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INCREASING HANDICAPPED PRESCHOOLERS' PEER SOCIAL INTERACTIONS: CROSS-SETTING AND COMPONENT ANALYSIS

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The purposes of our study were: (a) to train a set of observationally determined social behaviors via peer initiation; (b) to determine if effects generalized across classroom settings and to directly intervene if generalization did not occur; and (c) to analyze components of the peer-initiation intervention. After baseline, nonhandicapped preschool children (confederates) were taught to direct social initiations to the three handicapped preschool-aged students. Teachers prompted the confederates to engage the students in social interaction when necessary and rewarded the confederates with tokens. Confederates' initiations to the students resulted in increased frequencies of positive social interaction. There was no generalization to other classroom settings, and the intervention was subsequently implemented in a second and third classroom. Next, the confederates' token reinforcement system was withdrawn, with no apparent deleterious effects on the confederates' or students' social interactions. When teachers substantially reduced their prompts to the confederates, students' social interactions decreased. Finally, reinstatement of teacher prompts resulted in increases in the confederates' social initiations and, consequently, the positive social interactions of the students.

DESCRIPTORS: social interactions, peer-initiation interventions, preschool children, token reinforcement, teacher prompting

Since Wahler's (1967) demonstration that young children could systematically modify the behavior of other children, peers have served as behavior change agents with preschool-aged handicapped children (Strain, Shores, & Timm, 1977), elementary-aged autistic children (Ragland, Kerr, & Strain, 1978), severely mentally retarded school-aged children (Young & Kerr, 1979), and even geriatric mentally retarded individuals in institutions (Dy, Strain, Fullerton, & Stowitschek, 1981). In such peer-initiation interventions, "confederates" are trained to direct social initiations to subjects to increase the subjects' levels of positive social interaction.

Critics of peer-initiation interventions and other behavioral forms of social skills training assert that positive social interaction is increased without regard to the quality of the behaviors targeted for treatment (Gresham, in press). However, in a recent study designed to identify potential target behaviors for social skills interventions, Strain (1983a) observed the social interactions of handicapped children who had received high sociometric ratings by their nonhandicapped classmates and a second group who received low ratings. High-rated children shared materials, organized play, assisted with tasks, were affectionate, and responded positively to peers' social initiations more often than did low-rated children. Low-rated children were involved in negative social interactions more frequently than high-rated children. One purpose of our investigation was to examine the feasibility and efficacy of using the set of behaviors Strain identified as behavioral targets in a peer-initiation intervention with young, behaviorally handicapped children.

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Another persistent problem in social interaction research is the inconsistency of cross-setting generalization (Hendrickson, Strain, Tremblay, & Shores, 1982; Strain, 1977; Strain, Kerr, & Ragland, 1979). Thus, a second purpose of our study was to program for generalization using several strategies suggested by Stokes and Baer (1977) and to monitor the effects across two classroom activities. Several variables may mediate generalization across settings with peer-initiation interventions. The practice of including socially responsive peers in the generalization setting represents a generalization-facilitating strategy that Stokes and Baer (1977) identified as introducing "natural maintaining contingencies." In a study of cross-setting effects, Strain (1983b) found that increased levels of positive social interaction for three autistic preschoolers generalized to developmentally integrated settings containing responsive, nonhandicapped peers, but not to developmentally segregated settings containing only handicapped children. Although Hecimovic, Fox, Shores, and Strain (in press) failed to replicate the generalization-facilitating effects of responsive peers, Strain (in press) found that cross-setting generalization may depend on the training given to the responsive peers in the generalization setting (i.e., instruction to help the handicapped children play).

Programming common stimuli is another strategy we used to facilitate cross-setting generalization (Stokes and Baer, 1977). Several studies have demonstrated that peers involved in training sessions may promote cross-setting generalization of speech sounds (Johnston & Johnston, 1972), and word recognition tasks (Stokes and Baer, 1976; Stokes, Doud, Rowbury, & Baer, 1978). In our study, peers who served as the intervention agents in the peer-initiation interventions were present daily in each generalization setting. In addition, the interventions were conducted in typical classroom settings and generalization was assessed in similar, but not identical, settings at other times of the day.

Sequential modification is a third strategy used to promote cross-setting generalization. As Stokes and Baer (1977) noted, when treatment effects do not transfer across settings, investigators have subsequently implemented the treatment in the generalization settings. In our study, if increases in the students' social interactions did not generalize to other classroom settings, we sequentially introduced the intervention in those settings.

Social skills interventions seldom contain only one component and, in fact, are often made up of a "package" of components (Hops, 1983). Investigations of peer-initiation interventions have demonstrated that the confederates' initiations are responsible for increases in the subjects' positive social interactions. However, a variety of factors, particularly in classroom settings, may influence the confederates' behavior toward the subjects (e.g., reinforcement from the teacher, other activities in the room, "treatment fatigue," teacher directions). Thus, a third purpose of our study was to analyze the components of the peer-initiation intervention that influence the frequency of the confederates' social initiations to the target students and, in turn, the target students' positive social interactions.

METHOD

Participants

Three handicapped preschool children enrolled in a mainstreamed preschool class participated. Gary was a 34-month-old male who failed to achieve a basal score on the McCarthy Scales of Children's Abilities. In the classroom he exhibited a variety of behaviors associated with autism (e.g., stereotypic activity, little functional communication, negative reactions to changes), primarily played alone, and ignored social overtures from peers. Garvin was a 40-month-old male with a General Cognitive Index score (MCI) of 75 from the McCarthy Scales of Children's Abilities. Garvin rarely played with other children in the class and often responded negatively to social initiations from peers. When playing alone, he would occasionally engage in stereotypic behavior. Jack was a 52-month-old male with an MCI of 97. Jack's verbalizations were largely unintelligible to peers or teachers, and his initiations to peers were comprised primarily of a single game (i.e., playing

monster), which he repeated often. Peers frequently responded negatively to Jack's "monster game" initiations.

