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ORIGINAL ARTICLE

Cultural Adaptation and Evaluation of the PEERS® Program for Autistic Young Adults in Iran: A Mixed-Methods Study

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Abstract

Purpose This study evaluated the effectiveness of the Program for the Education and Enrichment of Relational Skills (PEERS®) for young autistic adults in Iran and explored participant and caregiver experiences.

Methods Twenty-one autistic males aged 18–30 were randomly assigned to either a 16-week program or a waitlist control group. Weekly group sessions were held for participants and their parents. Quantitative assessments were conducted at baseline, post-intervention, and 12-month follow-up using Farsi versions of validated scales measuring social functioning, empathy, loneliness, and social skills knowledge.

Results While no significant between-group differences were found in most outcome measures using repeated measures analyses, participants in the intervention group showed a statistically significant decrease in conflict scores reported by young adults ($p=0.026$) and an increase in Test of Young Adult Social Skills Knowledge (TYASSK) ($p=0.008$) after 16 weeks, which remained significant at 12 months ($p=0.046$) based on paired t-tests. Focus groups identified several challenges in program implementation, including limited awareness of autism, resistance to homework, dense session content, and cultural barriers such as indirect communication norms and limited opportunities for social practice. However, participants reported meaningful improvements in confidence and social engagement. Families and therapists also expressed high satisfaction and a desire for follow-up sessions.

Conclusion The findings suggest that PEERS® is a culturally adaptable and positively received intervention for autistic young adults in Iran. The study emphasizes the importance of contextualizing interventions to local cultures and addressing the needs of underrepresented populations in autism research.

Keywords Adult autism · Autism spectrum disorder · Social skills training · PEERS® · Group interventions

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Introduction

Autism Spectrum Disorder (ASD) is marked by ongoing difficulties in social communication and interaction across various settings, including differences in social-emotional reciprocity, nonverbal communication, and relationship (Bouzy et al., 2023). Additionally, autistic individuals have restricted, repetitive behaviors, interests, or activities (APA, 2000). A recent systematic review indicates that ASD prevalence varies globally and is rising (Zeidan et al., 2022). This rising prevalence has highlighted ASD as a public health concern, drawing policymakers' attention to the need for adequate services for autistic individuals and their families (Brooks et al., 2004; Chiri et al., 2022).

Social difficulties are considered a core feature of ASD, commonly presenting as challenges in social-emotional understanding, cognitive and communicative skills, both verbal and nonverbal, and forming relationships. Such differences may include limited social reciprocity, difficulty in interpreting social cues and figurative language, issues with social attention, motivation, orientation, joint attention, poor speech prosody, restricted eye contact, and challenges with empathy and perspective-taking (Dawson et al., 2004). These social differences often hinder the development and maintenance of relationships. Many autistic young adults remain dependent on caregivers and may lose social supports experienced during childhood and adolescence (Marsack-Topolewski & Church, 2019). Compared to neurotypical peers and individuals with other developmental disorders, autistic young adults tend to experience poorer outcomes in vocational, social, and educational realms (Anderson et al., 2014). They also face higher rates of unemployment or lower earnings and often struggle with mental health conditions like depression and anxiety, further limiting their functional outcomes (Eaves & Ho, 2008; Scheeren et al., 2022). Consequently, achieving social, financial, and emotional independence is often challenging for them.

Social skills programs (SSPs) for autistic adults are targeted therapeutic strategies designed to enhance interpersonal abilities (Balderaz, 2020; Dubreucq et al., 2022) and improve overall quality of life for individuals on the autism spectrum (Wu et al., 2025). These programs aim to empower participants, helping them navigate social environments more effectively and fostering greater social engagement and confidence. Social skills training (SST) is a well-established evidence-based intervention for autistic individuals ASD (Steinbrenner et al., 2020; Wong et al., 2015). Group SSPs for autistic children, adolescents, and young adults have become increasingly common and been delivered across a variety of settings (e.g., outpatient clinics, schools, and summer camps) (Afsharnejad et al., 2024). Group SSPs are often manualized programs combining various strategies including direct instruction, role-play practices, and performance feedbacks (Afsharnejad et al., 2024a, 2024b).

Although group-based SSPs have been successfully implemented across various age groups, their application in autistic young adults warrants special attention, as this population faces distinct needs during the transition to adulthood. The primary objective should be to enhance their general functioning and future outcomes through effective support during this critical developmental period. Group SSPs in clinical practice aim to help autistic young adults understand their differences and improve social functioning. Various models have emerged, including Cognitive Behavioral Therapy (CBT) (Bemmer et al., 2021), Social Skills Training, and the Program for the Education and Enrichment of Relational Skills (PEERS). Notable programs include SENSE (Social Emotional NeuroScience Endocrinology) Theatre (Corbett et al., 2014), the SOSTA-FRA (Social Skills Training Autism – Frankfurt) program (Freitag et al., 2016), the START (Social tools and rules for teens) program (Vernon et al., 2016), and other group SSPs. Among these, the UCLA PEERS® (Program for the Education and Enrichment of Relational Skills) for young adults is particularly well-regarded, with implementation several languages and use in more than 80 countries (Zheng et al., 2021). This structured program involves concurrent sessions for young adults and their parents, focusing on developing specific social skills such as making conversation, understanding humor, organizing social gatherings, and handling teasing and bullying. Young adult sessions combine direct instruction with role-play exercises, while parents receive training on coaching techniques for supporting their child outside of group sessions. Weekly skill-practice assignments are given to the young adult-parent dyads and reviewed at the beginning of each session. In a clinic or center setting, PEERS sessions last 2 h weekly for 16 weeks, targeting improvements in social engagement frequency, social skills knowledge, and reductions in ASD symptoms associated with social responsiveness.

Recent studies have shown that this program can lead to substantial improvements in social functioning, with evidence indicating increased social motivation and reduced symptoms of anxiety among participants (Cheng et al., 2025; Garbarino et al., 2020). However, challenges such as financial constraints, geographical barriers, and cultural considerations may affect the outcomes. Addressing barriers to access, assessing long-term effectiveness, and ensuring individualized and culturally relevant practices will be essential in maximizing the impact of these programs and supporting the diverse needs of autistic individuals.

