

*TRAINING PROSOCIAL BEHAVIORS TO YOUNG CHILDREN:
AN ANALYSIS OF RECIPROCITY WITH UNTRAINED PEERS*

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We examined the effects of a social skills training package on the play behaviors of three young girls. Two children were taught to invite their peers to play and to use social amenities during their conversations with other children. A combined reversal and multiple baseline across responses design demonstrated that both children directed more social behaviors to their classroom peers after training and that these two children's play invitations were maintained in the later absence of experimental contingencies. In addition, both target children received a greater number of play invitations from their peers during the free play periods. In contrast, a third child's play invitations were not reciprocated by peers; her invitations subsequently decreased in rate after training was discontinued. An interdependent group contingency produced a reciprocal exchange of invitations between this child and her classroom peers. A reversal design demonstrated partial maintenance of subject-peer exchanges after the group intervention was discontinued. The results obtained with the three target children suggest that peer reciprocity may facilitate the maintenance of children's play invitations over time.

DESCRIPTORS: peers, generalization, sharing, social behavior, children

During the past several decades many researchers have demonstrated the operant nature of children's social behavior (e.g., Allen, Hart, Buell, Harris, & Wolf, 1964; Barton & Ascione, 1979; Hart, Reynolds, Baer, Brawley, & Harris, 1968; Hopkins, 1968; Rogers-Warren & Baer, 1976). Despite this accomplishment, researchers have not always demonstrated the generalization and maintenance of social behavior (e.g., Berler, Gross, & Drabman, 1982; Herman & Tramontana, 1971; Strain, Kerr, & Ragland, 1981; Strain & Timm, 1974; Van Hasselt, Hersen, Whitehill, & Bellack, 1979; Warren, Baer, & Rogers-Warren, 1979). The mechanisms responsible for the generalization and maintenance of social behavior have become

the focus of recent research efforts (e.g., Fowler & Baer, 1981; Paine et al., 1982; Stokes & Baer, 1976; Stokes, Baer, & Jackson, 1974; Stokes, Fowler, & Baer, 1978; Timm, Strain, & Eller, 1979; Walker & Buckley, 1972).

Baer and Wolf (1970) noted that natural communities of peer reinforcement may be one solution to the generalization problem. Those authors argued that a group of preschool children could provide the social reinforcers necessary to shape and maintain various peer behaviors in the absence of adult contingencies. Unfortunately, little research has been conducted in this area and several investigators have noted that a complete understanding of the "entrapment" effect remains lacking (cf. Greenwood & Hops, 1981; Paine et al., 1982). In response to this problem, Strain and Shores (1977) suggested that the observation and documentation of reciprocal social exchanges between target children and their peers is critical (and perhaps even necessary) for the analysis of a peer entrapment process.

One phenomenon perhaps related to the peer reinforcement process is the "behavioral spillover effect," described and manipulated by Strain, Shores, and Kerr (1976). Those researchers observed that when reinforcement was delivered to a

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child receiving experimental intervention, the behaviors of peers not involved directly in the intervention also changed. Cooke and Apolloni (1976) also discovered this effect; after teaching four children to share with, smile at, and touch their peers, they found that the children's untrained playmates also exhibited the target behaviors more frequently. Kazdin (1981) has offered several explanations for this spillover effect. One account is that the social behaviors of children are interdependent. If the social behaviors emitted by young children are a function of the behavior exhibited by their peers, then modifying the social behaviors of one child should affect the behaviors of peers who interact with this child. An alternative explanation offered by Kazdin (1981) is that the contingent delivery of adult instructions, feedback, and praise to a target child may cue other children within the classroom to exhibit the same behaviors as the target child.

In support of the interdependency hypothesis, a growing body of literature has shown that children do influence the social behavior of their peers. For example, Wahler (1967) and Solomon and Wahler (1973) demonstrated that child attention can be withheld and delivered systematically to alter the behavior of classmates. In addition, Tremblay, Strain, Hendrickson, and Shores (1981) observed that preschool children responded differentially to various peer behaviors; responding positively to some, negatively to others, and ignoring the remainder. Finally, Charlesworth and Hartup (1967) found positive relationships between the number of positive and negative behaviors that children delivered to and received from their peers. The interdependent relationships reported in these studies support the following conclusion made by Strain et al. (1976): "as a child increases his rate of emitting positive social behavior, his peers will in turn increase their rates of emitting positive social behaviors toward him" (p. 31). This conclusion suggests that in many situations children will respond to or reinforce the behavioral gains obtained with their peers.