Confederates were chosen from the nonhandicapped children enrolled in the same class as the participants. Confederate 1 (CA = 53 months, MCI = 112) and Confederate 2 (CA = 61 months, MCI = 90), both girls, served as confederates for Gary and Garvin, respectively. Confederate 3 (CA = 61 months, MCI = 107) was a boy and served as the confederate for Jack. The criteria for selection as a confederate were regular attendance in the preschool, at least age-level play skills, age-appropriate levels of social initiations to all peers, and general compliance with teacher directions.

Setting

A mainstreamed preschool classroom located in a Pittsburgh public school, containing six nonhandicapped children and four handicapped children (similar to the classes in the Strain, 1983a study) provided the three study settings. The first setting was a structured play activity, during which one of the students, one confederate, and at least one other nonhandicapped peer engaged in a preplanned activity for an 8–10 minute period each day. Specific play activities (e.g., cooking supper, grocery store) changed daily but were repeated every 2–3 weeks.

The second setting was an independent "table" activity, occurring at the beginning of the school day, in which children completed fine motor tasks (e.g., parquetry, bristle blocks) or creative projects (e.g., pasting, gluing, coloring). The confederates and students always sat next to each other at a table with two or three other peers. The table activity lasted from 15 to 20 minutes.

The third setting, "learning centers," consisted of a variety of fine motor, manipulative, and instructional activities such as "work jobs," "sand or water table." In this setting, the confederates and students participated in a single activity for a 7–10 minute period before moving to another learning center in the classroom. One or two other nonhandicapped classmates were usually present during this activity. In all the classroom settings, nonhandicapped peers in the intervention group, aside from the confederates, changed frequently (i.e., were not constant across days).

Confederate Training

At the beginning of the intervention phase, the three confederates participated in five, 20-minute training sessions outside the classroom. The teacher described the target behaviors, demonstrated the behaviors with a second adult who played the role of one of the students, and then required each confederate to direct the desired social initiation to the second adult. The second adult did not respond to the confederates' initiations on 50% of the occasions, and the confederates were taught to persist in their initiations until the adult responded. The trained social initiations were play organizer, share, share request, assistance, affection, and complimentary statements (see the observational categories for a description of each behavior). In pilot observations, these initiations had been observed to elicit the types of social interactions identified by Strain (1983a) to be associated with high sociometric ratings from nonhandicapped peers.

In the confederate training, the teacher described the following token reinforcement system that was used in the classroom. During intervention in the classroom, a happy face was drawn on a white notecard every time the student responded to an initiation from the confederate. Confederates who met their preset criterion for happy faces (i.e., got the student to play with them), received a social reinforcer (e.g., a special handshake, a teacher's helper task) at the end of the day. To give them practice with the token reinforcement system, happy faces were awarded to the confederates whenever the second adult responded to their initiations in the training sessions.

Observational Procedures and Categories

Each day observers collected a 5-minute sample of each of the target student's interactions in the classroom settings described previously. All social interactions directed to the students or directed by the students to peers were coded. Although observers coded the discrete social interactions contin-

uously, interactions were recorded within 10-second intervals for reliability purposes. An audiotape cued the observers to change intervals every 10 seconds. Observers were trained to a 0.75 (kappa) criterion across two daily sessions before the study began.

The observational system contained six positive and two negative social interaction categories:

Play organizer: Verbalizations or responses to verbalizations wherein a child specifies an activity, suggests an idea for play, or directs a child to engage in a play behavior.

Share: Offers or gives an object to another child or accepts an object from another child by taking the object in hand or using it in play.

Share request: Asks a child to give an object to the speaker.

Assistance: Helps another child complete a task or desired action which he or she could not complete or do alone.

Complimentary statement: Verbal statement indicating affection, attraction, or praise.

Affection: Patting, hugging, kissing, or holding hands with another child.

Negative motor-gestural: Hitting, pushing, sticking out tongue, taking unoffered objects, or destroying others' constructions.

Negative vocal-verbal: Crying, shouting, calling another child an ugly name, and refusal to engage in a requested behavior or corrections.

In addition to recording categorical interactions, observers noted whether the behavior was an initiation or a response and whether it had been prompted by the teacher. A behavior was considered an initiation if it had not been preceded, in the previous 3 seconds, by a social behavior from a peer to whom the initiation was directed. For example, Confederate 1 might ask Gary to build a tower with her. If Gary had not engaged in social interaction with Confederate 1 in the previous 3 seconds, Confederate 1's behavior would be coded as a play organizer initiation. A behavior was coded as a response if it had been preceded in the previous 3 seconds by a social behavior from a peer to whom the response was directed. For example, in a social interaction with a peer, a response might be preceded by an initiation from a peer, or it might be preceded by a response if interaction had continued for several turns. If Gary said, "Okay, let's play house" after Confederate 1's previously described initiation, Gary's behavior would be coded as a play organizer response. Similarly, if Confederate 1 then said, "That's nice playing" within 3 seconds of Gary's response, this behavior would be coded as a complimentary statement response.

A social interaction was coded as prompted if the teacher verbally requested the child to direct the social behavior to a peer in the 5 seconds previous to when the child began to engage in the behavior. A manual describing this coding system (Odom, Silver, Sandler, & Strain, 1983) may be obtained from the first author.

Interobserver Agreement

Two observers simultaneously recorded the social interactions of the students and their peers on 26% of the sessions. Reliability observations were evenly distributed across students, settings, and treatment conditions. As recommended by Hartmann (1982) and Kazdin (1982), two types of reliability measures were used to assess interobserver agreement at the component (i.e., interval) and composite (i.e., session) levels. The kappa statistic (Cohen, 1960), which includes a correction for chance agreement, was used to analyze observational agreement for single 10-second intervals. Agreement was scored when two observers marked identical interactions for identical children in the same interval or did not mark any interaction in the same interval.

As a measure of composite reliability, Pearson product-moment coefficients were computed for each interaction category. The total number of occurrences of an interaction coded by each observer was analyzed for all reliability sessions. Sessions in which both observers recorded zero frequencies were not included in the correlational analyses.

Design and Experimental Conditions

The effects of peer-initiation intervention were examined in multiple-baseline design across three classroom settings with direct replications across the three students.

