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A Comparative Study of Community Based Social Skills Group Interventions for Children with Autism Spectrum Disorders

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Abstract

Impairments in social reciprocity are a core feature of Autism Spectrum Disorders (ASD) and a major focus of intervention regardless of an individual's cognitive or language ability. Because these impairments do not naturally remit with age, it is critical to intervene as early as possible to offset potential risk factors associated with prolonged social challenges. Fortunately, recent research indicates that social skills group therapy is a promising treatment approach, but research reviews remain mixed. In addition, virtually little is known about effectiveness of social skills interventions provided in community-based rather than research, settings. A between group comparison of three community-implemented social skills interventions - a summer camp, a clinic model, and a combined camp-clinic model was conducted using a standardized and a criterion-based social skills outcome measure. Parent and therapist outcome ratings of social skills for 37 children with ASD between the ages of 8 to 14 years were evaluated. Within group results showed that the combined context had the highest treatment effects, followed by the camp model and clinic model respectively, although between group analyses did not reveal significant differences.

Keywords: Autism Spectrum Disorder; Camp; Social Skills Training

Introduction

Children with Autism Spectrum Disorders (ASD) demonstrate a number of significant social behavioral impairments such as lack of social reciprocity, initiating for social reasons, and orienting naturally toward social situations [1,2]. Social impairments and their effects do not naturally remit with maturation and can actually increase as the child approaches adolescence and adulthood due to the complexity of social demands [3], the individual's awareness of their social differences [4], and an increasing discrepancy between social abilities of individuals with ASD and their same age peers [5]. As a result, children and adolescents with ASD are at an increased risk for peer rejection and social isolation [6], academic and occupational underachievement [7], and mood and anxiety problems [8,4]. Additionally, the ability to obtain and maintain employment is jeopardized as deficiencies in social skills are much more likely to cause termination of employment than are nonsocial factors [9]. Thus, it is critical to intervene as early as possible to offset these potential negative outcomes and develop interventions that improve young children's peer-related social competence and social cognitive problem solving skills. Although children with ASD fail to develop age appropriate social skills, they also often lack opportunities for learning through positive peer interactions [10].

Social skills group training is advantageous over individual therapy because it provides opportunities for participants to practice newly learned social skills with peers [11], while still allowing direct instruction of skills within a structured environment [11,12]. Group training also utilizes resources more effectively by allowing specialists, who are often limited in number, to work with a larger number of individuals [13]. Finally, group interventions are more economical, reducing the financial strain on parents and caregivers. Research indicates that social skills group therapy is promising [3,14,11,15-20], but research reviews are mixed. White, Koenig,

& Scahill (2007) [10], for example, reviewed 14 social skill group interventions and found little empirical support, a finding concluded by Bellini et al., 2007 [12]. In contrast, McConnell (2002) [21], reviewed 55 studies and deduced a different and positive conclusion for the effectiveness of social skills group interventions. The variability of the interventions applied, the measures used, and the type of social skill outcome assessed may explain reasons for the differences in conclusions. For example, dosage of the intervention, inclusion of plans for generalization of skills, measurement of treatment integrity, type of social skill, and the operational definitions of complex constructs such as social reciprocity [22] can vary tremendously from study to study making direct comparisons virtually impossible. Nevertheless, in their review of social skills outcomes [23], deduced four features that may serve as active ingredients of effective social skills intervention programs: (a) frequent and intense instruction (i.e., at minimum thirty hours of instruction spread over 10 to 12 weeks) that surpasses what is typically implemented (e.g., one hour, once a week); (b) plans for maintenance and generalization of skills; (c) measures of treatment integrity; and (d) consideration of the type of skill deficit presented (e.g., if the child is experiencing skill acquisition deficits, then intervention strategies are designed to teach new skills; if the child is experiencing performance deficits, then intervention strategies are designed to enhance the performance of existing skills). Thus considering the above four factors and its impact on social skills functioning would be imperative in the development of future social skills programs for children with ASD.

