



# **A Systematic Review of Autism Spectrum Disorder in Children and Adolescents: Social Deficits and Intervention**

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## **Abstract**

*Autism is a neurodevelopmental disorder that challenges families and professionals to find effective interventions that can improve the lives of individuals with autism spectrum disorders. The objectives of this paper are to find out social deficits and different interventions for autism spectrum disorder in children and adolescents.*

**Keywords:** Autism spectrum disorder, social deficits, intervention.

## **Introduction**

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM)5 (American Psychiatric Association, 2013), Autism spectrum disorder is characterized by persistent deficits in social communication and social interaction across multiple contexts, including deficits in social reciprocity, nonverbal communicative behaviors used for social interaction, and skills in developing, maintaining, and understanding relationships. In addition to the social communication deficits, the diagnosis of autism spectrum disorder requires the presence of restricted, repetitive patterns of behavior, interests, or activities. Because symptoms change with development and may be masked by compensatory mechanisms, the diagnostic criteria may be met based on historical information, although the current presentation must cause significant impairment.

Within the diagnosis of autism spectrum disorder, individual clinical characteristics are noted through the use of specifiers (with or without accompanying intellectual impairment; with or without accompanying structural language impairment; associated with a known medical/genetic or environmental/acquired condition; associated with another neurodevelopmental, mental, or behavioral disorder), as well as specifiers that describe the autistic symptoms (age at first concern; with or without loss of established skills; severity). These specifiers provide clinicians with an opportunity to individualize the diagnosis and communicate a richer clinical description of the affected individuals. For example, many individuals previously diagnosed with Asperger's disorder would now receive a diagnosis of autism spectrum disorder without language or intellectual impairment.

The impairments in communication and social interaction specified in Criterion A are pervasive and sustained. Diagnoses are most valid and reliable when based on multiple sources of information, including clinician's observations, caregiver history, and, when possible, self-report. Verbal and nonverbal deficits in social communication have varying manifestations, depending on the individual's age, intellectual level, and language ability, as well as other factors such as treatment history and current support. Many individuals have language deficits, ranging from complete lack of speech through language delays, poor comprehension of speech, echoed speech, or stilted and overly literal language. Even when formal language skills (e.g., vocabulary, grammar) are intact, the use of language for reciprocal social communication is impaired in autism spectrum disorder.

Deficits in social-emotional reciprocity (i.e., the ability to engage with others and share thoughts and feelings) are clearly evident in young children with the disorder, who may show little or no initiation of social interaction and no sharing of emotions, along with reduced or absent imitation of others' behavior. What language exists is often one-sided, lacking in social reciprocity, and used to request or label rather than to comment, share feelings, or converse. In adults without intellectual disabilities or language delays, deficits in social-emotional reciprocity may be most apparent in difficulties processing and responding to complex social cues (e.g., when and how to join a conversation, what not to say). Adults

who have developed compensation strategies for some social challenges still struggle in novel or unsupported situations and suffer from the effort and anxiety of consciously calculating what is socially intuitive for most individuals(American Psychiatric Association, 2013, P.53).

Deficits in nonverbal communicative behaviors used for social interaction are manifested by absent, reduced, or atypical use of eye contact (relative to cultural norms), gestures, facial expressions, body orientation, or speech intonation. An early feature of autism spectrum disorder is impaired joint attention as manifested by a lack of pointing, showing, or bringing objects to share interest with others, or failure to follow someone's pointing or eye gaze. Individuals may learn a few functional gestures, but their repertoire is smaller than that of others, and they often fail to use expressive gestures spontaneously in communication. Among adults with fluent language, the difficulty in coordinating nonverbal communication with speech may give the impression of odd, wooden, or exaggerated "body language" during interactions. Impairment may be relatively subtle within individual modes (e.g., someone may have relatively good eye contact when speaking) but noticeable in poor integration of eye contact, gesture, body posture, prosody, and facial expression for social communication.

