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Psychometric Properties of the Persian Version of the Autism Social Skills Profile

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A B S T R A C T

The present study was conducted to determine the psychometric properties and examine the factor structure of the Persian version of the Autism Social Skills Profile (ASSP) in children with Autism Spectrum Disorder (ASD). The current study was descriptive-analytical in nature and was conducted within the framework of psychometric research. The statistical population included all children with Autism Spectrum Disorder in the city of Tehran. From this population, a sample of 420 children and adolescents aged 6 to 17 years was selected, including two groups of 210 participants each: one group with typical development and the other consisting of individuals with autism spectrum disorder. Participants were randomly selected from regular schools, autism schools, and autism centers in Iran. Fifteen participants from each group also participated in the test–retest procedure. The instruments used in this study included the Autism Social Skills Profile (ASSP) and the Gilliam Autism Rating Scale-Second Edition (GARS-2). Data were analyzed using Confirmatory Factor Analysis (CFA), internal consistency indices (Cronbach's alpha), temporal stability (test–retest reliability), and convergent validity analysis. The results of the confirmatory factor analysis indicated that the measurement models demonstrated satisfactory fit within the Iranian population. Reliability coefficients (Cronbach's alpha and test–retest reliability) for both scales were calculated at a significant level ($p < .001$), indicating high stability and internal consistency of the instruments. Furthermore, the significant negative correlations between the scores of the studied instruments and the GARS-2 scale confirmed the convergent validity and clinical discriminative validity of the instruments. The Persian version of the Autism Social Skills Profile demonstrated strong psychometric properties and can be considered an effective instrument for clinical assessment and monitoring of educational interventions in children with Autism Spectrum Disorder within the Iranian cultural context. The application of these instruments in rehabilitation centers may substantially contribute to more accurate diagnosis and the development of individualized treatment programs.

Keywords: *Autism Spectrum Disorder, Social Skills, Psychometric Properties, Confirmatory Factor Analysis.*

1. Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by persistent deficits in social communication and social interaction, alongside restricted and repetitive patterns of behavior, interests, and activities. Among the core manifestations of ASD, impairments in social skills and social communication are considered some of the most challenging difficulties affecting children and adolescents across developmental stages. These impairments often interfere with peer relationships, academic performance, emotional adjustment, adaptive functioning, and long-term quality of life (Reddy & J, 2023; Silveria- Zaldivar et al., 2023). Social interaction difficulties in children with ASD may include reduced eye contact, impaired reciprocal communication, limited understanding of social cues, difficulty initiating and maintaining conversations, and deficits in emotional reciprocity. Consequently, the development and assessment of social competence in this population have become central concerns in both clinical and educational contexts (Howard et al., 2023; Karna & Stefaniuk, 2024).

Over the past two decades, increasing attention has been directed toward identifying effective interventions to improve social skills among children with ASD. Contemporary evidence suggests that social competence is not a static characteristic but rather a modifiable developmental domain that can improve through structured intervention, environmental support, and adaptive educational programs (Heidarzadeh et al., 2023; Wattanawongwan et al., 2023). Social skills interventions have included a broad range of approaches such as applied behavior analysis (ABA), peer-mediated interventions, play-based interventions, sports and motor activities, parent training programs, video modeling, and technology-assisted learning strategies (Bordini et al., 2024; O'Keeffe & McNally, 2023; Soares et al., 2021). Although many of these interventions have demonstrated promising outcomes, their effectiveness largely depends on accurate assessment tools capable of identifying social deficits, monitoring treatment progress, and evaluating intervention outcomes.

Social skills are multidimensional constructs encompassing social interaction, social participation, communication abilities, emotional responsiveness, and behavioral adaptability. In children with ASD, deficits in these domains frequently coexist with motor impairments, executive dysfunction, and sensory processing difficulties, which collectively influence social functioning (Howard et al., 2023; Wang et al., 2022). Recent findings indicate that gross motor impairments are significantly associated with lower levels of social competence in autistic children, suggesting that social and motor development are deeply interconnected developmental processes (Wang et al., 2022). Similarly, sensory integration-based sports training has been shown to improve both motor coordination and social skills among children with ASD, highlighting the role of embodied and experiential learning in social development (Wen & Wu, 2025). Such findings emphasize the necessity of comprehensive assessment instruments capable of capturing various dimensions of social behavior in autism.

The increasing prevalence of ASD worldwide has further amplified the need for valid and reliable assessment tools. Early diagnosis and timely intervention have been consistently associated with better developmental outcomes, particularly in social communication and adaptive behavior (Howard et al., 2023; Reddy & J, 2023). However, the diagnostic and evaluative process in ASD remains complex due to the heterogeneity of symptom presentation across individuals. Children with autism may exhibit substantial variability in language abilities, cognitive functioning, behavioral profiles, and social responsiveness. Therefore, psychometrically sound instruments are essential not only for diagnosis but also for distinguishing different levels and patterns of social functioning among autistic individuals (Silveria- Zaldivar et al., 2023; West & Silverman, 2021).

The importance of culturally adapted assessment tools has also been increasingly recognized in autism research. Many social skills measures have been developed in Western contexts and may not fully capture culturally specific expressions of social behavior in non-Western populations. Cultural norms influence social expectations, interpersonal communication styles, emotional expression, and behavioral interpretation, all of which affect how social competence is perceived and evaluated (Monahan et al., 2023; West & Silverman, 2021). Consequently, the adaptation and validation of social skills instruments in different cultural settings are necessary to ensure conceptual equivalence, linguistic accuracy, and measurement validity.

The Autism Social Skills Profile (ASSP) is one of the specialized instruments designed to assess social functioning in children and adolescents with ASD. This instrument evaluates several domains of social behavior, including social reciprocity, social participation, and detrimental social behaviors. Compared with broader autism diagnostic scales, the ASSP specifically focuses on the practical and

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behavioral dimensions of social competence, making it particularly useful for clinical assessment and intervention monitoring (West & Silverman, 2021). The ASSP has been utilized in various studies examining intervention effectiveness and developmental outcomes in autism populations. Its multidimensional structure allows clinicians and researchers to identify specific areas of social difficulty and to tailor intervention programs accordingly.

