A Controlled Social Skills Training for Children With Fetal Alcohol Spectrum Disorders

Mary J. O'Connor, Fred Frankel, Blair Paley, Amy M. Schonfeld, Erika Carpenter, Elizabeth A. Laugeson, and Renee Marquardt
University of California, Los Angeles

Children with fetal alcohol spectrum disorders (FASD) have significant social skills deficits. The efficacy of a child friendship training (CFT) versus a delayed treatment control (DTC) was assessed for 100 children ages 6 to 12 years with FASD. Children in the CFT showed clear evidence of improvement in their knowledge of appropriate social behavior, and according to parent report, CFT resulted in improved social skills and fewer problem behaviors compared with DTC. Gains were maintained at 3-month follow-up. After receiving treatment, the DTC group exhibited similar improvement. Teachers did not report improvement as a function of social skills treatment. The findings suggest that children with FASD benefit from CFT but that these social skills gains may not be observed in the classroom.

Keywords: fetal alcohol spectrum disorders, social skills training, prenatal alcohol exposure

In 1996, the Institute of Medicine (Stratton, Howe, & Battaglia, 1996) released a report containing broadly defined diagnostic criteria for fetal alcohol syndrome (FAS), partial FAS, alcohol-related birth defects (ARBD), and alcohol-related neurodevelopmental disorders (ARND). These diagnostic categories represent a continuum of effects and are subsumed under the term *fetal alcohol spectrum disorders* (FASD; Streissguth & O'Malley, 2000). It is estimated that in the United States, about 1 in 100 children born each year has FASD, resulting in substantial life-long impairments in development (May & Gossage, 2001).

Three decades of research have documented a multitude of debilitating neurobehavioral effects following prenatal alcohol exposure. Much of this research has focused on overall intellectual functioning, and these general deficits have been revealed in both children with FAS and those with heavy prenatal alcohol exposure who do not exhibit all of the features to warrant a diagnosis of FAS (Mattson & Riley, 1998). Other neurobehavioral deficits include inattention, hyperactivity, and poor language performance, as well as problems in memory and executive functioning (for a review, see Mattson & Riley, 1998; Rasmussen, 2005; Streissguth & O'Malley, 2000). Alarmingly, these deficits also have been documented in the offspring of women who drank light to moderate amounts of alcohol (Jacobson & Jacobson, 2002; O'Connor, Sigman, & Kasari, 1993; Sood et al., 2001).

As a consequence of the primary deficits described, children with FASD exhibit considerable social impairment. Problems understanding social cues, indiscriminant social behavior, and difficulty communicating in social contexts are reported (Streissguth, 1997). Both caregivers (Roebuck, Mattson, & Riley, 1999) and teachers (Brown et al., 1991) have rated children with prenatal exposure to alcohol as having fewer social skills than unexposed children, even after controlling for differences in cognitive functioning (Thomas, Kelly, Mattson, & Riley, 1998; Whaley, O'Connor, & Gunderson, 2001). Furthermore, studies of adolescents and adults with FASD have indicated that social skills deficits continue into adulthood (Carmichael-Olson, Morse, & Huffine, 1998; Streissguth & O'Malley, 2000).

Current research suggests that exposed children without mental retardation may be at the greatest risk for poor adaptation. In a study using parent report, alcohol-exposed children with less cognitive impairment were found to be more likely than children with mental retardation to exhibit lack of consideration for the rights and feelings of others, resistance to limits set by authority figures, and conduct problems suggestive of early delinquency (Roebuck et al., 1999; Schonfeld, Mattson, & Riley, 2005). These findings are consistent with the increased rate of delinquency and school failure found in alcohol-exposed adolescents with higher IQs but without FAS (Streissguth, Barr, Kogan, & Bookstein, 1996). Given the high percentage of individuals with prenatal exposure to alcohol who have significant social problems as they grow older, it is important to begin promoting social problem solving and competence early in development.

To assist children with FASD in achieving more success in peer relationships, we established the following aims for the current study: (a) to examine the impact of parent-assisted child friendship training (CFT; Frankel & Myatt, 2003) compared with a delayed treatment control (DTC) on the social skills of children with a history of prenatal alcohol exposure and (b) to examine the maintenance of social skills gains over a 3-month period. The innovation afforded by this study is in its reliance on parents as facilita-

tors of social competence in their children and in its use with a unique sample of children with developmental disabilities. No previous studies have systematically implemented social skills training for children with FASD, and to our knowledge, this is the first controlled study of its kind on this population.

Method

The study was conducted at the medical center of a large Southern California university. The university and the Centers for Disease Control and Prevention Institutional Review Boards approved all procedures, and a certificate of confidentiality was obtained from the National Institute of Alcohol Abuse and Alcoholism. Informed consent was obtained from the parents, and assent was obtained from children 7 years of age and older.

Participants

Participants were recruited from February 2003 to February 2005 through letters mailed to local health care providers (e.g., pediatricians, YMCA, schools) and flyers posted within the medical center and the community. Interested families contacted the project coordinator, who conducted a screening interview by telephone to determine initial eligibility. Children were eligible if they were between 6 and 12 years of age and had documented prenatal alcohol exposure, measurable social skills deficits (> -1 standard deviation below the mean) on the Socialization domain of the Vineland Adaptive Behavior Scales (VABS; Sparrow, Balla, & Cicchetti, 1984), and a verbal IQ of ≥ 70[1] on the Kaufman Brief Intelligence Test (K-BIT; Kaufman & Kaufman, 1990). Children were not admitted if they had major sensory or motor deficits or a past diagnosis of mental retardation or pervasive developmental disorder.

