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**Direct and Peer-Mediated Social Skills Training for Children with  
Asperger Syndrome**

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**Abstract**

The present study investigated the effectiveness of combining direct social skills training with peer-mediated interventions to increase social initiation and response behaviours in children with Asperger syndrome. Three children with Asperger syndrome and six typical peers were recruited. A multiple baseline design across participants was used to demonstrate the behavioural changes during intervention and one-month follow up. Results from visual inference suggested that the combined intervention was effective in increasing the degree of social interaction in children with Asperger syndrome. Furthermore, there were some evidence for generalisation and maintenance of social skills at one-month follow up. Suggestions for future research and professionals working with children with Asperger syndrome were provided.

**KEYWORDS: ASPERGER SYNDROME, SOCIAL SKILLS, SOCIAL SKILLS TRAINING**

## **Direct and Peer-Mediated Social Skills Training for Children with Asperger Syndrome**

International trends indicate that there is a growing number of children being identified on the high functioning end of the autism spectrum and many will receive a diagnosis of Asperger syndrome (AS), (Frith, 2004). Impaired social functioning is a core feature of AS (Atwood, 1998) and the diagnosis may initially be considered by appraisal of the child's exposure to and responses during group social situations such as occurs in school or on the playground (Shaked & Yirmiya, 2003). As children with AS have average or above average cognitive abilities (American Psychological Association, 1994) they often receive their education in mainstream school settings underscoring the need for development of effective social skills training programs as these skills are crucial for successful integration with their typical peers (Gresham, 1995; Koegel, Koegel & Dunlap, 1996). Because the identification of AS is on the rise there is a need for professionals who work with these children in mainstream school settings to have examples of empirically validated social skills interventions that they can utilize. The present study was intended to provide an example of such an intervention by drawing on past research that included both direct training to children on the Autism spectrum as well as those that involved peer mediated interventions.

Studies in favor of direct training for improving social skills among children with AS (Carruthers & Foreman, 1989; Marriage et al., 1995) have indicated positive increases in social skills through individual or group training format but were descriptive in nature and only subjective ratings were used to evaluate the outcome of the training. Much more can be gleaned by reviewing the literature on social skills training for children with Autism where direct training on initiating and responding

and nonverbal communication skills was provided mainly in group format to adolescents (Mesibov, 1984; Williams, 1989).

Similar to direct social skills training, peer-mediated interventions for children with autism have also demonstrated some success (Goldstein et al., 1992; Kohler & Strain, 1990; Odom & Watts, 1991; Roeyers, 1996). A major goal of peer-mediated interventions is to enhance social skills among children with autism by teaching and prompting their respective peers to initiate appropriate interactions and responses with them.

A variety of techniques have been utilized including simply providing information about Autism to peers and making available opportunities to interact (Roeyers, 1996). More intensive approaches include establishing peer support networks that included use of social scripts, structuring activities to promote interaction and using verbal and tangible reinforcement (Kamps et. al., 1997). A three year study that focused on establishing peer networks and carefully addressed generalization found improved social interaction skills for trained peers versus a control group of peers. Training included modeling, prompting and reinforcement strategies in the context of academic and play activities. Odom and Watts (1991) addressed the problem of over dependence on adult prompts by utilizing a peer mediated procedure that involved correspondence, training and visual feedback on performance (C.T.V.F.). The procedure involved training typical peers to initiate social interaction with teacher prompts that were later gradually removed. Correspondence training involved having peers first state the behaviours in which they were going to engage and then providing reinforcement for doing so. The visual feedback provided peers with a visual prompt by watching a video of themselves playing with Autistic children and giving feedback about their performance. Goldstein Kaczmarek, Pennington and Shafer (1992) utilised

a training regimen involving scripts and role playing of how to establish attention, comment on activities and acknowledge autistic children's communication. Prompting was provided to peers and target autistic students during play sessions. Providing social skills instruction to an entire classroom where students with autism were included has also shown success (Kamps et. al., 1992). Instruction was provided to an entire class of first grade children for 3 weeks 20 minutes each day. Instruction in appropriate initiating and responding, greeting, giving and accepting compliments, turn taking, sharing and helping others were included. The 3 children with autism in the study were given feedback during a 20 minute play session that included token reinforcers. Other studies have included utilizing preferred activities of children with autism as the venue for interaction and inclusion of picture cues (Garrison-Harrell & Kamps, 1997). Strategies such as descriptive talk, mirroring, assistance and choice making have also been taught to peers and demonstrated increases in social behaviours (Ostrosky & Kaiser, 1995). Houston (1999) trained autistic children and peers concurrently in small groups. Training included initiating, responding, making comments and compliments. The children were required to demonstrate the appropriate skills through role play prior to entering an open play situation where prompts and reminders were provided and systematically faded.

The majority of studies reviewed whether direct or peer mediated have demonstrated some success in enhancing social skills of children with autism. Difficulties noted from previous studies include lack of measures of generalization and maintenance (Mesibov, 1984; Williams, 1989; Garrison-Harrell et. al., 1997, Kamps, Barbetta, Leonard & Delquadri, 1994, and Roeyers, 1996). The present study will attempt to overcome some of the above difficulties by providing measures of both generalization

and a one month follow up to assess maintenance of skills. An attempt will also be made to incorporate improvements suggested from past studies including expansion of inclusive cooperative training (Odom & Watts, 1991, Houston, 1999) and the use of adult training followed by monitoring and reinforcement in naturalistic settings (Kamps et. al., 1997). Specifically, our study was designed to extend the literature on direct and peer mediated intervention in several important ways:

- (a) Expanding the theme of peers and children with social communication difficulties being taught interaction skills at the same time with the overall theme of the intervention reflecting a co-operative effort rather than approaches that teach peers to initiate individually or focus on individual training and prompting for autistic children.
- (b) To incorporate into the training a period of initial adult teaching that was followed by monitoring and reinforcement in the form of prompts and reminders and systematically fading the procedure.
- (c) To carry out the bulk of the training in a natural integrated school environment to maximize the potential for generalization and maintenance.
- (d) To contribute to the small body of the literature providing a model of social skills intervention for children diagnosed with AS.

Research questions included: (1) Can children with AS display an increase in social initiation and response behavior as a result of an intervention based on a combined

approach (direct and peer mediated)? (2) Can social skills learned during combined intervention generalize after adult prompts have been removed? (3) Can social skills learned during combined interventions be maintained at one month follow up during social interaction?

## Method

### Participants

Target Participants. Of the seven children with Asperger syndrome identified from two international schools, only parents of three participants agreed to participate in this study. The characteristics of these participants are summarised in Table 1. All target participants were diagnosed and trained in the present study by an experienced educational psychologist as exhibiting the characteristics of Asperger syndrome according to the DSM-IV (Diagnostic and Statistical Manual – 4<sup>th</sup> edition; American Psychological Association, 1994). A second independent clinical child psychologist also reviewed and concurred with these children's diagnoses. According to the teachers, these participants were said to have intact intellectual and academic capabilities, on or above average language capabilities accompanied by a lack of appropriate social behaviour (especially during teamwork or in situations where these participants were required to communicate with other children in their classes). Parents of all participants were very supportive to and well informed of their children's diagnosis of Asperger syndrome.

