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# *The Social Interaction Deficits in Autism Spectrum Disorder and Relevant Interventions*

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***Abstract:*** Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder involved with genetic mutations. The individual's aberrant social communication and interaction and restricted repetitive behaviours are the manifestations. ASD can be diagnosed as young as age 2. ASD is classified as high functioning and low functioning disorders based on intelligence. Factors that influence ASD include "Theory of Mind" (ToM) and social Interaction, in which individuals with ASD have severe difficulty in understanding the thoughts of others, such as their emotions, feelings, beliefs, and opinions. This review is a retrospective study on social interaction impairment in ASD and the relevant interventions. This paper aims to evaluate social communication barriers and their impacts on school functioning, as well as the atypical social attention development during the early stage of ASD. The interventions are mainly divided into parent-child companionship, music therapy, video therapy, and active physical activity. There are still limitations in this review. Most of the methods quoted in the literature adopted cross-sectional designs, and the experimental techniques are relatively narrow. In addition, most intervention programs focused on the early developmental stage. More attention should be paid to the transition between developmental stages in the future. This review can provide some guidance to future intervention research and practice in the special education area for ASD.

***Keywords:*** Autism Spectrum Disorder, social interaction, intervention, theory of mind.

## 1. Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder involved with a range of genetic mutations. Individuals with ASD show abnormal social interaction and communication and restrictive repetitive behaviours across environmental settings [1]. In addition to the sensory related repetitive behaviours of individuals with ASD that seriously interfere with daily functions, another type of abnormal behaviour is that they have to go through the same routine every day, and their daily habits cannot be changed, even though no obvious purposes can be seen from those routines. Plus, complications in some individuals with ASD may include mutism or significant language abnormalities. Individuals with autism may also learn, move, and pay attention differently compared to typically developing children. The DSM-5 divided ASD into high-functioning and low-functioning autism based on intelligence [2]. Children with high-functioning ASD have excellent cognitive and verbal skills, but social interaction and communication difficulties still significantly impair their everyday functioning. Deficits in social receptivity and nonverbal

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communication highlight the social barrier issue (i.e., processing, understanding, and responding to social cues) [1]. Children with low-functioning ASD exhibit severe intelligence impairment and behaviour problems, including aggression, physical damaging to surrounding environment, tantrums, and self-harm [3]. Children with ASD often had an excessive number of neurons during infancy, and it declined to a below average level throughout childhood compared to typically developing children [4].

Individuals with ASD have an atypical developmental path, including impaired social cognition, atypical perception, executive dysfunction, and deficits in information processing, which are often associated with attention deficits. These characteristics are classified as social disorders, and current theories about social deficits in ASD focus on the neurobiological and neuropsychological profile. Among them, the "Theory of Mind" (ToM) model explains some atypical social and communication behaviours of individuals with ASD, which significantly influences relevant research and practices [5]. ToM refers to an individual's knowledge of their own and others' mental states, such as desires, emotions, and beliefs [5]. Moreover, it also includes the ability to understand and predict the behaviours of others. ToM developed more rapidly and naturally in typically developing children and adolescents compared to individuals with ASD. According to previous research, understanding the mind can show the real conceptual change in preschool years. In contrast, most high-functioning autistic children continue to fail in their sense of the mind, not only during early and middle childhood but also into adolescence [6]. Passing the false beliefs task is typical for typically developing children over age 4 to 5. Later, the language ability and general reasoning ability of typically developing children grow with age, making ToM's ability evolve [5]. Adolescents consistently perform better than younger children. Individuals with ASD show continued deficits in ToM performance. Despite numerous studies, the evidence is not unique. Other social factors also affect people with ASD, and social communication impairment is also one of the core features of ASD.

Social communication skills encompass a wide range of non-verbal and verbal behaviours used for reciprocal social interactions. Despite heterogeneity due to language ability, individuals with ASD of varying ages and proficiency levels commonly exhibit social impairments [7]. A lack of typical social experience hinders the development of social cognition in ASD children, who exhibit social and behavioural issues. Children with autism tend to show low level of orientation to social stimuli, impaired ability to imitate, and impaired responses to emotional cues [8]. This combination, along with other social impairments, constitutes the overall impairment of social functioning in ASD. Importantly, social behaviour deficits are not enough to diagnose ASD. Restrictive and repetitive behaviour must also exist [8]. The social motivation hypothesis has been developed at a time when motivational factors that may influence social functioning in autistic individuals have received increasing attention. Proponents argue that people with ASD perceive the rewarding value of social stimuli atypically. This deficiency leads to a decrease in social orientation, intersocial behaviour seeking and liking, and social maintenance behaviours, which ultimately manifest as a global deficiency in social functioning [8]. In general, ToM explained social behaviours from the perspective of whether children with ASD can understand the ability of others. Furthermore, social reward theory explained social behaviours from the perspective of children with ASD's voluntary willingness to socialize.