Study Overview

The primary focus of this study was to evaluate outcomes of two commonly used comprehensive social skills group interventions for children with ASD – a traditional outpatient social skills group intervention and a summer social skills camp. A third condition was also evaluated that consisted of a combination of the two, in which children participated in both the clinic and camp interventions. To measure outcomes, two instruments were used. One was the Social Responsiveness Scale [24] - a standardized instrument; the second was the TRIAD Social Skills Assessment [25]– a criterion-based measure. This study is unique in the following ways. First, the interventions evaluated represented services as usual which is important because the procedures implemented demonstrate the feasibility of the interventions within a community-based outpatient treatment, camp or school setting [26]. Second, the inclusion of a camp condition is unique because there is a paucity of research available on effectiveness of this type of social skills program of instruction, an approach that is being increasingly applied [27]. Third, the camp intervention included typical peers who were taught skills to interact with children with ASD. Fourth, generalization was addressed in two different ways, depending on the intervention context. The camp model incorporated environmental modifications [21] and are described in detail in the methods section. These modifications were designed to facilitate the generalization of skills through the day over 10 successive days for the camp condition. The traditional clinic model included an additional component of parent observation to facilitate transference of skills to other settings. Finally, as recommended by Krasny, Williams [28], a social skills training manual also was developed based on first and last author's experience conducting more than fifteen social skills groups that included more than 60 children as part of an outpatient treatment program for children with ASD. The intervention format targeted specific skill areas using the recommended intervention strategies described by [10,23,21].

Method

Participants

A total of 37 children between the ages of 8 to 14 years with an ASD diagnosis (Autism, Aspergers, Pervasive Developmental Disorder Not Otherwise Specified) received from a psychologist or physician and referred to the clinic for social skills training were selected from each of the three treatment modalities: camp alone, clinic alone and both camp and clinic (combined) treatments.

Before participating in the social skills groups, the children completed a manualized social skills assessment for individuals with ASD [25] to ensure that they had appropriate task demand skills such as abilities to understand verbal instructions, conduct role-plays, answer questions, read simple questions, and speak in complete sentences spontaneously. This was a clinical sample, not recruited for research purposes, therefore, formal tests of intelligence and language were not performed. The Institutional Review Board approved the study. Data from 12 children in the camp condition, 12 children in the clinic condition, and 13 children in the combined condition were analyzed. (Table 1) describes the characteristics of the three treatment groups.

Group	Mean Age	Males	Fem ales	Autistic Disorder	Asperger's Disorder	PDD-NOS
Clinic	12.2	9	3	6	6	0
Camp	12.4	11	1	6	4	2
Camp & Clinic	12.3	8	5	7	6	0

Table 1: ample Characteristics by Group.

Measures

Social competence was measured using the: (a) the Social Responsiveness Scale [24], and (b) the TRIAD Social Skills Assessment [25]. Parents of children completed the SRS and the TSSA before and after the interventions.

SRS

The SRS is a 65-item informant-based measure of children's (4-18 years) social competence, where social deficits are represented as quantitative traits rated on a 4-point Likert scale. The SRS was designed for completion by a parent, teacher, or other primary caregiver who knows the child well and can be finished in 15 to 20 minutes. There are five subscales: ''Social Awareness'' (eight items), ''Social Cognition'' (12 items), ''Social Communication'' (22 items), ''Social Motivation'' (11 items) and ''Autistic Mannerisms'' (12 items) that are sensitive to change, and three 'DSM-oriented subscales measuring ''Social Aspects'' (47 items), ''Language Aspects'' (six items) and ''Preoccupations and Mannerisms'' (12 items) of autism as described in DSM-IV. Raw scores for the total test and the subscales are converted into T-scores. Total T-scores of 76 and higher fall into the severe range and suggest the presence of an autism spectrum condition. The internal consistency for the SRS Total score ranged from .93 to .97 for both the normative and clinical samples. For the subscales, Cronbach's alpha ranged from .77 (Social Awareness) to .90 (Autistic Mannerisms). Discriminant and concurrent validity correlations ranged from 0.65 to 0.74. The five subscale T scores and the total T score was used for data analysis.

TSSA.

