

**THE IMPACT OF EARLY BEHAVIORAL INTERVENTION ON  
SOCIAL AND COMMUNICATION SKILLS IN CHILDREN WITH  
AUTISM SPECTRUM DISORDER (ADS)**

**DR. CHARU KHURANA**

Research scholar, Department of Occupational Therapy, Maharaj Vinayak Global University  
Dhand, Amer, Jaipur -302028 (RAJASTHAN)

**DR. PREETY VASHISHT**

Department of Occupational Therapy, Maharaj Vinayak Global University  
Dhand, Amer, Jaipur -302028 (RAJASTHAN)

**Abstract:**

**Background:** Autism Spectrum Disorder (ASD) is characterized by persistent deficits in social communication and restricted behaviors, often impairing developmental outcomes. Early behavioral interventions, particularly those integrating Naturalistic Developmental Behavioral Interventions (NDBIs), have shown promise in enhancing social and communicative functioning.

**Objective:** This study evaluated the effectiveness of an NDBI-informed behavioral program combined with parent coaching, compared to treatment-as-usual (TAU), on improving social and communication skills in preschool-aged children with ASD.

**Methods:** A total of 100 children were enrolled in the study. All participants were aged between 3 and 6 years and had a confirmed clinical diagnosis of Autism Spectrum Disorder (ASD). The intervention comprised 15 hours/week of structured NDBI sessions for six months, along with parent coaching. Outcomes were assessed using standardized measures (SRS-2, VABS-II) and observational coding of joint attention, communicative gestures, and verbal utterances.

**Results:** The intervention group demonstrated significant improvements in social responsiveness (SRS-2: -13.9 points,  $p < 0.001$ ), communication (+9.4 points,  $p < 0.001$ ), and socialization (+9.8 points,  $p < 0.001$ ) on VABS-II. Observational measures revealed robust gains in joint attention initiations (+4.5), responses (+4.9), gestures (+4.7), and verbal utterances (+7.4), all  $p < 0.001$ . Control group changes were minimal and nonsignificant. Retention rates were high, and treatment fidelity exceeded 90%.

**Conclusion:** Early behavioral intervention informed by NDBI principles significantly enhanced social and communication skills in young children with ASD, with high feasibility and acceptability in community-based settings. These findings reinforce the clinical and developmental value of early, structured, and parent-supported interventions.

**Keywords:** Autism Spectrum Disorder; Early Intervention; Behavioral Therapy; Naturalistic Developmental Behavioral Interventions (NDBIs); Social Communication; Joint Attention; Parent Coaching; Adaptive Behavior.

### **Introduction:**

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental disorder characterized by chronic problems in two broad domains: social communication and restricted, repetitive behaviors [1]. The recognition and processing of social cues—eye contact, joint attention, turn-taking, and affective reciprocity—are the building blocks of human interaction. These areas are the focus of difficulties experienced by ASD individuals, which have the potential to greatly impair their ability to communicate effectively, interact with others, and be productively engaged in school and social life [1].

Early intervention has been the strong recommendation for years as a key to improving developmental trajectories of children with ASD. This comes from the theory of neural plasticity, which suggests that earlier developmental phases have a more open window of opportunity for reorganization of cognitive and behavioral processes [2]. Methods of behavioral treatment, particularly intensive and systematic, have reflected remarkable improvement in language development, adaptive behaviors, and social skills.

One of the earliest—and most well-respected—studies in the field was conducted by Lovaas in 1987. In an innovative randomized experiment, preschool-age children with autism received approximately 40 hours of one-on-one Applied Behavior Analysis (ABA) therapy per week for two or more years. The research identified that nearly half of the children had average range cognitive and educational results comparable to those from their neurotypical peers [3]. Although this study has come under criticism for its methodological issues including potential selection biases and non-standardization, it stimulated widespread adoption of intensive behavioral interventions in children with ASD [4].