Social interaction patterns and norms vary considerably across cultures, influencing how social skills are expressed,

interpreted, and valued. Therefore, interventions targeting social competence must be culturally responsive to ensure that their content, examples, and behavioral expectations align with local social norms. In societies with strong family involvement and more conservative social expectations, such as Iran, culturally sensitive adaptations are particularly crucial to support generalization of learned skills to real-life settings. In Iran, dating and opposite-sex interactions take place within a framework shaped by traditional and religious values. Although such relationships are becoming more common among young adults, social expectations continue to emphasize modesty, family oversight, and gendered norms (Khalajabadi-Farahani, 2025; Mokhtari et al., 2022; Motamedi et al., 2016). These cultural dynamics highlight why adapting social skills interventions like PEERS® is essential to ensure relevance and acceptability.

While proograms often aim to improve social competencies, they are largely designed and evaluated by neurotypical researchers and practitioners, with minimal direct involvement from autistic individuals. This lack of autistic input can lead to programs that may not fully address the real needs or preferences of the autistic community, potentially diminishing their effectiveness and relevance. Monahan et al. (2023) emphasize the critical role of autistic input in developing and assessing social skills groups for young adults on the autism spectrum. When autistic voices are excluded, interventions may inadvertently encourage behaviors like "masking"—the act of concealing autistic traits to conform to neurotypical social norms—which can lead to mental health challenges, such as increased anxiety or depression.

The study calls for a participatory research approach, advocating for autistic individuals to be actively involved in every stage of program development, from design through assessment.

Accordingly we also conducted focus groups with autistic individuals and their parents to gather lived experience feedback on the program's content, delivery, and cultural relevance. Such perspectives are essential to ensure that interventions are not only evidence-based but also personally meaningful and feasible in real-world contexts.

The goal of the current study was to evaluate the effectiveness and feasibility of a caregiver-assisted SSP (PEERS® for Young Adults) for autistic young adults without intellectual disabilities in Iran. The study also explored participants' and caregivers' experiences to inform future cultural adaptations of the program.

Methods

Participants

Twenty-one autistic young adult males, along with their parents, participated in the study. They were recruited from the Adult Developmental Disorders Clinic of …. The inclusion criteria were as follows: age between 18 and 30 years; male gender; a confirmed ASD diagnosis confirmed by an experienced psychiatrist through a structured clinical psychiatric interview based on DSM-5 criteria; predominant social difficulties; motivation and personal interest in group participation; and a family member willing to attend all sessions as a social coach. Participants were also required to have received no other social skills programs during the study.

Exclusion criteria included: an intellectual disability (Stanford-Binet Intelligence Scale score below 60); a major comorbid psychiatric condition or acute psychiatric symptoms (e.g., psychosis or suicidal thoughts); and significant verbal, reading, or writing difficulties.

Comorbid psychiatric conditions were assessed by a psychiatrist through a structured clinical interview based on DSM-5 criteria and review of prior clinical records. Participants with a major comorbid psychiatric condition or acute psychiatric symptoms (e.g., psychosis or suicidal thoughts) were excluded to ensure that the intervention focused on social communication difficulties rather than acute psychiatric symptoms.

Participants who missed more than three sessions over the course of the study were excluded from the final analysis.

Study Design

We conducted the study using single-sex groups to enhance ecological validity- given cultural norms and institutional restrictions in Iran around mixing genders in therapeutic/educational groups and venues, running mixed-gender groups was not feasible; additionally, recruitment yielded substantially greater interest and access to male participants, so single-sex groups increased the program's acceptability and feasibility. Participants were randomly assigned to either the PEERS® or a waitlist control group. To introduce participants to the PEERS®, obtain informed consent, and administer pretests for young adults and their social coaches, a face-to-face intake session was held. During this session, we conducted both the Autism Quotient (AQ) (Nejati Safa et al., 2003) and the Vineland Adaptive Behavior Scale (TAVAKOULI et al., 2000) providing baseline assessments of autism-related symptoms and adaptive functioning.

Outcome measures were collected for all participants one week before the start of the sessions (during the intake

session), at week sixteen (during the graduation celebration), and twelve months post-sessions.

Additionally, twelve months after completing the program, we conducted three separate focus groups with young adults, their parents, and the therapists who facilitated the group. The focus group with therapists included members of the treatment team who had been directly involved in implementing the program and participated in weekly sessions throughout the intervention, namely the two group leaders, the behavioral coach, and the clinical supervisor. Each interview session lasted approximately one hour for young adults and parents and about three hours across three sessions for therapists and staff. Participants were asked about their expectations and experiences, their perceptions of the program, and their perceived impacts of it. All interviews were audio-recorded and transcribed verbatim for analysis.

Program

Translation and Cultural Adaptation

Three psychiatrists and two psychologists completed the PEERS® for Young Adults Certified Teleconference training (organized by the UCLA PEERS® Clinic).

The PEERS® for Young Adults manual was translated and adapted according to the World Health Organization guidelines for the translation and adaptation of instruments (WHO, 2017). Three bilingual psychologists translated the manual into Farsi, after which the research team jointly reviewed and reconciled all sessions to ensure conceptual equivalence. Six experts (two child and adolescent psychiatrists, one psychiatrist, and three clinical psychologists) reviewed the draft translation to identify ambiguous wording, culturally inappropriate examples, and key terminology requiring consistency across sessions. Keywords were harmonized throughout the manual to ensure conceptual fidelity. Prior to each session, the research team re-examined the translated content for clarity and comprehensibility. Culturally sensitive content areas, such as common social activities among young adults and some details about dating were modified. Next, a survey was conducted among youth to identify ecologically valid social skills in Iran. The content areas that required cultural adaptation included common conversational topics among young adults, different social groups identified by young adults and social activities.

