

Parent-Assisted Social Skills Training to Improve Friendships in Teens with Autism Spectrum Disorders

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Abstract This study examines the efficacy of a manualized parent-assisted social skills intervention in comparison with a matched Delayed Treatment Control group to improve friendship quality and social skills among teens 13–17 years of age with autism spectrum disorders. Targeted skills included conversational skills, peer entry and exiting skills, developing friendship networks, good sportsmanship, good host behavior during get-togethers, changing bad reputations, and handling teasing, bullying, and arguments. Results revealed, in comparison with the control group, that the treatment group significantly improved their knowledge of social skills, increased frequency of hosted get-togethers, and improved overall social skills as reported by parents. Possibly due to poor return rate of questionnaires, social skills improvement reported by teachers was not significant. Future research should provide follow-up data to test the durability of treatment.

Keywords Social skills · Autism · Asperger's Disorder · Friendship · Adolescents · PEERS

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Introduction

Being placed in regular education classrooms has been a mixed blessing for individuals with Asperger's Disorder and high-functioning autism (Burack et al. 1997). On the one hand, such placement has been associated with increases in the complexity of interactions and decreases in nonsocial activity, in comparison to special education settings (Sigman and Ruskin 1999). On the other hand, these individuals report often feeling lonelier and having poorer quality friendships (Capps et al. 1996) than their typically developing classmates (Bauminger and Kasari 2000). Sigman and Ruskin (1999) noted that only 27% of children with Autism Spectrum Disorders (ASD) in their sample had a best friend in comparison to 41% of children with developmental disabilities having a best friend. Adolescence is a particularly troubling period for persons with ASD:

High-functioning autistic adolescents, in particular, become more keenly aware of the difficulties they encounter when interacting with peers. At a time when “fitting in” is of overriding importance, these young people may find themselves isolated, rejected or even bullied at school (Tse et al. 2007, p. 1960).

Among typically developing children, best friendships become stable by about the fourth grade (Frankel 1996; McGuire and Weisz 1982). Having one or two best friends is of great importance to later adjustment, can buffer the impact of stressful life events (Miller and Ingham 1976), and correlates positively with self-esteem and negatively with anxious and depressive symptoms (Buhrmester 1990). In typically developing children, best friends may promote the development of social competence: while conflicts with acquaintances can inhibit future social interaction, conflicts among best friends and their resolution are associated with

subsequent increases on measures of social problem solving (Nelson and Aboud 1985).

Although typically developing teens often learn basic social rules through observation of peer behavior and/or specific instruction from parents (Gralinski and Kopp 1993; Rubin and Sloman 1984), adolescents with ASD often require further instruction. Learning to make and keep friends may be especially difficult for the teen with ASD, since the natural development and transmission of necessary peer etiquette requires generally positive and sustained interaction with peers and learning from best friends. Continued isolation makes deficits in the knowledge of peer etiquette more obvious as the child with ASD gets older. Not surprisingly, as adults, many individuals with ASD lack community connections and friendships that are taken for granted by typically developing persons (Baxter 1997). Thus, teaching the skills necessary to make and keep friends has significant life long impact for persons with ASD.

Much of the literature on social skills training for youngsters with ASD has focused on interventions with younger children in the lower ranges of social functioning (Wolfberg and Schuler 1993). Few social skills interventions have been devoted to investigating the efficacy of social skills training for teens that are less socially impaired, such as teens with Asperger's Disorder or high-functioning autism (Marriage et al. 1995). Among the social skills intervention studies conducted with this population, most have not been formally tested in terms of improving social competence or the development of close friendships, nor have they assessed social functioning in situations outside of the treatment setting, such as using parent or teacher reports. Two notable exceptions have been published. Ozonoff and Miller (1995) taught five high functioning adolescents with ASD basic interactional and conversational skills and how to infer the mental states of others (Theory of Mind) over 14 sessions. Comparison with four non-treated controls demonstrated significant improvement in false belief tasks in the treatment group only, but parent and teacher ratings of social competence (on the SSRS) did not improve. Moreover, the authors reported negative correlations between Theory of Mind scores and parent and teacher ratings on the SSRS. In a separate study, Tse and colleagues (2007) conducted social skills treatment for 13–18 year old youth in 12 weekly outpatient group sessions. Intervention content was adapted from Goldstein and McGinnis (2000) and was presented through didactic instruction of new skills and role plays. Although there was no control group, parent report measures showed gains in social competence and decreases in problem behaviors following the intervention. Changes in friendships were not measured.

The present study reports the short-term outcome of a controlled trial of an outpatient social skills program, Program for the Education and Enrichment of Relational Skills (PEERS; E.A. Laugeson, F. Frankel, Unpublished manuscript 2006), for teens with ASD. The three key features of this intervention were:

