An Early Start Denver Model-based group intervention for parents of very young children diagnosed with or at risk for autism spectrum disorder

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AN EARLY START DENVER MODEL-BASED GROUP INTERVENTION FOR PARENTS OF VERY YOUNG CHILDREN DIAGNOSED WITH OR AT RISK FOR AUTISM SPECTRUM DISORDER

by

Stephanie A. Fox

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# Table of Contents

List of Tables ......................................................................................................................... iv
List of Figures.......................................................................................................................... v
Abstract ................................................................................................................................... vii
Introduction ............................................................................................................................... 1
Method ........................................................................................................................................ 21
  Participants............................................................................................................................... 21
  Measures ................................................................................................................................. 26
  Procedure ............................................................................................................................... 30
  Data Analysis ......................................................................................................................... 33
Results ....................................................................................................................................... 36
  Parent Knowledge .................................................................................................................. 36
  Parenting Stress and Sense of Competence ......................................................................... 37
  Child Expressive Language ................................................................................................... 37
  Parent-Child Interaction Observation .................................................................................. 38
  Parent Satisfaction ................................................................................................................ 41
Discussion ................................................................................................................................ 42
References ................................................................................................................................. 55
Appendices ................................................................................................................................. 65
List of Tables

1. Participant Demographics
2. Participant Demographics by Case
3. Baseline Scores by Case
4. Mean Baseline Scores by Group
5. Primary Outcome Measure Scores by Case
6. Parent Observation Variables by Case
7. Child Observation Variables by Case
List of Figures

1. Parent Knowledge Scores By Group
2. Parent 1 Primary Outcome Measures, Immediate Treatment Group
3. Parent 2 Primary Outcome Measures, Immediate Treatment Group
4. Parent 3 Primary Outcome Measures, Immediate Treatment Group
5. Parent 4 Primary Outcome Measures, Immediate Treatment Group
6. Parent 5 Primary Outcome Measures, Immediate Treatment Group
7. Parent 6 Primary Outcome Measures, Delayed Treatment Group
8. Parent 7 Primary Outcome Measures, Delayed Treatment Group
9. Parent 8 Primary Outcome Measures, Delayed Treatment Group
10. Parent 9 Primary Outcome Measures, Delayed Treatment Group
11. Parent 10 Primary Outcome Measures, Delayed Treatment Group
12. CDI Words Expressed Mean Scores
13. Parent Narration of Play
14. Parent Imitation of Play
15. Child Vocalizations During Play
16. Parent 3 – Immediate Treatment Group, Parent Observation Variables
17. Parent 4 – Immediate Treatment Group, Parent Observation Variables
18. Parent 3 – Immediate Treatment Group, Child Observation Variables
19. Parent 4 – Immediate Treatment Group, Child Observation Variables
20. Parent 7 – Delayed Treatment Group, Parent Observation Variables
21. Parent 8 – Delayed Treatment Group, Parent Observation Variables
22. Parent 9 – Delayed Treatment Group, Parent Observation Variables
23. Parent 10 – Delayed Treatment Group, Parent Observation Variables
24. Parent 7 – Delayed Treatment Group, Child Observation Variables
25. Parent 8 – Delayed Treatment Group, Child Observation Variables
26. Parent 9 – Delayed Treatment Group, Child Observation Variables
27. Parent 10 – Delayed Treatment Group, Child Observation Variables
28. Parent Satisfaction
Abstract

The current study sought to evaluate the effectiveness of an Early Start Denver Model-based (ESDM; Rogers & Dawson, 2010) group intervention for parents of infants and toddlers, ages 12 to 48 months, diagnosed with or at genetic risk for autism spectrum disorder (ASD). This project consisted of a six-week intervention program in which parents attended training sessions twice a week for 60-90 minutes per session. The training sessions used didactic instruction to teach parents how to elicit social communication from their very young children. The topic areas were based on the ESDM parent manual (Rogers, Dawson, & Vismara, 2012), and included skills such as capturing attention, eliciting social smiles and joint attention, fostering functional and pretend play, and beginning to evoke simple speech. Parents were also taught about evidence-based methods for teaching young children with ASD, including how to carry out functional behavioral assessments, how to provide appropriate and contingent reinforcement, and how to implement visual supports. Initial ASD symptom severity was assessed with the Autism Diagnostic Observation Schedule, Second Edition (ADOS-2; Lord et al., 2012). Pairs of parents were matched on their child’s ASD symptom severity and age. Matched pairs were then randomly assigned to participate in either the immediate intervention group or the delayed treatment control group. Child and parent outcomes were assessed using the Parenting Stress Index, Fourth Edition, Short Form (PSI-4-SF; Abidin, 2012), a program-specific parent knowledge questionnaire developed for this study, the MacArthur-Bates Communicative Development Inventories (CDI; Fenson, 2007), the Parenting Sense of Competence Scale (PSoC; Johnston & Mash, 1989), and a videotaped play-based observation task. The implications of the findings, the utility of brief group training programs for parents of very young children with ASD, and future directions for research are discussed.
An Early Start Denver Model-Based Group Intervention for Parents of Very Young Children Diagnosed With or At Risk for Autism Spectrum Disorder

Autism spectrum disorder (ASD) is a neurodevelopmental disorder marked by social and communication deficits, as well as the presence of restricted interests and repetitive behaviors (American Psychiatric Association, 2013). The prevalence of ASD has been rising rapidly over the past decade. The Centers for Disease Control and Prevention (CDC, 2014) currently estimates that one in 68 children will be diagnosed with ASD. Though it can be difficult to detect ASD in the very early years due to the wide variability of symptom presentation across children, it is now widely recognized that initial symptoms of the disorder often appear during the first year of life (Rogers & Dawson, 2010). The awareness that ASD emerges early in infancy has sparked a field-wide research initiative to promptly detect and diagnose the disorder to enable early intervention.

Benefits of Early Intervention

Due to the severity of ASD core characteristics and the potential for deleterious effects on various aspects of child development, there exists a need to develop and evaluate intervention methods for efficacy and effectiveness. With the rising prevalence of the disorder, studies of intervention for ASD are ubiquitous. The high stakes nature of ASD interventions requires that each study is evaluated for scientific rigor and viewed with skepticism. One line of research that has consistently yielded successful outcomes has been within the realm of early intervention for young children diagnosed with or at genetic risk for ASD (Towle, 2013).

Intervening with children diagnosed with or at risk for ASD during the first three years of life has been shown to be effective for reducing the severity of symptomatology and may even prevent the onset of the disorder (Kasari, 2002). Risk for ASD has been defined broadly.
Numerous risk factors have been delineated, including pre- and perinatal variables, such as pre-term birth and prenatal maternal influenza (Bradshaw, Steiner, Gengoux, & Koegel, 2014; Green, Brennan & Fein, 2002). Literature from the baby sibling consortium has emphasized the influence of genetics for determining risk status for ASD. Younger siblings of children with ASD have a five-fold increase in risk of developing the disorder (Ozonoff et al., 2011). The goal of studying risk factors for ASD is to aid in its early detection in an effort to make early intervention possible.

Early intervention has been extensively studied among children with ASD. This form of intervention was developed to target very young children aged zero to three years (Rogers, 1996). Towle (2013) delineated three theoretical arguments for early intervention. These arguments suggest reasons for pursuing early intervention that go beyond the emerging empirical literature documenting its effectiveness. The first theoretical argument for the use of early intervention is based on the field’s understanding of the etiology and course of ASD. Since ASD symptoms are known to emerge early in life and follow a chronic course, it is beneficial to begin targeting and reducing the central deficits of the disorder before they negatively affect development (Rogers & Dawson, 2010). These deficits (i.e., social and communicative disturbance) are likely to alter the style of early parent-child interactions, which are crucial to later cognitive and emotional development. The cascading effects of poor early relationships may serve to worsen core symptoms of the disorder. Relatedly, in the absence of intervention, poor patterns of interaction tend to remain stable over time (Green et al., 2015).

Secondly, developmental theory has long argued that there are “critical periods” during which the brain is thought to be plastic (Towle, 2013). The concept of brain plasticity suggests that there are windows of time during which neural connections are more easily created and
strengthened. Infancy and toddlerhood are believed to be critical periods for attaining social and communicative milestones – behaviors that are disrupted among children with ASD (Rogers & Dawson, 2010). Targeting these behaviors during the early stages of life should therefore maximize the effectiveness of intervention efforts.

Finally, and central to the arguments put forth by the current study, is the idea that intervention programs should target the family as a whole, rather than the child in isolation (Towle, 2013). Best practice early intervention efforts focus on parent-child interactions and teach caregivers how to evoke social responding from their children (Zwaigenbaum et al., 2009). The earlier one intervenes with a young child, the more likely it is that the intervention will include a family or parent component (Towle, 2013). This is simply because parents are more involved in their children’s lives during the early years. In sum, intervention for ASD is likely to benefit both the child and family system as a whole when implemented during the child’s first three years.

**Prior Early Intervention Research**

In a recent meta-analysis of relevant research on early intervention for infants and toddlers diagnosed with or at risk for ASD, Warren et al. (2011) identified 4,120 articles published on the topic between the years of 2000 and 2010. Of this large body of articles, thirty-four were selected for inclusion in the review. Independent raters made study inclusion decisions based on strength-of-evidence ratings, which took into account aspects of research methodology such as participant and intervention characteristics, assessment techniques, and outcomes (Warren et al., 2011). Two of the reviewed studies were randomized controlled trials, but the vast majority used case series designs.
**Early Intensive Behavioral Intervention.** All studies included in Warren et al.’s (2011) review examined either early intensive behavioral interventions (EIBI; Rogers & Vismara, 2008) or comprehensive developmental approaches to treatment (e.g., the Early Start Denver Model; Rogers & Dawson, 2010). EIBI was borne out of the UCLA/Lovaas (1987) approach to intervention for ASD. This form of intervention is generally required to contain several elements: 1) an individualized, comprehensive approach; 2) behavior analytic techniques (e.g., discrete trial training, use of prompting, implementation of contingent reinforcement); 3) facilitated by an individual with advanced training; 4) normative developmental sequences as guidelines; 5) parent inclusion in the intervention process; 6) intensive, year round, and frequently last as long as two years (Eldevik et al., 2009). The intensity of EIBI programming makes it difficult to carry out well-controlled and methodologically sound research of its efficacy. Given this, Warren et al. (2011) concluded that the vast majority of extant research examining EIBI was poor in quality. This conclusion was based on the studies’ lack of randomization of participants to groups, the rarity of the use of manualized treatments, and the relatively low strength of evidence suggesting that EIBI is effective for improving cognitive, language, and adaptive outcomes.

Smith, Groen, and Wynn’s (2000) study was the single evaluation of EIBI deemed to be of fair quality in Warren et al.’s (2011) review. In this study, young children with diagnoses of autistic disorder (AD) or pervasive developmental disorder not otherwise specified (PDD-NOS) were randomly assigned to EIBI as described by Lovaas (1987) or parent training. All children were between the ages of 18 and 42 months. The children assigned to the EIBI group received 30 hours of treatment per week over the course of two to three years. Treatment was implemented one-on-one using discrete trial teaching methods. Initially, treatment was
conducted in the children’s homes. As the participants reached developmental milestones, intervention was shifted into naturalistic settings, such as schools and the community.

Treatment efficacy was measured in terms of intellectual functioning, language functioning, adaptive functioning, socio-emotional functioning, academic achievement, and classroom placement (Smith et al., 2000). Results showed that children in the EIBI group performed significantly better than those in the parent training group on measures of intelligence, including the *Stanford-Binet Intelligence Scales* (Thorndike, Hagen, & Sattler, 1986) and the Bayley Scales of Infant Development (Bayley, 1993), visual-spatial processing (Merrill-Palmer Scale of Mental Tests; Stutsman, 1931), language abilities (*Reynell Developmental Language Scales*; Reynell, 1985) and academic achievement (*Wechsler Individual Achievement Test*; Wechsler, 1992). Gains in the realm of intelligence were sizeable; those in the EIBI group gained an average of 15 IQ points, while those in the control group maintained stable cognitive functioning following treatment. The children in the EIBI group also were more likely to transition to less restrictive school placements than those in the control group. There were no differences in treatment gains when children with AD were compared to those with PDD-NOS. This indicates that initial diagnostic status was not predictive of improvement over time, and therefore the results could not simply be explained by statistical regression to the mean.

Despite the strengths of the study, Smith et al. (2000) cited numerous limitations. Small sample size was arguably the most limiting factor, with only 28 participants split between two groups. The small sample and heavily skewed distributions precluded the use of more complex statistical techniques. Additionally, the authors did not include a standardized diagnostic measure of ASD. This limited the conclusions that could be drawn regarding pre-treatment severity or improvement in ASD symptomatology following treatment. Despite these
limitations, this study was among the first to use a true experimental design to investigate the
efficacy of EIBI. Its results provided a strong indication to move forward with the use of EIBI
for very young children with ASD.

**Comprehensive Developmental Approaches.** The stringent criteria followed by
Warren et al. (2011) indicated that the strength of evidence for comprehensive developmental
approaches to early intervention (e.g., the ESDM; Rogers & Dawson, 2010, the Early Social
Interaction Project; Wetherby & Woods, 2006, and the Hanen More Than Words program;
Sussman, 1999) was stronger than for EIBI as a whole. Comprehensive developmental
approaches to early intervention use applied behavior analytic techniques within a functional
developmental framework (Warren et al., 2011). Four articles using this approach with children
three years of age and younger were reviewed. One randomized controlled trial exploring the
effectiveness of the ESDM was deemed to be of good quality; the other three were of fair quality
(Warren et al., 2011).

The ESDM protocol will be described in detail below, as will the base of literature
supporting its use for very young children with ASD. Dawson et al.’s (2010) trial of the ESDM
with young children yielded significantly better outcomes when compared to a community
sample of children who received brief and less intensive interventions. These positive outcomes
were evidenced by IQ gains, improvements in adaptive behavior, and diagnostic shifts (i.e.
moving from AD to PDD-NOS).

A second comprehensive developmental approach to early intervention is Wetherby and
Woods’ (2006) Early Social Interaction project (ESI). Though only studied preliminarily, ESI is
a parent-implemented intervention that takes place in naturalistic settings and focuses on
teaching social and adaptive skills during daily routines. It was developed in conjunction with
recommendations from the National Research Council (NRC, 2001). In 2001, the NRC suggested that effective interventions for children with ASD must include: 1) early enrollment, as soon as ASD is suspected; 2) intensive instructional programming for at least five hours per day and five days per week; 3) repetition of systematic teaching practices; 4) individualized attention from an adult; 5) inclusion of a family component; 6) data collection; and 7) prioritization of functional skills (e.g., spontaneous communication, play skills, and peer interaction).

Preliminary investigation of ESI focused on the effectiveness of the use of an individualized curriculum within a naturalistic environment, as well as the inclusion of a parent-mediated component (Wetherby & Woods, 2006). Child gains were measured in terms of progress toward social communication goals that were identified collaboratively with parents at the outset of treatment. Examples of social communication goals included greater use of social signals (e.g., gaze shifts and shared positive affect), a higher rate of communicating, and a wider repertoire of communicative means (e.g., gestures, use of consonants, and use of words). When these specific behaviors were examined within group, results showed significant increases in social communicative behaviors from pre- to post-program among those in the ESI group. Additionally, between-group analyses showed that toddlers in the ESI group had better skills on measures of social signals, rate of communication, communicative functions, and understanding than did those in the control group who did not receive the intervention. Results from the ESI preliminary investigation helped to establish the value of using parent-mediated forms of intervention for very young children with ASD.

A third comprehensive developmental approach that has been systematically evaluated with young children with ASD is the Hanen More Than Words program (HMTW; Sussman,
The HMTW program is a parent training program that provides education and support to parents raising young children with ASD. The program is primarily focused on improving child language skills and is designed to be administered by a speech and language therapist (Sussman, 1999). It targets the transactional nature of parent-child play, capitalizing on parent opportunities for scaffolding their children’s linguistic development. To date, three studies have evaluated the benefits of the HMTW program for young children with ASD, and all showed positive gains in parenting behaviors and child outcomes following participation in the program (Warren et al., 2011).

Most recently, Carter et al. (2011) evaluated the impact of the HMTW program on parental responsivity/sensitivity and child language development. Parent participants in this study were randomly assigned to either the HMTW program or a no treatment control group. Those in the HMTW program received eight group sessions of parent education and three in-home parent-child interaction sessions. Outcomes were evaluated in terms of child progress toward four established goals: 1) improved two-way interactions between parent and child, 2) more conventional communication methods, 3) better social communication skills, and 4) improved receptive language ability. Additionally, parental responsivity to child communicative bids was deemed a primary focus of intervention efforts and was assessed using a behavioral coding system.

Participants were sixty-two children, with a mean age of 20.25 months, and their parents (Carter et al., 2011). All were diagnosed with ASD by a trained clinician using the Autism Diagnostic Observation Schedule (ADOS; Lord, 2002). Results showed large effects of the intervention on parental responsivity, however main effects were not statistically significant. Similarly, child communication was not found to improve from pre- to post-intervention. The
lack of conclusive findings in this study led the authors to call into question the appropriateness of the HMTW program for very young children (Carter et al., 2011). It is possible that, at this young age, intervention efforts should first focus on increasing child attention to objects and shared affectivity rather than language development. Parents therefore may be better served by initially learning to capture and share their children’s attentional foci in order to maximize opportunities for teaching within reciprocal interactions.

Overall, early intervention research has focused primarily on two widely used forms of intervention, EIBI and comprehensive developmental approaches (Warren et al., 2011). The literature to date appears to favor comprehensive developmental approaches for teaching very young children with ASD. Initial forms of early intervention programming focused explicitly on individualized teaching in a one-on-one setting. Though the inclusion of the family system has been a staple of early intervention efforts since their inception, research in this area has more recently begun to focus explicitly on teaching parents and family members the strategies for mediating interventions with their very young children with ASD. Parent training programs, in particular, have taken a place at the forefront of early intervention research and have evidenced favorable outcomes for very young children at risk for or diagnosed with ASD (Warren et al., 2011).

Why Parent Training?

Numerous arguments have been put forth to suggest a shift to the use of parent training early intervention protocols (Diggle & McConachie, 2009). Literature has documented the cascading effects of parent-child interactions for child development (Green et al., 2015). The transactions between parent and child have been shown to impact child social-emotional development, language development, and adaptive functioning, all of which may be delayed or
deficient among children with ASD. Therefore, it has been hypothesized that parents are the ideal facilitators of early intervention efforts (Green et al., 2015). Additionally, teaching parents to promote their children’s social engagement is likely to evidence long-term benefits that reach beyond the intervention time frame, since parents can continue to use the skills they learn in parent training programs throughout their children’s youth (Diggle & McConachie, 2009). Finally, parent training programs may be briefer and less intensive than direct one-on-one therapist-led interventions (Rogers, Estes, et al., 2012). This may reduce the resources and time required to administer traditional early intervention programs, thus increasing feasibility and accessibility for families with infants and toddlers with ASD.

Included in Warren et al.’s (2011) review of early intervention for ASD was a section dedicated to the emergence of parent training programs. Seven of their reviewed studies were focused on outcomes of parent training programs, though only four included comparison groups. None of the studies on parent training were deemed of good quality at the time of the review, and only three were considered of fair quality (Warren et al., 2011). Three types of parent training approaches to early intervention evaluated in these three studies were described.

Drew et al. (2002) carried out a pilot RCT of a parent training program that focused explicitly on teaching parents to foster joint action routines (e.g., distal pointing and gaze shifting) and joint attention skills (e.g., three-point gaze shifts and showing). The RCT design was a key strength of this study and a relatively novel addition to the extant literature on parent training programs. Parent participants were educated about behavior management techniques and how to promote child compliance during teaching. Based on previous literature suggesting the beneficial effects of parent-child interaction for the development of language, the authors
hypothesized that their parent training program would primarily lead to positive outcomes in the form of child linguistic development.

The program took place in-home and was integrated into the children’s daily routines (Drew et al., 2002). The authors described the program as a “consultant model” in which parents assumed the role of therapist. Parents met with a speech and language therapist once every six weeks for a three-hour session over the course of twelve months. Social communication goals were set for each six-week period, and parents were instructed to collect data regarding goal achievement.

Twenty-four children were randomly assigned to receive either the parent training program or locally available services as usual (Drew et al., 2002). The mean child age was 22.5 months. ASD diagnosis was confirmed through clinician administration of the *Autism Diagnostic Interview-Revised* (ADI-R; Lord, Rutter, & LeCouteur, 1994) and consensus clinical judgment. Outcomes were assessed in terms of language comprehension and production (*MacArthur Communicative Development Inventory*; Fenson et al., 1993), nonverbal IQ (*Griffith’s Scale of Infant Development*; Hindley, 1960), symptom severity (ADI-R; Lord et al., 1994), and parenting stress (*Parenting Stress Index*; Abidin, 1990). Following completion of the program, beneficial effects were primarily evident in receptive language gains (as measured by the *CDI Words Understood* subscale) among the children of parents in the training group.