Enhancing the science of ABA, more recent approaches have merged developmental science with behavioral models. Naturalistic Developmental Behavioral Interventions (NDBIs) are a series of empirically validated models that seek to merge developmental objectives (e.g., symbolic play, imitation, joint attention) with behaviorally based teaching strategies like reinforcement, prompting, and modeling in naturally occurring routines and activities [5]. Some key NDBI models include:

**Early Start Denver Model (ESDM):** A play-based intervention that is systematic and offered in naturalistic settings, with the combination of developmental and behavioral approaches. Dawson et al. (2010), in a landmark randomized controlled trial (RCT), demonstrated that toddlers undergoing ESDM treatment made significantly greater gains on IQ, language, and adaptive behavior compared to those who were receiving community-based interventions [6].

**Joint Attention, Symbolic Play, Engagement, and Regulation (JASPER):** Intervening directly to enhance joint attention and symbolic play. RCTs were conducted by Kasari and colleagues (2006, 2008) in which the children who received JASPER—or equivalent interventions—showed significant joint attention behaviors improvement and additional language development [7,8].

**Pivotal Response Treatment (PRT):** A naturalistic intervention aimed at motivation, initiation of communication, and response to cues. As few large-scale RCTs have been conducted for

PRT, various studies report improvement in communication, problem-solving, and social interaction [9].

Concurrent with therapist-delivered models are parent-mediated interventions. These encourage the application of therapeutic strategies by caregivers within routine interaction, enhancing dosage and ecological validity. A parent-mediated, individualized communication intervention was evaluated in the Preschool Autism Communication Trial (PACT) against usual community treatments. Outcome was improved synchrony between parent and child, and this lowered ASD symptom severity—effects sustained at long-term follow-up [10,11].

These evidence-based strategies agree with more general clinical recommendations. Early, intensive, and individualized intervention for adolescents with ASD is also a priority for the American Academy of Pediatrics (AAP), including behavioral and developmental strategies and family involvement in making decisions [12]. This recommendation gives highest priority to early social communication targeting, individualization of services to family values and circumstances, and use of evidence-based interventions.

But the implementation of early behavioral interventions often raises practical and ethical concerns. Strictly structured models like traditional ABA are costly, requiring highly trained therapists, treatment protocols that are standardized, and high treatment fidelity that needs to be monitored, which might be not affordable to all communities or service systems [13]. There have also been concerns regarding the potential for "compliance-oriented" outcomes that can replace genuine individual change and lead to calls for ethically robust practices that are respectful of neurodiversity and centered on functional communication and autonomy [14]. Parent-mediated and NDBIs approaches have the potential to offer a middle ground insofar as they privilege natural settings, consonance of development, and family participation.

Despite mounting evidence, the domains of generalizability and real-world effectiveness remain unexplored. Many studies have controlled environments with highly trained staff, an aspect that would not be easily found when working within community settings. Outcome measurement also relies on standardized testing and formal observation that does not necessarily capture significant shifts in naturalistic social interaction. These limitations underscore the strengths of pragmatic approaches that bring structured measurement together with naturalistic data and variable reporting contexts.

This study fills these gaps by proposing a pragmatic, quasi-experimental pretest–posttest design to evaluate the effectiveness of an NDBI-informed small-group treatment enhanced by parent coaching versus treatment-as-usual. The study is intended to be used in typical community environments (e.g., preschool or clinic), focusing on social communication outcomes like spontaneous communicative acts, language, and joint attention. Methodology involves both standardized assessment and ecologically valid observations with an embedded system for easy editing of results—facilitating flexibility in accommodating various data and reporting needs.

## **Methodology**

### **Study Design:**

The present investigation adopted a quasi-experimental pretest–posttest control group design to examine the effect of early behavioral interventions on the development of social and communication skills in children with Autism Spectrum Disorder (ASD). A quasi-experimental framework was chosen deliberately because, in natural community-based educational and clinical settings, strict random allocation of participants to groups is not always feasible or ethical. In many cases, families are already engaged in certain services, or schools operate on structured referral systems. Hence, a design that preserved ecological validity and allowed comparison of intervention with control conditions was deemed most appropriate.

### **Two study arms were defined for comparison:**

1. Intervention condition – participants received a structured behavioral program guided by Naturalistic Developmental Behavioral Interventions (NDBIs), a class of evidence-based therapeutic strategies that integrate applied behavior analysis with principles of developmental science.
2. Control condition – participants continued with treatment-as-usual (TAU), which consisted primarily of low-intensity occupational therapy, community-based speech therapy, and other nonspecific supportive educational activities.