The TSSA is a criterion based assessment and is designed for generating specific social skills teaching objectives for educational and clinical treatment planning [25]. The complete package consists of an interactive child assessment and parent and teacher assessment of social behaviors using a 4 -point Likert rating scale ranging from 1 (not very well) to 4 (very well). The parent and teacher questionnaire consists of 5 subscales: Problem behaviors (30 items), affective understanding/perspective taking (8 items), initiating interactions (11 items), responding to initiations (5 items), and maintaining interactions (17 items). In this study only the four latter subscales pertaining to social skills were included. Total scores are obtained by summing individual ratings for each subscale. A higher score indicated better functioning on each subscale. Reliability as measured by internal consistency was 0.92 for parent responses and 0.94 for teacher responses [29].

The total score for each of the four subscales and the total of the four subscales were used for data analysis.

Treatment Fidelity

All clinicians participating and or assisting at the camp or the clinic sites were trained by the first author in the implementation of the social skills curriculum also developed by the first author. All clinicians had prior experience in working with children with ASD. While teaching strategies and skill concepts remained consistent from group to group, adaptations were made when necessary for individual children with regard to level of language used in social narratives and range of visual supports required for teaching abstract concepts. The same clinicians ran the group for all clinic and camp participants. Clinicians met at the end of each group at both clinic and camp to discuss treatment fidelity.

Research Design

A quasi-experimental pre-post design was applied. Data from all children who received the intervention within one year were included for analysis.

Interventions

Social skills curriculum and teaching strategies.

Topics identified for instruction were identified from parental report using the TSSA. (Table 2) describes a typical 10-week instructional format. A combination of psychoeducational and behavioral methods for learning social skills was applied. The 10 sessions were classified under three major overarching skill areas: (a) initiating skills (three sessions); (b) cognitive skills of understanding emotions, perspective taking, and problem solving (four sessions); and (c) conversational skills (three sessions).

Instructional resources for the above curriculum were primarily adapted from four sources: (a) Social Skills Training [30], (b) Super Skills [31], (c) Talkabout [32], and (d) Skills Training for Children with Behavior Problems [33].Within the context of a comprehensive program, several instructional components were used and included the use of visual supports, role-playing, social stories, social scripts, video self -modeling and rehearsal, and nonverbal problem solving activities [10,30,31,34]. All instruction included modeling, rehearsal, and feedback and generally consisted of four steps: (a) introducing the topic with a social story; (b) explaining skills through nonverbal activities and modeling the correct behavior; (c) conducting role-plays through simulated situations, and (d) disseminating homework for skill practice [20]. Visual supports ranged from schedules that helped children understand the order of events within the group to pictures that illustrated abstract social norms. Social Stories [35] were written commensurate with the child's comprehension level for the primary purpose of increasing the child's awareness of problematic social situations. Role-plays were used to provide children opportunities to practice skills in a simulated environment, thus enabling them to correctly implement these skills in realistic situations. Social scripts [36] were used in situations when children did not know how to initiate or respond in situations. Video self-modeling [37] was used on a case-by-case basis, determined by the clinician that a particular group of children could benefit (Table 2).

Week	Topic	Instructional Methods
1	Introductions & Initiating: Greetings	Visual supports; social stories; social scripts; role play; nonverbal activities
2	Initiating: Friends and strangers	Visual supports; social stories; social scripts; role play; nonverbal activities
3	Initiating: Complementing others	Social stories; nonverbal activities (identifying steps to problem solving, generating solutions); modeling, role-play
4	Problem Solving	Social story; nonverbal activities; role-plays
5	Being a good sport	Social story; role-plays (setting up scenarios such as board or other games to provide opportunities to demonstrate cooperative play)
6	Emotion regulation	Visual supports; sorting activities; nonverbal activities (feelings thermometer, calming strategies) role-plays
7	Use and understanding of body language and showing Listening	Visual supports; video self-modeling; role play
8	Conversational skills: starting a conversation and choosing a topic	Social story; social scripts; role-play (different scenarios to starting a conversation); nonverbal activities
9	Conversational skills: maintaining conversations and staying on topic	Visual supports; video self-modeling; role play
10	Conversational skills: Terminating conversations	Visual supports; role-play; video self-modeling

Table 2: Example of 10-day Social Skills Instruction Program.