Baseline. Students and confederates were observed interacting in the three settings without any experimenter-manipulated changes in the routine. Teachers monitored the activities and offered work or play ideas but generally did not prompt the children to engage in social interaction.

Intervention. At the beginning of each intervention session, the teacher reminded each confederate to direct social initiations to the student and suggested several social initiations. The teacher held the token reinforcement card in view of the confederate and drew happy faces as the student responded to confederate's initiations. If the confederate did not initiate for a short period of time (i.e., 15–20 seconds), the teacher verbally prompted the confederate to initiate. Each intervention session lasted for 5 minutes. At the end of the intervention, the teacher took the confederate away from the activity, to prevent the student from hearing or seeing the confederate being reinforced, and had him or her count the number of happy faces. If the confederate had met criterion for the session, the teacher praised the confederate and awarded the specified reinforcer, if it was the last intervention session of the day.

Withdrawal of reinforcement. At the beginning of the third phase, the teacher told the confederates that they would not be receiving the "happy faces" or reinforcers, but that they should still initiate to the students. As in the previous phase, teachers continued to provide verbal prompts when necessary.

Reduction of teacher prompts. In the fourth phase, teachers gave a verbal prompt to a confederate only if he or she had not initiated to the student in the previous minute. The observers cued the teacher to prompt the confederate when they had not coded a confederate's social initiation in the previous minute. Reinforcement to the confederate was not reintroduced in this or the subsequent phase of the study.

Reinstatement of teacher prompts. During the final phase, teacher prompts were reinstated. This phase was procedurally identical to the third phase of the study. Unfortunately, the school year ended shortly after the last phase of this study, preventing the collection of follow-up data.

RESULTS

Interobserver Agreement

Mean kappa coefficients for social interaction categories, initiations and responses, and teacher prompted or independent behavior were 0.71, 0.73, and 0.61, respectively. Hartmann (1977) has recommended 0.60 as an acceptable minimum level for kappa coefficients. Pearson product-moment correlation coefficients were: initiations, 0.98; responses, 0.99; teacher prompts, 0.82; independent behavior, 0.98; complimentary statements, 0.98; assistance, 0.72; play organizer, 0.99; share request, 0.93; share, 0.99; negative motor-gestural, 0.90; and negative vocal-verbal, 0.90. A coefficient was not computed for the affection category because there were only 15 sessions in which the category was coded.

Confederate's Social Behavior

The confederates' social initiations with the students provided information about the procedural implementation of the major independent variable (i.e., peer initiations). Total positive and negative social initiations per session for Confederate 1 (the confederate for Gary), Confederate 2 (the confederate for Garvin), and Confederate 3 (the confederate for Jack), are presented in Figures 1, 2, and 3, respectively. As can be seen from these figures, baselines were uniformly low across all settings for the three confederates. Training coincided with the onset of intervention in the structured play setting. Substantial increases in the positive social initiations with peers was noted in this setting. Generalization across settings was not found for the students, so the intervention was subsequently

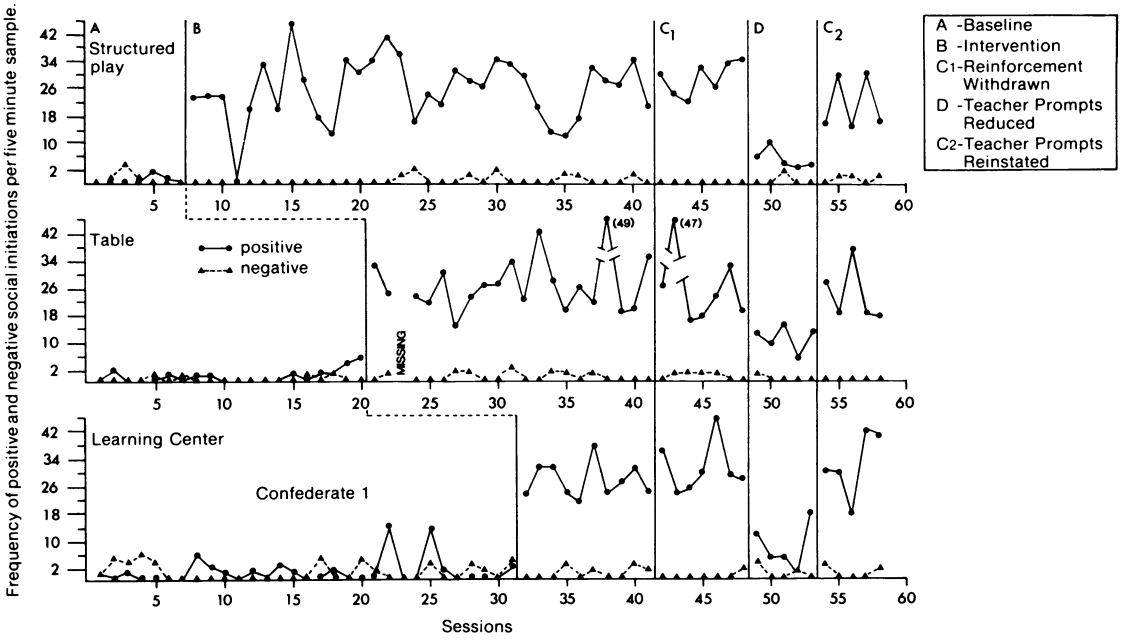

Figure 1. Frequency of positive and negative social initiations for Confederate 1.

implemented in the table and learning center settings. This resulted in comparable increases in the levels of positive social initiations. Negative social initiations remained low across the intervention settings.

To identify the controlling variables in the intervention package, the token reinforcement contingency was withdrawn across all settings in the third phase. The confederates' frequency of positive social initiation to the students maintained their previously high levels, suggesting that the contingency system was not supporting the confederates' social interactions with the students. Teacher prompts were substantially reduced in the fourth phase, and confederates' positive social initiations decreased markedly.