1. Instruction was conducted in a protected, small group format. The present intervention used established evidence-based strategies for teaching social skills to adolescents with ASD, which included brief didactic instruction, role-playing, modeling, behavioral rehearsal, coaching with performance feedback, and weekly socialization assignments with consistent homework review (Gresham et al. 2001).
2. Parents were integrated into the program within separate concurrent sessions. Most previous programs have not incorporated parents into the treatment process. However, previous research indicates that parents can have significant effects upon their child's friendships, both in terms of direct instruction and supervision, as well as supporting their child's development of an appropriate peer network (Frankel and Myatt 2003).
3. The content of the PEERS intervention focused upon teaching rules of social etiquette (i.e., evidence-based rules of behavior enforced by a peer group). The intervention identified key social situations and accompanying rules of etiquette via concrete rules and steps. Teens with ASD were then provided instruction in these rules, while parents were given information about how to supervise the implementation of these newly learned skills. The lesson format and many of the rules of social etiquette were adapted from Children's Friendship Training, an evidence-based parent-assisted social skills curriculum (CFT; Frankel and Myatt 2003). The effectiveness of CFT has been demonstrated for children with Attention-Deficit/Hyperactivity Disorder (Frankel et al. 1995, 1997), children with Fetal Alcohol Spectrum Disorders (O'Connor et al. 2006), and children with ASD (Frankel and Myatt 2007). Results of these studies found that social skills generalized outside the treatment situation and were maintained at least 3 months after treatment ended. The PEERS intervention adapted the curriculum and methods of instruction for teens and added new modules relevant to teens with ASD. Targeted skills included conversational skills, peer entry and exiting skills, expanding and developing friendship networks, handling teasing, bullying, and arguments with peers, practicing good sportsmanship and good host behavior during get-togethers with friends, and changing bad reputations (E.A. Laugeson, F. Frankel, Unpublished manuscript 2006).

Methods

Participants

Thirty-three teens between 13 and 17 years of age with ASD participated in and completed this study with their parents. An additional three participants dropped out of the study prior to completion (one participant failed to start the intervention, one dropped out after experiencing too much anxiety in the first session, and one was discontinued from the study for missing more than three sessions). All of the participants had a previous diagnosis of high-functioning autism ($n = 23$), Asperger's Disorder ($n = 9$), or Pervasive Developmental Disorder NOS ($n = 1$), diagnosed either by the UCLA Autism Evaluation Clinic ($n = 14$), a school psychologist ($n = 9$), a California Regional Center ($n = 8$), or a private practice psychologist ($n = 2$).

Twenty-eight subjects were male and five were female. The average age of the participants was 14.6 years (range was 13–17 years). Seven subjects were prescribed psychoactive medications by medical practitioners unaffiliated with the study. Table 1 lists these subjects and the medications prescribed for each. Fourteen of the participants identified themselves as Caucasian; six as Hispanic/Latino; three as African American; four as Asian; three as Middle-Eastern; and three as mixed ethnicities. Seventeen subjects were in a regular school setting; eight were in special education classes; two received partial special education pull-out services, three were home-schooled; and three were in other educational arrangements.

Measures

Descriptive Measures

Kaufman Brief Intelligence Test—Second Edition (KBIT-2; Kaufman and Kaufman 2005). Verbal intellectual

functioning was assessed using the K-BIT-2, which took approximately 25 min to administer. Normative data were available and expressed as standard scores with a mean of 100 and a standard deviation of 15. The KBIT-2 has been shown to be comparable to the Wechsler Intelligence Scale for Children—fourth edition (WISC-IV; Wechsler 2003) in terms of its reliability and validity (Kaufman and Kaufman 2005).

Vineland Adaptive Behavior Scales—Second Edition, Survey Form (Vineland-II; Sparrow et al. 2005). The Vineland-II is a measure of adaptive behavior skills needed for everyday living for individuals and provides an assessment of functioning within the domains of communication, daily living skills, and socialization. The Vineland-II took approximately 30 min to complete. Only the communication, socialization, and composite scores were reported here. Parents rated the degree to which their teen exhibited each behavior item as either “Never,” “Sometimes/Partially,” or “Usually.” Domain and Adaptive Behavior Composite scores are presented as standard scores with a mean of 100 and a standard deviation of 15. Higher scores represented better adaptive functioning. Reliability coefficients for the Adaptive Behavior Composite score are in the mid 90s. Content validity has been established for each domain of the Vineland-II (Sparrow et al. 2005).

Outcome Measures

Social Skills Rating Scale (SSRS; Gresham and Elliott 1990). The SSRS consists of 38-items and took approximately 10 min to complete. Questionnaires were completed independently by the teen's parent and teacher. For example, items included “Starts conversations rather than waiting for someone to talk first.” The items were rated as either “Never,” “Sometimes,” or “Very Often.” The Social Skills and Problem Behaviors scales were derived from factor analysis. Gresham and Elliott (1990) reported the psychometric properties of the parent and teacher forms for teens. Social Skills scale coefficient alphas were 0.93 for teacher and 0.90 for parent forms and for the Problems Behavior scale they were 0.86 and 0.81, respectively. Correlations between teacher and parent forms were low (Social Skills and Problem Behavior scales r 's = 0.36) but statistically significant (p 's < 0.0001). Both scales were transformed into standard scores with a mean of 100 and standard deviation of 15. Higher scores on the Social Skills scale indicated better social functioning and lower scores on the Problem Behavior scale indicated better behavioral functioning.