Recruitment efforts yielded a total of 183 families who agreed to be screened for initial eligibility. Following screening, 126 children met initial eligibility requirements. Failure to meet these requirements resulted from the following: (a) alcohol exposure levels too low ($n = 28$); (b) no reliable documentation of alcohol exposure ($n = 19$); or (c) a previous diagnosis of mental retardation ($n = 4$) or pervasive developmental disorder ($n = 6$). Of the 126 children who were scheduled for final eligibility, 20 families did not keep their appointments. These families did not differ from the final sample families on variables of child age, gender, or ethnicity. Of the 106 who came in for final eligibility assessment, 6 children were deemed ineligible for participation. Two children were excluded because they met criteria for pervasive developmental disorder, 1 child had an IQ $<$ 55 on the K-BIT, 1 child did not have social skills deficits as defined by the VABS, and the mothers of 2 children reported less drinking (below eligibility criterion) when questioned during final eligibility testing than they did during initial screening. A total of 100 children met final eligibility requirements, and all families agreed to participate. (See Table 1.)

FASD Diagnosis

Every child received a physical examination to assess for the presence of the diagnostic features of FASD according to the criteria set forth in the *Diagnostic Guide for Fetal Alcohol Spectrum Disorders* (Astley, 2004). This system uses a 4-digit diagnostic code reflecting the magnitude of expression of four key diagnostic features of FAS: (a) growth deficiency; (b) the FAS facial phenotype, including short palpebral fissures, flat philtrum, and thin upper lip; (c) central nervous system dysfunction; and (d) gestational alcohol exposure. Using this code, the study physician ranked the magnitude of expression of each feature independently on a 4-point Likert scale, with 1 reflecting complete absence of the FAS feature and 4 reflecting the full manifestation of the feature. The study physician administered this examination after achieving 100% reliability with the senior study clinician who was trained by S. J. Astley. The physician was unaware of social skills group assignment.

History of prenatal alcohol exposure was obtained from the biological mothers by means of the Health Interview for Women (O'Connor, Kogan, & Findlay, 2002). For adopted or foster children, medical or legal records documenting known exposure or reliable collateral reports by others who had observed the mother drinking during pregnancy were obtained. All children except 3[2] were assigned ratings of 3 (*some risk*) or 4 (*high risk*) in the prenatal alcohol exposure category.

On the basis of the 4-digit diagnostic system, 11% of children were diagnosed with FAS, 43% with partial FAS, and 46% with static encephalopathy, which is consistent with ARND according to guidelines developed by Astley (personal communication, July 5, 2005) for converting the 4-digit code to the diagnostic categories proposed by the Institute of Medicine (Stratton et al., 1996). No child met criteria for ARBD.

Study Design and Procedures

A two-group CFT or DTC longitudinal design was used. Each consecutive set of 14 to 16 eligible children formed a cohort. After completing all pretreatment assessments, the children within a cohort were assigned, in alternating sequence, to one of the two study conditions (child 1 CFT, child 2 DTC, child 3 CFT, child 4 DTC, etc.), with an attempt to equate groups on gender and ethnicity. In addition, families having 2 children in the study were allowed to have both children in the same condition (sibling pairs, $n = 5$ in CFT and $n = 6$ in DTC). Each cohort averaged approximately 7 to 8 children in each condition. The CFT group received 12 sessions, of 90 min in length, delivered over the course of 12 weeks. Parents attended separate concurrent sessions in which they were instructed on issues related to FASD and on the key social skills being taught to their children. Incentives included weekly pizza dinners, free baby-sitting for siblings, and $30 for completion of study assessments. On completion of the 12-week intervention, participants in the CFT condition were administered a posttreatment assessment. Children for whom treatment had been delayed (DTC) then received the social skills training.[3] After completing treatment, the DTC participants were assessed. At the same time, the CFT group completed a 3-month follow-up assessment.

Treatment Content

The CFT procedure used in this study and all its social skills components are based on social learning theory, have been validated empirically, and have been successfully implemented for children between 6 and 12 years of age in multiple clinical contexts (Frankel, 2005). Research has demonstrated that child and parent behaviors within certain critical situations

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[1] A cutpoint of ≥ 70 would allow 73% of children with FAS and 91% of children with partial FAS and ARND to participate in the study (Sampson, Streissguth, Bookstein, & Barr, 2000). For a minority of children recently adopted from Russia ($n = 3/13$), verbal IQs lower than 70 were accepted if a 95% confidence interval around this score included 70 and if estimates of their nonverbal IQs on the K-BIT were greater than 70.

[2] Three children in the study were assigned a score of 2 (*unknown risk*) in the prenatal alcohol exposure category of the *Diagnostic Guide* (Astley, 2004). These children were abandoned at birth with no documentation regarding their prenatal history. However, these children either presented with a diagnosis of FAS from a pediatric geneticist or had features consistent with prenatal alcohol exposure (e.g., facial dysmorphology, central nervous system dysfunction). Additionally, other disorders that might resemble FAS (e.g., certain genetic syndromes) had been ruled out during medical or psychiatric evaluations they had received prior to enrollment in the current study.

[3] Children in the DTC condition were yoked in time with the children in the CFT condition, and we decided that it would be unethical to deny treatment to the DTC families for 6 months.