Timmy: Timmy was placed in a mainstream primary two classroom (Grade 1). His chronological age was 5 years 1 month. He was originally identified as high functioning autistic at the age of 3 1/2. A re-evaluation completed one year later found that he met the criteria for AS. Timmy's intellectual ability was assessed four

months prior to the beginning of the study (chronological age, 4 years 7 months) and, was found to be in the high average range. Timmy was described by his classroom teacher as “a bright boy who has good reading skills.” He also was described as “having difficulty with social skills and playing co-operatively, has a poor sense of personal space, and difficulty following routines at school.” “he has very limited interaction with other children and can occasionally get aggressive if other children try to enter his play routines.”

Liza: Liza was a 6 years 4 months old female placed in a primary three (grade 2) classroom. She was identified as meeting the diagnostic criteria for AS at age 4 years 10 months. Liza’s overall intellectual ability was assessed in the superior range. Liza was described by her classroom teachers as being “very verbal” and being able to grasp high level intellectual concepts” she was further described as “eccentric” and “having limited interactions with peers.” She was also described as “having much difficulty working in groups and tending to be too bossy and dominating towards other children when she does interact.”

Avery: Avery was a male in a primary 4 (grade 3 classroom) whose chronological age was 8 years 7 months. An assessment that was carried out when Avery was 3 years 5 months of age suggested a diagnosis of Pervasive Developmental Disorder, Not Otherwise Specified (PDDNOS). Avery was re-evaluated at age 8 years 4 months with a resulting diagnosis of AS. Avery’s overall intellectual ability was assessed as falling in the average range. Avery was described by his current teacher as a “gentle boy who puts forth effort in his academic work”. He was further described as “having difficulty getting along with others especially in unstructured social situations”. He was further described as “having some odd mannerisms and a lack of personal space awareness which can be intrusive or annoying to other

children.” Teachers also noted that Avery was prone to being bullied by other children on occasion, has difficulty with emotional control and tendency to make irrelevant comments in conversation.

Typical Peers. A total of six children who exhibited age-appropriate social behaviours were also included in this study based on teacher recommendations. There were 3 males and 3 females. Teachers selected these six children based on demonstration of good cooperative play skills, well developed ability to make friends working well in groups and willingness to help other others

Each target participant was placed with two typical peers to form a total of three triads. Permission to conduct this study in each individual school was obtained from the participants’ respective parents, school principals and teachers.

### Study Variables

Initiation and response were the two primary social skill variables of interest in the present study. Initiation refers to any verbal or non-verbal/motor behaviour that is directed to a child that attempts to elicit a social response three to five seconds after approaching the target to begin or to continue a greeting, sharing an object of interest, saying a child’s name or offering directions, smiling or approaching the receiving child, and looking at an object that is important in the context of the interaction (toy or other item of interest). Response refers to behaviours that occur within three to five seconds that acknowledges a reply to initiation from another child, including behaviours such as looking at the initiating child when the target child’s name is called and acknowledging the presence of other children.

### Settings

School Setting. Two international schools from which the participants of this study were recruited have maintained a high standard of academic and English

language ability in their students. All teachers in these schools were native English speakers. A 10-minute free play activity was provided for all students in the classroom in order to provide an opportunity to observe the participants' social interactions. Stations were set up with various activities (e.g., playing with construction toys, colouring, board games, books, puppets, cars, and trains). The participants were instructed to choose an activity (which was supervised by a teacher and a teaching assistant).

Non-school setting. Non-school settings (e.g. gymnastics and indoor and outdoor play room), was chosen based on parental recommendations to assess the generalisation at the beginning and towards the end of the intervention. Each target participant was placed in separate settings. These non-school settings were selected on the basis that they provided ample opportunities to observe participants in a naturalistic social environment. A 10-minute free play activity that allowed for social interaction was selected for observational purpose.

### Procedures

This study took 24 weeks to complete. Weeks 1-4 consisted of baseline observations carried out in the school and non-school settings during the 10 minute free play activities. Weeks 5-8 is when the actual training in school and clinic setting took place. Weeks 9 – 12 consisted of a reduction in the training to prompts and reminders only (Implementation). Observations were conducted in the school and generalisation settings during weeks 9-12. During weeks 13 thru 16 the prompts and reminders were systematically faded out, when the participants were in the open play setting in school. During weeks 17 – 20 no training or observations was carried out. The final weeks (21- 24) consisted of gathering follow up data in the school and non-school settings.

A multiple baseline design across individuals (see Kazdin & Kopel, 1975) was used in the present study and consisted of the following phases.

Baseline. (Weeks 1 – 4). This phase consisted of gathering baseline data on the participants' social initiation and response behaviours within school and non-school settings. A total of seven observations in the school setting and five observations in the non-school setting were collected for each target participant. The observations took place over a period of two weeks during the free play activity.

Combined Social Skills Training (Weeks 5 – 8) Training sessions in the school setting occurred over a period of five weeks, with a total of five sessions for each triad. In addition, target participants took part in five 45-minute sessions (once per week) at a clinic. These additional training sessions at the clinic were conducted for maximizing intervention effects, as previously suggested by Houston (1999). Each target participant was placed in a small group with two or three other children with social communication difficulties of the same age during the clinic sessions. The development of the training procedures used in this study was adopted from Houston's (1999) study, and consulted along with other sources (Cotter, 1998; Gresham, 1995; Roeyers, 1996) on the factors to consider in designing social skills training. A general outline of what was introduced during lessons (including specific instructions and reminders on 'how to respond', along with a social skills checklist are provided in Appendix A.

The goal was for each participant in the triad to perform 90% of the skills listed on this checklist, during training before moving to the prompt/reminder phase of training. After each training session the children transitioned directly to the open play activity where the baseline and subsequent observations were carried out.

Supplementary activities incorporated during school and clinic training included Gray's (1996) social stories procedures (a method developed to aid children with social communication difficulties) and cooperative games. Participants were encouraged to use the skills taught during these training sessions when they entered the open play situation.

### Training Sessions

Lesson 1. The goal was to establish rapport and introduce the children to concept of the behaviours necessary for making and keeping friends. Children were asked to come up with reasons why we approach and respond to others. Each child was required to answer the questions correctly when asked why we approach and respond to others as stated above. A brief demonstration on how to introduce oneself was provided by the trainer.

Lesson 2. The goal was to teach children how to approach and respond to others appropriately. A discussion on how to approach and respond to others was provided. Target behaviours of social initiation and responses (e.g., getting attention and saying one's name) were identified and demonstrated by the trainer. Children then role-played 'getting attention' and 'saying names' with each child taking approach and respond roles.

Lesson 3. The goal was to have the children demonstrate all social initiation and response behaviours after being prompted by the trainer. Each child should successfully role-play all target behaviours by either approaching or responding to another child.

Lesson 4. The goal was to have children demonstrate all social initiation and response behaviours (through role play) after a review of the materials taught in

previous lessons. Target behaviours were identified and reviewed, with minimal demonstration and prompts.

Lesson 5. The goal was to have each child independently demonstrate all target behaviours through role-play. A brief review of target behaviours was provided without demonstration or prompts.

Group Activity. At the end of each lesson (1 through 5), children engaged in a cooperative game or activity (e.g., board game or group drawing involving taking turns and reading a social story with the theme of looking at others while talking or the importance of being polite to others). The trainer provided positive (verbal) praise whenever a child engaged in appropriate social initiation and responses.

Training sessions at the clinic included the ‘how to approach’ and ‘how to respond’ procedures used during the school settings. This provided an additional training opportunity for participants to practice the skills that they learned during the school training sessions. In addition to the activities presented during the training sessions in school, other procedures were employed (e.g., board games, as well as other co-operative group, colouring and other art activities). The participants were continually reminded and prompted to use appropriate social skills during these activities as well. Since the first author (an educational psychologist specialising in social/communication difficulties) conducted all school and clinic training sessions, consistent training procedures were provided for all participants.

