RESEARCH ARTICLE

A Randomized Controlled Trial evaluating the Hebrew Adaptation of the PEERS® Intervention: Behavioral and Questionnaire-Based Outcomes

Shai Joseph Rabin, Sandra Israel-Yaacov, Elizabeth A. Laugeson, Irit Mor-Snir, and Ofer Golan 🔲

Social interaction deficits form a core characteristic of ASD that is commonly targeted through social-skill groups. The Program for the Education and Enrichment of Relational Skills (PEERS®) is a well-established parent-assisted intervention for adolescents, which addresses key areas of social functioning. PEERS® has been mainly studied in North-America and its evaluations were mostly questionnaire based. The aim of the current study was to test the effectiveness of the adapted and translated Hebrew version of the PEERS® intervention in a randomized controlled trial, using behavioral measures of peer interaction, in addition to self, parent, and teacher reports. Forty-one participants with ASD and no intellectual impairment, aged 12–17 years, were randomly assigned to an immediate intervention or a delayed-intervention group. All participants were assessed before and after the immediate intervention, and again at follow up, after the delayed intervention took place. Results revealed intervention-related behavioral improvements on adolescents' engagement, question-asking, and physical arousal. Parental reports indicated improved social skills, and reduced ASD symptoms. Adolescents reported on more social encounters, greater empathy, and scored higher on social-skill knowledge. Most of these effects maintained at a 16-week follow-up. Teacher reports' yielded effects only on pre-post intervention analysis. Adolescents' improvement on behavioral engagement predicted parent-reported social skills improvement. Our findings support the effectiveness of the adapted Hebrew version of PEERS® for adolescents with ASD, through significant behavioral and questionnaire-based outcomes, which maintained at follow-up. *Autism Res* 2018, 0: 000–000. © 2018 International Society for Autism Research, Wiley Periodicals, Inc.

Lay Summary: Social-skills groups, which facilitate key social deficits characteristic of ASD, are a popular intervention for adolescents with ASD. Indeed, many treatment protocols have been published, and some have also been research validated. However, there have been inconsistent findings regarding the effectiveness of different protocols, in addition to limited findings of improvement beyond questionnaire reports. This study evaluated the Hebrew adaptation of the PEERS® intervention, a 16-weeks long program, which involves the parents as their adolescents' social coaches. Following the intervention, adolescents improved their social-skills, participated more in social encounters, reported greater empathy, and demonstrated higher social-skill knowledge. A live play-role assessment with an unfamiliar peer indicated that adolescents showed greater involvement, asked more questions and were more physically relaxed during the conversation. Improvements maintained 16 weeks after the intervention was completed.

Keywords: adolescents; clinical trials; intervention – behavioral; skill learning; social cognition; treatment research

Introduction

Autism spectrum disorder (ASD) is a neuro-developmental condition characterized by social communication impairments as well as restricted and repetitive behavior patterns [American Psychiatric Association, 2013]. These characteristics persist throughout the lifespan, even for higher functioning individuals [Taylor, Gillberg, Lichtenstein, & Lundström, 2017].

For many individuals with ASD, adolescence is a particularly troubling period. As they attempt to integrate socially, adolescents with ASD experience more negative social outcomes (e.g., fewer friends, little support from classmates, limited involvement in social activities, and increased peer rejection) compared to adolescents with other developmental disabilities or typically developing adolescents [Renno & Wood, 2013; Shattuck, Orsmond, Wagner, & Cooper, 2011]. They are also more exposed to bullying, reflected in high rates of victimization and perpetration [Sofronoff, Dark, & Stone, 2011; van Roekel, Scholte, & Didden, 2010]. Due to these vast difficulties, adolescents with ASD can gain

from interventions targeting social-skills, such as social-skills groups.

Social-skills training groups are among the most common interventions for people with ASD, especially those with intact cognitive skills [Reaven, Blakeley-Smith, Culhane-Shelburne, & Hepburn, 2012]. A meta-analysis of social-skills training programs' evaluation studies has shown that participants in social-skills group interventions showed some improvement in social competence yet these improvements may not have generalized to school settings [Gates, Kang, & Lerner, 2017].

Difficulties generalizing learned skills into other contexts are characteristic of ASD [Church et al., 2015]. Various methods have been suggested in order to promote generalization, such as conducting the intervention within the educational system [Bauminger, 2007], including peers as intervention mediators [Kasari, Rotheram-Fuller, Locke, & Gulsrud, 2012] or involving a parent as part of the intervention [DeRosier, Swick, Davis, McMillen, & Matthews, 2011].

The well-established Program for the Education and Enrichment of Relational Skills [PEERS®; Laugeson & Frankel, 2010] is a parent-assisted, manualized social-skills training program for adolescents with ASD, addressing key areas of social functioning (see methods for a detailed description). Ecologically valid skills for making and maintaining friends are taught using psycho-educational and cognitive-behavioral treatment techniques. Adolescents practice the taught skills in between sessions. Parents, serve as their adolescents' social coaches, supervise their treatment fidelity, and practice the taught skills with them. PEERS® has been evaluated in several RCTs, with its efficacy established for improving a variety of social-skills in adolescents [Laugeson, Frankel, Mogil, & Dillon, 2009, Laugeson, Frankel, Gantman, Dillon, & Mogil, 2012; Schohl et al., 2014]. A follow up study has shown PEERS-related gains were maintained even 5 years post intervention [Mandelberg et al., 2014]. PEERS® intervention effects have also been reflected in changes in the social brain as revealed through biomarkers of intervention outcome using EEG [Van Hecke et al., 2015]. PEERS® has also been cross-culturally evaluated in South Korea, with significant behavioral improvements in adolescents' communication and social interaction, as well as social-skills knowledge, interpersonal skills, play/leisure skills, and a decrease in depressive symptoms [Yoo et al., 2014]. In Israel, culturally adapted PEERS® groups, conducted in a clinical setting, have yielded promising preliminary results [Golan & Israel-Yaacov, 2014], highlighting the need for the current randomized controlled trial.

Most of the above-mentioned studies have solely relied on informant and self-report questionnaires to evaluate the intervention outcomes. While this method is practical, economic, and enables a quick collection of data, it is prone to various biases, and may differ from actual performance [Brace, 2008; Mcdonald, 2008]. Some of these shortages may be overcome, by adding laboratory behavioral observations to the intervention evaluation plan. Integrating behavioral observations with self and informant reports could enable a better evaluation of generalization of traits and skills [Lord et al., 2005] in a controlled situation [Horner et al., 2005; Mcdonald, 2008], which overcomes biases related to recalling behaviors retrospectively [Henry, Moffitt, Caspi, Langley, & Silva, 1994]. Finally, this approach provides a measure that is sensitive to change and can be used repeatedly without a bias relating to learning effects [Cunningham, 2012].

The Contextual Assessment of Social Skills [CASS; Ratto, Turner-Brown, Rupp, Mesibov, & Penn, 2011] is a semi-structured live role play assessment of conversational skills developed for adolescents and young adults with high-functioning ASD. The CASS consists of a 3-min conversation of the adolescent with a confederate. They are both asked to get to know one another. The confederate is instructed to either display social engagement and interest, or social disengagement and boredom. Each condition is coded by an independent and double-blinded trained clinician and is scored on a conversation rating item. So far, the CASS has been used in two intervention studies for adolescents and young adults with ASD. White and colleagues [2015], who used the CASS to evaluate the young adults version of PEERS® [Laugeson, 2017], reported significant intervention-related improvement on participants' involvement in conversation, question asking and topic changes during conversation [White, Scarpa, Conner, Maddox, & Bonete, 2015]. Dolan and colleagues [2016], who used the CASS in a RCT evaluation of PEERS®, reported improved intervention-related vocal expressiveness and a trend for improvement on quality of rapport. To the best of our knowledge, this is the first study using the CASS to evaluate maintenance of intervention effects at follow up.

The current study reports the first-year results of a randomized controlled trial, evaluating the Hebrew adaptation of the PEERS® protocol. Participants were randomized into an immediate intervention or a delayed intervention control group and evaluated at three time points (see figure 1 for detailed description). We examined immediate intervention outcomes, as well as maintenance of effects at a 4 month follow-up, employing self, parent, and teacher questionnaires, as well as lab-based, blindly coded, behavioral observation. We hypothesized that we would see (1) an intervention-related improvement on all variables examined; (2) greater improvement in the immediate

intervention group compared to the delayed intervention control group from Time 1 to Time 2; (3) maintenance of the immediate intervention group's improvements at Time 3; and (4) prediction of the questionnaire-based intervention-related outcomes, based on the behavioral intervention-related outcomes.