Table 1
Sample Characteristics and Comparison of Child Friendship Training (CFT) and Delayed Treatment Control (DTC) Conditions

	Total (N = 100)			CFT (n = 51)			DTC (n = 49)		
Variable	%	M	SD	%	M	SD	%	M	SD
Ethnicity									
White, non-Hispanic	54.0			56.8			51.1		
Black, non-Hispanic	17.0			11.8			22.4		
Hispanic	17.0			19.6			14.3		
Asian	2.0			2.0			2.0		
Mixed	10.0			9.8			10.2		
Child gender									
Boys	51.0			56.9			44.9		
Girls	49.0			43.1			55.1		
Child age (years)		8.59	1.56		8.32	1.47		8.66	1.65
Child composite IQ[a]		97.24	14.83		95.53	17.14		99.02	11.88
Child verbal IQ[b]		93.58	14.73		92.59	16.78		94.61	12.32
Child socialization[c]		62.83	8.04		63.53	7.97		62.10	8.14
Biological mother	21.0			17.6			24.5		
Number of placements		2.18	0.20		2.29	0.28		2.06	0.27
Primary caregiver married/has partner	62.0			62.8			61.2		
Primary caregiver education (years)		16.28	0.26		16.43	0.35		16.12	0.39
Fetal alcohol syndrome	11.0			11.8			10.2		

[a] Kaufman Brief Intelligence Test Composite IQ. [b] Kaufman Vocabulary subtest. [c] Vineland Socialization standard score.

discriminate accepted from rejected children. These critical situations are the following: (a) social network formation with the aid of the parent (Parke, Neville, Burks, Boyum, & Carson, 1994), (b) informational exchange with peers leading to common-ground activities (Black & Hazen, 1990), (c) entry into a group of children already at play (Frankel, 2005), (d) in-home play dates (Frankel & Myatt, 2003), and (e) conflict avoidance and negotiation (Rose & Asher, 1999). The key features of CFT were taught through the instruction of simple rules of social behavior; modeling, rehearsal, and performance feedback during treatment sessions; rehearsal at home; homework assignments; and coaching by parents during play with a peer (Elliot & Gresham, 1993). See Table 2 for a description of sessions.

Therapist Training

Five clinical psychology interns provided treatment. First, the therapists were educated about the developmental challenges faced by children with FASD. This training was followed by the social skills treatment training that began with instruction on the theoretical and empirical rationale underlying the treatment protocol and a review of the elements of the CFT adapted for children with FASD. Concurrently, group leaders became familiar with the treatment by assisting more experienced group leaders in either the parent or child sessions as coaches during one complete 12-week treatment cycle with nonparticipant children seen in the university child outpatient child friendship program. Group leaders then conducted either a child or parent group according to the training they had received.

Treatment Integrity

Treatment integrity was ensured consistent with the guidelines of Moncher and Prinz (1991) through the use of trained and qualified group leaders, standardized treatment manuals, ongoing weekly supervision, and live monitoring of sessions. Fidelity checklists covering the primary content of the protocol were created for each treatment session. Undergraduate psychology students, trained to reliability, served as coders and coded all sessions live. If a group leader failed to cover any primary content, the coder reminded the leader during the sessions. Using this procedure, we noted no substantial deviations from the treatment protocol.

Measures

Eligibility Measures

Health Interview for Women. All biological mothers were interviewed with the Health Interview for Women, which yields standard measures of the average number of drinks per drinking occasion and the frequencies of those occasions. One drink was considered to be 0.60 oz of absolute alcohol (i.e., one 12-oz can of beer containing 5% absolute alcohol was considered one drink). Criteria for alcohol exposure was seven or more drinks per week or three or more drinks per drinking occasion. In a recent study by Barr and Streissguth (2001), a cutpoint of seven or more drinks per week had 100% sensitivity and 83% specificity for diagnosis of FASD. In other studies, a cutpoint of three or more drinks per drinking occasion has been a statistically significant predictor of behavioral teratogenesis (O'Connor, Sigman & Kasari, 1993; Sood et al., 2001).

Review of medical records. If the biological mother was not available, medical, adoption, or other legal records were obtained documenting prenatal alcohol exposure. These records provided sufficient information to meet the diagnostic criteria outlined in the *Diagnostic Guide (*Astley, 2004). Such documentation included medical records that indicated the biological mother was intoxicated at delivery or records indicating that the mother was observed to drink heavily during pregnancy by a reliable collateral source (e.g., grandparent, spouse).

VABS. The VABS is for individuals from birth through 18 years of age and measures parent assessment of child functioning in communication, self-help, social, and motor skills (Sparrow et al., 1984). For children 6 years of age and older, the motor scale is not scored. The median split-half coefficient for the Socialization scale is .89 for 6- to 12-year-olds, and test–retest reliability is .89.

K-BIT. The K-BIT is a brief, individually administered measure of verbal and nonverbal intelligence (Kaufman & Kaufman, 1990) composed of two subtests: Vocabulary and Matrices. The Vocabulary subtest was used as an eligibility criterion to ensure that study participants could understand the verbal components of the treatment. The split-half reliability coefficients for the Vocabulary IQ score for children 6 to 12 years of age averages .91, with test–retest reliability of .86 and construct validity