There are conditions, however, when children are not responsive to improvements in peers' be-

havior. For example, Strain et al. (1981) indicated that even if socially competent children participate in the training of withdrawn classmates, they tend to avoid these youngsters when socially skilled peers are available as playmates. Furthermore, those authors also reported that normal children may extinguish or even punish the behavioral gains of their handicapped peers. Finally, Walker and Buckley (1972) found that children's behavioral gains were maintained in a regular classroom setting only if classmates or original training stimuli were involved directly in the maintenance program. Thus, the literature is contradictory and additional research identifying the conditions under which peer responsiveness occurs is necessary. Until these conditions are identified, researchers cannot assume that children's behavioral gains will be reinforced and maintained by their peers in the absence of explicit experimental contingencies. Our primary intent in this study was to obtain a measure of peer responsiveness and to determine its relationship to the trapping and maintenance of behavior change.

The purposes of this experiment were to increase the number of prosocial responses exhibited by three young children, to determine whether this modification would increase the number of prosocial responses received from untrained classmates (e.g., peer responsiveness), and to determine whether the exchange of prosocial behaviors between children was related to the maintenance of these responses over time.

METHOD

Children and Setting

Three young girls, nominated by their teachers as candidates for social skills intervention, participated in this investigation. Betty attended a regular kindergarten and Sarah and Amanda attended a first-grade classroom in the Lawrence, Kansas, public school district.

Betty, a 5-year, 8-month-old girl was described by her classroom teachers as domineering and somewhat inconsiderate of her classmates. Observations during play activities indicated that Betty

emitted high rates of directive and negative statements in the presence of other children. When peers did not comply with Betty's directive statements, she frequently demanded that they leave the activity.

Sarah, a 6-year, 3-month-old girl, exhibited few negative behaviors during free play; rather, her passivity and lack of regular playmates concerned the first-grade teacher. Observations indicated that Sarah often watched other children play, but rarely requested permission to join in their activities.

Amanda, a 7-year, 10-month-old girl, frequently dominated free play activities by obtaining control of the most attractive materials and allowing only one or two peers to join her play group. Amanda usually directed negative behaviors to uninvited peers who attempted to join her group or gain access to the play materials.

All experimental observations were conducted during free play activities in the regular classroom. The 21 children in Betty's kindergarten participated in a 10–17 minute free play activity, 5 days per week. Daily play sessions of a similar duration were also conducted in Sarah and Amanda's first-grade classroom, which contained 14 children. During the free play activity, all children had access to three or four different play materials that were rotated daily from a pool of 16 items. Materials conducive to social interactions were selected (cf. Quilitch & Risley, 1973) and included building blocks, tinker toys, dominoes, and various board games. A classroom teacher was present throughout each session to monitor the children's noise level and to ensure appropriate use of the play materials. Outside of this role, the teacher was instructed not to interact with the children during free play.

Training sessions were conducted in a quiet area of the classroom approximately 30 feet from ongoing academic activities 10 minutes prior to the free play session. The entire classroom area was utilized for the daily free play activities.

Behavioral Definitions

Four classes of social behaviors were scored during subject-peer interactions: play invitations,

amenities, negative behavior, and directive verbalizations. Both play invitations and amenities were selected for intervention; invitations were chosen because previous research has indicated that these behaviors often occasion positive peer responses (cf. Tremblay et al., 1981). Similarly, social amenities have also been identified as an important social skill for primary grade children to exhibit (e.g., Risley, 1977; Walker et al., 1983).

Play invitations. Four types of invitations were scored. They included all instances in which a target child or peers: (a) verbally and physically offered to share play materials with another child; (b) verbally offered some form of assistance to another child (e.g., "Can I help you?"); (c) verbally invited another child to join a particular play activity (e.g., "Do you want to play with me?"); and (d) verbally requested permission to join an ongoing play activity (e.g., "Can I play?").