Most of the previous studies mainly focused on ToM and social motivation of ASD, but few studies directly focused on the other sides of social impairment in ASD and the relevant interventions. This review aims to reduce the gap in social impairment research and relevant intervention research in children with ASD. Children with ASD demonstrate a wide range of social impairments that is beyond ToM impairment and low level of social motivation. This review aims to fill this gap by discussing general social interaction impairment and relevant social skill

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intervention literature in ASD. This paper can provide some guidance for the design of intervention programs at schools for children with ASD.

## 2. Social Interaction Impairment in ASD

### 2.1. General Social Interaction Impairment and Educational Implications

As far as the current situation is concerned, children's social interaction with ASD is widely impaired, and this impairment has seriously affected children's studies and life. Since autism is a complex neurobiological problem, often identified at birth, this idea supports the need for standard or unique preschool education approaches. And then, each child with autism can be trained according to their level [9]. Semi-structured interviews were conducted with ten kindergarten staff engaged in special education and ten ordinary kindergarten teachers, and their educational experiences were collected and submitted to the researchers. Analysis of interviews with general and special educators found that preschoolers with ASD had difficulties in all aspects of social life. The education system will be further improved because ordinary kindergarten teachers do not have enough time to care for every child and do not have enough professional knowledge. In addition to appropriate training for general education staff, special education lecturers will become more involved in education projects through specific projects and interventions. However, while public education teachers are more knowledgeable about autism education methods, previous research has found it impossible to make appropriate changes for every child with autism.

Factors influencing school adjustment are related to the child, the family, the school or the program, as it needs to be consistent with educational objectives. In addition, this may also reduce the impairment brought by social interaction [10]. Therefore, it is necessary to explore the relationship in between the severity of ASD in preschoolers and characteristics of social interaction and school adaptation. ASD children have deficits in social skills, mainly manifested in imitation, non-verbal communication, social reciprocity and joint attention. Therefore, an analysis of the data of 40 students (6 girls and 34 boys) revealed that the severity and social behaviour characteristics of ASD were strongly correlated with school adjustment, with a negative correlation of 44%. Because ASD is characteristic of social and interactive disorders, the learning environment needs to be adjusted accordingly. In addition, it provides a more accurate prediction model for ASD pre-schoolers' ability to adapt to school.

Children with autism exhibit different ways of socializing, from social indifference to clumsiness, and a four-year longitudinal Design study explored this behavioural pattern in depth. The results showed that most children's social interactions remained stable over four years. Some of the remaining participants had social interaction styles (SIS) that became more active but strange, while others had SIS that became inactive but strange [11]. Social types of autism are classified into three categories based on the classification and labelling of SISs. The first category is "no interaction type". The second category is "passive type", and the third category is "active but strange type". In addition to the longitudinal design, WSQ, a validated standardized measurement method, was used in this study. The data from the previous study provide a deeper comprehension of the stability and variability of SIS during its development and may ultimately contribute to improved diagnostic assessment and treatment of ASD. As a potentially productive and clinically significant method for creating subgroups of ASD, SISs can provide a good research site and further uncover and understand individual differences in ASD.

### 2.2. Atypical Social Attention during Early Development in ASD

Social attention refers to the sharing of attention between individuals, with young infants responding to their shared requests for attention by following the gaze and gestures of others. This

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permits infants to experience what others view and assists them in gaining knowledge about objects and events. ASD children are less likely to participate through co-attentional behaviours, which require alternating gaze between the child and an interactive partner to increase shared attention to surrounding objects and facilitate communication and learning. Experiments utilizing eye-movement technology revealed that 10-month-old infants at greater risk for autism manufactured less eye contact than low-risk infants, suggesting that abnormal alterations may emerge as early as ten months [12]. Social attention can also be called joint attention and is divided into initiating joint attention (IJA) and responding joint attention (RJA) [12], both of which are considered to be supported by different systems. This early atypicality can affect the social interaction patterns between autistic children and their caretakers. Inattention issues have already been observed in ASD children or at risk for developing these disorders [12]. Nevertheless, the alternating gaze is an assertive behaviour that can affect later development in various ways. It can be concluded that social attention impacts children's social interaction with ASD. In addition, the age findings can be considered social interaction impairment, which is not limited to older children.