### Peer Initiation Training

For peer-initiation training, two typical peers from each triad were removed from an outdoor recess activity during school for two 10-minute sessions (this was done after Lesson 3). During these sessions a non-intensive training approach

outlined by Roeyers (1996) was used. The participants were introduced to autism and other social communication difficulties within their level of comprehension. They were asked to identify children in their neighbourhood or school who may have similar difficulties. They were asked to take the perspective of a person who had difficulty playing properly and communicating and asked to role play appropriate ways to approach and interact with children who had such difficulties based on the training in which they had participated thus far. Actual instructions were as follows:

#### Peer Instruction Procedures

*'All children have things that they do well and also things that they need to improve. Some children may have difficulty talking with others. Some children may have difficulty playing together with others or they just don't know how to play. You may have noticed it is very difficult for some children to play with others and they often play alone. How might a child who has problems talking and playing feel if they have to play alone all the time? I have heard from your teachers that you always play nicely. How do we play nicely with other children? Your teachers have also told me that all of you have a lot of friends (the children were then asked to role play appropriate ways to approach and interact with children who had the above mentioned difficulties, based on the training they had received thus far, while the researcher took the role of the child with difficulties). I would like to ask you to help other children to learn to play with you.'*

The children role-played the initiation and response behaviour and were given motivation in helping others. They were also instructed to use the skills taught in previous lessons to help others (e.g., asking a person to join in, saying the other child's name, commenting, and complimenting).

During these role-play exercises, the children discussed appropriate ways to approach a person with these problems, how to keep them in a cooperative play situation, and how to deal with and react to any intrusive or aggressive behaviour. These sessions were commenced and concluded by telling the participants that they had been identified by teachers and parents as exhibiting excellent play and social skills, and that they had always been helpful to others and should continue to do so when they encounter children with similar difficulties.

At the end of all training sessions in the school setting, verbal prompts (e.g., “go play with someone”) were provided for all participants to use initiation and response behaviours in the free-play activity. The first author provided the prompts only at the beginning of each free play activity.

#### Implementation/Prompts and Reminders

After the five week training, the implementation phase was completed over the following four weeks. Each triad was removed from the classroom together for seven 5-minutes prompt/reminder sessions. A review of skills on ‘how to approach’ and ‘how to respond’ activities was conducted. They were also given the same prompts used at the beginning of the activity. In addition, all participants received a five-minute feedback session at the end of the free play activity during which the participants were asked to describe the activity and provide a few examples of when they had used the skills taught during the training sessions. A total of seven observations were collected for each target participant.

#### Generalisation

Observations of the target children were conducted in a non-school setting during the last two weeks of the prompt/reminder implementation phase. The settings

for this phase were identical to that used in the baseline phase. A total of five observations were collected for each target participant.

### Fade Out

This phase consisted of a gradual removal of prompts and reminders over a period of four weeks, with a total of seven sessions. In Session 1, the reminder session was cut to two minutes but the children still received a prompt. In Session 2, the children received a prompt with no reminders. In Session 3, the children received a two-minute reminder and no prompt. In Session 4, the children received only a prompt. During Session 5, the children received only a reminder. A prompt was given during Session 6, whereas no prompts or reminders were provided in Session 7.

### One-Month Follow Up

At one month after the completion of the fade out phase, seven data points were collected for each target participant in school and non-school setting over a period of two weeks to assess the maintenance of social skills acquired during the training.

### Data Analyses

Visual Inference. Observational data was initially subject to visual inference, with reference to Kazdin's (1994) guidelines for identifying a behavioural change. As Kazdin (1994) suggested, the general slope or direction of behaviour should be low during baseline followed by a general increase over 7 to 10 data points during the intervention phase in order to demonstrate an improvement of social interaction as a function of the intervention used in this study. This increase of 7 to 10 data points also should be maintained at follow-up to in order to show that positive increases in performance (as a result of training) were maintained. To identify whether or not there was a 'wearing off' effect of the intervention (i.e., a marked decrease in mean

level of performance from fade out to follow-up) a comparison of the mean level of performance during Implementation and Fade out in school and non-school settings was compared with that in Follow up in school and non-school settings.

Four sets of observations were collected in the school setting: Baseline, Implementation, Fade out and 1 month follow up.

Three sets of observations were collected in the non-school setting: Baseline, Implementation, and 1 month follow up.

Based on visual inference, the target participants' performance during the following phases will be compared for any existing overlap and mean level of performance: (1) Baseline and Implementation (school setting), (2) Baseline and Implementation (non-school setting), (3) Baseline and Fade out (school setting), and (4) Baseline and Follow up (school and non-school setting). In addition, an inspection of whether or not there was an increase of 7 to 10 data points from Baseline to Implementation and, whether or not this increase was maintained from Baseline to Follow up were performed.

## **Results**

### Direct social skills training in school setting

Participant A, the youngest of the target participants in this study, was not able to achieve a 90% accuracy level regarding the listed skills during any of the school training sessions. Occasionally, he refused to participate in any role-play activities especially in the first three school sessions. Participant B and C were able to demonstrate the ability to perform 90% of the skills after the third training session.

### Participant A

School setting. Based on visual inspection of the data in the school setting (see Figure 1), Participant A's behaviour had no overlap of performance between Baseline and Implementation, though the behaviour was variable. There was also no overlap of performance between Baseline and Fade out and, between Baseline and Follow up. In addition, the mean level of Participant A's performance during Baseline (5%) differed from that of Implementation (56.7%). Participant A's mean level of performance during Follow up (40.7%) differed from that observed during Baseline within the school setting. An increase of 7 to 10 data points during the intervention phase in the school setting was evident from Baseline to Implementation. This increase was maintained from Baseline to Follow up in the school setting. However, when comparing the mean performance in Fade out (67.5%) with that in Follow up there seems to be a 'wearing-off effect' for the positive gains of the intervention. Overall, Participant A was able to maintain a positive behaviour change across all phases in the school setting, although some intervention effects may have dissipated at one month follow-up.

Congruent with results obtained by visual inspection, there was a significant overall difference in behaviour between Baseline and Implementation, along with no significant changes in terms of intercept (level) and slope (distribution of the frequency of social initiation and responses between the two phases) (see Table 4). Comparisons of Baseline and Follow up indicated that there was a significant difference between these two phases, including changes in terms of intercept but not slope. No significant differences were observed between the following phases: Implementation and Follow up, Implementation and Fade out, and Fade out and Follow up.

Non-school setting. Observations in the non-school setting for Participant A indicated that there was no performance overlap between Baseline and Implementation and, between Baseline and Follow up (see Figure 2). The mean level of performance during Implementation (55.3%) differed from that for Baseline (2.8%). The mean level of performance in Follow up (42.5%) differed from that observed during Baseline. An increase of 7 to 10 data points across phases was evident from Baseline to Implementation. There was also a decrease in the frequency of social initiation and response behaviours for this participant when comparing the mean level of performance in Implementation with that observed in Follow up. Again, this finding suggested that some of intervention effects may have gradually ‘worn off’ in the non-school setting. Similar to the findings within the school setting for this participant, there was some generalisation of the learned social skills.