Additionally, parent report suggested that children in the parent training group were using more phrase speech than those in the local services group. Nonverbal IQ, ASD symptom severity, and parenting stress were not significantly different between groups following training.

Limitations of this study included the use of a treatment-as-usual control group (Drew et al., 2002). Since children in the control group received some form of intensive intervention,
including home-based intensive ABA therapy, it is possible that the parent training group was unable to provide benefits over and above treatment-as-usual. Additionally, since parents were responsible for collecting and maintaining data records, the authors noted that the quality of the data across families was discrepant and sometimes poor.

In 2004, Aldred, Green, and Adams carried out a more comprehensive form of parent training, which was replicated by Green and colleagues in 2010. The protocol of both studies included randomization of very young children to either a parent training intervention or a routine care group. The intervention was again focused on building language and communication skills. In Green et al.’s (2010) replication, parents received one-on-one training from a speech-language pathologist two times per week for six months. The initial focus was on increasing parental responsiveness to their children’s communicative bids. Over time, the training became more complex, and parents were taught to facilitate joint action routines and basic language development.

Parent ratings of their children’s language development were significantly higher among those in the intervention group than the routine care group (Green et al., 2010). Observations of parent-child interactions strongly favored the intervention group, with parents responding more sensitively to their children and children socially initiating toward their parents at a higher rate. Despite these positive outcomes, no impact of parent training on ASD symptom severity was noted. Given these findings, the authors concluded that parent training is beneficial for promoting parent-child synchrony, but does not provide any notable additions to routine care for the reduction of core ASD symptoms.

The third RCT reviewed by Warren et al. (2011) was Stahmer and Gist’s (2001) evaluation of a parent education and support group focused on pivotal response training (PRT;
PRT is a naturalistic approach to early intervention, which has been shown to significantly improve children’s language development and social skills. Its focus is on “pivotal” behaviors that can contribute to social emotional growth, such as responsivity to cues, motivation to initiate interactions, and behavioral self-regulation. Stahmer and Gist’s (2001) protocol provided a novel contribution to the literature by focusing on the effects of an accelerated manualized approach to parent training.

Due to the time-consuming nature of the extant parent training programs, Stahmer and Gist (2001) emphasized the importance of providing brief and accessible services for parents with very young children with ASD. As a result, their protocol consisted of one hour of individualized parent education per week for twelve weeks. In addition, parents received one hour of group support with a qualified interventionist to reduce the stress associated with raising a young child with ASD. Twenty-two families were enrolled in the program. Children in the study were between the ages of two and five years, which may limit the ability to generalize its results to very young children with ASD. Outcomes were assessed using the Bayley Scales of Infant Development (Bayley, 1993), the MacArthur Communicative Development Inventory (CDI; Fenson et al., 1993), and a five-minute behavioral observation of parent-child interaction.

Results of the study indicated that parents who participated in the accelerated training program showed significant improvement in their use of PRT skills from pre to post intervention (Stahmer & Gist, 2001). Additionally, results were evident in their children’s language development as measured by the CDI Words Expressed subscale. The authors also noted that parents who were better at administering PRT had children who performed better on outcome assessments when compared with parents who had difficulty with administration. Results of this study as a whole demonstrate the benefits of a less intensive approach to parent training.
programs for early intervention. It is worth reiterating that the children in the sample were past the age typically targeted for very early intervention programming. Inclusion of children aged four and five, who are beyond the critical period of neural plasticity, may have reduced the benefits of the intervention.

In sum, the existing literature on parent training programs for parents of very young children with ASD is suggestive of an alternative route to increasing child social-emotional development and language skills (Warren et al., 2011). Though some forms of parent training are resource intensive, Stahmer and Gist’s (2001) study suggests that even short-term education programs can be effective if they follow a manualized approach to treatment for ASD. The vast majority of parent training programs have been administered in a one-on-one setting; however, Stahmer and Gist’s (2001) use of a parent support group suggests that training parents in a group format may promote parents’ skills while also reducing the stress associated with raising a child with ASD.

**Parenting Stress and Sense of Competence**

The bulk of the literature on early intervention for ASD has focused primarily on child outcomes in order to evaluate its effectiveness. Relatively recently, research in this area has expanded to examine the impact of early intervention efforts on the target child’s family. Due to the high demands placed on parents of very young children with and at genetic risk for ASD, parenting stress has been of paramount interest to date. Parenting stress has been defined as the psychological discomfort that arises from the role of parenting (Hayes & Watson, 2013). It has been argued that parents of children with ASD experience higher levels of stress than parents of children with other disabilities, such as Down syndrome and cerebral palsy (Estes et al., 2009; Lecavalier, Leone, & Wiltz, 2006; Pisula, 2011). As the prevalence rates of ASD continue to
rise, the deleterious impact of the disorder on parenting stress is likely to become of increasing concern. Methods of stress remediation are also likely to take a place at the forefront of early intervention research.

Hayes and Watson (2013) conducted a comprehensive meta-analysis in which the literature on stress in parents with and without children with ASD was evaluated. Fifteen studies were included in the analysis. First, the authors calculated an effect size comparing parents of children with ASD to those with typically developing children on a standardized, reliable measure of parenting stress. The mean effect size was 1.58, indicating a large and significant effect of raising a child with ASD on parenting stress levels. Next, they specifically compared parents of children with ASD to those with other disabilities, including Down syndrome and intellectual disability. Again, the effect was large ($d=0.64$), signifying a difference in parenting stress based on a child’s diagnostic status, with a diagnosis of ASD relating to the highest reported stress levels.

There is evidence to suggest that high parenting stress levels may actually counteract the positive effects of early intervention for children with ASD. Osborne, McHugh, Saunders, & Reed (2008) found that parenting stress negated the positive outcomes of early intervention programs among 65 children aged 2.6 to 4 years in England. Moreover, parent inclusion in early intervention was found to indirectly reduce parenting stress levels and increase parent perception of their sense of competence (Keen, Couzens, Muspratt, & Rodger, 2010). Parenting sense of competence (PSoC) refers to a parent’s self-esteem as it pertains to his/her abilities to raise a child. PSoC, like parenting stress, is negatively impacted by an ASD diagnosis (Keen et al., 2010).
This suggests that the argument for early intervention parent training programs may be two-fold. First, failure to include parents with high stress levels in their children’s early intervention programs may dilute or negate the positive effects of treatment. Second, parent training programs that focus on early intervention techniques may serve to reduce parenting stress and increase PSoC, thus raising the odds of beneficial treatment effects. It is therefore recommended that early intervention programs for ASD either be parent-mediated or include a parent training component, and parenting stress and PSoC should be considered important intervention targets.

**Early Start Denver Model**

The Early Start Denver Model (ESDM; Rogers & Dawson, 2010) is a manualized, comprehensive approach to early intervention for very young children with ASD. Rogers and Dawson (2010) developed the approach in response to the surge of evidence suggesting that ASD can often be identified within the first year of life. It is rooted in developmental theory and aimed at improving the developmental trajectory of infants and toddlers with ASD symptoms. The ESDM is administered during the first years of life to capitalize on neural plasticity and the critical period for social-emotional development (Dawson & Zanolli, 2003). Rogers and Dawson (2010) explicitly define the ESDM as “a specific developmental curriculum that defines the skills to be taught at any given time and a specific set of teaching procedures used to deliver the curriculum (pg. 1).”

The ESDM is informed by empirical principles demonstrating how infants learn, such as through environmental contingencies (Rogers & Dawson, 2010). It is also grounded in scientific knowledge of how ASD alters the typical parent-child dynamic, and the implications of poor interaction styles for early child development. The theoretical underpinnings of the ESDM were
borne out of various earlier models of ASD, including the model of interpersonal development in ASD (Pennington & Ozonoff, 1996), the model of ASD as a disorder of social motivation (Dawson et al., 2004), pivotal response training (PRT; Koegel, et al., 1999), and applied behavior analysis (Foxx, 2008). The curriculum starts with simple skills, such as orienting, and culminates in more complex social behaviors, including symbolic play.

The initial format of the ESDM was focused on the importance of an interdisciplinary approach to ASD treatment (Rogers & Dawson, 2010). Though parents and other professionals were incorporated in the development of the children’s individualized treatment plans, the primary method of teaching was through the use of one-on-one, therapist-led instruction. Like PRT, the ESDM is meant to be administered in naturalistic settings, and is often embedded in play activities. The child’s therapist is trained to teach specific social and communicative skills with the use of ABA techniques. Such techniques include capturing attention, implementing contingent reinforcement, prompting desired behaviors, fading prompts over time, and shaping and chaining behaviors of interest (Rogers & Dawson, 2010).

Research on the traditional ESDM has consistently demonstrated its effectiveness. Rogers and Dawson (2010) cited eight peer-reviewed papers, each of which described evidence of developmental growth among large groups of children with ASD who were enrolled in the program (Dawson et al., 2010; Hayden, 2004; Rogers & DiLalla, 1991; Rogers et al., 2006; Rogers, Herbison, Lewis, Pantone, & Reis, 1986; Rogers & Lewis, 1989; Rogers, Lewis, & Reis, 1987; Vismara, Colombi, & Rogers, 2009). The authors of the eight individual studies varied the length and intensity of the intervention, ranging from one hour per week for twelve weeks to 25 hours per week for two years. Regardless of treatment intensity, children who participated in the ESDM showed gains in language development, social initiative, imitation, and symbolic play.
Children who received more intensive intervention showed significantly improved developmental quotients on the *Mullen Scales of Early Learning* (Mullen, 1995) following treatment completion. Notably, children who participated in the ESDM for two years were developmentally equivalent to their typically developing same-aged peers after treatment (Dawson et al., 2010).

The ESDM is designed to be delivered by individuals with advanced training in psychology, special education, occupational therapy, speech and language pathology, or applied behavior analysis (Rogers & Dawson, 2010). It begins with the development of learning objectives based on an observed interaction between parent and child. The therapist uses ABA principles to facilitate progress toward the learning objectives and collects data on the child’s behavior over the course of the therapy sessions.

Literature on the traditional ESDM has generated a clear consensus: intensive, developmentally-focused teaching using principles of ABA within naturalistic settings is effective for improving outcomes among very young children with ASD (Rogers & Dawson, 2010). Despite its successes as a method of early intervention, the traditional ESDM remains limited by its time-intensive protocol. Though family members are encouraged to collaborate with the treatment team in traditional ESDM, parents are not explicitly taught how to evoke social and communicative behaviors from their children. To address these limitations, Rogers et al. (2012) carried out a randomized controlled trial of a brief, parent-delivered form of the ESDM.

**Parent-Delivered ESDM.** Rogers, Estes et al. (2012) created the ESDM-based parent intervention (P-ESDM) to evaluate the efficacy of a twelve-week, low-intensity, parent-delivered intervention for young children at risk for ASD. The P-ESDM RCT sample included 98 infants,
ages 14 to 24 months, and their parents. Participants were randomly assigned to the P-ESDM intervention group or community treatment as usual. The purposes of the study were two-fold: 1) to examine the feasibility of administering a parent-delivered intervention for children with ASD younger than three years, and 2) to evaluate the outcomes of the P-ESDM for both parent and child behavior change. Outcomes were assessed using the *Autism Diagnostic Observation Schedule for Toddlers* (ADOS-T; Lord et al., 2012), the *Mullen Scales of Early Learning* (Mullen, 1995), the *MacArthur-Bates Communicative Development Inventory* (Fenson, 2007), the *Vineland Adaptive Behavior Scales* (Sparrow & Cicchetti, 1989), and observational coding of child social behaviors.

The P-ESDM consisted of twelve one-hour sessions over the course of twelve weeks (Rogers, Estes et al., 2012). Treatment sessions followed a detailed, manualized curriculum. Therapist fidelity to the curriculum was assessed with a program-specific tool. Early sessions focused on developing child learning objectives collaboratively with parent participants. Following the development of objectives, parents were taught one new skill per week. Review and refinement of previously learned skills occurred as the sessions progressed. The ten topics addressed in P-ESDM included: 1) increasing child attention and motivation; 2) using sensory social routines; 3) promoting dyadic engagement and joint activity routines; 4) enhancing nonverbal communication; 5) building imitation skills; 6) facilitating joint attention; 7) promoting speech development; 8) using antecedent-behavior-consequence relationships; 9) employing prompting, shaping, and fading techniques; and 10) conducting functional assessments of behavior to develop ongoing interventions (Rogers, Estes et al., 2012).

Results of the P-ESDM RCT showed that parents in the intervention group made significant gains in the use of the targeted skills following the twelve-week program (Rogers,
Estes et al., 2012). The P-ESDM group showed a large effect of treatment (.57), which was greater than that of the control group (.37). Though parents were shown to increase their use of relevant skills, these gains were not mirrored in the assessment of child outcome variables. The authors hypothesized that some families of children in the community treatment-as-usual group were also receiving parent coaching, which may have been similar to the P-ESDM. Additionally, they indicated that parents might not have fully mastered the skills until the second month of treatment; therefore, they suggested that future studies conduct a follow-up assessment of parent and child behaviors to measure long-term gains.

**Current Study Objectives**

The existing literature on early intervention, parent training, and the ESDM (Rogers & Dawson, 2010) informed the development of the current study. Although promising preliminary outcomes have been evidenced for the parent-led version of the ESDM, condensed, group-based forms of this treatment have yet to be evaluated. Therefore, this study sought to implement an accelerated six-week, group format parent training program based on the manualized P-ESDM. This intervention was delivered to at least one parent from each enrolled family. Each parent had an infant or toddler, aged 12 to 48 months, diagnosed with or at genetic risk for ASD. For the purposes of the current study, genetic risk for ASD was defined as having an older sibling diagnosed with the disorder.

**Hypotheses**

It was expected that parents and children assigned to the ESDM-based, group format parent training program would show significant improvements in parenting stress, parent knowledge, parenting sense of competence, and child expressive language abilities from pre- to post-program as measured by standardized assessment tools. Additionally, it was expected that
participants in the immediate treatment group would perform significantly better on these measures compared to those in the delayed treatment control group. It was also anticipated that participants in the intervention group would show improvements in parent-child interaction style as measured by increased parental responding, child initiations of social interaction, and joint attention following program participation. Finally, it was hypothesized that improvement would remain stable at six weeks post-intervention (for the delayed treatment control group) and twelve weeks post-intervention (for the immediate treatment group).

Method

Participants

Selection Procedures. Participants were recruited from local pediatricians’ offices, daycare settings, and community organizations for individuals with ASD with the assistance of the Center for Autism and Related Disabilities (CARD) at the University at Albany, State University of New York (see Appendix A for recruitment flyer, parent letter, and parent e-mail). To be eligible for participation, parents were required to meet criteria for inclusion. Eligible participants were parents of infants or toddlers, aged 12 to 48 months, diagnosed with ASD or at genetic risk for the disorder (i.e., having an older sibling with a confirmed ASD diagnosis). Screening questionnaires determined that the primary referral source was a developmental pediatrician’s office in the New York’s Capital Region.

Prior to enrollment in the study, phone screening was conducted with inquiring parents to determine diagnostic/risk status and motivation to participate. During the screening process, parents were asked questions about their children’s participation in other forms of early intervention. Parents were not excluded from the study if their children were enrolled in early intervention programs, but care was taken to ensure group equivalency on this variable. It was
required for at least one parent from each family to consistently attend all sessions. Families who were ultimately enrolled in the program were asked to bring their infant or toddler to CARD for an initial visit. At this visit, parents provided written consent for their participation in the program and informed permission consent for their children’s participation in assessments (see Appendix A for consent forms). All included participants received the intervention at no cost and could choose to withdraw from the study at any time, although no participants elected to withdraw. Participants who were deemed ineligible for this project based on age, ability, or motivation were provided with resources and referral, as appropriate.

**Description.**

**Immediate Treatment Group.**

*Parent 1.*

Parent 1 was the biological mother of a 31.7-month-old son. Parent 1’s son attended a preschool early intervention program four days per week at the time of his mother’s enrollment in the current study. Parent 1 had three other children, one of whom was also diagnosed with ASD. She was Caucasian and reported attending “some college.” Her son received a total score of 11 on the ADOS-2 Module 1, placing his baseline symptom severity in the mild range.

*Parent 2.*

Parent 2 was the biological mother of a 34.9-month-old son. She was Caucasian and received her high school degree. Parent 2 was the mother of triplets, all three of whom were diagnosed with ASD. Parent 2 chose to enroll her most severely affected son in the current program. Parent 2’s son was nonverbal and received early intervention services, including speech-language therapy (three times per week), occupational therapy (two times per week),
special education services (one time per week), and physical therapy (one time per week). His
ADOS-2 Module 1 total score was 27, indicating a severe level of baseline symptoms.

Parent 3.

Parent 3 was the biological mother of a 34.6-month-old daughter who was minimally verbal. Parent 3 had only one child. She was Caucasian and reported attending “some college.” Parent 3’s daughter was not enrolled in preschool or early intervention services. Her daughter’s ADOS-2 Module 1 total score was 18, indicating a moderate level of ASD symptoms at baseline.

Parent 4.

Parent 4 was the biological mother of a 36.2-month-old son. Parent 4 also had another child who was typically developing. She was Caucasian and had a master’s degree. Her son was enrolled in speech-language early intervention services. He received a 17 baseline total score on the ADOS-2, indicating a moderate level of symptoms.

Parent 5.

Parent 5 was the biological mother of a 42.2-month-old African American son. She was married and received her college degree. Parent 5’s mother joined her for almost all sessions. At the time of enrollment, Parent 5’s son was not receiving early intervention services. Parent 5’s son received a total ADOS-2 score of 21, indicating a severe level of ASD symptoms at baseline.

Delayed Treatment Control Group.

Parent 6.

Parent 6 was the biological mother of a 28.1-month-old Caucasian son. Parent 6’s son was minimally verbal. Parent 6 was married and her husband occasionally attended sessions with her. She received her college degree. At the time of enrollment, Parent 6’s son was enrolled in speech-language therapy (three times per week), occupational therapy (three times per week),
and special education (four times per week). He received a total score of 23 on the ADOS-2, indicating a severe level of symptoms at baseline.

**Parent 7.**

Parent 7 was the biological mother of a 21.6-month-old Caucasian daughter. She was married and had her master’s degree. Parent 7 was the only parent who enrolled her “at-risk” child in the program. She also had an older son, age 5, who was diagnosed with ASD and enrolled in early intervention services. At the time of enrollment, Parent 7’s daughter was not evidencing any signs of ASD, as indicated by her ADOS-2 total score of 0.

**Parent 8.**

Parent 8 was the biological mother of a 31.2-month-old African American son. She was married and had a college degree. At the time of enrollment, Parent 8’s son was enrolled in speech-language therapy. Her son received a total score of 15 on the ADOS-2, indicating a moderate level of ASD symptoms at baseline.

**Parent 9.**

Parent 9 was the biological mother of a 25.2-month-old Caucasian son. She was divorced and reported having attended “some college.” Parent 9’s son had never received early intervention services. At the time of enrollment, he was minimally verbal and received a total score of 15 on the ADOS-2, indicating a moderate level of symptoms.

**Parent 10.**

Parent 10 was the biological father of a 42.9-month-old daughter. He was married and his wife occasionally attended sessions with him. He was Caucasian and had a college degree. Parent 10’s daughter was not enrolled in early intervention services. Parent 10 had two other
daughters and neither had an ASD diagnosis. At the time of enrollment, Parent 10’s daughter received an ADOS-2 total score of 8, indicating a mild level of ASD symptoms.

**Demographics.** The final sample consisted of ten parents (nine mothers and one father) who were split evenly between groups (see Appendix B for Demographic Information Form). All ten parents had at least a high school degree. Six parents were college educated. The majority of children whose parents participated in the program were male (n=7). Children’s ages ranged from 21.6 to 42.9 months (M=32.8, SD=6.8). Nine of the children whose parents enrolled in the program had a confirmed diagnosis of ASD. One child was deemed at genetic risk because her five-year-old brother had a confirmed ASD diagnosis. The majority of children were receiving some form of early intervention at the time of the program (n=7), and the types of services being received were primarily within the realm of speech/language therapy and occupational therapy. Two children were African American and eight were Caucasian. Table 1, Appendix B displays compiled demographic data for the immediate treatment and delayed treatment control groups. Refer to Table 2, Appendix B for individual parent and child demographic characteristics.

