Article

autism

Autism
2014, Vol. 18(3) 255–263

DOI: 10.1177/1362361312472403
aut.sagepub.com
SAGE

Long-term outcomes of parent-assisted social skills intervention for high-functioning children with autism spectrum disorders

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Abstract

This study aims to evaluate the long-term outcome of Children's Friendship Training, a parent-assisted social skills intervention for children. Prior research has shown Children's Friendship Training to be superior to wait-list control with maintenance of gains at 3-month follow-up. Participants were families of children diagnosed with autism spectrum disorder who completed Children's Friendship Training 1–5 years earlier. They were recruited through mail, phone, and email. Information collected included parent and child completed questionnaires and a phone interview. Data were collected on 24 of 52 potential participants (46%). With an average of 35-month follow-up, participants had a mean age of 12.6 years. Results indicated that participants at follow-up were invited on significantly more play dates, showed less play date conflict, improved significantly in parent-reported social skills and problem behaviors, and demonstrated marginally significant decreases in loneliness when compared to pre–Children's Friendship Training.

Keywords

autism, children, follow-up, intervention, social skills

Studies have shown that high-functioning children with autism spectrum disorders (ASDs) who are in mainstream classrooms have increase in the complexity of their play and decrease in nonsocial activity, when compared to how they behave in special education settings (Sigman and Ruskin, 1999). However, these children feel lonelier and have poorer quality friendships than typically developing classmates (Bauminger and Kasari, 2000). Child self-reports of loneliness contradict the commonly held notion that these children lack interest in friendships, since they can be "painfully aware of their social skills deficits" (Knott et al., 2006).

Social skills training programs may potentially promote the development of friendships. Recent reviews of this research disagree as to their effectiveness. Hwang and Hughes (2000) reviewed 16 studies, which treated children across a wide range of functioning, including children with ASDs who were nonverbal or echolalic. Programs were typically embedded in everyday activities in more naturalistic situations. Generalization was reported in many studies and follow-up also tended to support maintenance of treatment effects. However, measures of outcome were generally limited to circumscribed target behaviors rather than to friendship skills. In one recent review, Bellini et al. (2007) reviewed school-based approaches using a standard metric to measure outcome and concluded that there was minimal evidence for effectiveness of social skill interventions for children with ASDs.

Many studies of social skill training have used higher functioning children with ASDs. In a review of these studies, Rao et al. (2008) conclude, "Overall, it is clear that, despite their widespread clinical use, empirical support for SST programs for children with AS/HFA is minimal at this time" (p. 353). Few studies assessed improvement in social competence or the development of close friendships. For instance, Ozonoff and Miller (1995) taught five high-functioning adolescents with ASDs basic interaction and conversation skills and how to infer the mental states of others (Theory of Mind). Comparison with four nontreatment controls demonstrated significant improvement in false belief tasks in the treatment group only, but parent and

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teacher ratings of social competence did not improve. Moreover, the authors reported negative correlations between Theory of Mind scores with parent and teacher ratings of social skill.

White et al. (2007) looked at all social skill group interventions for children with ASDs from 1985 to 2006. They identified 14 studies with *n*s ranging from 4 to 20 participants. Most of these studies did not use a treatment manual, and only five studies included a comparison group. One such study was that by Tse et al. (2007), who reported the results of a 12-week social skills training group for 46 teenagers (13–18 years old) with ASDs. They reported significant posttreatment improvement on the Social Responsiveness scale (Constantino, 2005), the Aberrant Behavior Checklist (Aman et al., 1985), and the Nisonger Child Behavior Rating Form (Aman et al., 1996). However, the intervention was not manualized, and the study did not include a control group or follow-up after the intervention.

Herbrecht et al. (2009) reported the results of an intervention lasting nearly a year on 17 participants aged 9–20 years. Results, based on ratings by parents and experts, showed improvement in social skills and general adaptive functioning, with some evidence of generalization to the home and school situations. However, there were little data presented about longer term outcomes.

Follow-up studies of the effects of social skills interventions have been few and have spanned only a few months at most. Rao et al. (2008) reviewed 10 studies of social skills training programs and noted that only two studies reviewed reported follow-up data. Barry et al. (2003) reported improved perceptions of classmate social support but with only a 6-week follow-up. The longest period was reported by Frankel et al. (2010), with a 3-month follow-up, and Laugeson et al. (2009), with a 14-week follow-up. Thus, the literature on maintenance of treatment gains in social skills training for children with ASDs is limited at best.