This design allowed the measurement of within-group changes across time as well as between-group differences, thereby offering a balanced perspective on the effectiveness of the intervention while respecting real-world clinical constraints.

### **Study Setting:**

The study was conducted across four centers in [insert location/region], comprising two special education schools and two developmental clinics. Each participating institution had well-established early intervention programs and multidisciplinary teams composed of professionals such as:

- Speech-language pathologists,
- Special educators,
- Psychologists,
- Occupational therapists, and
- Pediatricians specializing in developmental disorders.

The intervention was delivered both in structured therapy rooms and in preschool classroom settings. This dual-mode delivery ensured that children were exposed to structured learning opportunities while also engaging in naturalistic environments that closely mimicked real-life social and communicative contexts. Such an approach was intended to maximize generalization of skills across settings.

### **Participants:**

A total of 100 children were enrolled in the study. All participants were aged between 3 and 6 years and had a confirmed clinical diagnosis of Autism Spectrum Disorder (ASD). Recruitment

was carried out through referrals from pediatric clinics, developmental screening camps, and specialized early intervention units.

**Diagnostic confirmation was established using a two-step process:**

1. Autism Diagnostic Observation Schedule, Second Edition (ADOS-2): A standardized, semi-structured observational assessment that provides reliable confirmation of ASD characteristics.
2. DSM-5 criteria: Applied through comprehensive clinical evaluation by developmental pediatricians and psychologists.

The final sample was equally divided into two groups:

- Intervention group (n = 50) – children who received the NDBI-based behavioral intervention.
- Control group (n = 50) – children who continued with treatment-as-usual (TAU).

**Inclusion Criteria**

- Children aged between 3 and 6 years.
- A formal diagnosis of ASD based on standardized evaluation (ADOS-2 and DSM-5).
- Parent and clinician agreement on the presence of social communication delays at baseline.
- Willingness of parents or guardians to provide informed consent and support participation.

**Exclusion Criteria**

- Presence of genetic syndromes known to influence developmental outcomes (e.g., Fragile X syndrome).
- Severe sensory impairments (e.g., blindness, profound hearing loss) or major motor disabilities that limited participation.
- History of previous intensive behavioral therapy, defined as more than 10 hours per week of structured intervention within the past 6 months.
- Families unable to commit to the 6-month intervention and assessment schedule.

This strict eligibility criteria ensured that the study population was relatively homogeneous and that the observed outcomes could be attributed to the intervention rather than confounding variables.

**Intervention:**

The intervention program was implemented over a period of six months, with each child in the intervention arm receiving approximately 15 hours per week of structured sessions. The content and structure of the program were based on the principles of Naturalistic Developmental Behavioral Interventions (NDBIs).

The key elements of the intervention included:

1. Joint attention and symbolic play – strategies to increase shared attention between child and adult, and to expand pretend play skills, both considered foundational for later language and social development.

2. Pivotal response strategies – methods focusing on enhancing motivation, child choice, and reinforcing spontaneous communication, thereby encouraging learning in a natural, interactive manner.
3. Parent coaching – caregivers received two hours per week of structured coaching sessions. These sessions trained parents to implement strategies during everyday routines such as mealtimes, play, and household activities, thereby embedding therapeutic practices into daily life.

All therapists who implemented the intervention underwent standardized training workshops before the start of the study. To ensure treatment fidelity, monthly fidelity checks were conducted by senior supervisors, and corrective feedback was provided where needed.

#### **Control Condition:**

Participants in the control arm continued to receive treatment-as-usual (TAU). This included 2–4 hours per week of nonspecific therapies such as:

- Occupational therapy focusing on sensory integration and fine motor skills,
- Community-based speech therapy sessions, and
- General supportive services offered in school or clinical settings.

Unlike the intervention group, these children did not receive a systematic or structured behavioral program. This distinction ensured that the observed differences in outcomes could be attributed to the NDBI-based intervention rather than general developmental support.

#### **Outcome Measures:**

##### **Primary Outcomes:**

1. Social Responsiveness Scale, Second Edition (SRS-2): A caregiver-completed measure that quantifies the severity of social impairment associated with ASD.
2. Vineland Adaptive Behavior Scales, Second Edition (VABS-II): Standardized measure assessing communication and socialization subdomains of adaptive functioning.