Deficits in developing, maintaining, and understanding relationships should be judged against norms for age, gender, and culture. There may be absent, reduced, or atypical social interest, manifested by rejection of others, passivity, or inappropriate approaches that seem aggressive or disruptive. These difficulties are particularly evident in young children, in whom there is often a lack of shared social play and imagination (e.g., age-appropriate flexible pretend play) and, later, insistence on playing by very fixed rules. Older individuals may struggle to understand what behavior is considered appropriate in one situation but not another (e.g., casual behavior during a job interview), or the different ways that language may be used to communicate (e.g., irony, white lies). There may be an apparent preference for solitary activities or for interacting with much younger or older people. Frequently, there is a desire to establish friendships without a complete or realistic idea of what friendship entails (e.g., one-sided friendships or friendships based solely on shared special interests). Relationships with siblings, co-workers, and caregivers are also important to consider (in terms of reciprocity).(P.54).

Early intervention services are the key to help children have a successful future, both in and out of school. When children receive educational interventions at an early age, they gain the skills necessary to successfully enter school. Early educational opportunities are important for all children, but especially important for children with special needs, such as autism. Matson (2007) found that the consensus is that early intervention is valuable and, within limits, the more intense the intervention, the greater the gains despite variability in outcomes within groups of children treated.

### **Peer-Mediated Intervention**

Peer mediation refers to the “coaching” of typically developing peers to help increase the social, language, or play skills of children with ASD. The use of peers is important as children with ASD typically tend to communicate more with adults than with their own peer group (Adel Abdulla & Mourad Ali, 2014).

Peer-mediated interventions are generally classified into six dimensions which include (a) peer modeling, (b) peer initiation training, (c) peer monitoring, (d) peer networking, (e) peer tutoring, and (f) group-oriented contingencies (Strasberger, 2013). Peer-mediated intervention requires the teacher to design and train a peer or peers to deliver instruction that is often designed to address social or academic skills. The role of the target child is to

respond to peers' initiations to gain needed skills. In particular, studies have indicated the use of peers as role models has the potential to be more advantageous than teachers for teaching and modeling social behaviors (Kathleen I. Harris, 2010).

Lee, Odom, and Loftin (2007) examined peer initiation for its potential to decrease stereotypic behaviors in three children with autism. Two typically developing peers learned to direct social initiations to each child with autism demonstrating stereotypic behaviors, such as hand flapping, body rocking, head rolling, and repetitive object manipulation, during structured play activities. Peers were taught four positive social behaviors: sharing a toy, suggesting play ideas that were interesting to the child with autism, assisting the child with autism, and being affectionate. Peer initiation increased children's social engagement with play and decreased the level of stereotypic behaviors for all three children with autism while playing with peers. The level of stereotypic behaviors decreased even further during generalization of the study for two out of three children with autism.

Jie Zhang(2011) investigated the efficacy of peer-mediated interventions for promoting social interactions among children from birth to eight years of age diagnosed with ASD. Forty-five single-subject design studies were analyzed and the effect sizes were calculated by the regression model developed by Allison and Gorman (1993). The overall effect sizes suggest that peer-mediated interventions were highly effective. Further categorical comparisons suggest that these interventions were more effective in enhancing social responses in younger boys, when older male siblings served as interventionists, when the interventions took place in the home, when peer modeling was used, and when consideration was given to maintenance and generalization across participants, behaviors and activities, and in involving collaboration among all researchers, peers/siblings, school staff, and parents/families.

Abla (this volume) explored the effect of peer-mediated picture exchange communication system intervention in improving vocabulary knowledge in children with autism spectrum disorders. Participants were ten children aged seven, attended a center for children with autism. A pre-post design was used to examine the effect of peer-mediated picture exchange communication system intervention in improving vocabulary knowledge in children with autism spectrum disorders. Findings from this study advocated for the effect of peer-mediated picture exchange communication system intervention in improving vocabulary knowledge in children with autism spectrum disorders.

Peer-mediated strategies demonstrate a naturalistic application of behavioral teaching. The typical peers of a child with an autistic spectrum disorder are instructed in a more adult-centered, mass-trial approach, while children with autistic spectrum disorders are taught by their peers in a more child-centered, naturalistic type of approach. In peer-mediated intervention, peers are taught to initiate play with children with autism through sharing, offering assistance, suggesting play ideas, and showing affection. Teachers remind peers to use their initiation strategies to facilitate play with their peers with autism. Research indicates interactions increase, stereotypic behaviors decrease, time engaged with peers increase and initiations and responses to initiations by children with autism increase. Peer-mediated intervention has therefore been purported as a promising practice for increasing social and communication skills in children with autism(Adel Abdulla & Mourad Ali, 2014).