Children's Friendship Training (CFT; Frankel and Myatt, 2003) is a 12-week parent-assisted social skills intervention for children that specifically targets ecologically valid friendship skills. CFT contains modules that teach social etiquette and specific rules of behavior that are used by the peer group. Parents are integrated into CFT within separate concurrent sessions. CFT addresses both a child's reputation in the peer group and the development of a best friend through parent-structured and supervised play dates with children from outside the treatment group.

The effectiveness of CFT has been demonstrated for children with attention-deficit hyperactivity disorder (ADHD) (Frankel et al., 1995, 1997a, 1997b) and fetal alcohol spectrum disorders (O'Connor et al., 2006). Results of these studies suggest that skills generalize outside the treatment situation. Recently, Frankel et al. (2010) reported the results of CFT for 56 boys and 10 girls who were mainstreamed second to fifth graders diagnosed with ASDs. Comparison was made with a delayed treatment control group. At posttesting, the CFT group was superior to the control group on parent measures of social skill and play date behavior and on child measures of popularity and loneliness. At 3-month follow-up, parent measures showed significant improvement from baseline. Post hoc analysis indicated that more than 87% of children receiving CFT showed reliable change on at least one measure at posttest and 66.7% after 3-month follow-up. The present study evaluates the longer term outcomes of children who completed CFT 1–5 years after completing this study.

Method

Participants

Participants were recruited from the 66 participants who had completed Frankel et al.'s (2010) study (between 21 December 2004 and 24 September 2008) with at least 75% attendance. Participants were initially between 6 and 11 years of age and in grades 1–5 at the time of the original study. All participants were diagnosed with an ASD based on the Autism Diagnostic Observation Schedule (Lord et al., 2000) and Autism Diagnostic Interview–Revised (Lord et al., 1994). The original inclusion criteria for children in Frankel et al.'s (2010) study were that the child:

1. Was attending a second through fifth grade regular classroom for most of the school day without a closely supervising adult;
2. Was not currently prescribed any psychotropic medication;
3. Had Wechsler Intelligence Scale for Children-III (WISC-III) (Wechsler, 1991) Verbal IQ greater than 60;
4. Was able to switch topics in a conversation when the other person was interested in talking about something else;
5. Had adequate knowledge of rules in playing at least two common age-appropriate board games;
6. Had knowledge of rules to play common school yard games;
7. Did not have a thought disorder;
8. Was free of clinical seizure disorder, gross neurologic disease, or other medical disorder.

Criteria 5–8 were established during a child mental status examination (cf. Frankel and Myatt, 2003). Additional criteria for participation in the follow-up study included not having taken either CFT or the teen adaptation of CFT (PEERS; Laugeson and Frankel, 2010) during follow-up.

This follow-up study was planned and carried out well after the short-term follow-up was completed. In all, 12 of the 66 participants indicated that at the time of consent for the initial study and prior to receiving CFT, they did not wish to be contacted further. Nine participants moved and

left no forwarding information. Two participants subsequently enrolled in PEERS, leaving 43 potential participants for this follow-up. Recontact was initiated by the coordinator of the original study. A total of 12 participants did not return calls or mail.

Interested participants were interviewed by the first author (J.M.), who was not involved in the original study. Informed consent was obtained from parents and assent from children. All procedures were approved by The University Institutional Review Board.

Five of the potential participants who were successfully contacted stated that they were not willing to participate and one participant agreed to participate but failed to complete any current assessments. Thus, 24 of the 52 participants who allowed contact on signing consent (46.2%) completed the present study.

Procedure

CFT

The CFT manual (Frankel and Myatt, 2003) was developed for the mixed clinical sample seen through the UCLA Children's Friendship Program and is reviewed briefly here. Study participants were integrated into classes with no more than four children with ASDs admitted to any class (class size was usually 10). The nonstudy participants were seeking clinical treatment on a fee for service basis and also met the same inclusion criteria as study children. Chart diagnoses for these children were adjustment disorder (18.6%), ADHD (46.0%), ADHD and oppositional defiant disorder (ODD; 2.7%), ODD (0.5%), fetal alcohol spectrum disorder (0.7%), anxiety disorder (4.9%), mood disorder (1.3%), and learning disability (1.3%), and 25.2% had no diagnosis. The mixing of ASD and non-ASD children provided peers who were more typically developing, offering realistic practice for the skills being taught, as the aim of the program was to integrate children with ASDs into groups of typically developing peers. Each CFT class was composed of children separated by not more than one grade level. Study participants were not identified in any way to other class participants.