Due to cultural sensitivities around openly discussing dating, we adjusted the session sequence to cover dating topics in the final three sessions. Prior to these discussions, we obtained additional consent from families to include such materials.

Examples, role plays, and homework assignments were modified to reflect local cultural practices—for instance, including religious and community gatherings as potential friendship sources, allowing family and relatives to be considered in 'get-together' activities, and revising humor and conversational examples to reflect Iranian social contexts. Content related to physical intimacy was omitted, and instructions on dating were adapted to emphasize appropriate boundaries and family involvement. A detailed summary of these adaptations is presented in Table 1.

Format of the Sessions

For 16 weeks, young adults and their parents (as social coaches) attended concurrent 90-min group sessions held in two separate rooms. Each group was led by a fully trained and PEERS® certified psychologist as a group leader, and at least one behavioral coach as an assistant. The group leaders had previous experience working with autistic adults and their parents.

A clinical psychologist assisted with the young adult sessions as behavioral coach. She had completed formal PEERS® for Young Adults training, obtaining certification in program delivery. Her role included conducting role-play demonstrations, providing feedback during behavioral rehearsals, and supporting behavior management throughout the sessions. An intake session was dedicated to the introduction and completion of the pre-tests, and the last session was dedicated to the graduation ceremony and completion of the post-tests. Other sessions were devoted to training lessons, including starting and maintaining conversations, creating a source of friends (a resource for finding friends), electronic forms of communication, appropriate use of humor, entering and exiting conversation, organizing and having successful dates, dating etiquette, conflict management, and managing direct and indirect bullying and other forms of rejection, using the PEERS® Adult Manual as a complete program. The considered lessons were presented to build on previously learned skills. Each session was run using techniques such as social skills rules, role-playing, behavioral exercises, as well as assigning homework. Each session started with a review of last week's homework.

In accordance with the PEERS® for Young Adults manual, parents participated concurrently as 'social coaches.' While the young adults attended their weekly skills sessions, parents joined parallel social coaching sessions led by facilitators trained in the program. Social coach groups included reviewing weekly assignments, discussing how social coaches could assist their young adults, examining the obstacles in the past week, empathizing with parents, reviewing the week's didactic lesson, and explaining the week's assignment and the role of the coaches in doing the assignment. In these sessions, they learned how to support the application and generalization of social skills in real-life

Table 1 Cultural adaptations applied to the original program

Original topic	Cultural adaptation	Rationale
Language and idioms	Adjusted idiomatic expressions (e.g., "hang out," "break the ice") into culturally equivalent Farsi terms	Many English idioms do not translate naturally; adapted for clarity and cultural resonance
Social media and texting examples	Replaced or generalized examples from Western platforms to locally used ones (e.g., Telegram, WhatsApp)	To ensure relevance and avoid culturally inappropriate references
Conversation topics	Removed or avoided sensitive topics (e.g., politics, dating, alcohol) and replaced with culturally neutral small-talk topics such as education, movies, sports, and family	To maintain cultural appropriateness and participant comfort
Mixed-gender group	Conducted as single-sex (male-only) group	Mixed-gender therapy groups are not permitted in most Iranian institutions
Session order	Dating sessions moved to the final three weeks	To reduce cultural sensitivity; dating content introduced after building rapport and obtaining family consent
Finding a source of friends	Added religious communities and family gatherings as friendship sources	Reflects common and acceptable social venues in Iran
Appropriate use of humor	Added culturally familiar examples of humor	Increased relatability for Iranian participants
Get-togethers	Included family and relatives as acceptable get-together guests	Common social practice in Iran
Handling disagreements, direct and indirect bullying	- Increased Handling Disagreements sessions into two sessions - Greater focus on indirect disagreement styles, reduced "taarof," and emphasized direct communication	Iranian social norms often value politeness and indirectness; participants practiced more assertive, clear communication
Dating Etiquette (Letting Someone Know You Like Them, Asking on a Date, Going on Dates, Dating Do's and Don'ts)	- Dating topics moved to end - Additional family consent obtained - Omitted kissing and physical contact - Changed "talk to mutual friends" → "talk to mutual friends or family member" - Omitted "prepare your home for the date" content - Clarified that it is still common for men to pay for dates - Briefly mentioned handling sexual pressure, with note that physical contact typically postponed until marriage	Adapted to Iranian social and religious norms; ensured appropriateness and participant comfort
Homework and examples	Adjusted examples for local settings and added culturally familiar situations	To enhance comprehension and applicability

contexts. Parents assisted their young adults in completing weekly homework assignments, identifying opportunities for social engagement, and providing feedback during naturally occurring social interactions. This involvement aimed to promote the generalization and durability of treatment effects beyond the structured sessions. Each session ended with the reunification of young adults and social coaches to go over lessons and homework assignments.

Participants were given weekly homework assignments designed to encourage the generalization of social skills outside of group sessions. Each week, participants completed four to six structured activities with the support of their social coach (typically a parent). Homework tasks paralleled the session topics and included activities such as finding potential sources of friends, initiating and maintaining conversations, entering and exiting group discussions, arranging get-togethers, and handling teasing, bullying, or disagreements. Participants also practiced advanced social behaviors such as expressing romantic interest with their social coaches. Social coaches were instructed to provide feedback, model skills, and reinforce appropriate behaviors during these activities. Homework completion was reviewed at the beginning of each subsequent session, allowing therapists to provide corrective feedback and additional role-play practice as needed.

Every week before the training sessions, the members of the treatment group, including leaders, behavioral trainers, and plan executives, reviewed the training content of the upcoming session to align the sessions and coordinate the therapists, recount the existing problems and potential questions of the therapists, and coming up with the solutions.

Outcome Measures

Test of Young Adult Social Skills Knowledge (TYASSK)

The TYASSK is adapted from the adolescent questionnaire (Laugeson et al., 2009) and is a 30-item measure evaluating the knowledge of young adults about the evidenced-based social skills taught during the *PEERS*® coefficient alpha of 0.56 (Laugeson et al., 2015). Two culturally inappropriate items from the TYASSK (Questions 21 and 24) were

omitted as we removed the related content from the session to accommodate cultural considerations.