In the final phase, teacher prompts resulted in increases in Confederates' 1 and 2 positive social initiations with the students. Confederate 3 was withdrawn from school during the final phase, and Confederate 1 substituted as a confederate for Jack. Confederate 1's level of positive social initiations to Jack approximated the levels of social behavior that Confederate 3 had directed to Jack in previous intervention phases.

Teacher Prompts

Prompts to the confederates to direct social initiations to the students were a component of the intervention package examined. Documentation of the presence and absence of prompts also represents a procedural analysis of a second variable of interest. As can be seen in Table 1, the mean frequency of social interaction prompted by the teacher was extremely low in baseline. During the first intervention phase, teacher-prompted social interaction increased markedly for the confederates, with the proportion of total social behavior ranging from 0.20 to 0.41. When the token reinforcement system was withdrawn, the confederates' teacher-prompted behavior decreased slightly in the first and third settings and increased slightly in the second setting. The proportions of total social behavior remained approximately the same. Also, as noted above, the level of the confederates' social initiations to the students remained stable.

During the fourth phase, teachers reduced their prompts to the confederates to a maximum of one per minute (i.e., if a social interaction had not occurred in the previous minute), resulting in low

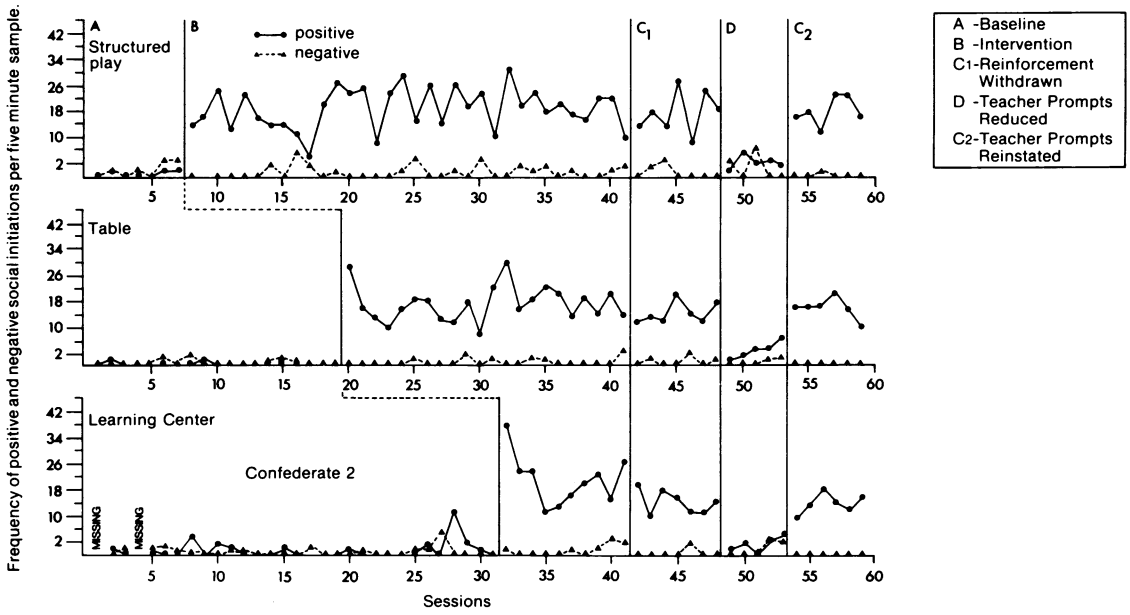

Figure 2. Frequency of positive and negative social initiations for Confederate 2.

mean frequencies of teacher-prompted social interaction. Likewise, in the last phase of the intervention, teachers were asked to resume prompting the confederates' social initiations to the students. Levels of teacher-prompted social interaction were comparable to earlier phases of the intervention, though the proportions of teacher-prompted social interaction were slightly higher.

As dictated by the peer-initiation intervention, teachers rarely prompted the students to interact with peers. With the exception of baseline in the table setting, teacher-prompted social interaction never accounted for more than 0.04 of the total social interaction. As can be seen in Table 1, these teacher-prompted interactions were distributed at a low rate, across all phases.

Students' Social Behavior

Gary's total positive and negative social interactions appear in Figure 4. In the structured play setting, increases in positive social interaction were slight at the beginning of the intervention, but reached a level substantially above baseline as the intervention progressed. Levels of positive social interaction increased slightly when his confederate's reinforcement system was withdrawn, decreased markedly when teacher prompts to the confederate were reduced, and increased again when teacher prompts to the confederate were reinstated.

When the intervention was implemented in the second setting (table), initially high levels of social interaction decreased across the first 9 days of intervention and then increased substantially during the latter part of the intervention. Levels of positive social interaction remained stable when the confederate's token reinforcement system was withdrawn, decreased when prompting to the confederate was reduced, and increased when prompts were again available to the confederate. Similar effects were observed in the third setting. Negative social interaction occurred very infrequently across all phases.

Garvin's total positive and negative social interactions appear in Figure 5. After near zero levels of positive and negative social interaction in baseline, Garvin's positive social interaction increased as Confederate 2 began to initiate to him. As the opportunities for social interaction increased, Garvin's negative social interaction also increased in the structured play setting and in the early days of