Several studies have highlighted the importance of evidence-based social skills assessment in autism intervention programs. A meta-analysis conducted by Soares et al. demonstrated that both face-to-face and technology-assisted social skills interventions produced moderate to strong effects in improving social competence among children with ASD (Soares et al., 2021). Likewise, Wattanawongwan et al. reported that interventions targeting social communication skills among adolescents and adults with ASD yielded significant improvements in interpersonal functioning and adaptive social behaviors (Wattanawongwan et al., 2023). These findings underscore the necessity of reliable assessment tools for evaluating intervention effectiveness and tracking behavioral change over time.

Play-based interventions have also emerged as effective approaches for improving social communication skills in children with autism. O'Keeffe and McNally emphasized that structured play-based educational interventions can enhance social reciprocity, peer interaction, and communicative engagement among autistic children (O'Keeffe & McNally, 2023). Similarly, adapted sports programs and physical activities have demonstrated positive effects on both psychosocial and motor functioning in children with ASD. Morales et al. found that participation in adapted judo programs significantly improved social behaviors and emotional regulation among autistic children (Morales et al., 2022). Levante et al. further reported that sports participation contributes not only to physical development but also to improvements in social integration and interpersonal competence (Levante et al., 2023). These findings support the conceptualization of social skills as dynamic and trainable capacities that can be enhanced through structured environmental experiences.

Peer relationships also play a central role in the social development of children with ASD. Karna and Stefaniuk emphasized that positive peer interactions contribute substantially to emotional adjustment, communication development, and social inclusion among autistic children (Karna & Stefaniuk, 2024). Nonetheless, many children with ASD experience social isolation, peer rejection, or limited opportunities for meaningful social engagement. Effective assessment tools can help identify specific interpersonal challenges and guide interventions aimed at facilitating peer acceptance and social participation.

Recent intervention models have increasingly incorporated autistic perspectives into the design and implementation of social skills programs. Monahan et al. noted that involving autistic individuals in the development of social interventions can enhance program relevance, acceptability, and ecological validity (Monahan et al., 2023). This shift reflects broader movements toward neurodiversity-informed practices and individualized intervention planning. Accordingly, social skills assessment instruments must be sufficiently flexible and sensitive to capture the diverse experiences and behavioral profiles of autistic individuals across different contexts and developmental stages.

Psychometric evaluation is a fundamental process in determining the scientific adequacy of psychological instruments. Reliability indices such as internal consistency and test–retest stability provide evidence regarding measurement precision and temporal stability, whereas validity analyses evaluate whether an instrument accurately measures the intended construct (West & Silverman, 2021). Factor analysis, particularly confirmatory factor analysis (CFA), is widely used to examine the structural validity of assessment tools and to determine whether empirical data fit the theoretical model underlying the instrument. In autism research, psychometric validation is particularly important because social behavior is multifaceted and influenced by developmental, cognitive, and contextual factors.

Previous studies have demonstrated the effectiveness of structured social interventions in improving adaptive social functioning among autistic children. Drüsedau et al. examined the Tübinger Training for Autism Spectrum Disorders (TüTASS) and reported improvements in self-perception and social skills among children with ASD following participation in structured group interventions (Drüsedau et al., 2023). Similarly, Inci and Saglam found that interactive art activity programs significantly reduced repetitive behaviors while improving social skills and parental emotional outcomes in children with ASD (Inci & Saglam, 2025). Ranjbar et al. also demonstrated that social adaptation enhancement packages contributed to improvements in social adaptation among autistic children (Ranjbar et al., 2023). Collectively, these studies indicate that social functioning can improve substantially when

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interventions are guided by valid assessment frameworks and individualized treatment planning.

Despite growing international research on social skills interventions and assessment in autism, there remains a limited number of psychometrically validated Persian-language instruments specifically designed to evaluate social skills in Iranian children with ASD. Existing assessment tools are often translated without comprehensive validation procedures, potentially limiting their reliability and cultural applicability. Furthermore, differences in social norms, educational systems, family dynamics, and communication patterns may affect how social behaviors are expressed and interpreted within Iranian society. Therefore, the adaptation and psychometric evaluation of specialized instruments such as the Autism Social Skills Profile are essential for improving clinical assessment, research quality, and intervention planning in Iran.

In addition to diagnostic utility, validated social skills measures have important implications for rehabilitation services, educational programming, and therapeutic outcome evaluation. Rehabilitation centers, schools, psychologists, speech therapists, and special education professionals require accurate instruments to assess baseline functioning, identify strengths and weaknesses, and monitor developmental progress over time. Reliable measurement tools also facilitate evidence-based practice by enabling researchers and clinicians to evaluate the effectiveness of intervention programs across diverse populations and settings (Soares et al., 2021; West & Silverman, 2021).

Given the increasing need for culturally appropriate assessment instruments for children with ASD in Iran, and considering the importance of psychometrically sound measures for evaluating social competence and intervention outcomes, the present study aimed to examine the psychometric properties and factor structure of the Persian version of the Autism Social Skills Profile (ASSP) among Iranian children and adolescents with Autism Spectrum Disorder.

2. Methods and Materials

2.1. Study Design and Participants

The present study was conducted using a descriptive-analytical design within the framework of psychometric research. The statistical population consisted of all children and adolescents aged 6 to 17 years with Autism Spectrum Disorder (ASD), as well as children and adolescents with typical development in Iran. Considering the objectives of the study and the necessity of evaluating the psychometric properties of the instruments, the sample size was determined according to the recommendations of Klein (2005), who suggested that at least 5 to 10 participants should be considered for each questionnaire item in factor analytic and validation studies. Based on this criterion and with the aim of achieving adequate statistical power, a total sample of 400 participants was selected, including 200 children and adolescents diagnosed with ASD and 200 typically developing participants.

Cluster random sampling was employed in this study. This sampling strategy is considered appropriate in situations where direct access to a complete national sampling frame is not feasible or where the target population is geographically dispersed. Accordingly, clusters were randomly selected from rehabilitation centers, autism schools, support associations, and regular schools. Due to health-related considerations and accessibility issues, parents or primary caregivers completed the questionnaires online after receiving a detailed explanation regarding the objectives and procedures of the study. In addition, 15 participants from each group participated in the test–retest procedure in order to evaluate temporal stability.

Participants in the ASD group were selected based on inclusion criteria including age range between 6 and 17 years, confirmed diagnosis of ASD by clinical specialists, and absence of concurrent specialized therapeutic interventions during the data collection period. Exclusion criteria included severe physical or intellectual disabilities that could interfere with accurate assessment and questionnaire completion. Ethical considerations were fully observed throughout the study process. Parents and caregivers were informed about the aims of the research, the confidentiality of the data, and the voluntary nature of participation, and informed consent was obtained from all participants prior to data collection.