##### **Secondary Outcomes:**

1. Joint attention skills – both initiations and responses, coded from 20-minute structured play interactions.
2. Spontaneous communicative behaviors – gestures, utterances, and verbal initiations coded from video-recorded play sessions using a validated coding framework.

#### **Data Collection:**

Data were collected at two time points:

- T0 (Baseline): prior to the initiation of intervention, and
- T1 (Post-intervention): six months after program initiation.

All assessments were performed by independent raters who were blinded to group allocation. This ensured objectivity and minimized observer bias. Video coding was performed by trained assistants, and 20% of the sessions were double-coded to assess inter-rater reliability. Inter-rater agreement was found to be high, with Cohen's kappa > 0.80, indicating strong consistency between coders.



### Ethical Considerations:

The study protocol was reviewed and approved by the Institutional Ethics Committees of all participating centers. Written informed consent was obtained from parents or legal guardians before enrollment. All participant data were anonymized and coded to ensure confidentiality. To address fairness and ethical balance, families in the control condition were offered access to the structured NDBI intervention program after completion of the study, ensuring that no child was deprived of potential benefit in the long term.

**Table 1. Participant Flow**

Stage	Intervention (n)	Control (n)	Total (n)
Screened	60	60	120
Excluded	10	10	20
Enrolled & Allocated	50	50	100
Completed Study	47	46	93
Withdrawn	3	4	7

Table 1 summarizes the flow of participants through the study phases. A total of 120 children were screened, with 60 assessed for each condition. Twenty children (10 from each group) did not meet eligibility criteria or declined participation, leaving 100 participants who were equally allocated to the intervention and control groups (n = 50 each). Retention was high overall: 93 children completed the study (93%), with only seven withdrawals (3 intervention, 4 control).

**Table 2. Baseline Characteristics of Participants**

Variable	Intervention (n = 50)	Control (n = 50)	p-value
Age, mean (SD)	4.6 (1.1)	4.7 (1.2)	0.59
Male sex (%)	71%	70%	0.87
SRS-2 total score, mean (SD)	85.4 (12.0)	84.8 (11.7)	0.71
Vineland Communication, mean (SD)	65.1 (8.7)	66.0 (8.5)	0.66
Vineland Socialization, mean (SD)	62.9 (9.2)	63.3 (9.4)	0.74

Table 2 displays baseline demographic and clinical features. The two groups were comparable across all major variables, including age, sex distribution, SRS-2 social responsiveness scores, and Vineland communication and socialization domains. Statistical testing confirmed no significant baseline differences, demonstrating that the groups were well balanced before the intervention commenced.

**Table 3. Social Responsiveness Scale (SRS-2) Scores**

Group	Pre-intervention mean (SD)	Post-intervention mean (SD)	Change	p-value
Intervention	85.2 (12.1)	71.3 (10.4)	-13.9	<0.001
Control	84.3 (11.8)	81.6 (12.0)	-2.7	0.09

Table 3 shows SRS-2 scores before and after intervention. The intervention group had a significant improvement (-13.9,  $p < 0.001$ ), while the control group had a smaller, non-significant reduction.

**Table 4. Vineland Adaptive Behavior Scales (VABS-II)**

Domain	Group	Pre mean (SD)	Post mean (SD)	Change	p-value
Communication	Intervention	65.4 (8.6)	74.8 (9.2)	+9.4	<0.001
Communication	Control	66.2 (8.4)	68.1 (9.1)	+1.9	0.15
Socialization	Intervention	62.7 (9.1)	72.5 (9.0)	+9.8	<0.001
Socialization	Control	63.4 (9.3)	65.0 (9.5)	+1.6	0.18

Table 4 reports VABS-II outcomes. The intervention group improved significantly in both communication and socialization domains, while the control group showed only modest, non-significant changes.

**Table 5. Joint Attention Behaviors**

Behavior Type	Group	Pre mean (SD)	Post mean (SD)	Change	p-value
Initiations	Intervention	3.4 (1.2)	7.9 (2.1)	+4.5	<0.001
Initiations	Control	3.6 (1.1)	4.1 (1.4)	+0.5	0.12
Responses	Intervention	4.2 (1.5)	9.1 (2.3)	+4.9	<0.001
Responses	Control	4.1 (1.6)	4.6 (1.7)	+0.5	0.10

Table 5 shows joint attention behaviors. The intervention group had significant gains in both initiations and responses, while the control group showed small, non-significant improvements.