Method

Recruitment and Inclusion Criteria

Following ethical approval by the *Beer-Yaacov - Ness-Ziona* mental health center's Helsinki committee, 48 families were recruited for the study. They were recruited through the *Bait-Echad* ASD clinical centers of the association for children at risk, located in two different regions in the center of Israel. In addition, information about the study was sent to ASD professionals around the country, in order to encourage referrals to the groups. In order to be considered for the group, participants had to be (1) aged 12–17 years, (2) clinically diagnosed with ASD by a psychiatrist or a neurologist, according to established criteria (APA, 2013), (3) with no comorbid intellectual impairment (IQ >70) or severe behavioral problems, (4) personally motivated to take part in the group, and (5) having a parent who was willing to serve as a social coach and attend all group sessions.

Pre-Assessment

Forty-eight adolescents (two females) and their parents were recruited for the study. All the adolescents were born in Israel and spoke Hebrew as their first language.

Trained and licensed psychologists met the families for a 3 hour assessment in order to ensure they meet the inclusion criteria. The adolescents preexisting diagnosis of ASD was validated using module 4 of the Autism Diagnostic Observation Scale, 2nd edition [ADOS-2; Lord et al., 2012]. Intellectual functioning was assessed by two verbal (vocabulary, similarities) and two nonverbal (block-design, matrix-reasoning) subtests, taken from the 3rd edition of the Wechsler Adult Intelligence Scale [WAIS-III; Wechsler, 1997] or the 4th edition of the Wechsler Intelligence Scale for Children [WISC-IV; Wechsler, 2003], according to the adolescent's age (WISC-IV for 34 participants, WAIS-III for 7 participants). Parents filled out the Socialization scale of the Vineland Adaptive Behavior Scales-2nd Ed [Sparrow, Cicchetti, Balla, & Doll, 2005] to assess for pre-intervention adaptive functioning in this area. The last part of the assessment included a semi-structured clinical interview with the adolescent and his/her parent which was aimed to assess the adolescent's motivation to participate in the group and to rule out any other diagnosis of a major mental illness (e.g., psychosis, bipolar disorder) or a sensory impairment (e.g., major

visual or hearing impairment). Based on this pre-assessment, seven participants were excluded from the study, four due to an intellectual impairment comorbidity, two due to poor adolescent motivation, and one due to severe behavioral problems. These families have been referred to other individual and/or group-based clinical services.

Randomization and Assessments

All 41 participants (39 males, 2 females) who met the inclusion criteria were tested at baseline (T1) on the CASS. In addition, questionnaires were filled out by adolescents (QSQ, TASSK, LSDQ and EQ) and their parents (SRS-2, SSIS, and QSQ) and teachers (SRS-2 and SSIS). Participants were then randomly assigned to one of two conditions: an Immediate Intervention group (II, $n = 20$), or a Delayed Intervention Control group (DIC, $n = 21$). The groups were comparable on adolescents' age, gender, cognitive ability measures, ADOS-2 comparison scores, and Vineland Socialization scores. In addition, the groups were comparable on the participating parent's age, gender, and years of education. Seventeen parents reported their child was using psychiatric medication prior the study (II group: 2 SSRI, 6 methylphenidate; DIC group: 2 SSRI, 6 methylphenidate and 1 low dose of antipsychotic for anxiety), with no difference between the groups. Finally, there were no significant group differences at T1 on all of the research measures (see Table 1).

Next, participants in the II group received the adapted 16-week PEERS® intervention, while the DIC group maintained treatment as usual. Both groups were then evaluated again with the same measures (T2), 16 weeks after T1. Next, participants in the DIC group received the 16-week adapted PEERS® intervention, while the II group maintained treatment as usual. The two groups were then tested again (T3), 16 weeks after T2 and 32 weeks after T1, on the same measures. At each assessment point, families and teachers were paid for their time and effort. The study design is illustrated in Figure 1.

Intervention

PEERS® [Laugeson & Frankel, 2010] is a parent-assisted manualized social-skills intervention program that targets the friendship skills of adolescents with ASD.

The intervention protocol consists of 14 weekly 90-min sessions for adolescents and their parents, which are carried out concurrently in two separate rooms. Each session focuses on a particular social-skill (detailed in supplementary material), and consists of teaching the skill via concrete behavioral rules, modeling and role-play, practicing the newly learnt skill in class with another member, and ensuring mastery and

Table 1. RCT Group Comparison on Background Variables and Baseline Measures

|	Immediate Intervention (n = 20) Mean (SD)	Delayed Intervention Control (n = 21) Mean (SD)	
Demographics			
Adolescent gender (m:f)	19:1	20:1	$\chi^2(1)=.00$
Adolescent education (Mainstream: mainstream with aid: special education class)	6:9:5	7:8:6	$\chi^2(2)=.60$
Usage of psychiatric medication (yes:no)	8:12	9:12	$\chi^2(1)=.03$
Parent gender (m:f)	(5:15)	(5:16)	$\chi^2(1)=.00$
			t(39)
Parent age (years)	47.08 (5.89)	47.64 (4.86)	−0.33
Parent education (years)	16.77 (1.73)	15.88 (1.74)	1.53
Adolescent age (years)	14.03 (1.83)	13.95 (1.72)	0.15
WISC IV / WAIS III block design	11.65 (3.52)	10.28 (2.85)	1.37
WISC IV / WAIS III similarities	12.20 (3.76)	10.71 (2.69)	1.46
WISC IV / WAIS III vocabulary	11.20 (3.13)	10.00 (2.93)	1.27
WISC IV / WAIS III matrix reasoning	10.00 (4.14)	9.14 (2.83)	0.78
ADOS-2	6.65 (2.03)	6.95 (1.53)	−0.54
Vineland socialization	30.05 (6.39)	29.85 (5.19)	0.11
Caregiver Measures			
QSQ total score	1.57 (2.13)	2.35 (3.64)	−0.82
SSIS social skills	80.6 (13.44)	82.12 (9.86)	−0.41
SSIS behavior problems	122.45 (14.32)	124.59 (12.61)	−0.51
SRS total score	87.15 (31.49)	84.35 (25.09)	0.32
Adolescent measures			
TASSK	14.15 (2.18)	12.80 (2.44)	1.84
QSQ total score	2.69 (3.03)	4.05 (4.32)	−1.16
LSQ	43.25 (12.62)	43.19 (11.71)	0.02
EQ	31.45 (8.35)	37.85 (12.06)	−1.96
Observational Measures			**t(37)**
CASS total score	14.21 (4.81)	13.11 (5.06)	0.69
Teacher Measures			**t(36)**
SRS total score	92.00 (25.14)	79.89 (25.35)	1.46
SSIS social skills	45.83 (15.64)	46.89 (22.50)	−0.17
SSIS behavior problems	27.55 (13.02)	26.45 (15.80)	0.23
SSIS academic competence	18.72 (8.12)	14.10 (9.28)	1.61

Note: $P > .1$ for all comparisons, except EQ ($P = .062$) and TASSK ($P = .071$). WISC IV-Wechsler Intelligence Scale for Children or WAIS III-Wechsler Adult Intelligence Scale subtest standardized scores ($M = 10$, $SD = 3$), ADOS-2 - Autism Diagnostic Observation Scale 2nd edition comparison score, CASS- Conversational Assessment of Social Skills, QSQ- Quality of Socialization Questionnaire, SSIS- Social Skills Improvement Scale, SRS- Social Responsiveness Scale, TASSK- Test of Adolescent Social Skills Knowledge, LSQ- Loneliness and Social Dissatisfaction Questionnaire, EQ- Empathy Quotient.

generalization by assigning social homework assignments. The parent group sessions comprise weekly homework review, discussions regarding ways for parents to coach their adolescents, a review of the new social-skill being presented to the adolescents, and going through the following social homework assignments. The session ends with a reunification of adolescents and parents, in order to summarize the meeting.