Clinic Format. In the clinic modality, children attended 1-hour small group sessions conducted weekly for 10 or 12 weeks. Total treatment time ranged from 10 to 12 hours. At the start of each session, parents were briefly met by a clinician who described the skill of the day and the teaching methods involved. The sessions were then observed by parents through a one-way mirror facilitating parent training in skill instruction and, thereby, generalization to other environments. Parents met with the same clinician at the end of the session to answer questions and provide the support materials included in the session, such as social stories, visuals, etc. Homework was given to each child to practice the skill taught in the session in other environments and reviewed with the parent. Parents were encouraged to share the material with teachers.

Camp Format. Approximately 25 children attended summer camp for two weeks. Camp sessions occurred over 10 consecutive days (except weekends) for 5 hours each per day and a total duration of 50 hours. Children divided into five groups based on age and language ability. A minimum of two typical peers were assigned to each group. The typical peers were taught to initiate and interact with children with ASD by clinicians prior to the start of camp. Campers started at 9.00 am each morning and received 1 hour of skills training in small group, followed by other large group activities. An outline of the camp schedule is detailed in (Table 3). After the skill of the day was taught in the small social skills group, participants were encouraged to practice these skills throughout the different activities with their peers using a reward system. When children were caught demonstrating the skill of the day with other campers, they were rewarded through praise and tokens that were traded for tangible reinforcers. At the end of the day, therapists briefly met with parents to discuss the skill taught and disseminate homework to practice in other environments.

Time	Activity
9.00 to 9. 30 am	Chores for the day
9.30 to 10.30 am	Social skills group
10.30 to 11.00 am	Board games
11 to 11.30 am	Gym activities
11.30 to 12.00 pm	Lunch
12 to 12.30 pm	Outdoor games
12.30 to 1.00 pm	Craft time
1.00 to 2.00 pm	Large group activity (e.g., magic show, fun with inflatables)

Table 3: Example Camp Schedule.

Combined Format. Children in this group received the camp and clinic treatment for a total number of hours that ranged from 60 to 62 hours. The treatment order (clinic or camp) did not follow any particular sequence. A child in the combined model could have participated in the clinic treatment in the spring and attended camp in the summer or attended camp in the summer and the clinic treatment in the fall of the same year.

Data Analysis.

Paired-samples t-test and effect sizes were calculated to compare the pre and post scores of the three treatment conditions on the two outcome measures. A total of nine dependent variables were analyzed under each treatment modality and across the three different treatment settings. To control for Type, I error due to multiple comparisons, raw p values were adjusted using the Benjamin and Hochberg (BH) False Discovery Rate (FDR) procedure. BH multiple comparison adjustments were based on number of subscales of the measures. The BH procedure is found to be most optimal as it achieves relatively high power while remaining conservative [38]. Effect sizes were calculated using Cohen's d for each pre and post data pair to substantiate the magnitude of treatment effect and control for Type II error. Effect size values for d are considered small at 0.2, medium at 0.5 and large at 0.8 [39]. For between group comparisons, an Analysis of Covariance (ANCOVA) was conducted on each dependent variable, with post scores as the dependent variable, pre scores as the covariate, and treatment modality or group as the fixed factor. This procedure eliminates any subject variances across the three treatment groups [40].

Results

Results from the paired t-tests based on the SRS (Table 4), indicated no significant changes for the clinic or camp condition. Effect sizes in these conditions ranged from low (0.11) to moderate (0.54). In the combined condition, all five scales of the SRS showed significant improvement and effect sizes ranged from moderate (0.57) to high (0.89). Results using the TSSA (Table 4) revealed a different picture. Although no significant differences within the clinic condition was found and effect sizes ranged from low (0) to moderate (0.79), all four dependent variables were significant for the camp condition, and effect sizes were moderate and ranged from 0.34 to 0.76. In the combined condition, three of the four dependent variables showed significant changes, including relatively large effect sizes that ranged from 0.34 to 1.08. Results from a 3x2 between (group) by within (time: pre-post) fixed-effect ANCOVA failed to show statistically significant interaction between group and time for the SRS, $F(2, 33) = 0.62$, $p = 0.54$, and for the TSSA, $F(2.33) = 1.90$, $p = 0.17$. Both were not statistically significant at the specified .05 level.