CFT was composed of 12 weekly sessions, 60 min in length. Children and their parents were seen concurrently in separate locations (except for the finalization of the child's homework assignment). Each child session (except for the first and last) was composed of four segments. During the first segment (10 min), children reported the results of the homework assignment given in the previous session. The second segment (15 min) consisted of a didactic presentation, behavioral rehearsal between children, and coaching. The third segment (25 min) consisted of coached play in which children practiced newly learned skills. In the fourth segment (10 min), parents and children were reunited to finalize specific contracts for homework.

Children were instructed on how to "play detective" as an information sharing technique with other class members in order to plan future play. They also rehearsed calling up another class member on the telephone. Participants were instructed on good and bad times and places to make friends, how to watch a group of children in play in order to understand what the group was doing, and what the rules were to participate. They were also coached to make relevant comments or praise the children who were playing, to join by "helping them play their game" and how make a bid to join the children playing at the appropriate time. Techniques of persuasion and negotiation were taught to allow participants to change activities when they lost interest.

The "rules for a good host" were presented in order for children to avoid conflict on play dates: (a) The guest gets to choose the games; (b) praise the guest's behavior; (c) do not criticize the guest; (d) if you are bored, make a deal with the guest to change the game; and (e) play dates were to be with only one guest at a time, who was not to be left alone. Children were paired together to practice being a good host during pretend play dates (i.e. one was the "host" and one was the "guest" in each dyad). Children were taught to respond neutrally or humorously to teasing by "making fun of the teasing," which deflects teasing by informing the perpetrator about their inability to tease well (e.g. "I've heard that one before" and "Tell me when you get to the funny part").

Parent sessions were held concurrently with all child sessions and were broken into four segments. During the first segment (15 min), the group leader reviewed parent and child performance on the previous socialization homework assignment. During the next segment (25 min), a parent handout was presented. In the third segment (10 min), the next socialization homework was assigned, and during the last segment (10 min), parents and children were reunited and verbal contracts were made for completion of the homework assignment.

Socialization homework assignments were as follows: (a) Children were to call another member of the class under parent supervision to practice "playing detective"; (b) children were instructed to bring a nonviolent, interactive toy from home to all sessions to be used during play activities. Group leaders inspected these toys for appropriateness prior to allowing them into the child session; (c) children were to join a group of children at play in their neighborhood. Parents were to help their children decide where and when this would be attempted; (d) parents were provided with a handout listing the specific steps to organize and implement a play date (Frankel and Myatt, 2003: 132). Social contact with class members outside the class was prohibited, so that this potential playmate had to be a child who was not a member of the CFT class; and (e) children were to practice "making fun of the teasing" with a selected child who had teased them. Treatment fidelity

was maintained by the use of experienced group leaders using a manual, which detailed the curriculum for each parent and child session, and using fidelity checklists during each session, which were coded by observers.

Measures

Baseline data (T1) for each measure were collected upon initial entry into CFT. Posttest assessment measures (T2) were taken 12 weeks later, immediately after receiving CFT. The current assessment (T3) was an average of 43.2 months after T2. In all cases, the parent who completed baseline measures completed the parent portions of the present study.

The Social Skills Rating System (SSRS; Gresham and Elliott, 1990) is a parent questionnaire consisting of 55 items rated as either "Never," "Sometimes," or "Very often." The instrument is divided into two major scales. The Social Skills scale (38 items) inquires about behavior in social situations. Items assess interactions with agemates and adults, performance of household tasks, and use of free time. Higher scores on the Social Skills scale indicate more social skills. The Problem Behaviors scale (17 items) concentrates on behavioral problems. Items assess externalizing, internalizing, and hyperactive behaviors. High scores on the Problem Behaviors scale indicate more problematic behaviors.