2.2. Measures

The Autism Social Skills Profile (ASSP) was originally developed by Bellini and Hopf in 2007 to assess the social skills of children and adolescents with Autism Spectrum Disorder. The instrument is designed for individuals aged 6 to 17 years and can be completed by parents, teachers, or other adults familiar with the child's social behaviors. The questionnaire consists of 45 items rated on a four-point Likert scale ranging from "Never" to "Always," and completion typically requires approximately 15 to 20

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minutes. Higher scores indicate more positive social behaviors. Most items are positively worded, whereas negatively worded items are reverse scored. Exploratory factor analysis identified three distinct dimensions, including Social Reciprocity (23 items), Social Participation/Avoidance (12 items), and Detrimental Social Behaviors (10 items). Previous findings demonstrated acceptable internal consistency and test–retest reliability for all three subscales. In an Indian validation study, Cronbach's alpha coefficients of 0.93 and internal consistency coefficients of 0.90 were reported. Principal component analysis further confirmed the three-factor structure of the instrument, including Social Reciprocity, Social Participation, and Detrimental Social Behavior. Reported Cronbach's alpha coefficients for the three dimensions were 0.92, 0.89, and 0.85, respectively, while test–retest reliability coefficients were reported as 0.89, 0.86, and 0.86. In the present study, the Persian translation of the ASSP was used in order to evaluate its validity and reliability among Iranian children and adolescents with ASD.

The Gilliam Autism Rating Scale–Second Edition (GARS-2) was also used in this study as a criterion measure for assessing autism-related symptoms. The GARS-2 was developed by Gilliam for the identification and assessment of autism in individuals aged 3 to 22 years and can be completed by parents, caregivers, or educational and clinical professionals. The scale includes three subscales: Stereotyped Behaviors, Communication, and Social Interaction. Items are scored on a four-point scale including "Never," "Seldom," "Sometimes," and "Frequently," corresponding to scores of 0 to 3, respectively. The Persian version of the GARS-2 was translated and adapted at the Isfahan Autism Center, and its face and content validity were confirmed by experts and specialists in the field. Construct validity was assessed through correlations with related instruments, yielding a correlation coefficient of 0.80. Diagnostic validity was evaluated through discriminant analysis by comparing scores between children with ASD and healthy controls. The cut-off score of the test was reported as 52, while sensitivity and specificity values were found to be 99% and 100%, respectively. Cronbach's alpha coefficient for the Persian version of the scale was reported as 0.89, indicating satisfactory reliability. In the present study, the GARS-2 was used as a criterion instrument to assess autism symptoms and to evaluate convergent validity between the ASSP and autism severity indicators.

Before the administration of the instruments, a rigorous back-translation procedure was conducted to ensure linguistic and cultural equivalence of the Persian versions. Initially, two bilingual psychology specialists translated the original English questionnaires into Persian. Subsequently, two linguistics experts independently translated the Persian versions back into English. The translated versions were then compared with the original instruments, and necessary modifications were made to eliminate semantic ambiguities and ensure conceptual consistency with the original scales.

2.3. Data Analysis

The collected data were first screened carefully in order to enhance statistical accuracy and reduce error variance. All completed questionnaires were reviewed, and forms containing substantial missing responses, technical errors, or multiple responses to single items were excluded from the final dataset. This strict data-screening process improved the quality and integrity of the data entered into the statistical software.

To evaluate temporal stability, a test–retest procedure was conducted on a subgroup of 15 participants. Parents or caregivers of these participants were asked to complete the questionnaires again after a three-week interval, and the correlations between the two administrations were calculated. All statistical analyses were performed using SPSS version 22. Internal consistency reliability was assessed using Cronbach's alpha coefficients, while test–retest reliability was evaluated through correlation analysis. Confirmatory Factor Analysis (CFA) was conducted to examine the factor structure and construct validity of the Persian version of the ASSP. In addition, convergent validity and criterion-related validity were assessed through correlations between the ASSP scores and the GARS-2 scores. These analyses were performed to determine the psychometric adequacy and clinical applicability of the Persian version of the Autism Social Skills Profile in the Iranian population.

3. Findings and Results

In this study, a total of 420 individuals participated. To describe the demographic characteristics of the sample, the variables of child gender, child age, and diagnostic grouping were examined. The results are presented in the following table.

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Table 1

Demographic Characteristics of the Sample

Variable	Category	Frequency (N)	Percentage (%)
Child gender	Girl	159	37.9
	Boy	261	62.1
Child age	6 years	84	20.0
	7 years	43	10.2
	8 years	33	7.9
	9 years	50	11.9
	10 years	40	9.5
	11 years	24	5.7
	12 years	24	5.7
	13 years	27	6.4
	14 years	23	5.5
	15 years	20	4.8
	16 years	17	4.0
	17 years	32	7.6
	18 years	3	0.7
Diagnostic grouping	Typical development	210	50.0
	Autism	210	50.0
Autism subgroup	Autism Spectrum Disorder (ASD)	116	27.6
	Autism + ADHD	73	17.4
	Autism + intellectual disability	16	3.8
	Autism + physical disability	5	1.2

Note: The results showed that boys constituted the majority of the sample, and the highest age frequency was related to 6-year-old children. Moreover, the research sample was equally divided between the typical-development group and the autism group. Among the autism subgroups, the highest frequency belonged to pure autism, followed by autism comorbid with ADHD.

Table 2 reports the descriptive indices, including maximum, minimum, mean, and standard deviation, for the research components.

Table 2

Scores and Descriptive Indices of the Research Variables

Component	Minimum	Maximum	Mean	Standard Deviation	Skewness	Kurtosis
Social Interaction	1	69	32.2	20.1	0.23	-1.09
Social Participation	1	39	16.5	10.6	0.24	-1.10
Detrimental Social Behavior	10	43	28.9	8.4	-0.18	-0.76
Autism Social Skills Profile (ASSP)	13	148	77.5	35.3	0.28	-0.97

The results of the Kolmogorov–Smirnov test for each research variable are presented in Table 3. Since the significance level for all variables is less than .05, the null hypothesis regarding the normality of the distribution of these components is rejected at the 95% confidence level.