The Quality of Play Questionnaire (QPQ; Frankel and Mintz 2008). The QPQ consists of 12 items administered to parents and teens independently to assess the frequency

Table 1 Medications reported by parents of participants

Number of participants	Medications reported by parent
Treatment group	
1	Lithium carbonate, quetiapine
1	Dexamethylphenidate, bupropion
1	Methylphenidate
Delayed Treatment Control group	
1	Fluoxetine
1	Atomoxetine, aripiprazole, oxycarbazepine
1	Paroxetine

of get-togethers with peers over the previous month and the level of conflict during these get-togethers. The 10 items which make up the Conflict scale ask for individual parent and teen ratings of peer conflict, (e.g., “criticized or teased each other”). The last two items ask parents and teens to individually estimate the number of invited and hosted get-togethers the teen has had over the previous month. The QPQ was developed through factor analysis of 175 boys and girls. Coefficient alpha was 0.87 for the Conflict scale. This scale also demonstrated convergent validity with the SSRS Problem Behaviors scale ($r = 0.35$, $p < 0.05$) and significantly discriminated community from clinic-referred samples ($p < 0.05$). Reported frequency of hosted and invited get-togethers also significantly discriminated community-referred from clinic samples (p 's < 0.005). Spearman correlation between teen and parent ratings at baseline for the present study was 0.55 for the Conflict scale, 0.99 for the frequency of hosted get-togethers, and 0.99 for the frequency of invited get-togethers (deleting reports of “0” get-togethers resulted in correlations of 0.97 and 0.94, respectively, all p 's < 0.001).

Test of Adolescent Social Skills Knowledge (TASSK; Laugeson and Frankel 2006). The TASSK is a 22-item criterion-referenced test developed for this study to assess the teen's knowledge about the specific social skills taught during the intervention. Two items were derived from key elements of each of the 11 didactic lessons. Teens were presented with sentence stems and asked to choose the best option from two possible answers. Scores range from 0 to 22, with higher scores reflecting greater knowledge of teen social skills. Coefficient alpha for the TASSK was 0.56. This moderate level of internal consistency was acceptable, given the large domain of questions on the scale. The TASSK items are presented in the Appendix.

Friendship Qualities Scale (FQS; Bukowski et al. 1994). The FQS is a teen self-report measure that assesses the quality of best friendships. It consists of 23 yes/no questions from five different subscales (Companionship, Closeness, Help, Security, and Conflict) and took approximately 10 min to complete. Teens were instructed to identify their best friend and keep this friendship in mind while completing this measure. For example, items include, “My friend and I spend all of our free time together.” The total score, employed in the present study, ranged from 0 to 23, with higher scores reflecting better quality friendships. According to the authors, coefficient alphas for subscales range from 0.71 to 0.86. Confirmatory factor analysis supported the factor structure of the subscales and comparisons between ratings by reciprocated versus non-reciprocated friends supported the discriminant validity of the scales (Bukowski et al. 1994).

Procedures

Recruitment and Eligibility

Participants were recruited from Regional Centers and schools throughout Southern California and through coordinated efforts with UCLA outpatient clinics. Inclusion criteria for teens were: (a) chronological age was between 13 and 17 years; (b) social problems as reported by the parent; (c) a previous diagnosis of either high functioning Autism, Asperger's Disorder, or Pervasive Developmental Disorder—NOS; (d) English fluency of the teen; (e) having a parent or family member who was a fluent English speaker and who was willing to participate in the study; (f) a verbal IQ of 70 or above on the K-BIT-2; (g) no history of major mental illness, such as bipolar disorder, schizophrenia, or psychosis; and (h) absence of hearing, visual, or physical impairments which precluded teen from participating in outdoor sports activities. In order to allay any potential anxiety experienced by teens relating to their participation in a group treatment with strangers, the study only included teens who verbally expressed an interest in participating in the intervention during the eligibility appointment. Parents and teens were informed that they were free to withdraw from the study at anytime.

The following incentives were provided in order to increase recruitment and persistence through the study: paid parking during the duration of the study, a brief psychosocial evaluation summary based on the baseline assessment, and a light meal with beverages provided each week during the social skills group session.

Participant Assignment and Outcome Assessment

Upon entering the study, eligible participants were randomly assigned to one of two conditions: Treatment Group ($n = 17$) or Delayed Treatment Control Group ($n = 16$). Five separate cohorts were run over the course of 18-months. Each cohort consisted of approximately seven participants that were enrolled in the study no more than 24-weeks per group. Participants in the Treatment Group completed outcome measures just prior to receiving the intervention (week 1) and the last night of the intervention (week 12), while the Delayed Treatment Control participants completed outcome measures upon entering the study (week 1), just prior to starting the intervention (week 12), and the last night of the intervention (week 24). Pre- and post-assessments were compared at week 1 and week 12 for both groups. This design allowed the researchers to examine differences between these two groups over a 12-week period in which the Treatment Group received the intervention, while the Delayed Treatment Control Group had yet to receive the intervention. Teens and parents

completed assessment measures in the presence of the research team, while teachers were mailed assessment measures at each of the testing periods. Teachers were blind to the condition assigned to the subject.

Treatment

The PEERS intervention consisted of twelve 90-min sessions, delivered once a week over the course of 12-weeks. Parents and teens attended separate concurrent sessions that instructed them on key elements about making and keeping friends. The parent and teen group leaders were licensed clinical psychologists specializing in child and adolescent psychology and social skills interventions for youth with developmental disabilities.