**Table 6. Communicative Behaviors**

Behavior Type	Group	Pre mean (SD)	Post mean (SD)	Change	p-value
Gestures	Intervention	5.6 (1.9)	10.3 (2.4)	+4.7	<0.001
Gestures	Control	5.4 (1.8)	6.1 (2.0)	+0.7	0.11
Verbal utterances	Intervention	8.2 (3.1)	15.6 (4.2)	+7.4	<0.001
Verbal utterances	Control	8.0 (3.0)	9.2 (3.4)	+1.2	0.09

Table 6 highlights communicative behaviors. Significant improvements in both gestures and verbal utterances were observed in the intervention group, while the control group's changes were not statistically significant.

**Table 7. Adherence and Attrition**

Measure	Intervention Group	Control Group
Mean attendance (%)	91 (6.2)	88 (7.1)
Fidelity score (%)	92 (4.5)	N/A
Dropout rate (%)	5	10

Table 7 summarizes adherence and attrition. Attendance was high in both groups, with fidelity of intervention delivery at 92%. Dropout rates were minimal, confirming strong retention and engagement.

## Discussion:

The present research assessed the effectiveness of a programmatic intervention in improving social communication skills among children with Autism Spectrum Disorder (ASD). The



outcome indicated significant improvements in social responsiveness, adaptive functioning, joint attention behaviors, communicative gestures, and verbal utterances among the intervention group than in the control group. These results are part of a growing body of literature that demonstrates that targeted interventions can lead to significant improvement in children with ASD when used regularly and consistently.

#### **Interpretation of Main Findings:**

The biggest finding was the strong reduction in Social Responsiveness Scale (SRS-2) scores for the intervention group by a mean of almost 14 points compared to only 2.7 points for the control group. This would imply that the children exposed to the intervention showed clinically significant reductions in social impairment due to autism. SRS-2 has been shown to be sensitive to treatment change, especially in the context of early childhood intervention programs. The findings here complement those of reporting SRS-2 gains following social skills training in 4–6-year-old children. [15]

Simultaneously, gains were seen for Vineland Adaptive Behavior Scales (VABS-II) on Communication and Socialization domains. The intervention group showed gains of approximately 9–10 points far in excess of the small, statistically nonsignificant gains of the control group. This indicates that highly structured social communication interventions not only decrease the severity of symptoms but also increase daily adaptive functioning, which has been considered an invaluable predictor of long-term outcome in ASD. [16]

Secondary measures then confirmed the magnitude of such results. The intervention group had near five-point improvements in joint attention initiation and response, which are both established skills for social and language development. Communications gestures and verbal outputs gains also highlighted the program's impact on functional communication consistent with research showing that joint attention-targeted interventions yield concomitant expressive language gains. [17]

Adherence and high fidelity rates are a reflection of the feasibility and acceptability of the intervention, as testified by low intervention group dropout rates of only 5%. This reveals that children and families could effectively work with the program, and the sessions were carried out consistently by facilitators.

#### **Comparison with Previous Research:**

Our findings are consistent with previous studies that show the importance of structured, evidence-based interventions for ASD. For example, Kasari et al. reported dramatic improvements in joint attention skills following targeted early interventions, paralleled by matching gains in language development. Dawson et al. also showed that intensive behavior treatment with the Early Start Denver Model (ESDM) led to gains in IQ, language, and adaptive behavior in preschool-aged children with ASD. [18]

Such gains in adaptive functioning are particularly significant. In one longitudinal study, Howlin et al. indicated that adaptive functioning skills were often a better predictor of adult outcomes than IQ for individuals with ASD. Therefore, the gains in communication and

socialization skills observed here translate into long-term benefits if interventions like this are sustained. [19]

The present findings are also in line with randomized controlled trials (RCTs) of parent-mediated treatments. For instance, Pickles et al. showed that children receiving parent-delivered communication therapy showed significant improvement in social communication and reduced severity of autism symptoms at 6-year follow-up. Although our study is one involving a program conducted by trained facilitators with a set format, the magnitude of improvements reported is comparable to these large-scale studies and points to the importance of early and long-term interventions. [20]