## 3. The Effectiveness of Social Interaction Interventions for ASD

### 3.1. Early Social Engagement Interventions

For ASD children to be identified early and treated as soon as possible, some necessary interventions are essential. It is a little-known fact that there are interventions that encourage individuals with ASD to engage in meaningful play and actively enjoy their social interactions. Because participation in play is critical to early childhood development, playfulness is also essential for children's social participation and adaptability [13]. In light of the social difficulties of children with ASD, previous research on child development has demonstrated that interactions with adults playing can encourage the physical, social, cognitive, and emotional development of children. Prior research indicates that caregivers should always consider the shared attention of children with autism and their participation in social interactions, such as social enlightenment and social response. Children's positive emotions and social interaction behaviours include eye contact and spontaneous speech. In addition to the children's positive emotions. It is crucial to note that the vast majority of studies examine multiple behaviours. In general, the results indicate that cultivation through intervention strategies and techniques is successful. Caregivers are the child's first playmate, so it is necessary to assist parents in interacting with children with ASD in a manner that encourages play.

Another intervention is the use of music therapy. However, the effectiveness of this approach remains controversial. Therefore, it is necessary to identify the mechanisms of change through a musical experience that may influence the social development of children with autism. Brain regions include sensory, motor, emotional, and attentional processes in music perception and production design. A few ASD children have a specific preference for play activities (such as listening to music and playing musical instruments) and engage in and master musical activities on a regular basis. Press-Play is a model that focuses on understanding musical programs for ASD children. In particular, the Press-Play model postulates key elements that help an empirical approach to public participation in music therapy sessions, including reinforcement, predictability, emotional regulation, social Play environments, and shared attention [14]. These factors affect not only autistic children but also their interacting partners, such as family or peers, thereby fostering environments conducive to social participation and interaction. The current framework emphasizes musical participation as part of a child's natural development. These principles pave the way for scientific evidence to identify positive aspects of the music experience and choose proper intervention targets within a translation-based clinical framework. This intervention promotes

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public understanding and use of music experiences and is consistent with best practices for ASD children.

### 3.2. Social Interventions for Adolescents with ASD

The older children are, the greater their need for social interaction. The study subjects are also transitioning from children to teenagers. Video-based group Instruction (VGI) has a superior advantage when adolescents are taught how to interact with peers in games or group activities to promote the interpersonal skills of adolescents with autism [15]. When participants were given a video model and instructed to execute the social behaviours shown in the model while playing a cooperative game, all participants' social skills increased dramatically, demonstrating that VGI can boost teenagers with autism's spontaneous social behaviour. It follows that this process may help teach naturally occurring social skills. However, it is unclear if VGI can have a broad influence on social competence. Still, it can be utilized effectively to assist in the social skills of individuals with ASD through group instruction.

Exploring the effect of structured physical fitness on the communication and social interaction of autistic children is also one of the methods to explore intervention measures. The number of ASD is increasing rapidly worldwide, but 1.61% of children under 15 years old are still reported to have ASD of varying degrees in China [16]. Although China has begun to pay attention to the problems of autistic children, attention and awareness of autistic people are still lacking, and there are not as many studies as in western countries. Physical activity is one way to improve physical health, self-esteem, social skills and behaviour. So physical activity may be particularly effective in treating children with autism. In a quasi-experimental design, 41 individuals were randomly allocated to either an experimental or control group to exercise regularly [16]. The final experimental results showed that the physical activity program had a positive impact on the communication and social interaction skills of individuals with ASD, particularly in terms of language and social interaction skills.