Table 3

Results of the Kolmogorov–Smirnov Test for Assessing Normality of the Research Components

Component	Significance Level	Hypothesis Confirmed	Result
Social Interaction	.03	H1	Non-normal
Social Participation	.00	H1	Non-normal
Detrimental Social Behavior	.12	H1	Normal
Autism Social Skills Profile (ASSP)	.06	H1	Normal

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The results of the Kolmogorov–Smirnov test indicated that the distribution of the research components was non-normal; therefore, appropriate nonparametric statistical methods were used to examine the research hypotheses.

The data collected from the Iranian cultural context fit the factor structure confirmed by the developers of the "Autism Social Skills Profile."

Confirmatory factor analysis was used to address this hypothesis.

The AMOS output (Figure 1) shows the measurement model of the Autism Social Skills Profile (ASSP) in the standardized estimation mode. According to the results of this diagram, because the RMSEA value is also less than 0.10, it can be concluded that the model has an acceptable fit.

Figure 1

Measurement model of the Autism Social Skills Profile (ASSP) questionnaire using structural equation modeling in standardized estimation mode before model modification.

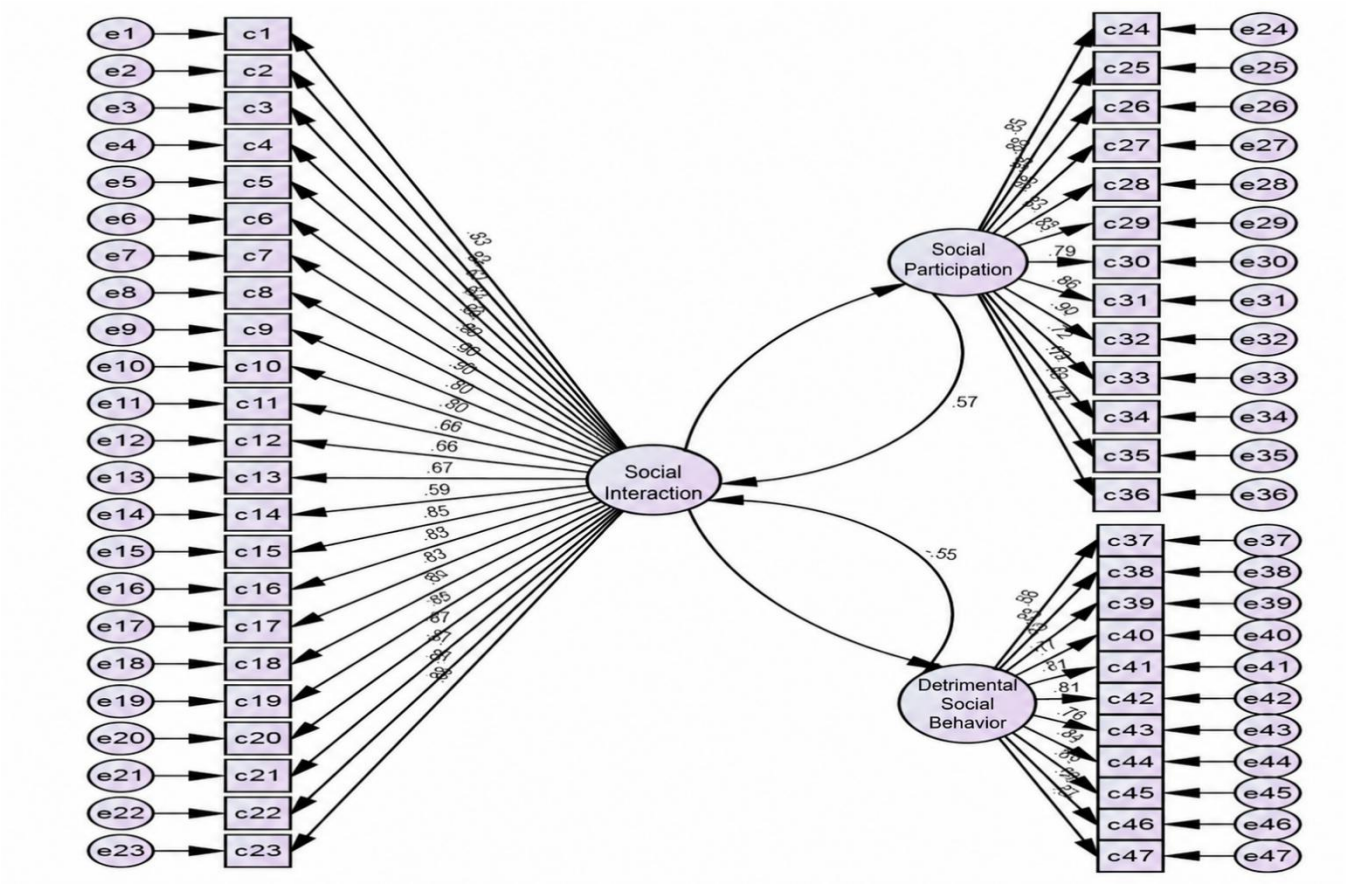

Table 4

Model Fit Indices for the Autism Social Skills Profile (ASSP)

Fit Index Type	Fit Index	Value	Criterion	Interpretation
Absolute	χ^2	2557.81 with 1020 df	$\chi^2/df = 2.51$, less than 3	Desirable fit
Absolute	Goodness-of-Fit Index (GFI)	0.91	Greater than 0.90	Desirable fit
Comparative	Incremental Fit Index (IFI)	0.91	Greater than 0.90	Desirable fit
Comparative	Comparative Fit Index (CFI)	0.91	Greater than 0.90	Desirable fit
Parsimonious	Root Mean Square Error of Approximation (RMSEA)	0.08	Less than 0.10	Desirable fit
Parsimonious	Parsimonious Normed Fit Index (PNFI)	0.80	Greater than 0.05	Desirable fit

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To test whether the measurement model of the Emotion Regulation and Social Skills Questionnaire had an acceptable fit, model fit indices were used. In structural equation modeling, with emphasis on AMOS software, three groups of fit indices should be used to determine model fit: absolute, comparative, and parsimonious fit indices. Based on the results in Table 5, the χ^2 statistic was 794.01 with 309 degrees of freedom, and the χ^2/df ratio was 2.57. Since this value is less than 3, it indicates model confirmation. The Goodness-of-Fit Index (GFI) was 0.93, indicating an acceptable level for desirable model fit. The Root Mean Square Error of Approximation (RMSEA), another goodness-of-fit index, was 0.05, which is acceptable because it is less than 0.10 and indicates confirmation of the research model. Other goodness-of-fit indices for structural equation modeling were as follows: the Comparative Fit Index (CFI) was 0.92, and the Parsimonious Normed Fit Index (PNFI) was 0.37. All of these indices indicate that the measurement model of the Emotion Regulation and Social Skills Questionnaire (ERSSQ) fits the collected data.