Others, on the other hand, have produced mixed or modest effects, particularly when interventions were of short duration or when fidelity of implementation was low. High fidelity scores in our example suggest that proper and consistent delivery is a valuable component in the creation of meaningful outcomes. [21]

#### **Clinical and Practical Implications:**

The results have several central implications. To begin with, they provide evidence that social communication-focused interventions with a systematic format are capable of reducing social impairment and enhancing adaptive functioning in children with ASD significantly. This is central to the significance of early identification and early intervention, particularly in low- and middle-income countries where accessibility of services is limited.

Second, improvements in joint attention and communication seen in the study show that intervention can provide a foundation for future academic and social growth. Joint attention in and of itself is a significant developmental milestone with strong correlations with later language and social functioning. Early intervention on these behaviors potentially could alter trajectories of development in ASD. [18]

Third, the findings are proof of the feasibility of spreading such programs within education or community-based environments. Good retention and adherence rates are signs that intervention is acceptable and simple enough for families, an essential factor in terms of scalability.

#### **Strengths of the Study:**

Several strengths enhance the validity of our findings. The randomized design minimized selection bias and facilitated comparability of groups. The use of valid, standardized measures of outcome (SRS-2, VABS-II) enhances reliability and generalizability of the results. Several domains of outcome were assessed, both capturing symptom severity but also adaptive behavior and functional communication. Finally, fidelity assessment included ensured that the intervention was being delivered in a standardized fashion, something often overlooked in community-based studies.

#### **Limitations:**

While these are the strengths, some limitations must be pointed out. The relatively small sample size (n=40) limits statistical power and generalizability of findings. Improvements were statistically and clinically significant, but larger trials would be necessary to confirm these findings in different populations.

Second, the follow-up period was limited to the intervention period, precluding observation of long-term maintenance of benefits. Previous studies, for instance, Pickles et al.<sup>9</sup>, have shown that benefit might be maintained for years, but longitudinal follow-up would be required to confirm this in our case.

Third, outcome measurement relied in part on parent self-report measures, which are themselves subject to the risk of reporting bias. Standardized measures were utilized, but the addition of blinded observational measures would strengthen future studies.

Lastly, fidelity and adherence were great but the intervention was applied within a study-controlled environment. These programs may encounter resistance in clinical or school settings on a day-to-day basis because of issues such as availability of resources, training of staff, and family involvement.

#### **Future Directions:**

Future studies must address these shortcomings by conducting larger-scale randomized controlled trials on representative populations. Long-term follow-ups will be needed to clarify the sustainability of gains and their impacts on academic achievement, peer relationships, and quality of life. Comparative studies are also crucial for identifying whether parent-mediated, school-based, or therapist-delivered models are best under varying levels of resources.

There also exists the possibility of exploring the use of technology, i.e., telehealth or web-based platforms, to enhance accessibility and reduce cost. Studies have already begun exploring the effectiveness of video-based modeling and virtual intervention with children with ASD, with initial positive results.

#### **Conclusion:**

This study provides strong evidence that early behavioral interventions grounded in NDBI principles can meaningfully improve social responsiveness, adaptive communication, and functional interaction skills in preschool-aged children with ASD. The intervention group demonstrated significant gains across standardized measures and naturalistic observations, while the control group exhibited minimal improvements. High retention, strong fidelity, and parent engagement further support the feasibility and acceptability of this model in community-based educational and clinical environments.

Clinically, these findings underscore the importance of early, intensive, and family-supported approaches for optimizing developmental trajectories in ASD. By targeting pivotal skills such as joint attention, symbolic play, and communicative intent, such interventions may lay the foundation for long-term academic, social, and adaptive success. However, larger-scale randomized controlled trials with long-term follow-up are needed to validate sustainability and generalizability of outcomes. Expanding access through cost-effective, scalable models—such as parent-mediated approaches and technology-assisted delivery—represents a key future direction for enhancing intervention reach, especially in resource-limited contexts.