These items involved kissing on a first date and responding to pressure for physical intimacy, which were not culturally applicable in the Iranian context. No items were substituted, in order to preserve fidelity to the original PEERS® manual.

Quality of Socialization Questionnaire (QSQ)

There are two relatively similar forms of the Quality of Socialization Questionnaire; caregiver report (QSQ-C) and young adult report (QSQ-YA). Adapted from the Quality of Play Questionnaire (QPQ) for autistic individuals (Frankel et al., 2010), this 12-item measure assesses the quality and frequency of young adults' social interactions over the previous month from the perspective of themselves and their caregivers (Gantman et al., 2012). The scale has demonstrated good internal consistency ($\alpha = 0.87$ for the Conflict subscale), convergent validity with the SSRS Problem Behaviors Scale ($r = 0.35$, $p < 0.05$), and discriminant validity between community and clinic-referred samples ($p < 0.05$). The assessment measures how often participants host or are invited to gatherings and includes three scales: the Social Initiation Scale, Conflict Scale, and Social Reciprocity Scale. We translated both types of measures into Farsi and asked parents and young adults to complete their forms.

Social Skills Rating System (SSRS)

The Social Skills Rating System (SSRS) is a 52-item measure that evaluates social skills and problem behaviors in students (Gresham, 1990). In the current study, the Farsi version of this form was completed by parents (Shaheem, 2002). The internal consistency was satisfactory, with Spearman–Brown coefficients of 0.88 (total) and 0.86 (behavioral problems), and Cronbach's alpha values of 0.90 (social skills) and 0.85 (behavioral problems).

Empathy Quotient (EQ)

To measure empathy differences in our participants, we used the Farsi version of the Empathy Quotient (EQ) which has demonstrated acceptable psychometric properties based on Rasch analysis, showing comparable item functioning, fit, and ordering to the original English version (Wind et al., 2021). The EQ is an appropriate measure for this study as it is designed to examine empathy, particularly in clinical populations who may report reduced levels of empathy, such as autistic individuals (Allison et al., 2011). There are four options from strongly agree to strongly disagree. Each item is scored 0,1, or 2, with strong responses scoring 0 or 2, while slight responses scoring 1. The higher total score indicates a greater level of empathy.

Social Responsiveness Scale—Second Edition (SRS-2)

Known as the most reliable scale for assessing social function in autistic young adults, SRS-2 comprises 65 items focusing on five subscales including social awareness, social cognition, social communication, social motivation, and restricted interests and repetitive behavior (Frazier et al., 2014). We used the Farsi version of the adult form covering ages 19 to 89 (Mirzakhani Araghi et al., 2022). The reported intra-class correlation coefficient performed by different raters is 0.80 and Cronbach's alpha for all items is 0.93. Results are converted to T scores ($M = 50$; $SD = 10$). T scores of 60 to 65 indicate mild social functioning differences, while T scores of 66 to 75 equal moderate, and T scores of 76 or higher show severe impairment.

The Teenage Inventory of Social Skills (TISS)

The TISS (Inderbitzen & Foster, 1992) is designed to indicate the social behaviors associated with peer acceptance and peer dislike among teenagers (Inglés et al., 2003). This scale is a self-report comprising 39 items measuring positive social behaviors (20 items) and socially inappropriate behaviors (19 items) of adolescents. Each item is rated on a 6-point Likert scale from "not at all" to "very much". A higher total score on the prosocial subscale indicates better social skills, while a higher total score on the asocial subscale indicates more problematic social behaviors. Amini validated this questionnaire for second-grade female secondary school students in Tehran, with a validity coefficient of 0.71 for the positive section and 0.68 for the negative section (Amini, 1999).

The Matson Evaluation of Social Skills with Youngsters (MESSY)

The MESSY is a 62-item measure designed to assess social skills in adolescents. This self-report scale includes subscales for appropriate social skills, inappropriate assertiveness, impulsiveness, overconfidence, and jealousy (Matson et al., 1983). In the current study, the Farsi version of this measure (Karami et al., 2013) was used to evaluate both positive and negative social behaviors from the perspective of young adults. Internal consistency was calculated to be 0.95 for Inappropriate Assertiveness/Impulsiveness and 0.952 for Appropriate Social Skills.

Self-concept, Accessibility, Rewardingness, and Alienation (SACRAL)

Consisting of 20 items, the SACRAL scale (Reisman, 1983) was completed by young adults to measure friendliness and social behaviors and identify how they perceive and engage in friendly behaviors. Rated on a 5-point Likert continuum from "strongly disagree" to "strongly agree", the measure can be scored from 0 to 80. The Farsi version has shown acceptable internal consistency (Cronbach's $\alpha = 0.74$) and good construct validity. The higher total score indicates higher levels of friendliness (Arefi et al., 2006).

UCLA Loneliness Scale (UCLA-LS)

The UCLA Loneliness Scale (Russell et al., 1978) is a 20-item self-reporting instrument used in this study to assess the frequency of perceived loneliness and social isolation in young adults. It includes 10 positively and 10 negatively worded items, with the former being reverse-coded. Therefore, higher scores indicate greater levels of loneliness. The Persian version of the scale was used in this study (Bahirayi et al., 2006) which demonstrated a Cronbach's alpha of 0.889 and inter-item correlation coefficients ranging from 0.262 to 0.631.

Data Analysis

All quantitative data were analyzed using SPSS software, version 26. For between-group and within-group comparisons, we conducted a paired t-test and repeated measures ANOVA to assess differences over time within each group and between the PEERS® program and waitlist groups. Statistical significance was set at a p-value of less than 0.05.