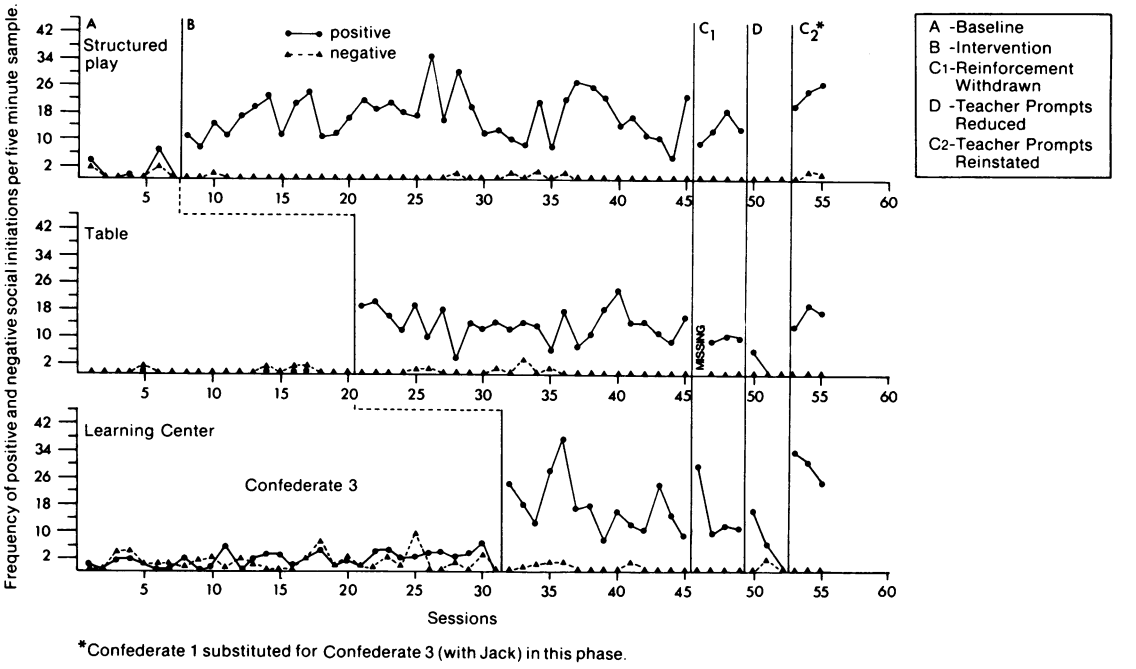

Figure 3. Frequency of positive and negative social initiations for Confederate 3.

the intervention in the table setting. However, as the intervention continued, negative interactions decreased. Garvin's positive social interactions remained stable when token reinforcement to his confederate was withdrawn, decreased when teacher prompts to the confederate were reduced, and increased when the teacher prompts to the confederate were reinstated.

The frequency of Jack's positive social interaction, found in Figure 6, replicated the effects found with the first two students. After initially small increases in positive social interaction in the structured play setting, a higher level of positive social interaction occurred at the end of the intervention phase. Again, levels of positive interaction remained fairly stable when the confederate's token reinforcement was withdrawn and decreased when teacher prompts to the confederate, and the confederate's initiations, decreased. As previously noted, Confederate 3 was withdrawn from school before the last phase of the study could be completed and Confederate 1 served as the peer trainer in the final phase. Her increased initiations resulted in increases in Jack's positive social interaction. Jack's negative interaction, at a low but variable rate across baseline and the early parts of the intervention in all three settings, reduced to a near zero level in the latter phases of the study.

Initiations and Responses

For ease of presentation, the positive and negative interactional behavior categories were summed in the previous graphs, and thus provide no information about the specific types of social interaction in which the students engaged. The students' rate of initiations and responses and their respective proportions of total social interaction are listed in Table 2. Rates of initiations and responses were extremely low during baseline. As the peer-initiation intervention was implemented, the students' response rates increased markedly. Response rates remained stable as the confederates' reinforcement was withdrawn, decreased when teachers reduced their prompts to the confederates, and increased when prompts were reinstated. The students' rates of initiations were also quite low during baseline

Table 1
Mean Frequency of Teacher-Prompted Positive Social Interation and Proportion of Total Positive Social Interaction

Experimental phase	Mean frequency and (proportion of total behavior)					
	Confederate 1	Gary	Confederate 2	Garvin	Confederate 3	Jack
Baseline						
Setting 1	0.0 (—)	0.0 (—)	0.0 (—)	0.0 (—)	0.0 (—)	0.0 (—)
Setting 2	0.0 (—)	0.5 (0.09)	0.31 (0.40)	0.11 (0.19)	0.1 (1.0)	0.2 (0.33)
Setting 3	0.1 (0.05)	0.0 (—)	0.3 (0.03)	0.3 (0.03)	0.0 (—)	0.13 (0.04)
Intervention						
Setting 1	11.2 (0.41)	0.27 (0.003)	7.97 (0.39)	0.05 (0.01)	7.0 (0.35)	0.79 (0.01)
Setting 2	6.1 (0.21)	0.0 (—)	6.52 (0.31)	0.05 (0.004)	3.88 (0.24)	0.0 (—)
Setting 3	8.6 (0.29)	0.0 (—)	6.7 (0.26)	0.0 (—)	4.33 (0.20)	0.67 (0.004)
Withdrawal of reinforcement						
Setting 1	6.14 (0.19)	0.0 (—)	6.29 (0.31)	0.0 (—)	5.0 (0.29)	0.0 (—)
Setting 2	8.28 (0.27)	0.0 (—)	7.14 (0.47)	0.14 (0.02)	4.25 (0.34)	0.25 (0.25)
Setting 3	5.14 (0.16)	0.14 (0.008)	3.86 (0.22)	0.0 (—)	3.0 (0.17)	0.0 (—)
Reduction of teacher prompts						
Setting 1	0.0 (—)	0.0 (—)	0.0 (—)	0.0 (—)	0.0 (—)	0.0 (—)
Setting 2	0.2 (0.02)	0.0 (—)	0.2 (0.05)	0.0 (—)	0.0 (—)	0.0 (—)
Setting 3	0.0 (—)	0.2 (0.03)	0.0 (—)	0.0 (—)	0.0 (—)	0.0 (—)
Reinstatement of teacher prompts						
Setting 1	7.5 (0.35)	0.0 (—)	10.0 (0.54)	0.0 (—)	3.33 (0.13)	0.33 (0.02)
Setting 2	9.4 (0.34)	0.0 (—)	6.17 (0.37)	0.17 (0.01)	7.67 (0.43)	0.0 (—)
Setting 3	6.4 (0.18)	0.0 (—)	4.5 (0.29)	0.0 (—)	1.0 (0.03)	0.0 (—)

Note. Setting 1 = structured play, Setting 2 = table, and Setting 3 = learning centers.

and remained at a low level throughout the intervention. These data reveal that the peer-initiation interventions, as one might expect, increased the rate and proportion of responses by the students, but left initiation rates unaffected.

