

Social Skills Training to Increase Social Interactions Between Children with Autism and Their Typical Peers

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In this study young children with autism and same-age typical peers were trained by special education teachers in social skills that (a) would be effective in a variety of situations (i.e., greeting, imitating and following instructions, sharing, taking turns, and asking for help and requesting things) and (b) were appropriate for the age and the functioning level of the children involved. Free play immediately following training was monitored to determine if the training and the feedback procedures were effective in producing an increase in positive social interactions for participants. The typical peers were given information about disabilities and received training in basic behavior management procedures in addition to the social skills training. A final component, implemented during play time, consisted of a reinforcement and feedback procedure for all children. Results showed increased frequency and duration of interactions for all target students.

Integration of children with autism into general classrooms constitutes a particular challenge for teachers. One of the major deficits of these children involves their social behavior (*Diagnostic and Statistical Manual of Mental Disorders [DSM-IV]*; American Psychiatric Association, 1994; Rutter, 1979; Schreibman, 1988). Their ability to develop reciprocal social interactions is limited by lack of responsivity to others' initiations and the absence of social initiations on their part (Simpson, Smith Myles, Sasso, & Kamps, 1991; Stone & Lemanec, 1990). Frequently they avoid social contact by leaving the situation, or they may exhibit negative responses in the form of disruptive behavior (e.g., aggression, tantrums, destruction of materials). These characteristics make it difficult for typical children to maintain

interaction with children with autism.

These concerns have led researchers to evaluate and intervene on various aspects of these children's social interactions, including specific units of social behavior (e.g., reciprocity, social skills, peer selection, and social networks) and social tasks (e.g., functions of the interactions). Researchers have also studied evaluations of the children's performance by adults in their environments (Odom, McConell, & McEvoy, 1992).

Researchers have reported that observing peer interactions of typical children provides unique social learning opportunities for children with disabilities (Gaylord-Ross & Peck, 1988; Hops, Walker, & Greenwood, 1988; McEvoy & Odom, 1987). Support for the premise that social skills are a learned behavior is evidenced in the increase in inter-

actions between children with disabilities when they are trained in specific social skills (e.g., Kamps et al., 1992; Odom & Strain, 1986; Oke & Schreibman, 1990; Strain, Kohler, Storey, & Danko, 1994). Interventions have thus frequently focused on training peers and teachers to produce and maintain interactions and to shape more appropriate social behaviors in children with autism in analog situations. When the skills are mastered, the children are then expected to practice them in natural situations (Ladd & Asher, 1985).

Early studies determined several effective procedures to improve the quality and frequency of social interactions of children with autism and their peers. Some of those strategies included verbal prompts and feedback systems (e.g., Kamps et al., 1992); teaching specific social initiations and skills (Strain, Danko, & Kohler, 1995; Tremblay, Strain, Hendrickson, & Shores, 1981); training with multiple peers (Fox, Gunter, Brady, Bambara, Spiegel-McGill, & Shores, 1984); and the selection of specific objects and social settings to produce more positive effects (Gaylord-Ross, Haring, Breen, & Pitts-Conway, 1984). Conversational social scripts have been used that showed that direct teaching of scripts in the social situation increased the interactions between the children with autism

and their peers (Goldstein & Cisar, 1992; Krantz & McClannahan, 1993; Loveland & Tunali, 1991). In one study, teaching specific social skills (e.g., keeping it going, giving compliments, taking turns) in small groups increased the frequency and duration of interactions during a play period following the training session for children with autism and their typical peers (Kamps et al., 1992). Positive results have also been found when peers are taught to attend to and acknowledge the social participation of the children with autism (Goldstein, Kaczmarek, Pennington, & Shafer, 1992). It has also been shown that teaching a child with autism to initiate social interaction with peers may reduce disruptive behavior as well as increase positive interactions between the children (Oke & Schreibman, 1990). In addition to these findings, McEvoy, Shores, Wehby, Johnson, and Fox (1990) established that active teacher participation (i.e., teaching, planning, and monitoring) was necessary to increase children's social exchanges in integrated settings.

To summarize, the majority of the research has indicated effective strategies to produce changes in the social interactions of children with developmental disabilities and their typical peers. Elements contained in most programs have included (a) teaching peers to increase initiations and maintain interactions; (b) adult intervention to teach the children and to prompt and reinforce interaction during less structured activities; and (c) social skills training to provide all children with specific alternatives to initiate, respond, and maintain positive social interactions. Two other factors involved in several studies, although not studied independently from the skills programs, were communication and play abilities. Most of the social skills required basic communication skills and were themselves some type of communication. In addition, interactions between children were usually rated during play periods, in which toys were provided by the experimenters. More research is needed, however, to determine and evaluate the specific skills to be taught, and the optimal procedures to accomplish

social participation for children with varying adaptive and communicative abilities.

The purpose of the present study was to investigate the influence of social skills training, both alone—in a small-group teaching format—and in combination with a reinforcement procedure, on the social behavior of elementary school-age children with autism and same-age typical peers. This study addressed social behaviors for young, lower-functioning children with limited communication and play skills and with a history of behavior problems and characteristics that interfered greatly with the children's social abilities. Therefore, in addition to the social skills and the reinforcement system, a final component to the study was peer training in basic behavior management techniques.

Method

Participants

Four children with autism and 12 typical children in the same elementary school were participants in this study. The children with autism attended a self-contained special education classroom for children with autism and serious behavior and communication problems. Six of the typical students attended kindergarten, and the other six attended first grade in general education settings.

Children with Autism. Maria, age 7, was diagnosed as having autism. She demonstrated moderate verbal comprehension and also communicated verbally (two- and three-word phrases) to request items or assistance. She had some articulation difficulties and echolalia. She exhibited appropriate independent play with a few toys (e.g., dolls, purse, and high-heel shoes), but rarely requested to play with other students. Frequently she was noncompliant, aggressive toward the other children (hitting and pulling hair, grabbing materials), and destructive (throwing materials and tearing paper). She obtained a score of 68 on the Leiter International Performance Scale (LIPS;

Leiter, 1979) and a score of 70 on the Autism Behavior Scale (ABS; Krug, Arick, & Almond, 1980).

Mark, age 7, had good verbal comprehension and communicated with some fluency but with articulation difficulties and echolalia. He played appropriately with a variety of toys and occasionally invited other children and adults to participate. He was also distractible and hyperactive and demonstrated episodes of noncompliance, destruction (throwing toys), aggression (throwing materials toward others), and swearing. He had previously attended a general classroom, but because of serious behavior problems he was placed in the special class. Mark obtained a score of 34 on the ABS; LIPS scores were not available.

