






# The Effectiveness of Therapeutic Interventions Based on Theory of Mind in Improving Social Skills and Adaptability in Children with Autism Spectrum Disorder

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### Article Info

### ABSTRACT

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Autism Spectrum Disorder (ASD), as a neurodevelopmental disorder, is often characterized by deficits in social skills and adaptability challenges. This study aimed to evaluate the effectiveness of therapeutic interventions based on Theory of Mind in improving social skills and adaptability in children with ASD. This applied research utilized a quasi-experimental design with a pretest-posttest approach, including one experimental group and one control group, along with a two-month follow-up period. The participants were 105 boys aged 6 to 10 years with high-functioning autism who were referred to the Ferdows Autism Disorder Treatment and Rehabilitation Center in Karaj in 2024. From this population, 36 children were selected through convenience sampling and randomly assigned into two groups of 18 participants each (experimental and control). The research tools included the Autism Social Skills Profile (Bellini & Hopf, 2007) and the Children's Adaptability Questionnaire (Dekhanchi, 1998). Data were analyzed using mixed analysis of variance and SPSS software. The results of data analysis showed that the intervention had a positive impact on improving the social skills and adaptability scores of children with ASD. The absence of a significant difference between posttest and follow-up scores indicates that the outcomes were sustained over time, confirming the long-term effectiveness of therapeutic interventions based on Theory of Mind in enhancing these skills ( $p < .05$ ). Therapeutic interventions focusing on strengthening Theory of Mind—the ability to understand and predict the thoughts and feelings of others—can improve social skills and adaptability in children with ASD. By enhancing children's ability to interact with others and manage social situations, these interventions increase their adaptability across various environments.

**Keywords:** Theory of Mind, Social Skills, Adaptability, Autism Spectrum Disorder.

## 1. Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder that affects social interactions, communication, and behavioral patterns. This disorder manifests across a wide spectrum of severity and symptoms, with deficits in social skills and adaptability being among its core characteristics. Theory of Mind (ToM) refers to an individual's ability to understand and predict the thoughts, beliefs, and emotions of others (Waltz, 2023).

Recent studies suggest that children with ASD face challenges in interpreting nonverbal cues, such as facial expressions and vocal tones, and may struggle to discern the intentions and emotions of others (Hollander et al., 2022). These deficits can lead to difficulties in forming and maintaining friendships and participating in group activities, resulting in impaired social skills (Özerk et al., 2021). Social skills are defined as an individual's ability to communicate effectively and appropriately in various social contexts. They include understanding and responding to social cues, initiating and maintaining conversations, sharing, taking turns, showing empathy, and resolving conflicts. Deficits in social skills are a hallmark feature of children with ASD, often leading to communication challenges and social isolation (Frolli et al., 2022).

Various interventions have been implemented to improve social skills in these children. For instance, social skills training programs that incorporate role-playing exercises, social stories, and assistive technologies have been shown to help children with ASD learn appropriate social behaviors and perform better in social interactions (Khalili & Ebrahimi, 2023). Social skills play a critical role in enhancing the quality of life and daily interactions of children with ASD. In recent years, numerous studies have explored and developed effective methods to strengthen these skills (Wang et al., 2022).

Adaptability in children with ASD refers to their ability to regulate their behaviors, emotions, and thoughts to respond appropriately to environmental and social changes. This capability includes managing stress, exhibiting flexibility in new situations, and building effective social relationships (DuBay et al., 2021). Recent research highlights the significant challenges faced by children with ASD in adapting to everyday changes and unfamiliar situations. These children may display a higher dependency on consistent and predictable routines and may react negatively, with anxiety or repetitive behaviors, when changes occur (Zirakashvili et al., 2022).

Interventions aimed at improving adaptability in these children often involve social and behavioral skill training programs, which include role-playing exercises, social stories, and the use of assistive technologies. These approaches can help children with ASD learn more appropriate behaviors and improve their success in social interactions (Arora et al., 2021).