Table 2
Description of Child and Parent Treatment Sessions

Session	Child group topic	Child group goals	Parent group topic	Parent group goals
1	Rules of the group; elements of good communication	Children learn and practice elements of good communication by introducing themselves to one another.	Goals and methods of treatment; limitations of intervention; what not to expect	Parents learn about importance of their role in the intervention; group leader reviews context and stability of sociometric categories.
2	Having a conversation	Children learn how to exchange information and learn good and bad places to make friends.	Having a conversation	Parents learn how to help their child develop two-way conversation skills and how to better communicate with their child.
3	Joining a group of children already at play: "slipping in"	Children learn when, where, and how to "slip in" or join a group of children already at play.	Supporting child friendships	Parents learn about appropriate settings for play dates, sources of potential playmates, and importance of adequate time availability for play dates.
4	Joining a group of children already at play: "slipping in"	Children learn more techniques for group entry, reasons for rejection from group entry, and what to do in response to rejection.	Joining a group of children already at play: "slipping in"	Parents learn when, where, and how their children should "slip in" to a group of children already at play and the importance of their child taking "no" for an answer.
5	How to be a good sport	Children learn and practice basic rules of being a good sport.	Joining a group of children already at play: "slipping in"	Parents learn how to help their child practice "slipping in" outside of the session.
6	How to be a good sport	Children learn to praise other children and learn techniques of persuasion and negotiation.	Appropriate games for play dates	Parents learn appropriate games and games to exclude for indoor and outdoor play.
7	Rules of being a good host	Children learn and practice rules of being the host during interactive indoor games.	Play dates	Parents learn about sources for potential playmates for their child. Parents learn about their responsibilities for the play date.
8	How to handle teasing	Children learn and practice strategies for reacting neutrally or humorously to teasing, so as to reduce the likelihood of further teasing.	How to handle teasing	Parents learn about effective strategies their child can use to handle teasing and are instructed on appropriate role-play for practice.
9	Unjustified accusations	Children learn how to handle situations when unjustly accused of bad behavior by an adult.	How to handle adult complaints about child's behavior	Parents learn how to respond appropriately and effectively to other adults who complain about their child's behavior so as to minimize their child getting a negative reputation.
10	How to be a good winner	Children learn and practice rules of being a good winner.	How to be a good winner	Parents learn rules of being a good winner and how to encourage their child's practice of those rules.
11	Bullies and conflict situations	Children learn how to avoid conflict and have the opportunity to practice strategies for conflict resolution.	Bullies and conflict situations	Parents learn how to support their child's use of strategies for defusing confrontations with another child.
12	Graduation	Children and their parents attend a posttreatment evaluation, graduation ceremony, and party.	Graduation	Parents complete posttreatment evaluation and participate in the child's graduation ceremony and party.

with the Wechsler Intelligence Scale for Children—Revised (Wechsler, 1974) of .78.

Outcome Measures

Test of Social Skills Knowledge (TSSK). The TSSK (O'Connor, Paley, & Frankel, 2003) is a 17-item forced choice criterion-based measure designed to assess children's social skills knowledge. The items, which were read to the child, directly relate to the social skills taught during the CFT intervention. This measure, and similar measures, has been used successfully in evaluating treatment gains in other studies of social skills training (Frankel & Myatt, 2003; Pfiffner & McBurnett, 1997). Scores

range from 0 to 17, with a higher score reflecting higher social skills knowledge.

Social Skills Rating System (SSRS). Social skills were evaluated with the Social Skills Rating System Parent (SSRS-P) and Teacher (SSRS-T) Forms (Gresham & Elliott, 1990). Two scales compose the SSRS: Social Skills and Problem Behaviors, presented as standard scores ($M = 100$; $SD = 15$). The Academic Competence scale on the teacher version of the SSRS was not used in this study. The Social Skills scale measures cooperation, assertion, responsibility (parent version only), and self-control. Lower scores represent poorer social functioning. The Problem Behaviors scale measures internalizing, externalizing, and hyperactiv-

ity. Higher scores represent greater problem behaviors. The SSRS has high criterion validity, correlating significantly with other established measures of child social and problem behaviors. The SSRS has high internal consistency (Cronbach's $\alpha = .87-.94$) and test–retest reliability for parent (.65 and .87) and teacher (.84 and .85) ratings.

Data Analysis Plan

Data analyses were conducted with SPSS Statistical Analysis software (13.0). The children's knowledge of social skills measure (TSSK) and the parent (SSRS-P) and teacher (SSRS-T) measures were assessed at baseline (T1), at the end of the 12-week treatment (T2), and, for the CFT condition, at 3-month follow-up (T3). The short-term efficacy of the treatment was evaluated with separate analyses of covariance (ANCOVAs) performed at the group level, with the posttreatment (T2) TSSK and parent or teacher SSRS scores as outcome variables. Treatment (CFT vs. DTC) was the grouping factor, and baseline scores (T1) on the TSSK and SSRS parent or teacher ratings were used as the primary covariates. Group leader, cohort, child gender, and ethnicity were evaluated in preliminary analyses of models as possible additional covariates. Other possible covariates included child age, IQ, home placement (biological or nonbiological parent), number of placements, FASD diagnosis, caregiver marital status, and education. Effect size of treatment was determined by calculating the mean difference between the CFT and DTC groups on each of the three posttreatment outcomes (T2) and dividing each difference score by the pooled standard deviation of the groups (Cohen, 1988). The long-term effect of treatment (3-month follow-up) on outcome variables was evaluated with two-tailed pairwise t tests (T2–T3, T1–T3) on the scores of participants in the CFT condition. Effect sizes for the change over time of the CFT group were estimated by computing the mean change score for each of the pairwise comparisons and dividing by the pooled standard deviation within each pair. Following treatment, these comparisons were repeated for participants in the DTC condition, with the exception that there was no 3-month follow-up for this group. Sample size was determined by means of conventional power analyses. When two-tailed $\alpha = .05$ and $n = 100$, power has to be .81 to detect a conventional "medium" effect ($d = 0.50$) in a two-group ANCOVA with the addition of a baseline covariate accounting for 25% of the variance (i.e., a baseline–posttreatment correlation of .50).