Anna was 5 years old and diagnosed as having autism. She generally followed requests and verbal directions. She was able to say a few words, was learning to use a communication board, and was able to communicate with gestures. She maintained good eye contact with adults and classmates. She did not play appropriately with toys but showed interest in the behavior of teachers and peers. This appeared to be more a fixation than a social interest. She frequently smelled objects and perseverated on objects, such as clothes tags and other persons' body parts. Anna was frequently out of her seat and would run away from her assigned area. She was occasionally noncompliant and screamed loudly. She obtained a score of 31 on the ABS; LIPS scores were not available.

Tom was 5 years old, with a diagnosis of autism. He demonstrated appropriate comprehension of directions and communicated with gestures and two- and three-word phrases using a communication board. He usually played alone, looking at children's books, holding a toy in his hands, or looking out the window in the classroom. Inappropriate behaviors included climbing on the furniture and occasional aggression (i.e., hitting or pushing others). Tom also displayed self-stimulatory behaviors (e.g., repetitive looking at his fingers while holding his hands close to his eyes; smelling objects). He appeared to be

sensitive to some sounds and continuous noises. He seldom paid attention to social stimuli, such as other children in the room or unknown adults. He obtained a score of 49 on the LIPS and a score of 82 on the ABS.

Nondisabled Peers. The 6 kindergarten children (three girls and three boys, ages 5 and 6) and 6 first-grade children (two girls and four boys, ages 7 and 8) were selected by their teachers, who were informed about the purpose of the study.

Teachers. Two special education teachers participated in the study. One teacher had 3 years' special education experience, and one had more than 5 years' special and general education experience. They had received previous consultation on behavior management techniques and small-group instruction and had previously been involved in experimental research.

Setting

Experimental sessions were conducted three or four times per week in the special education classroom with two groups running simultaneously but independently of each other (two kindergarten groups, followed by two first-grade groups). For each group, a table was set with the toys assigned for the day. Four children and one teacher constituted each group, with one to three experimenters present during sessions. Sessions lasted 20 to 25 minutes, with approximately 10 minutes of teacher-led social skills training and 10 to 15 minutes of play time.

Each group consisted of one child with autism and three typical peers, who were matched by age (Anna and Tom with kindergarten children, and Maria and Mark with first graders). The children remained in the same groups throughout the experiment, except for Peers 2 and 4, who switched groups at the end of baseline because of their disruptive behavior.

Materials

Training Scripts. Training consisted of direct instruction of five social skills using scripts, which included the skill descriptor, one or more key behaviors, the instructions that the teachers were to give the children, and examples of practice skills. Skills were adapted from commonly used instructional strategies (e.g., imitation training) and two existing social skills curricula (Hops, Walker, & Greenwood, 1988; Odom & McConnell, 1993). Skill 1 was taught to the peers only, and skills 2-5 were taught to all children (targets and peers).

Skill 1. Behavior management skills for the typical peers included (a) giving easy instructions; (b) showing the children with autism how to do things by demonstrating for them, prompting them physically by holding their hand, or, if still no response was obtained, giving another instruction; (c) telling the other children that they were doing well, praising them, and saying nice things at the end of the play session; and (d) helping friends with autism be good by providing no verbal response to disruptive behaviors but looking away for 10 seconds, continuing to play, and then giving the target child an easy instruction.

Skill 2. Greetings, using names, and conversations included (a) saying hello, (b) asking friends to play and answering, (c) asking questions about the toys, (d) keeping the conversation going by talking about the toys while playing, and (e) saying good-bye when the group was over.

Skill 3. Imitation and following instructions included two behaviors: (a) imitation (e.g., touch head, arms up) and (b) following simple instructions (e.g., "Rock the baby").

Skill 4. Sharing and taking turns included (a) sharing, in which children were asked to let the other children play with the toys they had, and (b) taking turns.

Skill 5. Asking for help and requesting things included (a) asking the peers for help and (b) asking the peers to give them things they wanted.

Play Materials. Twenty-five toys were selected, which included games (e.g., Ants in the Pants, cards), dramatic-play items (e.g., kitchen utensils, dress-up clothes), and toys (e.g., balls, cars). Each day materials were rotated and three different toys were assigned to each group.

Reinforcement and Feedback Materials. Feedback materials consisted of two items. Cards (3-inch \times 2.5-inch) with small stickers on them were used as reinforcers. Each student received a card at the end of each session for actively participating in play groups. Star charts (laminated 12-inch \times 9-inch poster boards) with four columns were used to write the names of the children and assign stars during the play period when reciprocal interactions occurred.

Design and Procedure

Experimental conditions consisted of baseline, social skills training, social skills training plus reinforcement, return to baseline, and social skills training plus reinforcement. Thus, a reversal design with two intervention conditions (Johnston & Pennypacker, 1993) was used to demonstrate the effects of the intervention on the social interactions of the children.

Baseline (A) consisted of 20-minute play groups, with no instruction or feedback from the teachers except to prompt the children to stay in or return to the area and/or to interrupt when severe disruptions occurred (aggression, destruction of materials). A general positive statement was provided at the end of each session ("I am glad you could play today; thanks"), and a small card with a sticker was given to each child for participation.

The first intervention (B) consisted of 10 minutes of social skills training followed by 10-minute play groups during which no feedback was given to the children. During training the children sat at the table with the teacher, who introduced the session, briefly reviewed the skills previously taught, described the

skill to be taught that day, and modeled practice examples for the children. The children then practiced with each other for the remainder of the 10 minutes while the teacher corrected errors and reinforced correct interactions and participation. Following training the children played for 10 to 15 minutes, with occasional prompting and verbal praise by the teacher. The children again received a sticker card at the end of the session, as at the end of the baseline session.

A second intervention (C1) condition included the 10-minute social skills training and 10-minute play groups, in which the teacher gave verbal feedback and assigned stars on a chart to the children when they interacted appropriately. The children received a sticker card for accumulating three or more stars. The star chart was later modified in order to fade the frequency of the teacher's intervention, and stars were given to the children at 1-minute intervals.

A second baseline (A2) condition consisted of the same procedures as during the initial baseline, that is, 20-minute play groups were conducted, with instructions to remain with the group and play with the materials available (i.e., no training or reinforcement).

Social skills training and reinforcement were then reinstated during a third intervention phase (C2). During this final condition, all skills were reviewed during training, and the star charts were used during play time immediately following.