Child acceptance or refusal of play invitations. All invitations exchanged between a target child and her peers were scored as accepted or refused 15 seconds after their occurrence. Verbal forms of acceptance included statements of assent (e.g., "yes," "I guess so," or "all right"); nonverbal acceptance included head nods or acceptance of the other child's materials (see offers to share). Refusal of an invitation included head shaking, verbalizations of dissent (e.g., "No thanks," "Not right now,"), or no response at all (e.g., ignoring the offer).

Amenities. This was scored when children emitted the verbalizations "please," "thank you," "I'm sorry," "you're welcome," or "excuse me."

Negative behaviors. Both verbal and nonverbal forms of negative behavior were scored initially for Betty, Amanda, and their peers. Negative verbalizations included all derogatory, uncomplimentary, or rejecting statements (e.g., name calling or criticism), as well as verbal threats. Nonverbal forms of negative behavior included hitting, pushing, offensive or threatening gestures, and disruption of another child's play materials. Betty and her peers' verbalizations were scored initially for both content and voice intonation. Because this procedure yielded low levels of interobserver agreement, Betty and

her peers' negative behaviors were not usable for analysis. To ensure higher reliability scores, Amanda and her peers' verbalizations were scored according to content only.

Verbal directives. These were scored for Betty and Amanda only. Directives were recorded when a target child instructed or commanded another child to engage (or to cease engaging) in a specified behavior (e.g., "give me that block" or "don't touch that"). Directive statements did not present the other child with an alternative from which to choose.

Observational Procedure

Each target child was observed throughout the entire free play session. The observers, an undergraduate and two graduate students, used a 5-second interval recording system (Powell, Martindale, & Kulp, 1975) during the daily free play sessions. All observers had clipboards and cassette recorders that signaled the intervals via earplug attachments. To record child verbalizations accurately, observers remained within 6 feet of the observed child throughout the play session.

A 5-second interval was selected to reduce the possibility that a desirable and undesirable response could occur within the same observation interval. Observers scored child behaviors according to the following priority rules: Negative behaviors were scored first, followed by invitations or amenities, and then verbal directives. Invitations and amenities could occur together and be scored during the same observational interval (e.g., "May I *please* play with you?"); however, neither response could be scored in the same interval with a negative or verbal directive. In other words, the occurrence of a negative behavior, proximal in time to an invitation or amenity, was scored as discounting the positive social behavior.

During reliability sessions a second observer simultaneously but independently recorded child behaviors throughout the entire free play activity. Reliability was assessed at least once during all experimental conditions for each child; these assessments occurred during 20% to 25% of each child's observations. Calculations were derived by

dividing the total number of agreements by the total number of agreements plus disagreements and multiplying by 100. Because the behaviors occurred at a low frequency, occurrence calculations only were obtained on all behavioral categories for each target child and for the peers who interacted with these children.

The percentage of observer agreement was generally high and averaged 80% or above for each child behavior, in each condition for each target child. Specifically, agreement on the occurrence of play invitations ranged from 77% to 100% across experimental conditions and averaged 90%, 92%, 97%, and 85% for Betty, Sarah, Amanda, and their peers respectively. Agreement on the acceptance or rejection of these invitations was 100% for all three children and their playmates. Occurrence reliability on amenities ranged from 50% to 100% and averaged 87%, 100%, 80%, and 100% for the target children and their peers. The percentage of agreement obtained with Amanda and peer negative behavior ranged from 75% to 100% across conditions and averaged 83% and 80%, respectively. Finally, the scores obtained with Betty and Amanda's directives ranged from 70% to 82% and averaged 80% for both children.

Intervention Procedures

Betty and Sarah were exposed to a multiple baseline intervention across invitations (B) and amenities (C) with a reversal condition (A) following each intervention. Their sequence of conditions was ABACA. In contrast, Amanda received training with invitations only; she was exposed to three different interventions for invitations: train invitations individually (B), group contingency 1 (D), and group contingency 2 (E). Amanda's sequence of experimental conditions was ABADAEA. The sequence of experimental conditions for each child is described below.