#### Participant B

School setting. Visual inspection suggested a general increase in social initiation and response behaviours and that this was maintained across all phases (see Figure 3). There was no performance overlap between Baseline and Implementation, between Baseline and Fade out and, between Baseline and Follow up. Participant B’s mean level of performance in Implementation (64.2%) differed from that in Baseline (0.35%). The mean level of performance in Follow up (53.5%) differed from that in Baseline. There was an increase of 7 to 10 data points from Baseline to Implementation and, from Baseline to Follow up. However, a possible ‘wearing off’ effect was again evidenced by comparison of the mean levels of performance for Participant B between Fade out (69.6%) and Follow up. In summary, Participant B was able to demonstrate some increase in social initiation and response behaviours.

This increase was maintained throughout most phases of the present study, but dropped slightly at one-month follow-up.

Non-school setting. Based on visual inspection of the data for Participant B in the non-school setting, there was no performance overlap between Baseline and Implementation and, between Baseline and Follow up (see Figure 4). An increase of 7 to 10 data points was evident when comparing the performance during Baseline and Fade out and, Baseline and Follow up. The mean level of performance in Implementation (47.8%) differed from that in Baseline (1.1%). The mean level of performance during Follow up (55.3%) also differed from that in Baseline. Comparison of the mean level of performance between Implementation and Follow up suggested there was not a downward trend in performance at one-month follow-up. Therefore, there was a change in social initiation and response behaviours from baseline to intervention and, from baseline to one-month follow up. Visual inspection also suggested that social behaviours in Participant B were maintained from intervention to one-month follow up.

There was also an overall change in behaviour from Baseline to Follow up in the non-school setting, accompanied by a significant change in intercept but not for slope. No significant differences were found between Implementation and Follow up. Therefore, there seems to be an overall improvement in terms of Participant B's frequency of social initiation and response behaviours in the non-school setting.

### Participant C

School setting. Participant C generally had a lower overall level of social initiation and response behaviour throughout the study, relative to Participant A and B. There was no overlap of performance between Baseline and Implementation and, between Baseline and Follow up (see Figure 5). However, there were some overlap in

performance between Baseline and Fade out. In addition, there was an estimated change in 7 to 10 data points from Baseline to Implementation and, from Baseline to Follow up. The mean level of performance for Participant C in Implementation (27.8%) differed from that in Baseline (8.2%). Also, the mean level of performance in Follow up (28.5%) differed from that in Baseline. There was no drop in mean performance, from Fade out (23.5%) to Follow up. There seems to be an increase in social initiation and response behaviours, where this change was maintained at one-month follow up. This would indicate that there were some lasting treatment effects as there were no significant changes from the implementation phase to one-month follow up.

Non-school setting. There was no overlap of performance between Baseline and Implementation and, between Baseline and Follow up (see Figure 6). A change in trend across 7 to 10 data points from Baseline to Implementation was evident, and this trend was maintained at one-month follow-up. The mean level of performance in Implementation (68.2%) also differed from that in Baseline (6.7%). The mean level of performance during Follow up (55.7%) also differed from that in Baseline. There was a mild decrease in mean level of performance during Follow up when compared with that in Implementation.

### **Discussion**

The purpose of the present study was to evaluate the effectiveness of combining direct and peer-mediated social skills training in increasing the frequency of social initiation and response behaviours of children with AS. In general, the results provided some support for the use of this approach to social skill training for children with AS. Visual inspection generally showed that there was an increase in

the social initiation and response behaviour of the children with AS in school and non-school settings.

Visual inference data suggested that social initiation and response skills were maintained even after the adult prompts were systematically faded out. By visual inference all participants showed increases in social initiation and response behaviours from baseline through intervention and one-month follow up (in both school and non-school settings). Based on visual inspection, all participants showed a significant increase in social initiation and response behaviours from baseline to implementation in school and non-school settings and, from baseline to fade-out. It also was noted that there was some 'wearing off' effect for all participants in both the school and non-school settings with the exception of Participant C whose performance in school at one-month follow-up phase was slightly higher than during the fade out phase. It was also noted that Participants A and B showed higher mean levels of performance in the intervention, fade out and follow up phases than Participant C. However, Participant C's performance in the non-school setting during fade out and follow up phases were more in line with the average performance of Participant A and B. This overall low level of interaction noted in the school setting for Participant C may have been due to the fact that Participant C's classroom setting included seven children who qualified for special needs or special education services for behavioural difficulties. It could be inferred that Participant C's behaviour may be more withdrawn in the presence of a large number of children with behavioural difficulties. In contrast, there were only a few children with behavioural difficulties in the classrooms for Participant A and B.

Additional support for this combined social skills training came from anecdotal reports from parents and teachers. For example, prior to the present study,

Participant A was described by parents as ‘actively resisting social interaction’ when prompted by parents. Participant A’s teachers also reported difficulty with cooperative play and following routines in school. Half way through the training, Participant A’s teacher reported significant increases in his ability to play cooperatively and a reduction in incidences of physical aggression. During and after intervention, parents of Participant A reported an increased willingness to approach others. Both teachers and parents also suggested that Participant A responded more appropriately to changes in daily routine and unfamiliar persons. Similarly, both parents and teachers of Participant B reported an increase in appropriate social interactions (e.g., willingness to play with others). After intervention, both parents and teachers of Participant C reported increases in peer interaction a significant reduction in inappropriate social behaviours (e.g., spitting and nose picking) as well as an increased ability to tolerate other people’s behaviour.

Despite these significant improvements in the participants’ behaviour, this study has several limitations. Problems associated with using visual inference as well as the small number of data points per phase (seven) that was collected is just above the minimum suggested by Crosbie, (1993). In addition, variability of performance across phases may also be problematic due to the small number of observations made. The youngest participant (Participant A) did not show as high as level of behavioural change from base line to follow up in the non-school setting, nor reach the 90% accuracy during training (unlike the other older participants). Therefore, the present social skills training programme may be less effective for younger children. The present study also did not include a specific structured parent-training component. Parents were simply asked to reinforce the positive social skills that the children

displayed. The extent to which parenting style and individual parent personality traits had an effect on each participant could not be determined.

While the present study was not entirely successful in demonstrating a significant positive increase in social initiation and response behaviours for all participants across settings results were generally promising. Overall, this training method seems to show promise for children with social communication difficulties. By initially choosing peers for AS children and arranging a well structured opportunity to socialize we were able to establish a basic level of peer interaction and in later phases the AS children could generalize and expand these behaviours. Another important result of this intervention is the anecdotal finding that primary school aged children can demonstrate a willingness to interact and help children with social communication difficulties whose previous behaviour toward them may have been intrusive and unwelcome. This seemed to occur when the expectation for assistance and cooperation was communicated to them and reinforced by teachers and peers. There was a general “wearing off” effect of the training at one month follow up for the majority of the children in this study. This underscores the need for continuous teaching of social skills after a period of training and monitoring/reinforcement. In addition, the present study differs from previous studies in that direct social skills training took place in both school and clinic settings, where previous studies performed training sessions in school or clinic settings only. The authors acknowledge that the use of clinic training sessions in addition to school training sessions in the present study may not have been necessary but was included to maximise treatment effects. Partial replication of this study using the training program carried out in the school setting exclusively would be helpful to establish whether or not treatment effects would be as salient without the advent of the clinic sessions.