Data Collection Procedures

Dependent measures consisted of (a) the frequency and duration of social interaction between students with autism and typical peers, (b) the use of specific social skills within play sessions, and (c) the occurrence of disruptive behaviors.

The Social Interaction Code (Niemeyer & McEvoy, 1989; Tapp, Wehby, & Ellis, 1992) was used to record duration and frequency of social interactions of group members on NEC 8300 laptop computers. A target child (or peer) was

selected for observation. The experimenter then recorded initiations, responses, and interactions of the child with peers during play. Initiations were defined as motor or verbal behavior directed to another student that attempted to prompt a response. Examples included handing materials to another, demonstrating an action while prompting imitation, asking a question, commenting on the activity, and requesting an action or turn. Responses were defined as motor or verbal behaviors that occurred within 3 seconds after the initiation (eye contact in response to an initiation, gestural or verbal imitation following a request for such, turn taking, answering questions, etc.). Thus, social interactions were defined as reciprocal behaviors among students that were social or task related and that occurred as a result of an initiation-response sequence. The computerized system allowed for interactions to be registered and timed if the observer keyed in an initiation followed by a response within 3 seconds. Social interaction observations were recorded in 5-minute samples during the last 10 minutes of play groups, immediately following social skills training.

A social skills/behavior rating scale was used to assess the use of social skills and the occurrence of disruptive behaviors by the children during play time. The scale included 28 items describing social skills (e.g., uses peers' names) and 4 items describing appropriate general behavior during the session (e.g., remained in group all session). It was not expected that the children would demonstrate all skills during a particular session, because this depended on availability of opportunities and appropriateness (e.g., taking turns, asking for help, responding to initiations, following instructions). The rating scale also included items about behavior management skills (e.g., gave simple instructions to target student). The rating scale used a Likert format, with 1 being *never/seldom*, 2 *sometimes*, and 3 *always/frequently*. Observers/experimenters completed the rating scale immediately following the free-play session.

A procedural checklist was designed to assess the accuracy with which the teachers followed the scripts and procedures defined for training. The 17-item checklist included the behaviors teachers used for training (e.g., uses materials and scripts, models target skill, gives clear and short instructions, gives opportunities to practice, prompts to respond, interrupts incorrect responses, reinforces correct responses, reviews previously taught skills) and for the feedback and reinforcement system (e.g., records stars on chart by students' names at 1-minute intervals during play, reviews chart after 5 minutes and at end of session, gives verbal feedback, gives stickers for three or more stars). Observers/experimenters completed the checklist marking yes or no for each item immediately following the teachers' social skills training. Checklists were completed at least weekly during the intervention phases.

Consumer Satisfaction. At the end of the study, the teachers answered a survey concerning their opinions about the program. The survey was a Likert scale format, with 5 corresponding to *strongly agree* with the item statement and 1 corresponding to *strongly disagree*.

Reliability

Interobserver agreement for the duration and frequency of interactions was obtained with a second observer, who completed independent social interaction records. The reliability observer also completed the social skills/behavior rating scale for the children and procedural checklists for the teachers. Reliability for the total duration of the interactions was calculated by dividing the shorter duration by the larger duration. A total of 25.2% of the sessions had reliability checks, with an average interobserver agreement score of 84.8%.

Reliability for inappropriate behaviors (obtained from the social skills/behavior rating scale) was calculated by assessing agreements and disagreements on each item per session (item-by-item agreement). The scores were obtained by

dividing the number of agreements by the number of agreements plus disagreements, with an average agreement of 94%.

Reliability was recorded for the teacher procedural checklists for five sessions (10% of sessions) using the same formula. For Teacher 1 a score of 81.4% mean agreement (range 35.7% to 100%) was obtained, and for Teacher 2 a mean agreement of 77.1% (range 62.5% to 100%) was obtained.

Results

Total Duration of Interactions

As depicted in Figures 1 through 4, experimental conditions consisting of social skills training and reinforcement produced increased interaction time for children with autism. Peers in three groups (those of Maria, Mark, and Anna), however, demonstrated social interaction during the baseline and thus showed few changes in interaction time during intervention. Tom's peers were the exception and showed increases similar to students with autism during social skills training plus reinforcement.

Children with Autism. The total duration time of interactions per session increased with the social skills training over baseline rates for Maria, Anna, and Tom. When reinforcement was introduced during play time, the total duration of interactions increased for all students, with mean durations ranging from 90.7 seconds to 136.8 seconds. During the final intervention phase, the duration of interactions increased again for all students (mean durations 62.7 seconds to 134.3 seconds).

Peers. Means by condition are presented in Table 1 for target students and peers. Peers showed considerable variance in the amount of social interaction time during baseline (range 0 to 175 seconds) and intervention conditions (ranges 24 to 160 seconds and 23 to 160 seconds, respectively, for B and C). Five peers showed steady increases across conditions, but more so when the rein-

forcement system was included. Four peers showed drops from baseline to training; however, two of them increased their interaction time when both the training and the reinforcement system were in place. Two others had low, stable interaction levels throughout the experiment, except for a large increase in the final condition for one. Another peer showed higher levels of interaction when training was introduced, but this progressively decreased during training plus reinforcement and in the final phase. All of the peers except one showed some decrease in the total duration of interactions in the final condition.

Frequency of Interactions

Similar effects were obtained for the frequency as for the total duration time of interactions. Increases were observed when training was introduced, with more interactions also occurring during reinforcement conditions (see Figures 1 through 4).

Children with Autism. For students with autism the mean frequency of interactions increased when social skills training (mean 2.3 to 3.4) and training plus reinforcement (mean 6.6 to 8.3)

were introduced, except for Mark, whose frequency of interactions was similar during baseline and training alone (3.7, 3.1, respectively) but increased to 8.3 during training plus reinforcement. During the return to baseline, a decrease in the frequency of interactions per session occurred (mean 1.8 to 4.0) across students. During the final intervention, the frequency of interactions again increased (mean 4.0 to 7.5).

Peers. As with the duration, great variability was also observed in the frequency of interactions for peers across the different conditions. Eight peers showed increased frequency of interactions from baseline (mean 0 to 4) to the training plus reinforcement condition (mean 2 to 5.7), whereas four others showed decreases (mean 1.5 to 4.5). The return to baseline produced a decrease in interactions for only one peer. When training plus reinforcement were reinstated, only five peers showed increased numbers of interactions.