Gresham and Elliott (1990) reported test–retest reliabilities of .87 and .65 for Social Skills and Problem Behaviors Scales, respectively. Correlations with teacher (r = .36) and peer versions of the instrument (r = .12) were low but statistically significant (ps < .0001 and .022, respectively). Alpha coefficients for the present subjects were .78 for Social Skills and .77 for Problem Behaviors. Macintosh and Dissanayake (2006) compared children with ASDs on the teacher- and parent-completed SSRS. Mean differences between children with ASDs and typically developing children were highly significant (p < .001). Standard scores were used in the present analysis.

The Quality of Play Questionnaire–Parent (QPQ; Frankel and Mintz, 2011) measures the quality of the last play date and the frequency of play dates. The administration of the QPQ begins by defining a play date as a one-on-one experience. Parents rated the last play date their child had with the peer invited most often during the past month. Items 1–7 have parents rate how much children engaged in different activities (e.g. cards or board games, watching TV, or videos). Items 8–17 ask about negative interactions. Parents are required to make judgments of "Not at all" (0), "Just a little" (1), "Pretty much" (2), and "Very much" (3) for these items. Item 18 asks parents to report the number of times their child was invited to another child's home as the only invited guest in the last month (Guest), and item 19 asks parents to report the number of times their child had another child to their home as the only invited guest in the last month (Hosted play dates). The importance of these measures as social outcome variables was suggested by previous research indicating fewer play dates for children with ASDs (Sigman and Ruskin, 1999) and by anecdotal reports from parents of conflict on play dates due to the child setting an inflexible agenda for a play date and arguing with his playmate if that playmate would not comply with this agenda.

The Conflict scale was developed through factor analysis (Frankel and Mintz, 2011). Coefficient alpha was .87. Higher scores on the Conflict scale indicate greater conflict on plat dates. Conflict scores significantly discriminated a general community sample from children referred to social skills training (p < .05). Hosted play dates and Guest measures also significantly discriminated community-referred children from clinic samples (ps < .005, Frankel and Mintz, 2011). Spearman correlation between teens with ASDs and parent ratings were observed to be .55 for the Conflict scale, .99 for Hosted play dates, and .99 for Guest (Laugeson et al., 2009; all ps < .001). Frankel et al. (2011) reported significant correlations of Hosted play dates, Guest, and Conflict with school playground observations of joint engagement with peers and positive peer responses to the initiations by the child with ASD.

The Loneliness scale (Asher et al., 1984) is a child self-report measure consisting of 16 statements such as "I feel left out of things at school" or "I get along with my classmates." Responses are scored on a 5-point Likert scale ranging from "never" to "always." Summation of all items yields a total loneliness score. Higher Loneliness scale scores indicate greater feelings of loneliness. Asher et al. (1984) reported high internal consistency (Cronbach's alpha = .90) and low-to-moderate correlations with sociometric status and best friend nominations (range = −.25 to −.37, ps < .001) for a sample of third to sixth graders. Bauminger and Kasari (2000) and Bauminger et al. (2003) found children with ASDs reported high levels of loneliness on this scale.

Friendships and Interventions Interview (Mandelberg, project developed 2011) is a semi-structured parent interview developed for the present study, which asked about current best friendships including the types of activities engaged in together, how often the friends have play dates outside of school, and how close the friendships are judged to be. It also asks about different programs and treatments in which the child participated since the child completed the CFT program and how helpful each was. All questions on this interview were asked for the first time at T3.

Statistical analysis

Measures that were continuous and normally distributed were analyzed using paired t-tests. The QPQ–Guest and QPQ–Hosted play date measures were highly positively skewed as many participants reported no play

Table 1. Means and standard deviations (in parentheses) for demographic characteristics for Completers versus Non-Completers.