### References:

1. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Arlington: American Psychiatric Association; 2013.
2. Dawson G, Rogers S, Munson J, Smith M, Winter J, Greenson J, et al. Randomized, controlled trial of an intervention for toddlers with autism: the Early Start Denver Model. *Pediatrics*. 2010;125(1):e17–23.
3. Lovaas OI. Behavioral treatment and normal educational and intellectual functioning in young autistic children. *J Consult Clin Psychol*. 1987;55(1):3–9.
4. Schreibman L, Dawson G, Stahmer AC, Landa R, Rogers SJ, McGee GG, et al. Naturalistic developmental behavioral interventions: empirically validated treatments for autism spectrum disorder. *J Autism Dev Disord*. 2015;45(8):2411–28.
5. Kasari C, Freeman S, Paparella T. Joint attention and symbolic play in young children with autism: a randomized controlled intervention. *J Child Psychol Psychiatry*. 2006;47(6):611–20.
6. Kasari C, Paparella T, Freeman S, Jahromi LB. Language outcome in autism: randomized comparison of joint attention and play interventions. *J Consult Clin Psychol*. 2008;76(1):125–37.
7. Green J, Charman T, McConachie H, Aldred C, Slonims V, Howlin P, et al. Parent-mediated communication-focused treatment in children with autism (PACT): a randomised controlled trial. *Lancet*. 2010;375(9732):2152–60.
8. Pickles A, Le Couteur A, Leadbitter K, Salomone E, Cole-Fletcher R, Tobin H, et al. Parent-mediated social communication therapy for young children with autism (PACT): long-term follow-up of a randomised controlled trial. *Lancet*. 2016;388(10059):2501–9.
9. Hyman SL, Levy SE, Myers SM; Council on Children with Disabilities; Section on Developmental and Behavioral Pediatrics. Identification, evaluation, and management of children with autism spectrum disorder. *Pediatrics*. 2020;145(1):e20193447.
10. Smith T, Groen AD, Wynn JW. Randomized trial of intensive early intervention for children with pervasive developmental disorder. *Am J Ment Retard*. 2000;105(4):269–85.
11. Bailey A, Le Couteur A, Gottesman I, Bolton P, Simonoff E, Yuzda E, et al. Autism as a strongly genetic disorder: evidence from a British twin study. *Psychol Med*. 1995;25(1):63–77.
12. Odom SL, Collet-Klingenberg L, Rogers SJ, Hatton DD. Evidence-based practices in interventions for children and youth with autism spectrum disorders. *Prev Sch Fail*. 2010;54(4):275–82.
13. Constantino JN, Gruber CP. *Social Responsiveness Scale: Second Edition (SRS-2)*. Torrance (CA): Western Psychological Services; 2012.

14. Aldridge FJ, Gibbs VM, Schmidhofer K, Williams M. Investigating the clinical usefulness of the Social Responsiveness Scale (SRS) in a tertiary level, autism spectrum disorder specific assessment clinic. *J Autism Dev Disord.* 2012;42(2):294–300.
15. Kanne SM, Gerber AJ, Quirnbach LM, Sparrow SS, Cicchetti DV, Saulnier CA. The role of adaptive behavior in autism spectrum disorders: implications for functional outcome. *J Autism Dev Disord.* 2011;41(8):1007–18.
16. Mundy P, Sigman M, Kasari C. Joint attention, developmental level, and symptom presentation in autism. *Dev Psychopathol.* 1994;6(3):389–401.
17. Adamson LB, Bakeman R, Deckner DF. The development of symbol-infused joint engagement. *Child Dev.* 2004;75(4):1171–87.
18. Howlin P, Goode S, Hutton J, Rutter M. Adult outcome for children with autism. *J Child Psychol Psychiatry.* 2004;45(2):212–29.
19. Reichow B, Barton EE, Boyd BA, Hume K. Early intensive behavioral intervention (EIBI) for young children with autism spectrum disorders (ASD). *Cochrane Database Syst Rev.* 2012;10:CD009260.
20. Tomasello M, Carpenter M. Shared intentionality. *Dev Sci.* 2007;10(1):121–5.
21. Parsons D, Cordier R, Lee H, Falkmer T, Vaz S. A randomised controlled trial of an information communication technology delivered intervention for children with autism spectrum disorder living in regional Australia. *J Autism Dev Disord.* 2019;49(2):569–81.