Social Skills

As can be seen in Table 2, social skills training in addition to reinforcement of positive interactions (C1 and C2) re-

TABLE 1
Total Duration of Interaction—Mean Per Condition

Student	Condition				
	A1	B	C1	A2	C2
Maria	10	35.9	106.7	75.7	102.7
P1	50.5	91.7	139	131	69
P2	27	55.3	(no data)	(no data)	(no data)
P3	55.5	90.8	160.3	(no data)	145.3
P4	(no data)	(no data)	71	169	149
Mark	55.7	45.3	136.8	60.6	134.3
P2	(no data)	(no data)	55.3	90	81.5
P4	115	95.7	(no data)	(no data)	(no data)
P5	0	30.3	140.5	102	90
P6	82	54	115	144	113
Anna	9	72.2	126.1	27.5	62.7
P7	91	80	67.7	103.5	68.5
P8	27	36.3	96.6	154	135.5
P9	175	50	105.5	(no data)	108.8
Tom	0	40.8	90.7	57	85.5
P10	24.7	24	24	31.5	119
P11	40.7	160.5	77.2	(no data)	23
P12	64.5	67	83.3	(no data)	67

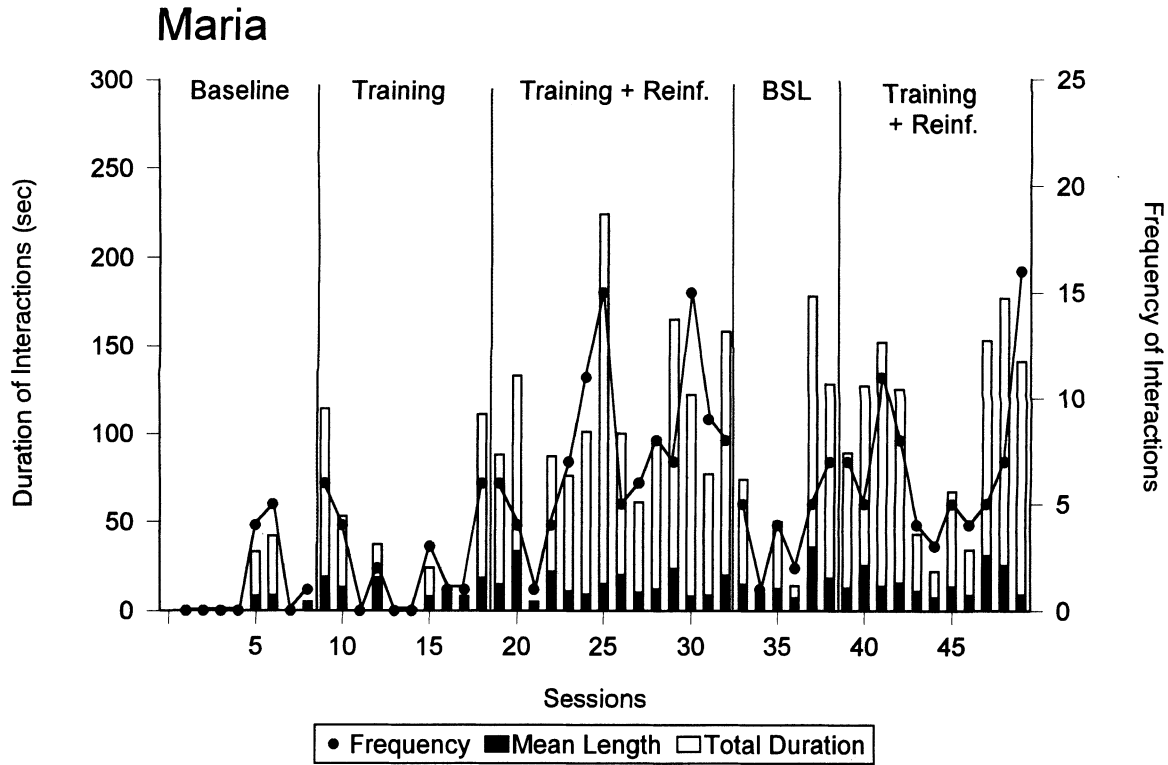


FIGURE 1. Maria's frequency and duration of interactions.

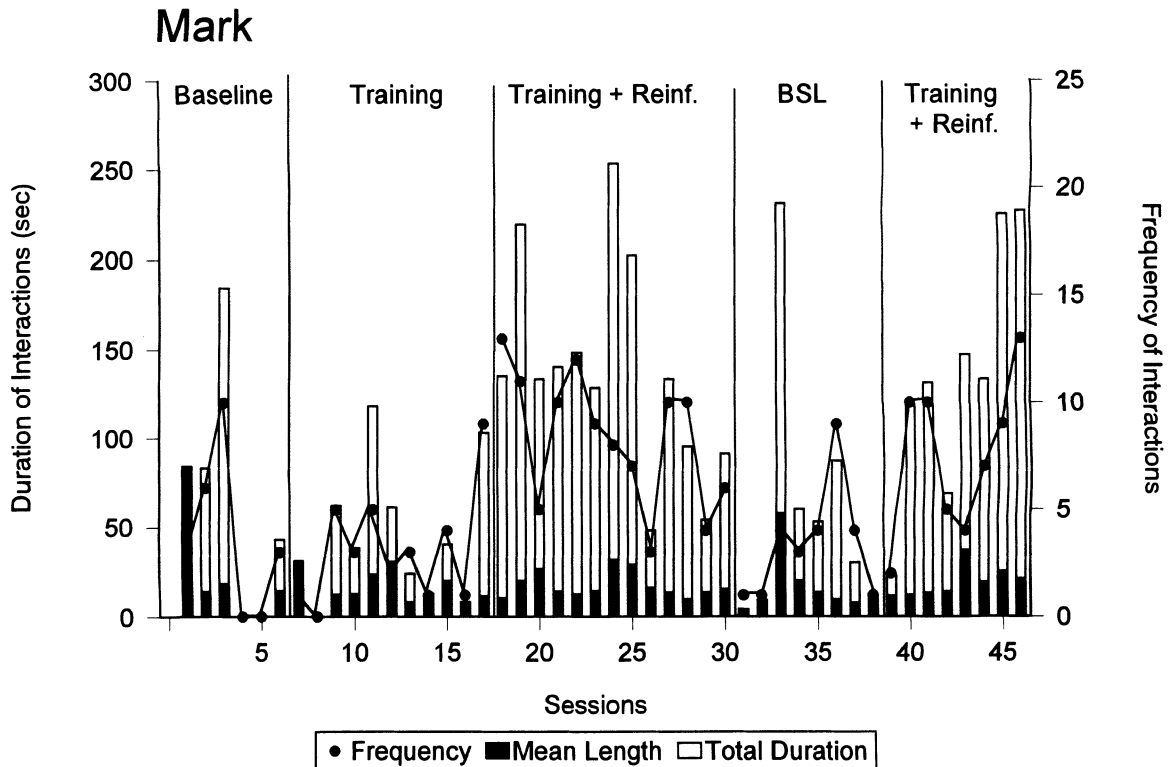


FIGURE 2. Mark's frequency and duration of interactions.