Children with ASD often experience difficulties with Theory of Mind. They may struggle to understand that others have thoughts, feelings, and beliefs that differ from their own. This difficulty can lead to challenges in communication, social interactions, and understanding others' behavior. Research shows that Theory of Mind-based interventions can enhance the ability of children with ASD to understand and predict the thoughts and emotions of others, which, in turn, leads to improvements in social skills and adaptability (Watson et al., 2021).

Theory of Mind refers to an individual's ability to understand and predict the thoughts, feelings, and intentions of others. This ability forms the foundation of successful social interactions, as it helps individuals exhibit more appropriate social behaviors in various situations. Deficits in Theory of Mind, commonly observed in children with ASD, result in difficulties with social interactions, understanding others' expectations, and appropriately responding to social contexts (Baron-Cohen et al., 1985). Baron-Cohen et al. (2000) demonstrated that deficits in Theory of Mind are a primary cause of impaired social interactions in children with ASD. These children struggle to understand that others may hold beliefs different from their own (Baron-Cohen et al., 2000). Similarly, Frith and Happé (1994) highlighted that the ability to understand others' false beliefs is a critical indicator of Theory of Mind. Enhancing this ability improves social interactions (Frith & Happé, 1994). Furthermore, Zhao and Deng (2020) found that Theory of Mind-based therapeutic interventions significantly increased social skills in children with ASD by improving their ability to predict and interpret others' behaviors (Zhao & Deng, 2020).

On the other hand, Theory of Mind directly impacts individuals' adaptability in social and daily environments. Adaptability refers to the ability to manage various situations and respond effectively to environmental changes. Theory of Mind helps individuals adjust their behavior to new circumstances, establish effective interpersonal relationships, and manage conflicts. Tager-Flusberg and Joseph (2005) demonstrated that deficits in Theory of Mind impair the ability of children with ASD to manage social

situations and environmental changes, directly affecting their adaptability (Tager-Flusberg & Joseph, 2005). Similarly, the study by Hughes et al. (2011) showed that Theory of Mind-enhancing interventions improved children's ability to interact with their environment and solve social problems, leading to increased adaptability in diverse settings (Hughes & Devine, 2011).

Hadwin et al. (1997) showed that Theory of Mind-based interventions could significantly improve social skills in children with ASD (Hadwin et al., 1997). Fischer and Happé (2005) demonstrated that Theory of Mind training enhances children's ability to understand others' intentions and engage in more successful social interactions (Fisher & Happé, 2005).

Conversely, some studies have reported inconsistent findings. For example, Sobel and Capps (2001) found that improvements in Theory of Mind do not necessarily lead to better social behaviors. Factors such as family environment and individual child characteristics serve as moderators. These findings suggest that Theory of Mind interventions alone may not be effective for all children with ASD (Sobel & Capps, 2001).

Despite studies like those by Lind and Bowler (2009) on the effectiveness of Theory of Mind-based interventions, significant gaps remain in this area (Lind & Bowler, 2009). Many studies have focused solely on the impact of interventions on Theory of Mind itself, with less attention given to the long-term outcomes of these interventions on social skills and adaptability. Additionally, contradictory findings regarding the effectiveness of interventions across different age groups and ASD severity levels indicate the need for more comprehensive and systematic research.

## 2. Methods and Materials

### 2.1. Study Design and Participants

This study is applied in terms of its goal and employed a quasi-experimental design with a pretest-posttest format, including an experimental group and a control group, and a two-month follow-up period. The participants were 105 boys aged 6 to 10 years with high-functioning autism referred to the Ferdows Autism Disorder Treatment and Rehabilitation Center in Karaj in 2024. From this population, 36 children were selected through convenience sampling and randomly assigned to two groups of 18 participants each (experimental and control). The research tools included the Autism Social Skills Profile by Bellini and Hopf (2007) and

the Children's Adaptability Questionnaire by Dekhanchi (1988).