Hebrew Translation and Adaptation

In Israel, the PEERS® protocol was translated and adapted by a team of clinicians at the *Bait-Echad* ASD center, for clinical use. A pilot of two PEERS® groups were led and supervised by clinicians trained at the UCLA PEERS® clinic. These groups were followed by qualitative interviews with the adolescents, the parents and the clinical team about the protocol's applicability and the cultural adaptations required. Following this process, some modifications of the original protocol were recommended [Golan & Israel-Yaacov, 2014]: First, in the Israeli adaptation of PEERS®, two lessons have been extended, resulting in a 16-week long intervention. These changes were a result of both clinicians' and families' feedback that those lessons are packed with too much information, and the need to elaborate on the material taught. Second, clinicians agreed that some cultural changes were required in the examples and rules given in the original version. The adapted intervention and culture changes are outlined in supplementary material.
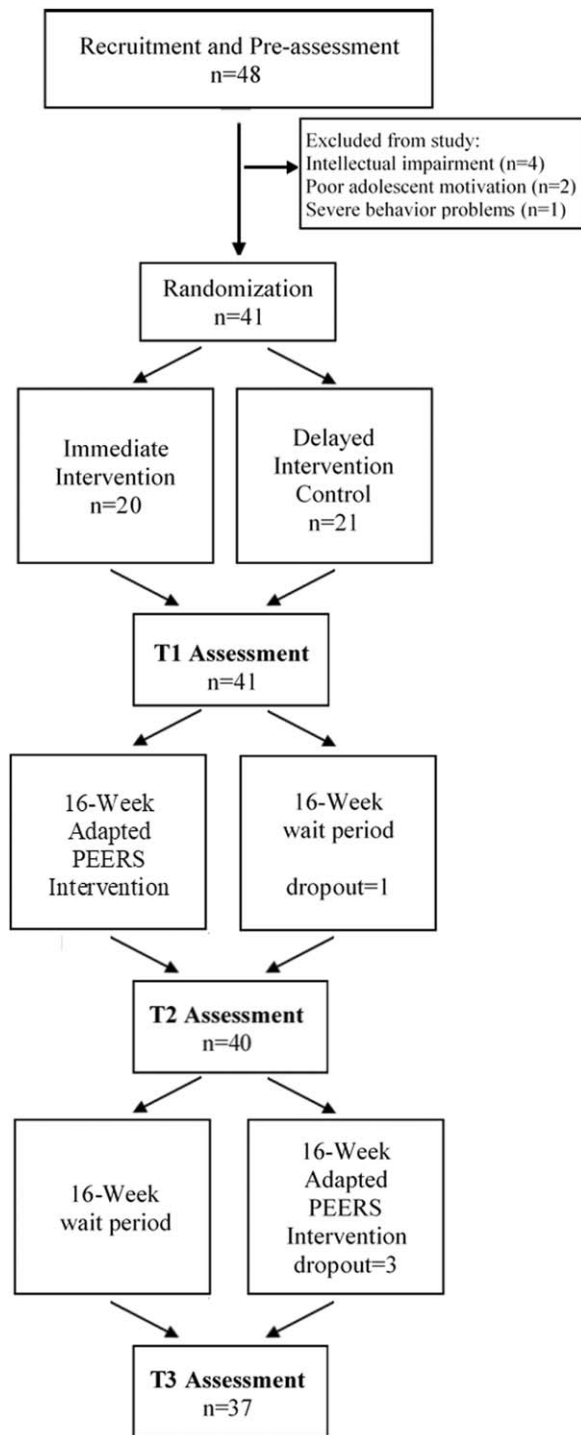
Figure 1. Design of the Randomized Controlled Trial.

Measures
Observational Measure

Contextual assessment of social skills [CASS; Ratto et al., 2011]. The *CASS* is a live role-play assessment of conversational skills, developed for adolescents with high-functioning ASD. The participant is introduced to a confederate, and the two are asked to spend some time to get to know each other. The 3-min interaction is videotaped and coded for number of questions asked, number of topic changes, and evaluations on a 1–7 likert scale of participants' vocal expressiveness, gestures, positive affect, kinesic arousal, social anxiety, involvement in the conversation, and quality of rapport. In addition, a CASS total score was calculated. Prior studies found the CASS to be a valid, reliable and sensitive measure [Dolan et al., 2016; Ratto et al., 2011; White et al., 2015]. The original CASS consists of two interactions-one with an engaged confederate and another with a bored confederate. In the current study, only the engaged confederate condition was administered. Participants met with a different and unfamiliar confederate at each assessment point. Videos were coded by two independent blind raters, who had an average inter-rater agreement of 0.86. Internal consistency for CASS items in the current study, calculated at T1, was $\alpha = 0.84$.

Self-Report Measures

Test of adolescent Social Skills knowledge [TASSK; Laugeson & Frankel, 2010]. The TASSK is a criterion referenced measure designed to assess adolescent's knowledge of the specific social-skills taught during the PEERS® intervention. Two items were derived from each of the PEERS® didactic lessons making a total of 26 forced-choice items. Prior PEERS® studies found the TASSK to be a reliable measure among adolescents with ASD, which is sensitive to intervention related change [Schohl et al., 2014; Yoo et al., 2014].

Quality of socialization questionnaire [QSQ; Laugeson et al., 2009]. The QSQ is a measure completed by adolescents (QSQ-A) and parents (QSQ-P). It comprises 10 statements regarding the quality of the adolescent's last get-together on a scale of 0 (not at all true) to 3 (very much true). Higher scores represent get-togethers of better quality. In addition, respondents are asked to separately number the times the adolescent initiated a get-together, and the number of times s/he was invited to a get-together in the previous month. The QSQ was found reliable and sensitive to change among adolescents with ASD [Laugeson et al., 2009; Yoo et al., 2014]. The internal consistency measures of the quality of the last get-together ranked on the QSQ in the current study, calculated at T1, were $\alpha = 0.79$ for parents and $\alpha = 0.72$ for adolescents.

Loneliness and social dissatisfaction questionnaire [LSDQ; Asher, Hymel, & Renshaw, 1984]. The LSDQ is a 16-item, standardized self-report measure that assesses global feelings of loneliness and social inadequacy on a scale of 1 (not true at all) to 5 (always true). Higher scores represent greater loneliness. The LSDQ been validated with young adolescents with

typical development, intellectual disabilities, learning disorders and ASD [Caputi, Pantaleo, & Scaini, 2017; Regev & Guttmann, 2005]. The internal consistency of the LSDQ for this sample, calculated at T1, was $\alpha = 0.80$.

Empathy quotient [EQ; Baron-Cohen & Wheelwright, 2004]. The EQ is a 40 item self-assessment questionnaire measuring empathy levels, sensitive to changes among adults [Gantman, Kapp, Orenski, & Laugeson, 2012] and adolescents [Johnson, Filliter, & Murphy, 2009]. Internal consistency for this sample, calculated at T1, was $\alpha = 0.82$.

Informant-Report Measures

Social responsiveness scale, 2nd edition [SRS-2; Constantino & Gruber, 2012]. The SRS-2 is a 65-item rating scale, measuring the severity of autism spectrum symptoms as they occur in natural social settings. Completed by parents and teachers, it is appropriate for use with children aged 4–18 years. SRS-2 comprises social awareness, social cognition, social communication, social motivation, and autistic mannerisms scales. The SRS-2 has been shown to be sensitive to changes in social functioning among children with ASD [Wood et al., 2009]. Internal consistency measures for the SRS-2 in the current study, calculated at T1, were $\alpha = 0.94$ for parents and $\alpha = 0.92$ for teachers.

The social skills improvement system [SSIS; Gresham & Elliott, 2008]. The SSIS is a standardized rating scale that assesses global social competence for children aged 3–18 years. Designed to assess treatment-related social-skills change, it utilizes parent and teacher reports to evaluate target social behaviors including communication, cooperation, assertion, responsibility, empathy, engagement, and self-control. In addition, targeted problem behaviors include externalizing, hyperactivity/inattention, bullying and internalizing. Finally, a separate scale assesses ASD symptoms. It has been used to assess social difficulties among youth with ASD [Gillis, Callahan, & Romanczyk, 2011], social anxiety [Gresham, Vance, Chenier, & Hunter, 2013], and behavioral/emotional problem [Porter et al., 2017]. The internal consistency of the SSIS measures in the current study, calculated at T1, were $\alpha = 0.86$ for parents and $\alpha = 0.91$ for teachers.

Results
Intervention Outcomes – Joint Analysis

In order to examine the extent to which the PEERS® intervention affects adolescents' social abilities, we analyzed pre-to post-intervention effects jointly for all the participants who completed the intervention, that is, T2 vs. T1 for the II group, and T3 vs. T2 for the DIC group. Four repeated measures MANOVAs were conducted separately for parent measures, adolescent measures, teacher measures, and CASS items. Since

CASS guidelines require that confederates should be of the opposite gender to participants, and since all our confederates were females, we have excluded the female participants ($n = 2$) from all CASS analyses. Table 2 details the sample's measures pre-and post-intervention.

The analysis of the CASS items yielded an overall intervention effect (F_{wilks} [9,28]=5.26, $P<.001$, $\eta^2=.63$). Univariate analyses (sphericity assumed), detailed in Table 2, revealed significant intervention effects for enhanced involvement in the conversation, better quality of rapport, increased number of questions during the conversation, reduced social anxiety, reduced kinesic arousal, and improved CASS overall score.

The adolescent measures MANOVA yielded an overall intervention effect (F_{wilks}[6,30]=26.88, $P<.001$, $\eta^2=.84$). Univariate analyses (sphericity assumed), detailed in Table 2 showed that following the intervention, adolescents demonstrated improved social-skill knowledge on the TASSK, reported they hosted more friends on the QSQ, and reported increased empathy levels on the EQ. In addition, they reported 601 feeling less lonely.