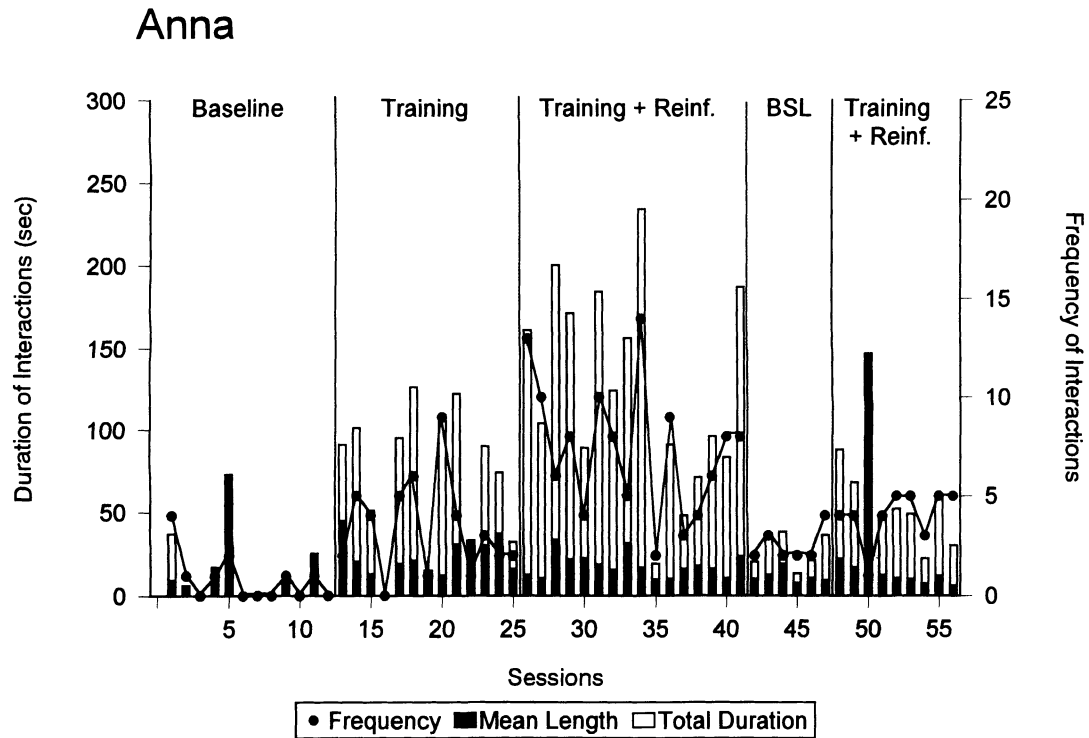


FIGURE 3. Anna's frequency and duration of interactions.

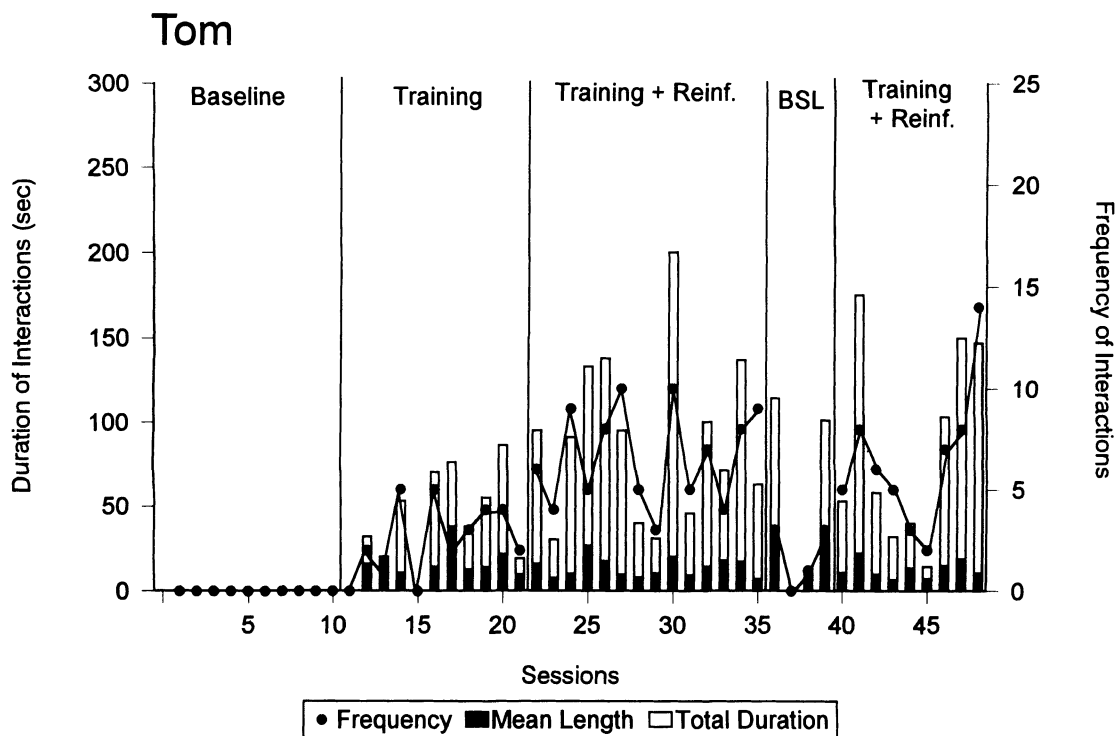


FIGURE 4. Tom's frequency and duration of interactions.