### 2.2. Measures

#### 2.2.1. Social Skills

This 48-item questionnaire, developed by Bellini and Hopf (2007), is designed specifically for treatment planning and assessing therapeutic progress. It measures a wide range of social behaviors in children and adolescents with Autism Spectrum Disorder (ASD) aged 6 to 17 years and is particularly sensitive to therapeutic changes. The questionnaire can be completed by a parent, teacher, or any adult familiar with the child's social behavior. It takes approximately 15 to 20 minutes to complete, with items rated on a four-point Likert scale from 1 = Never to 4 = Always. Higher scores indicate more positive social behaviors. The reliability coefficient of the Autism Social Skills Profile, measured using the test-retest method with a three-week interval, was reported as 0.97. Component reliability scores for social interaction, social participation, and harmful social behaviors were 0.96, 0.74, and 0.96, respectively (Moghim-Islam et al., 2013).

#### 2.2.2. Adaptability

This 37-item, unidimensional questionnaire was designed and developed by Dokhanchi (1988) to assess children's level of adaptability. It categorizes adaptability into five levels: very low, low, moderate, high, and very high. Scores range from 0 to 111. Adaptability is evaluated across the following levels: very low (scores below 52), low (scores between 52 and 65), moderate (scores between 65 and 77), high (scores between 77 and 90), and very high (scores above 90). Items are scored on a four-point Likert scale, ranging from 0 = Never to 4 = Most of the time. The questionnaire is completed by the child's mother or teacher, who is more familiar with their behavioral status. The questionnaire's reliability, using the split-half method, was reported as 0.79, and its validity was reported as 0.81 in Dokhanchi's (1998) study (Tohidi Manesh et al., 2022; Zayer et al., 2020).

### 2.3. Intervention

#### 2.3.1. Therapeutic Interventions Based on Theory of Mind

Theory of Mind, introduced by Simon Baron-Cohen, Alan Leslie, and Uta Frith (1985), is particularly relevant for

children with Autism Spectrum Disorder. The intervention protocol included eight therapeutic sessions based on Theory of Mind techniques. These sessions were implemented after participant selection and parental briefing. Details regarding the study objectives, session start and end times, ethical considerations, and assurance of no harm to the children were explained to the parents. Additionally, parents were advised that participants should not attend similar classes to ensure the validity of the assessment. Following the initial evaluation, students entered the treatment program. The intervention consisted of eight sessions conducted over four weeks, with two sessions per week (Salehi Kamroodi et al., 2022).

**Session 1: Introduction and Familiarization**

The child is introduced to the therapist and the play therapy room. This session focuses on creating a comfortable and trusting environment for the child, allowing them to explore the space and build a rapport with the therapist through engaging and non-directive play activities.

**Session 2: Selecting a Game and Learning About Happiness**

The child engages with tools such as emotion-identification books or balls featuring different emotional expressions. The therapist asks the child to choose one and teaches the emotion of happiness during play, incorporating simple and interactive explanations to reinforce the concept.

**Session 3: Introducing the Emotions of Joy and Sadness**

The child selects between toys such as balls or cars with happy and sad designs. During play, the therapist introduces and explains the emotions of joy and sadness, ensuring the child begins to distinguish between these emotional states through interactive storytelling and examples.

**Session 4: Interactive Games and Social Engagement**

The therapist hides toys and engages in interactive activities like tickling or playing chase games. The child's emotions are observed and verbalized by the therapist, who uses this opportunity to enhance social interaction and emotional expression in a playful and supportive context.

**Session 5: Joint Attention and Learning Four Primary Emotions**

Four pictures representing emotions (happiness, sadness, fear, and anger) are displayed on the wall. While playing, the child is encouraged to observe these images, and the therapist teaches the associated emotions. This session fosters joint attention and deepens the child's understanding of core emotional states.

**Session 6: Storytelling and Emotion Recognition**

The child looks at a book featuring images of various emotions. The therapist explains each emotion in the book and prompts the child to demonstrate specific emotions or match them with others. This activity helps reinforce emotion recognition and expressive skills.