To examine all questionnaire items together, first-order confirmatory factor analysis was performed using AMOS software. The t values and factor loadings of each item are presented. In the initial analyses, items that did not have appropriate factor loadings and items with nonsignificant t values were removed from the analysis process. The remaining items were then analyzed, and confirmatory factor analysis was performed as a modified model by establishing covariance between error terms.

Table 5

Confirmatory Factor Analysis of the Emotion Regulation and Social Skills Questionnaire (ERSSQ)

Item	t Value	r Value	Item	t Value	r Value
a27	—	0.74	a13	18.46	0.86
a26	13.48	0.57	a12	17.69	0.82
a25	16.81	0.79	a11	16.18	0.76
a24	17.96	0.84	a10	15.72	0.74
a23	18.29	0.85	a9	13.73	0.66
a22	17.06	0.80	a8	14.26	0.68
a21	17.56	0.82	a7	13.80	0.66
a20	19.21	0.89	a6	7.37	0.36
a19	19.36	0.90	a5	13.87	0.66
a18	19.32	0.89	a4	14.37	0.68
a17	18.69	0.87	a3	12.34	0.59
a16	17.38	0.81	a2	12.22	0.59
a15	2.84	0.14	a1	10.49	0.51
a14	17.61	0.82			

Table 5 reports the fit indices of the confirmatory factor analysis of the Emotion Regulation and Social Skills Questionnaire (ERSSQ). The results indicate an acceptable error value and an appropriate fit of the model to the questionnaire data. Therefore, the results of Table 5 show that all indices and all items are significant at the 99% level ($\pm 2.58 \leq t$). These findings indicate that the items are consistent with the theoretical construct of the questionnaire and that the model fit is appropriate.

To test whether the measurement model of the Autism Social Skills Profile (ASSP) had an acceptable fit, model fit indices were used. In structural equation modeling, with emphasis on AMOS software, three groups of fit indices should be used to determine model fit: absolute, comparative, and parsimonious fit indices.

Based on the results in Table 5, the χ^2 statistic was 2257.81 with 1020 degrees of freedom, and the χ^2/df ratio was 2.51. Since this value is less than 3, it indicates model confirmation. The Goodness-of-Fit Index (GFI) was 0.90, indicating an acceptable level for desirable model fit. The Root Mean Square Error of Approximation (RMSEA), another goodness-of-fit index, was 0.08, which is acceptable because it is less than 0.10 and indicates confirmation of the research model. Other goodness-of-fit indices for structural equation modeling were as follows: the Comparative Fit Index (CFI) was 0.91, and the Parsimonious Normed Fit Index (PNFI) was 0.80. All of these indices indicate relative fit and confirmation of the measurement model of the Autism Social Skills Profile (ASSP).

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Table 6

Confirmatory Factor Analysis of the Autism Social Skills Profile (ASSP)

Social Interaction Item	t Value	r Value	Social Participation Item	t Value	r Value
c23	—	0.89	c24	—	0.85
c22	23.87	0.82	c25	30.07	0.89
c21	16.37	0.65	c26	25.31	0.88
c20	24.77	0.83	c27	24.16	0.86
c19	25.87	0.85	c28	22.70	0.83
c18	26.66	0.86	c29	25.41	0.88
c17	27.49	0.88	c30	20.76	0.79
c16	24.33	0.83	c31	24.34	0.86
c15	25.40	0.84	c32	26.39	0.90
c14	14.15	0.59	c33	18.24	0.72
c13	17.02	0.67	c34	22.83	0.83
c12	16.65	0.66	c35	19.34	0.75
c11	29.37	0.90	c36	2.56	0.12
c10	24.21	0.82			
c9	29.06	0.90			
c8	26.82	0.87			
c7	28.77	0.89			
c6	27.19	0.87			
c5	26.11	0.85			
c4	25.64	0.85			
c3	16.97	0.67			
c2	24.11	0.83			
c1	24.44	0.828			

Detrimental Social Behavior Item	t Value	r Value
c37	—	0.56
c38	11.31	0.70
c39	11.14	0.69
c40	12.38	0.82
c41	11.95	0.77
c42	12.35	0.81
c43	11.85	0.76
c44	12.59	0.84
c45	11.12	0.68
c46	12.24	0.80
c47	5.21	0.27

To examine all questionnaire items together, first-order confirmatory factor analysis was performed using AMOS software. Table 4-12 presents the t values and factor loadings of each item. In the initial analyses, items that did not have appropriate factor loadings and items with nonsignificant t values were removed from the analysis process. The remaining items were then analyzed, and confirmatory factor analysis was performed as a modified model by establishing covariance between error terms.

In Table 4-12, the fit indices of the confirmatory factor analysis were used to examine all questionnaire items together through first-order confirmatory factor analysis using AMOS software. Table 5 presents the t values and factor loadings of each item. If, in the initial analyses, some items had inappropriate factor loadings or nonsignificant t values, they should have been removed from the set; however, no such item existed in the present questionnaire. Moreover, all remaining items were analyzed, and confirmatory factor analysis was reported as a modified model by establishing covariance between error terms. The results indicate an acceptable error value and an appropriate fit of the model to the questionnaire data. The results of Table 5 show that all indices and all items are significant at the 99% level ($\pm 2.58 \leq t$). These findings indicate that the items belong to a single construct. Therefore, the data collected from the Iranian cultural context fit the factor structure confirmed by the developers of the "Autism Social Skills Profile."

To estimate internal consistency among the items, Cronbach's alpha was used for reliability estimation, defined

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as the ratio of the sum of the true variances of the items to the sum of the true variances of the items plus the sum of error variances. To determine the reliability of the questionnaire, Cronbach's alpha and retesting were used, and the Cronbach's alpha results are presented in Table 6.