TABLE 2
Ratings on Social Skills Checklist

	Maria				Mark				Anna				Tom			
	A1	C1	A2	C2	A1	C1	A2	C2	A1	C1	A2	C2	A1	C1	A2	C2
1. Greeted 1 peer	1.0	2.9	1.5	2.7	1.0	2.8	2.3	2.5	1.0	2.1	1.0	2.1	1.0	2.8	1.0	2.2
2. "> 1 peer	1.0	2.9	1.0	2.7	1.0	2.8	2.3	2.5	1.0	1.8	1.0	2.1	1.0	2.8	1.0	2.2
3. Used name	1.0	1.5	1.2	1.0	1.0	1.3	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4. "> 1 peer	1.0	1.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
5. Followed instructions	1.0	2.4	1.4	2.4	1.4	2.8	2.3	2.6	1.0	2.6	1.7	2.7	1.0	2.0	2.3	2.0
6. "> 1 peer	1.0	2.3	1.0	2.3	1.4	2.8	2.3	2.4	1.0	2.5	1.0	2.7	1.0	1.8	1.0	1.7
7. Imitated	1.1	2.0	1.2	1.4	2.2	2.8	2.5	2.5	1.5	2.7	1.3	3.0	1.1	1.4	1.0	1.7
8. "> 1 peer	1.0	1.9	1.0	1.4	2.2	2.7	2.3	2.0	1.1	2.2	1.3	1.6	1.0	1.2	1.0	1.3
9. Took turns	1.1	1.5	1.1	1.1	1.2	1.6	1.8	1.5	1.1	2.1	1.0	2.7	1.0	1.3	1.0	1.1
10. "> 1 peer	1.0	1.3	1.0	1.0	1.0	1.6	1.5	1.2	1.0	1.7	1.0	1.3	1.0	1.2	1.0	1.0
11. Played w/materials	1.3	2.1	1.5	2.0	2.0	2.8	3.0	2.3	1.0	2.5	1.5	2.7	1.0	1.7	2.0	1.7
12. "> 1 peer	1.0	2.1	1.3	2.0	2.0	2.6	2.0	1.8	1.0	2.3	1.0	1.0	1.0	1.6	1.0	1.5
13. Gave materials	1.0	1.1	2.1	1.0	1.3	1.2	1.3	1.2	1.0	1.1	1.0	1.1	1.0	1.1	1.0	1.0
14. "> 1 peer	1.0	1.0	2.1	1.0	1.2	1.2	1.3	1.2	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0
15. Asked for item	1.1	1.1	1.0	1.0	1.7	1.1	1.8	1.3	1.0	1.1	1.0	1.1	1.0	1.0	1.0	1.0
16. "> 1 peer	1.0	1.1	1.0	1.0	1.7	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
17. Asked for help	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
18. "> 1 peer	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
19. Offered help	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
20. "> 1 peer	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
21. Initiated	1.0	1.2	1.4	1.1	1.7	1.5	1.8	1.8	1.1	1.5	1.0	1.4	1.1	1.2	1.0	1.0
22. "> 1 peer	1.0	1.0	1.0	1.0	1.7	1.5	1.3	1.2	1.0	1.1	1.0	1.0	1.1	1.0	1.0	1.0
23. Responded	1.0	2.6	1.6	2.6	2.3	2.9	2.5	2.7	1.0	2.6	1.7	2.6	1.0	2.2	2.0	2.3
24. "> 1 peer	1.0	2.5	1.0	2.3	2.0	2.6	2.3	2.5	1.0	2.6	1.7	2.2	1.0	2.0	1.5	2.2
25. Interacted for 1 min	1.0	1.1	1.0	1.1	1.3	1.5	1.5	1.8	1.0	1.6	1.0	1.4	1.0	1.0	1.0	1.3
26. "> 1 peer	1.0	1.0	1.0	1.0	1.3	1.1	1.0	1.3	1.0	1.4	1.0	1.0	1.0	1.0	1.0	1.0
27. Interacted > 1 min	1.0	1.1	1.0	1.0	1.2	1.2	1.5	1.7	1.0	1.2	1.0	1.2	1.0	1.0	1.0	1.0
28. "> 1 peer	1.0	1.0	1.0	1.0	1.2	1.1	1.0	1.3	1.0	1.0	1.0	1.1	1.0	1.0	1.0	1.0

Note: Code: 1 = Never/Seldom; 2 = Sometimes. Condition A = baseline; Condition C = training and reinforcement.

sulted in increased ratings for the use of social behaviors by the target students. Improved ratings reflected consistent increases in the use of particular social skills during the intervention phases. The skills more frequently used by Maria and Mark were greetings, following instructions given by peers, imitating peers, playing with materials given by peers, and responding to one or more

peers. Anna frequently demonstrated following instructions given by peers, imitating peers, and playing with materials given by one or more peers, as well as responding to one peer. Tom used greetings, followed instructions given by peers, responded to one or more frequently during intervention conditions. Increases were also seen in the use

of other skills (e.g., using names, taking turns initiating to one peer, and interacting with others for at least one minute), but they were not displayed as consistently throughout the intervention phases. Changes were not seen in the use of other skills (e.g., asking for and offering help, asking for materials and giving materials to others, interacting for longer than one minute, and initiat-

ing to more than one peer) by the target students.

An increase in the use of certain skills by the peers was noted (although total percentages did not change) and included more consistent use of greetings, giving materials to, initiating to, using names, following instructions, and responding to others.

Inappropriate Behaviors

Inappropriate behaviors (e.g., grabbing, disruptions, leaving the group, unpleasant demeanor) during free-play periods were rated in four items on the social skills/behavioral rating scale. Children were rated as displaying the inappropriate target behaviors *sometimes* (score 2) or *frequently* (score 1). Figure 5 displays the percentage of items per session scored as 1 or 2 across experimental conditions (i.e., the behavior was observed sometimes or frequently during play).

Maria and Peers. Maria's inappropriate behaviors did not show changes during the different phases of the experiment, with means of 0 to 100 for leaving the group, unpleasant demeanor, disruptions, and grabbing. Decreases were noted for all behaviors except grabbing during the final intervention phase. Her peers' behavior was generally appropriate, except for Peer 4, who switched groups with Peer 2 at the end of the first training condition. In all conditions, Peer 4 was rated as being disruptive and as not having a pleasant demeanor and was observed grabbing materials often.

Mark and Peers. Mark's inappropriate behaviors progressively decreased during the experiment; however, a slight increase was noted in the last condition for being disruptive. His peers' behaviors were often rated as inappropriate. In the early sessions in this group, Peer 4 was disruptive and was observed grabbing materials and leaving the group during free play following training. He also was rated as not having a pleasant demeanor. Peer 5 on occasion was disruptive and

grabbed materials. The behavior of Peer 6 was inappropriate in many sessions across all conditions. Peer 2 was disruptive and was observed grabbing only during the return to baseline.

Anna and Peers. Anna's inappropriate behaviors were progressively less frequent during the experiment. In the last condition she never displayed inappropriate behaviors. Her peers' behaviors were generally adequate, with only occasional occurrences of inappropriate behaviors (i.e., disruptions and grabbing materials) in the two initial conditions.