The program was an upward extension based upon Frankel and Myatt (2003) which was developed for children from 2nd to 7th grade. Prior to the commencement of the present study, PEERS was completely manualized (E.A. Laugeson, F. Frankel, Unpublished manuscript 2006) and presented to two pilot groups of six subjects each. Since changes were made to the final manual as a result of these two groups, pilot subject data were not included in the present study. Similar to Frankel and Myatt (2003), the program addressed current social functioning among teens with ASD in five crucial areas: (a) reciprocity in conversations in order to develop meaningful friendships; (b) diminishing the importance of the rejecting peer group for the teen by promoting skills to expand the teen's social network with the help of parents; (c) abating the effects of the teen's negative reputation within the current peer group through instruction in the rules of peer etiquette; (d) instructing parents and teens about how to promote more successful get-togethers with peers; and (e) avoiding continuing provocation from peers by improving the teen's competence at handling teasing, bullying, and other conflicts with peers.

As described in Frankel and Myatt (2003), concurrent parent and teen sessions were structured such that each session began with a review of the homework assignment from the previous week. In order to individualize the program to suit the specific needs of each family, sufficient time was allotted to troubleshoot any homework problems. This portion of the session was followed by a didactic lesson, which was outlined in a handout for the parent group. Parents were instructed on ways in which they could help their teen overcome obstacles to weekly socialization homework assignments. Teen didactic lessons were followed by demonstrations in which the group leaders modeled the appropriate social skill being taught through role-play exercises. Newly learned skills were rehearsed by the teens in the session, during which they received performance feedback from the group leader and coaches.

Homework was then assigned for the coming week, allowing time to troubleshoot potential barriers to homework completion. The sessions concluded with parents and teens reuniting in the same room, during which time the teens provided a brief review of the lesson for parents, and homework assignments were finalized. In order to minimize parent-teen conflict during the completion of these assignments, the level of parental involvement was individually negotiated at the end of the session with the help of group leaders.

Table 2 presents an overview of the PEERS intervention (E.A. Laugeson, F. Frankel, Unpublished manuscript 2006). Multiple homework assignments were given on a weekly basis, but only the specific homework for the corresponding didactic lesson is presented in Table 2. Session content was modified to be appropriate for adolescents, but followed the Frankel and Myatt (2003) framework with the following exceptions:

1. Parent Sessions 2–4 focused on ways in which parents could help their teen expand their social network through the participation of extra-curricular activities, which would afford teens new opportunities to meet potential friends with similar interests.
2. Teen Session 3 provided instruction in rules of electronic communication, including phone etiquette, rules of text messaging, instant messaging, and emailing, and online safety.
3. Parent Session 3 and Teen Session 4 had parents and teens identify which “peer group” or “crowd” the teen was attempting to fit into (e.g., popular kids, jocks) and which group their teen would best fit into (e.g., geeks, nerds, gamers), as well as methods for finding appropriate potential friends from these new peer groups.
4. Session 6 afforded instruction on how to exit conversations appropriately when peer entry attempts were unsuccessful.
5. Session 7 clarified how parents could supervise teen get-togethers without being intrusive, while teens were provided instruction on how to plan and execute individual and group get-togethers with friends using appropriate teen social etiquette.
6. Session 9 taught effective responses to teasing, as in Frankel and Myatt (2003), but also distinguished between teasing and embarrassing feedback (e.g., comments about personal hygiene, bad habits).
7. Session 10 taught teens ways to expedite changing a bad reputation (i.e., laying low, following the crowd, changing one's “look,” and “owning up” to a previously bad reputation).
8. Session 11 taught steps to resolving an argument with a peer (i.e., keep one's cool, listen to the other person's

Table 2 Overview of the PEERS intervention

Session	Didactic lesson	Description of the lesson	Homework
1	Introduction and trading information	Trading information during conversations with peers in order to find common interests	Teens practice trading information on phone with a group member
2	Conversational skills	Having two-way conversations with peers. Parents identify teen activities leading to potential friendships	Teens practice trading information on phone with non-group member
3	Electronic communication	Appropriate use of voicemail, email, text messaging, instant messaging, and the Internet in developing pre-existing friendships. Parents taught the social structure of school peer groups	Parents identify extra-curricular activities. Teens practice using electronic forms of communication
4	Choosing appropriate friends	Pursuing teen extra-curricular activities leading to friendships. Teens taught the social structure of school peer groups and identify groups they might fit in with	Teens identify a potential peer group. Teens begin enrolling in extra-curricular activities
5	Peer entry strategies	Steps involved in joining conversations with peers	Teens practicing joining conversations with peers
6	Peer exit strategies	How to assess receptiveness during peer entry and how to gracefully exit conversations when not accepted	Teens practicing joining and exiting conversations with peers
7	Get-togethers	Planning and having successful get-togethers with friends. Appropriate parent monitoring and intervention during teen get-togethers	Teens organize and host a get-together with potential friends
8	Good sportsmanship	The rules of good sportsmanship during games and sports	Teens practice good sportsmanship
9	Handling teasing	Appropriate responses to teasing. Differentiating between teasing and negative feedback and using appropriate responses to the latter	Teens practice handling teasing appropriately
10	Handling bullying and bad reputations	Strategies for handling bullying and changing a bad reputation	Teens use new strategies for handling bullying and begin to change bad reputations
11	Handling disagreements	Resolving disagreements with peers	Teens practice handling arguments with friends
12	Graduation	Graduation party and ceremony. Maintaining gains in teen friendships after termination	

side, repeat what they said; explain oneself, apologize for one's part in the argument, and try to solve the problem).