Interactional Behavior Categories

An analysis of the specific behavioral categories that constituted the students' social interactions revealed that play organizer and share interactions occurred most frequently in each setting. For the study as a whole, play organizers represented 31%, 64%, and 30% of the total positive social interactions exhibited by Gary, Garvin, and Jack, respectively. Share interactions represented 46%, 33%, and 68%, respectively, of the three students' total positive social interaction. Other positive interaction categories occurred at a low or zero rate. Negative social interactions were evenly distributed between negative motor-gestural and negative vocal-verbal behaviors.

DISCUSSION

The peer-initiation intervention package used with three socially withdrawn handicapped children increased the types of social interactions that Strain (1983a) had found to be related to sociometric acceptance by nonhandicapped peers (i.e., play organization, sharing, responding to peers' social initiations). Thus, the intervention moved the students closer to the reported performance of handicapped children who are rated positively by their nonhandicapped peers.

As in previous studies (Hendrickson et al., 1982; Strain et al., 1977), students' positive social interactions increased when confederates directed their initiations to students. Van Houten (1979) has suggested that norms of competent individuals can be used as social validity standards against which treatment effects may be compared. Though frequencies of the nonhandicapped classmates' social interactions were not obtained in this study,

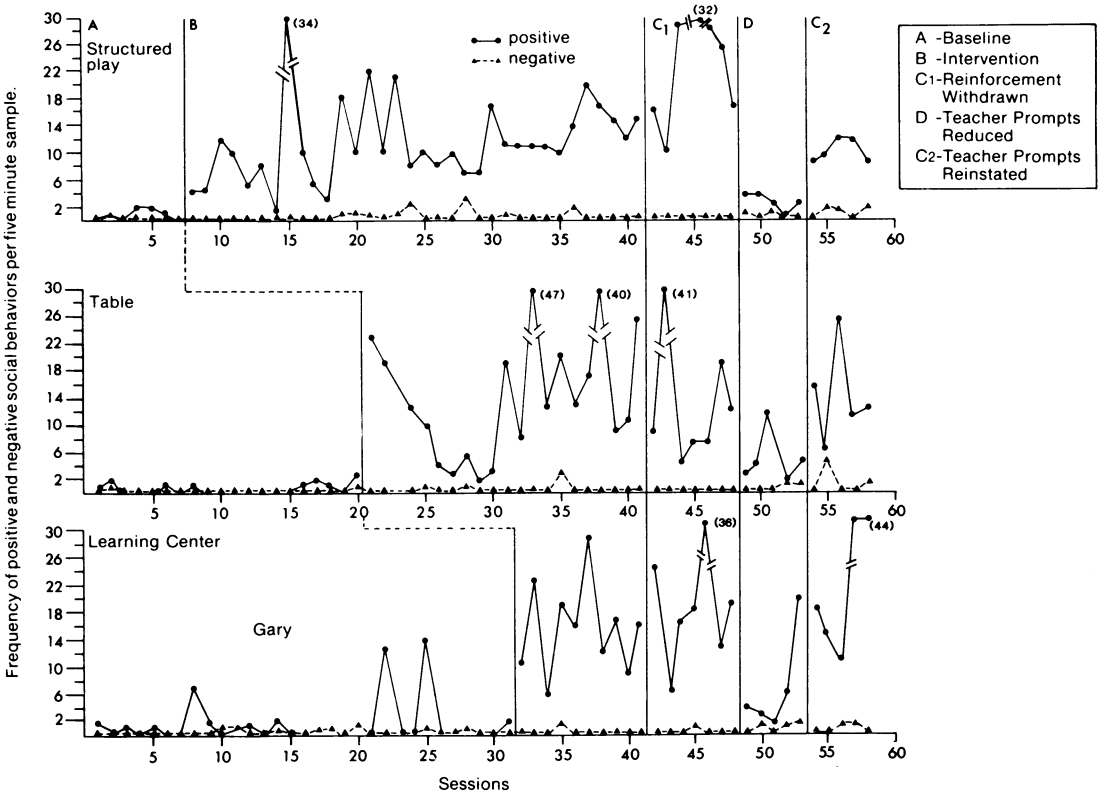

Figure 4. Frequency of positive and negative social interaction for Gary.

Greenwood, Walker, Todd, and Hops (1981) have provided social interaction rate norms for 461 preschoolers in Eugene, Oregon. Total interaction rates for 3- and 4-year-old males were 0.53 and 0.69, respectively, and the authors stated that initiation rates were approximately half of the total interaction rates. As revealed in Table 2, the baseline interaction rates were substantially below the levels of nonhandicapped children in the Greenwood et al. (1981) sample. During intervention, the total rates were substantially above the standard. However, changes in the total social interaction rates were primarily due to increases in social responding.

Peer-initiation interventions depend on the reciprocal nature of social behavior to effect changes in children's social interactions. As such, the most direct intervention effects would be on one class of social behavior: social responding. Though Strain (1983a) found social responding to be related to peer social acceptance by nonhandicapped classmates, other classes of behavior, such as social initiations, are also important in treating children with social interaction deficits. Table 2 revealed that the students' social initiations to peers occurred at a low rate across the study. It is likely that the intensive intervention may even have suppressed the students' spontaneous social initiations. Though some studies have found spontaneous increases in the social initiations of some subjects involved in peer-initiation interventions (Strain et al., 1977), such increases do not automatically occur for all subjects. Thus, a different intervention tactic may be necessary for increasing target students' social initiations to peers. In a recent study, Brady, Shores, Gunter, McEvoy, Fox, and White (in press) used a teacher-prompting and reinforcement technique to increase an autistic adolescent's social initiations to peers and observed increases in unprompted initiations to peers. The results from Brady et al. (in