Tom and Peers. Tom's inappropriate behaviors also showed progressive decreases during the experiment, demonstrating moderate increases during reversal in disruptive behaviors, grabbing, and leaving the group. His peers' behaviors were generally adequate, with only some occurrences of inappropriate behavior during the first two conditions.

Behavior Management Skills of Peers

A six-item section of the social skills/behavior rating scale rated the use of behavior management skills (e.g., giving easy instructions, prompting, praising, and ignoring disruptive behavior) by the peers. Social skills training alone produced an increase in their use by 10 peers (range 22% to 67%). Social skills training plus reinforcement produced increases in behavior management skills for all 12 peers (range 41% to 88%). Reversal data were not available for six peers, and five of the other six children demonstrated a lower percentage of skills used during this condition (range 0% to 60%). During the final intervention, data for eight peers were available, with five of them maintaining the use of behavior management skills (range 33% to 100%).

Regarding specific behavior management skills, Maria's peers showed significant increases in giving simple directions to her, prompting her, and ignoring her disruptive behavior. However, after training they did not praise her, redirect her, or give her paced instructions.

Mark's peers gave him simple instructions and sometimes prompted and redirected him, but they did not demonstrate increased use of the other skills (i.e., praising, ignoring disruptive behaviors, and giving paced instructions). Anna's peers gave her simple directions and prompted her when needed. However, no instances were observed when they praised her. There were no opportunities for the peers to ignore Anna's disruptive behaviors, redirect her, or give her paced instructions. Tom's peers gave simple instructions, prompted him, and ignored his disruptive behaviors. On occasion they redirected him when he was disruptive. No instances were observed when they praised him. There were no opportunities for them to give him paced instructions.

Procedural Checklist

A procedural checklist for the training sessions was completed on 32 occasions for Teacher 1 (Maria's and Anna's groups) and on 28 occasions for Teacher 2 (Mark's and Tom's groups) throughout the experiment. Teacher 1 used a mean of 88.4% of the skills per session, with a range of 35.7% to 100%. The skills less frequently used by Teacher 1 were as follows: uses the materials as described in the scripts (83.3% *always*, 8.3% *sometimes*); reviews previously taught skills at the beginning of the session (80.0% *always*, 12% *sometimes*); reinforces taught skills (81.5% *always*, 14.8% *sometimes*); and redirects the child when disruptive (77.8% *always*, 22.2% *sometimes*). Teacher 2 used a mean of 85.6% of training skills per session, with a range of 44.4% to 100%. The skills less frequently used by Teacher 2 were as follows: gives enough opportunities for the children to practice (67.7% *always*, 32.3% *sometimes*); uses the materials as described in the scripts (72.4% *always*, 20.6% *sometimes*); reviews previously taught skills at the beginning of the session (79.3% *always*, 17.2% *sometimes*); ignores the child when disruptive (66.7% *always*, 26.7% *sometimes*); and redirects the child when disruptive (73.3% *always*, 20.0% *sometimes*).

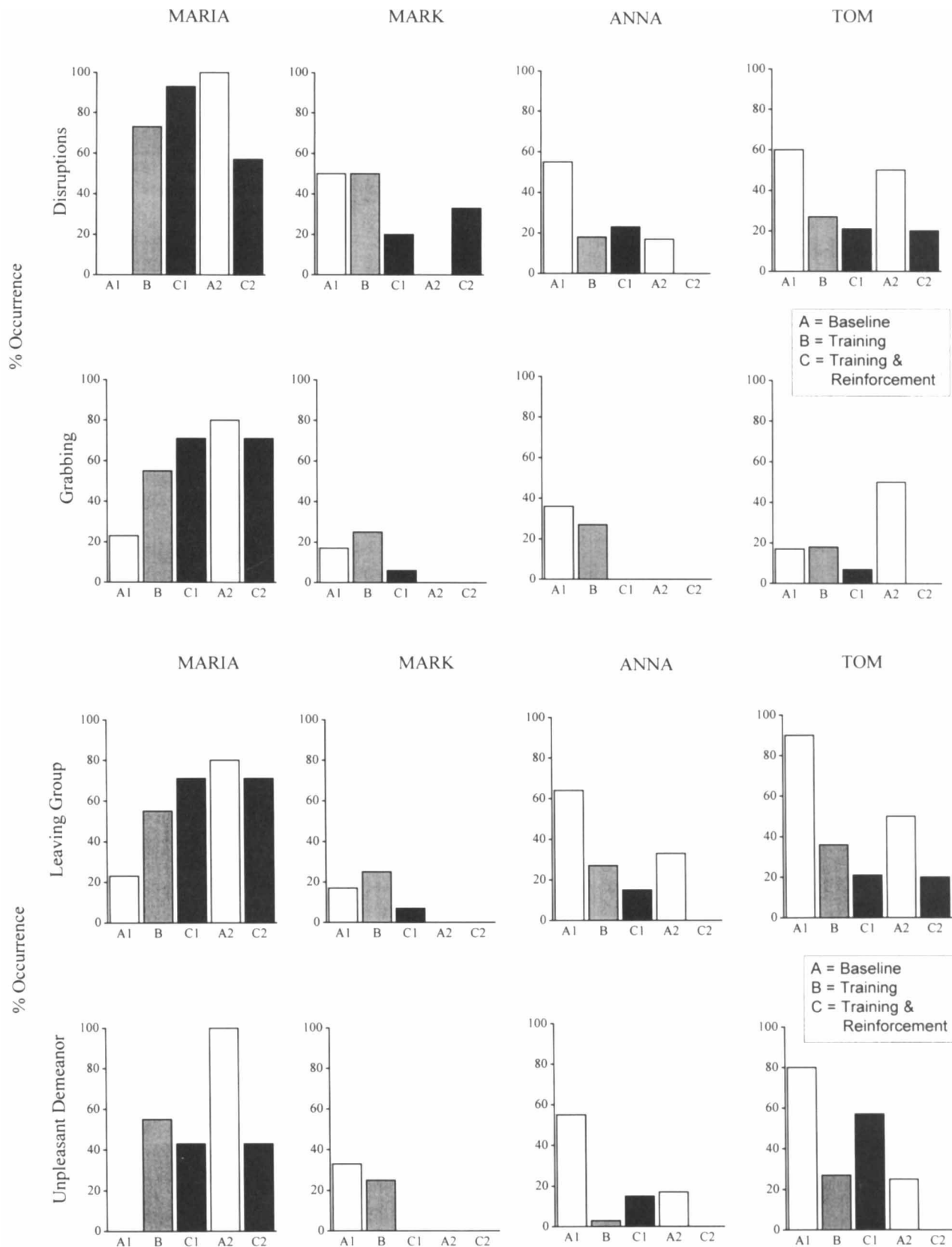


FIGURE 5. Percentage occurrence of disruptions per condition.