In summary, the authors make the following general recommendations to practitioners who are considering undertaking a social skills training programme for children on the autism spectrum based on findings from the present and related studies: (a) the use of naturalistic settings (schools) as the venue for training; (b) recruitment of same age typical peers who demonstrate appropriate social skills; (c) training typical peers and target ASD children together in small groups (2-3 typical children and 1 ASD child) and establishing an atmosphere of mutual co-operation and purpose; (d) providing an initial period of adult directed learning, guided practice and feedback followed by prompts, reminders and reinforcement for both ASD children and peers; (e) the inclusion of separate training sessions for peers that focus on motivating and empowering them to help ASD children; (f) concurrent and ongoing classroom wide social skill education delivered by the children's regular classroom teacher (g) utilization of visual cues and reminders such as photos, picture cards or social stories; (h) initial treatment duration of at least two months and (i) inclusion of parents in some portion of training such that they can recognize and reinforce appropriate social behaviour.

Directions for future research include long term studies that include the analysis of the components that promote maintenance and generalization of social skills, peer mediated studies that include older children and teenagers, additional studies that include cooperative academic interventions (Kamps et. al , 1994, 2002), combination studies of parent and school training (Strain & Schwartz, 2001), using peers across multiple settings as well as novel peers (Kamps, 2002), the utility of combination interventions with lower functioning children on the autism spectrum as well as the structured use of visual cues in combination with direct and peer mediated interventions (Krantz and McClanahan, 1998).

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### **Acknowledgements**

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Table 1  
Demographic Characteristics of Target Participants

	Participant		
	A	B	C
Chronological Age (years)	5.08	6.33	8.58
Gender	Male	Female	Male
Education Level (years)	2	3	4
Age at Onset (years)	4.5	4.83	8.33
IQ	114	122	93

Table 3

Time Schedule for Data Collection

Week	Phase					
	1	2	3	4	5	6
1	School					
2	OBS					
3	Non-					
4	School OBS					
5		School Training				
6						
7						
8						
9			School OBS			
10						
11				Non- School OBS		
12						
13					School OBS	
14						
15						
16						
17 to 20	NO OBS. WERE PERFORMED DURING THIS PERIOD					
21						School
22						OBS
23						Non-
24						School OBS

Note. Observation data were collected in the cells that indicate OBS. Baseline, 2, 3, 4, 5, and 6 represent baseline, intervention, generalisation probe, fade-out, and one month follow-up phases.

**Figure Captions**

Figure 1. Observed social interactions for Participant A during baseline, intervention, fade out and one-month follow up in school setting.

Figure 2. Observed social interactions for Participant A during baseline, intervention, and one-month follow up in non-school setting.

Figure 3. Observed social interactions for Participant B during baseline, intervention, fade out and one-month follow up in school setting.

Figure 4. Observed social interactions for Participant B during baseline, intervention, and one-month follow up in non-school setting.

Figure 5. Observed social interactions for Participant C during baseline, intervention, fade out and one-month follow up in school setting.

Figure 6. Observed social interactions for Participant C during baseline, intervention, and one-month follow up in non-school setting.