Baseline (A). Three to four different play activities were available to all children in the classroom during a daily free play period. A teacher was present throughout each session to monitor the noise level and ensure appropriate use of play ma-

terials. No intervention occurred with invitations or amenities during this condition.

Train invitations (B). Betty, Sarah, and Amanda participated in a daily 10-minute training session. Two classmates participated in Betty's sessions on an alternating basis; a 5-year-old boy served as the peer trainer on one day and a 5-year-old girl on the next day. Sarah and Amanda participated in training together. The training procedure was developed by Cooke and Apolloni (1976) and consisted of instructions, modeling, behavioral rehearsal, and feedback. Following a brief rationale, the trainer (the first author) used the materials selected for free play on that day to model the behavior for the target child and her peer. Next, the children role played the behavior with the trainer and one another. The trainer occasionally prompted a child to refuse a play invitation and modeled viable responses that could be made in these situations (e.g., "Ok, I'll ask again later" and "Ok, I'll ask somebody else"). Finally, praise and feedback were provided by the adult throughout the training session.

Two forms of invitations, offering to share with peers and to help peers, were taught during the first half of this condition. Inviting peers to play and requesting permission to play with peers were taught during the second half of this condition.

Immediately after the training session, Betty, Sarah, and Amanda were given a counting bracelet and were instructed to move a bead after each occurrence of a target behavior during free play. On the first session of this condition the trainer made the following announcement to the class: "Today I will help Betty/Sarah/Amanda during free play by teaching her to play nicely with other children. You can help too if you want to. Also, if you have any questions about this, you should ask Betty/Sarah/Amanda." On the first three sessions of this condition, the trainer prompted the target children throughout free play by pointing out those situations appropriate for a play invitation and reminding the children to move a point bead. On the fourth session the trainer discontinued prompting.

After each free play session, the target child met

with the trainer briefly for feedback and reinforcement. Reinforcement was contingent on the occurrence of four play invitations during free play. The trainer relied on the observers' records to determine whether the criterion for reinforcement had been met. Examples of reinforcers included small stickers, pages from a coloring book, and the opportunity to read to the trainer. Betty's peer trainers were thanked daily for their participation and were given a small reward at the termination of this condition.

Interdependent group contingencies for Amanda and her peers (D and E). Two group-oriented procedures were implemented to increase invitations from peers to Amanda.

Group contingency 1—train invitation to Amanda and her peers (D). An interdependent group contingency was introduced to promote an exchange of invitations between Amanda and selected peers (excluding Sarah). During the daily training session, Amanda was instructed to extend at least three—but no more than six invitations—and to refrain from emitting negative behaviors during free play. In addition, the trainer described and rehearsed invitations with Amanda's classmates and each day appointed three children to direct one invitation each to Amanda during free play. A fourth child was also selected each day to prompt each of these peers to make an invitation to Amanda. Children were selected on a volunteer basis and the trainer nominated different children each day so that eventually all of Amanda's peers participated in the procedure (excluding Sarah). Amanda and her four designated classmates earned a colored sticker on the days that they met their predetermined criterion. In addition, the entire class earned a large-group reward after Amanda and her designated peers accumulated six daily points (three for Amanda and three for her peers) on 3 consecutive days.

Group contingency 2—train invitations to Amanda's peers only (E). The group intervention was continued for Amanda's peers only. As in the previous condition, three children were designated to direct an invitation to Amanda and a fourth child prompted these children to meet that re-