Consumer Satisfaction Surveys

With respect to the students, the teachers agreed that the social skills play groups benefited the children and that the children enjoyed both the training sessions and the play groups. They also agreed that the skills were appropriate for the children, that the groups were an appropriate and functional way to integrate children with disabilities with typical children, and that the quality of the interactions between the children improved. One teacher agreed that the number of interactions between the children increased, and one teacher was "neutral" about this statement.

The teachers also agreed that the implementation of the procedures was manageable for them, that they benefited from the program, and that they were satisfied with the amount of feedback and assistance received from the researchers during the study. One teacher showed interest in other programs focused on integration of children with disabilities and typical peers, and the other teacher was "neutral" about this statement. For future projects, one teacher recommended starting with the reinforcement system sooner in the research. She also commented that children with otherwise limited access to toys spent little time interacting and more time playing with the toys. The second teacher recommended higher-interest activities, as well as selecting typical peers with better social skills. Both teachers reported that they were using the procedures in their classrooms even after completion of the study. Following the successful play groups in their classrooms, they had four typical peers participating in the regular morning activities with their students.

Discussion

Their lack of social skills prevents children with autism from developing positive peer relationships and from achieving a more successful integration into the community. Therefore, promoting the development of social skills has been

a primary objective in the habilitation of these children (e.g., Egel & Gradel, 1988; Guralnick, 1981; Haring & Breen, 1992; Kamps et al., 1992; Koegel, Koegel, Hurley, & Frea, 1992; Odom et al., 1992; Strain et al., 1995). The ultimate goal of any social program for children with autism is to improve the quality of their life in integrated settings.

The purpose of this investigation was to develop and increase social interaction between elementary school children with autism and their peers. Results indicated that social skills training combined with a reinforcement system was especially effective in increasing the duration and frequency of peer interactions of the children with autism. These findings provide a replication of previous studies that included children with autism (e.g., Gaylord-Ross et al., 1984; Kamps et al., 1992; Odom & Strain, 1986) that have confirmed that social skills training may increase the amount of interactions between children with disabilities and their typical peers. Notable features of this study that expand the literature include (a) the inclusion of elementary school-age children with autism who have limited communication and play skills and a history of behavior problems, (b) use of small groups including the target student and two to three peers as a training format rather than one-to-one instruction, (c) use of a rating scale to note the occurrence or nonoccurrence of disruptive behaviors across conditions, and (d) use of data on typical peers within the play sessions as normative data. In prior studies, target students have often been preschoolers (e.g., Strain et al., 1994; Ostrosky & Kaiser, 1995) or those with high functioning levels (e.g., Kamps et al., 1992; Oke & Schreibman, 1990). Few studies have provided normative data (Tremblay et al., 1981), particularly in urban elementary school settings. This study demonstrated the importance of strategies for teaching social behaviors to lower-functioning students in integrated elementary school settings.

In addition to facilitating increased interaction, the procedures assisted peers in reducing behavior problems by ignor-

ing, redirecting, giving easy instruction, and so forth. These skills appeared to help maintain their attempts to interact with students with autism and to assist in reducing behavior problems during play time. This study, then, allowed for evaluation of the procedures with a special population that imposes a great challenge to teachers and peers alike when encouraging reciprocal positive social interactions. For example, with the exception of Maria, who might have used disruptive behavior for peer attention, the overall occurrence of inappropriate behaviors decreased when the intervention was in place. Furthermore, the children appeared to enjoy the play groups more after training, as reflected by the ratings of their demeanor (peers and students with autism). These outcomes suggest that for children with more disruptive or aggressive behavior (Maria, in this case), teachers may need to implement additional behavioral programs and management strategies, as well as build more skills, as a part of the social skills training groups. Of interest is that disruptive behaviors were also observed for the typical peers during social groups. Thus, practitioners might need to use a reinforcement system for appropriate behavior in play sessions as well for using positive social skills.

Other positive effects of the social skills training suggest additional benefits of continued use of the procedures for integrated activities in public school settings. For the typical children in this study, the social skills became aids to initiate effective interactions with the children with disabilities. The typical peers also learned how to persist in continuing interactions, especially during times when they obtained few responses to their attempts. The social skills/play groups might also provide opportunities for children with autism or developmental disabilities to observe similar-age typical children play with toys and with each other, an opportunity seldom available within segregated or clinical settings (e.g., Odom & Karnes, 1988) or in environments focusing exclusively on one-to-one teaching and skill building with adults.

In spite of these positive findings, specific percentages on the use of social skills did not change dramatically during the intervention phases. Several points can be mentioned to clarify this issue. The use of the social skills/behavior rating scale presented some difficulties, primarily in that the display of certain skills depends on availability of opportunities during the play session. For example, most items were rated as "used with one peer" or "used with more than one peer." It was considered appropriate when the student was engaged in a dyad, although this restricted interactions with multiple students. Similarly, skills such as asking for or offering help and turn taking also depended on the specific situations and activities encountered during the session. Thus, practitioners might need to structure social activities to provide opportunities to practice specific skills. In addition, specific skills might require more teaching (e.g., modeling, shaping, practice trials, reinforcement) than available in 10-minute training for the children to be able to acquire, maintain, and generalize skills to peer-group activities.

To summarize, the results of the program allowed teachers with some training to carry out and manage social skills training and play groups within their daily classroom schedules for their students with autism and typical peers. As reported by the teachers in this study, the procedures were beneficial for both teachers and students for skill development and as an integration strategy for elementary school settings. These results suggest the continued use of social programs for students with autism and their peers, in particular procedures that teachers agree are effective and easy to implement. The teachers who participated in this study further reported that after observing the success of the play groups, they integrated most of the techniques into daily activities with general education peers in their classrooms. During the remainder of the school year, three kindergarten peers increased their school attendance to full day and were included in the special education classroom morning routines.

Important issues for future research include (a) selection and assessment of social skills according to age and functioning levels, (b) identification of minimal prerequisite skills (e.g., communication system, imitation, or play skills) for children to benefit from social skills training, (c) development of activities to promote maintenance and generalization of the skills, (d) promotion of social skills training that continues to be mutually beneficial for lower-functioning students and their peers, (e) development of strategies that produce sustained interactions, and (f) development of teacher training procedures that allow for the design and implementation of social programs that address individual students' needs and complement the social ecology in elementary school settings.

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AUTHORS' NOTES

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