Variable	Completers (n = 24)	Non-Completers (n = 28)
Percent male	83	86
Percent Caucasian	67	61
SES[a]	46.2 (12.9)	47.2 (9.7)
Wing	24.3 (8.0)	21.5 (7.8)
Age (T1)	8.7 (1.4)	8.7 (1.1)
Grade (T1)	3.0 (1.8)	3.5 (1.1)
WISC-III Verbal IQ	104.1 (17.8)	101.3 (15.8)

WISC-III: Wechsler Intelligence Scale for Children-III; SES: Socioeconomic Status.
[a]SES (Hollingshead, 1975).

dates at different time points. As a result, these measures were analyzed using Wilcoxon signed-rank test. First, initial differences were compared between Completers and Non-Completers using t-tests for independent samples to determine whether sample selection factors influenced long-term outcome. Next, outcome variables were compared between T1 and T2 to see whether this subsample showed significant improvement at posttesting. Outcome variables were compared between T2 and T3 to see whether any variables showed significant return toward baseline values. Finally, outcome variables were compared between T1 and T3 to see whether improvement in outcome variables was maintained at follow-up. All analyses were performed using SAS/STAT software version 9.2 (SAS Institute Inc., 2008) and SPSS version 17.

Results

Table 1 compares the mean demographic characteristics of participants completing the present study (Completers) with those that completed T2 in the original study that did not complete the present study (Non-Completers). Although Completers were not significantly different from Non-Completers in percentage of Caucasian subjects (67% for Completers vs 61% for Non-Completers), the proportions of other ethnicities differed between the two samples. Completers were composed of six Asians, one African American, four Hispanics, and one Pacific Islander. Non-Completers were composed of three Asians, seven African Americans, and one Native American. There were no significant differences between these two samples on other demographic variables.

Mean WISC-III Verbal IQ for Completers was 104.1 (standard deviation (SD) = 17.8). Their mean age at T1 was 8.7 years (SD = 1.4), at T2 it was 9.0 years (SD = 1.4), and at T3 it was 12.6 years (SD = 1.4). Mean Grade Level for Completers at T1 was 3.0 (SD = 1.8), at T2 it was 3.2 (SD = 1.8), and at T3 it was 6.5 (SD = 1.8). Mean Socioeconomic Status (Hollingshead, 1975) for Completers was 46.2 (SD = 12.9). Completers were 83% male (n = 20) and 17% female (n = 4). All participants resided in the Greater Los Angeles urban area.

T1 and T2 differences between Completers and Non-Completers

Table 2 presents outcome variables for Completers and Non-Completers at T1 and T2. Only T1 Loneliness was significantly greater for the Completers as compared with Non-Completers ($T(49) = -2.3$, $p < .05$). This is close to the type 1 error rate for the 19 variables being compared in Tables 1 and 2. No other differences between Completers and Non-Completers reached significance (ps > .05).

Services reported during the follow-up period

In all, 16 of 24 children (66%) were reported to have been involved in some form of treatment after having participated in CFT. Parents of seven children could identify specific content: conversational skills or taking turns for three children, language skills for two children, a problem-solving group for one child, and a friendship group for one child. There was no direct parent involvement in any of these groups. While 71% of parents rated the CFT program as being socially "very helpful" for their child, only 31% found these other programs socially "very helpful" for their child.

At follow-up, 7 of 24 children (21%) were in some form of individual therapy, and 5 of 24 (21%) were on psychotropic medications (none were receiving both therapy and medications). Complementary alternative medicine strategies were being used in 7 of 24 children (29%).

Qualitative outcome at T3

At T3, 21 of 24 children (88%) reported having at least one friend with whom they were at least "pretty close." By parent impression, 20 of 24 children (83%) reported their child having at least one friend with whom they were at least "pretty close." Parents felt that at least one of their children's close friends had "a social skills problem" in 11 of 24 cases (46%). This social skills problem was known or suspected to be autistic spectrum disorder in 6 of 24 cases (25%).

Table 2. Means and standard deviations (in parentheses) for baseline (T1) and postintervention (T2) scores for each outcome measure for Completers versus Non-Completers.

Variable	Completers (n = 24)	Non-Completers (n = 28)
T1		
QPQ–Guest play dates[a]	1.0	1.0
QPQ–Hosted play dates[a]	1.0	1.0
QPQ–Conflict play date	5.2 (5.0)	3.8 (4.0)
SSRS–Social Skills[b]	72.3 (12.2)	79.0 (17.3)
SSRS–Problem Behaviors[b]	118.7 (11.9)	111.5 (15.6)
Loneliness	39.2 (12.5)*	32.6 (13.6)*
T2		
QPQ–Guest play dates[a]	1.0	2.0
QPQ–Hosted play dates[a]	3.0	4.0
QPQ–Conflict play date	1.4 (2.9)	1.1 (1.7)
SSRS–Social Skills[b]	91.4 (18.2)	81.7 (21.6)
SSRS–Problem Behaviors[b]	110.1 (13.8)	108.2 (13.9)
Loneliness	32.7 (12.2)	32.0 (9.3)

NS: not significant; QPQ: Quality of Play Questionnaire–Parent; SSRS: Social Skills Rating System.
All other differences NS.
[a]Median value.
[b]Standard scores.
*$p < .05$.