Three children were administered the ADOS-2 Toddler Module (Lord et al., 2012), based on age, and seven received the ADOS-2 Module 1 (Lord et al., 2012). Children were matched to condition based on ADOS-2 scores at baseline to prevent systematic differences between groups. The majority of children showed a moderate to severe level of symptoms at baseline (n=7). Two children showed a mild level of symptoms at baseline. The infant who was at genetic risk for ASD was not showing any symptoms at her initial visit. The average baseline ADOS-2 total score was in the “moderate” symptom severity range (M=15.5, SD=7.7). T-tests indicated that there were no significant differences in demographic variables or baseline measures between
groups (p’s > .12), suggesting that the randomly assigned, matched groups were equivalent in terms of child age and gender, parent gender and education level, race, participation in early intervention, ASD symptom severity, and baseline skills (i.e., parent knowledge, parenting stress, parenting sense of competence, child expressive language scores on the Communication Development Inventory, and all behaviors assessed during the observation task. (See Tables 2, 3, and 4, Appendix B).

Measures

**ASD Symptom Severity.** *The Autism Diagnostic Observation Schedule, Second Edition* (ADOS-2; Lord et al., 2012) was administered prior to commencement of the parent training program to assess ASD symptom severity at baseline. The ADOS-2 is a semi-structured, standardized, play-based assessment. It is currently considered the gold standard tool for assessing ASD. It is designed to be administered to individuals across ages of varying developmental levels and language abilities. The ADOS-2 includes five modules, each requiring 40 to 60 minutes to administer. Each individual is administered only one module, selected on the basis of his or her expressive language level and chronological age. All children enrolled in the current study were assessed with either the Toddler Module (ADOS-T; Lord et al., 2012) or Module 1. The ADOS-2 must be administered by a trained clinician with at least a bachelor’s degree in psychology or a related field. For the current study, the ADOS-2 was administered by a graduate student in a clinical psychology doctoral program who had achieved research reliability on the tool with a doctoral-level clinician.

The Toddler Module is appropriate for infants aged 12 to 30 months and Module 1 is meant for use with toddlers aged 31 months and older who are pre-verbal or have single-word speech. The ADOS-2 is designed to evoke a range of behaviors characteristic of ASD, including
joint attention, response to name, eye contact, requesting, functional play with objects, posturing, and hand mannerisms. Parents are required to be present during administration of the ADOS-T and Module 1. This allows for the assessment of child overtures toward his or her parent, as well as toward the examiner. Following administration, clinicians obtain scores for the child in the domains of language and communication, reciprocal social interaction, play, stereotyped behaviors and restricted interests, and other behaviors, such as anxiety, overactivity, and negativity. The domain scores are then converted to an algorithm score, which provides an overall social affect (SA) and restricted and repetitive behavior (RRB) score. Finally, this score is converted into a range of concern, from little to no concern to moderate to severe concern based on the child’s age and language ability. For the current study, the overall total (SA + RRB) was used to operationalize ASD symptom severity.

**Child Language.** Child language abilities were assessed with the *MacArthur-Bates Communicative Development Inventory* (CDI; Fenson, 2007). The CDI has been created in two separate forms, *Words and Gestures* and *Words and Sentences* (see Appendix C). The *Words and Gestures* form is for use with infants aged 8 to 18 months. *Words and Sentences* is appropriate for toddlers aged 16 to 36 months. Each parent participant was administered the appropriate form for his or her child’s age. Given the ages of the participants enrolled in the current study, all parents completed the *Words and Sentences* form of the CDI. The *CDI Words and Sentences* form has been used frequently to measure communication abilities and vocabulary skills in studies of early intervention for ASD (Warren et al., 2011). It consists of checklists of words the child understands and says. Parents were asked to complete the form at baseline, post-intervention, and six-week follow-up.
**Parenting Stress.** The 36-item *Parenting Stress Index, Fourth Edition, Short Form* (PSI-4-SF; Abidin, 2012) was used to assess parent-reported levels of stress related to parenting experiences (see Appendix C). Items represent stress based on three different domains of parenting, including parental distress (PD), parent-child dysfunctional interaction (P-CDI), and difficult child (DC), that are combined to form an index of total parenting stress. Participants were asked to respond to items on a five-point Likert scale, with response options including “strongly agree,” “agree,” “not sure,” “disagree,” and “strongly disagree.” Sample items from the PSI-4-SF include, “I feel trapped by my responsibilities as a parent,” “Since having a child, I feel that I am almost never able to do things that I like to do,” and “I feel that my child is very moody and easily upset.”

Since its development in 1995, the PSI-4-SF has been used extensively as a measure of parenting stress among parents of children with ASD (Davis & Carter, 2008; Rivard, Terroux, Parent-Boursier, & Mercier, 2014). The developers of the PSI-4-SF report that it has acceptable psychometric characteristics, with reliability coefficient alphas above .90 for each scale. The PSI-4-SF was administered at baseline, post-intervention, and six-week follow-up.

**Parenting Sense of Competence.** Parent perception of their parenting competence was assessed with the *Parenting Sense of Competence Scale* at baseline, post-intervention, and six-week follow-up (PSoC; Johnston & Mash, 1989). The PSoC is a 16-item Likert-scale questionnaire that assesses for parent competence in two domains: satisfaction and efficacy (see Appendix C). The items are rated on a 6-point scale, with response options ranging from “strongly agree” to “strongly disagree.” The satisfaction domain measures feelings of anxiety and frustration related to one’s parenting behaviors. Specific items in this domain include, “Even though being a parent can be rewarding, I am frustrated with my child now” and “Being a
parent makes me feel tense and anxious.” Items assessing parent efficacy tap into a parent’s problem-solving abilities and parenting capability. Items in the efficacy domain include, “If anyone can find the answer to what is troubling my child, I am the one” and “I honestly believe I have all the skills necessary to be a good parent to my child.”

**Parent Knowledge.** Parent knowledge was assessed with a questionnaire that was developed specifically for the proposed study (see Appendix C). The items on the questionnaire were drawn from the material covered in the ESDM-based parent training program. It is a ten-item assessment covering topics ranging from a basic understanding of the core characteristics of ASD to the specific skills taught in the parent training program. Example items include, “Which of the following is NOT a core characteristic of autism spectrum disorder?” and “Which of the following is an example of a sensory social routine?” Answer options were provided in a multiple-choice format, with four possible selections. Parents were asked to complete the knowledge questionnaire at baseline, post-intervention, and six-week follow-up. Percentage scores were used to assess gains in knowledge as a result of participation in the program.

**Parent-Child Interaction Observation.** Five-minute videotaped parent-child interactions were used to assess social reciprocity and parental responsivity before and after program participation. For this task, a parent-child dyad was placed in a room with various age-appropriate toys. Parents were told prior to the observation that they should “play with their child as they normally would at home.” Undergraduate research assistants who were blind to group assignment and trained to observe specific parent and child behaviors scored the videotapes. Two undergraduate research assistants independently coded 63 percent of the interaction videotapes. A single measures intraclass correlation coefficient (ICC) was calculated to determine interrater reliability. Results of this analysis showed extremely high reliability.
between the raters. Single measures ICCs for the parent observation variables ranged from .85 to 1.0. Single measures ICCs for the child observation variables ranged from .86 to .98. Therefore, random selection was used to enter one rater’s scores for the 63 percent of the videotapes that were coded by two independent raters. One coder rated the remaining videos and that score was entered into the database for analysis.

Parent behaviors that were taught as part of the ESDM-based program were coded, including initiating sensory social routines, responding to child bids for comfort and attention, narrating play, and imitating child vocalizations. Child behaviors were also coded, including vocalizations, gestures (i.e. pointing, showing, and giving), and initiation of joint attention. (See Appendix C for a coding manual describing the behaviors of interest and a sample coding sheet).

**Parent Satisfaction.** Parents were administered a satisfaction survey following program participation (see Appendix C). The survey consisted of ten items on a 5-point Likert scale, with response options ranging from “strongly agree” to “strongly disagree.” Items were created specifically for this program to assess parent satisfaction with the session topics, staff expertise, and the usefulness of the program materials. Qualitative data were collected through comments provided by parents following program completion.

**Procedure**

**Design.** The current study’s experimental design compared an immediate treatment group to a delayed treatment control group in order to allow for control of variables while still ensuring that all participants received the intervention. Previous research examining parent-led early intervention models for young children with ASD has not yet used a delayed treatment control group. Due to the typical long-term nature of early intervention programs, it has likely been deemed unethical to withhold child treatment for such a lengthy period of time. The current
study however, evaluated a short-term parent training protocol, thus reducing the treatment delay to six weeks and allowing for random assignment of parents to groups. Following recruitment and collection of baseline assessment measures, parents were matched on pre-treatment child symptom severity and child age. Matched pairs were randomized to groups using a computerized coin toss application.

Assessment. Following phone screening, recruited participants visited the Center for Autism and Related Disabilities (CARD) for an initial visit. During this visit, all parents provided informed consent and informed permission consent prior to the filming of the five-minute videotaped interaction and the administration of the Autism Diagnostic Observation Schedule, Second Edition (ADOS-2; Lord et al., 2012). Parents from both groups also completed baseline self-report measures at this visit, which included the parent knowledge questionnaire, the Parenting Stress Index, Fourth Edition Short Form (Abidin, 2012), the Parenting Sense of Competence Scale (Johnston & Mash, 1989), and the MacArthur-Bates Communicative Development Inventory (Fenson, 2007). After parents in the immediate treatment group finished the training program, parents from both groups completed the aforementioned self-report outcome measures for the second time. All families were asked to visit CARD for a second videotaped interaction.

Outcome measures used to assess treatment gains were informed by the growing literature on parent training programs. In addition to the use of standardized assessment tools for child language development (MacArthur-Bates Communicative Development Inventory; Fenson, 2007), parenting stress (Parenting Stress Index, Fourth Edition, Short Form; Abidin, 2012), and parenting sense of competence (Parenting Sense of Competence Scale; Johnston & Mash, 1989),
a program-specific knowledge test was used to evaluate increases in parent knowledge of ASD and the ESDM techniques.

An objective behavioral index (Merrill, 1994) of parent-child interaction was used to provide an assessment of meaningful and observable changes in parental responding, parent narration of play, child initiation of joint attention, and other specific parent and child behaviors. Specifically, a five-minute interaction surrounding developmentally appropriate toys was videotaped and coded in thirty-second intervals. Trained independent raters who were blind to treatment group coded the occurrences of targeted behaviors of interest, such as parent imitation, narration of play, initiations of sensory social routines, child initiations of social interaction, and joint attention.

Finally, a follow-up assessment of child progress was conducted both through visits to the research lab and with the use of an online survey. Follow-up observational data were collected at twelve weeks post-intervention for the immediate treatment group and six weeks post-intervention for the delayed treatment control group. The follow-up survey consisted of online versions of the MacArthur-Bates Communicative Development Inventory (CDI; Fenson, 2007), Parenting Stress Index, Fourth Edition, Short Form (PSI-4-SF; Abidin, 2012), Parenting Sense of Competence Scale (PSoC; Johnston & Mash, 1989), and parent knowledge questionnaire in order to determine whether parent and child gains observed immediately following treatment were maintained over time. Parents in the immediate treatment group were e-mailed the survey six weeks following the conclusion of their treatment sessions. All study procedures were reviewed and approved by the Office of Regulatory Research Compliance’s Institutional Review Board (IRB) at the University at Albany, State University of New York.
**Intervention.** The parent training program evaluated in this study followed the manualized session outlines provided in *An Early Start for Your Child with Autism* by Rogers, Dawson et al. (2012). Sessions took place twice per week for 60-90 minutes per session over the course of six weeks. The intervention consisted of a small group format (5 parents per group) and at least one parent consistently attended all sessions. Occasionally, parents brought their spouse or partner to the group with them. Consistency in attendance was required due to the teaching method of the program, which began with basic skills that built on one another over the course of the intervention. A clinical psychology doctoral-level student was responsible for administering the didactic lessons. A psychology undergraduate student simultaneously assessed the fidelity of administration with session-specific checklists. All sessions were administered with 100 percent fidelity.

The following parent skills were targeted during the intervention: capturing attention, using sensory social routines to elicit social smiles, methods of building back-and-forth interactions, eliciting gestures and other forms of nonverbal communication, helping children learn through imitating, eliciting joint attention, scaffolding functional, symbolic, and pretend play skills, and eliciting simple speech. Each session began with a review of the previous week’s topic, a didactic lesson on a new topic, and opportunities to rehearse and discuss the skills with one another. Parents were given homework assignments to begin using the newly learned skills at home with their infants and toddlers (see Appendix D for the session list and select session outlines). Formal assessment of progress only occurred following program completion in order to ensure that parents had the opportunity to learn and become comfortable with the skills at their own pace over the course of the program. Though it was emphasized that the current intervention program was *not* meant as a support group, parents were given opportunities during
each session to troubleshoot difficulties occurring at home with their individual children. This form of facilitated discussion was meant to target and reduce parenting stress in a systematic way.

Parents were given visual supports throughout the program that they took home to use with their children. Examples of visual supports that accompanied the ESDM program included refrigerator lists with weekly goals and “first-then” cards (see Appendix D for a sample visual support). In addition to the complementary visual supports given throughout the program, parents were provided with a small incentive (i.e., a $35 gift card) following their participation in the program to encourage attendance.

Data Analysis

Initial descriptive analyses were calculated to assess for normality of data distributions. General information on demographic characteristics of the sample was computed with descriptive statistics and is shown in Table 1 (see Appendix B). As indicated in the demographic description of participants, t tests were used to assess for equivalency among individuals in the immediate treatment and delayed treatment control conditions on child age, enrollment in early intervention programs, ADOS-2 scores at baseline, and parent variables, such as education level and socioeconomic status. Additionally, interrater reliability for coding on the parent-child interaction observation was assessed with an intraclass correlation coefficient (ICC) to determine the degree to which behavior targets were reliably observed by the independent coders.

Graphs of each participant’s primary outcome measures, including child language, parenting stress, parenting sense of competence, and parent knowledge, in addition to all parent and child observation variables, were prepared for visual inspection of the data. A mixed analysis of variance (ANOVA) for repeated measures was used to assess for change from pre- to
post-program on the *MacArthur-Bates Communicative Development Inventory* (CDI; Fenson, 2007), parent knowledge questionnaire, *Parenting Stress Index* (PSI-4-SF; Abidin, 2012), and the *Parenting Sense of Competence Scale* (PSoC; Johnston & Mash, 1989). Between- and within-group differences in total scores from the coded observations were examined with dependent and independent samples *t* tests rather than ANOVA due to small sample size. Between-group differences were assessed following completion of the intervention group and prior to the start of the delayed-treatment control group using ANOVA. Further detail regarding this method of statistical analysis is provided below.

The goal of the present study was to compare outcomes between the immediate treatment and delayed treatment control groups across three time points (i.e., baseline, post-intervention for the immediate treatment group/pre-intervention for the delayed treatment control group, and six-week follow-up for the immediate treatment group). Therefore, a mixed ANOVA for repeated measures (O’Brien & Kaiser, 1985) was used to assess treatment outcomes by assessing the significance of Condition (immediate treatment versus delayed treatment) X Time interactions. Unfortunately, two participants in the immediate treatment group did not complete six-week follow-up data via SurveyMonkey. Therefore, power was even more limited when examining the data over three time points. A fourth time point (twelve-week follow-up for the immediate treatment group and six-week follow-up for the delayed treatment control group) was included to assess progress on the videotaped behaviors. Six of the ten families completed this visit (i.e., two families from the immediate treatment group and four from the delayed treatment group). To increase power and maximize the chances of detecting significant treatment effects, data were analyzed over baseline and post-intervention only when initial Condition X Time interactions were not found to be significant with three time points.
The use of a mixed ANOVA requires that the data meet numerous assumptions, including dependent variable continuity and normality, sphericity, homogeneity of variance, and no significant outliers. Therefore, the data were first evaluated for these assumptions before interpreting results for each dependent variable below.

**Results**

**Parent Knowledge**

Residual statistics, Mauchly’s Test of Sphericity, and group variances all indicated that the assumptions for conducting a mixed ANOVA were met for parent knowledge. The omnibus test from the mixed ANOVA did not reveal a significant Condition X Time interaction for parent scores on the study-specific knowledge assessment \( (F_{(2, 6)}=3.33, p=.07) \). Based on this result, a mixed ANOVA including Condition X Baseline and Post-/Pre-Intervention was conducted. As shown in Figure 1 (Appendix E), this test revealed a significant Condition X Time interaction \( (F_{(1, 8)}=24.2, p=.001) \). Given this significant interaction, the simple main effect of group at post-intervention was examined individually with a \( t \) test. There was a significant difference between groups at post-intervention for the immediate treatment group and pre-intervention for the delayed treatment control group (two-sample \( t_{(8)}=2.85, p=.02 \)). This indicates that the immediate treatment group performed significantly better on the knowledge measure after completing parent training than the delayed treatment control group prior to program enrollment.

Two paired-samples \( t \) tests were calculated to evaluate the performance of the immediate treatment group on the knowledge assessment from baseline to post-intervention and post-intervention to follow-up. Results indicated that parent knowledge significantly increased from baseline to post-intervention (paired \( t_{(4)}=-9.8, p=.001 \)). Refer to Appendix E for visual depictions of parent knowledge across time points as shown in Figures 2 through 6 for children.
in the immediate treatment group and in Figures 7 through 11 for children in the delayed
treatment control group. Data across time points for parent knowledge are also included in Table
5 in Appendix E.

**Parenting Stress and Sense of Competence**

Data from the measures of parenting stress and parenting sense of competence were
assessed for violations of mixed ANOVA assumptions. All assumptions were met. Visual
inspection of the data showed even distributions for both measures. The interaction of Condition
X Time was not significant with the inclusion of all three time points for either the *Parenting
Stress Index* (F(2, 6) = .57, p = .58) or the Satisfaction (F(2, 6) = .65, p = .54), Efficacy (F(2, 6) = .11,
p = .90), or Total (F(2, 6) = .35, p = .71) scores from the *Parenting Sense of Competence Scale*.
Again, the data were instead examined at only the first two time points due to missing data at
follow-up. There was not a significant interaction of Condition X Time for parenting stress (F(1,
8) = 2.51, p = .15). The Condition X Time interaction for the *Parenting Sense of Competence Scale*
Total Score was also not significant (F(1, 8) = .47, p = .51). Therefore, simple main effects and
paired-samples t tests were not carried out for these variables. Refer to Appendix E for visual
depictions of parenting stress and parenting sense of competence across time points as shown in
Figures 2 through 6 for children in the immediate treatment group and in Figures 7 through 11
for children in the delayed treatment control group. Data across time points for parenting stress
and parenting sense of competence are also included in Table 5 in Appendix E.

**Child Expressive Language**

Child expressive language was defined for the purposes of this study as the number of
words said by the child according to parent report. In reviewing descriptive statistics, there were
two outliers in these data. Two of the children were nonverbal from entry into the study through
completion. These two children were removed from the analyses. Following removal of these outliers, all assumptions of ANOVA were met. The Condition X Time interaction was not significant for child vocabulary ($F_{(1,6)} = .40, p = .55$). However, qualitative exploration of the data showed that children in the immediate treatment group had on average 151 words prior to their parents’ participation in the program and 267 words at six-week follow-up. In comparison, the children in the delayed treatment group evidenced slower expressive language growth over the same period of time from baseline to follow-up, with an average of 149 words at baseline and 219 words at post-intervention (see Figure 12 in Appendix E).

Based on qualitative data, paired-samples $t$ tests looking explicitly at the increase in child vocabulary for the immediate treatment group from baseline to post-intervention and post-intervention to follow-up were conducted. No significant difference was found from baseline to post-intervention (paired $t_{(4)} = -.82, p = .44$) or from post-intervention to follow-up (paired $t_{(2)} = -2.56, p = .10$). This suggests that children in the immediate treatment group did not gain a significant number of words while their parents were enrolled in the parent training program or in the time between post-intervention and follow-up. Refer to Appendix E for visual depictions of words expressed across time points as shown in Figures 2 through 6 for children in the immediate treatment group and Figures 7 through 11 for children in the delayed treatment control group. Data across time points for words expressed are also included in Table 5 in Appendix E.

**Parent and Child Interaction Observation**

As indicated above, the videotaped interaction data were analyzed solely with $t$ tests and qualitative visual examination due to small sample size at follow-up. Two families from the immediate treatment group and four families from the delayed treatment control group attended
their follow-up visits. Comparisons were made from baseline to 12-week follow-up for the immediate treatment group and from baseline to 6-week follow-up for the delayed treatment control group. An independent samples \( t \) test was calculated comparing the immediate treatment group at 12-week follow-up with the delayed treatment control group at pre-intervention to determine if any changes were evident between groups as a result of participation in the parent training program. Changes in observed behaviors as a result of program participation were also evaluated through an independent samples \( t \) test examining differences between the immediate treatment group’s baseline scores and the delayed treatment group’s six-week follow-up.