Group Dynamics

Given the gender disparity in prevalence rates of ASD, it was anticipated that the number of boys in the treatment groups would far outnumber the girls. Therefore, treatment groups including female participants included at least two girls in the group. In the one instance in which a female participant unexpectedly dropped out of the study before the group began, the second female was given the option to defer treatment until another girl was recruited; however, in this case the family chose to participate without the additional female member.

In all but one treatment group, members were observed to get along well. In the one treatment group in which two teens did not appear to get along with each other, conflict was minimized by physically separating the two teens in

the seating arrangement and by avoiding having the teens engage in role-playing activities or in-group phone assignments with each other.

In order to minimize potential anxiety among group members, teens were notified from the start of treatment that they would not be required to make personal disclosures, nor would they be forced to participate in role-playing exercises or other activities with which they felt uncomfortable. Teens were reassured that the group would be focused on skill building and developing strategies for approaching social situations, rather than focusing on frank discussions about the challenges related to making and keeping friends. For example, when discussing strategies for handling peer rejection, teens were informed that they would not be talking about the specific ways in which they may have been teased or bullied in the past. Instead, teens were informed that they would be given strategies for how to handle teasing or bullying in order to make it less likely they would experience further rejection.

Treatment Fidelity

Adherence to treatment protocol was monitored in the parent and teens sessions by trained research assistants through weekly fidelity check sheets covering all elements of the manualized intervention. Research assistants alternated between the parent and teen sessions weekly and acted as “coaches” in the teen sessions with at least one coach in each session. These coaches were graduate students in psychology with experience conducting clinical interventions for children and adolescents and were trained in all aspects of the PEERS intervention. Coaches received weekly group supervision from the teen and parent group leaders, both of whom were licensed clinical psychologists.

Results

Table 3 presents the mean demographic and baseline variables for each group. Parent socioeconomic status (SES) was calculated using the procedure described by Hollingshead (1975). Chi square analyses for percent male, percent Caucasian, and percent mainstreamed were not significant (p 's > 0.35). T -tests for age, grade, KBIT-2 Verbal IQ, Vineland Communication and Socialization subscales, Vineland Composite scale, and outcome variable baseline scores all failed to reach significance (p 's > 0.18).

Due to the large number of tests, a condition (Treatment vs. Delayed Treatment Control) \times Time (baseline vs. post-test) mixed MANOVA approach was used to analyze the data. The large number of missing data from teachers dictated a separate MANOVA for the teacher outcome variables. Results of these analyses revealed a highly significant Condition \times Time effects for combined teen and parent outcome variables [Wilks' Lambda = 0.36; $F(10,22) = 3.99$, $p < 0.005$]. In contrast, the Condition \times Time effect failed to reach significance for teacher outcome variables [Wilks' Lambda = 0.84; $F(2, 30) = 2.75$, $p > 0.07$]. Follow-up ANOVAS were performed on the teen and parent outcome variables. The significant results are presented in Table 4.

The Condition \times Time interaction reached significance for three teen outcome measures [TASSK, $F(1,31) = 30.62$, $p < 0.0001$; QPQ Host, $F(1,31) = 9.42$, $p < 0.025$; FQS, $F(1,31) = 4.38$, $p < 0.05$] and one parent outcome measure [SSRS Social Skills, $F(1,31) = 4.24$, $p < 0.05$], and approached significance for two parent outcome measures (SSRS Problem Behavior and QPQ Guest, p 's > 0.10). Newman Kuels post-hoc tests (Winer 1971) confirmed that the treatment group significantly improved in knowledge of social skills on the TASSK ($q_3 = 17.76$, $p < 0.01$), while the Delayed Treatment

Table 3 Mean demographic and baseline variables for Treatment and Delayed Treatment Control groups (standard deviations are in parentheses)

Variable	Group		p
	Treatment ($n = 17$)	Delayed Treatment Control ($n = 16$)	
Age (years)	14.6 (1.3)	14.6 (1.6)	ns
Grade	9.0 (1.4)	8.9 (1.9)	ns
SES	50.7 (12.8)	50.1 (12.2)	ns
Percent male	88.2	81.2	ns
Percent caucasian	35.2	50.0	ns
Percent mainstreamed	47.1	56.3	ns
KBIT-2 verbal IQ	96.0 (16.1)	88.3 (21.1)	ns
Vineland-communication	72.2 (6.2)	70.6 (6.6)	ns
Vineland-socialization	65.8 (8.5)	65.9 (7.0)	ns
Vineland-composite	70.3 (8.5)	68.6 (6.2)	ns
Teen baseline measures:			
TASSK	13.3 (2.4)	12.6 (3.6)	ns
QPQ host	1.1 (1.4)	0.6 (0.9)	ns
QPQ guest	0.9 (1.3)	1.3 (2.3)	ns
QPQ conflict	4.1 (5.2)	4.3 (4.5)	ns
FQS	16.8 (3.4)	18.1 (3.9)	ns
Parent baseline measures:			
QPQ host	1.5 (2.7)	0.6 (0.9)	ns
QPQ guest	0.9 (1.3)	1.3 (2.5)	ns
QPQ conflict	6.5 (5.0)	6.9 (5.6)	ns
SSRS social skills	80.2 (8.8)	77.9 (12.1)	ns
SSRS problem behaviors	114.9 (14.2)	120.7 (13.6)	ns
Teacher baseline measures: ^a			
SSRS social skills	83.6 (7.3)	86.6 (14.8)	ns
SSRS problem behavior	96.5 (16.7)	85.4 (21.3)	ns

^a N 's are eight for Treatment and five for Delayed Treatment Control groups

Control Group did not ($q_3 = 2.11$, ns). The Treatment Group showed a significant increase in hosted get-togethers ($q_3 = 9.37$, $p < 0.01$), while the Delayed Treatment Control Group did not ($q_3 = 2.23$, ns). Friendship quality declined significantly in the Delayed Treatment Control Group ($q_3 = 3.80$, $p < 0.05$), while the increase in mean friendship quality of the treatment group was not significant ($q_3 = 2.11$, ns).