Figure 1

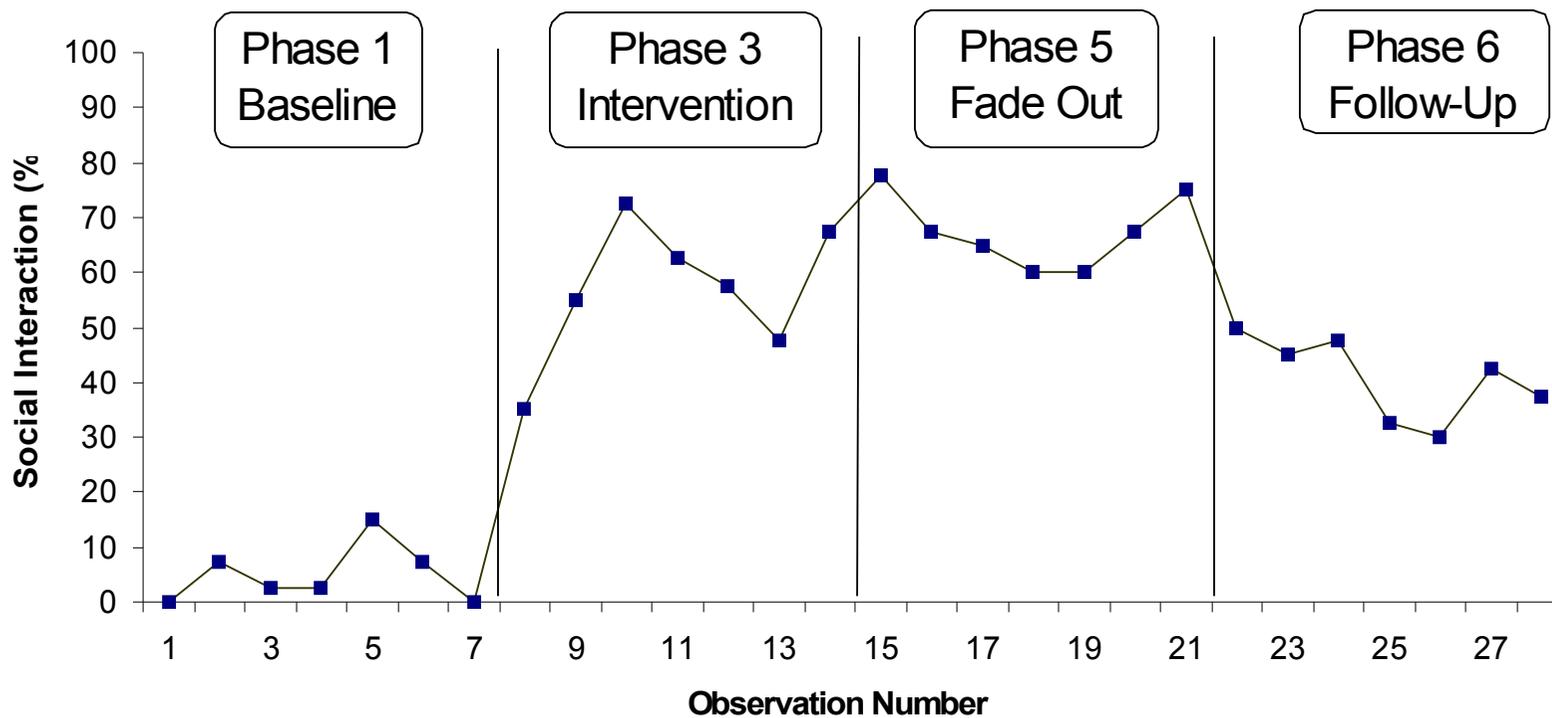


Figure 2

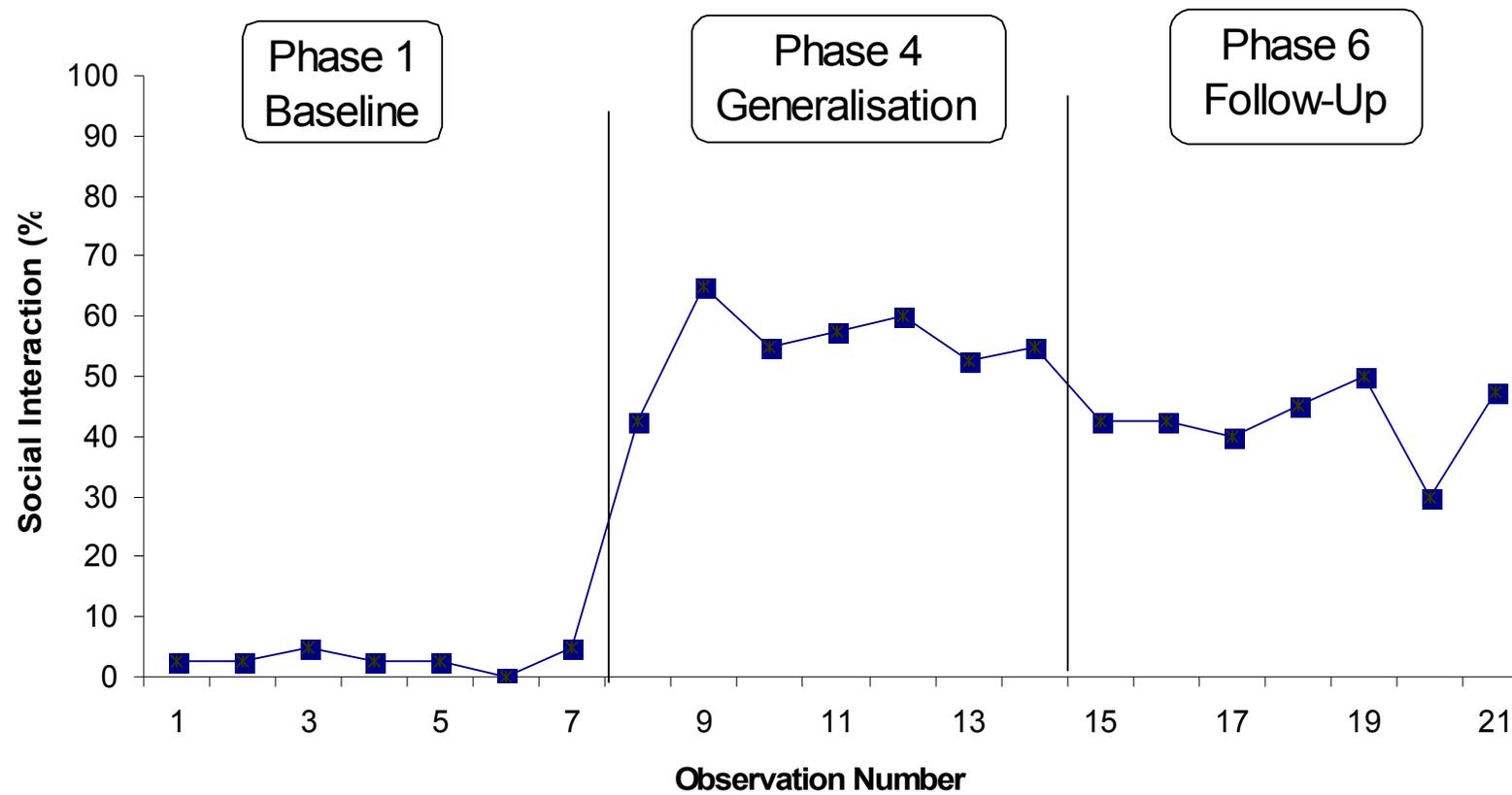
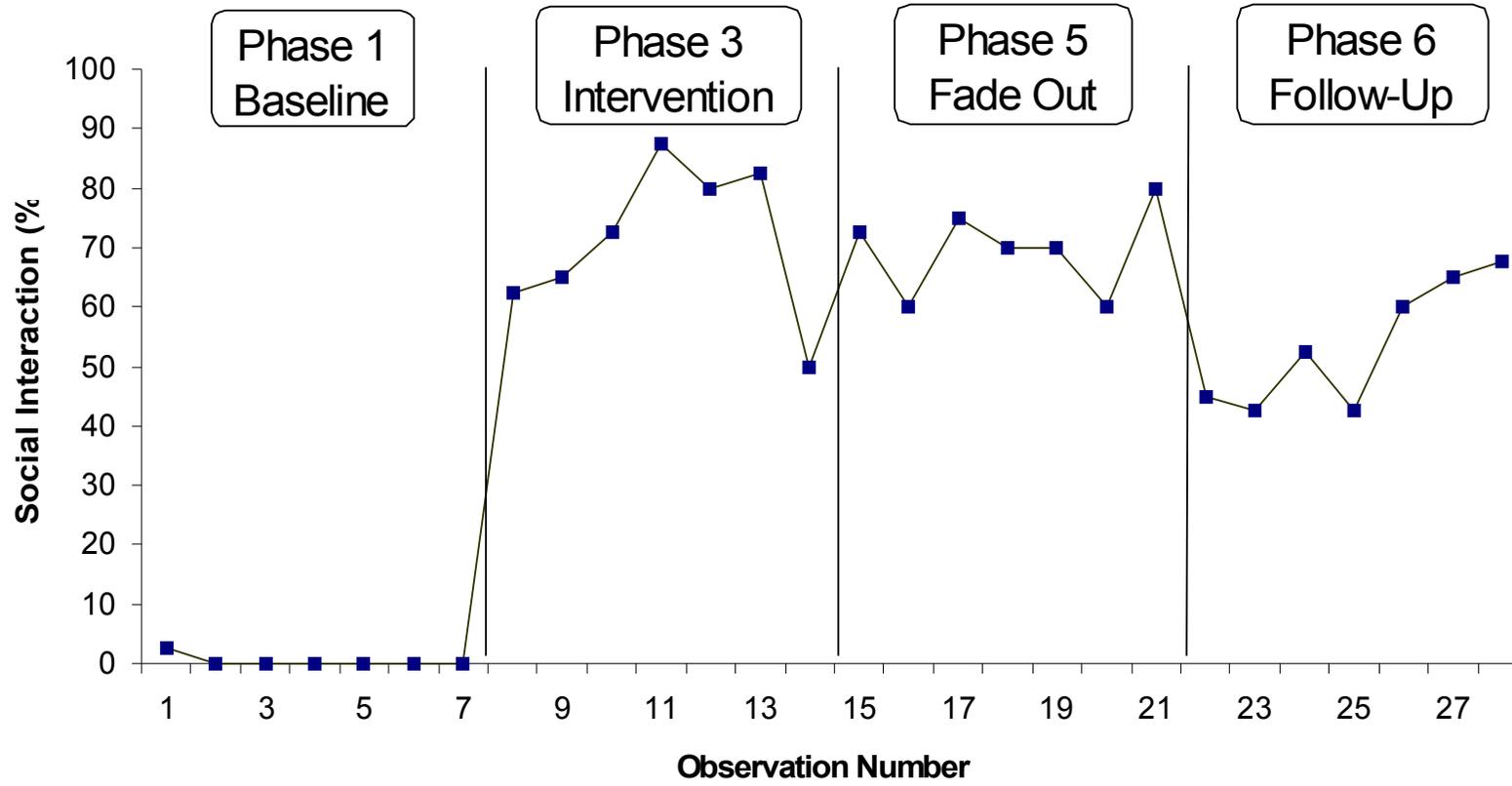