Results

Participant Attrition

Of the 100 children who were recruited for study, 51 were assigned to the CFT condition and 49 were assigned to the DTC condition. Of that number, 96 children completed the baseline and 12-week posttreatment or wait phases of the study (CFT, $n = 49$; DTC, $n = 47$). Two children did not start treatment because of illness or family circumstances (CFT, $n = 1$; DTC, $n = 1$), and 2 were asked to leave the program because of significant aggressive behavior that could not be safely monitored in the groups (CFT, $n = 1$; DTC, $n = 1$). At the conclusion of the study, 47 children (92%) completed the 3-month follow-up assessment in the CFT condition. One sibling pair did not complete the assessment because of multiple failures to show up for their appointment, resulting in too great a lapse in time. In the DTC condition, 46 (94%) of the children completed the posttreatment assessment following friendship training. One child did not start treatment because the family moved from the area.[4] (See Figure 1.)

Baseline Comparison of CFT to DTC

Chi-square and independent t tests revealed no statistically significant differences at baseline between the CFT and DTC conditions on study demographic variables or on measures of social skills and problem behaviors. (See Tables 1 and 3.)

Comparison of CFT to DTC

Children's Report of Social Skills Knowledge

To examine the impact of social skills training on children with FASD, a two-condition (CFT, DTC) ANCOVA design was used. Analyses were conducted on the scores derived from the TSSK completed by the children. The posttreatment score (T2) was the dependent variable, and the baseline score (T1) was used as a covariate to control for initial levels. Analyses of variance and simple correlations revealed no significant associations between variables of group leader, cohort, child gender or ethnicity, home placement, number of placements, caregiver marital status or education, and social skills knowledge. As expected, child IQ ($r = .43, p < .003$) and age ($r = .23, p < .03$) were related to outcome. In addition, a diagnosis of FAS was negatively associated with knowledge of social skills ($r = -.23, p < .05$) and so was included in data analysis. After controlling for these variables, the analysis yielded a significant group effect with the children in the CFT showing significantly improved knowledge of appropriate social skills compared with children in the DTC group, $F(1, 90) = 56.52$, $p < .0001, d = 1.28$. (See Table 3.)

Parent Report of Social Skills and Problem Behaviors

A two-condition (CFT, DTC) ANCOVA design was used for testing the hypothesis that the groups would differ on parent-reported outcome measures posttreatment. Analyses were conducted on the standard scores derived from parent ratings on the SSRS Social Skills and Problem Behaviors scales. The posttreatment scores (T2) were the dependent variables, and the baseline scores (T1) were used as covariates to control for initial levels. Demographic, child and caregiver characteristics, group leader, and cohort proved to be unnecessary as covariates because they were unrelated to the outcome variables. Analyses revealed statistically significant condition effects for both Social Skills and Problem Behaviors, respectively, $F(1, 93) = 5.03, p < .03, d = 0.52$, and $F(1, 93) = 4.05, p < .05, d = 0.40$. Children in the CFT condition showed significantly improved social skills and decreased problem behaviors compared with the children in the DTC condition. (See Table 3.)

Teacher Report of Social Skills and Problem Behaviors

Examination of possible covariates to outcome on the teacher-rated SSRS Social Skills and Problem Behaviors scales revealed that only child IQ was statistically related to outcome (Social Skills, $r = .29, p < .01$; Problem Behaviors, $r = -.27, p < .01$).

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[4] Analyses included all participants with outcome data; however, to check for possible effects of missing data on the results, supplemental analyses were done on each of the outcome measures by means of multiple imputation (Rubin, 1987). As expected, these supplemental analyses were not meaningfully different from the primary analyses and are not reported further.
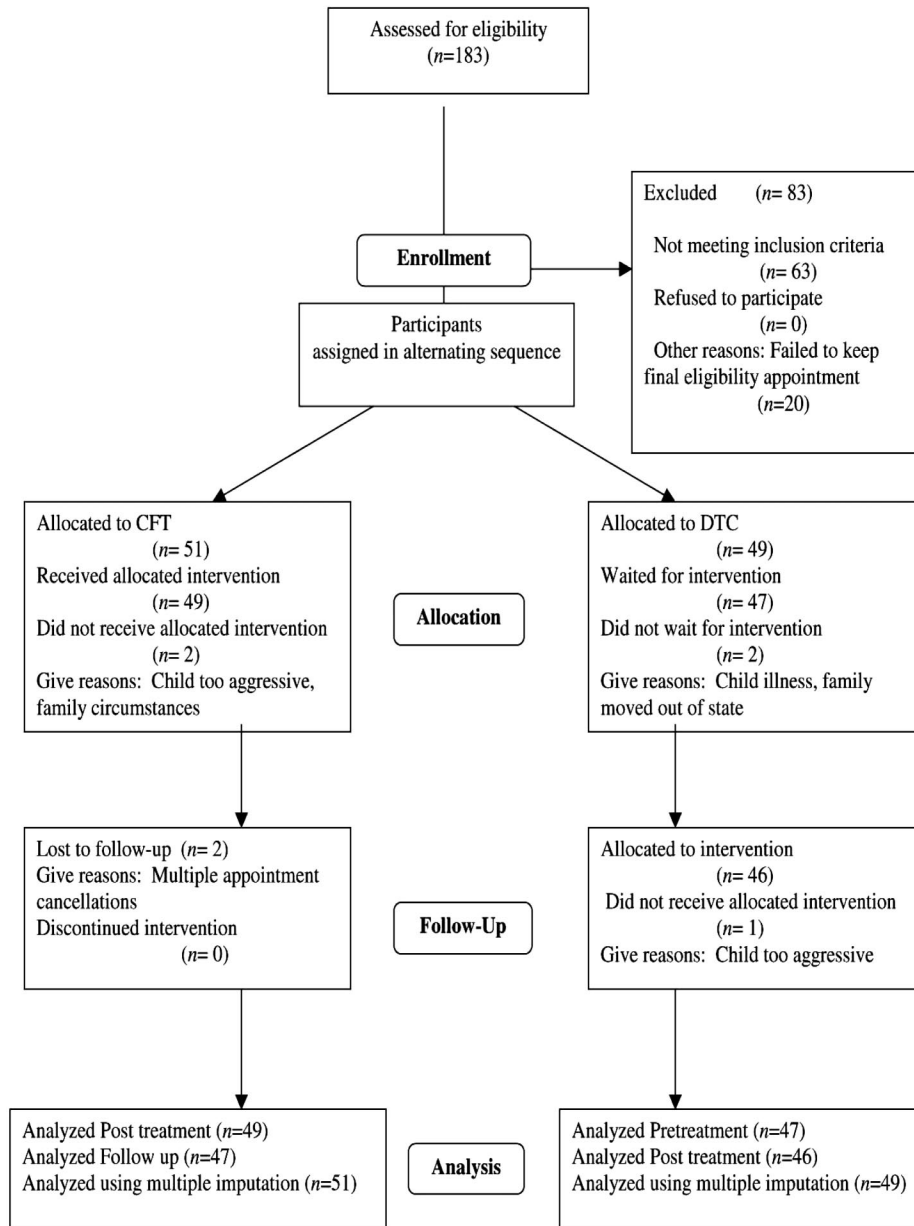
Figure 1. Participant accountability. CFT = child friendship training; DTC = delayed treatment control.