Table 2 Participants' characteristics

	Intervention group ($N=11$)	Waiting list ($N=9$)	P value
Age	22.8±4.9	22.2±2.1	0.894
Parent's age	50.6±7.8	46.9±5.1	0.350
Education			
High school or lower	1	1	0.189
Diploma	9	4	
University education	1	4	
Parents' education			
High school or lower	2	1	0.375
Diploma	4	6	
University education	5	2	
AQ	29.8±6.2	36.5±3.1	0.067
VABS age-equivalent	14.5±4.3	18.80±3.7	0.075
Stanford-binet intelligent scale	82.6±16.91	84.85±22.68	0.817

AQ Autism quotient, *VABS* Vineland adaptive behavior scales

For each ANOVA we report partial eta squared (η^2) as the effect-size index.

Focus group discussions with young adults, parents, and therapists were audio-recorded and transcribed verbatim. Data were analyzed using thematic analysis. Two researchers independently read and re-read the transcripts to gain familiarity with the content and to identify initial meaning units. Open coding was conducted inductively, and codes were organized into categories and overarching themes based on semantic and conceptual similarities. Coding and theme development were performed manually and refined iteratively through discussion among the research team until consensus was achieved. Any disagreements were resolved through consultation with a senior researcher. The process followed the general steps outlined by Braun and Clarke, ensuring credibility and transparency of the analysis (Braun & Clarke, 2023).

Ethics

The study received approval from the Ethics Committee of Iran University of Medical Sciences (approval code: …) and followed the Declaration of Helsinki guidelines. Informed consent was obtained from all participants and their family members, who were fully informed about the study's purpose, procedures, and their right to withdraw at any time. Due to cultural sensitivities, additional consent was obtained for topics related to dating. All participant information was kept confidential and anonymized in reports and publications.

Results

The baseline characteristics of the participants are presented in Table 2. We enrolled 12 individuals and their parents in the *PEERS®* group and 9 individuals in the waitlist control group. One participant from the *PEERS®* group dropped out after the first session and was excluded from the final analysis. The mean IQ scores were 82.6±16.91 for the intervention group and 84.85±22.68 for the waitlist control group. Two participants in the intervention group had IQ scores of 62 (one with a Verbal IQ of 73), and one participant in the waitlist group had an IQ of 63.

Quantitative Results

No significant differences were found in any of the outcome measures between baseline and week 16 in both the *PEERS®* and control groups, as analyzed using a generalized linear model for repeated measures (Table 3).

Table 3 Outcome measures at baseline and after 16 weeks

	Intervention group ($N=11$) (Mean±SD)		Waiting list ($N=9$) (Mean±SD)		Within-subjects			Between-subjects		
	Week 0	Week 16	Week 0	Week 16	F	*P*	Effect size	F	*P*	Effect size*
TYASSK	12.20±5.32	20.60±4.32	12.22±4.17	14.88±5.57	3.44	0.081	0.168	3.043	0.099	0.152
SRS-2	129.90±56.10	141.50±36.27	139.14±76.02	178.43±28.39	0.819	0.380	0.052	1.396	0.273	0.080
SACRAL	41.80±19.73	45.40±13.13	29.78±12.30	33.55±11.50	0.001	0.976	0.000	3.861	0.066	0.185
UCLA- LS	50.09±10.04	41.91±18.12	53.55±22.86	54.55±12.62	1.348	0.261	0.070	1.661	0.214	0.084
EQ	79.27±16.61	68.72±34.80	65.22±10.86	70.11±19.36	1.88	0.187	0.095	0.543	0.471	0.029
TISS	112.87±14.35	120.00±19.01	120.50±14.16	115.43±16.96	2.80	0.118	0.177	0.019	0.893	0.001
SSRS	60.40±16.83	65.70±20.55	51.60±10.83	55.80±14.24	0.019	0.893	0.001	1.214	0.291	0.085
MESSY	209.55±35.53	218.66±32.77	171.55±18.64	181.67±24.10	0.008	0.928	0.001	9.412	**0.007**	0.370

TYASSK Test of Young Adult Social Skills Knowledge, *SRS-2* Social Responsiveness Scale—Second Edition, *SACRAL* Self-concept, Accessibility, Rewardingness, and Alienation, *UCLA- LS* UCLA Loneliness Scale, *EQ* Empathy Quotient, *TISS* The Teenage Inventory of Social Skills, *SSRS* Social Skills Rating System, *MESSY* The *Matson* Evaluation of *Social Skills* with Youngsters

*: Effect sizes are reported as partial eta squared (η^2)

Table 4 Outcome measures at baseline and after 1 year

	Intervention group ($N=9$) (Mean±SD)		Waiting list ($N=7$) (Mean±SD)		Within-subjects			Between-subjects		
	Week 0	1 year follow-up	Week 0	1 year follow-up	F	*P*	Effect size	F	*P*	Effect size*
TYASSK	11.44±5.43	16.88±3.48	11.71±4.68	14.14±2.48	1.150	0.302	0.076	0.596	0.453	0.041
SRS-2	132.11±59.04	143.00±32.29	128.14±90.68	166.57±35.76	0.499	0.491	0.034	0.206	0.657	0.015
UCLA- LS	51.37±11.30	50.62±9.85	49.16±22.83	55.66±16.34	0.551	0.472	0.044	0.046	0.833	0.004
TISS	112.87±14.36	114.87±16.25	124.50±16.23	123.17±23.81	0.094	0.764	0.008	1.626	0.226	0.119

TYASSK Test of Young Adult Social Skills Knowledge, *SRS-2* Social Responsiveness Scale—Second Edition, *UCLA- LS* UCLA Loneliness Scale, *EQ* Empathy Quotient, *TISS* The Teenage Inventory of Social Skills

*: Effect sizes are reported as partial eta squared (η^2)

Effect sizes (partial η^2) are presented in Table 3. Between-group partial η^2 values ranged from 0.001 to 0.370, indicating effects from negligible to very large according to Cohen's benchmarks (0.01 = small, 0.06 = medium, 0.14 = large). The largest intervention-related proportions of explained variance were observed for MESSY ($\eta^2 = 0.37$), SACRAL ($\eta^2 = 0.19$), and TYASSK ($\eta^2 = 0.15$); several other outcomes showed medium effects (e.g., SRS-2, UCLA-LS, SSRS $\approx \eta^2 = 0.08$). Although several outcomes did not reach conventional statistical significance—likely due to limited sample size—the magnitude and consistent direction of these η^2 values indicate potentially meaningful intervention effects and therefore warrant cautious interpretation (Table 3).