Table 3. Baseline (T1), posttreatment (T2), long-term follow-up (T3), and significance levels for each comparison for each outcome measure.

	T1 (M (SD))	T2 (M (SD))	T3 (M (SD))	p (T1–T2)	p (T2–T3)	p (T1–T3)
Play dates						
Guest play dates[a]	1.0	1.0	1.8	NS	NS	<.05
Hosted play dates[a]	1.0	3.0	1.7	<.01	<.01	NS
Conflict play dates	5.2 (5.0)	1.4 (2.9)	2.3 (3.1)	<.001	NS	<.05
SSRS						
Social Skills[b]	72.3 (12.2)	91.4 (18.2)	91.5 (14.7)	<.001	NS	<.001
Problem Behaviors[b]	118.7 (11.9)	110.1 (13.8)	109.3 (13.1)	<.05	NS	<.001
Loneliness						
Loneliness	39.2 (12.5)	32.7 (12.2)	35.5 (14.0)	<.001	NS	.05

SD: standard deviation; NS: not significant; SSRS: Social Skills Rating System.
[a]Median scores.
[b]Standard scores.

At follow-up, 18 of 24 children (75%) were involved in some extracurricular activity. Parents reported that 16 of 24 children (67%) were engaged in an extracurricular activity that they judged to be socially "very helpful" for their child.

Quantitative outcome

Table 3 presents the means and SDs for T1–T3 and the p values for the paired comparisons. Reviewing Table 3 reveals that T2 values for all outcome variables were significantly different from T1 values in this subsample from the original study, except for the frequency of being an invited Guest for play dates ($p > .10$). Median number of Hosted play dates per month at T2 increased significantly when compared to the median at T1 (Wilcoxon $Z = 2.79$, $p < .01$). Mean Conflict on play dates at T2 decreased significantly when compared to T1 ($T(23) = 3.89$, $p < .001$). Mean SSRS Social Skills–scaled scores increased at T2 when compared to T1 ($T(23) = 4.61$, $p < .001$) and Problem Behaviors–scaled scores decreased at T2 when compared to T1 ($T(23) = 3.05$, $p < .05$). Child reported Loneliness decreased at T2 when compared to T1 ($T(22) = 3.81$, $p < .001$).

Nearly all areas of significant improvement at T2 remained significantly improved at T3. The only significant change during this follow-up period (T3 vs T2) was for Hosted play dates, which decreased to baseline levels (Wilcoxon $Z = 3.16$, $p < .01$). No other results reached significance (ps > .07).

With the exception of Hosted play dates ($p > .7$), all outcome variables were improved at T3 when compared to T1. Improvements at T3 were significant for Guest (Wilcoxon $Z = 2.02$, $p < .05$), Conflict ($T(23) = 2.59$, $p < .05$), SSRS Social Skills ($T(23) = 7.14$, $p < .001$), SSRS Problem Behaviors ($T(23) = 3.65$, $p < .01$), and marginally significant for Loneliness ($T(21) = 2.00$, $p = .05$).

Discussion

This study evaluated the long-term outcome of parent-assisted CFT. This intervention contains two features that make it unique among group-based interventions for children's friendships. First, the parent was integrated into the intervention. Socialization homework assignments were key to generalization at home and school. No assignment was made until its contents were practiced in the child sessions and presented within a handout to parents. The first segment of each parent session was especially critical as parents were asked to recount the events of the homework assignment for the previous week. Thus, after a play date homework assignment, parents described all the major events of the play date and any barriers to organizing a successful play date. The mixing of ASD and non-ASD children provided peers who were more typically developing, offering realistic practice for the skills being taught, as the aim of the program was to integrate children with ASDs into groups of typically developing peers.