Table 7

Cronbach's Alpha for the Internal Consistency of the Items of the Autism Social Skills Profile (ASSP)

Social Interaction Item	Correlation with Total Score	Coefficient if Deleted	Social Participation Item	Correlation with Total Score	Coefficient if Deleted
c1	0.81	0.98	c24	0.83	0.98
c2	0.80	0.98	c25	0.84	0.98
c3	0.67	0.98	c26	0.84	0.98
c4	0.82	0.98	c27	0.81	0.98
c5	0.84	0.98	c28	0.80	0.98
c6	0.84	0.98	c29	0.85	0.98
c7	0.86	0.98	c30	0.76	0.98
c8	0.84	0.98	c31	0.83	0.98
c9	0.86	0.98	c32	0.87	0.98
c10	0.80	0.98	c33	0.68	0.98
c11	0.87	0.98	c34	0.80	0.98
c12	0.65	0.98	c35	0.70	0.98
c13	0.66	0.98	c36	0.21	0.98
c14	0.56	0.98			
c15	0.82	0.98			
c16	0.81	0.98			
c17	0.85	0.98			
c18	0.85	0.98			
c19	0.83	0.98			
c20	0.82	0.98			
c21	0.64	0.98			
c22	0.81	0.98			
c23	0.86	0.98			

Detrimental Social Behavior Item	Correlation with Total Score	Coefficient if Deleted
c37	0.28	0.98
c38	0.51	0.98
c39	0.40	0.98
c40	0.58	0.98
c41	0.46	0.98
c42	0.49	0.98
c43	0.49	0.98
c44	0.65	0.98
c45	0.46	0.98
c46	0.63	0.98
c47	0.57	0.98

The results presented in Table 6, which concern the internal consistency of the items of the Autism Social Skills Profile (ASSP), show that the Cronbach's alpha value of the questionnaire was above 0.90. This value indicates that the items have high internal consistency. Pearson's correlation coefficient ranges between -1 and +1. If r = 1, it indicates a perfect direct relationship between two variables. A direct or positive relationship means that if one variable increases or decreases, the other variable also increases or decreases. The total alpha was also calculated for the components and the overall questionnaire and is reported separately in Table 7.

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Table 8

Overall Cronbach's Alpha Values of the Autism Social Skills Profile (ASSP)

Component	Number of Items	Cronbach's Alpha
Social Interaction	23	0.98
Social Participation	13	0.95
Detrimental Social Behavior	11	0.91
Total questionnaire	47	0.98

As shown in Table 7, which reports the Cronbach's alpha values for the overall questionnaire and its components, Cronbach's alpha values were reported as α = 0.98 for Social Interaction, α = 0.95 for Social Participation, α = 0.91 for Detrimental Social Behavior, and α = 0.98 for the total questionnaire.

To examine whether the scores of the "Autism Social Skills Profile" remained acceptably stable over time, the correlation between administrations of the Autism Social Skills Profile (ASSP) at two different times was used. The second administration was conducted three weeks after the first administration.

Table 9

Test–Retest Coefficients of the Components of the Autism Social Skills Profile (ASSP)

Component	First Administration M	First Administration SD	Second Administration M	Second Administration SD	Test–Retest Coefficient
Social Interaction	15.12	4.45	15.25	4.33	0.99**
Social Participation	22.37	7.05	22.25	7.27	0.99**
Detrimental Social Behavior	25.56	7.28	25.44	7.36	0.99**
Total questionnaire	63.06	16.54	62.94	16.74	0.99**

**Significant at the 99% confidence level.

As shown in Table 8, which reports the test–retest coefficients obtained at the 99% confidence level for the components of the Autism Social Skills Profile (ASSP), the test–retest coefficients for Social Interaction (r = 0.99), Social Participation (r = 0.99), Detrimental Social Behavior (r = 0.99), and the total questionnaire (r = 0.99) were significant at the 99% level. These coefficients indicate the desirable temporal stability of the Autism Social Skills Profile (ASSP). In examining whether the psychometric properties of the "Autism Social Skills Profile" were of acceptable quality, the item discrimination coefficient was used.

Table 10

Item Discrimination Coefficients of the Autism Social Skills Profile (ASSP)

Component	Item	Discrimination Coefficient	Component	Item	Discrimination Coefficient	Component	Item	Discrimination Coefficient
Social Interaction	c1	0.81	Social Participation	c24	0.83	Detrimental Social Behavior	c37	0.28
Social Interaction	c2	0.80	Social Participation	c25	0.84	Detrimental Social Behavior	c38	0.51
Social Interaction	c3	0.67	Social Participation	c26	0.84	Detrimental Social Behavior	c39	0.40
Social Interaction	c4	0.82	Social Participation	c27	0.81	Detrimental Social Behavior	c40	0.58
Social Interaction	c5	0.84	Social Participation	c28	0.80	Detrimental Social Behavior	c41	0.46
Social Interaction	c6	0.84	Social Participation	c29	0.85	Detrimental Social Behavior	c42	0.49
Social Interaction	c7	0.86	Social Participation	c30	0.76	Detrimental Social Behavior	c43	0.49
Social Interaction	c8	0.84	Social Participation	c31	0.83	Detrimental Social Behavior	c44	0.65
Social Interaction	c9	0.86	Social Participation	c32	0.87	Detrimental Social Behavior	c45	0.46

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Social Interaction	c10	0.80	Social Participation	c33	0.68	Detrimental Social Behavior	c46	0.63
Social Interaction	c11	0.87	Social Participation	c34	0.80	Detrimental Social Behavior	c47	0.57
Social Interaction	c12	0.65	Social Participation	c35	0.70			
Social Interaction	c13	0.66	Social Participation	c36	0.21			
Social Interaction	c14	0.56						
Social Interaction	c15	0.82						
Social Interaction	c16	0.81						
Social Interaction	c17	0.85						
Social Interaction	c18	0.85						
Social Interaction	c19	0.83						

The discrimination coefficient refers to the ability of a test to distinguish between strong and weak groups. In other words, the discrimination coefficient examines the power of an item in identifying and differentiating stronger respondents from weaker respondents; therefore, the discrimination coefficient was used to address this research hypothesis. As shown in Table 9, the item discrimination coefficients ranged from 0.21 to 0.87. To calculate the discrimination coefficient for each factor, the lowest and highest item discrimination coefficients for the "Social Interaction" factor were 0.56 and 0.87, respectively, and the mean discrimination coefficient of this factor was 0.79. For the other factors, the lowest, highest, and mean values were 0.21 to 0.87 and 0.71 for "Social Participation," and 0.28, 0.65, and 0.48 for "Detrimental Social Behavior," respectively. The mean discrimination coefficient obtained for the questionnaire was calculated as 0.704, which is an acceptable value.