### **Music Therapy**

According to the American Music Therapy Association (2014), Music Therapy is, "the clinical and evidence - based use of music interventions to accomplish individualized

goals within a therapeutic relationship by a credentialed professional who has completed an approved Music Therapy program.” Ouimet et al. (2012) noted that people with ASD often show an ability to succeed at music and rhythm related tasks. It is the empirical evidence that music can be an engaging and motivating stimulus for the population validates the value of music therapy in the treatment of children with autism. Researchers have developed different models of music therapy and continued to explore new strategies for effective intervention with these clients.

O’Connell (1974) as stated in Yuen-Man Chan(2005),coined the term “autistic musicality” to describe the outstanding musical talent in an otherwise low-functioning child with autism whom he worked with for four years. The child had absolute pitch and could play familiar tunes in any keys with appropriate chord accompaniment to the melody on the piano before receiving any formal musical training. He could also memorize every single note of a piece, including those notes inside the texture of the music. At the same time, however, some typical characteristics of autism such as difficulties in understanding abstract concepts and concentration problems were found in this unconventional music student. Albeit this may not be a common case in the autistic population, what draw attention is the possible astounding musical capabilities in these children when compared to their weaknesses in other performance and behavioral areas.

Over the past ten years, the prevalence of research on the use of music therapy for individuals with ASD has increased. Boso, Emanuele, Minazzi, Abbamonte, and Politi (2007) investigated the effects of a long-term active music therapy program on behavior profiles for eight young adults with severe autism spectrum disorder (ASD) with no previous music training, and also the effects of active music teaching on musical ability. Scores based on the Clinical Global Impression scale (CGI) and the Brief Psychiatric Rating Scale (BPRS) were used to measure behavior and completed by the psychiatrist of each participant. The psychiatrist was considered an external rater who did not participate in the music sessions. A music skills questionnaire was independently completed for each participant by an external rater, who was considered a music expert. Scores on the CGI, BPRS, and music skills questionnaire were analyzed in three tiers: the first tier (T1) represented the baseline scores before music therapy began, the second tier (T2) included scores after six months of music therapy, and the last tier (T3) included ratings at the end of the treatment. The results indicated significant improvements on behavior scales and music skills at the end of the 52-week program for the participants. The authors reported significant changes after six months from the beginning of the program, but no significant changes were evident between the six-month mark and the end of the program, yielding a plateau effect after six months.

Wan, Demaine, Zipse, Norton, and Schlaug (2010) described the characteristics of deficits often found in individuals with autism, particularly areas of social, communication, and understanding of theory of mind. They offered a theory that these impairments might be related to a dysfunction of the mirror neuron system (MNS). According to previous research, the MNS is located in the Broca’s area of the brain and is linked to complex cognitive processes such as understanding motor actions of others, language, and imitation (seeing, hearing, and doing). These processes are common areas of impairment in individuals with autism. The authors further explained that when intact, the MNS serves as a hub of firing neurons that allows humans to perceive speech in a multi-modal manner through processing bodily and mouth movements as well as auditory stimuli from another person. This has been supported by neuro-imaging research.

The current literature and support, both empirical and anecdotal, encourage that music can be a benefit for individuals with ASD in numerous ways. There are therapeutic benefits, skill-building benefits, and benefits to wellbeing. As the research continues to grow in this area of study, the more the awareness of the benefits of music can potentially increase within music communities and ASD communities. The hope is that this awareness will then bridge these communities to provide opportunities for individuals with ASD to utilize music as a positive tool and outlet (Samantha, 2014).

### **Social Story Intervention**

Gray (1995, 1998) suggested a couple of steps in preparation for generating a social story. The first step is to determine the topic on which the entire story will focus. It can be a specific social skill or a social situation that continues to be difficult for a child even with interventions. Other possible topics are future situations such as new social skills or novel social situations. Once a topic is identified, the second step involves gathering information. Detailed information is usually obtained through direct observations and interviews with relevant individuals. Information such as typical sequence of events, relevant cues, the child's abilities, interests and responses to the given situation are important. Last but not least is the perspective of the child with regard to the target skill or situation. Gray (1993, 1995, 1998) has consistently emphasized that the child's perspective is the most critical factor in writing an effective social story. The more thorough an author understands the child's perceptions and feelings, the more likely he or she will provide accurate information that is useful to that child.