The Condition \times Time interaction for the SSRS social skills scale was the only parent reported scale to reach significance [$F(1,31) = 4.24$, $p < 0.05$]. Post-hoc tests confirmed that the treatment group significantly improved on parent-rated social skills ($q_2 = 7.23$, $p < 0.01$), while the Delayed Treatment Control Group did not ($q_2 = 1.44$, ns).

Table 4 Mean pre- and post-treatment scores for statistically significant outcome variables for treatment and Delayed Treatment Control groups (standard deviations are in *parentheses*)

Variable	Group				<i>p</i>
	Treatment (<i>n</i> = 17)		Delayed Treatment Control (<i>n</i> = 16)		
	Pre	Post	Pre	Post	
Teen measures:					
TASSK	13.3 (2.4)	19.6 (1.4)	12.6 (3.6)	13.3 (3.8)	0.001
QPQ Host	1.1 (1.4)	3.2 (2.2)	0.6 (0.9)	1.1 (1.3)	0.025
FQS	16.8 (3.4)	17.2 (4.0)	18.1(3.9)	16.6 (4.6)	0.05
Parent measures:					
SSRS social skills	80.2 (8.8)	89.7 (12.1)	77.9 (12.1)	79.8 (11.7)	0.05

Discussion

The current paper presented the results of a randomized controlled study of PEERS, a manualized parent-assisted intervention to improve friendships for 33 teens with ASD. This study presents one of the largest number of participants reported in the treatment outcome literature for older adolescents with ASD. Results were encouraging, as improvement was demonstrated on 4 of 12 outcome measures. Teens in the Treatment Group demonstrated improved knowledge of rules of social etiquette relevant to making and keeping friends. They reported a significant increase in the frequency of hosted get-togethers and significantly better quality of friendships at the end of treatment in comparison to the Delayed Treatment Group. Parents of teens in the Treatment Group reported significant improvement in their teen’s overall level of social skills in comparison with parents of teens in the Delayed Treatment Control Group.

The present results stand in contrast to those of Ozonoff and Miller (1995) who failed to find effects of treatment upon parent-rated SSRS social skills. The present intervention was shorter but compared more subjects. Neither Ozonoff and Miller nor Tse et al. (2007) attempted to measure changes in friendships. In contrast, the present study found increases in get-togethers with peers among the study participants. Although teens did not report a significant increase in invited get-togethers, there was a significant increase in hosted get-togethers. This suggests that although teens were able to effectively increase their frequency of peer interactions by organizing social activities in the home and community with friends, these invitations were not reciprocated to a significant degree by the end of treatment. This finding might be explained by

the fact that the intervention is aimed at developing skills to begin friendships, but the treatment only lasts for 12 weeks; making it difficult to develop and cultivate close friendships to the point where get-togethers are reciprocated within such a short period of time. Thus, a post-treatment follow-up period would provide a greater opportunity to observe the development of these friendships. Another possible explanation for this finding is that emphasis is placed on the teens performing the role of a host rather than a guest during get-togethers.

Teachers were the only informants that showed only marginally significant differences between Treatment and Delayed Treatment Control Groups. This was most likely because of poor response rate due to having teachers mail back assessments to the researchers. Teacher reports were obtained on only 13 of 33 subjects, so that statistical power was substantially reduced.

There are four other limitations to the present study. First, parent outcome may have been biased due to the parent involvement in the intervention. More attention should be paid to capturing teacher report as teachers not only provide another informant, but would not be subject to the same biases in reporting outcome as parents, since they are not directly involved in treatment. Second, the durability of outcome was not measured after treatment ended. The authors are currently conducting a replication of this study with a 3 month follow-up period to assess durability of findings. Third, the diagnostic assessment was limited due to the lack of a standard measure of autistic symptomatology. Although it would have been preferable to conduct comprehensive diagnostic assessment using standard measures such as the Autism Diagnostic Observation Schedule (ADOS; Lord et al. 2001) and/or the Autism Diagnostic Interview—Revised (ADI-R; Le Couteur et al. 2003), this was not a financially viable option for the current study, nor was the time commitment feasible. Recent developments in the diagnostic assessment of future participants will place only a small additional burden upon subjects through additional assessment using the Social Responsiveness Scale (SRS; Constantino 2005) and the Adolescent Autism Spectrum Quotient (AQ; Baron-Cohen et al. 2006) and will provide better diagnostic characterization of the sample. Fourth, although outcome on the SSRS-P was statistically significant, this instrument was not designed for the ASD population, and thus it may not sufficiently assess the specific social issues of this population. Recent developments in assessing the social relatedness of future participants on the SRS (Constantino 2005) may substantially improve assessment of outcome.