No significant differences were found between baseline and 12-week follow-up for the immediate treatment group. Based on the small sample size at 12-week follow-up, there was likely not enough power for a \( t \) test to detect significant differences. Therefore, data from the two families who attended both the baseline and the follow-up appointments were examined qualitatively and with the use of the Reliable Change Index (RCI; Jacobson & Truax, 1991) to examine clinically meaningful, rather than statistically significant, change. It should be noted that calculation of the RCI for the observational variables is limited by the lack of normative data available for these variables; therefore, for the current study, the standard criterion of RCI>1.96 was used to define reliable change.

Taken together, an examination of the mean number of observed behaviors for these two families showed the largest increases for the parent variables of Narrate Play (\( \Delta = 26.5 \)) and Imitate/Mirror (\( \Delta = 4 \)) and the child variable of Vocalizations (\( \Delta = 13.5 \)) from baseline to 12-week follow-up (see Figures 13, 14, and 15, Appendix F). The reliable change index calculation yielded a reliable change in parent narrations from baseline to follow-up (RCI=3.4). The reliable change index calculation did not yield a reliable change for parent imitations/mirror (RCI=0.00).
The reliable change index did not yield a significantly reliable change for child vocalizations, likely due to the wide range in vocalizations among the two children at baseline (RCI=.5). Refer to Appendix F for visual depictions of parent and child observational variables across time points as shown in Figures 16 through 19 for children in the immediate treatment group.

A similar result was found from baseline to six-week follow-up for the delayed treatment control group, with \( t \) tests failing to yield any significant differences. Again, visual exploration of the data was carried out to qualitatively evaluate behavioral changes among the four families who attended their six-week follow-up visit and the RCI was calculated. The largest increases in behaviors were seen for the parent variable of Narrate Play (\( \Delta=3.25 \)) and the child variable of Vocalizations (\( \Delta=53 \)). Again, a reliable change was seen in parent narrations (RCI=4.46). The RCI could not be calculated for vocalizations among children in the delayed treatment control group due to the extremely wide range in child vocalizations and the negative average covariance between items that resulted from this variability. Refer to Appendix F for visual depictions of parent and child observational variables across time points as shown in Figures 20 through 27 for children in the delayed treatment group. Data across time points for these variables are also included in Tables 6 and 7 in Appendix F.

An independent samples \( t \) test was conducted to compare the immediate treatment group’s follow-up scores for each of the parent and child variables to the delayed treatment control group’s pre-intervention scores. Results showed significant differences for the parent variable of Narrate Play (two-sample \( t_{(5)}=2.84, p=.047; \) see Figure 13, Appendix F). No significant differences were found for any of the child variables. A second comparison was made between the immediate treatment group’s baseline scores and the delayed treatment control group’s six-week follow-up. A significant difference was found for the parent variable of
Imitate/Mirror (two-sample \( t_{(7)}=2.87, p=.037 \)) (see Figure 14, Appendix F). Again, no child variables yielded significant results.

**Parent Satisfaction**

Means for each item from the parent satisfaction questionnaire were calculated to assess how satisfied parents felt with various aspects of the program (see Figure 28, Appendix G). For the rating of overall satisfaction with the program, parent responses averaged 4.73. Parents averaged 4.64 on the item, “I feel I and/or my child benefitted from this program.” When asked if they would recommend the program to other parents, the average response was 4.82. For the items indicated, parent average responses are listed in parentheses: “I feel the program helped me be more effective at helping my child with or at risk for autism” (4.73); “I feel my child’s skills have improved because of the program,” (4.36); “I am more informed about treatment targets for my child with or at risk for autism,” (4.73); and “This program taught me something new,” (4.82). Both “I believe this program was worth my time” and “The program staff were helpful and knowledgeable during sessions” received average ratings of 4.91. Select comments included, “I learned a lot and also realized I was doing a lot incorrectly” and “I believe this is an awesome program and a great resource for the Capital Region.” One parent indicated that, due to the short duration of the program, she anticipated that she and her son would continue to show improvement over time.

**Discussion**

The primary goal of the current study was to assess the impact of a brief, group format early intervention parent training program for families of children with ASD. The program was based on the Early Start Denver Model (ESDM; Rogers & Dawson, 2010). A training group lasting six weeks was offered to parents of infants and toddlers (12-48 months) diagnosed with
or at genetic risk for ASD. The primary outcome measures evaluated following participation in the parent training program included parent knowledge, parenting stress and sense of competence, child expressive language, parent satisfaction, and several objective behavioral indexes, including parental responsiveness and child social initiations. This project assessed both immediate outcomes directly following program completion and longer-term outcomes at 6 and 12 weeks post-program. The version of the Early Start Denver Model evaluated in this project yielded increases in parent knowledge, parent narration of play, parent imitation of play, and child vocalizations. Parents were also highly satisfied with the program.

The most robust result from the current study was found for parent knowledge. Parents consistently showed a large and significant increase in knowledge following participation in the parent training program. Previous research has shown that higher levels of parent knowledge are positively associated with child outcomes in high-risk samples. Further, parents with more general knowledge of child development have been found to be more sensitive to their children’s needs during play interactions (Hess, Teti, & Hussey-Gardner, 2004).

Previous literature on parent training for families of children with ASD has routinely assessed for changes in parent knowledge from baseline to post-intervention. The purpose of assessing for program-specific parent knowledge is to ensure that parents have established basic understandings of techniques for teaching their children at home (Ingersoll & Dvortcsak, 2006; McConachie & Diggle, 2007). Though, as a whole, parents enrolled in the current program showed an increase in knowledge from baseline to post-intervention, visual inspection of individual cases revealed that one parent received a poorer score on the knowledge questionnaire at post-intervention than she did at baseline. Ingersoll & Dvortcsak (2006) developed a model of parent training that was primarily group-based, but also delivered intermittent individual
sessions. It is possible that this “individual check-in” model may have been more successful for targeting and increasing each parent’s knowledge of ASD and the ESDM.

The overall increase in parent knowledge suggests that material from the current program was successfully communicated to the majority of parent participants. Though several of the child variables evaluated in this study were not significantly improved during the assessment window, it is possible that parents may observe increases in their children’s skills over time as they continue to apply their acquired knowledge of the ESDM strategies in their homes.

The primary areas in which the current study failed to demonstrate significant results were those of parenting stress and parenting sense of competence. The lack of change in parenting stress and sense of competence has negative implications for parents’ abilities to successfully implement intervention techniques at home with their children. According to Osborne et al. (2008), high levels of parenting stress may dilute or negate the positive outcomes generally seen among children as a result of participation in early intervention programs. Since parents continued to report relatively high levels of stress following program completion, it may suggest an alternative explanation for the lack of findings among the child observational variables evaluated in the current study.

Previous literature has consistently shown reductions in parenting stress to be one “collateral effect” of parent training programs for ASD (Koegel, Bimbela, & Shreibman, 1996). Though it is unclear why these variables were unchanged by the current parent training program, it is highly likely that the small sample sizes of the groups limited the ability to detect significant differences. The means for both of these variables were in the expected direction, so it is possible that examining the impact of this type of program on parenting stress and sense of competence with a larger sample may have yielded different results. It is also possible that the
A group-based model, though intended to explicitly target parenting stress through the provision of social support, decreased the number of opportunities for focusing individually on each parent’s specific needs (Ingersoll & Dvortcsak, 2006).

A third possible explanation for the lack of findings in these areas is the reliance on parent self-report measures to assess for the constructs of stress and competence. Koegel et al. (1996) conducted an objective assessment of parenting stress following participation in a parent-training group. They filmed parent-child interactions at home visits and coded the tapes for parent stress on a five-point scale from negative (score of 0) to positive (score of 5). Specific behaviors used to operationalize parent stress included, “Adult seems tense” and “Adults exhibit little patience.” Positive stress responses were coded if parents seemed relaxed, laughed, smiled, or showed humor. Since parents often exhibit response bias when reporting about their own levels of stress and competence, this type of objective behavioral assessment may have uncovered meaningful changes on these variables (Stokes, Pogge, Wecksell, & Zaccario, 2011).

Results of the present study did not replicate previous literature in terms of child language outcomes (Stahmer & Gist, 2001). Though the current program did yield large increases in child expressive vocabulary from baseline to follow-up on a qualitative level, this gain was not statistically significant. This is likely due in part to the brief nature of the current program and the study’s small sample size. Pilot research of the Parent-Mediated Early Start Denver Model led Rogers, Estes et al. (2012) to conclude that it might take up to two months post-intervention for children’s gains to mirror their parents’. Since children were not directly involved in the intervention, there may be a lag between the time when parents learn the ESDM skills and the time when their children begin to achieve increases in language. This could be further explored with a longer-term follow-up. Moreover, Stahmer and Gist (2001) suggested
that parents who show more mastery of the skills taught in parent training programs tend to have children who perform better on measures of expressive language. The current study did not assess for parental mastery of the ESDM skills, but it is possible that exploration of this construct might have revealed a relationship between parent achievement and child expressive language.

Children in the current study had an extremely wide range of language abilities at baseline. This range in expressive language skills continued to be vast at follow-up. Variability in children’s language abilities is to be expected, given the nature of the autism spectrum. However, it is challenging to compare nonverbal children who exhibit severe ASD symptoms to those with milder deficits. Future research would benefit from using a single-case, multiple baseline design, in which children of varying abilities are followed over time. Such a controlled design would help to tease apart individual gains in language skills as a result of program participation. This suggestion for future research is discussed in more detail below.

Objective evidence of parental benefit from the current study was seen in the coding of behavioral indexes. Parents were found to increase their narration of play and imitation/mirroring of their children’s behaviors from baseline to follow-up. There are several implications of these improvements. A wealth of past literature has documented the benefits of parent narration and imitation of play. Jordan (2003) outlined the transactional nature of social play specifically among families of children with ASD. Because children with ASD, by definition, have difficulty engaging the interests of others, parents often need to teach their children to participate in interactive play. One key method of facilitating play development is through the narration of play (Jordan, 2003; Wolfberg & Schuler, 1999). Describing a child’s actions during play is helpful for drawing his or her attention to appropriate behaviors and reinforcing spontaneous, interactive play (Solomon, Ono, Timmer, & Goodlin-Jones, 2008).
Further, failure in imitation is a central deficit seen among children with ASD (Rogers, 1999). Imitation of social partners is one primary method through which children learn. Therefore, Rogers and Dawson (2010) emphasized the importance of modeling imitation as part of the ESDM curriculum. The ESDM program refers to parental modeling and eliciting of imitation behaviors from children as “imitation games.” This is meant to encourage parents to understand the reciprocal nature of imitation/mirroring behaviors. Results of the current study showed that parents engaged in a higher frequency of imitation/mirroring following participation in the ESDM program. Over time, it is anticipated that the enrolled children will learn from their parents’ increased modeling of imitation, thus addressing a core deficit area of ASD.

Parent satisfaction with the current program was consistently high across participants. Parents reported that the program helped them to become more effective at helping their children with ASD. Parents also indicated that they perceived their children’s social/communication skills to have improved because of the program. Parent satisfaction with a training curriculum is essential for guaranteeing attendance at sessions and ensuring that parents will be willing to implement program techniques outside of the training classroom (Ingersoll & Dvortcsak, 2006). Moreover, parent satisfaction with a particular intervention approach helps to validate its use with future groups of participants (Ingersoll & Gergans, 2007). Parents in the current program indicated that they would be likely to recommend the current program to other parents of infants and toddlers with ASD.

The current study sought to deliver the Early Start Denver Model to families through a method that increased its feasibility and decreased its time intensity. Taken as a whole, results were consistent with expectations for the variables of parent knowledge, parent narration and imitation of play, child vocalizations, and parent satisfaction. Qualitative gains were evident in
child expressive language abilities, according to parent report. Parenting stress and sense of competence remained unchanged following program participation, but mean scores were in the expected directions from baseline to follow-up.

Since the current study used a delayed treatment control design, firm and clear conclusions cannot be drawn on an individual basis. However, qualitative exploration of individual cases yields important information regarding the relationship between parenting stress, sense of competence, child language, and observed parent and child variables. For example, Parent 10 demonstrated fewer desirable parent behaviors on the observational task over time. This was unexpected and in contrast to Parent 10’s apparent gains on the knowledge questionnaire from baseline to post-intervention. Further exploration of Parent 10 shows that he reported among the highest levels of stress of families in the current study at baseline (90\textsuperscript{th} percentile, which was in the clinical range), and his stress increased from baseline to post-intervention (94\textsuperscript{th} percentile). Additionally, Parent 10’s sense of competence slightly decreased over time from a score of 45 at baseline to 40 at post-intervention. Parent 10 reported that his daughter had 100 fewer words from baseline to post-intervention. The worsening of Parent 10’s stress and sense of competence, in addition to his perception of his daughter’s decline in language skills, may have negatively influenced his abilities to demonstrate the behaviors taught as part of the current ESDM curriculum. Other aspects of the participant’s family environment and life stressors were not assessed, but it is possible that external circumstances may have contributed to Parent 10’s apparent lack of improvement as a result of participation in the current study.

Further individual qualitative analysis yielded an example of progress over time that contrasts that of Parent 10. Parent 4 engaged in much more narration of play and
imitation/mirroring of her child’s behaviors at follow-up than she did at baseline. She also made more attempts to capture her child’s attention. This indicates that she integrated specific behaviors that were taught as part of the ESDM curriculum into her repertoire. In addition, Parent 4’s reported parenting stress decreased from the 72\textsuperscript{nd} percentile at baseline to the 54\textsuperscript{th} percentile at follow-up, both of which were in the non-clinical range. Her sense of competence also improved from baseline (total score of 63) to follow-up (total score of 72). Though her child did not evidence any significant gains in desired behaviors on the observational task, Parent 4 reported a large increase in her child’s expressive language abilities, from 387 words at baseline to 513 words at follow-up. It should be noted that Parent 4’s child was the second-most verbal child in the current study, with his \textit{Words Expressed} score placing him in the 27\textsuperscript{th} percentile when compared to other boys his chronological age. Therefore, Parent 4 appeared to yield a great deal of benefit from her participation in the current ESDM program. The stark contrast across parent report measures and behavioral outcomes between Parents 4 and 10 demonstrates the need for future examination of parent-mediated early intervention outcomes for children with ASD at the individual level.

Additional qualitative exploration of the current data showed that, overall, parents in the delayed treatment group exhibited stagnant, if not worsening of, parenting stress, sense of competence, knowledge, and appropriate behaviors during play from baseline to pre-intervention. This suggests that parents do not naturally show improvement in these aspects of functioning over time without intervention. In fact, the many parents who exhibited poorer scores on objective and self-report measures from baseline to pre-intervention demonstrate that circumstances of parents of very young children with ASD may worsen over time without the receipt of early intervention. Therefore, it is important that all parents of children with ASD
have the opportunity to receive some form of education and training regarding how to intervene with their children.

**Strengths, Limitations & Future Directions**

The Early Start Denver Model is a well-researched program for early intervention with very young children with ASD. Several studies have shown the benefits of the ESDM for promoting child social engagement with parents and peers (Dawson et al., 2010; Hayden, 2004; Rogers & DiLalla, 1991; Rogers et al., 1986; Rogers, Lewis, & Reis, 1987; Rogers & Lewis, 1989; Rogers et al., 2006; Vismara et al., 2009). Research has even demonstrated increases in developmental quotients following participation in intensive ESDM as measured by the Mullen Scales of Early Learning (Dawson et al., 2010; Mullen, 1995). Given the documented benefits of the ESDM, it is frequently recommended that parents of very young children enroll in this type of comprehensive early intervention program. However, there are several factors, including time-intensity and limited access, which have made it difficult, if not impossible, for many families with children with ASD to experience the benefits of the Early Start Denver Model.

A major strength of the current study was the inclusion of parent training in which parents were taught to mediate their children’s early intervention programs. Each enrolled parent received all twelve lessons of the ESDM curriculum. Additionally, individual parents were provided with assistance at the outset of treatment to set goals for themselves and their children. This enabled each parent to individualize the treatment program to his or her child’s specific needs and areas of strength.

Since parents were taught how to implement the Early Start Denver Model techniques in their own homes, the current study allowed for a briefer length of intervention. Parents were strongly encouraged to continue to implement their children’s treatment following conclusion of
the training classes. Several parents indicated that the brief time frame of this program made it possible for them to consistently attend all sessions, despite their busy schedules.

Another strength of the current study was the group model of service delivery. This promoted increased access to treatment for parents in the Capital Region of New York. Additionally, previous literature has demonstrated that participation in group-format parent training programs is helpful for reducing parenting stress, which is a significant concern among families of children with ASD (Hayes & Watson, 2013; Keen et al., 2010). Participants in the current study noted the usefulness of troubleshooting their difficulties with other parents who were in the midst of similar circumstances.

In terms of data collection and evaluation of program outcomes, the current study greatly benefitted from the inclusion of an objective performance-based measure. All parents were scheduled to attend a CARD visit at least twice to film a videotaped interaction surrounding age-appropriate toys. This enabled the examination of specific behavioral indicators of treatment gains, including parent narration of play, parent imitation, and child social initiations. This type of objective analysis has routinely been missing from past literature.

Additionally, previous literature has often failed to include follow-up assessment of children and families. Therefore, Rogers, Dawson et al. (2012) encouraged future researchers to collect follow-up data to determine whether treatment gains evidenced immediately after EDSM participation are maintained over time. The current study included six- and 12-week follow up evaluations of participants in order to help fill this gap in the existing literature. These follow-up assessments proved to be beneficial for assessing continued progress following treatment completion.
The current study was undoubtedly limited by its small sample size. Given the limited amount of resources available for carrying out the current program, the number of families served was inevitably restricted to a small number. Though an a priori power analysis was conducted and suggested a sample size of 24 to detect medium effects, it was not possible to recruit and enroll 24 families in the time allotted. Additionally, it would have been difficult, if not impossible, to individualize treatment to a group that large. Further, several families did not submit their follow-up surveys or attend their follow-up visits. Therefore, future researchers may be interested in replicating the form of the ESDM used in the current study (i.e. group-based parent training) over time to accumulate a larger sample. This would enable investigators to draw more concrete conclusions regarding treatment effects.

On the other hand, though it is generally desirable to increase sample size and gain power to detect significant differences, studies examining skill increases among children with ASD may in fact be more informative if they use a highly controlled single-subject design. Autism spectrum disorder is a heterogeneous disorder with wide variability within the two core symptom domains of social-communication and restricted interests/repetitive behaviors. The phenotypic variability in ASD makes it difficult to draw firm conclusions across individuals in terms of response to treatment. Therefore, single-subject research is extremely important for studying outcomes in this population. Though less generalizable to the broader population, single-subject studies can help to explain the impact of intervention on skill development and reduction in symptoms at the individual level.

The examination of individual cases is particularly relevant in early intervention research when very young children are followed over time. As Turner and Stone (2007) reported, diagnostic stability for an ASD diagnosis in children who are diagnosed prior to age 2 can be as
low as 63%. Infants and toddlers who the authors deemed most likely to lose their diagnoses were those with milder social-communication deficits and higher cognitive abilities. Though early detection and diagnosis continues to become more fine-tuned, it is possible that some children who are enrolled in early intervention programs have more capability to improve over time (such that they may even lose their ASD status) than others who exhibit more severe symptomatology. The variability in language abilities and baseline ADOS-2 scores among the children enrolled in the current study highlights the unevenness in the sample’s potential to show increases in social-communication behaviors and expressive language. Though the groups were matched on language and ASD symptoms, the lack of control among individual participants limits the types of conclusions that can be drawn from the current study.

Though the current study was strengthened by the collection of 6- and 12-week follow-up data, it is recommended that future studies examining such brief models of early intervention evaluate even longer-term outcomes of program participation. Oftentimes, children with ASD begin to experience more significant social-communication challenges as demands increase (Fox, Dunlap, & Cushing, 2002). Therefore, enrollment in school programs, along with the accompanying increase in peer interactions, often poses difficulties for children with ASD. The majority of children in the current study were just beginning to enroll in preschool programs or daycare. It would be beneficial to determine whether this transition was eased through the provision of the ESDM parent training program. An evaluation of this type would require longer-term follow-up, with assessments occurring periodically over the course of six months to one year.

Another limitation of the current study was the lack of a third comparison group of typically developing children. The inclusion of a delayed treatment control group was
intentionally chosen based on the dearth of literature using this design; however, it would have been ideal to also evaluate differences in children without ASD to tease apart normative developmental changes over time. The gains seen in the immediate treatment group from the current study would likely still fall short when compared to typically developing children, particularly on the objective behavioral evaluation. It was not anticipated that the current form of ESDM would fully ameliorate core ASD symptoms. However, a literature base exists in which children with ASD have become indistinguishable from their peers without ASD following early intervention. These studies primarily evaluated the effects of extremely intensive and long-term individualized treatment. The evaluation of parent-mediated early intervention is still in its infancy and it is not yet known whether this form of intervention is powerful enough to alter the developmental course of children with ASD. Future research should include multiple comparison groups in order to make this determination.