Figure 3



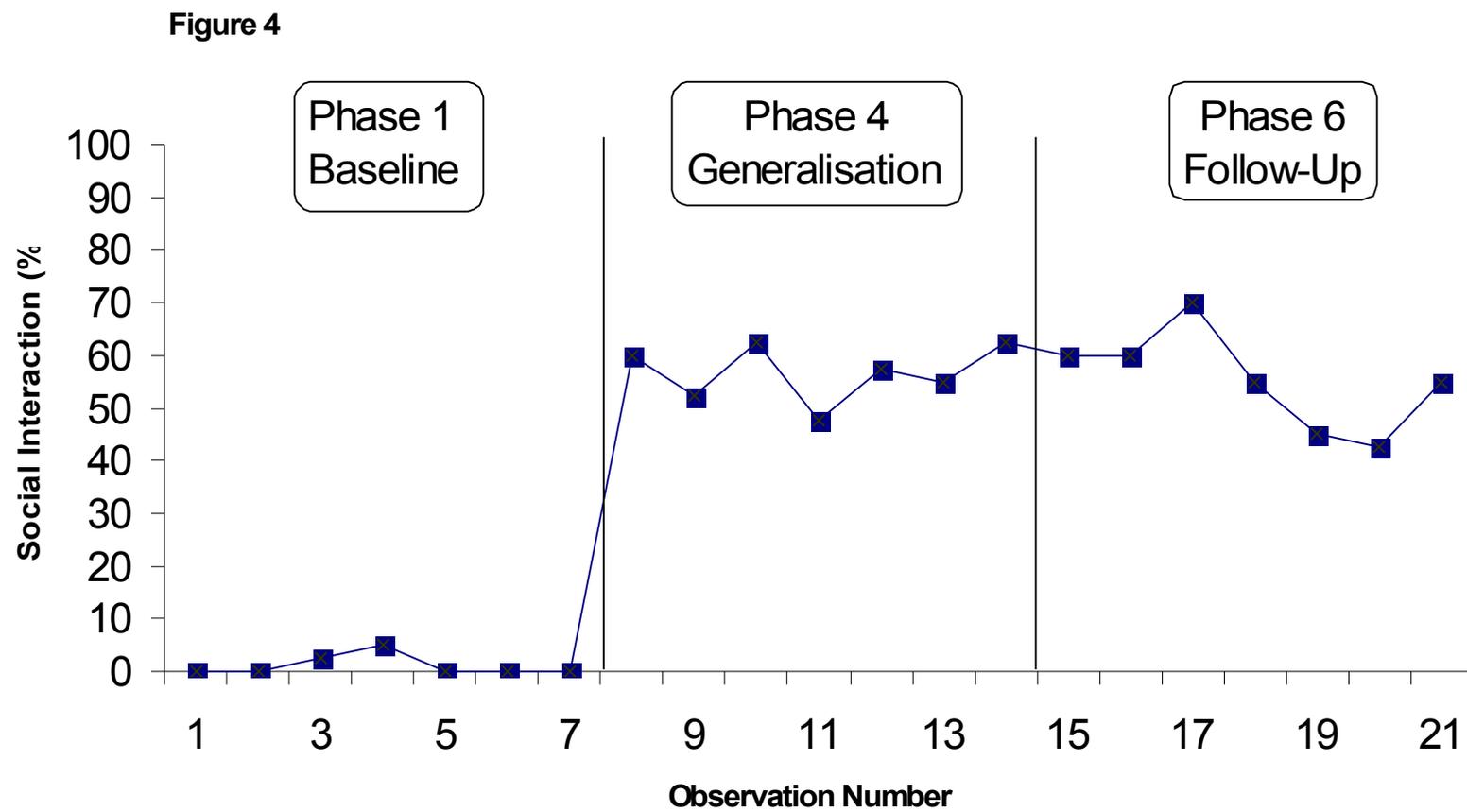


Figure 5

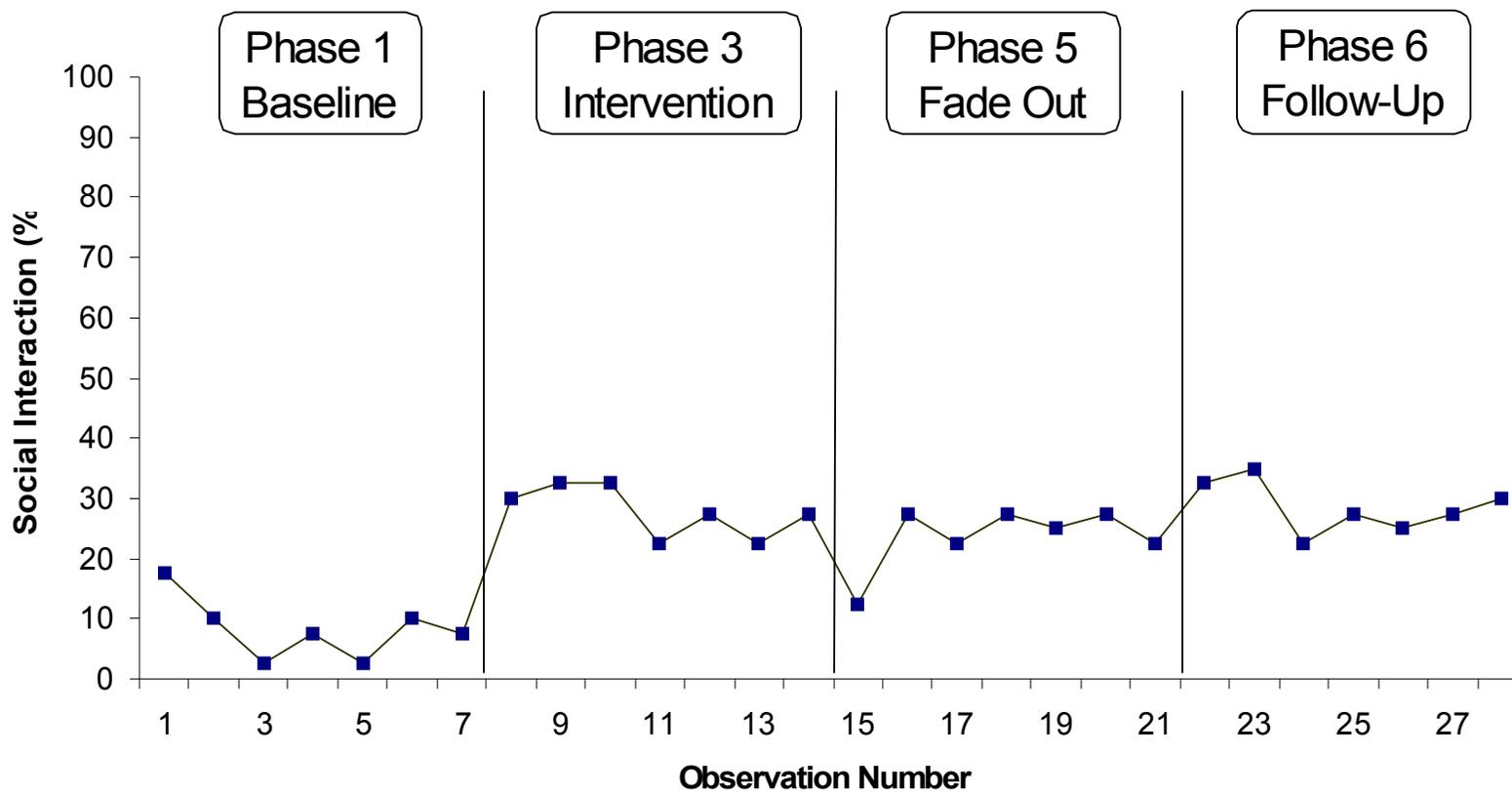
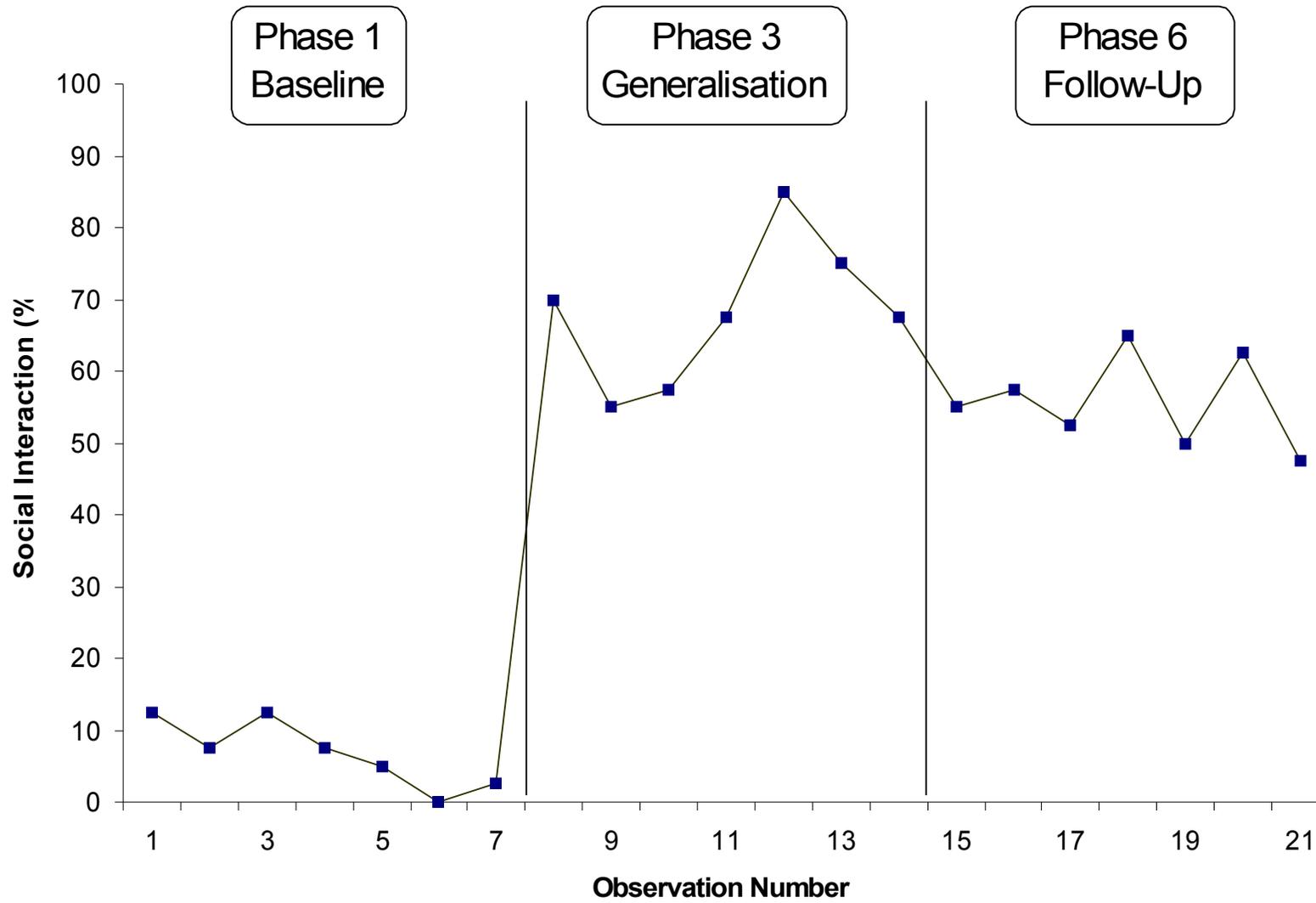