The convergent validity of the "Autism Social Skills Profile" and "GARS-2" in children with autism was examined. Given that the Kolmogorov–Smirnov test showed that the distribution of the research variables was non-normal, Spearman's correlation test was used to examine this hypothesis because the aim was to assess the correlational relationship between two variables.

Table 11

Spearman's Correlation Test for Examining the Convergent Validity of the "Autism Social Skills Profile" and "GARS-2" in Children with Autism

Factor / Component	n	Correlation Coefficient (r)	Significance Value (p)
Social Interaction	210	-0.471**	.001
Social Participation	210	-0.376**	.001
Detrimental Social Behavior	210	-0.406**	.001
Autism Social Skills Profile (ASSP)	210	-0.533**	.001
GARS-2 Questionnaire	210	-0.396**	.001

As shown in Table 10, based on the Spearman correlation test, there was a relationship between the Autism Social Skills Profile (ASSP) and the "GARS-2" questionnaire for the total questionnaire score (r = -0.533). This relationship was statistically significant at the 99% confidence level ($p \leq .01$; p = .001). The correlation was r = -0.471 for Social Interaction (p = .001), r = -0.376 for Social Participation (p = .001), and r = -0.406 for Detrimental Social Behavior (p = .001). Moreover, the total score of the "GARS-2" questionnaire had a significant relationship with the total score of the "Autism Social Skills Profile" (r = 0.396, $p < .01$). Since the relationships between the examined variables were negative and significant, it can be inferred that as the score on the "Autism Social Skills Profile" increases, the score obtained from the "GARS-2" questionnaire decreases among children and adolescents with typical development.

Table 5 presents the standardized scores of the Autism Social Skills Profile. Its raw scores ranged from a minimum

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of 13, corresponding to a percentile rank of 0.5 and a standardized T score of 31.74, to a maximum raw score of 148, corresponding to a percentile rank of 100 and a standardized T score of 69.96. Considering the standard deviation of 10, the 50% cumulative point of the data corresponded to a raw score of 85, a percentile rank of 59, and a standardized T score of 52.12. In this questionnaire, individuals who obtain higher scores have higher social competence.

4. Discussion

The present study aimed to investigate the psychometric properties and factor structure of the Persian version of the Autism Social Skills Profile (ASSP) among Iranian children and adolescents with Autism Spectrum Disorder (ASD). The findings demonstrated that the Persian version of the ASSP possesses acceptable psychometric characteristics, including strong construct validity, internal consistency, temporal stability, convergent validity, and item discrimination indices. Overall, the results indicated that the ASSP is a reliable and valid instrument for assessing social skills and social functioning among Iranian children and adolescents with ASD.

One of the primary findings of the study was the confirmation of the three-factor structure of the ASSP through confirmatory factor analysis. The results revealed that the dimensions of Social Interaction, Social Participation, and Detrimental Social Behavior exhibited appropriate factor loadings and satisfactory model fit indices. The goodness-of-fit indices, including GFI, CFI, IFI, RMSEA, and PNFI, all fell within acceptable ranges, indicating that the collected data from the Iranian sample were consistent with the theoretical structure proposed by the original developers of the instrument. These findings support the construct validity of the Persian ASSP and indicate that the conceptual domains underlying social competence in autism can be reliably identified within the Iranian cultural context. This result is consistent with the findings reported by West and Silverman, who emphasized the importance of multidimensional social skills instruments for children with ASD and highlighted the role of factor-analytic validation in establishing the structural adequacy of autism-related assessment tools (West & Silverman, 2021). Similarly, Silveria-Zaldivar et al. emphasized that social competence in autism is a multidimensional construct involving social reciprocity, participation, communication, and adaptive behavioral engagement, which aligns with the multidimensional structure observed in the present study (Silveria- Zaldivar et al., 2023).

The findings related to internal consistency also demonstrated that the ASSP possesses high reliability. Cronbach's alpha coefficients for the total questionnaire and all subscales exceeded acceptable standards, indicating strong internal homogeneity among the items. In addition, item-total correlations and discrimination coefficients showed that the items effectively differentiated between varying levels of social competence. These findings suggest that the questionnaire items consistently measure the underlying constructs of social functioning and are capable of identifying meaningful differences in social behavior among autistic individuals. The high level of internal consistency observed in the present study corresponds with previous research emphasizing the reliability of structured social skills assessment instruments in autism populations (Soares et al., 2021; West & Silverman, 2021). Reliable assessment instruments are especially important in autism research because social behaviors often vary across contexts and developmental stages, making consistent measurement essential for accurate diagnosis and intervention planning.

Another important finding of the present study was the strong temporal stability of the ASSP. The test–retest coefficients obtained over a three-week interval indicated very high stability for the total questionnaire and all subscales. This result suggests that the ASSP provides stable and consistent measurements of social functioning over time. Temporal stability is particularly important in autism assessment because clinicians and researchers frequently use such instruments to evaluate treatment outcomes, developmental changes, and intervention effectiveness across longitudinal periods. The high stability observed in this study supports the suitability of the ASSP for repeated clinical and educational evaluations. Similar findings have been reported in intervention-related studies where reliable social functioning measures were necessary to monitor developmental progress and treatment outcomes among children with ASD (Drüsedau et al., 2023; Wattanawongwan et al., 2023).

The results also demonstrated significant convergent validity between the ASSP and the GARS-2. Specifically, negative and statistically significant correlations were found between the ASSP scores and autism severity scores measured by GARS-2. This finding indicates that higher levels of social competence were associated with lower levels of autism-related symptoms and impairments. Such relationships are theoretically expected because social

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communication deficits represent one of the core diagnostic domains of ASD. Therefore, as social functioning improves, autism-related difficulties in communication and interpersonal interaction are expected to decrease. The observed convergent validity confirms that the ASSP accurately measures social functioning in relation to broader autism symptomatology. These findings are consistent with previous literature emphasizing the close relationship between social communication impairments and autism severity (Howard et al., 2023; Silveria- Zaldivar et al., 2023). Howard et al. further highlighted that executive functioning and attentional capacities significantly influence language and social communication abilities in autistic children, reinforcing the interconnected nature of cognitive and social functioning in ASD (Howard et al., 2023).