In summary, the current study evaluated the impact of a group parent training program based on the ESDM for parents of children with ASD. Results indicated that parents gained knowledge from the program, which translated into some aspects of their play (e.g. narration and imitation) with their very young children. Additionally, over time, children whose parents participated in the immediate treatment group evidenced qualitative gains in their expressive language abilities from baseline to follow-up. Parenting stress and sense of competence were not impacted by the current program, despite parents reporting high levels of satisfaction with treatment.

Though traditional forms of early intervention have accumulated a strong evidence-base, these approaches are typically time-intensive, difficult to access, and require the expertise and involvement of a one-to-one treatment provider. Findings from the current study suggest
beneficial impacts of short-term parent training programs for early intervention. This may indicate the need to move toward parent-mediated models of intervention for young children at risk for and/or diagnosed with ASD. This form of treatment would increase feasibility and accessibility of intervention for families who do not live in resource-rich areas of the country, thus providing an alternative method for improving developmental outcomes of children with ASD.
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Appendix A

Recruitment Flyer

Parent Letter

Parent E-mail

Parent Informed Consent Form

Parent Informed Permission Consent Form
Let’s Play! A Brief Training Program for Parents of Infants and Toddlers Diagnosed With or At Risk for Autism Spectrum Disorder

An Early Start Denver Model-Based Group Intervention for Parents of Infants and Toddlers

Program Eligibility Requirements

Participants must:
- Be parent/caregiver of a 12-47 month old infant or toddler
- The infant or toddler must be:
  a) Diagnosed with ASD OR
  b) The younger sibling of a child diagnosed with ASD
- Be motivated to learn skills for promoting infant/toddlers development
- Be able to participate in all training sessions
- Participate in 6 weeks of intervention provided twice per week (Monday and Thursday evenings 4:30-5:30 or 6pm)
- Be willing to complete research-based assessments

The Center for Autism and Related Disabilities at the University Albany is now offering a group intervention for parents of infants/toddlers diagnosed with or at genetic risk for ASD

An Early Start Denver Model-based group intervention is being offered at no cost as part of a project being conducted through the Center for Autism and Related Disabilities at the University at Albany. This group intervention provides parents with training and tools to promote their very young children’s social and communicative development. The program includes small-group instruction to help parents learn real-world skills that will help them interact with their infants/toddlers in a way that has been shown to elicit social and communicative behaviors. Participants are asked to complete research assessments in order for us to evaluate the effectiveness of this intervention.

For more information
Contact the program coordinator,
Stephanie Fox:
Email: safox@albany.edu
Phone: (518) 442-2574
1535 Western Avenue, Albany, NY
Parent Letter

Dear Parent,

Your developmental pediatrician informed me that you may be interested in CARD’s upcoming parent training series! The training will begin during the month of May and spaces are limited. Please call as soon as possible if you would like to be a part of this training opportunity. See the attached flyer for more information!

The training sessions will take place at the Center for Autism and Related Disabilities during weeknight evenings over the course of six weeks. Each session will last approximately 60 to 90 minutes and cover topics including directing your child’s attention, engaging in social play with your child, and helping to teach very early functional language skills. Your participation in this program is voluntary. **To compensate you for your participation in this study, you will be offered educational materials throughout the program and $35 at the completion of the six weeks.** If you have any questions regarding this study, please feel free to contact me at: safox@albany.edu or 518-442-9078.

Thank you so much for your interest.

Sincerely,

Stephanie Fox, M.A.

Doctoral Candidate, Department of Psychology
University at Albany, SUNY
Social Sciences 399
1400 Washington Avenue, Albany, NY 12203
Phone: 518-442-9078
E-mail: safox@albany.edu
Dear Parent,

We are writing to inform you about an early intervention opportunity available to parents who have an infant or toddler, aged 12 to 36 months, with a diagnosis of autism spectrum disorder to participate in a brief parent training program regarding various aspects of parenting a very young child with autism. Families with an older child with a diagnosis of autism spectrum disorder who have a younger child younger than 36 months are also eligible. This study is being conducted through the University at Albany, SUNY by Stephanie Fox, who is a current doctoral student.

The training sessions will take place at the Center for Autism and Related Disabilities during week night evenings over the course of six weeks. Each session will last approximately 60 to 90 minutes and cover topics including directing your child’s attention, engaging in social routines with your child, and helping to teach very early functional language skills. Your participation in this program is voluntary. **To compensate you for your participation in this study, you will be offered educational materials throughout the program and $35 at the completion of the six weeks.** If you have any questions regarding this study, please feel free to contact me at: safox@albany.edu or 518-442-9078.

Thank you so much for your interest.

Sincerely,

Stephanie Fox, M.A.

Doctoral Candidate, Department of Psychology
University at Albany, SUNY
Social Sciences 399
1400 Washington Avenue, Albany, NY 12203
Phone: 518-442-9078
E-mail: safox@albany.edu
Parent Informed Consent Form

Project Title: An Early Start Denver Model-Based Group Intervention for Parents

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My name is Stephanie Fox, and I am from the Center for Autism and Related Disabilities (CARD) at the University at Albany. You are invited to participate in my research project.

Purpose: Infants and toddlers diagnosed with or at genetic risk for autism spectrum disorder often experience social and communication difficulties. Research has shown that providing parents with education about how to elicit social behaviors and language from their very young children may help to promote the development of these skills. In this research project, I am trying to learn more about how providing parents with group-based education may help their very young children with or at genetic risk for autism spectrum disorder. As part of this study, I am also interested in learning how to parent education may help to reduce parenting stress. You are being asked to take part in this research project because you are the parent/legally authorized representative (LAR) of an infant or toddler diagnosed with or at genetic risk for autism spectrum disorder.
autism spectrum disorder and are interested in learning how to promote your child’s social and communicative development.

Program Information: This study will take place at the Center for Autism and Related Disabilities (CARD). Initially, you will be asked to complete some questionnaires about your child’s social functioning and language. The questionnaires will take approximately 20 minutes to complete. You will also be asked to complete some questionnaires regarding your levels of parenting stress and knowledge of autism spectrum disorder. Next, you and your infant or toddler will be asked to interact with one another around age-appropriate toys. This interaction will be videotaped solely for the purposes of the current project. Your infant or toddler will also be asked to participate in an evaluation of autism symptoms. This evaluation is purely for the purposes of this project and will not yield any diagnostic information. Following the completion of the questionnaires, you will be randomly placed in one of two groups, the Immediate Parent Training Group or the Delayed Parent Training Group. The parent groups will take place on Monday and Thursday evenings from 4:30-5:30 or 6:00pm (60 to 90 minutes each) over the course of 6 weeks. The group you are placed in is determined by chance, like flipping a coin for heads or tails. If you are assigned to the Delayed Parent Training Group, you will start the training in approximately 6 weeks. If you are placed in the Immediate Parent Training Group, you will be asked to begin the intervention shortly (to attend the next scheduled session). The parent/caregiver training consists of 12 sessions that will teach you about promoting your infant or toddler’s social and communicative development. You will be asked to complete questionnaires one additional time over the course of the program (about 25 minutes to complete) to evaluate the effectiveness of the parent training program.

Risks & Benefits: We hope this project will help us learn more about how to educate parents to teach their very young children with or at genetic risk for autism spectrum disorder to engage socially and communicate with others. However, we cannot guarantee that you personally will receive any benefits from this program. This project involves only minimal risk to those who join the study. No more risk is involved in this study than what you might encounter in a group setting. You may feel uneasy at first when starting training classes. To help to alleviate this, study staff will make efforts to make every parent/caregiver feel comfortable and accepted. You might become slightly distressed by some of the questions that we ask in the questionnaire portion of the program. If there is a question that makes you feel uncomfortable, you do not have to provide an answer. If you are placed in the Delayed Parent Training Group, please be advised that you will have to wait a short period of time before training classes begin. In addition to the skills you are likely to acquire by participating in this program, you will also receive a $35 Target gift card following completion of the program’s post assessments.

Confidentiality: Any information that is obtained in connection with this project and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. We will not identify you by name on any of the study data or to anyone outside of the project personnel without your prior written permission. We will use a code instead of a name to track of the information you have given us. We will keep confidential information in locked file cabinets for up to 7 years following the completion of the program. After this point, all data will be destroyed. Although the project personnel will do their best to maintain your privacy and confidentiality, we cannot promise that the other participants will do the same.
Participation & Withdrawal: Your participation is voluntary. If you decide to participate, you are free to withdraw your consent and discontinue participation at any time without penalty. If you have any questions about the program, please feel free to contact the principal investigator, Stephanie Fox, at (518) 442-5412 or safox@albany.edu, or the faculty advisor, Kristin Christodulu, at (518) 442-4845 or kvchristodulu@albany.edu.

Your Rights as a Participant:
If you have questions concerning your rights as a research participant or if you wish to report any concerns about the study, please contact the University at Albany’s Office of Regulatory Research Compliance at its toll-free phone number 1-866-857-5459 or via email at hsconcerns@albany.edu.

Consent Agreement & Signature
Your signature indicates that you have read and understand the information provided above, that you willingly agree to participate, that you may withdraw your consent at any time and discontinue participation without penalty, and that you will receive a copy of this form.

________________________________________
Name of Participating Parent/Caregiver (PRINTED)

________________________________________
Signature of Participating Parent/Caregiver          Date
Parent Informed Permission Consent Form

Project Title: An Early Start Denver Model-Based Group Intervention for Parents

Principle Investigator:
Stephanie Fox, M.A.
Department of Psychology
1535 Western Avenue
Albany, NY 12203
Phone: 518-442-2574
safox@albany.edu

Faculty Advisor:
Kristin Christodulu, Ph.D.
Department of Psychology
1535 Western Avenue
Albany, NY 12203
Phone: 518-442-4845
kvchristodulu@albany.edu

My name is Stephanie Fox, and I am from the Center for Autism and Related Disabilities (CARD) at the University at Albany. Your infant or toddler is invited to participate in my dissertation research project.

Purpose: Infants and toddlers diagnosed with or at risk for autism spectrum disorder often experience social and communicative difficulties. Research has shown that providing parents with education about how to elicit social behaviors and language from their very young children may help to promote the development of these skills. In this research project, I am trying to learn more about how providing parents with group-based education may help their very young children with or at risk for autism spectrum disorder. As part of this study, I am also interested in learning how parent education may help to reduce parenting stress. Your infant or toddler is
being asked to take part in this research study because he/she is diagnosed with or at genetic risk for autism spectrum disorder.

**Program Information:** This study will take place at the Center for Autism and Related Disabilities (CARD). Initially, you will be asked to complete some questionnaires about your child’s social functioning and language. It will take about 20 minutes to complete these measures. You will also be asked to complete two questionnaires regarding your levels of parenting stress and knowledge of autism spectrum disorder. Next, you and your infant or toddler will be asked to interact with one another around age-appropriate toys. This interaction will be videotaped solely for the purposes of this project. Your infant or toddler will also be asked to participate in an evaluation of autism symptoms. *This evaluation is purely for the purposes of this project and will not yield any diagnostic information.* Following completion of the assessments, you will be randomly placed in one of two groups, the *Immediate Parent Training Group* or the *Delayed Parent Training Group*. The parent groups will take place on Monday and Thursday evenings from 4:30-5:30 or 6:00pm (60 to 90 minutes each) over the course of 6 weeks. The group you are placed in is determined by chance, like flipping a coin for heads or tails. If you are assigned to the *Delayed Parent Training Group*, you will start the training in approximately 6 weeks. If you are placed in the *Immediate Parent Training Group*, you will be asked to begin the intervention shortly (to attend the next scheduled session). The parent/caregiver training consists of 12 sessions that will teach you about promoting your infant or toddler’s social and communicative development. You will be asked to complete questionnaires one additional time following completion of the program (about 25 minutes to complete) to evaluate the effectiveness of the parent training program.

**Risks & Benefits:** We hope this study will help us learn more about how to educate parents to teach their very young children with or at risk for autism spectrum disorder to engage socially and communicate with others. However, we cannot guarantee that you personally will receive any benefits from this project. This project involves only minimal risk to those who join. No more risk is involved in this study than what your infant or toddler encounters when playing with you at home. Your infant or toddler may become upset or uneasy at first when engaging with you in some activities. To alleviate this, study staff will make efforts to help every infant and toddler warm up to the environment before beginning the interaction portion of the program. If you are placed in the *Delayed Parent Training Group*, please be advised that you will have to wait a short period of time before training classes begin, thus delaying the benefits received by your infant or toddler.

**Confidentiality:** Any information that is obtained in connection with this study and that can be identified with your infant or toddler will remain confidential and will be disclosed only with your permission or as required by law. We will not identify your infant or toddler by name on any of the study data or to anyone outside of the project personnel without your prior written permission. We will use a code instead of a name to track of the information you have given us. We will keep the files containing confidential information in locked file cabinets for up to 7 years following the completion of the project. After this point, all data will be destroyed. Although the project staff will do their best to maintain your privacy and confidentiality, we cannot promise that the other participants will do the same.
**Video Recordings**: As part of the project, I will be videotaping you and your infant or toddler during play. Any video that is recorded will only be used for research/training purposes at CARD or in professional settings, and your infant/toddler's identity will not be revealed. Video recordings will be stored on a secure server for up to 7 years and will be deleted after this point.

**Participation & Withdrawal**: Your participation is voluntary. If you permit your infant or toddler to participate, you are free to withdraw your consent and discontinue participation at any time without penalty. If you have any questions about the study, please feel free to contact the principal investigator, Stephanie Fox, at (518) 442-2574 or safox@albany.edu, or the faculty advisor, Kristin Christodulu, at (518) 442-4845 or kvchristodulu@albany.edu.

**Your Child's Rights as a Participant**:

*If you have questions concerning your infant or toddler's participation in this project or if you wish to report any concerns about the study, please contact the University at Albany's Office of Regulatory Research Compliance at its toll-free phone number 1-866-857-5459 or via email at hsconcerns@albany.edu.*

---

**Consent Agreement & Signature**

Your signature indicates that you have read and understand the information provided above, that you willingly agree for your infant or toddler to participate, that you may withdraw your consent at any time and discontinue participation without penalty, and that you will receive a copy of this form.

________________________________________

*Name of Parent or LAR (PRINTED)*

________________________________________

*Signature of Parent or LAR*
Appendix B

Demographic Information Form

Table of Participant Demographic Information

Baseline Scores By Case

Mean Baseline Scores By Group
Demographic Information Form

ID#: __________
Date: __________

CENTER FOR AUTISM AND RELATED DISABILITIES
UNIVERSITY AT ALBANY State University of New York

Early Start Denver Model Parent Training Program

DEMOGRAPHIC FORM

The following information will allow us to better help you. Please answer all items. ALL INFORMATION PROVIDED WILL REMAIN IN THE STRICTEST PROFESSIONAL CONFIDENCE.

CONTACT INFORMATION

CAREGIVER 1 LAST NAME________________________ FIRST NAME________________________

CAREGIVER 2 LAST NAME________________________ FIRST NAME________________________

Home Address_________________________________________ City_________ Zip_________

Home Telephone( )____________________ Work/Cell Telephone ( )____________________

CHILD LAST NAME________________________, CHILD FIRST NAME:________________________

CHILD DEMOGRAPHICS

1. Child Sex: □ Male □ Female

2. Child Age: _____ DOB: _____/_____/_____

3. Child Racial Background:
   □ Caucasian    □ Latino/Hispanic
   □ African American  □ Asian
   □ Native American  □ Middle Eastern
   □ Other (specify)________________________

4. Is your child currently in preschool/daycare? □ Yes □ No
   If so, where and how often?

5. Does your child currently receive early intervention? □ Yes □ No
   Specify type/how often/organization:

6. If your child has an autism diagnosis, where was he/she evaluated?

CAREGIVER/FAMILY DEMOGRAPHICS

7. Caregiver Occupation: Please write in the kind of work you most usually do. Please use a “job title” indicating what you do (not merely where you work).

8. Number of hours per week employed:________________________

9. Occupation of Spouse/Partner (even if separated/divorced):________________________

Please turn page over
ID#: __________
Date: __________

11. Caregiver Current Marital Status:
   - Unmarried
   - Separated
   - Married
   - Widowed
   - Divorced
   - Living with common law spouse

12. Education: What were the highest levels in school or college completed? Or degrees obtained?
    - Yourself: ______________________
    - Spouse/Partner: ______________________

13. Children: Please write in the name, sex, and birth date of each of your children. If adopted, put age at time of adoption.
    
    | Name     | Sex | Birth date |
    |----------|-----|------------|
    | _________|     |            |
    | _________|     |            |
    | _________|     |            |

14. History of Developmental Disabilities or Delays: Please list any relatives of your child who have been diagnosed with a developmental disability (such as autism) or a developmental delay.
    
    | Relation | Diagnosis |
    |----------|-----------|
    | _________|           |
    | _________|           |
    | _________|           |

16. Who referred you to this program?
   - Self
   - Friend
   - Flyer
   - Website
   - Professional:
     - Name: ______________________
     - Phone: ( ) ______________________

17. Is there any additional information we should have in order to help your family?
    __________________________________________
    __________________________________________
Table 1

Participant Demographics

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<th>Characteristics</th>
<th>n</th>
<th>%</th>
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</thead>
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<td>100.0</td>
</tr>
<tr>
<td>Total Children</td>
<td>10</td>
<td>100.0</td>
</tr>
<tr>
<td>Parent Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mothers</td>
<td>9</td>
<td>90.0</td>
</tr>
<tr>
<td>Fathers</td>
<td>1</td>
<td>10.0</td>
</tr>
<tr>
<td>Child Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>7</td>
<td>70.0</td>
</tr>
<tr>
<td>Female</td>
<td>3</td>
<td>30.0</td>
</tr>
<tr>
<td>Child Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-25 months</td>
<td>2</td>
<td>20.0</td>
</tr>
<tr>
<td>26-30 months</td>
<td>1</td>
<td>10.0</td>
</tr>
<tr>
<td>31-35 months</td>
<td>4</td>
<td>40.0</td>
</tr>
<tr>
<td>36-40 months</td>
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<td>10.0</td>
</tr>
<tr>
<td>41-45 months</td>
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<td>20.0</td>
</tr>
<tr>
<td>Ethnicity</td>
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<td></td>
</tr>
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<td>African-American</td>
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<tr>
<td>Caucasian</td>
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<td>80.0</td>
</tr>
<tr>
<td>Parent Education Level</td>
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<td></td>
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<td>High school degree</td>
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</tr>
<tr>
<td>Some college</td>
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<td>30.0</td>
</tr>
<tr>
<td>College degree</td>
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</tr>
<tr>
<td>Graduate degree</td>
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<td>20.0</td>
</tr>
<tr>
<td>Enrolled in Early Intervention</td>
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<td>70.0</td>
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ADOS-2 Symptom Range

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<tr>
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<td>Minimal-to-no evidence</td>
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<td>10.0</td>
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<tr>
<td>Mild</td>
<td>2</td>
<td>20.0</td>
</tr>
<tr>
<td>Moderate</td>
<td>4</td>
<td>40.0</td>
</tr>
<tr>
<td>Severe</td>
<td>3</td>
<td>30.0</td>
</tr>
</tbody>
</table>

Note: ADOS-2 = Autism Diagnostic Observation Schedule, Second Edition
Table 2

Demographic Characteristics of Participants

<table>
<thead>
<tr>
<th>Immediate Treatment Group</th>
<th>Parent Gender</th>
<th>Child Gender</th>
<th>Child Age (Mos)</th>
<th>Ethnicity</th>
<th>Early Intervention</th>
<th>4DOS-2 Baseline Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent 1</td>
<td>Female</td>
<td>Male</td>
<td>31.7</td>
<td>Caucasian</td>
<td>Yes</td>
<td>11; Mild</td>
</tr>
<tr>
<td>Parent 2</td>
<td>Female</td>
<td>Male</td>
<td>34.9</td>
<td>Caucasian</td>
<td>Yes</td>
<td>27; Severe</td>
</tr>
<tr>
<td>Parent 3</td>
<td>Female</td>
<td>Female</td>
<td>34.6</td>
<td>Caucasian</td>
<td>No</td>
<td>18; Moderate</td>
</tr>
<tr>
<td>Parent 4</td>
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<td>Male</td>
<td>36.2</td>
<td>Caucasian</td>
<td>Yes</td>
<td>17; Moderate</td>
</tr>
<tr>
<td>Parent 5</td>
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<td>Male</td>
<td>42.2</td>
<td>African American</td>
<td>No</td>
<td>21; Moderate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Delayed Treatment Control Group</th>
<th>Parent 6</th>
<th>Parent 7</th>
<th>Parent 8</th>
<th>Parent 9</th>
<th>Parent 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent Gender</td>
<td>Female</td>
<td>Female</td>
<td>Female</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>Child Gender</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Child Age (Mos)</td>
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<td>31.2</td>
<td>25.2</td>
<td>42.9</td>
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<tr>
<td>Ethnicity</td>
<td>Caucasian</td>
<td>Caucasian</td>
<td>African American</td>
<td>Caucasian</td>
<td>Caucasian</td>
</tr>
<tr>
<td>Early Intervention</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>4DOS-2 Baseline Total Score</td>
<td>23; Severe</td>
<td>0; No concerns</td>
<td>15; Moderate</td>
<td>15; Moderate</td>
<td>8; Mild</td>
</tr>
</tbody>
</table>