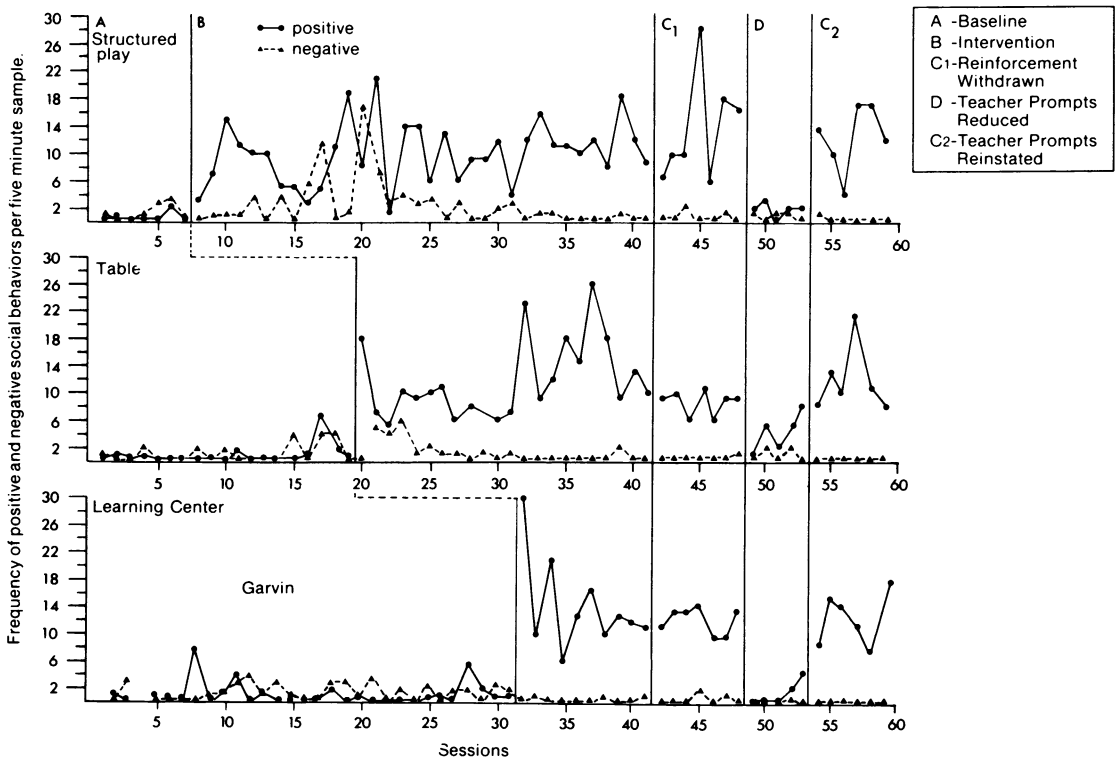

Figure 5. Frequency of positive and negative social interaction for Garvin.

press) and our study suggest that social initiations and responding to initiations may be different classes of social behavior that require complementary treatment approaches.

Proactive strategies for programming generalization of treatment gains (i.e., introducing natural maintaining contingencies, programming common stimuli) did not produce cross-setting increases in the students' social interactions. Thus, a sequential modification approach was used in a second setting, and, when generalization did not occur, the intervention was introduced in the third setting. Future research should examine the use of more proactive generalization-facilitating strategies (e.g., correspondence training for confederates, multiple exemplars using multiple confederates). Practitioners now using peer-initiation interventions should be cautioned that sequential modification approaches may be necessary for ensuring generalization of treatment effects across settings.

A second issue related to generalization is the intensity and length of the intervention. When implemented in three settings, this intervention was more intense (i.e., number of minutes per day) than most others that have been reported. However, it still only occurred for a total of 15 minutes per day across less than 5 weeks. As Hops (1982) has noted, it may be too much to expect brief interventions to produce enduring changes in social interaction that transfer across settings. Such strong effects may only occur when classroom-based curricula or procedures are developed that can be implemented and evaluated across an extended time period. The use of peer-mediated interventions implemented across settings and over extended time periods needs to be investigated.

A further purpose of this study was to analyze the controlling components of this peer-initiation intervention. Withdrawing the confederates' token reinforcement system had little effect on their level of social initiations to the students, suggesting that the rewards may not have been functional in sup-

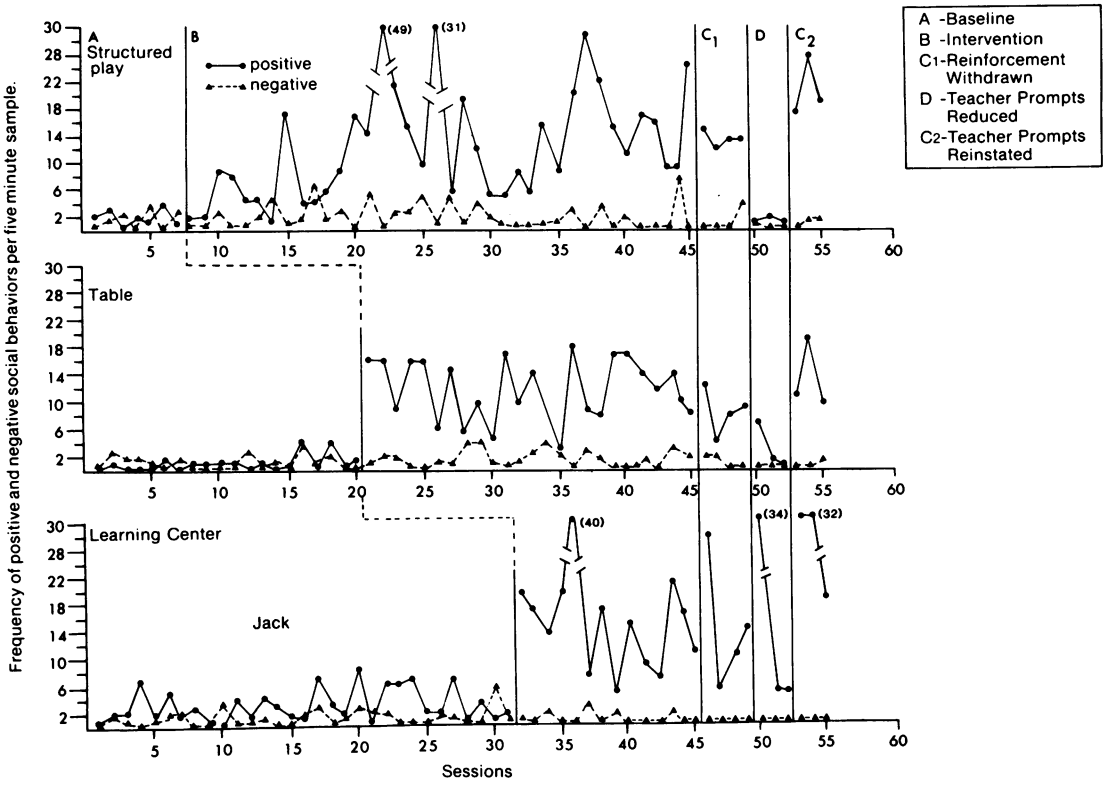

Figure 6. Frequency of positive and negative social interaction for Jack.