After controlling for child IQ and baseline levels, teacher ratings revealed no treatment effects posttreatment. (See Table 3.)

CFT Treatment Effects at 3-Month Follow-Up

Children's Report of Social Skills Knowledge

To examine the maintenance of social skill knowledge over a 3-month period following treatment, we analyzed data from children in the CFT condition using two-tailed pairwise t tests. The DTC group received treatment during this time period so could not be used as a comparison group. Change scores across two time periods, posttreatment to 3-month follow-up (T2–T3) and baseline to 3-month follow-up (T1–T3), constituted the dependent variables

for the outcome measure (TSSK). Results indicated that children's knowledge not only significantly improved following treatment but also was maintained over the 3-month follow-up period, T2–T3, $t(48) = 1.07$, $p < .29$, $d = 0.16$, and T1–T3, $t(48) = 11.83$, $p < .0001$, $d = 1.73$. (See Table 3.)

Parent Report of Social Skills and Problem Behaviors

To examine the maintenance of social skills gains and the reduction in problem behaviors at follow-up, we analyzed ratings (SSRS Social Skills and Problem Behaviors standard scores) from parents of the children in the CFT condition as described above. Results indicated that social skills gains increased from T2 to T3,

Table 3
Comparison of Child Friendship Training (CFT) With Delayed Treatment Control (DTC)

Measure	T1		T2		T3	
	CFT	DTC	CFT	DTC	CFT	DFT
Child—TSSK						
n	51	49	49	47	47	46
M	11.08	11.22	15.02	12.26[a]	15.32[b]	14.87[c]
SD	2.42	2.37	1.97	2.35	1.42	2.09
95% CI	10.40, 11.76	10.54, 11.91	14.45, 15.59	11.56, 12.95	14.90, 15.73	14.25, 15.49
Parent—SSRS-SS						
n	51	49	49	47	47	46
M	75.22	72.33	84.39	77.00[d]	89.40[e]	85.24[f]
SD	14.33	11.63	14.71	13.54	17.38	15.95
95% CI	71.19, 79.25	68.99, 75.67	80.16, 88.62	73.03, 80.97	84.30, 94.51	80.50, 89.97
Parent—SSRS-PB						
n	51	49	49	47	47	46
M	122.80	124.55	116.63	122.55[g]	115.04[h]	118.26[i]
SD	14.63	13.28	15.51	14.08	15.82	13.52
95% CI	118.69, 126.92	120.74, 128.37	112.18, 121.09	118.43, 126.68	110.40, 119.69	114.24, 122.28
Teacher—SSRS-SS						
n	50	48	48	46	43	43
M	89.94	85.54	89.13	88.17	92.00	90.35
SD	11.45	14.31	12.49	10.49	11.11	12.30
95% CI	86.68, 93.20	81.39, 89.70	85.50, 92.76	85.06, 91.29	88.58, 95.42	86.56, 94.13
Teacher—SSRS-PB						
n	50	48	48	46	43	43
M	112.76	115.54	112.38	113.02	109.12	113.09
SD	15.06	15.62	12.79	15.55	13.27	13.44
95% CI	108.48, 117.04	111.01, 120.08	108.66, 116.09	108.40, 117.64	105.03, 113.20	108.96, 117.23

Note. T1 = baseline; T2 = CFT posttreatment, DTC pretreatment; T3 = CFT 3-month follow-up, DTC posttreatment; TSSK = Test of Social Skills Knowledge; SSRS-SS = Social Skills Rating System–Social Skills; SSRS-PB = Social Skills Rating System–Problem Behaviors; CI = confidence interval.
[a] CFT–DTC comparison on TSSK, $p < .0001$, $d = 1.28$.   [b] CFT 3-month follow-up on TSSK, $p < .0001$, $d = 1.73$.   [c] DTC posttreatment on TSSK, $p < .0001$, $d = 0.92$,   [d] CFT–DTC comparison on Parent SSRS-SS, $p < .03$, $d = 0.52$.   [e] CFT 3-month follow-up on SSRS-SS, $p < .0001$, $d = 1.15$. [f] DTC posttreatment on SSRS-SS, $p < .006$, $d = 0.42$.   [g] CFT–DTC comparison on Parent SSRS-PB, $p < .05$, $d = 0.40$.   [h] CFT 3-month follow-up on SSRS-PB, $p < .0001$, $d = 0.66$. [i] DTC posttreatment on SSRS-PB, $p < .01$, $d = 0.39$.