The confirmation of the ASSP structure within the Iranian cultural context is particularly important given the increasing recognition of cultural influences on social behavior and communication patterns. Social competence is not expressed identically across cultures, and culturally adapted instruments are necessary to ensure accurate interpretation of social behaviors. Many autism-related assessment tools have been developed in Western countries, and direct translation without psychometric evaluation may compromise validity and reliability. The present study addressed this issue by examining the psychometric adequacy of the Persian version of the ASSP, thereby contributing to the development of culturally sensitive assessment resources for Iranian clinicians and researchers. This issue has been emphasized in previous studies highlighting the necessity of culturally responsive social skills assessment in autism populations (Monahan et al., 2023; West & Silverman, 2021). Monahan et al. particularly stressed the importance of incorporating contextual and experiential perspectives into autism-related interventions and assessment frameworks (Monahan et al., 2023).

The findings of the present study also have important implications for intervention research and rehabilitation planning. Social skills deficits significantly affect peer relationships, emotional adjustment, educational participation, and adaptive functioning in children with ASD. Therefore, valid assessment instruments are essential for identifying specific social difficulties and tailoring interventions accordingly. Previous research has shown that structured interventions, including play-based programs, peer-mediated approaches, sports activities, and behavioral interventions, can significantly improve social competence among autistic children (Levante et al., 2023; Morales et al., 2022; O'Keeffe & McNally, 2023). Accurate assessment tools such as the ASSP allow practitioners to identify baseline deficits, monitor developmental changes, and evaluate intervention outcomes more effectively.

The multidimensional structure of the ASSP also aligns with contemporary perspectives on autism intervention, which emphasize comprehensive and individualized treatment planning. Social functioning in ASD involves multiple domains, including interpersonal reciprocity, social engagement, communication, and behavioral regulation. The ability of the ASSP to separately assess Social Interaction, Social Participation, and Detrimental Social Behavior provides clinicians with detailed information regarding specific strengths and weaknesses in social functioning. Such multidimensional assessment can facilitate more targeted intervention strategies and individualized therapeutic planning. Previous studies examining intervention effectiveness have similarly highlighted the importance of domain-specific assessment in evaluating treatment outcomes (Bordini et al., 2024; Drüsedau et al., 2023).

The strong psychometric performance of the ASSP may also be interpreted in light of growing evidence regarding the trainability of social skills in autism. Several intervention studies have shown that social competence can improve substantially through structured educational and therapeutic programs. For instance, Bordini et al. demonstrated that applied behavior analysis, parent training, and video modeling significantly contributed to the acquisition of social communication skills among children with autism (Bordini et al., 2024). Likewise, Inci and Saglam found that interactive art-based interventions reduced repetitive behaviors while simultaneously improving social skills and parental emotional experiences (Inci & Saglam, 2025). These studies support the notion that social functioning is dynamic and modifiable, thereby increasing the importance of reliable assessment instruments capable of accurately capturing changes in social competence over time.

The relationship between social functioning and broader developmental capacities also provides an important framework for interpreting the present findings. Research has increasingly demonstrated that social skills in autism are closely associated with motor development, sensory integration, emotional regulation, and peer relationships (Karna & Stefaniuk, 2024; Wang et al., 2022; Wen & Wu, 2025). Wen and Wu reported that sensory integration-based sports training significantly improved both motor and social skills among children with ASD (Wen & Wu, 2025).

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Similarly, Wang et al. demonstrated a strong relationship between gross motor impairment and social difficulties in autistic children (Wang et al., 2022). These findings suggest that social competence is influenced by multiple developmental systems and therefore requires multidimensional assessment approaches such as the ASSP.

5. Conclusion

The findings of this study further contribute to the growing body of evidence supporting evidence-based assessment practices in autism research. Psychometrically validated instruments are essential for ensuring scientific rigor, improving diagnostic accuracy, and facilitating cross-cultural comparisons. The validation of the Persian ASSP provides an important contribution to autism research and clinical practice in Iran by offering a specialized instrument specifically designed to evaluate social functioning in autistic children and adolescents. Furthermore, the strong psychometric properties observed in this study support the use of the ASSP in rehabilitation centers, educational institutions, psychological clinics, and research settings.

One limitation of the present study was the reliance on parent-report questionnaires, which may be influenced by subjective perceptions, response biases, or variations in parental awareness regarding children's social behaviors. Additionally, the sample was limited to children and adolescents from specific educational and rehabilitation contexts in Iran, which may reduce the generalizability of the findings to other populations or cultural groups. Another limitation was the cross-sectional nature of the study, which restricted the ability to examine developmental changes in social functioning over time. Furthermore, although the sample size was adequate for psychometric analysis, additional studies involving more diverse clinical subgroups and broader geographical regions would provide stronger evidence regarding the applicability of the ASSP across different populations.

Future research should investigate the psychometric properties of the ASSP in different age groups, clinical conditions, and cultural settings. Longitudinal studies examining developmental changes in social functioning and intervention-related outcomes would provide valuable information regarding the sensitivity of the instrument to behavioral change over time. Future studies may also compare the ASSP with additional autism-related social functioning instruments in order to further evaluate convergent and discriminant validity. Moreover, research examining the role of gender, cognitive functioning, language abilities, and comorbid conditions in ASSP performance may contribute to a more comprehensive understanding of social competence in ASD. Expanding validation studies to include teacher reports, observational methods, and multi-informant approaches would also strengthen the clinical utility of the instrument.

The findings of the present study have several practical implications for clinicians, educators, rehabilitation specialists, and policymakers. The Persian version of the ASSP can serve as an effective instrument for screening social difficulties, identifying intervention priorities, and monitoring therapeutic outcomes among children and adolescents with ASD. Rehabilitation centers and educational institutions may use the ASSP to design individualized treatment plans tailored to specific social deficits and behavioral needs. The instrument may also facilitate interdisciplinary collaboration among psychologists, speech therapists, occupational therapists, and special education professionals by providing a comprehensive profile of social functioning. In addition, the availability of a culturally validated Persian social skills assessment tool may contribute to improving evidence-based autism services and promoting more accurate clinical decision-making within Iranian healthcare and educational systems.

Authors' Contributions

Authors equally contributed 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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The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. This study entered the field implementation phase after obtaining the necessary approvals and receiving the research ethics code No. IR.SBU.REC.1400.094.

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