**Session 7: Imitation Games and Enhancing Eye Contact**

The therapist performs simple role-playing demonstrations of various emotions and encourages the child to imitate these expressions. This session aims to improve the child's ability to express emotions while fostering increased eye contact and interactive skills.

**Session 8: Review and Skill Generalization**

The session focuses on reviewing and consolidating the emotional and social skills learned in previous sessions. The therapist works with the child to apply these skills to everyday environments, ensuring the interventions extend beyond the therapy room and into real-world interactions.

**2.4. Data analysis**

Data analysis was conducted using mixed analysis of variance and SPSS software.

**3. Findings and Results**

The study was conducted with 36 boys aged 6 to 10 years with high-functioning autism. The mean and standard deviation of the participants' age in the experimental group were 7.72 (SD = 1.27), and in the control group, 8.50 (SD = 1.29). An independent t-test indicated no significant age difference between the groups, showing homogeneity ( $t = 1.816, p > .05$ ). Descriptive statistics for social skills and adaptability are reported in Table 1.

**Table 1**

*Means (M) and Standard Deviations (SD) of Social Skills and Adaptability Across Pretest, Posttest, and Follow-up*

Variable	Group	Pretest M (SD)	Posttest M (SD)	Follow-up M (SD)
Social Skills	Experimental	63.28 (7.01)	74.67 (6.52)	75.67 (6.76)
	Control	64.00 (8.41)	64.28 (7.99)	64.06 (8.04)
Adaptability	Experimental	34.11 (7.74)	52.61 (9.26)	52.22 (8.55)
	Control	35.06 (6.29)	35.28 (6.18)	35.17 (5.98)

As observed, the pretest means for the dependent variables were almost identical between groups. However, following the intervention, the means in the posttest stage changed in the experimental group. The significance of these changes was examined using repeated-measures mixed analysis of variance (ANOVA).

According to the assumptions of mixed ANOVA, the Kolmogorov-Smirnov test confirmed the normal distribution of data for social skills ( $z = 0.151, p = .201$ ) and adaptability

( $z = 0.171, p = .176$ ) in both groups. Levene’s test verified the homogeneity of variances for social skills ( $F = 0.497, p = .485$ ) and adaptability ( $F = 0.662, p = .422$ ) at the posttest stage. M Box test results indicated homogeneity of variance-covariance matrices for the study variables ( $p > .05$ ). Since the assumption of sphericity was not met for the study variables, the Greenhouse-Geisser correction was applied for within-group effects. The results of the mixed ANOVA are reported in Table 2.

**Table 2**

*Results of ANOVA for Within-Group and Between-Group Differences*

Variables	Source of Variation	Sum of Squares	df	Mean Squares	F	p-value	Partial Eta Squared
Social Skills	Test	874.741	1.204	726.763	47.656	.001	.584
	Group Membership	1358.231	1	1358.231	9.058	.005	.210
	Test × Group Membership	831.185	1.204	690.575	45.284	.001	.571
Adaptability	Test	2048.463	1.166	1756.427	105.889	.001	.757
	Group Membership	3355.593	1	3355.593	23.149	.001	.405
	Test × Group Membership	1974.463	1.166	1692.977	102.064	.001	.750

As shown in Table 2, the scores for the variables within-group, between-group, and the interaction of test × group were significant across the three measurement stages ( $p <$

$.05$ ). Bonferroni post hoc tests were used for pairwise comparisons, and the results are presented in the following.

**Table 3**

*Bonferroni Post Hoc Test*

Variable	Pairwise Comparison	Mean Difference	Standard Error	p-value
Social Skills	Pretest–Posttest	-5.833*	0.766	.001
	Pretest–Follow-up	-6.222*	0.908	.001
	Posttest–Follow-up	-0.389	0.344	.800
Adaptability	Pretest–Posttest	-9.361*	0.895	.001
	Pretest–Follow-up	-9.111*	0.853	.001
	Posttest–Follow-up	0.250	0.292	1.000

The comparison of means indicates that the intervention effectively improved social skills and adaptability scores in children with Autism Spectrum Disorder. The non-significant differences between the posttest and follow-up stages ( $p > .05$ ) suggest that the results were maintained over time. This indicates the sustained effectiveness of Theory of Mind-based therapeutic interventions in improving social skills and adaptability in children with Autism Spectrum Disorder.