Measure	Clinic Condition		Camp Condition		Combined Condition	
	Adjusted p value[1]	Effect Size	Adjusted p value	Effect Size	Adjusted p value	Effect Size
SRS Measures						
Social Awareness	0.51	0.16	0.12	0.36	0.01**	0.68
Social Cognition	0.08	0.5	0.46	0.11	0.03*	0.57
Social Communication	0.19	0.32	0.36	0.26	0.03*	0.89
Social Motivation	0.23	0.13	0.08	0.27	0.05	0.57
Autistic Mannerisms	0.52	0.05	0.16	0.54	0.05*	0.59
TSSA Measures						
Affective Understanding	1	0	0.03*	0.62	0.01**	0.95
Initiating Interactions	0.23	0.36	0.05*	0.34	0.17	0.34
Responding to Initiations	0.23	0.44	0.03*	0.76	0.04*	1.08
Maintaining Interactions	0.08	0.79	0.05*	0.61	0.02*	1.04

Table 4: Pre and Post Analyses of Social Behaviors as Assessed by the SRS and TSSA.

[1]p value adjusted using the Benjamin and Hochberg (BH) False Discovery Rate (FDR) procedure

*: p value significant at the 0.05 level

**: p value significant at the 0.01 level

Pre-and post change scores on SRS total T scores and TSSA total scores are shown using boxplot displays in (Figures 1 and 2). In (Figure 1), SRS change scores show greater improvement in the combined condition; however, prescores in the clinic condition were higher at the start of treatment and have a few outliers reflecting greater improvement compared to others.

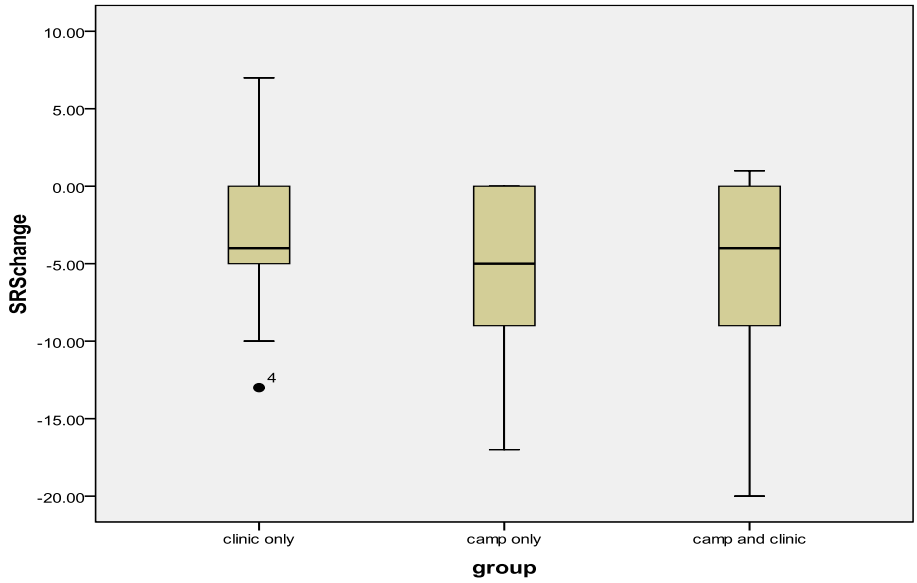

Figure 1: Higher T score values indicate greater impairment.

In (Figure 2), change scores on total TSSA scores show great variability within the three groups, with the greatest range and improvement in the combined group and less variability in the camp group, which also shows more outliers reflecting increased improvement. Pearson's correlation coefficient indicated a significant and positive association ($r = 0.39$, $p < 0.004$) between effect size and time involved in intervention. Effect sizes increased from the clinic to camp model, and highest effect sizes were obtained from the combined treatment condition.