The parents' measures MANOVA has only shown a marginally significant overall effect (F_{wilks} [13,23]=2.00, $P < .10$, $\eta^2=.78$). Univariate analyses (sphericity assumed), detailed in Table 2 indicated that following the intervention, parents reported on the QSQ that their children hosted more friends for social encounters and were invited by friends to their home more frequently, and had better quality of get togethers. On the SSIS, parents reported a significant improvement on the social skills scale and a significant reduction on the behavior problems and autism spectrum scales, as well as significant improvement on the following subscales: communication, assertion, responsibility, social engagement, and self-control, as well as a reduction on the externalizing and hyperactivity/inattention subscales. On the SRS-2, parents reported intervention-related reduced ASD symptoms on the social awareness, social cognition, social communication, social motivation, and autistic mannerisms subscales, as well as on the SRS-2 total score.

The teachers' measures MANOVA has also yielded a significant overall intervention effect (F_{wilks}[11,19]=6.67, $P < .001$, $\eta^2=.86$). Univariate analyses, detailed in Table 2, indicated significant improvements on the SSIS social skills scale and its communication, cooperation, assertion, responsibility, empathy, engagement, and self-control subscales, as well as reduction on the autism spectrum scale. In addition, following the intervention teachers reported reduced ASD symptoms on the SRS-2 social cognition and social motivation subscales.

RCT Outcomes

The RCT compared T2 vs. T1 assessments in the II and DIC groups and examined whether the intervention

Table 2. Means (S.D.) of the Research Measures Pre- and Post-Intervention – Joint Analysis (*n* = 36)

	Pre-intervention	Post-intervention		η^2
Behavioral Measures			F(1,35)	
CASS Total Score	13.66 (5.59)	17.72 (5.88)	29.24***	.45
Questions	2.50 (2.47)	4.58 (3.34)	20.05***	.36
Topic Change	2.25 (1.57)	2.53 (2.11)	0.42	.01
Vocal Expressiveness	4.08 (1.76)	4.33 (1.49)	1.43	.03
Gestures	3.89 (2.10)	4.19 (1.98)	1.34	.03
Positive Affect	4.19 (1.81)	4.47 (1.50)	0.86	.02
Kinesic Arousal	4.44 (1.15)	4.81 (1.00)	4.52*	.11
Social Anxiety	4.08 (1.57)	4.56 (1.22)	5.11*	.12
Overall Involvement	4.44 (1.66)	5.33 (1.28)	25.16***	.41
Overall Rapport	4.47 (1.55)	5.08 (1.20)	14.45**	.29
Parents Measures			F(1,36)	
SSIS- Social Skills	74.48 (1.81)	82.06 (15.54)	23.18***	.40
Communication	11.88 (2.77)	13.62 (2.85)	28.13***	.45
Cooperation	11.96 (3.00)	12.16 (3.32)	0.68	.02
Assertion	11.89 (2.98)	13.58 (2.88)	13.55***	.28
Responsibility	10.58 (3.62)	11.94 (3.52)	16.26***	.32
Empathy	10.19 (3.10)	10.55 (3.49)	1.37	.04
Engagement	8.42 (3.58)	9.75 (2.97)	11.06**	.24
Self-Control	9.39 (3.32)	10.43 (3.57)	5.63*	.14
SSIS- Behavior Problems	35.33 (13.14)	30.09 (11.65)	12.00***	.26
Externalizing	11.25 (6.36)	9.62 (5.45)	7.64**	.18
Bullying	2.41 (2.33)	2.07 (2.20)	1.70	.05
Hyperactivity/Inattention	9.36 (3.86)	7.78 (3.41)	10.01**	.22
Internalizing	11.47 (4.39)	10.31 (3.86)	3.68	.10
SSIS- Autism Spectrum	22.25 (5.73)	18.46 (5.82)	21.11***	.38
SRS- Total Score	79.94 (29.13)	66.95 (23.99)	12.73***	.27
Social Awareness	9.13 (4.49)	7.76 (3.84)	6.41*	.15
Social Cognition	14.87 (6.31)	12.61 (5.72)	12.30***	.26
Social Communication	27.04 (10.93)	21.89 (8.71)	10.88**	.24
Social Motivation	14.08 (5.54)	12.2 (5.31)	4.45*	.11
Autistic Mannerism	14.81 (6.35)	12.47 (5.21)	9.03**	.21
QSQ- Total Score	1.99 (2.66)	3.36 (3.89)	9.42**	.21
Host	1.14 (1.15)	1.76 (2.20)	4.69*	.12
Guest	0.85 (1.24)	1.6 (1.97)	10.89**	.24
Conflict	2.8 (3.26)	1.95 (3.60)	1.31	.04
Adolescent Measures				
TASSK	14.08 (2.33)	20.08 (3.11)	145.38***	.81
EQ	32.44 (9.62)	38.5 (11.38)	12.54***	.26
LSQ	42.66 (12.15)	38.05 (11.29)	7.37*	.17
QSQ- Total Score	3.1 (3.31)	5.27 (4.59)	6.52*	.16
Host	1.82 (2.11)	3.33 (3.00)	7.81**	.18
Guest	1.28 (1.59)	1.95 (1.91)	2.82	.07
Conflict	10.35 (3.52)	9.32 (2.92)	3.19	.08
Teacher Measures			F(1,29)	
SSIS- Social Skills	60.93 (22.01)	79.53 (18.43)	34.49***	.54
Communication	8.86 (4.84)	12.23 (4.22)	40.58***	.58
Cooperation	9.9 (4.37)	11.86 (2.78)	9.53**	.25
Assertion	7.43 (4.80)	10.96 (3.43)	48.17***	.62
Responsibility	11.16 (3.50)	12.83 (2.93)	9.64**	.25
Empathy	7.73 (4.50)	10 (4.03)	16.56***	.36
Engagement	4.86 (4.27)	8.93 (4.05)	34.59***	.54
Self-Control	10.96 (6.26)	12.7 (4.42)	5.18*	.15
SSIS- Behavior Problems	26.33 (11.94)	26.6 (12.05)	0.04	.00
Externalizing	7.33 (5.64)	7.4 (5.44)	0.01	.00
Bullying	1.43 (2.60)	1.46 (2.40)	0.01	.00
Hyperactivity/Inattention	7.23 (4.09)	6.86 (3.92)	0.42	.01
Internalizing	8.73 (3.77)	8.53 (3.65)	0.15	.01
SSIS- Autism Spectrum	24.76 (6.74)	20.5 (7.34)	16.53***	.36
SSIS- Academic Competence	19.53 (7.03)	19.43 (6.82)	0.02	.00
SRS-2 Total Score	84.9 (25.77)	78.36 (24.23)	3.78	.12

Table 2. Continued

	Pre-intervention	Post-intervention		η^2
Social Awareness	9.86 (3.86)	9.7 (3.88)	0.11	.00
Social Cognition	16.43 (4.98)	14.66 (4.96)	5.64*	.16
Social Communication	28.03 (10.01)	26.1 (9.47)	1.97	.06
Social Motivation	15.66 (5.55)	13.3 (5.61)	6.39*	.18
Mannerism	14.9 (6.59)	14.56 (6.11)	0.14	.00

Note. *$P < .05$, **$P < .01$, ***$P < .001$. CASS- Conversational Assessment of Social Skills, SSIS- Social Skills Improvement Scale, SRS-2, Social Responsiveness Scale, QSQ- Quality of Socialization Questionnaire, TASSK- Test of Adolescent Social Skills Knowledge, EQ- Empathy Quotient, LSQ- Loneliness and Social Dissatisfaction Questionnaire.

group had improved significantly more than the waiting-list group on the various outcome measures.

In order to address this question, four repeated measures MANOVAs were conducted, for CASS items, adolescent measures, parent measures, and teacher measures, with group (II, DIC) as the between group variable, and time (T1, T2) as the repeated measures variable. For the sake of parsimony, the MANOVAs included only the measures that have shown to significantly change following the intervention, as presented in Table 2. The measures which yielded significant time-by-group interactions, the mean scores over the two timepoints, and post-hoc comparisons between them in each group, are presented in Table 3.

The CASS MANOVA yielded an overall time-by-group interaction effect ($F_{\text{wilks}}[6,33]=4.46$, $P < .01$, $\eta^2=.45$). Univariate analyses (sphericity assumed), detailed in Table 3, indicated that following the intervention, compared to the waiting-list group, participants from the intervention group asked more questions during the conversation, showed reduced kinesic arousal, and improved their overall involvement scores and their CASS total scores.