The social stories used under Gray's (1998, 2000, 2004) approach contain the following types of sentences:

1. *Descriptive sentences*: These sentences appear at the beginning of the social stories. They describe situations and the people involved in them, what is going to happen, and the causes of events. They also address the following questions: Where? Who? What is going to happen?
2. *Perspective sentences*: These sentences describe internal feelings—the sensations, wishes, emotions, attitudes, thoughts, and beliefs of people in the situations depicted. These sentences are very important because they contain information that is not available to children with ASD.
3. *Directive sentences*: These sentences present social cues within situations and indicate the expected responses of individuals. Such responses may begin with “I will try” or “I will attempt.”
4. *Control sentences*: These sentences are added to the story by the storyteller and describe more general observations and thoughts to reinforce the information presented in the story.
5. *Affirmative sentences*: These sentences emphasize the importance of directive sentences; they begin with “It is good that . . .”
6. *Cooperative sentences*: These sentences describe others' actions, and show who these actions can help and how.

The ratio of the sentences is one directive sentence for every two to five descriptive, perspective, affirmative, and cooperative sentences. Based on Gray's rules, when care providers utilize control and cooperative sentences in a story, a control sentence must be used

with a directive sentence, and cooperative sentences must be used with descriptive and affirmative sentences (Gray, 2004).

Adams, Gouvousis, VanLue, & Waldron (2004) studied the effectiveness of social stories in decreasing "socially inappropriate and undesirable behaviors" in an elementary school student with autism (p. 88). Researchers identified four target behaviors, which included crying, falling, hitting, and screaming. The participating child displayed these behaviors with the greatest frequency and these inappropriate behaviors were addressed with a social story. The researchers wrote a social story for the student that described the target behavior in the context of homework completion; positive alternative behaviors were also included in the story. With the introduction of this social story, the student experienced decreases in each of the four identified problem behaviors. For example, the number of crying episodes decreased by 48 percent and screaming decreased by 61 percent. The student experienced similar decreases in falling (74 percent) and hitting (60 percent). The social story helped the child see that inappropriate behaviors during homework time could be replaced with more appropriate behaviors such as asking for help. The results of the Adams et al. (2004) study support the effectiveness of social stories, but are limited because only one child experienced the intervention.

Quirnbach, Lincoln, Feinberg-Gizz, Ingersol, Andrews (2008) compared two formats of a social story targeting the improvement of social skills during game play using a pretest posttest repeated measures randomized control group design. A total of 45 children diagnosed with Autism Spectrum Disorder (ASD) ages 7-14 were randomly assigned to standard, directive, or control story conditions. Results demonstrated that the standard and directive story formats were equally as effective in eliciting, generalizing and maintaining the targeted social skills in participants who had prior game play experience and Verbal Comprehension Index (VCI) scores from the WISC-IV intelligence test in the borderline range or above.

In their study, Reichow and Sabornie (2009) used a Social Story intervention to increase acceptable verbal greeting initiations with an 11-year-old boy who had a diagnosis of high functioning autism. A withdrawal design with a comparison condition examined the frequency of acceptable verbal greeting initiations during 5 min observation periods. Results showed no acceptable verbal greeting initiations during both baseline conditions, increased frequency of acceptable verbal greeting initiations during both intervention conditions, and maintenance of intervention levels of behavior with visual supports during the comparison condition.

Samuels, and Stansfield (2012). examined the use of Social Stories with four adults with learning disabilities and social communication impairments characteristic of ASD. This study employed an N = 1 multiple-baseline, across-participant, AB design with fade and maintenance probe stages. Each participant was involved in two Social Story interventions. The intervention and data collection was carried out by support staff who knew the participants. Results found that all target behaviors showed positive change during at least one phase of the study, although data indicated a return towards baseline levels across all behaviors into the probe phase.

A multiple baseline across participants design was used to evaluate the effects of Social Stories to help preschool-aged children with characteristics of Autism Spectrum Disorders (ASD) increase their engagement in functional behaviors and use sensory integrative-based strategies to promote self-regulation. Three children, 3-5 years old, from a self-contained preschool classroom were selected to participate in the study. The intervention package included reading individualized Social Stories that discussed desired behaviors and

self-regulation strategies. The researchers measured the percentage of intervals in which participants engaged in desired behaviors. The frequency of desired behaviors increased for all participants. The use of self-regulation strategies varied across participants. These findings suggested that the intervention was successful in increasing desired behaviors of the three children (Thompson and Johnston, 2013).