porting the confederates' social exchanges with students. It was possible that the confederates' social initiations could have been maintained by increased teacher prompting. Significantly, teacher prompts did not increase during the withdrawal of reinforcement phase of the study.

Though the token reinforcement system appeared to have little effect in maintaining the social initiations of the confederates, it would be too hasty to dismiss the use of reinforcement for confederates. Other studies have successfully used some form of reinforcement for confederates (Hendrickson et al., 1982; Strain et al., 1979; Young & Kerr, 1979). In the early part of the intervention phase of our study, it appeared that the token reinforcement system provided information to the confederates about their correct performance, as evidenced by confederates watching the token reinforcement card to see when they received a happy face and how many happy faces they had received. Also, such incentives could be effective for countering fatigue effects that some confederates may experience during interventions (Odom & Strain, in press). In fact, Confederate 2 would often abruptly discontinue her social initiations to Garvin after she had reached her criterion for the intervention sessions. As the students became more responsive to the confederates' initiations, it is possible that the social interactions themselves became of more interest to the confederates, allowing the token reinforcement to be withdrawn with minimal effects.

When the teacher reduced prompts to the confederates, the confederates' social initiations decreased substantially, resulting in marked declines in the students' positive social interactions. Reinstating teacher prompts increased the level of confederates' social initiations to students, resulting in increases in the students' interactions. This finding suggests that teacher prompts are an important part of this peer-initiation intervention package.

The issue of how much teachers should be involved in peer-initiation interventions is important.

Table 2
Rate (and Proportion) of Social Initiations and Responses for Students

Experimental phase	Gary		Garvin		Jack	
	Initiations	Responses	Initiations	Responses	Initiations	Responses
Baseline						
Setting 1	0.086 (0.50)	0.086 (0.50)	0.029 (0.50)	0.029 (0.50)	0.200 (0.54)	0.171 (0.46)
Setting 2	0.053 (0.45)	0.063 (0.55)	0.084 (0.66)	0.042 (0.34)	0.070 (0.78)	0.020 (0.22)
Setting 3	0.065 (0.20)	0.026 (0.80)	0.138 (0.65)	0.076 (0.35)	0.374 (0.67)	0.181 (0.33)
Intervention						
Setting 1	0.076 (0.03)	2.23 (0.97)	0.824 (0.04)	1.92 (0.96)	0.305 (0.12)	2.24 (0.88)
Setting 2	0.021 (0.01)	3.17 (0.99)	0.160 (0.07)	2.40 (0.93)	0.250 (0.10)	2.16 (0.90)
Setting 3	0.240 (0.08)	2.92 (0.92)	0.200 (0.07)	2.66 (0.93)	0.053 (0.04)	1.22 (0.96)
Withdrawal of reinforcement						
Setting 1	0.657 (0.15)	3.89 (0.85)	0.314 (0.14)	2.43 (0.86)	0.650 (0.25)	2.00 (0.75)
Setting 2	0.086 (0.03)	2.71 (0.97)	0.057 (0.03)	1.66 (0.97)	0.450 (0.27)	1.20 (0.73)
Setting 3	0.029 (0.08)	3.46 (0.92)	0.229 (0.12)	1.74 (0.88)	0.350 (0.13)	2.45 (0.87)
Reduction of teacher prompts						
Setting 1	0.080 (0.17)	0.04 (0.83)	0.80 (0.22)	0.28 (0.78)	0.067 (0.25)	0.20 (0.75)
Setting 2	0.000 (0.0)	0.92 (1.0)	0.12 (0.20)	0.48 (0.80)	0.067 (0.13)	0.46 (0.87)
Setting 3	0.240 (0.18)	1.12 (0.82)	0.80 (0.33)	0.16 (0.67)	0.133 (0.05)	2.67 (0.95)
Reinstatement of teacher prompts						
Setting 1	0.040 (0.02)	2.00 (0.98)	0.133 (0.06)	2.27 (0.94)	0.267 (0.07)	3.80 (0.93)
Setting 2	0.000 (0.00)	2.88 (1.00)	0.033 (0.01)	2.33 (0.99)	0.333 (0.13)	2.27 (0.87)
Setting 3	0.000 (0.00)	4.72 (1.00)	0.133 (0.05)	2.30 (0.95)	0.000 (0.00)	5.47 (1.00)

Note. Setting 1 = structured play, Setting 2 = table, and Setting 3 = learning centers.

If the purpose of peer-initiation interventions is to increase the students' participation in social interactions with peers, then teacher prompts to confederates may be less of a problem because they could be considered part of the total intervention package (i.e., the independent variable). If the purpose of peer-initiation interventions is to promote independent social interactions between confederates and students, then procedures must be developed to reduce teacher prompts systematically. Two approaches may be used for reducing the teacher-dependent nature of the confederates' initiations. At the beginning of the intervention, the confederate training might be altered to provide more practice in a less teacher-directed context. Later, as the confederate consistently reaches a criterion level of performance, teacher prompts could be systematically reduced in a response-dependent manner (Timm, Strain, & Eller, 1979). However, a related and important question is whether preschool-aged children have adequate social repertoires for independently generating a variety of successful social initiations when interacting with a peer who is consistently unresponsive. It is possible that some minimal form of teacher prompting may always be required for young confederate peers and unresponsive target children.

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