and problem behaviors, although not decreasing significantly, remained low over time: Social Skills, T2–T3, $t(48) = 3.35$, $p < .002$, $d = 0.49$, and T1–T3, $t(48) = 7.89$, $p < .0001$, $d = 1.15$; Problem Behaviors, T2–T3, $t(48) = 1.48$, $p < .15$, $d = 0.22$, and T1–T3, $t(48) = 4.55$, $p < .0001$, $d = 0.66$. (See Table 3.)

Teacher Report of Social Skills and Problem Behaviors

Teachers saw little change in social skills in the CFT group from T2 to T3; however, there was a trend for an effect of treatment in the right direction at the 3-month follow-up (T1–T3, $ps < .14$, $d = 0.22$ for Social Skills and $d = 0.24$ for Problem Behaviors; see Table 3).

DTC Treatment Outcomes

Similar to findings reported for the CFT group, following treatment the children in the DTC group exhibited a statistically significant increase in their social skills knowledge as measured by the TSSK (T2–T3), $t(45) = 6.26$, $p < .0001$, $d = 0.92$, and, according to parent report, an increase in their social skills, $t(45) = 2.86$, $p < .006$, $d = 0.42$, and a decrease in problem behaviors, $t(45) = 2.63$, $p < .01$, $d = 0.39$. ANCOVAs on outcome variables, controlling for pretreatment levels (T1 for CFT and T2 for DTC),

revealed that the CFT and the DTC groups were comparable after having received treatment (*ns*). Consistent with findings for the CFT group, teachers did not report a statistically significant improvement in social skills or a significant decrease in problem behaviors in the DTC group following treatment. (See Table 3.)

Clinical Significance

One approach to clinical significance testing is normative comparisons in which the findings are defined as end-state functioning that falls within a normative range on important outcome variables (Kendall, Marrs-Garcia, Nath, & Sheldrick, 1999). Statistical norms are available for the SSRS Social Skills and Problem Behavior scales ($M = 100$, $SD = 15$) and so were used in comparison tests between the mean scores of the CFT group and the standardized normative sample. We conducted one-tailed z tests using 1.5 standard deviations around the normative mean as the range of closeness (standard score = 77.5–122.5). For posttreatment Social Skills (T2), a standard score of 77.5 was chosen as the lower limit of the normative range. On this scale, $_{C.E.}z = 3.18$, $p < .001$, and $_{trad}t(94) = 7.19$, $p < .001$, one-tailed. From these results we conclude that, following treatment, the CFT group was clinically equivalent to the normative group; however, there

was still a statistically significant difference between the CFT posttreatment mean and the normative mean. Similar results were found for the Problem Behaviors scale when we used a standard score of 122.5 as the upper limit of the normative range, $_{C.E.}z = 2.70$, $p < .01$, and $_{trad}t(94) = 7.64$, $p < .001$, one-tailed. At 3-month follow-up, sample scores continued to fall within the normative ranges but were still significantly different from the normative sample mean. (See Figure 2.)

Discussion

Children with FASD who participated in social skills training showed clear evidence of improvement in their knowledge of appropriate social behavior posttreatment, and this improvement was retained over a 3-month follow-up period. Moreover, according to parents, CFT was also effective in increasing social skills and decreasing problem behaviors in sample children. Overall, statistically significant differences between the CFT and the DTC groups immediately following treatment were found according to parent reports. It is also important that for the CFT group, social skills improved significantly from posttreatment to 3-month follow-up, suggesting that children were continuing to benefit from the intervention targeting social skills performance. Similar gains were reported for the children in the DTC group following treatment, suggesting that waiting 3 months for treatment was not detrimental. Study findings are consistent with those reported by Frankel and associates using CFT for children with and without ADHD (Frankel, 2005; Frankel, Myatt, Cantwell, & Feinberg, 1997a, 1997b). In contrast to previous results using CFT, teachers of children in the present sample reported no improvement for the CFT or the DTC group following treatment.

Failure to find statistically significant generalization of effects to the classroom merits some discussion. Close inspection of the baseline ratings by the teachers revealed that they tended to rate sample children as functioning within the average ranges in social skills and problem behaviors, suggesting that teachers did not perceive significant problems in social competence in sample children even at baseline. Frequency counts revealed that teachers rated only 19% of the sample as having social skills scores and only 34% as having behavior problems scores in the clinical range as defined in this study as between 1.5 standard deviations below or above the normative mean, respectively. The reason for this finding may be that teachers may focus less on child social skills than on behaviors related to successful classroom functioning. Because this program was not designed to address those behaviors that are important for classroom success, teachers may not have observed changes in the behaviors targeted in this intervention. Indeed, the social skills targeted by CFT, such as trading information to establish common interests or peer group entry, are skills that are more likely to be enacted on the playground, periods when teachers may be less likely to be closely observing student behavior. Moreover, a positive association was found between child IQ and teacher-rated social skills, suggesting that teachers rated more intelligent children as making more significant social skills gains regardless of treatment condition.

Alternatively, the parents who participated in the CFT treatment may have overestimated changes in their children simply as a function of being involved in treatment. Although this is a plausible explanation for the difference seen between the parent and teacher outcomes, the fact that children in the treatment condition demonstrated a significant increase in their knowledge of the social rules of behavior that was retained over the follow-up period suggests that they did learn socially appropriate behaviors as a function of treatment.