The sample was composed of children rigorously diagnosed with ASDs. Outcome measures represented ratings by the child and the parent. Since this study was not conceived until well after the end of participation in the original study (e.g. subjects were not asked to complete locator forms), there was considerable attrition. Many subjects indicated that they did not want to be recontacted before they began the intervention. Thus, their attrition was not due to intervention or outcome factors. Only one of 19 baseline and demographic variables compared between Completers and Non-Completers reached significance. Thus, there was little evidence of selection bias affecting these two groups.

The results demonstrated sustained improvement in most measures. At long-term follow-up, parents reported that their children were invited on significantly more play dates outside the home and showed less conflict on these play dates compared to baseline. The number of invited play dates was arguably the most socially significant peer social interaction measure, because it implies that peers were reciprocating the play date invitations made by study participants. Qualitative measures, assessed for the first time at follow-up, indicated that a large percentage of participants had at least one "pretty close" friendship at long-term follow-up, according to both parent (83%) and child report (88%). Most (71%) parents continued to find CFT helpful 2–3 years later. Children reported marginally significant decreases in Loneliness from baseline. The most comparable sample to the present participants was that studied by Green et al. (2000) who only included high-functioning individuals with ASDs between the ages of 11 and 19 years. They found that only 15% were reported by parents to have never had friendships.

Study participants also showed increased social skill with fewer problem behaviors at follow-up. Scores on the SSRS scales at long-term follow-up were within one standard deviation of the average for typical children. Past research on the SSRS shows that this measure is not expected to normalize naturally over time for children with ASDs (Gresham and Elliott, 1990; Wang et al., 2011).

Limitations

The most important limitation of the present study is the lack of a randomized control group. Employing a comparison group for this study poses significant ethical and logistical problems. It is not possible nor is it ethically justifiable to have a true randomized control trial over periods of several years. One possibility to consider is use of participants who failed to complete the original study. However, only 8 of 74 participants would be in this group. Many of these subjects participated in the full treatment. With the exception of the SSRS, the long-term stability of other measures is not known. Thus, results are suggestive of continued improvement in outcome but must await more definitive studies of these measures with children with ASDs. Parents reported that their child had at least one close friend. But this was not surveyed at T1 or T2. Although other authors maintained that children with high-functioning ASDs do not "grow out of" their social deficits (Rao et al., 2008), the present finding is not clearly interpretable.

The results are based solely on parent and child report, rather than observations of school playground behavior or teacher report. Frankel et al. (2011) recently reported relationships between play date measures and observation of peer interaction on the school playground. They noted that Hosted play dates showed substantial correlation with two important indices of peer acceptance: joint engagement and positive peer response to the initiations of the child with ASD. Thus, it is possible that gains in Hosted play dates noted in the present study may eventually result in gains on the school playground. On the other hand, the stability of the play date measures is not known for periods as long as 2–3 years. Future research should include observation measures of playground interaction and test–retest reliability for play date measures.

The original selection criteria for the study focused upon children with ASDs who were very high functioning (e.g. attending a regular classroom without an aide and having significant preexisting communicative and social skills, such as the ability to shift topics in conversations and knowledge of rules of board and school yard games). Thus, the present findings are limited to this subsample of high-functioning children with ASDs.

Conclusion

The present findings suggest that the CFT can lead to lasting benefits for participants, including improved overall social skills, increased invitations to play dates from peers, and decreased problematic behaviors, play date conflict, and loneliness. Results show that a large majority of participants had close friendships at long-term follow-up, in contrast with baseline, where many had no play dates at all, and poorer quality friendships, as reflected by their loneliness scores. However, firm conclusions can be reached only after more definitive studies of the measures employed.

Acknowledgements

The authors gratefully acknowledge the invaluable assistance of Pegeen Cronin, PhD and staff of the UCLA Center for Autism Research and Treatment evaluation core.

Declaration of conflicting interest

The contents of this publication are solely the responsibility of the authors and do not necessarily represent the official views of the NIH.

Funding

This research was supported in part by NIH Research Grant U54 MH68172 funded by the National Institute of Mental Health, NICHD, NIDCD and NINDS, Marian Sigman, STAART Center Program Principal Investigator, and Fred Frankel, Project Principal Investigator, and was also part of the Developmental Pediatrics Fellowship of Josh Mandelberg, partially funded by the Mattel Children's Hospital Shirley and Ralph Shapiro Fellowship Fund.

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