Figure 6



## **Appendix A - Guidelines for Combined Social Skills Training**

### (1) Overall Goals

To understand why do we approach and respond to others to learn how to approach and respond to others

### (2) Materials

Candy, toys, pencils, and stickers were provided as positive reinforcements.

### (3) General Procedures

Each child was required to demonstrate knowledge by verbally indicating why they would approach and respond to others. Each child was then required to demonstrate the skills of how to approach, initiate and respond to others through role-play activities, and identify inappropriate social initiation and response behaviours. The target behaviours were gradually enhanced and evaluated during each successive lesson. During role-play sessions, target participants were given specific prompts to attend to the appropriate social initiation and response behaviours of their typical peers. All children were given positive reinforcement by verbal praise for displaying appropriate social initiation and response behaviours.

### (4) Introductions

- (a) Why do we approach others? (e.g., how to introduce ourselves, ask questions, ask if someone wants to join an activity, and ask for assistance)
- (b) Why do we respond to others? (e.g., be polite, to get to know someone better, to give assistance, and to answer a question/provide information)

### (5) Discussions

- (a) How do we approach others? (e.g., good ways to approach someone, and what to say when you approach someone)

- (b) How do we respond to others? (e.g., responding to questions and inviting someone to join an activity)

(4) Target Behaviours: Initiations

- (a) Get the person’s attention (walk over to where the person is, say excuse me)
- (b) Greet the person (say hi, smile, look at the person)
- (c) Say your name and ask the person for his/her name
- (d) Wait for the person to respond
- (e) Be polite (do not talk when the other person is talking and always say thank you for compliments made by the other person)
- (f) Begin general conversation (ask them a question, make a comment about something you like to do and ask what the other person is doing).

(5) Target Behaviours: Responses

- (a) Acknowledge the person’s presence (turn around and look at the person, and smile)
- (b) Say hello
- (c) Answering questions (e.g., ‘what is your name?’ or ‘what are you doing?’)
- (d) Be polite (e.g., don’t talk while the other person is talking, do not ignore the other person when you are approached)

**Reminders to Participants**

(1) Things to remember when playing with friends and making friends

<u>Approaching</u>	<u>Responding</u>
Get attention by saying ‘excuse me’, Introduce yourself (e.g., ‘hi, I am Bill’) Ask a question (e.g., ‘what are you	Turn and look at the person, then smile Say ‘hello’ or ‘hi’, ‘my name is ... ’ Answer questions (e.g., ‘I am playing’)
doing’)	

Make a comment (e.g., 'I like that toy')	Say 'yes, me too' or 'have a look'
Ask to join in (e.g., 'Can I play with you')	Say 'sure, let's play together'
Make a compliment (e.g., 'I like your new game')	Say 'thanks, would you like to play?'

(2) Always remember to be polite

- (a) Wait for the person to talk after you talk to them
- (b) Don't talk while the other person is talking
- (c) Don't ignore others when you are approached or asked to play
- (d) Share with others and take turns

(3) Always remember to do the following

- (a) Ask to join in with others who are playing
- (b) Always try to talk to others when you are playing (e.g., ask questions, make comments and compliments)

Include others when you play and ask them to join in. Sometimes others need to be asked to play with you

A social initiation response checklist was used to evaluate participants' performance during these training sessions and is presented below.

***Social Initiation/Response Checklist***

*INITIATIONS*

<i>Session:</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>Get attention</i>	_____	_____	_____	_____	_____
<i>Say hello, smile</i>	_____	_____	_____	_____	_____
<i>Tell your name</i>	_____	_____	_____	_____	_____
<i>Wait for a response</i>	_____	_____	_____	_____	_____
<i>Ask a question</i>	_____	_____	_____	_____	_____
<i>Make a comment</i>	_____	_____	_____	_____	_____

*RESPONSES*

<i>Session:</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>Turn/face person</i>	_____	_____	_____	_____	_____
<i>Smile/say hello</i>	_____	_____	_____	_____	_____
<i>Answer questions</i>	_____	_____	_____	_____	_____
<i>Be polite</i>	_____	_____	_____	_____	_____