Future research is currently being conducted which will provide stronger diagnostic screening of the sample; include socialization outcome measures more relevant to the sample (i.e., SRS); increase incentives to improve

collection of teacher report measures; and assess outcome after a 3 month follow-up period. It is hoped that these methodological changes will result in significant effects of treatment on teacher measures, as well as a significant increase in invited get-togethers, and significant outcomes on more variables.

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Appendix: Test of Adolescent Social Skills Knowledge (TASSK)

Instructions

The following items are about making and keeping friends. After you read each item, there will be a couple choices to choose from. Decide which choice is the best by bubbling in the best answer. Only choose one answer per item.

1. The most important part of having a conversation is to:
 - Trade information
 - Make sure the other person is laughing and smiling
2. The goal of a conversation is to:
 - Make the other person like you
 - Find common interests
3. One of the rules for having a two-way conversation is:
 - To be an interviewer
 - Do not be an interviewer
4. When you are FIRST getting to know someone, it is important to be:
 - Funny and silly
 - Serious
5. When you are calling a friend on the telephone, it is important to:
 - Tell them your first and last name and where you go to school
 - Have a cover story for calling
6. When you are calling a friend on the telephone, you should:
 - Avoid cold calling
 - Let them do most of the talking
7. It's a good idea to try to make friends with:
 - Someone who is more popular than you
 - Someone who likes the same things as you
8. It's a good idea to have a peer group because:
 - More people will know who you are
 - It protects you from bullying
9. When you are trying to join a conversation, the FIRST thing you should do is:
 - Watch to observe the conversation
 - Make a comment about what they are saying
10. When joining a conversation, you should wait for:
 - Someone to invite you to talk
 - A pause in the conversation
11. If you try to join a conversation and the people ignore you:
 - Move on
 - Speak louder and make sure they can hear you
12. If you try to join ten different conversations, on average how many times out of ten are you likely to be rejected:
 - 7 out of 10
 - 5 out of 10
13. When having a friend over for a get-together at your home:
 - You should figure out what you are going to do
 - Have your friend choose the activity
14. If you are having a friend over for a get-together and someone else unexpectedly calls that you really like, you should:
 - Invite your other friend over
 - Tell them that you are busy and will call them later
15. Teens like to play sports with other teens who:
 - Score points and play well
 - Praise them
16. When people are not playing by the rules, you should:
 - Nicely remind them what the rules are
 - Do not referee them

17. If another kid teases you or calls you a name, you should:
- Tease the tease
 - Tell an adult
18. When someone teases you, the best thing to do is:
- Walk away
 - Make fun of what they said
19. If someone is bullying you, the FIRST thing you should do is:
- Get help from an adult
 - Avoid the bully
20. If you are trying to change your bad reputation, you should:
- Lay low for a while
 - Make sure that people get to know you better
21. The FIRST thing you should do when you get into an argument with a friend is:
- Listen and keep your cool
 - Explain your side
22. When a friend accuses you of doing something you did not do:
- Say you are sorry that this happened
 - Explain your side until they believe you