The parents' measures MANOVA's overall time-by-group interaction effect had failed to reach significance ($F_{\text{wilks}}[19,20]=1.53$, $P = .18$, $\eta^2=.59$). However, univariate analyses (sphericity assumed), revealed significant time-by-group interaction effects, indicating that following the intervention, compared to the waiting-list group, parents from the intervention group reported reduced scores on the autism spectrum scale, and greater gains on the social skills scale of the SSIS, as well as on its communication, assertion, responsibility, and engagement subscales.

The adolescent measures' MANOVA revealed an overall time-by-group interaction effect ($F_{\text{wilks}}[6,33]=11.45$, $P<.001$, $\eta^2=.67$). Univariate analyses (sphericity assumed) indicated that following the intervention, compared to the waiting-list group, adolescents from the intervention group showed higher improvements on the TASSK, reported greater empathy improvements on the EQ, and reported an increased number of times they hosted friends.

No significant time-by-group interaction effects were found for teachers' reports.

Treatment Outcome Maintenance

We hypothesized the maintenance of the intervention-related gains 16 weeks post treatment. To examine this hypothesis, we conducted three repeated measures MANOVAs on the II group only, for CASS items, parent measures, and adolescent measures, with Time (T1, T2, T3) as the repeated measures variable. For the sake of parsimony, we have only analyzed measures that have shown to significantly change following the intervention, as presented in Table 2. Teachers' measures were not analyzed, as they did not show significant interaction effects on the RCT. Table 4 presents the measures that have shown significant time effects, the mean scores over the three time points and post-hoc comparisons.

The CASS analysis yielded a significant overall effect for Time ($F_{\text{wilks}}[12,66]=2.20$, $P<.05$, $\eta^2=.67$). Univariate effects indicated that the intervention-related improvements on number of questions asked during the conversation, involvement in conversation and total CASS score, maintained at T3. Sphericity could not be assumed for total score and question asking. Huynh-Feldt adapted degrees of freedom were calculated for these measures, as detailed in Table 4.

The Parents' MANOVA revealed an overall effect for Time ($F_{\text{wilks}}[36,42]=2.50$, $P < .01$, $\eta^2=.68$). Univariate analyses indicated that intervention-related gains on the SSIS social skills scale and communication, responsibility, and engagement subscales, as well as reductions on behavior problems and autism spectrum scales, and hyperactivity/inattention subscale, were maintained at the 16-week follow-up. Similarly, intervention-related reductions on the SRS-2 total score, and social cognition, and autistic mannerisms subscales maintained at T3. Sphericity could not be assumed for some SRS-2 and QSQ measures. Huynh-Feldt adapted degrees of freedom were calculated for these measures, as detailed in Table 4.

The adolescents' measures MANOVA revealed an overall Time effect ($F_{\text{wilks}}[12,66]=9.65$, $P < .001$,

Table 3. RCT Outcomes: Means (S.D.) of the Immediate and the Delayed Intervention Groups at Times 1 and 2

	Immediate Intervention Group (n = 20)			Delayed Intervention Control Group (n= 21)			η^2
	T1 (20)	T2 (20)	Contrasts	T1 (21)	T2 (20)	Contrasts	
Observational Measures						F (1,36)	
CASS Total Score	14.21 (4.81)	17.47 (6.12)	T1<T2***	12.96 (5.15)	12.94 (6.08)	T1=T2	7.17*	.16
Questions	2.63 (2.33)	4.68 (3.80)	T1<T2**	2.21 (2.34)	2.32 (2.23)	T1=T2	5.05*	.12
Kinesic Arousal	4.47 (1.34)	5.05 (0.91)	T1<T2*	4.58 (1.34)	4.42 (0.90)	T1=T2	4.51*	.11
Overall Involvement	4.84 (1.50)	5.53 (1.26)	T1<T2**	4.51 (1.42)	4.05 (1.68)	T1>T2*	13.94***	.27
Parent Measures						F (1,38)	
SSIS- Social Skills	73.40 (16.95)	81.10 (16.83)	T1<T2***	76.36 (12.97)	74.88 (13.91)	T1=T2	16.30***	.30
Communication	11.55 (2.66)	13.40 (2.81)	T1<T2***	12.93 (2.48)	12.33 (2.77)	T1=T2	14.73***	.28
Assertion	11.35 (3.26)	12.80 (3.22)	T1<T2*	13.15 (2.13)	12.15 (2.98)	T1=T2	9.21**	.20
Responsibility	10.50 (3.28)	11.95 (3.11)	T1<T2***	10.88 (3.44)	11.00 (4.09)	T1=T2	4.93*	.11
Engagement	7.60 (3.48)	9.15 (3.46)	T1<T2***	9.05 (3.60)	9.16 (3.70)	T1=T2	5.99*	.14
SSIS- Autism Spectrum	22.75 (5.95)	19.25 (5.39)	T1>T2**	21.60 (4.61)	21.85 (6.15)	T1=T2	7.64**	.17
Adolescent Measures							
TASSK	14.15 (2.18)	21.00 (2.59)	T1<T2***	12.90 (2.46)	14.20 (2.98)	T1<T2*	49.02***	.56
EQ	31.45 (12.88)	37.3 (8.35)	T1<T2*	37.35 (12.13)	36.00 (14.41)	T1=T2	5.27**	.12
QSQ- Host	1.37 (1.52)	3.11 (2.80)	T1<T2**	2.84 (2.96)	2.25 (2.44)	T1=T2	8.48**	.09

Note. *P < .05, **P < .01, ***P < .001, CASS – Conversational Assessment of Social Skills, SSIS- Social Skills Improvement Scale, QSQ- Quality of Socialization Questionnaire, TASSK- Test of Adolescent Social Skills Knowledge, EQ- Empathy Quotient.

η^2 =.63). The adolescents' univariate analyses (sphericity assumed) indicated that their intervention related improvements on social-skills knowledge (TASSK scores) maintained at follow up. In addition, adolescents' intervention-related reports on increased numbers of social encounters (QSQ scores), both as hosts and as guests, maintained at the 16-week follow-up.

Behavioral Outcomes as Predictors
of Questionnaire-Based Outcomes

In order to evaluate the extent to which intervention-related gains on the CASS predict parent and teacher outcome reports, we conducted four hierarchical regression analyses, for teacher and parent post-pre difference scores on the SRS-2 total score and the SSIS social skills score. In each regression model, adolescents' age, and Wechsler vocabulary and matrix reasoning standard scores were entered in the first block, followed by post-pre difference scores on the CASS items which showed intervention effects (questions, kinesic arousal, social anxiety, overall involvement, overall rapport) that were entered in a stepwise model. The analysis model for parent SSIS social skills difference scores reached statistical significance ($R^2 = 0.27$, $F(4,30)=2.78$, $P < .05$). Of the different predictors, only the CASS involvement in conversation difference score showed a significant effect ($\beta = .40$, $P < .05$). In addition the analysis model for parent SRS-2 total difference scores reached statistical significance ($R^2 = 0.25$, $F(3,31)=3.40$, $P < .05$). Of the different predictors, vocabulary was the only predictor that had a significant effect ($\beta = -.50$, $P < .01$). The teacher report regressions did not reach significance.

Discussion

This paper presents results of the first year of a randomized controlled trial, which examines the efficacy of the adapted and translated Hebrew version of the PEERS® intervention for adolescents with ASD. The Hebrew version was adapted and extended so as to become more sensitive to the Israeli culture and customs, as previous literature indicated that these modifications enhance therapeutic outcomes [Kim, Kim, & Saffo, 2017; Olsson et al., 2016]. Intervention outcomes and maintenance were investigated through parent, teacher, and self-report questionnaires. In addition, we used behavioral observations to evaluate the PEERS® intervention's effectiveness and its outcome maintenance.