**4. Discussion and Conclusion**

The results of this study demonstrated that Theory of Mind-based therapeutic interventions significantly improved social skills and adaptability in children with Autism Spectrum Disorder (ASD). Statistical analyses

confirmed the research hypotheses, indicating the effectiveness of these interventions in enhancing social skills and adaptability during both posttest and follow-up stages. The findings showed that the effects were not only evident in the short term but also sustained over time, as no significant differences were observed between posttest and follow-up scores.

Previous studies have reported similar findings regarding the effectiveness of Theory of Mind-based interventions. For example, Williams and Happé (2021) found that these interventions could significantly enhance social skills and social interactions in children with ASD. Additionally, Zhao and Deng (2020) emphasized that Theory of Mind interventions improved adaptive behaviors in these children

by increasing their ability to understand others' perspectives and predict social behaviors.

On the other hand, some research, such as that by Sobel and Capps (2001), suggested that while Theory of Mind interventions enhance social-cognitive skills, these improvements do not always generalize to daily social behaviors unless real-life and socially immersive environments are included in the interventions. These discrepancies may be related to the intervention design and implementation conditions (Sobel & Capps, 2001).

Theory of Mind, which involves the ability to understand and predict others' thoughts, emotions, and intentions, is fundamental for successful social interactions and environmental adaptability. Children with ASD often lack these skills, leading to communication and social challenges. Structured interventions based on Theory of Mind strengthen the understanding of others' perspectives, improving these abilities and helping children exhibit more appropriate social behaviors and greater adaptability. The stability of results during follow-up indicates that these interventions achieved lasting improvements in social skills and adaptability.

Prior studies have highlighted the importance of social interventions. For instance, Hadwin et al. (1997) reported that Theory of Mind-based interventions increase social interaction abilities, provided real-life environments are simulated during training (Hadwin et al., 1997). Similarly, Lind and Bowler (2009) found that combining Theory of Mind training with group interactions enhanced the effectiveness of the interventions (Lind & Bowler, 2009). This study, by focusing on standardized structures and continuous monitoring at various stages, provides additional evidence supporting these interventions.

Based on the data and results of this study, it can be concluded that Theory of Mind-based therapeutic interventions are effective in improving the social skills and adaptability of children with ASD and that these effects are sustained over time. This finding suggests that enhancing perspective-taking and the ability to predict social behaviors can serve as a key approach for empowering children with ASD in their social interactions and daily environments. However, incorporating more diverse and realistic environments into future interventions is crucial to enhance the generalizability of the results. Moreover, conducting comparative research with other intervention approaches could help identify the most effective methods for supporting these children.

The overall conclusion of this study highlights that designing interventions aimed at strengthening Theory of Mind can be a significant step toward improving the quality of life for children with ASD.

One of the limitations of this study was the lack of full generalizability of the learned social skills to environments beyond the therapeutic center. Due to limited access to settings such as playgrounds, classrooms, homes, and other everyday social environments, it was not possible to evaluate the effectiveness of interventions under diverse conditions. This limitation is similar to many studies on social skills training in children with ASD. It is recommended that future studies implement Theory of Mind-based social skills training in various environments, including homes, classrooms, playgrounds, and other real-life settings. Involving individuals such as parents, teachers, and peers as facilitators could enhance the generalizability and effectiveness of the learned skills. Furthermore, comparative studies examining the effectiveness of Theory of Mind-based interventions relative to other approaches are recommended. Such research could help identify the strengths and weaknesses of different interventions and lead to the development of more comprehensive therapeutic programs for improving social skills and adaptability in children with ASD.

### Authors' Contributions

Authors contributed equally to this article.

### Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

### Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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### Declaration of Interest

The authors report no conflict of interest.

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## Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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