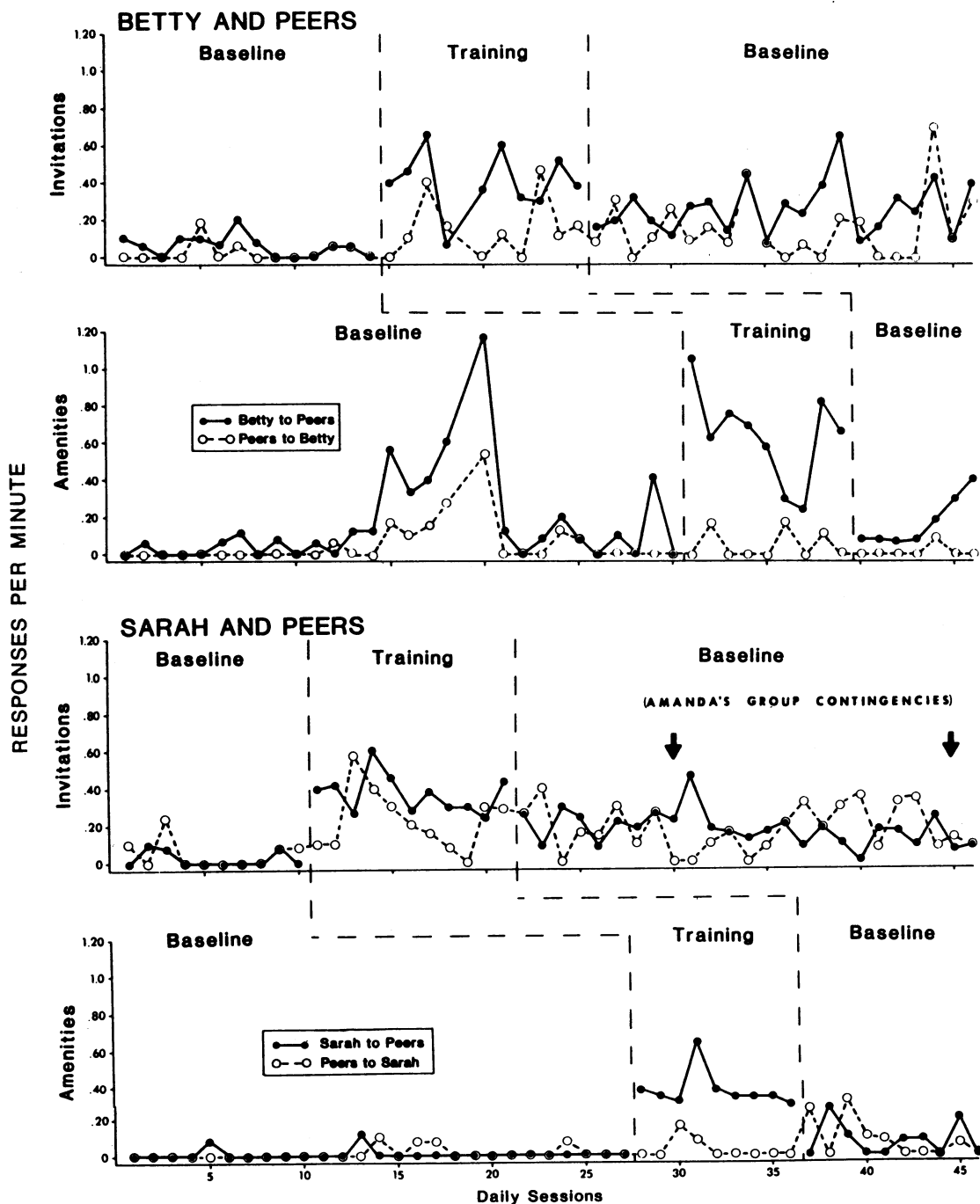


Figure 1. Daily rate of play invitations and social amenities exhibited by Betty, Sarah, and their peers.

quirement. As before, the trainer appointed different children on each day to ensure that all of Amanda's peers (again excluding Sarah) participated in this procedure. In addition, these children

continued to receive daily sticker reinforcement and a weekly class reward for meeting their criterion. Conversely, all intervention components that were related to Amanda (e.g., individual training ses-

sions, daily points and praise for three invitations, and for the absence of negative behaviors) were discontinued. Amanda continued to participate in the group activity earned by her classmates; however, she no longer earned class points or wore the bead bracelet during free play. Similarly, Sarah also participated in the daily free play activity and weekly class reward but was never appointed to contribute to the class effort.