We found that both behavioral and questionnaire-based outcomes revealed significant intervention effects, which supported the effectiveness of the adapted Hebrew version of the PEERS® intervention. According to questionnaire-based reports, the intervention affected various aspects of adolescents' social-skills, including improving social-skill knowledge, increasing communication abilities, and processing social information better. Moreover, according to reports, after completing PEERS®, adolescents felt more confident with themselves, were able to control better their emotions and desires, and displayed more responsible behaviors. They were more socially motivated, engaged in more social encounters and were able to interact more cooperatively. Consequently, adolescents reported feeling less lonely. Our findings revealed that the PEERS® intervention also played an important role in reducing ASD

Table 4. Treatment Outcome Maintenance: Means (S.D.) of the Immediate Intervention Group at the Three Assessment Time Points

|	Pre intervention Mean (SD)	Post intervention Mean (SD)	16 week Follow-up Mean (SD)	Contrasts	η^2
Observational Measures					F(2,36)
CASS Total Score	14.21 (4.81)	17.47 (6.12)	16.63 (3.36)	T1<T2**=T3	5.76†*	.24
Questions	2.63 (2.33)	4.68 (3.80)	3.53 (2.14)	T1<T2*=T3	4.93†*	.22
Overall Involvement	4.84(1.50)	5.53 (1.26)	5.26 (0.93)	T1<T2**=T3	4.85*	.21
Parent Measures					F(2,38)
SSIS-Social Skills	73.40 (16.95)	81.1 (16.83)	79.25 (18)	T1<T2**=T3	7.76**	.29
Communication	11.55 (2.66)	13.40 (2.81)	12.40 (2.56)	T1<T2**=T3	6.63**	.26
Responsibility	10.5 (3.28)	11.95 (3.11)	11.70 (3.59)	T1<T2**=T3	4.76*	.20
Engagement	7.60 (3.48)	9.15 (3.46)	8.60 (3.42)	T1<T2**=T3	5.55**	.23
SSIS-Behavior Problems	34.85 (12.65)	30.4 (11.36)	29.6 (10.77)	T1>T3*= T2	4.58*	.19
Hyperactivity/Inattention	9.15 (3.36)	7.50 (3.22)	6.85 (2.88)	T1>T2*=T3	6.83**	.26
SSIS-Autism Spectrum	22.75 (5.95)	19.25 (5.29)	19.05 (5.95)	T1>T2*=T3	7.77**	.29
SRS-2 Total Score	87.15 (31.48)	70.25 (22.10)	73.50 (28.24)	T1>T2*=T3	7.50†**	.28
Social Cognition	16.55 (6.64)	13.75 (5.70)	14.00 (6.50)	T1>T2*=T3	5.89**	.24
Autistic Mannerism	16.15 (6.79)	13 (5.29)	13.65 (5.96)	T1>T2*=T3	5.29†*	.22
Adolescent Measures					F(2,38)
TASSK	14.15 (2.18)	21 (2.59)	19.9 (3.14)	T1<T2***=T3	73.45***	.79
QSQ- Total Score	2.69 (3.02)	4.81 (4.99)	7.133 (7.63)	T1<T3*=T2	5.04*	.21
Host	1.37 (1.52)	3.11 (2.80)	3.80 (4.22)	T1<T2*=T3	5.34**	.22
Guest	1.31 (1.16)	1.69 (2.29)	3.33 (3.61)	T1<T3*=T2	4.69*	.20

Note. *$P<.05$, **$P<.01$, ***$P<.001$. †Sphericity could not be assumed for these measures. Huynh-Feldt adapted degrees of freedom were calculated for: CASS Total Score (1.65, 29.69), CASS Questions (1.34, 24.19), SRS-2 Total Score (1.57, 29.79), SRS-2 Autistic Mannerism (1.48, 28.04). Significance levels were set according to the adapted df. CASS- Conversational Assessment of Social Skills, SSIS- Social Skills Improvement Scale, SRS-2 Social Responsiveness Scale, QSQ- Quality of Socialization Questionnaire, TASSK- Test of Adolescent Social Skills Knowledge, EQ- Empathy Quotient.

related symptoms. The behavioral examination of adolescents' conversational social-skills has validated their self, parents' and teachers' reports: following the intervention the adolescents asked more questions, showed greater involvement, exhibited more comfort and balance in the conversation, and were less fidgety and anxious, despite having to meet with a new confederate. Furthermore, participants' improvement on their involvement in the behavioral paradigm predicted intervention-related social-skills improvement, as reported by their parents.

When gains in the immediate intervention group were compared to the waiting-list group, both behavioral and questionnaire-based measures revealed the II group had improved significantly more than the DIC group. In this comparison, intervention related reported gains on social-skills, number of social encounters, and self-confidence and responsibility were significantly higher, while reports on ASD symptoms were significantly lower, compared to the waiting-list group. Similarly, stronger overall behavioral gains of the II group on the social communication paradigm, as well as gains on question asking, involvement in the conversation, and reduced fidgety behavior, were found, compared to the waiting-list group. Contrary to our hypothesis, teacher reports showed no significant gains in the intervention group, compared to the waiting-list group.

The examination of the maintenance of treatment effects has shown that the overall behavioral improvement on the social communication paradigm, as well as intervention-related gains reported on social-skills and knowledge, number of social encounters, and reduction of ASD symptoms have maintained 16 weeks after completing the intervention.

The current study replicates earlier literature, indicating that, according to parents' reports, PEERS® has an immediate and a long term effect on the improvement of social-skills and the reduction of behavior problems [Laugeson et al., 2009; Mandelberg et al., 2014; Marchica & D'amico, 2016; Schohl et al., 2014; Yoo et al., 2014], as well as on symptoms related to ASD [Mandelberg et al., 2014; Schohl et al., 2014], as illustrated in Figure 2. Furthermore, consistent with prior research, teachers reported on significant intervention effects on the SSIS, following the PEERS® intervention [Laugeson et al., 2012; Schohl et al., 2014]. However, our RCT findings did not show that teacher reported gains were greater in the II group, compared to the DIC group. Whereas this lack of teacher-reported improvements could be related to the small sample size, it may also indicate that the measures employed in the current study (and in other studies) are not sensitive enough to reflect change, when reported by teachers. Indeed, some of the teachers involved in the current study have
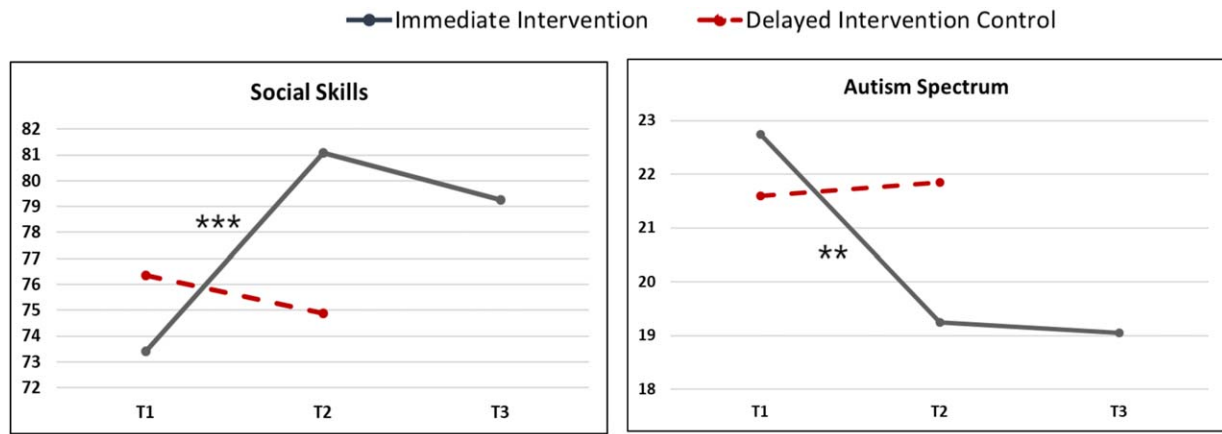
Note: **P<.01, ***P<.001

Figure 2. RCT gains and maintenance on the parent-reported SSIS social skills and autism spectrum scales.

reported of their poor familiarity with specific social behaviors, included in the instruments that may be more common outside of the classroom. These limited findings on teacher reports stand in contrast with the significant outcomes of our lab-based behavioral measure, which were also predictive of parent reported improvements. Thus, employment of observational measures may be needed for a more sensitive evaluation of school-based social behavior [Kasari et al., 2012].

The RCT and the examination of maintenance effects in the II group replicated previous PEERS® studies, showing that following the intervention, adolescents improved their social-skills knowledge and friendship skills more than controls, both immediately, and at follow-up [Laugeson et al., 2009, Laugeson et al., 2012; Mandelberg et al., 2014; Schohl et al., 2014; Yoo et al., 2014].

The only previous study evaluating PEERS® with the CASS among adolescents found positive intervention-related changes on vocal expressiveness and quality of rapport [Dolan et al., 2016]. Our results show an intervention effect on the latter, though the RCT results showed this difference was not greater in the intervention- compared to the control-group. However, our RCT findings extend Dolan et al's report by showing significant intervention-related improvements on adolescents' involvement in conversation, question asking, kinesic arousal, and CASS total score, in comparison to adolescents in the waiting-list group. In addition, our study was the first to evaluate PEERS® with the CASS at three timepoints. As illustrated in Figure 3, we found that gains on the CASS total score, involvement in conversation, kinesic arousal and question asking maintained 16 weeks after intervention completion.