Regarding the clinical significance of study findings, although the scores of the children in the CFT group met criteria for clinical equivalency with the normative sample following treatment (they were no longer scoring in the clinical range), their scores were still considerably different compared with the standardized mean of the
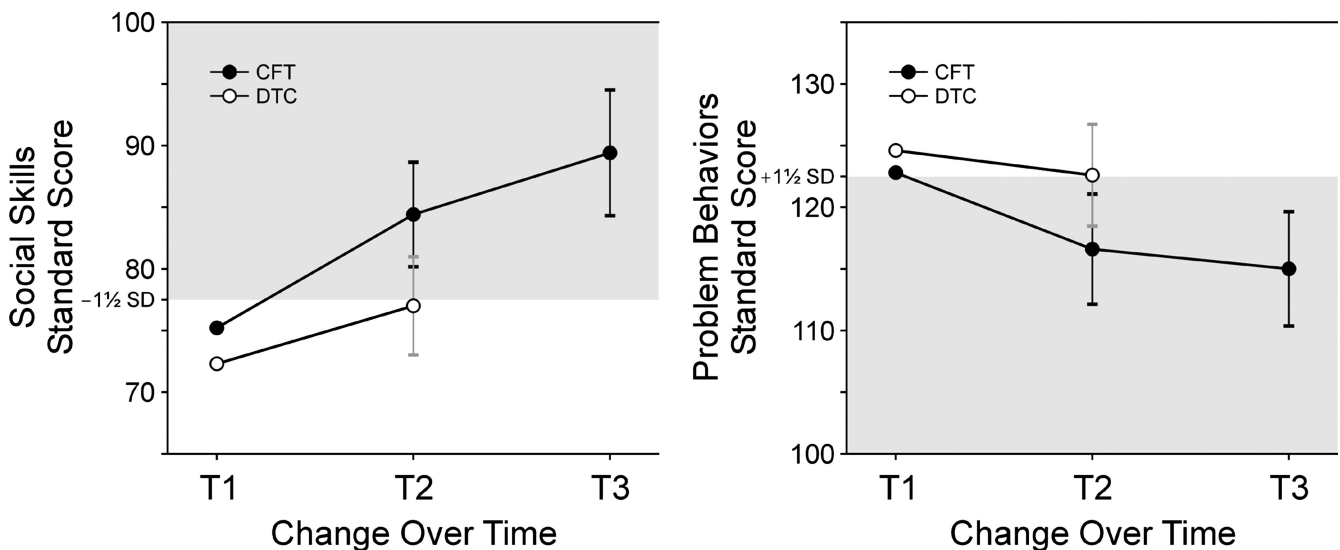

Figure 2. Parent report of change in social skills and problem behaviors following child friendship training (CFT) in comparison to delayed treatment control (DTC). Error bars represent 95% confidence intervals. T1 = baseline; T2 = CFT posttreatment, DTC pretreatment; T3 = CFT 3-month follow-up.

normative sample, particularly with regard to problem behaviors. These findings are not surprising in light of the fact that children with FASD are characterized as having significant brain pathology that may restrict the degree of improvement they can achieve from this type of psychosocial intervention. Although we attempted to modify the treatment protocol to address primary neurocognitive deficits seen in children with FASD, it is possible that additional refinements of the intervention techniques will further enhance its efficacy with this population. Additionally, it may be useful to examine whether adjunctive therapies such as parent training or psychopharmacological interventions might improve treatment outcomes.

The conclusions of this study should be considered in the context of some methodological issues. Children were enrolled in the study in alternating sequence rather than randomized to condition. Nevertheless, no statistically significant differences between groups on any measured baseline variables were found, suggesting that there was no systematic bias in participant assignment. The lack of independent evaluation of child behaviors and failure to find concordance between parent and teacher ratings of child social performance represent limitations of the study, and future research would ideally measure social behaviors in more naturalistic settings such as during unstructured classroom time and on the playground.

In addition, some factors restrict our ability to generalize our study findings to larger populations of children with FASD. First, it was necessary to work only with children with verbal IQs of 70 or above because the treatment required that the children understand the instructions provided during the didactic portions of the sessions. This necessarily limited the generalizability of the study to some children with prenatal alcohol exposure. In the future, further modifications of the protocol could be made to accommodate children functioning in the moderate to mild range of mental retardation, as social skills are extremely important for these children in order to foster more positive social adaptations. Second, the study sample was composed of volunteers who were actively seeking help for their children and who were highly motivated to participate, as evidenced by the low rate of study attrition. Although this may represent a potential limitation with regard to generalization to other children with FASD and their families, research shows that the children with FASD who have the best prognoses are those who are identified early, who come from stable supportive homes, and who receive intervention early in life (Streissguth, 1997). Given the requirement of parent involvement for the success of the present treatment, we would expect that it is those highly motivated families who would benefit most from this particular intervention.

This study represents the first controlled treatment for improving the social functioning of children with FASD. As such, it is a promising intervention for these children, who experience multiple failures in social interaction leading to poor peer choices and, for some, juvenile delinquency. However, the treatment was performed in a highly controlled university setting, and thus the next step in determining its effectiveness would be to test the treatment on children enrolling in more typical community-based programs. Given the high rates of mental health problems among children with FASD (Streissguth et al., 1996), these children are likely to be seen for treatment in these community settings. Providing increased access to interventions that have been empirically demon-

strated to be efficacious with this population would be a critical step toward reducing some of the devastating secondary disabilities faced by children with FASD and helping their families facilitate change.

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