When analyzing each group separately using paired T-tests, no significant differences were observed in most measures, except for the TYASSK scores. The *PEERS*® group showed a significant increase in TYASSK scores after 16 weeks ($p=0.008$, $t=-3.397$), while no significant changes were detected in the control group.

Due to missing data for the Quality of Socialization Questionnaire, we employed the Wilcoxon signed-rank test to compare the conflict scale between young adults and their peers at baseline and week 16 in the *PEERS*® group. No significant change was observed in parents' reports, but the conflict score in young adults' report significantly decreased after 16 weeks ($p=0.026$).

To assess the long-term effects of the *PEERS*®, we repeated the analysis after 12 months for four outcome measures using a generalized linear model. No significant changes were found in any of the measures. However, paired T-test analysis revealed that TYASSK scores significantly increased in the *PEERS*® group after 12 months ($p=0.046$, $t=-2.363$) (Table 4).

Qualitative Results

To gain deeper insights, we organized three focus groups with young adults (YA), their parents (P), and therapists (T) who participated in the program. Focus groups explored participants' experiences, satisfaction, and views on the program's relevance and cultural appropriateness, aligning with a participatory research approach that values autistic input in program evaluation. Through these discussions, four major themes emerged:

Obstacles to Overcome

Need for Psychoeducation

Participants by and large had limited awareness of autism and were even unaware of the diagnostic label or its implications, highlighting an essential need for more basic psychoeducation about autism. In general, parents viewed their children's behavior as oppositional, rude and personal, leading to frustration and a reluctance to get engaged positively. This subtheme emerged from both therapists and parents focus groups.

> "At the start, most families didn't even know what autism really means. They came in thinking it was just rudeness or bad behavior"(T).

> "In other programs, like our anxiety groups, we first teach what the disorder is. Here that step was missing—parents often don't know what the problem actually is."(T).

> "Before joining, I thought my son was just stubborn. I didn't understand that some things he does are part of his condition."(P).

Challenges With Homework Assignments

Homework assignments intended to reinforce social skills often met resistance from participants. Some perceived these tasks as childish, felt shy or bored, or found them too challenging, which hindered engagement. Additionally, the lack of alternative tasks tailored to individual preferences made it difficult for participants to connect with the exercises, further limiting their motivation to complete them.

> "Some assignments had no alternative—like the get-together task. They'd say, 'We didn't do it,' but their phone calls were great. We needed backup options."(T).

> "The homework sometimes felt too hard. My child said, 'This is for kids, not for me,' and then didn't want to do it."(P).

> "At first I felt shy about calling people. But after a few times it got easier and I actually liked doing it."(YA).

Overloaded Content, Limited time

The program's dense content made it challenging for participants to absorb essential skills, resulting in a superficial understanding of key topics. Issues like cyberbullying, dating skills, and sexual victimization were only briefly addressed, leaving participants without a deep grasp of these important areas. Core skills such as active listening and perspective taking were often rushed, leading some to "fake" comprehension rather than genuinely internalize the techniques. Too many instructions left little room for flexibility or a natural flow.

> "The manual tried to cover everything—dating, bullying, social media—all in one program. There wasn't enough time to go deep."(T).

> "Some topics needed more sessions. One week on social media wasn't enough for them to really understand."(P).

> "There were a lot of rules to remember; sometimes I just said 'OK' but didn't really get it."(YA).

Managing Comorbidities

Comorbid conditions, such as obsessive tendencies and inattention, interfered with engagement in sessions and skills application. Young adults sometimes struggled to remain still, frequently asked repetitive questions, or insisted on making exceptions, which made participation and skill-building more challenging.

Family dynamics, such as controlling behaviors and unresolved conflicts, created further obstacles, particularly when completing homework, often leading to frustration and a lack of cooperation at home.

This subtheme emerged from both therapists and parents focus groups.

> "A few participants had obsessive traits—they kept asking the same questions or insisted on exceptions, which slowed the group."(T).

> "Some had attention problems; they couldn't sit still or follow a long conversation."(T).

> "At home, my son gets anxious easily. When homework doesn't go perfectly, he repeats it over and over until he's upset."(P).

Cultural and Contextual Gaps

Cultural barriers in Iranian social interactions, particularly the nuanced and indirect style known as *ta'arof*, posed challenges to the SSP. This practice relies on subtle hints and politeness rather than direct communication, often creating mixed signals that can be difficult for autistic individuals to interpret. For those on the autism spectrum, the expectation to read between the lines and pick up on non-verbal cues complicates applying social skills learned in *PEERS*®, as real-life interactions demand navigating these implicit, context-dependent cues.

Limited social venues for practice inhibited skill generalization; There are few accessible clubs or social groups that encourage social engagement for autistic individuals, further hindering their ability to practice newly acquired skills in real-world settings.

This subtheme emerged mainly from therapists and parents focus groups.

> "Here people speak indirectly. My child doesn't understand ta'arof—he takes everything literally and gets confused."(P).

> "We realized some examples didn't fit Iranian culture—like asking for a change after a disagreement. We had to rephrase those parts."(T).

> "There aren't many safe social places for them to practice—no clubs or social groups they can join easily."(T).

Dating

The topic of dating emerged as both a practical and cultural challenge. While dating sessions required adaptation to align with Iranian norms, this theme also appeared in focus group discussions, where facilitators and team members described their initial hesitation to introduce dating content and the participants' mixed levels of comfort and curiosity. Thus, dating was considered an 'obstacle to overcome' not only in terms of program modification but also as a recurring concern reflected in the qualitative data.

> "At first, even we were unsure how to handle the dating topic. We postponed it to the end after getting families' permission."(T).

