, ii) to mand for an item or activity, iii) to imitate a motor or vocal response, and iv) to respond to a clear instruction. Infant target behaviors included: (1) the frequency of eye contact directed towards the parent and (2) the frequency of responding to the learning opportunity presented by the parent.

Parental fidelity of implementation was assessed, as well as social validity.

### **Results**

The outcomes with regard to eye-contact demonstrated the most significant increase out of all three infant target behaviors, with a mean increase of 40% across all five infants and results maintaining at the 3-month follow-up.

Infants' responsivity to learning opportunities also showed a significant increase of 41% on average compared to baseline across all infants. The effect size estimators for children responsivity, children eye contact and parent behavior indicated a large or very large improvement. Additionally, all five infants showed a decrease in autism symptoms and an increase in appropriate acquisition behaviors within the 12-week intervention period. However, four of the five infants still received a diagnosis of ASD between 18 and 22 months of age.

Social validity assessments were also conducted during the 3-month follow-up and showed that the intervention was widely acceptable by parents, with 96% of questions rating the intervention as either positive or very positive.

## Discussion

The aim of the present study was to assess the efficacy and acceptability of a pre-emptive behavioral intervention for infants at risk of ASD. The five infants showed approximately a 10-month gain of skills that would not be accounted for by maturation alone. The goal of pre-diagnostic intervention is not to eliminate the future diagnosis of ASD but rather to maximize the potential of infants who are showing early signs of ASD and alter their developmental trajectory. The study is unique in that it provides directions on how to deliver such an intervention building capacity among behavior analysts and allowing more families to access pre-diagnostic services, therefore improving the well-being of individuals. Behavior analysts are trained to identify socially significant target behaviors and should begin treatment regardless of the presence or absence of an ASD diagnosis and as soon as the first concerns around the child's development are expressed.

The results of the present study add to the massive literature that has examined the effect of behavioral interventions on a child's outcomes showing that Applied Behavior Analysis (ABA) is the scientific basis of the treatment of choice for ASD. Additionally, the present study provides support to the existing literature in the use of low-intensity parent-mediated intervention, which can be implemented by any parent or entry-level professional, under the guidance of a qualified professional (i.e., BCBA®).

## References

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