*="At genetic risk"

Note: 4DOS-2 = Autism Diagnostic Observation Schedule, Second Edition
Table 3

**Baseline Scores By Case**

<table>
<thead>
<tr>
<th>Immediate Treatment Group</th>
<th>Knowledge</th>
<th>PSI Total Score</th>
<th>PSoC Total Score</th>
<th>CDI Words Expressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent 1</td>
<td>70%</td>
<td>151</td>
<td>48</td>
<td>155</td>
</tr>
<tr>
<td>Parent 2</td>
<td>60%</td>
<td>107</td>
<td>72</td>
<td>0</td>
</tr>
<tr>
<td>Parent 3</td>
<td>50%</td>
<td>99</td>
<td>51</td>
<td>11</td>
</tr>
<tr>
<td>Parent 4</td>
<td>70%</td>
<td>91</td>
<td>63</td>
<td>387</td>
</tr>
<tr>
<td>Parent 5</td>
<td>60%</td>
<td>62</td>
<td>81</td>
<td>52</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Delayed Treatment Control Group</th>
<th>Knowledge</th>
<th>PSI Total Score</th>
<th>PSoC Total Score</th>
<th>CDI Words Expressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent 6</td>
<td>70%</td>
<td>52</td>
<td>85</td>
<td>12</td>
</tr>
<tr>
<td>Parent 7*</td>
<td>80%</td>
<td>64</td>
<td>85</td>
<td>140</td>
</tr>
<tr>
<td>Parent 8</td>
<td>70%</td>
<td>62</td>
<td>60</td>
<td>55</td>
</tr>
<tr>
<td>Parent 9</td>
<td>50%</td>
<td>95</td>
<td>53</td>
<td>2</td>
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<tr>
<td>Parent 10</td>
<td>60%</td>
<td>114</td>
<td>45</td>
<td>387</td>
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</tbody>
</table>

*"At genetic risk"

Note: PSI = Parenting Stress Index, Fourth Edition, Short Form
PSoC = Parenting Sense of Competence Scale
CDI = MacArthur-Bates Communicative Development Inventory
Table 4

Mean Baseline Abilities by Group (SD)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Group</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Immediate</td>
</tr>
<tr>
<td>Parent Knowledge Questionnaire</td>
<td>.62 (.08)</td>
</tr>
<tr>
<td>PSI Total Score</td>
<td>102.0 (32.2)</td>
</tr>
<tr>
<td>PSoc Total Score</td>
<td>63 (13.9)</td>
</tr>
<tr>
<td>CDI Words Expressed</td>
<td>121.0 (160.8)</td>
</tr>
</tbody>
</table>

Note: PSI = Parenting Stress Index, Fourth Edition, Short Form
PSoc = Parenting Sense of Competence Scale
CDI = MacArthur-Bates Communicative Development Inventory
Appendix C

MacArthur-Bates Communicative Development Inventory – Words and Sentences

Parenting Stress Index, Fourth Edition, Short Form

Parenting Sense of Competence Scale

Parent Knowledge Questionnaire

Coding Manual

Sample Behavioral Observation Coding Sheet

Parent Satisfaction Survey
A. VOCABULARY CHECKLIST

Children understand many more words than they say. We are particularly interested in the words your child SAYS. Please go through the list and mark the words you have heard your child say. If your child uses a different pronunciation of a word (for example, “raffe” instead of “giraffe” or “sketti” for “spaghetti”), mark the word anyway. Remember that this is a "catalogue" of all the words that are used by many different children. Don't worry if your child knows only a few of these right now.

### 1. SOUND EFFECTS AND ANIMAL SOUNDS (12)

<table>
<thead>
<tr>
<th>Sound Effect</th>
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</thead>
<tbody>
<tr>
<td>baa baa</td>
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<tr>
<td>shoe shoe</td>
</tr>
<tr>
<td>cockadoodledoo</td>
</tr>
<tr>
<td>grr</td>
</tr>
<tr>
<td>meow</td>
</tr>
<tr>
<td>moo</td>
</tr>
<tr>
<td>squawk, squeak</td>
</tr>
<tr>
<td>uff 0ff</td>
</tr>
<tr>
<td>vroom</td>
</tr>
<tr>
<td>woof woof</td>
</tr>
<tr>
<td>yum yum</td>
</tr>
</tbody>
</table>

### 2. ANIMALS (Real or Toy) (43)

<table>
<thead>
<tr>
<th>Animal</th>
</tr>
</thead>
<tbody>
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<td>alligator</td>
</tr>
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<td>ant</td>
</tr>
<tr>
<td>bear</td>
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<td>bird</td>
</tr>
<tr>
<td>bug</td>
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<td>donkey</td>
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<td>duck</td>
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<td>giraffe</td>
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<td>horse</td>
</tr>
<tr>
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7. BODY PARTS (27)

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<tbody>
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<td>arm</td>
<td>finger</td>
<td>ovewboo boo</td>
</tr>
<tr>
<td>belly button</td>
<td>hair</td>
<td>penis *</td>
</tr>
<tr>
<td>buttocks/bottom *</td>
<td>hand</td>
<td>shoulder</td>
</tr>
<tr>
<td>cheek</td>
<td>head</td>
<td>tooth</td>
</tr>
<tr>
<td>chin</td>
<td>knee</td>
<td>toe</td>
</tr>
<tr>
<td>ear</td>
<td>leg</td>
<td>tongue</td>
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<td>eye</td>
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* or word used in your family

8. SMALL HOUSEHOLD ITEMS (50)

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<td>purse</td>
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<tr>
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<td>jar</td>
<td>radio</td>
</tr>
<tr>
<td>box</td>
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<td>knife</td>
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<td>tape</td>
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<td>bucket</td>
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<td>telephone</td>
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<tr>
<td>camera</td>
<td>money</td>
<td>tissue/skinex</td>
</tr>
<tr>
<td>can</td>
<td>mop</td>
<td>toothbrush</td>
</tr>
<tr>
<td>clock</td>
<td>nail</td>
<td>towel</td>
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<tr>
<td>comb</td>
<td>napkin</td>
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<tr>
<td>cup</td>
<td>paper</td>
<td>tray</td>
</tr>
<tr>
<td>dish</td>
<td>penny</td>
<td>truex</td>
</tr>
<tr>
<td>fork</td>
<td>picture</td>
<td>walker</td>
</tr>
<tr>
<td>garbage</td>
<td>pillow</td>
<td>watch</td>
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<tr>
<td>glass</td>
<td>plant</td>
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9. FURNITURE AND ROOMS (33)

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<th>drawer</th>
<th>rocking chair</th>
</tr>
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<tbody>
<tr>
<td>bathroom</td>
<td>dryer</td>
<td>room</td>
</tr>
<tr>
<td>bathtub</td>
<td>garage</td>
<td>shower</td>
</tr>
<tr>
<td>bed</td>
<td>high chair</td>
<td>sink</td>
</tr>
<tr>
<td>bedroom</td>
<td>kitchen</td>
<td>sofa</td>
</tr>
<tr>
<td>bench</td>
<td>living room</td>
<td>stairs</td>
</tr>
<tr>
<td>chair</td>
<td>oven</td>
<td>stove</td>
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<tr>
<td>closet</td>
<td>play pen</td>
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<tr>
<td>couch</td>
<td>porch</td>
<td>TV</td>
</tr>
<tr>
<td>crib</td>
<td>poatty</td>
<td>washing machine</td>
</tr>
<tr>
<td>door</td>
<td>refrigerator</td>
<td>window</td>
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10. OUTSIDE THINGS (31)

<table>
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<th>star</th>
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<tbody>
<tr>
<td>cloud</td>
<td>rock</td>
<td>stick</td>
</tr>
<tr>
<td>flag</td>
<td>roof</td>
<td>stone</td>
</tr>
<tr>
<td>flower</td>
<td>sandbox</td>
<td>street</td>
</tr>
<tr>
<td>garden</td>
<td>shovel</td>
<td>sun</td>
</tr>
<tr>
<td>grass</td>
<td>sidewalk</td>
<td>swing</td>
</tr>
<tr>
<td>hose</td>
<td>sky</td>
<td>tree</td>
</tr>
<tr>
<td>ladder</td>
<td>slide</td>
<td>water</td>
</tr>
<tr>
<td>lawn mower</td>
<td>snow</td>
<td>wind</td>
</tr>
<tr>
<td>moon</td>
<td>snowman</td>
<td></td>
</tr>
</tbody>
</table>
### 11. PLACES TO GO (22)

<p>| | | | |</p>
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<thead>
<tr>
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<tbody>
<tr>
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<td>church</td>
<td>circus</td>
</tr>
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<td></td>
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</tr>
<tr>
<td>county</td>
<td>downtown</td>
<td>farm</td>
<td>gas station</td>
</tr>
</tbody>
</table>

* or word used in your family

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>home</td>
<td>house</td>
<td>movie</td>
<td>outside</td>
</tr>
<tr>
<td></td>
<td>park</td>
<td>party</td>
<td>picnic</td>
</tr>
</tbody>
</table>

|        |        |        |
|        | school |        |        |
|        | store  | woods  | work   |
|        | yard   | zoo    |        |

### 12. PEOPLE (29)

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<tr>
<td>babysitter's name</td>
<td>boy</td>
<td>brother</td>
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<td></td>
<td>child</td>
<td>clown</td>
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<td></td>
<td>cowboy</td>
<td>daddy *</td>
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</tbody>
</table>

* or word used in your family

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<tr>
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</thead>
<tbody>
<tr>
<td>doctor</td>
<td>fireman</td>
<td>friend</td>
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<tr>
<td></td>
<td>girl</td>
<td>grandma *</td>
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<td></td>
<td>lady</td>
<td>mailman</td>
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<td></td>
<td>man</td>
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<thead>
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</thead>
<tbody>
<tr>
<td>nurse</td>
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</tr>
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<td>people</td>
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<td>person</td>
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<td>pet's name</td>
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<tr>
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### 13. GAMES AND Routines (25)

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<td></td>
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<td>call (on phone)</td>
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<tr>
<td></td>
<td></td>
<td>dinner</td>
</tr>
<tr>
<td></td>
<td></td>
<td>give me five</td>
</tr>
<tr>
<td></td>
<td></td>
<td>go gotta you!</td>
</tr>
<tr>
<td></td>
<td></td>
<td>go potty</td>
</tr>
<tr>
<td></td>
<td></td>
<td>hi</td>
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* or word used in your family

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<td>peekaboo</td>
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<td>shh/shush/hush</td>
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<td>so big!</td>
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<tr>
<td></td>
<td>thank you</td>
</tr>
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<td>this little piggy</td>
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### 14. ACTION WORDS (163)

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86
### 15. DESCRIPTIVE WORDS (63)

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<th>adjective</th>
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<td>alike</td>
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<td>asleep</td>
<td>gentle</td>
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<td>quiet</td>
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<td>red</td>
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<td>better</td>
<td>happy</td>
<td>better</td>
<td>sad</td>
</tr>
<tr>
<td>big</td>
<td>hard</td>
<td>big</td>
<td>scared</td>
</tr>
<tr>
<td>black</td>
<td>heavy</td>
<td>black</td>
<td>sick</td>
</tr>
<tr>
<td>blue</td>
<td>high</td>
<td>blue</td>
<td>slow</td>
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<td>cold</td>
<td>tiny</td>
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<tr>
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<td>mad</td>
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</tr>
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<td>naughty</td>
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<td>windy</td>
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<td>new</td>
<td>empty</td>
<td>yellow</td>
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<td>nice</td>
<td>fast</td>
<td>yucky</td>
</tr>
<tr>
<td>fine</td>
<td>noisy</td>
<td>fine</td>
<td></td>
</tr>
<tr>
<td>first</td>
<td>old</td>
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</table>

### 16. WORDS ABOUT TIME (12)

<table>
<thead>
<tr>
<th>adjective</th>
<th>Meaning</th>
<th>adjective</th>
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<tr>
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<td>morning</td>
<td>after</td>
<td>today</td>
</tr>
<tr>
<td>before</td>
<td>night</td>
<td>before</td>
<td>tomorrow</td>
</tr>
<tr>
<td>day</td>
<td>now</td>
<td>day</td>
<td>tonight</td>
</tr>
<tr>
<td>later</td>
<td>time</td>
<td>later</td>
<td>yesterday</td>
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### 17. PRONOUNS (25)

<table>
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<th>Meaning</th>
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<tbody>
<tr>
<td>he</td>
<td>me</td>
<td>their</td>
<td>we</td>
</tr>
<tr>
<td>her</td>
<td>mine</td>
<td>them</td>
<td>you</td>
</tr>
<tr>
<td>hers</td>
<td>my</td>
<td>these</td>
<td>your</td>
</tr>
<tr>
<td>him</td>
<td>myself</td>
<td>they</td>
<td>yourself</td>
</tr>
<tr>
<td>his</td>
<td>our</td>
<td>this</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>she</td>
<td>those</td>
<td></td>
</tr>
<tr>
<td>it</td>
<td>that</td>
<td>us</td>
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### 18. QUESTION WORDS (7)

<table>
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<th>Meaning</th>
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<td>which</td>
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</tr>
<tr>
<td>what</td>
<td>where</td>
<td>who</td>
<td></td>
</tr>
</tbody>
</table>

### 19. PREPOSITIONS AND LOCATIONS (26)

<table>
<thead>
<tr>
<th>adjective</th>
<th>Meaning</th>
<th>adjective</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>about</td>
<td>down</td>
<td>on top of</td>
<td></td>
</tr>
<tr>
<td>above</td>
<td>for</td>
<td>out</td>
<td></td>
</tr>
<tr>
<td>around</td>
<td>here</td>
<td>over</td>
<td></td>
</tr>
<tr>
<td>at</td>
<td>inside</td>
<td>there</td>
<td></td>
</tr>
<tr>
<td>away</td>
<td>into</td>
<td>to</td>
<td></td>
</tr>
<tr>
<td>back</td>
<td>next to</td>
<td>under</td>
<td></td>
</tr>
<tr>
<td>behind</td>
<td>of</td>
<td>up</td>
<td></td>
</tr>
<tr>
<td>beside</td>
<td>off</td>
<td>with</td>
<td></td>
</tr>
<tr>
<td>by</td>
<td>on</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 20. QUANTIFIERS AND ARTICLES (17)

<table>
<thead>
<tr>
<th>adjective</th>
<th>Meaning</th>
<th>adjective</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>each</td>
<td>other</td>
<td></td>
</tr>
<tr>
<td>all</td>
<td>every</td>
<td>same</td>
<td></td>
</tr>
<tr>
<td>a lot</td>
<td>more</td>
<td>some</td>
<td></td>
</tr>
<tr>
<td>an</td>
<td>much</td>
<td>the</td>
<td></td>
</tr>
<tr>
<td>another</td>
<td>not</td>
<td>too</td>
<td></td>
</tr>
<tr>
<td>any</td>
<td>none</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 21. HELPING VERBS (21)

| am     | does        | need
|--------|-------------|-----
| are    | don't       | try
| be     | gonna/go to | wanna/want
| can    | gotta/got to| was
| could  | hafta/have to| were
| did/did ya | is | will
| do     | lemme/let me | would

## 22. CONNECTING WORDS (6)

<table>
<thead>
<tr>
<th>and</th>
<th>but</th>
<th>so</th>
</tr>
</thead>
<tbody>
<tr>
<td>because</td>
<td>if</td>
<td>then</td>
</tr>
</tbody>
</table>

## B. HOW CHILDREN USE WORDS

<table>
<thead>
<tr>
<th></th>
<th>Not Yet</th>
<th>Sometimes</th>
<th>Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Does your child ever talk about past events or people who are not present? For example, a child who saw a parade last week might later say parade, clown, or band.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Does your child ever talk about something that's going to happen in the future, for example, saying &quot;choo choo&quot; or &quot;airplane&quot; before you leave the house for a trip, or saying &quot;swinging&quot; when you are going to the park?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Does your child talk about objects that are not present such as asking about a missing or absent toy, referring to a pet out of view, or asking about someone not present?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Does your child understand if you ask for something that is not in the room, for example, by going to the bedroom to get a teddy bear when you say &quot;where's the bear?&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Does your child ever pick up or point to an object and name an absent person to whom the object belongs? For example, a child might point to mommy's shoe and say &quot;mommy&quot;.</td>
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<td></td>
</tr>
</tbody>
</table>

## PART II. SENTENCES AND GRAMMAR

### A. WORD ENDINGS/PART 1

<table>
<thead>
<tr>
<th></th>
<th>Not Yet</th>
<th>Sometimes</th>
<th>Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To talk about more than one thing, we add an &quot;s&quot; to many words. Examples include cars (for more than one car), shoes, dogs, and keys. Has your child begun to do this?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. To talk about ownership, we add an &quot;s&quot;, for example, Daddy's key, kitty's dish, and baby's bottle. Has your child begun to do this?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. To talk about activities, we sometimes add &quot;ing&quot; to verbs. Examples include looking, running, and crying. Has your child begun to do this?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. To talk about things that happened in the past, we often add &quot;ed&quot; to the verb. Examples include kissed, opened, and pushed. Has your child begun to do this?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### B. WORD FORMS

Following are some other words children learn. Please mark any of these words that your child uses.

<table>
<thead>
<tr>
<th>NOUNS</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>children</td>
<td>men</td>
<td>teeth</td>
</tr>
<tr>
<td>foot</td>
<td>mice</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VERBS</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ate</td>
<td>fell</td>
<td>made</td>
<td></td>
</tr>
<tr>
<td>blow</td>
<td>flew</td>
<td>ran</td>
<td></td>
</tr>
<tr>
<td>bought</td>
<td>got</td>
<td>sat</td>
<td></td>
</tr>
<tr>
<td>broke</td>
<td>had</td>
<td>saw</td>
<td></td>
</tr>
<tr>
<td>came</td>
<td>heard</td>
<td>took</td>
<td></td>
</tr>
<tr>
<td>drank</td>
<td>held</td>
<td>went</td>
<td></td>
</tr>
<tr>
<td>drove</td>
<td>lost</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
C. WORD ENDINGS/PART 2

Young children often place the wrong endings on words. For example, a child might say “Auntie go home.” Mistakes like this are often a sign of progress in language. In the following lists, please mark all the mistakes of this kind you have heard your child say recently.

| NOUNS          |  | NOUNS          |  |
|----------------|  |----------------|  |
| blockses       | ○ | means          |  |
| childrens      | ○ | mens           |  |
| childs         |  | meases         |  |
| feets          |  | mousees        |  |
| feet           |  | shoeess        |  |
| VERBS          |  |                |  |
| ated           |  | comed          |  |
| blewed         |  | doed           |  |
| blowed         |  | dranked        |  |
| brighet        |  | dranked        |  |
| buyed          |  | aeted          |  |
| breaked        |  | fallad         |  |
| brokeed        |  | filled         |  |
| earned         |  | getted         |  |

HAS YOUR CHILD BEGUN TO COMBINE WORDS YET, SUCH AS “ANOTHER CRACKER”, OR “DOGGIE BITE?”

○ Not Yet ○ Sometimes ○ Often

IF YOU ANSWERED NOT YET, PLEASE STOP HERE. IF YOU ANSWERED SOMETIMES OR OFTEN, PLEASE CONTINUE.

D. EXAMPLES: Please list three of the longest sentences you have heard your child say recently.

1. ___________________________________________________________
2. ___________________________________________________________
3. ___________________________________________________________

E. COMPLEXITY

In each of the following pairs, please mark the one that sounds MOST like the way your child talks right now. If your child is saying sentences even longer or more complicated than the two provided, just pick the second one.