A closer look at the CASS total score, which comprises four items (question asking, topic changes, involvement in conversation, and quality of rapport)

that are indicative of social-skills [Ratto et al., 2011], suggests that the intervention has a significant impact on adolescents' social conversation skills. Of all these items, improved involvement in conversation was the only significant predictor of parent-reported social-skills improvement, suggesting it is the most salient component in the behavioral social-interaction evaluation.

The PEERS® intervention aims to develop adolescents' verbal and nonverbal reciprocal communication skills. Throughout the intervention, they learn and practice how to trade information, to participate in a two-way reciprocal conversation, to identify and to use nonverbal cues. Behaviorally, this therapeutic investment culminated in enhanced engagement in conversations, which was maintained at follow-up and predicted more general social-skill improvement.

The intervention-related reduction in kinesic arousal in the CASS found on the RCT, as well as the pre-post reduction on social anxiety on the CASS may suggest improved emotion regulation of the adolescents, following the intervention. Emotion dysregulation is a significant challenge for adolescent with ASD [Mazefsky, Borue, Day, & Minshew, 2014]. Although PEERS® does not directly target emotion regulation, it has been shown to contribute to reduced social anxiety, as measured by self-report questionnaires [Schohl et al., 2014]. Our findings behaviorally demonstrate and strengthen these important side effects of PEERS®.

An extension to previous PEERS® studies is the intervention-related gain, found on adolescent-reported empathy. However, this was not supported by parental report (on the SSIS). Discrepancies between self and parent perceptions of empathy in adolescents with ASD are attributed to limitations in adolescents' self-perception and under-reporting biases [Johnson et al., 2009]. An alternative explanation could be that adolescents'
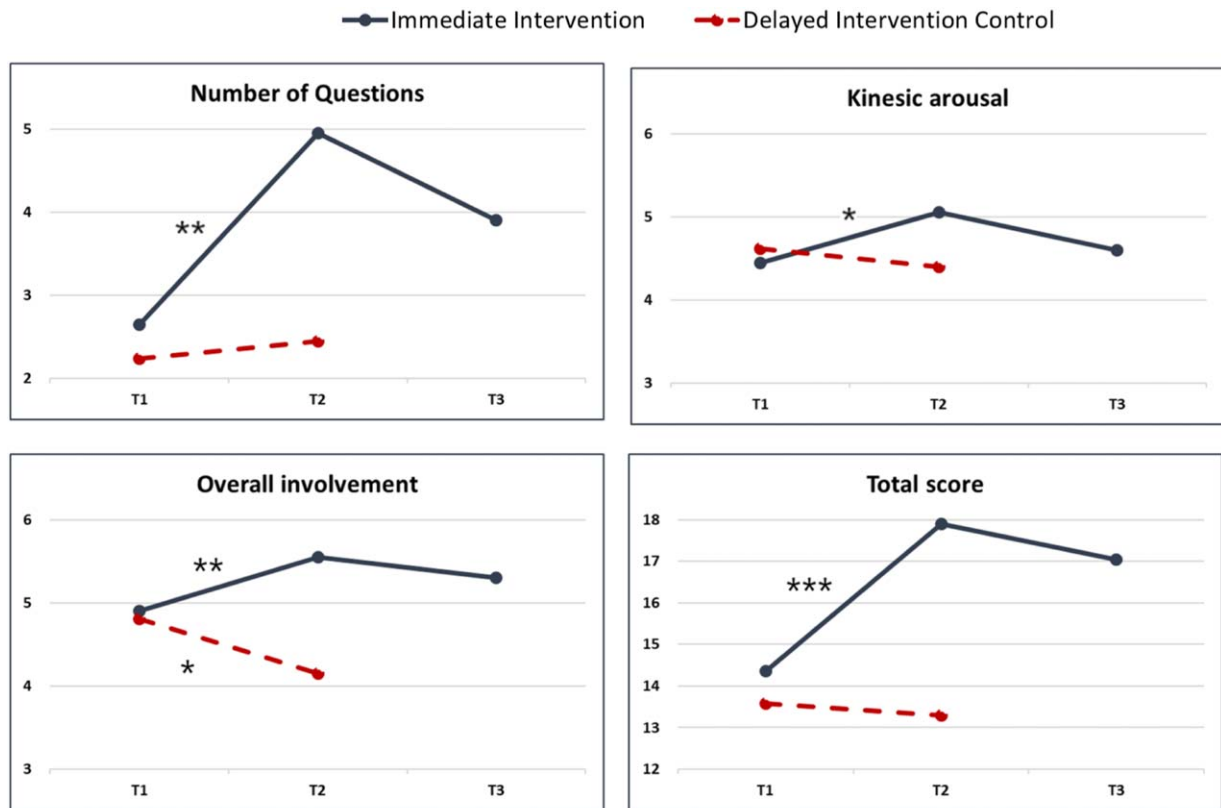
Figure 3. RCT gains and maintenance on the CASS.

reports related to their empathic experience and to its behavioral manifestations, whereas parent reports focused only on the external behavioral expression of empathy.

A few limitations should be noted: First, the sample included only two girls, which made it impossible to examine sex differences on intervention effects. Second, adolescents, parents and teachers who filled out questionnaires were not blinded to the randomization and hence their answers could be biased. Finally, the small sample size limited the RCT based effects, which were more modest, compared to the effects found in the pre-post intervention analysis. This was most prominently manifested in the teacher reports, but also in marginally significant effects, which were found for some parent-reported QSQ, SRS-2, and SSIS subscales. The small sample size also prevented the examination of moderating factors to treatment effectiveness. As mentioned, the current report includes results from the first year of the study. With the completion of the full 2-year RCT, we hope to have the opportunity for a more powered examination of these questions.

We conclude that the Hebrew adaptation of PEERS® is an effective social skills training for adolescents with ASD, yielding significant behavioral and questionnaire-based effects that maintain at follow-up.

References

American Psychiatric Association. (2013). Diagnostic and Statistical Manual of Mental Disorders, 5th Edition. American Psychiatric Association.

Asher, S.R., Hymel, S., & Renshaw, P.D. (1984). Loneliness in Children. Child Development, 55, 1456.

Baron-Cohen, S., & Wheelwright, S. (2004). The Empathy Quotient: An Investigation of Adults with Asperger Syndrome

or High Functioning Autism, and Normal Sex Differences. Journal of Autism and Developmental Disorders, 34, 163–175.

Bauminger, N. (2007). Brief Report: Group Social-Multimodal Intervention for HFASD. Journal of Autism and Developmental Disorders, 37, 1605–1615.

Brace, I. (2008). Questionnaire design: How to plan, structure and write survey material for effective market research (2nd ed.). London: Kogan Page.

Caputi, M., Pantaleo, G., & Scaini, S. (2017). Do feelings of loneliness mediate the relationship between sociocognitive understanding and depressive symptoms during late childhood and early adolescence?. The Journal of Genetic Psychology, 178, 207–216.

Church, B.A., Rice, C.L., Dovgopoly, A., Lopata, C.J., Thomeer, M.L., Nelson, A., & Mercado, E. (2015). Learning, plasticity, and atypical generalization in children with autism. Psychonomic Bulletin & Review, 22, 1342–1348.

Constantino, J.N., & Gruber, C.P. (2012). Social Responsiveness Scale-Second Edition ("SRS-2"). Torrance, CA: Western Psychological Services.

Cunningham, A.B. (2012). Measuring change in social interaction skills of young children with autism. Journal of Autism and Developmental Disorders, 42, 593–605.

DeRosier, M.E., Swick, D.C., Davis, N.O., McMillen, J.S., & Matthews, R. (2011). The efficacy of a social skills group intervention for improving social behaviors in children with high functioning autism spectrum disorders. Journal of Autism and Developmental Disorders, 41, 1033–1043.

Dolan, B.K., Van Hecke, A.V., Carson, A.M., Karst, J.S., Stevens, S., Schohl, K.A., ... Hummel, E. (2016). Brief Report: Assessment of intervention effects on in vivo peer interactions in adolescents with Autism Spectrum Disorder (ASD). Journal of Autism and Developmental Disorders, 46, 2251–2259.

Gantman, A., Kapp, S.K., Orenski, K., & Laugeson, E.A. (2012). Social skills training for young adults with high-functioning autism spectrum disorders: A Randomized controlled pilot study. Journal of Autism and Developmental Disorders, 42, 1094–1103.

Gates, J.A., Kang, E., & Lerner, M.D. (2017). Efficacy of group social skills interventions for youth with autism spectrum disorder: A systematic review and meta-analysis. Clinical Psychology Review, 52, 164–181.

Gillis, J.M., Callahan, E.H., & Romanczyk, R.G. (2011). Assessment of social behavior in children with autism: The development of the Behavioral Assessment of Social Interactions in Young Children. Research in Autism Spectrum Disorders, 5, 351–360.