Hala Ahmed (2014) explored whether or not Social Stories intervention strategy has positive effects on the social skills of children with autism. Participants were ten children between the ages of five and seven who attended a school for children with developmental disabilities. A pre- post design was used to examine the effectiveness of the social stories Intervention Strategy on the social skills of the target children. Findings from this study indicated the effectiveness of the social stories intervention employed in teaching the target children social skills.

Asmaa Abdullah (2014) explored whether or not Social Stories intervention strategy has positive effects decreasing problem behavior of children with autism. Participants were ten children between the ages of seven and nine who attended a center for autism. A pre- post design was used to examine the effectiveness of the social stories intervention strategy on decreasing problem behavior of the target children. Findings from this study indicated the effectiveness of the social stories intervention employed in teaching the target children problem behavior.

Fatemeh, Ghorban and Shahram (2015) aimed to investigate the effect of a social stories intervention on the social skills of male students with autistic spectrum disorder (ASD). The sample included 30 male students with ASD who were selected through convenience sampling and randomly assigned to an experimental group (n = 15) or a control group (n = 15). The social skills of both groups were assessed pre- and post-test using Stone and colleagues' Social Skills Scale (which included subscales for understanding/ perspective-taking, initiating interactions, responding to interactions, and maintaining interactions). The experimental group participated in 16 sessions of social stories training, while the control group did not. Overall, the results showed that the social stories intervention improved the social skills of the children with ASD in the experimental group compared with the control group. The effects of the social stories intervention were mostly evident in the subscales for understanding/ perspective-taking, initiating interactions, and maintaining interactions with others.

### **Augmentative communication systems**

The field of augmentative and alternative communication (AAC) has notably developed a number of intervention techniques for individuals with communication and language impairments in the last decades (Adel Abdulla& Mourad Ali, 2014).

The use of augmentative and alternative communication was proposed by Lloyd in 1985. The name had already been adopted by the international organization in 1983. Eventually augmentative and alternative communication was adopted and later shortened to AAC. Currently the field and practice is most commonly known as AAC (Adel Abdulla& Mourad Ali, 2014).

According to ASHA:

*AAC refers to an area of research, clinical and educational practice. AAC involves attempts to study and when necessary compensate for temporary or permanent impairments, activity limitations, and participation restrictions of persons with severe*



*disorders of speech-language production and/or comprehension, including spoken and written modes of communication (ASHA, 2005, p. 1).*

If AAC users are going to be competent, they have to develop competency in four important ways: (a) linguistic, (b) operational, (c) social, and (d) strategic. Communication competence enables us to achieve our goals for communication (Maud Selasie, 2008). Linguistic skills involve expressive and receptive skills of one's native language as well knowledge of the linguistic code peculiar to the user's AAC system. These skills afford persons who use AAC systems the ability to understand and use symbols to communicate their ideas, thoughts, and feelings to others. These skills also ensure that users will produce the symbols expressively in their environment. Most often, the linguistic code of a user's primary language may be different from the linguistic code of AAC (Light, Beukelman, & Reichle, 2003). Consequently, linguistic competence for AAC users may include knowledge of both the native language used in his/her environment and special AAC symbols (Maud Selasie, 2008).

Teresa, David and Shane (2016) completed a systematic search of three databases (OVID Medline, PsycINFO, ERIC) as well as forward citation and hand searches to identify systematic reviews of AAC intervention efficacy research including children with autism, published between 2000 and March 2016 in peer-reviewed journals. Data pertaining to the quality indicators of included studies, effect sizes for intervention outcomes, and evidence for effectiveness were extracted for descriptive analysis. The search yielded 17 systematic reviews. Most provided indicators of research quality for included studies, of which only relatively few provided conclusive results. Communication targets tended to be focused on teaching children to make requests. Still, effect size measures for included studies indicated that AAC was effective to highly effective.

## **Conclusion**

Providing intensive early intervention is critical to amplify outcomes for children with autism spectrum disorder (ASD), and evidence suggests that the earlier the intense intervention can begin, the better the result (Woods & Wetherby, 2003). Children with autism are very capable of learning, socializing and becoming an integral part of society. Research indicates that when children with autism receive early intervention services based on Applied Behavior Analysis (ABA) principles, they have an improved chance of achieving functional levels of normal or near-normal ranges of intelligence and development (Lori A. Reffert, 2008).

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