1. Two shoe.         Two shoes.       ○ ○
2. Two foot.         Two feet.        ○ ○
3. Daddy car.        Daddy’s car.     ○ ○
4. (Talking about something happening right now) Kitty sleep.  Kitty sleeping. ○ ○
5. (Talking about something happening right now) I make tower.  I making tower.  ○ ○
6. (Talking about something that already happened) I fall down. I fell down. ○ ○
7. More cookies!     More cookies!    ○ ○
8. These my tooth.   These my teeth.  ○ ○
10. (Talking about something that already happened) Doggie kiss me. Doggie kissed me. ○ ○
11. (Talking about something that already happened) Daddy pick me up. Daddy picked me up. ○ ○
12. (Talking about something that already happened) Kitty go away. Kitty went away. ○ ○
14. That my truck.   That’s my truck. ○ ○
### E. COMPLEXITY (Continued)

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Baby is crying.</td>
<td>That coffee hot.</td>
<td>Baby want to eat.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. You fix it?</td>
<td>24. I no do it.</td>
<td>32. Lookit me!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can you fix it?</td>
<td>I can’t do it.</td>
<td>Lookit me dancing!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Read me story, Mommy.</td>
<td>25. I like read stories.</td>
<td>33. Lookit!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Read me a story, Mommy.</td>
<td>I like to read stories.</td>
<td>Lookit what I got!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. No wash dolly.</td>
<td>26. Don’t read book.</td>
<td>34. Where’s my dolly?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t wash dolly.</td>
<td>Don’t want you read that book.</td>
<td>Where’s my dolly name Sam?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Want more juice.</td>
<td>27. Turn on light.</td>
<td>35. We made this.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Want juice in there.</td>
<td>Turn on the light so I can see.</td>
<td>Me and Paul made this.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. There a kitty.</td>
<td>28. I want that.</td>
<td>36. I sing song.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>There’s a kitty.</td>
<td>I want that one you got.</td>
<td>I sing song for you.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wanna go bye-bye.</td>
<td>Want cookies and milk.</td>
<td>Baby crying cuz she’s sad.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where did mommy go?</td>
<td>Cookie for mommy.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### OTHER COMMENTS:

- 90
Parenting Stress Index, Fourth Edition, Short Form, Sample Items

SA = Strongly Agree      A = Agree      NS = Not Sure      D = Disagree      SD = Strongly Disagree

1. I often have the feeling that I cannot handle things very well.  SA   A   NS   D   SD
2. I find myself giving up more of my life to meet my children’s needs than I ever expected.  SA   A   NS   D   SD
3. I feel trapped by my responsibilities as a parent.  SA   A   NS   D   SD
Parenting Sense of Competence Scale

Being A Parent

Name: ____________________________________________  Date: ______________

Listed below are a number of statements. Please respond to each item, indicating your agreement or disagreement with each statement in the following manner.

If you strongly agree, circle the letters SA
If you agree, circle the letter A
If you mildly agree, circle the letters MA
If you mildly disagree, circle the letter MD
If you disagree, circle the letter D
If you strongly disagree, circle the letter SD

1. The problems of taking care of a child are easy to solve once you know how your actions affect your child, an understanding I have acquired.  
SA A MA MD D SD

2. Even though being a parent could be rewarding, I am frustrated now while my child is at his/her present age.  
SA A MA MD D SD

3. I go to bed the same way I wake up in the morning – feeling I have not accomplished a whole lot.  
SA A MA MD D SD

4. I do not know what it is, but sometimes when I’m supposed to be in control, I feel more like the one being manipulated.  
SA A MA MD D SD

5. My parent was better prepared to be a good parent than I am.  
SA A MA MD D SD

6. I would make a fine model for a new parent to follow in order to learn what she would need to know in order to be a good parent.  
SA A MA MD D SD

7. Being a parent is manageable, and any problems are easily solved.  
SA A MA MD D SD

8. A difficult problem in being a parent is not knowing whether you’re doing a good job.  
SA A MA MD D SD

9. Sometimes I feel like I’m not getting anything done.  
SA A MA MD D SD
10. I meet my own personal expectations for expertise in caring for my child.  
11. If anyone can find the answer to what is troubling my child, I am the one.  
12. My talents and interests are in other areas, not in being a parent.  
13. Considering how long I’ve been a parent, I feel thoroughly familiar with this role.  
14. If being a parent of a child were only more interesting, I would be motivated to do a better job as a parent.  
15. I honestly believe I have all the skills necessary to be a good parent to my child.  
16. Being a parent makes me tense and anxious.
Parent Knowledge Questionnaire

Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

_____ 1. Which of the following is NOT a core characteristic of autism spectrum disorders?
1. Repetitive behaviors and interests
2. Social impairments
3. Communication impairments
4. Adaptive behavior deficits

_____ 2. Recent research suggests that autism spectrum disorder can be diagnosed as early as:
1. 12 months
2. 36 months
3. 1 month
4. It cannot be diagnosed until the child is of school age.

_____ 3. What is the first step in facilitating social communication with your child with ASD symptoms?
1. Using gestures
2. Using imitation
3. Capturing attention
4. Engaging in sensory routines

_____ 4. Which of the following is an example of a sensory social routine?
1. Playing with an app on the iPad
2. Playing with dolls
3. Bouncing a ball
4. Peekaboo

_____ 5. Which type of consequence results in an increase in the behavior?
1. Reinforcement
2. Punishment
3. Extinction
4. Imitation

_____ 6. The three-way interaction involving two people and an object or event is known as:
1. Directed attention
2. The triangle of attention
3. Joint requesting
4. Pretend play

_____ 7. Which of the following explains why flexible toy play is so important?
1. Young children use play to build new skills
2. Young children use play to practice skills they have already mastered

94
3. Young children use play to practice social skills
4. All of the above

_____ 8. Which of the following is NOT considered a “red flag” indicating that a young child is at risk for autism spectrum disorder:

1. Lack of sharing interest or joint attention
2. Lack of appropriate eye gaze
3. Pointing, showing, and reaching gestures
4. The presence of repetitive movements or posturing of body, arms, hands, and fingers

_____ 9. According to the ESDM, what is the purpose of engaging in sensory social routines?

1. To find your child’s smile
2. To increase independent toy play
3. To reduce sensory sensitivity
4. To increase arousal

_____ 10. Which of the following is a form of nonverbal communication that is often absent among young children with autism spectrum disorder:

1. Symbolic play
2. Use of simple speech
3. Social gestures, such as pointing, clapping, and showing
4. Turn-taking
Parent Behavior

1. **Imitate/Mirror**: Code each instance of parents joining in play by imitating their child’s actions. If a child makes a sound and the parent immediately mimics the sound, this should be coded here. Imitating can also take place during play through mirroring of child actions, such as rolling, kicking or throwing a ball. Immediate imitation of child gesturing should also be coded here. Imitation should be done for the child’s benefit, therefore, it is required that the parent is in view of their child’s face for behavioral imitation/mirroring.

   1. Example: If the child begins to roll a car back and forth, the parent may take another car or object and roll it back and forth at the same speed.

2. **Capture Attention**: This should be coded if the parent attempts to capture his or her child’s attention. Note that the attempt does not have to be successful. **An attempt to capture attention involves positioning oneself face-to-face.** If a parent moves to sit in front of his or her child, or puts the child on his or her lap facing her, this counts as an attempt to capture attention.

3. **Sensory Social Routine**: Code each individual instance of a parent initiating a sensory social game. Examples may be: peekaboo, patty cake, airplane, Wheels on the Bus. Making silly faces or noises can also count as a sensory social routine, if presented in a manner such that there is a “big event” or a dramatic moment in play. Be attentive to parent pauses that allow for the infant to request more of the routine. These routines are “sensory rich” – they involve sounds and/or physical touch aimed at increasing the child’s engagement in the activity.

4. **Narrate/Label Play**: Code each individual instance of parents adding simple single words or short phrases to describe what the child is doing. ONLY code simple language and short phrases, for example, “It’s a train.” Do not code language that is too complex for the child to understand. Narration and labeling should occur during play, without interrupting or changing the child’s focus. Narration typically occurs when the parent is in front of the child in such a way that the child has a very clear view of the parent’s face. This behavior can also be viewed as “providing the play-by-play” like a sportscaster commenting about the objects and actions being used in play. Providing sound effects for games that the child is playing should also be coded here.

5. **Respond to Child Bid**: Code each instance of a parent responding to his or her child’s bid for attention, closeness, or play. This may be among the most pervasive forms of parent behavior and can therefore be difficult to code! If a child reaches for a toy or object and the parent responds by handing it to him or her, this would be coded here. If a child makes a bid for closeness or comfort and the parent responds by picking him or her up, this would also be coded here. Finally, if a child initiates joint attention, shows an object, or gives an object, and the parent makes a physical or verbal response, it would also be coded here. Any parent behavior that takes place in response to a child initiation should be coded here.

6. **Offer Praise**: Code each instance of praise offered by the parent. Praise can come in many forms. Vocalized praise (i.e. “good job!”) is the most obvious form of praise offered by parents. Clapping that is contingent on child behavior is also a form of praise that should be coded here.
Note that praise need not always be contingent on child behavior. Parents may clap and vocalize (i.e. yay!) while playing with their children, this should be coded here.

Child Behavior

1. **Look at Parent**: Code each instance of child eye contact with parent. It does not matter whether the child initiates the eye contact or whether the “look” is in response to parent initiation. Any instance of child eye contact with parent should be coded here.

2. **Smile at Parent**: Code each instance of the child smiling directly at parent. Note that this code requires eye contact. The child must display upturned corners of his or her mouth to code a smile. IMPORTANT: Because smiles require eye contact, “look at parent” should also be coded when smile is coded.

3. **Vocalization**: Code each instance of the child producing a sound that has pitch. Words should absolutely be coded here, but it is not required that the sound be intelligible. Babbling should also be coded here. If the child produces long babbles without a break, it should be coded as one vocalization. Each word should be coded as a separate vocalization.

4. **Spontaneous Initiation of Joint Attention**: An instance of joint attention should be coded if there is a three-point gaze shift. This code requires a gaze shift that is either parent-object-parent or object-parent-object. Note that this is a highly social behavior and requires eye contact. Note that because joint attention requires eye contact, “look at parent” should also be coded when joint attention is coded.

5. **Show**: Code each instance of the child holding up an object in the air when paired with eye contact and/or vocalization. Note that the eye contact or vocalization is essential for coding a show behavior.

6. **Give**: Code each instance of the child handing an object to his or her parent. This may or may not be paired with eye contact and/or vocalization. Note that giving gestures may occur for social or nonsocial reasons (i.e. requesting) and therefore is a less advanced gesture than showing. For this code, the handing of an object or item is all that is required.

7. **Distal Point**: A distal point should be coded when the child extends an index finger in the air. Though the intention may not be clear, this gesture is used to draw a parent’s attention to an object in the distance. If the child touches the object when pointing, it should not be coded. The distal point does not have to be accompanied by vocalization or eye contact in order to be coded.

8. **Seek Contact/Closeness**: Code each instance of the child moving to touch his or her parent. If the child backs into his parent, it should be coded here. Reaching to be picked up should also be coded here. Any attempts for contact should be coded if they are child-initiated. Note: if the child cries and the parent moves to pick him or her up, it should not be coded as seeking contact/closeness. Child initiation is required for this code.
Sample Behavioral Observation Coding Sheet

Parent Satisfaction Survey

<table>
<thead>
<tr>
<th>Subject ID</th>
<th>Date</th>
<th>Coder Name</th>
<th>Parent Behavior</th>
<th>Time</th>
<th>Time Point</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Imitate/Mirror</td>
<td>0:31</td>
<td>0:00-0:30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Capture Attention</td>
<td>1:00</td>
<td>0:31-1:00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sensory Social Routine</td>
<td>1:30</td>
<td>1:00-1:30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Narrate/Label Play</td>
<td>2:00</td>
<td>1:30-2:00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Respond to Child Bid</td>
<td>2:30</td>
<td>2:00-2:30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Offer Praise</td>
<td>3:00</td>
<td>2:30-3:00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Child Behavior</td>
<td>3:30</td>
<td>3:00-3:30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Look at Parent</td>
<td>4:00</td>
<td>3:30-4:00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Smile at Parent</td>
<td>4:30</td>
<td>4:00-4:30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Vocalization</td>
<td>Total</td>
<td>4:30-5:00</td>
</tr>
</tbody>
</table>

Seek Contact/Closeness
Parent Satisfaction Survey

ESDM Project Feedback

Thank you for participating in the Early Start Denver Model Parent Training Program at CARD. We greatly appreciate any feedback you might have about our program!

Please circle a response on the following questions to provide us with feedback about our program.

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither/neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Overall, I am satisfied with this program.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2. I and/or my child benefited from the program.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3. I would recommend this program to others.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>4. The program helped me to become more effective at helping my child with autism.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>5. I feel my child’s social/communication skills have improved because of this program.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>7. I am more informed about important social/communication targets for my child with autism.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>8. This program taught me something new.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>9. I thought the program was worth the time and effort.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
10. The program staff were knowledgeable and helpful during sessions.

<table>
<thead>
<tr>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
</table>

Other comments?

____________________________________________________________________________________
Appendix D

Session List

Session 2 Outline – Capturing Your Child’s Attention

Session 6 Outline – Help Your Child Learn by Imitating

Sample Visual Support
Session List

ESDM Session List

Session 1: Getting Started – Knowledge is Power!

Session 2: Step into the Spotlight – Capturing Your Child’s Attention

Session 3: Find the Smile! – Having Fun with Sensory Social Routines

Session 4: It Takes Two to Tango – Building Back and Forth Interactions

Session 5: Talking Bodies – The Importance of Nonverbal Communication

Session 6: “Do What I Do!” – Helping Your Child Learn by Imitating

Session 7: Let’s Get Technical – How Children Learn

Session 8: The Joint Attention Triangle – Sharing Interests with Others

Session 9: It’s Playtime!

Session 10: Let’s Pretend!

Session 11: Moving into Speech

Session 12: Putting It All Together
Session 2 Outline – Capturing Your Child’s Attention

Today’s Goal: To teach you how to increase your child’s attention to you, so that your child’s opportunities to learn from you will increase. Learning requires paying attention to other people.

Opening Question: Why is your child’s attention to others so important?

What’s happening in ASD?
1. Young children with ASD do not show a strong interest in watching and interacting with other people.
   1. Interactions with people are complex and unpredictable
   2. Young children with ASD may be less tuned in to others from the start
2. Young children with ASD often find interacting with objects to be somewhat more interesting.

Why is this a problem?
1. Missing out on learning opportunities
2. Attention to others is critical to understanding social interaction
3. More attention = More opportunities to learn

Step 1. Identify what is in the spotlight of your child’s attention.
Step 2. Step onto the “stage”; take your position.
Step 3. Eliminate the competition.
Step 4. Identify your child’s social comfort zone.
Step 5. Join in by following your child’s lead.

Step 1. Identify What Is in the Spotlight of Your Child’s Attention
1. Does your child typically have an interest in toys and objects?
2. Include materials in play that relate to your child’s interests and preferences
3. This will increase motivation to pay attention to you and make interaction more rewarding
4. Motivating and rewarding interactions support active social learning
5. More motivation = Longer interactions
6. Longer interactions = More opportunities to learn

“As a parent, this was the single most motivating part of the ESDM approach….it’s encouraging to work with a child who is looking at you and paying attention!”

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Example: Pablo

Home Activity #1: Find out what your child likes.
Spend time over the next few days really observing your child during the following activities:
1. Toy or object play
2. Social play
3. Meals
4. Caregiving (bathing/changing/dressing/bedtime)
5. Book activities
Here are some ideas for learning what your child is interested in and paying attention to:
1. For each activity above, make a list of the objects, materials, toys, or physical games your child seems to seek out and enjoy (use the form!). If your child does not independently seek out objects or games, set out a few materials or toys and encourage your child to manipulate or play with them. Find what he or she likes!
2. Next, answer these questions:
   1. What objects is my child searching for?
   2. What is he or she watching or grasping?
   3. What makes my child smile or laugh?
   4. What calms my child when he or she is upset?
3. When your child is moving independently, what is it toward or away from? When you tickle, cuddle, squeeze, or spin your child, what is the reaction? What does he or she seem to enjoy?
4. Remember, sometimes children’s favorite objects are rather unusual for their age or are used in a repetitive/limited manner. *Even if your child’s interests are unusual, they are interests and can help facilitate learning!*
5. There are very few young children who do not approach or act on *anything*. Be creative!

Step 2. Step onto the Stage: Take Your Position
1. Social communication occurs through the eyes, face, and body.
2. Sitting down helps focus your child’s attention, because the chair provides support and prevents easy movement
3. Often parents seat their children in their laps to interact. This prevents engagement in face-to-face interaction and limits social learning!
4. Get used to playing *in front* of your child
5. Cuddling is less important than attention during this time.
6. Consider taking advantage of mealtimes!
7. **Better Positioning = More attention**

Home Activity #2: Find positions that put you in the spotlight.
When you are playing with your child over the next few days, start to position yourself in such a way that your child has a very clear view of your face and eyes. Here are some ideas:
1. Positions in which your child is laying down on his back and you are seating while leaning over him are wonderful for social games. *Diaper changing time!
2. Sitting on the floor with your legs out in front of you, with your child on her back on top of your legs or between them is great for tummy tickles!
3. Physical play routines on a big bed or on the couch, whether the child is lying down or sitting, provides excellent face-to-face interaction
4. Seat your child on your lap, facing you.
5. Seat your child on a bean bag chair, high chair, or corner of a living room chair or couch while you sit on the floor in front of him.
6. When seating your child, make sure her back and feet are well-supported, so your child is comfortable. Pick a chair that fits your child well. Avoid dangling feet!
7. Some fidgety youngsters do not want to sit! Standing can also be good for face-to-face. Consider standing at a table where you can play with toys together.
8. Take advantage of mealtimes when your child is in a high chair or booster seat.

**Step 3. Eliminate the Competition**

1. The physical environment can be a powerful pull for your child’s attention
2. Observe your child to determine what is competing for your child’s attention during interactions
3. You may need to control the environment so that you have less competition

**Home Activity #3: Notice Distractors and Manage Them.**

**Tips for Managing Distractors**

1. Put loose toys away on hard to reach shelves or out of sight
2. Turn off the TV unless this is the object used for motivation
3. During social play, change rooms if the environment is busy. A big bed is often a great place for social play.
4. Use bath time as an opportunity for social play

**Step 4. Identify Your Child’s Social Comfort Zone**

1. All people have different reactions to the physical closeness of other people.
2. To attract your child’s attention to your face, it is important to determine your child’s comfort level with physical closeness.

**Home Activity #4: Learn Your Child’s Signals about How Close is Comfortable**

Try an experiment to find your child’s social comfort zone! During face-to-face activities from Step 2, pay attention to how close you are to your child and how she reacts to your closeness.

Most parents play within arm’s length of their child’s face. Most young children with ASD can handle this level of closeness comfortably, though you may need to move back.
1. Move closer to your child. If your child shows marked head turns and looks away from you (gaze aversion), back up and observe how your child responds. This goes against the natural inclination to move closer in comfort.

2. Some children may change between enjoying your closeness in one activity and wanting distance in another. If your child’s mood changes rapidly, consider changing your distance.

**Step 5. Join in by Following Your Child’s Lead**

1. It is very common for parents to interact with their child by creating a new activity and offering it when the child is already attending to something else.

   **Think about it!**

2. This can lead your child to ignore you or even become angry or upset.

3. Instead of trying to direct your child’s attention to something, in this step you will practice following your child’s attentional focus.

4. Following your child’s focus may seem backwards or unnatural, especially if his object of interest seems inappropriate or her play is repetitive. However, many studies have taught us that children learn more easily if parents and others follow their attention and talk about what they are already attending to!

5. Use the objects, toys, or activities your child is focused on to build a social interaction

6. **Where you lead, I will follow.**

---

**Home Activity #5: Use Active Listening, Narrate, Offer Help, Imitate Your Child, & Combine!**

1. **Active Listening:** listening, really listening, to what the other person is saying. When we are active listeners with a young child at play, we position ourselves in front of him and share gaze, watch what he is doing to understand his goals, make admiring comments, narrate his actions, and add sound effects.

2. **Narrate:** Move from active listening to being your child’s narrator. Add simple single words or short phrases to describe what she is doing.
   1. Remember to position yourself in front of your child in such a way that your child has a very clear view of your face.

3. **Offer Help:** Hand your child toys during play after your child indicates an interest, rather than simply placing all toys within your child’s reach. Name the toys as your hand them. Make sure your help is obvious to your child. Being the deliverer of desired objects and helps your child attend to you.
   1. **Mealtime is great for offering help!**

4. **Imitate Your Child:** Mirroring your child can help to increase her attention to you and create interactions. While facing your child, play with an identical toy or object to imitate her actions. Even imitate those repetitive behaviors! Positioning yourself in front of your child and imitating him will almost certainly attract his attention.
   1. **Imitating can help to shift your child’s attention to you as a social partner**

5. **Finally – Combine!** Active listening, narrating, helping, and imitating should typically occur together during play with very young children. Even though you have started by practicing one technique at a time, you have probably found that it feels more natural to use more than one. Practice playing this way during at least one of the activities you discover that your child enjoys!
Session 2: Home Activity Checklist

1. **Figure Out What Your Child Likes.**
   **Checklist: What does my child like to do?**
   
   [ ] I know a number of toys my child likes to play with.
   
   [ ] I know several social games (games without toys, like tickling or roughhousing) that make my child smile.
   