Golan, O., & Israel-Yaacov, S. (2014). Adaptation and perliminary results of a clinical trial of PEERS® with adolescents with ASD in Israel. Paper presented at the 16th World Congress of Psychiatry, Madrid, Spain.

Gresham, F., & Elliott, S. (2008). Social skills improvement system (SSIS) rating scales. Bloomington, MN: Pearson.

Gresham, F.M., Vance, M.J., Chenier, J., & Hunter, K. (2013). Assessment and treatment of deficits in social skills functioning and social anxiety in children engaging in school refusal behaviors. In D. McKay, & E.A. Storch (Eds.), Handbook of assessing variants and complications in anxiety disorders (pp. 15–28). New York, NY: Springer.

Henry, B., Moffitt, T.E., Caspi, A., Langley, J., & Silva, P. A. (1994). On the 'remembrance of things past': A longitudinal evaluation of the retrospective method. Psychological Assessment, 6, 92–101.

Horner, R.H., Carr, E.G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. Exceptional Children, 71, 165–179.

Johnson, S.A., Filliter, J.H., & Murphy, R.R. (2009). Discrepancies between self- and parent-perceptions of autistic traits and empathy in high functioning children and adolescents on the autism spectrum. Journal of Autism and Developmental Disorders, 39, 1706–1714.

Kasari, C., Rotheram-Fuller, E., Locke, J., & Gulsrud, A. (2012). Making the connection: Randomized controlled trial of social skills at school for children with autism spectrum disorders. Journal of Child Psychology and Psychiatry, 53, 431–439.

Kim, S., Kim, H., & Saffo, R.W. (2017). Culturally and linguistically responsive social skills interventions for children with autism spectrum disorders. International Journal of Special Education, 32, 413–438.

Laugeson, E.A. (2017). PEERS® for young adults: Social skills training for adults with autism spectrum disorder and other social challenges. New York: Routledge.

Laugeson, E., A., & Frankel, F. (2010). Social skills for teenagers with developmental and autism spectrum disorders: The PEERS® treatment manual. New York: Routledge.

Laugeson, E.A., Frankel, F., Gantman, A., Dillon, A.R., & Mogil, C. (2012). Evidence-based social skills training for adolescents with autism spectrum disorders: The UCLA PEERS® Program. Journal of Autism and Developmental Disorders, 42, 1025–1036.

Laugeson, E.A., Frankel, F., Mogil, C., & Dillon, A.R. (2009). Parent-assisted social skills training to improve friendships in teens with autism spectrum disorders. Journal of Autism and Developmental Disorders, 39, 596–606.

Lord, C., Rutter, M., DiLavore, P.C., Risi, S., Gotham, K., & Bishop, S. (2012). Autism diagnostic observation schedule, second edition (ADOS-2) manual (part I): Modules 1–4. Torrance, CA: Western Psychological Services.

Lord, C., Wagner, A., Rogers, S., Szatmari, P., Aman, M., Charman, T., ... Yoder, P. (2005). Challenges in evaluating psychosocial interventions for autistic spectrum disorders. Journal of Autism and Developmental Disorders, 35, 695–708.

Mandelberg, J., Laugeson, E.A., Cunningham, T.D., Ellingsen, R., Bates, S., & Frankel, F. (2014). Long-term treatment outcomes for parent-assisted social skills training for adolescents with autism spectrum disorders: The UCLA PEERS® Program. Journal of Mental Health Research in Intellectual Disabilities, 7, 45–73.

Marchica, L., & D'amico, M. (2016). Examining the efficacy of an adapted version of the UCLA PEERS® Program with Canadian Adolescents. Journal of Education & Social Policy, 3, 54–65.

Mazefsky, C.A., Borue, X., Day, T.N., & Minshew, N.J. (2014). Emotion regulation patterns in adolescents with high-functioning autism spectrum disorder: Comparison to

typically developing adolescents and association with psychiatric symptoms. Autism Research, 7, 344–354.

Mcdonald, J.D. (2008). Measuring personality constructs: The advantages and disadvantages of self-reports, informant reports and behavioural assessments. Enquire, 1, 75–94.

Olsson, N.C., Karlsson, A., Andersson, S., Boström, A., Ljungström, M., & Bölte, S. (2016). Cross-cultural adaptation of the KONTAKT social skills group training program for children and adolescents with high-functioning autism spectrum disorder: a feasibility study. Scandinavian Journal of Child and Adolescent Psychiatry and Psychology, 4, 46–54.

Porter, S., McConnell, T., McLaughlin, K., Lynn, F., Cardwell, C., Braiden, H.-J., . . . Holmes, V. (2017). Music therapy for children and adolescents with behavioural and emotional problems: A randomised controlled trial. Journal of Child Psychology and Psychiatry, 58, 586–594.

Ratto, A.B., Turner-Brown, L., Rupp, B.M., Mesibov, G.B., & Penn, D.L. (2011). Development of the Contextual Assessment of Social Skills (CASS): A role play measure of social skill for individuals with high-functioning autism. Journal of Autism and Developmental Disorders, 41, 1277–1286.

Reaven, J., Blakeley-Smith, A., Culhane-Shelburne, K., & Hepburn, S. (2012). Group cognitive behavior therapy for children with high-functioning autism spectrum disorders and anxiety: A randomized trial. Journal of Child Psychology and Psychiatry, 53, 410–419.

Regev, D., & Guttmann, J. (2005). The psychological benefits of artwork: The case of children with learning disorders. The Arts in Psychotherapy, 32, 302–312.

Renno, P., & Wood, J.J. (2013). Discriminant and convergent validity of the anxiety construct in children with autism spectrum disorders. Journal of Autism and Developmental Disorders, 43, 2135–2146.

Schohl, K.A., Van Hecke, A.V., Carson, A.M., Dolan, B., Karst, J., & Stevens, S. (2014). A Replication and extension of the PEERS® Intervention: Examining effects on social skills and social anxiety in adolescents with autism spectrum disorders. Journal of Autism and Developmental Disorders, 44, 532–545.

Shattuck, P.T., Orsmond, G.I., Wagner, M., & Cooper, B.P. (2011). Participation in social activities among adolescents with an autism spectrum disorder. PLoS One, 6, e27176. https://doi.org/10.1371/journal.pone.0027176

Sofronoff, K., Dark, E., & Stone, V. (2011). Social vulnerability and bullying in children with Asperger syndrome. Autism, 15, 355–372.

Sparrow, S.S., Cicchetti, D.V., Balla, D.A., & Doll, E.A. (2005). Vineland adaptive behavior scales: Survey forms manual. Circle Pines, MN: American Guidance Service.

Taylor, M.J., Gillberg, C., Lichtenstein, P., & Lundström, S. (2017). Etiological influences on the stability of autistic traits from childhood to early adulthood: Evidence from a twin study. Molecular Autism, 8, 5.

Van Hecke, A.V., Stevens, S., Carson, A.M., Karst, J.S., Dolan, B., Schohl, K., . . . Brockman, S. (2015). Measuring the plasticity of social approach: A randomized controlled trial of the effects of the peers® intervention on eeg asymmetry in adolescents with autism spectrum disorders. Journal of Autism and Developmental Disorders, 45, 316–335.

van Roekel, E., Scholte, R.H.J., & Didden, R. (2010). Bullying among adolescents with autism spectrum disorders: Prevalence and perception. Journal of Autism and Developmental Disorders, 40, 63–73.

Wechsler, D. (1997). WAIS-III: Wechsler adult intelligence scale. San Antonio, TX: Psychological Corporation.

Wechsler, D. (2003). Wechsler intelligence scale for children (4th ed.). San Antonio, TX: The Psychological Corporation

White, S.W., Scarpa, A., Conner, C.M., Maddox, B.B., & Bonete, S. (2015). Evaluating change in social skills in high-functioning adults with autism spectrum disorder using a laboratory-based observational measure. Focus on Autism and Other Developmental Disabilities, 30, 3–12.

Wood, J.J., Drahota, A., Sze, K., Har, K., Chiu, A., & Langer, D.A. (2009). Cognitive behavioral therapy for anxiety in children with autism spectrum disorders: A randomized, controlled trial. Journal of Child Psychology and Psychiatry, 50, 224–234.

Yoo, H.-J., Bahn, G., Cho, I.-H., Kim, E.-K., Kim, J.-H., Min, J.-W., . . . Laugeson, E.A. (2014). A randomized controlled trial of the Korean Version of the PEERS® Parent-Assisted Social Skills Training Program for Teens With ASD. Autism Research, 7, 145–161. https://doi.org/10.1002/aur.1354

Supporting Information

Additional Supporting Information may be found in the online version of this article.

Supplementary Material: An Outline of the Hebrew adaptation of the PEERS® protocol.