> "When I heard there's a session about dating, I was nervous. But it was handled respectfully—more about friendship and boundaries."(P).

> "The dating part was interesting; I was curious but also embarrassed. It helped to talk about it."(YA).

Unrealistic Expectations

Initial expectations ranged widely, with some expecting total transformation while others helplessly anticipated no change. Over time, however, shared insights emerged among parents, fostering a more balanced outlook.

> "At first, I thought after sixteen sessions everything would change. Later I saw it takes time, but small changes matter."(P).

> "Over time, we became more patient and hopeful—not expecting perfection."(P).

> "Some families expected miracles; we had to remind them it's skill-building, not magic."(T).

> "At first, I thought after finishing the course I would make a lot of friends. Later I saw it needs practice" (YA).

Milestones: What Drove Success

Young Adult Characteristics

Certain traits among participants positively shaped group dynamics. Many exhibited motivation, attention to detail, and persistence, which fostered active engagement and resilience, as shown by their consistent attendance. Notably, the humility and honesty within the group, created a supportive atmosphere where individuals encouraged each other over time. Participants viewed therapists as mentors, and the lack of manipulative behavior contributed to a strong sense of trust and commitment within the sessions.

> "They were very committed; attendance was excellent. Their honesty and openness made the group trusting."(T).

> "My son really looked up to the therapists—he said they understand him better than anyone."(P).

> "I liked that everyone respected each other. We encouraged each other every week."(YA).

Accessible and Structured Content

The program's structured, step-by-step approach—with its use of keywords, roleplays, and behavioral exercises—was recognized by participants as both accessible and impactful. The clear framework made the material easy to follow. Participants appreciated being "seen" and valued in a space where they felt respected and taken seriously, which reinforced their commitment to the program. Namely, the "graduation" milestone gave participants a sense of accomplishment, significantly boosting their self-esteem.

> "The keywords helped me remember what to say. The steps made it easier."(YA).

> "The structure was clear. We could follow what they learned each week."(P).

> "The graduation ceremony made them so proud; it really boosted confidence."(P).

> "The step-by-step method and role-plays worked well—they understood better when they practiced."(T).

Real-world Wins and Takeaways

Skills Implementation and Behavioral Growth

Participants, parents, and therapists observed tangible, real-world improvements in the application of social skills learned during the program. Therapists noted that participants were increasingly proactive in practicing techniques, applying them before and after sessions, signaling an integration of these skills into daily routines. Both parents and young adults demonstrated a growing understanding and comfort with social rules, often discussing and practicing new skills together. The collaborative learning experience extended to parents, who also applied these insights, enhancing communication and social understanding within the family.

> "They started using the techniques before and after sessions—like greeting with us, initiating conversations or calling peers."(T).

> "Now we talk more at home. He explains what he learned and we practice together."(P).

> "I practiced greeting people and asking questions—it worked! I even made a new friend."(YA).

Gradual, Real-Life Improvements

Participants and caregivers recognized improvements in important aspects of daily life, such as communication, self-care, assertiveness, and even success in finding jobs signifying meaningful progress in the participants' ability to manage social and professional interactions more effectively.

> Furthermore, improvements in self-esteem were evident, as many participants reported feeling more confident and capable in social situations. These positive changes were recognized by family members, therapists, and even friends outside of the sessions, who acknowledged the participants' progress. "He started taking care of his appearance—he changes clothes before sessions and goes out more."(P).

> "We saw real changes in self-confidence and social awareness."(T).

> "I feel more comfortable talking to people now, even at work."(YA).

High Satisfaction and Motivation for Continuity

The positive experiences led participants and parents to express high levels of satisfaction with the program. There was a strong desire for ongoing sessions, with some suggesting booster sessions or individualized support to sustain and deepen these skills. Parents expressed gratitude for the structured support, indicating a lasting positive impact on family cohesion and individual development.

> "We're grateful; this program finally gave us structured support."(P).

> "I wish the sessions didn't end. Maybe we can have more meetings."(YA).

> "Families asked for booster sessions—they saw progress and wanted to continue."(T).

Looking Ahead: Amplifying the Gains

Sustained Engagement

Maintaining post-program connections and follow-up support was highlighted as essential by participants. Additional practice and reinforcement were also seen as important for

consolidating the skills learned, ensuring long-term benefits and helping participants confidently apply these skills in real-life situations.

> "Follow-ups are essential. Without ongoing support, the skills may fade."(T).

> "We need a place for them to meet again and practice, not just finish and stop."(P).

> "I'd like to keep in touch with friends from the group—it helps to practice together."(YA).

Enhanced Preparation

Individual sessions focused on emotional literacy, emotion recognition, and psychoeducation were recommended to lay groundwork for core social skills training. This subtheme was emerged from therapists and parents focus froups.

> "Before social-skills training, we should have sessions on emotions—recognizing and naming feelings."(T).

> "It would help if they first learn about emotions and self-control, then go to social skills."(P).

Discussion

Our mixed-design study investigated the lived experiences and evaluated the acceptability and efficacy of standard PEERS® program for autistic young adults. The program was received well and accepted by the participants and their families. The program's feasibility was demonstrated by high attendance (no drop) and overall satisfaction. The program has been developed for autistic adults to improve their social communication, peer interactions, independence and interpersonal relationships (Gantman et al., 2012). However, except for knowledge about social skills taught during the *PEERS®* sessions (as measured by *TYASSK) and conflicts during get-togethers* there was no other findings across the measures we used. This would raise the possible role of culture as well as methodological shortcomings in our study.

The present study included only 21 participants and was underpowered for many inferential tests, so p-values alone provide an incomplete picture of intervention effects. We therefore emphasize the partial η^2 effect sizes from our ANOVAs, which reflect the proportion of variance explained by the intervention. Several outcomes showed medium-to-large η^2 values (for example, MESSY $\eta^2 = 0.37$; SACRAL $\eta^2 = 0.19$; TYASSK $\eta^2 = 0.15$), indicating that a meaningful portion of outcome variance was associated with program participation despite limited sample size. As partial η^2 expresses variance explained rather than standardized mean differences, its numerical values are not directly comparable with Cohen's *d*; however, our largest η^2 values (e.g., MESSY $\eta^2 = 0.37$) approximate large standardized effects ($d \approx 1.5$).