   [ ] I know some outdoor activities my child likes (playing on swings, walking, etc.).
   
   [ ] I know some objects and activities that make my child happier when he or she is in a bad mood.
   
   [ ] I know some songs or sounds that my child likes to listen to.
   
   [ ] I know some activities or toys I can use while I am involved in meals or caregiving that make my child smile or laugh.

2. **Find Positions That Put You in the Spotlight.**
   **Checklist: Am I in the Spotlight during Activities with My Child?**
   
   [ ] When we are interacting, my child can easily see my eyes, face, and movements.
   
   [ ] My child is looking at me sometimes when we engage in activities together.
   
   [ ] I am in front of my child, at his or her level, and face-to-face (not towering).

3. **Notice Distractors and Manage Them.**
   **Checklist: Have I Identified and Minimized Distractors?**
   
   [ ] During play, my child is frequently attending to me and our activity.
   
   [ ] I have noticed what distracts my child and found ways to put away or hide the distractors.
   
   [ ] I have had success moving my child and myself to a different location to avoid distractors.
   
   [ ] During social time, the television and computer are turned off.

4. **Learn Your Child’s Signals about How Close Is Comfortable.**
   **Checklist: Am I in My Child’s Optimal Social Comfort Zone?**
   
   [ ] My child is not actively looking away from me or leaning back.
   
   [ ] My child is looking up at me and my actions sometimes.
   
   [ ] My child seems comfortable – playing with objects, smiling at times.

5. **Follow Your Child’s Lead: Practice Active Listening, Narrating, Helping, and Imitating**
   **Checklist: Am I Following My Child’s Lead?**
   
   [ ] I followed along with my child’s interests for a few minutes – listening, watching, narrating, and imitating his actions or sounds.
Today’s Goal: To encourage you to imitate your child’s sounds, gestures, facial expressions, actions, and words, and to teach your child to imitate yours. Children learn by watching others and doing what they do.

Opening Question: Why is imitation so important?

What’s happening in ASD?

1. Young children with ASD are much less inclined to imitate words, gestures, and actions than other children their age.
2. Though they are very interested in objects, they tend to not imitate what other people do with objects very often.

Why is this a problem?

1. There is so much to be learned through imitating, so children who don’t imitate are missing out on a lot.
2. Decreased motivation to imitate may be responsible for a significant part of the delays most young children with ASD show in all areas of development.
3. Without imitation, kids have to figure out everything anew rather than learning from others the easiest and most effective ways of doing things.

What You Can Do to Teach Imitation to Your Child

Step 1. Imitating sounds

Step 2. Imitating actions on objects

Step 3. Imitating hand gestures and body/facial movements

Step 4. Imitating and expanding on actions

Step 5. Putting imitation games into the joint activity frame.

Step 1. Imitating Sounds

1. Children who have not yet learned to use words to communicate need to build a large repertoire of sounds, to learn how to make a sound intentionally, and to learn how to make specific sounds in order to get something they want.
2. Parents can use imitation to achieve 3 things:
   1. 1) to help their children notice their own vocalizations
   2. 2) to increase the frequency of the sounds they are making
   3. 3) to increase their intentional production of sounds and specific vocalizations
Home Activity #1: Increase Your Child’s Sounds by Echoing Them

Over the next couple of days…
Begin by positioning yourself face-to-face.
Imitate whatever sounds your child makes (except for crying, screams, or whining).
Wait to see if your child makes the sound again.
If he does, you have the opportunity to imitate again, creating an imitation game.
If he doesn’t, you should make the sound again and look at him expectantly.

Imitation games are a critical step on the road to speech development.

Home Activity #2: Sing Songs and Play Rhyming Word and Finger Games

Try singing a song with a key word or phrase in the verse to help your child start to hear the pattern in the song. Emphasize the key word or phrase louder and slower so your child can attend to its meaning. Add gestures and facial expressions. See if your child will join in.
Example: “The wheels on the bus go round and round, round and round, round and round.”
Move your hands together. After singing a couple of times, use your pausing and waiting expectantly right before the key phrase. Wait for your child to make a sound or at the very least some kind of nonverbal cue before finishing the song.

Example: Malik

We encouraged our son to speak by using animal noises. It’s easy to make the noises fun, and they are relatively easy to repeat, so playing animal noise games with a farm set was a big part of our early attempts to encourage speech.
Step 2. Imitating Actions on Objects

1. Imitating your child’s actions with objects draws your child’s attention to what you are doing, gives you a specific vocabulary of objects and actions for narrating your child’s activity, and gives your child the sense of two people doing things together.
2. Research shows that when parents imitate what their children are doing, children with autism start making more eye contact and smile at their parents more often.
3. Imitating your child’s actions with objects can also increase the flexible, creative, and varied nature of your child’s play.

GOAL: For children with ASD to pay attention to what we do with objects.

Home Activity #3: Use matching (identical or very similar) toys, or multiple pieces of toys, to teach your child to imitate new actions quickly and easily.

You will need a matching set of objects or toys.

Make sure that you are right in front of your child, and that your objects are positioned in front of her matching objects.

If your child quickly engages, watches you imitate, and begins imitating your actions, you can move quickly, however you will likely need to spend more time on each step until you see the response you want.

Here is the sequence for using matching toys:

1. Begin by imitating your child’s actions with your own materials and labeling the objects and actions your child is using.
2. After you have precisely imitated your child’s actions for a while, introduce a variation on the action you are performing.
   1. If your child is interested in what you are doing, wait expectantly and see if he imitates. If not, help him copy you (hand over hand)
3. Once your child has made the new action, praise enthusiastically and let your child do whatever he wants with the toy for a few moments.
4. Imitate you child a few times and then show the new action again.

Step 3. Imitating Hand Gestures and Body Movements

1. The next step is to teach your child how to attend to and imitate the hand gestures and physical motions that are part of your songs and sensory social games.
2. Now it’s time to teach your child how to imitate some different gestures, body movements, and physical actions that you’ve been doing naturally during sensory social routines.
Home Activity #4: Teach Imitation During Sensory Social Games and Songs with Actions

Remember that up until now you have been face-to-face in social games and pausing before the big event? Your child should be communicating with a cue to tell you to continue the game. Once this is happening routinely, you can begin to focus on teaching your child to imitate one of the key movements used in the song or game.

**HERE IS THE SEQUENCE FOR TEACHING YOUR CHILD TO IMITATE GESTURES:**

1. Pick a favorite, well-practiced song or game and pick a movement from the game that is very easy to do (i.e. hands up, clap hands, etc.)
2. Teach your child by starting the song, then when it is time for the gesture stop and prompt your child (hand over hand) to make the gesture.
   - Over time, the goal is to reduce the prompt gradually.
3. Once your child has done the action with your help, continue the routine as a reward.
4. Teach only one gesture at a time & don’t be a perfectionist

>>BE CAREFUL not to just move the child’s body through the motions day after day. This does not teach imitation. Demonstrate first, then wait for your child to imitate you. If they do not imitate, then you can physically prompt. Be sure to reduce the prompt (prompt fading) over time<<

Step 4. Imitating and Expanding on Actions

1. Developing variations in the imitative turn-taking games keeps the games interesting and less repetitious for longer periods of time.
2. It supports your child’s longer periods of attention to you
3. It also teaches your child to be flexible and creative during play.

Home Activity #5: Add Variations

Once your child consistently imitates a familiar action that you model, you can start expanding the actions so that the initial theme doesn’t become boring.

Here are some ideas:

1. Show your child a new, easy, and interesting action to perform with an object you’ve already been playing with.
   - Do the action, then hand the object to your child for him to imitate you. If he doesn’t, then prompt.
2. Excellent materials for working on theme and variations include play-doh, art activities, musical toys, and objects with multiple parts.
3. Try not to use toys that your child already plays with repetitively for teaching variations.
Step 5. Putting Imitation Games into the Joint Activity Frame

1. Remember the four-part framework?
   1. You can probably see how well imitation games fit into this framework.

2. There should be a set-up (materials come out), a theme (the first action is imitated), and one or more variations.

3. We have not discussed closings yet, but ideally the closing is an organized ending to the imitation game.

Session 6 Home Activity Checklist

4. Imitating Sounds
   ____ I pay attention to my child’s sounds
   ____ I imitate my child’s sounds back to him or her when I hear them.
   ____ I have a repertoire of songs, finger plays, and other language activities that my child enjoys.
   ____ I know when to pause and wait in these games for my child to cue me or vocalize to continue the game.

5. Imitating Actions with Objects
   ____ There are double sets of toys or multiple objects that I can use with my child.
   ____ I frequently imitate my child’s actions with objects.
   ____ I sometimes model variations on my child’s actions as well as different actions in play, and prompt my child to imitate my actions on objects.
   ____ I have found opportunities to imitate my child across most of our daily activities; it feels almost automatic now to do so.

6. Am I Helping My Child Imitate Gestures and Body Movements?
   ____ I have found sensory social routines and songs that make my child smile.
   ____ My child easily signals me during his or her turn to continue sensory social routines.
   ____ I know at least one gesture or body movement in each sensory social and song routine that I can teach my child to imitate.
   ____ I know how to pause and wait for my child to imitate the action without my help.
   ____ I know when to physically help (or prompt) my child to imitate the action.

7. Am I Expanding My Child’s Imitation?
   ____ I know how to develop a theme during imitation with my child during toy play and sensory social routines.
   ____ My child can easily imitate at least one kind of action without my help during toy play and sensory social routines.
I know how to vary or expand the joint activity to teach other kinds of imitation to my child during toy play and sensory social routines.

My child thinks these variations are fun and attempts to imitate my actions.
Session 2: Refrigerator List

**Goal:** To increase my child’s attention to me

**Steps:**
1. Identify my child’s attentional spotlight.
2. Find my position in that spotlight, face-to-face with my child.
3. Eliminate the competition for my child’s attention.
4. Find my child’s social comfort zone and stay inside it.
5. Follow my child’s lead: Use active listening, narrating, helping, and imitating.
Appendix E

Figure 1. Parent Knowledge Scores By Group
Figure 2. Parent 1 Primary Outcome Measures, Immediate Treatment Group
Figure 3. Parent 2 Primary Outcome Measures, Immediate Treatment Group
Figure 4. Parent 3 Primary Outcome Measures, Immediate Treatment Group
Figure 5. Parent 4 Primary Outcome Measures, Immediate Treatment Group
Figure 6. Parent 5 Primary Outcome Measures, Immediate Treatment Group
Figure 7. Parent 6 Primary Outcome Measures, Delayed Treatment Group
Figure 8. Parent 7 Primary Outcome Measures, Delayed Treatment Group
Figure 9. Parent 8 Primary Outcome Measures, Delayed Treatment Group
Figure 10. Parent 9 Primary Outcome Measures, Delayed Treatment Group
Figure 11. Parent 10 Primary Outcome Measures, Delayed Treatment Group

Table 5. Primary Outcome Measure Scores By Case

Figure 12. CDI Words Expressed Mean Scores
Figure 1. Parent Knowledge Scores By Group

Error Bars: 95% CI
Figure 2

Immediate Treatment Group - Parent 1 Primary Outcome Measures

- Measure
  - Knowledge
  - Parenting Stress
  - Sense of Competence
  - Words Expressed

*Data from follow-up time point are missing
Figure 3

Immediate Treatment Group - Parent 2 Primary Outcome Measures
Figure 4

Immediate Treatment Group - Parent 3 Primary Outcome Measures

Measures
- Knowledge
- Parenting Stress
- Sense of Competence
- Words Expressed

Baseline | Post-Intervention | Follow Up
Figure 5

Immediate Treatment Group - Parent 4 Primary Outcome Measures

- Knowledge
- Parenting Stress
- Sense of Competence
- Words Expressed

Measure

Baseline  Post-Intervention  Follow Up
**Figure 6**

Immediate Treatment Group - Parent 5 Primary Outcome Measures

*Data from follow-up time point are missing*
Figure 7
Delayed Treatment Group - Parent 6 Primary Outcome Measures

Measure
- Knowledge
- Parenting Stress
- Sense of Competence
- Words Expressed

Baseline | Pre-Intervention | Follow Up
--- | --- | ---

Figure 8

Delayed Treatment Group - Parent 7 Primary Outcome Measures

Measure
- Knowledge
- Parenting Stress
- Sense of Competence
- Words Expressed

Baseline | Pre-Intervention | Follow Up
--- | --- | ---

Graph showing changes in various measures over time.
Figure 10

Delayed Treatment Group - Parent 9 Primary Outcome Measures

Measure
- Knowledge
- Parenting Stress
- Sense of Competence
- Words Expressed

Baseline | Pre-Intervention | Follow Up
Table 5

**Primary Outcome Measure Scores By Case**

**Immediate Treatment Group**

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<tr>
<th>Parent</th>
<th>B Knowledge</th>
<th>Post Knowledge</th>
<th>FU Knowledge</th>
<th>B PSI</th>
<th>Post PSI</th>
<th>FU PSI</th>
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<td>MD</td>
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<td>70%</td>
<td>90%</td>
<td>99</td>
<td>88</td>
<td>90</td>
</tr>
<tr>
<td>Parent 4</td>
<td>70%</td>
<td>90%</td>
<td>100%</td>
<td>91</td>
<td>82</td>
<td>75</td>
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<tr>
<td>Parent 5</td>
<td>60%</td>
<td>90%</td>
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<td>62</td>
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**Delayed Treatment Control Group**

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<th>Post Knowledge</th>
<th>B PSI</th>
<th>Pre PSI</th>
<th>Post PSI</th>
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<td>90%</td>
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<td>53</td>
<td>45</td>
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<tr>
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<td>64</td>
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<tr>
<td>Parent 8</td>
<td>70%</td>
<td>60%</td>
<td>50%</td>
<td>62</td>
<td>58</td>
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* = 'At genetic risk'

Note: B = Baseline
FU = Follow-up
MD = Missing data
PSI = Parenting Stress Index, Fourth Edition, Short Form
Table 5 Continued

*Primary Outcome Measure Scores By Case*

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<th>Immediate Treatment Group</th>
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<th>Post PSoC</th>
<th>FU PSoC</th>
<th>B CDI Words</th>
<th>Post CDI Words</th>
<th>FU CDI Words</th>
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<th>Pre CDI Words</th>
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<td>81</td>
<td>55</td>
<td>63</td>
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<td>233</td>
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* = "At genetic risk"

Note: B = Baseline
FU = Follow-up
MD = Missing Data
PSoC = Parenting Sense of Competence Scale
CDI = MacArthur-Bates Communicative Development Inventory
Figure 12

CDI Words Expressed

- Baseline
- Post-Intervention/Pre-Intervention
- Follow-up/Post-Intervention

Mean Words Expressed

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<thead>
<tr>
<th>Group</th>
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<td></td>
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<tr>
<td>Post-Intervention/Pre-Intervention</td>
<td></td>
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</tr>
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<td>Follow-up/Post-Intervention</td>
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<td></td>
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Appendix F

Figure 13. Parent Narration of Play
Figure 14. Parent Imitation of Play
Figure 15. Child Vocalizations During Play
Figure 16. Parent 3 – Immediate Treatment Group, Parent Observation Variables
Figure 17. Parent 4 – Immediate Treatment Group, Parent Observation Variables
Figure 18. Parent 3 – Immediate Treatment Group, Child Observation Variables
Figure 19. Parent 4 – Immediate Treatment Group, Child Observation Variables
Figure 20. Parent 7 – Delayed Treatment Group, Parent Observation Variables
Figure 21. Parent 8 – Delayed Treatment Group, Parent Observation Variables
Figure 22. Parent 9 – Delayed Treatment Group, Parent Observation Variables
Figure 23. Parent 10 – Delayed Treatment Group, Parent Observation Variables
Figure 24. Parent 7 – Delayed Treatment Group, Child Observation Variables
Figure 25. Parent 8 – Delayed Treatment Group, Child Observation Variables
Figure 26. Parent 9 – Delayed Treatment Group, Child Observation Variables
Figure 27. Parent 10 – Delayed Treatment Group, Child Observation Variables

Table 6. Parent Observation Variables By Case
Table 7. Child Observation Variables By Case
Figure 14.

Parent Imitation of Play

Mean Number of Imitations

Group

- Treatment
- Waitlist

Baseline
Follow-up (six or twelve weeks post-program)
Figure 15.

Child Vocalizations During Play

- Baseline
- Follow-up (six or twelve weeks post-program)

![Graph showing vocalizations during play between treatment and waitlist groups.](image-url)
Figure 16

Parent 3 - Immediate Treatment Group, Parent Observation Variables

*Data from post-intervention time point are missing

SSR = Sensory Social Routine
Figure 17
Parent 4 - Immediate Treatment Group, Parent Observation Variables

*Data from post-intervention time point are missing
SSR = Sensory Social Routine
*Data from post-intervention time point are missing
Figure 19

Parent 4 - Immediate Treatment Group, Child Observation Variables

*Data from post-intervention time point are missing*
Figure 20

Parent 7 - Delayed Treatment Group, Parent Observation Variables

SSR = Sensory Social Routine
Figure 21

Parent 8 - Delayed Treatment Group, Parent Observation Variables

Parent Behaviors
- Capture Attention
- Imitate
- Narrate
- Praise
- Respond
- SSR

*SSR = Sensory Social Routine
Figure 22
Parent 9 - Delayed Treatment Group, Parent Observation Variables

Parent Behaviors
- Capture Attention
- Imitate
- Narrate
- Praise
- Respond
- SSR

SSR = Sensory Social Routine
SSR = Sensory Social Routine
Figure 24

Parent 7 - Delayed Treatment Group, Child Observation Variables

- Child Behaviors
  - Joint Attention
  - Look
  - Point
  - Seek Contact
  - Smile
  - Vocalize

Baseline | Pre-Intervention | Follow Up
Figure 25

Parent 8 - Delayed Treatment Group, Child Observation Variables

Child Behaviors
- Joint Attention
- Look
- Point
- Seek Contact
- Smile
- Vocalize

Baseline  Pre-Intervention  Follow Up
### Table 6

**Parent Observation Variables By Case**

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<td>MD</td>
</tr>
<tr>
<td>Parent 5</td>
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<td>MD</td>
</tr>
</tbody>
</table>

|                | B Initiate | Pre Initiate | FU Initiate | B Capture | Pre Capture | FU Capture | B SSR | Pre SSR | FU SSR |
| Parent 6       | 0          | 0            | MD          | 1         | 0           | MD         | 0     | 0        | MD     |
| Parent 7*      | 4          | 0            | 5           | 0         | 0           | 0          | 0     | 0        | 0      |
| Parent 8       | 0          | 11           | 5           | 0         | 0           | 1          | 0     | 2        | 3      |
| Parent 9       | 3          | 0            | 0           | 1         | 0           | 2          | 0     | 0        | 0      |
| Parent 10      | 3.5        | 2.5          | 3           | 0         | 0           | 0          | 0     | 0        | 0      |

* *At genetic risk*

**Note:** B = "Baseline"

FU = "Follow-up"

MD = Missing Data

Initiate = "Imitate/mirror child's play"

Capture = "Capture child's attention"

SSR = "Engage child in a sensory social routine"
Table 6 Continued

**Parent Observation Variables By Case**

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<th>B Narrate</th>
<th>Post Narrate</th>
<th>FU Narrate</th>
<th>B Respond</th>
<th>Post Respond</th>
<th>FU Respond</th>
<th>B Praise</th>
<th>Post Praise</th>
<th>FU Praise</th>
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<th>FU Narrate</th>
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<th>FU Respond</th>
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* = 'At generic risk'

Note: B = 'Baseline'

FU = "Follow-up"

MD = Missing Data

Narrate = "Narrate play"

Respond = "Respond to child's bid for comfort"

Praise = "Praise child"
Table 7

*Child Observation Variables By Case*

<table>
<thead>
<tr>
<th>Immediate Treatment Group</th>
<th>B Look</th>
<th>FU Look</th>
<th>Post Smile</th>
<th>FU Smile</th>
<th>B Voc</th>
<th>Post Voc</th>
<th>FU Voc</th>
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* = "At genetic risk"

Note: B = 'Baseline'
FU = "Follow-up"
MD = Missing data
Look = "Look at parent"
Smile = "Smile at parent"
Voc = "Vocalization"
Table 7 Continued

**Child Observation Variables By Case**

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<th>Immediate Treatment Group</th>
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<th>Post JA</th>
<th>FU JA</th>
<th>B Point</th>
<th>Post Point</th>
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<th>B Comfort</th>
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<th>FU JA</th>
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<th>Pre Point</th>
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*= "At genetic risk"

Note: B = 'Baseline'
FU = "Follow-up"
MD = Missing data
JA = "Joint attention"
Point = "Distal point"
Comfort = "Seeks comfort from parent"
Appendix G

Figure 28. Parent Satisfaction
Figure 28. Parent Satisfaction

Error Bars: 95% CI