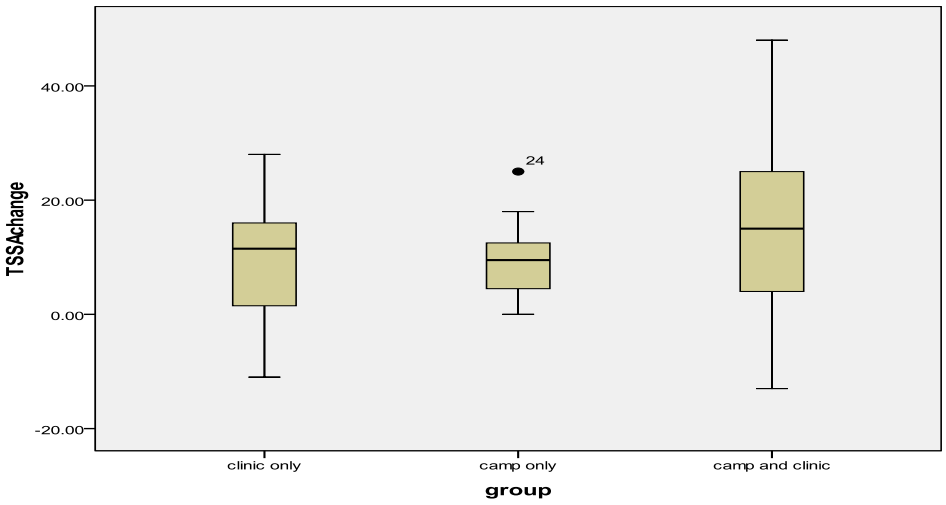

Figure 2: Lower scores indicate greater impairment.

Discussion

The two unique aspects of this study that set it aside from all other examples of social skills training of children with ASD was the simultaneous evaluation of the contexts in which the training was carried out and the examination of outcome using two types of social skills measures – one standardized measure and one criterion-based measure. Further, the specific emphasis on generalization of skills through parent training and the inclusion of typical peers to facilitate practice was novel for a community-based intervention.

Although general findings supported our hypothesis that the combined model would result in higher social skills outcomes, the group effect disappeared when mean scores were compared between groups. Even though significant treatment gains and large effect sizes were reported for the combined condition with most of the TSSA and SRS subscales, the gains made were not significant enough to suggest at this point, with this sample, that the combined treatment was superior to the other two groups. Further, we cannot say that the camp condition was superior to the clinic condition based on findings from the TSSA. The use of a quasi-experimental design may have limited the ability to account for between group differences not measured. Also, the small sample size and variations in scores within groups may have underpowered our ability to detect differences. Therefore, while the social interventions were effective (as noted by significant t scores differences and large effect sizes) they were not significantly different from each other to detect between group differences. Reasons for the general lack of findings for the other two groups are offered.

The clinic context differed from the other two groups by the length of time of treatment, this dosage was comparatively shorter compared to the number of hours of interventions reported in other studies conducted within the clinic settings. For example, Tse, et al., (2007) [3] had a total of 18 hours of clinical intervention, while our clinic-based intervention consisted of a total of 10 to 12 hours. Despite the relatively low dose of intervention and the findings that post treatment gains were not significant, we were able to detect small to moderate effect sizes. Evaluation of effect sizes offer analyses that are independent of sample size and adjustments based on multiple comparisons. One plausible reason for the small to moderate treatment effects within the clinic group may have been the unique advantage of simultaneous parent training that offers additional opportunities for the generalization of social skills - an active treatment ingredient previously described by [23]. Pre to post differences of treatment gains in the camp only condition showed small to large effect sizes depending on the outcome measure applied. Further, gains were generally superior when compared against the clinic only condition. When compared to other studies of similar intervention hours but spread over several months [28,41-43]. These findings are similar. Unique to the camp setting, however, was the significant improvement on all social skills measured using the subscales of the TSSA that are not reflected on the SRS. Once again, a plausible explanation for this inconsistency could be the specificity of items on the TSSA to the intervention.