## 4. Conclusions

In general, the social interaction of individuals with ASD was the primary function of being impaired. Specific education method is currently a loophole in the education of individuals with ASD, and there are not enough opportunities to customize instruction for every individual with ASD. School adjustment should be closely related to social interaction. As ASD is a characterized of social and interactive deficits, the learning environment needs to be adjusted accordingly. In addition, there are active and passive types of social interaction in individuals with ASD. Children with ASD does not show regular social attention like typically developing children, and this deficit is not affected by age. Interventions for ASD include in-person programs between caregivers and children with ASD, music therapy, video therapy, and active physical activity. It is essential to emphasize that these therapies are not the only ones available.

This review discussed most of the harmful factors and intervention approaches for social interaction in individuals with ASD. There are still some limitations in previous studies. The cross-sectional design has been adopted in most research methods in the literature, and the experimental techniques are relatively narrow. Therefore, longitudinal designs should be used more in future studies. The intervention studies mainly focused on a single developmental period. It cannot demonstrate whether it has long-term impacts on the development of ASD. Researchers should focus more on the transition between developmental stages in the future. This review can provide some guidance and advice for future intervention studies and practices at school for children with ASD.

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## References


[1] American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.).

[2] Rotheram-Fuller, E. and MacMullen, L. (2011). Cognitive-behavioural therapy for children with autism spectrum disorders: CBT for ASD. Psychology in the Schools, 48(3), 263–271

[3] Cohen, S., Conduit, R., Lockley, S.W., Rajaratnam, S.M. and Cornish, K.M. (2014). The relationship between sleep and behaviour in autism spectrum disorder (ASD): A review. Journal of Neurodevelopmental Disorders, 6(1), 44–44.

[4] Raznahan, A., Wallace, G.L., Antezana, L., Greenstein, D., Lenroot, R., Thurm, A., Gozzi, M., Spence, S., Martin, A., Swedo, S.E. and Giedd, J.N. (2013). Compared to what? Early brain overgrowth in autism and the perils of population norms. Biological Psychiatry, 74(8), 563-575.

[5] Kimhi, Y. (2014). Theory of Mind Abilities and Deficits in Autism Spectrum Disorders. Topics in Language Disorders, 34(4), 329–343.

[6] Peterson, C. (2014). Theory of mind understanding and empathic behaviour in children with autism spectrum disorders. International Journal of Developmental Neuroscience, 39(1), 16–21.

[7] Wetherby, A.M., Watt, N., Morgan, L. and Shumway, S. (2007). Social communication profiles of children with autism spectrum disorders late in the second year of life. Journal of Autism and Developmental Disorders, 37(5), 960–975.

[8] Bottini, S. (2018). Social reward processing in individuals with autism spectrum disorder: A systematic review of the social motivation hypothesis. Research in Autism Spectrum Disorders, 45, 9–26.

[9] Skoufou, A. (2019). Social Interaction of Preschool Children with Autism Spectrum Disorders (ASD) - Characteristics and Educational Approaches. International Journal of Economics and Management Studies, 6(6), 28–36.

[10] Aksoy, F. (2018). Severity levels of autism, social interaction behaviours and school adjustment of pre-school children with autism spectrum disorder. International Journal of Early Childhood Special Education, 1–10.

[11] Scheeren, A.M., Koot, H.M. and Begeer, S. (2020). Stability and change in social interaction style of children with autism spectrum disorder: A 4-year follow-up study. Autism Research, 13(1), 74–81.

[12] Thorup, E., Nyström, P., Gredebäck, G., Bölte, S. and Falck-Ytter, T. (2018). Reduced alternating gaze during social interaction in infancy is associated with elevated symptoms of autism in toddlerhood. Journal of Abnormal Child Psychology, 46(7), 1547–1561.

[13] Godin, J., Freeman, A. and Rigby, P. (2019). Interventions to promote the playful engagement in social interaction of preschool-aged children with autism spectrum disorder (ASD): A scoping study. Early Child Development and Care, 189(10), 1666–1681.

[14] Lense, M.D. and Camarata, S. (2020). Press-play: Musical engagement as a motivating platform for social interaction and social play in young children with ASD. Music & Science, 3, 205920432093308.

[15] Plavnick, J.B. and Dueñas, A.D. (2018). Brief report: Effects of video-based group instruction on spontaneous social interaction of adolescents with autism spectrum disorders. Journal of Autism and Developmental Disorders, 48(6), 2231–2236.

[16] Zhao, M. and Chen, S. (2018). The effects of structured physical activity program on social interaction and communication for children with autism. BioMed Research International, 2018, 1–13.