In a Cochrane review done on social skills groups for autistic people aged 6 to 21 the results have been mixed and even its impact on quality of life is far from conclusive (Reichow et al., 2012).

There are limited evidence-based social skills training groups available for adults on the autism spectrum, making it challenging to draw definitive conclusions. The UCLA PEERS program is one of the few caregiver-assisted, evidence-based social skills training programs. The original study by Laugeson et al. (Laugeson et al., 2015) reported positive effects on social knowledge. However, our study presented paradoxical findings: high satisfaction and low dropout rates contrasted with a lack of positive outcomes across many of the measures used. These results warrant further investigation and replication.

The UCLA PEERS program has primarily been implemented among North American, White, and affluent populations. While studies conducted in diverse settings generally report good outcomes, the findings remain somewhat mixed. Notably, the program has also been studied in non-American cultural contexts, where it has been adapted with varying levels of success. Across different cultures, the program has yielded satisfactory results, demonstrating effectiveness in some areas while highlighting the need for continued research and adaptation.

The study by Honan et al. conducted in Australia, evaluated an adapted version of the PEERS® social skills training program for young adults with autism spectrum disorder (ASD) and/or mild intellectual impairment, highlighting the challenges faced in its implementation. Participants found the program demanding due to its intensive 16-week schedule, which posed logistical challenges, including travel and time commitments. Similar to our findings, participants reported difficulties with the volume of content and certain tasks, such as practicing phone calls or discussing sensitive topics like dating, which required them to step outside their comfort zones. Despite these challenges, the program was deemed worthwhile, demonstrating improvements in social skills knowledge and parent-reported social responsiveness (Honan et al., 2023).

In a recent study done in Poland (Płatos et al., 2024) individuals who participated in the PEERS® program showed significant improvements in social skills, social cognition,

and social knowledge, but limited gains in social engagement. In a Taiwanese population study (Chien et al., 2023) they found improvement in terms of social interactions; however, the improvement was not universal across all domains of social interaction. Similarly in a Korean study, social skills knowledge was found to be improved after completing the clinical trial (Oh et al., 2021).

As suggested by Martin et al. (Martin et al., 2024), who studied the UCLA PEERS program on Latine families there are perhaps important cultural factors impacting the outcome. They propose a number of recommendations for program adaptation in order to make it more culturally sensitive as to Latine cultural views on parenting. As an example, they suggested that the text of the manual be written in a simpler language avoiding technical terms (such as positive or negative reinforcement). Our study subjects perhaps have some unique characteristics as well. For instance, in our study we found that participants had insufficient awareness of autism and were even unaware of their diagnosis, highlighting a need for more basic psychoeducation about autism for them. As a result, this lack of knowledge may lead to not understanding the nature and manifestations of their social and interpersonal differences. Furthermore, parents may disregard the cause-and-effect connection between autism and symptoms and regard their challenging behaviors as personal and rude. In turn, this leads to parents staying preoccupied with their children's oppositionality and take less advantage of the program. Under these circumstances, the parents (or the primary caretakers) are more focused on behavioral aspects and less engaged with social skills parts of the program. There are also other likely cultural differences with regards to child rearing practices and parental control which make the study results less robust and harder to interpret. For example, similar to Latine families some of the homeworks such as "get togethers" seemed to be challenging perhaps due to factors like *Taa'rof* in Iranian families as explained above. There are unknown confounding cultural factors as well. For instance, in a developing society like Iran, there are no universally agreed accepted norms for dating and for this reason we shortened the relevant part of the PEERS manual in order to be on the safe side.

This study has several limitations that should be considered when interpreting the findings. First, the small sample size and inclusion of only male participants limit the generalizability of the results to a broader population, particularly autistic females. Importantly, effect-size estimates in small samples are subject to sampling variability and potential inflation; several 95% confidence intervals around these estimates are wide, underscoring the need for replication in adequately powered trials. Thus, while the observed effect sizes in our study are encouraging and suggest real, clinically relevant change, they should be interpreted as preliminary and hypothesis-generating.

Second limitation is that diagnostic confirmation relied on clinical psychiatric interviews rather than standardized diagnostic instruments.

Third, the exclusion of participants with intellectual disabilities and major psychiatric comorbidities reduces the applicability of the findings to individuals with more complex presentations.

Fourth, although most participants had IQ scores within or near the average range, two participants in the intervention group had IQ scores of 62 (one with a Verbal IQ of 73), and one participant in the waitlist group had an IQ of 63. Although the PEERS® for Young Adults manual targets individuals without intellectual disabilities (IQ ≥ 70), it provides guidance for adapting sessions for those with lower cognitive ability. In line with these recommendations, we provided extra behavioral rehearsal and additional coaching support during and after sessions through individual check-outs for participants with IQ < 70. Nonetheless, the presence of participants with lower IQs may have introduced heterogeneity in learning capacity and treatment response, which should be considered when interpreting the findings.

Fifth, the reliance on self-reported and caregiver-reported measures, which are prone to subjective biases, may have influenced the accuracy of the outcomes. Future studies with larger, more diverse samples, mixed-gender groups, and multi-site collaboration are recommended to address these limitations and build upon the current findings.

Another limitation is the absence of a quantitative measure of program acceptability or satisfaction. Future studies should include standardized quantitative tools alongside qualitative feedback to provide a more comprehensive assessment of feasibility and acceptability.

In conclusion the Iranian young adults with autism view the PEERS program positively. In their views the program is perhaps a safe place to receive support and be heard. Our study highlights the importance of including underrepresented groups and taking into account cultural adaptation in order to increase validation of a program previously normed for a north American white and affluent population.

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Declarations

Competing Interests Authors declare no competing interests.

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