This study utilized two outcome measures. One standardized measure (SRS) to assess change in social skills to facilitate comparisons with other studies and one criterion-based measure (TSSA) to detect specific changes targeted by the social skills curriculum employed in this study. Most studies in the social skills training literature have employed the Social Skills Rating System [44], and the majority of studies that used the SSRS did not show change with treatment. Thus, a possible explanation for these findings is the lack of sensitivity of the measure for assessing the impact of social interventions for children with ASD. The SSRS assesses broad based behaviors associated with developing social skills, but does not assess the nuances of behaviors associated with social reciprocity that are lacking in children with ASD [10]. To avoid similar pitfalls, we selected the SRS which is more relevant to ASD and reported to be sensitive to change with treatment. The TSSA also allowed criterion measurement of specific skills of social reciprocity as well the behavioral skills of initiating, responding, and maintaining interactions. Thus, conclusions that social skills interventions are ineffective may need to be moderated if indeed the measures applied lacked sensitivity to detect treatment effects. Pre to post comparisons on the two measures showed that while nearly all post scores showed gains, statistical significance and effect sizes varied widely on the different subscales, with the criterion-related TSSA measure on the whole showing greater effect sizes and statistical significance than the SRS standardized measure. It is interesting to note that the two social skills measures picked up on two different aspects of social skills. The SRS showed most gains on aspects pertaining to awareness of social cues, while the TSSA showed gains on maintaining social interactions.

These differences may be attributed to the wording or manner in which statements are expressed in the two different questionnaires and parent understanding of these terms (e.g., on the TSSA a statement on peer interaction reads as “Plays cooperatively with other children, e.g., sharing, taking turns, following rules” while a similar statement on the SRS reads as “Plays appropriately with children his or her age”). Inconsistent outcome measures are also not unique in psychosocial intervention research [45]. While the TSSA as described earlier is a criterion based measurement and is more specific to the goals of the intervention, the SRS is a standardized instrument intended to capture social skills deficits specific to autism but at a more global level. So it is important for clinical researchers or practitioners who wish to evaluate their program outcomes to be aware of the sensitivity of measures selected and the issues of measuring complex social constructs.

Study Limitations

This community-based study was limited by a number of factors, including a small sample size and the absence of a control group. Quasi-experimental research, while common for community based settings, leaves unanswered the question of whether positive results are due to test attenuation [46] or spontaneous improvement rather than treatment group assignment. Further, participants were not recruited for research, but instead were referred by treating clinicians. More accurate description of the sample, such as IQ, while desirable, was unavailable for all participants. Cognitive functioning could play a role in degree of improvement achieved

[20], and may represent a pretreatment variable associated with outcome. Another limitation of the study was the use of parent report measures only to test for quantitative evidence of generalized improvement. Furthermore, it is not possible to know whether treatment gains were maintained as follow up data were not available. Another issue was medication. Medication use was not monitored over the course of the treatment groups within the different contexts. In a previous study [3], found no differences in outcomes for subjects taking medications. However, medication effects cannot be entirely ruled out as a confounding variable in this study. While the treatment program was manualized and all clinicians were trained in the use of the manual, a formal fidelity measure such as a fidelity checklist was not incorporated within the manual.

Future Research Options

A major focus in this study was the inclusion of ingredients to promote skill generalization through parent training and use of representative community contexts to implement the training. Future studies need to research more thoroughly the active ingredients as they may have the potential to change the course of social skills group intervention methods. In the camp context of this study, para professionals and peers were trained to engage and implement intervention strategies with children with ASD in a brief and cost effective manner. The question then is whether similar interventions could be implemented within a school setting that targeted teachers, paraprofessional, and classroom peers to act as social mediators for students with ASD? [47] in their nonrandomized sample of seven children with ASD showed that social skills training provided by paraprofessionals in both partially and fully included classrooms can result in perceived gains in social skills as measured by teacher ratings. Their results revealed that several areas of social responsiveness noticeably improved as a result of the intervention in the short run. More examples of social skills interventions provided by nonresearch personnel and community based providers is necessary in order to increase access to services, especially for children whose primary services come from educational settings.

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