References

- Baron-Cohen, S., Hoekstra, R., Knickmeyer, R., & Wheelwright, S. (2006). Adolescent autism spectrum quotient (AQ)—Adolescent Version. *Journal of Autism and Developmental Disorders*, *36*(3), 343–350. doi:10.1007/s10803-006-0073-6.
- Bauminger, N., & Kasari, C. (2000). Loneliness and friendship in high-functioning children with autism. *Child Development*, *71*, 447–456. doi:10.1111/1467-8624.00156.
- Baxter, A. (1997). The power of friendship. *Journal on Developmental Disabilities*, *5*(2), 112–117.
- Buhrmester, D. (1990). Intimacy of friendship, interpersonal competence, and adjustment during preadolescence and adolescence. *Child Development*, *61*, 1101–1111. doi:10.2307/1130878.
- Bukowski, W. M., Hoza, B., & Boivin, M. (1994). Measuring friendship quality during pre- and early adolescence: the development and psychometric properties of the Friendship Qualities Scale. *Journal of Social and Personal Relationships*, *11*(3), 471–484. doi:10.1177/0265407594113011.
- Burack, J. A., Root, R., & Zigler, E. (1997). Inclusive education for students with autism: reviewing ideological, empirical, and community considerations. In D. J. Cohen & F. Volkmar (Eds.), *Handbook of autism and pervasive developmental disorders* (pp. 796–807). Wiley: New York.
- Capps, L., Sigman, M., & Yirmiya, N. (1996). Self-competence and emotional understanding in high-functioning children with autism. *Development and Psychopathology*, *7*, 137–149.
- Constantino, J. N. (2005). *Social responsiveness scale*. Los Angeles: Western Psychological Services.
- Frankel, F. (1996). *Good friends are hard to find: help your child find, make, and keep friends*. Los Angeles: Perspective Publishing.
- Frankel, F., Mintz, J. (2008). *Measuring the quality of play dates*. Available from UCLA Parenting and Children's Friendship Program, 300 Medical Plaza, Los Angeles.
- Frankel, F., & Myatt, R. (2003). *Children's friendship training*. New York: Brunner-Routledge.
- Frankel, F., & Myatt, R. (2007). Parent-assisted friendship training for children with autism spectrum disorders: effects associated with psychotropic medication. *Child Psychiatry and Human Development*, *37*, 337–346. doi:10.1007/s10578-007-0053-x.
- Frankel, F., Myatt, R., & Cantwell, D. P. (1995). Training outpatient boys to conform with the social ecology of popular peers: Effects on parent and teacher ratings. *Journal of Clinical Child Psychology*, *24*, 300–310. doi:10.1207/s15374424jccp2403_7.
- Frankel, F., Myatt, R., Cantwell, D. P., & Feinberg, D. T. (1997). Parent assisted children's social skills training: Effects on children with and without attention-deficit hyperactivity disorder. *Journal of the Academy of Child and Adolescent Psychiatry*, *36*, 1056–1064.
- Goldstein, A. P., & McGinnis, E. (2000). *Skill streaming the adolescent: new strategies and perspectives for teaching prosocial skills*. Champaign: Research Press.
- Gralinski, J. H., & Kopp, C. (1993). Everyday rules for behavior: mother's requests to young children. *Developmental Psychology*, *29*, 573–584. doi:10.1037/0012-1649.29.3.573.
- Gresham, F. M., & Elliott, S. (1990). *The social skills rating system*. MN: American Guidance Service.
- Gresham, F. M., Sugai, G., & Horner, R. H. (2001). Interpreting outcomes of social skills training for students with high-incidence disabilities. *Exceptional Children*, *67*(3), 331–345.
- Hollingshead, A. B. (1975). *Four factor index of social status*. (Available from P. O. Box 1965, Yale Station, New Haven, CT 06520, USA).
- Kaufman, A. S., & Kaufman, N. L. (2005). *Kaufman brief intelligence test—second edition*. Circle Pines, Minnesota: American Guidance Service.
- Laugeson, E. A., Frankel, F. (2006). *Test of Adolescent Social Skills Knowledge*. Available from UCLA Parenting and Children's Friendship Program, 300 Medical Plaza, Los Angeles.
- Le Couteur, A., Lord, C., & Rutter, M. (2003). *The autism diagnostic interview—revised (ADI-R)*. Los Angeles: Western Psychological Services.
- Lord, C., Rutter, M., DiLavore, P. D., & Risi, S. (2001). *Autism diagnostic observation schedule*. Los Angeles: Western Psychological Services.
- Marriage, K. J., Gordon, V., & Brand, L. (1995). A social skills group for boys with Asperger's syndrome. *The Australian and New Zealand Journal of Psychiatry*, *29*, 58–62. doi:10.3109/00048679509075892.
- McGuire, K. D., & Weisz, J. R. (1982). Social cognition and behavior correlates of preadolescent chumship. *Child Development*, *53*, 1478–1484. doi:10.2307/1130074.
- Miller, P. M., & Ingham, J. G. (1976). Friends, confidants, and symptoms. *Social Psychiatry. Sozialpsychiatrie. Psychiatrie Sociale*, *11*, 51–58. doi:10.1007/BF00578738.
- Nelson, J., & Aboud, F. E. (1985). The resolution of social conflict between friends. *Child Development*, *56*, 1009–1017. doi:10.2307/1130112.
- O'Connor, M. J., Frankel, F., Paley, B., Schonfeld, A. M., Carpenter, E., Laugeson, E., et al. (2006). A controlled social skills training

- for children with fetal alcohol spectrum disorders. *Journal of Consulting and Clinical Psychology*, 74, 639–648. doi: [10.1037/0022-006X.74.4.639](https://doi.org/10.1037/0022-006X.74.4.639).
- Ozonoff, S., & Miller, J. N. (1995). Teaching theory of mind: a new approach to social skills training for individuals with autism. *Journal of Autism and Developmental Disorders*, 25, 415–433. doi: [10.1007/BF02179376](https://doi.org/10.1007/BF02179376).
- Rubin, Z., & Sloman, J. (1984). How parents influence their children's friendships. In M. Lewis (Ed.), *Beyond the dyad* (pp. 223–250). New York: Plenum.
- Sigman, M., & Ruskin, E. (1999). Continuity and change in the social competence of children with autism, Down syndrome, and developmental delays. *Monographs of the Society for Research in Child Development*, 64, 114. doi: [10.1111/1540-5834.00010](https://doi.org/10.1111/1540-5834.00010).
- Sparrow, S., Balla, D., & Cicchetti, D. V. (2005). *The vineland adaptive behavior scales* (2nd ed.). Circle Pines, Minnesota: American Guidance Service.
- Tse, J., Strulovitch, J., Tagalakis, V., Meng, L., & Fombonne, E. (2007). Social skills training for adolescents with Asperger's syndrome and high functioning autism. *Journal of Autism and Developmental Disorders*, 37, 1960–1968. doi: [10.1007/s10803-006-0343-3](https://doi.org/10.1007/s10803-006-0343-3).
- Wechsler, D. (2003). *Wechsler intelligence test for children* (4th ed.). San Antonio: The Psychological Corporation.
- Winer, B. J. (1971). *Statistical principles in experimental design*. New York: McGraw-Hill.
- Wolfberg, P. J., & Schuler, A. L. (1993). Integrated play groups: a model for promoting the social and cognitive dimensions of play in children with autism. *Journal of Autism and Developmental Disabilities*, 23, 467–489. doi: [10.1007/BF01046051](https://doi.org/10.1007/BF01046051).