Training amenities to Betty and Sarah (C). A 10-minute training session, similar to the one conducted for invitations, was implemented just prior to free play to teach amenities to Betty and Sarah. Betty's peer trainers participated in training; Sarah role played social amenities with the adult trainer only. The amenities of "please" and "thank you" were taught first, followed by "excuse me," "you're welcome," and "I'm sorry." The four training components—instructions, modeling, rehearsal, and feedback—described in the train invitations condition, were also used in this training condition. However, the trainer took care never to incorporate an amenity with a play invitation (trained in an earlier condition) during the training sessions. The same contingencies used in the train invitations condition were reinstated: Reinforcement was contingent on the occurrence of four amenities during free play.

Follow-up (Amanda only). Four weekly follow-up checks were conducted within the free play setting. Baseline conditions were in effect during these observations, which occurred on every sixth school day.

RESULTS

Betty and Sarah

The daily number of social behaviors per minute exchanged by these two children with their peers is depicted in Figure 1.

Introduction of the training condition for invitations immediately increased the rates of play offers and requests directed by Betty and Sarah to their playmates. With the exception of Betty on Session 18, both children consistently met the criterion for daily reinforcement by exhibiting four or

more invitations: Betty averaged 0.40 invitations per minute and Sarah averaged 0.36 offers and requests per minute. Classroom peers reciprocated by directing a greater number of invitations to both Betty and Sarah on these sessions. Only 11% of the invitations that Betty or Sarah received from peers occurred within 30 seconds of an invitation initiated by Betty or Sarah. Betty and her peers exchanged a surprising number of amenities during the first five sessions of the train invitations condition. These amenities occurred independently of invitations and were not incorporated into the play offer or request (e.g., "May I please play with you?").

Termination of the train invitations intervention somewhat reduced the number of invitations made by both target children. Betty and Sarah directed play offers and requests to their peers at average rates of 0.25 and 0.17, respectively throughout the prolonged baseline phase for invitations. Likewise, peers directed lower rates of 0.11 and 0.17 invitations to Betty and Sarah during this same baseline.

The train amenities condition produced immediate increases in the rate of amenities used by Betty and Sarah during their conversations with classmates. Approximately 50% of the target children's amenities were incorporated into their invitations during this phase. In contrast to play offers and requests, peers did not consistently reciprocate amenities. Finally, both Betty and Sarah used fewer amenities after the removal of experimental contingencies.

Figure 2 shows the number and proportion of invitations per session that were emitted and accepted by Betty, Sarah, and their playmates. A large percentage (81%) of Betty's invitations were accepted by her peers and 90% of the peer offers and requests were accepted by Betty. The proportion which Betty accepted decreased substantially after the removal of experimental contingencies: Betty accepted only 35% of her peers' invitations. Sarah and her playmates accepted approximately two-thirds of the invitations they exchanged during training; this proportion increased slightly and maintained after the termination of the train invitations condition.

The effects of the two interventions on Betty's rate of directive statements also were assessed. During the first and second baselines, Betty used an average of one directive per minute during peer interactions. This rate decreased to 0.25 or less during each of the two interventions. This low rate of directives was maintained throughout the final baseline phase.

Amanda

The daily rate per minute of social behaviors exchanged between Amanda and her classmates is depicted in Figure 3.

Introduction of the train invitations condition immediately increased Amanda's rate of invitations from near 0 to 0.69 per minute. In contrast to the results obtained with Betty and Sarah, peers did not increase their invitations to Amanda during this initial intervention. A reversal to baseline produced an immediate and clear decrease in Amanda's rate of play offers and requests. The interdependent group contingency introduced during Sessions 30 through 37, however, produced high rates of reciprocal invitations between Amanda and her classmates. Subsequently, the group contingency was shifted exclusively to the peer group (Sessions 38–44); both Amanda and the peers' invitations were successfully maintained.

On Session 45, a final baseline condition was reinstated for invitations. The peer rate immediately decreased from 0.33 to 0.15 behaviors per minute; this rate was similar to the rate of invitations directed to Betty and Sarah during their final baseline phases and higher than the rate exhibited by peers during Amanda's previous baselines. Amanda's rate of play offers and requests likewise decreased to 0.20 during the baseline III and follow-up sessions. Finally, although unprompted and unreinforced, Amanda also used a greater number of social amenities throughout the group contingency phases of this experiment.

Figure 4 illustrates the impact of the interventions on the number of invitations per session that were given and accepted by Amanda and her classmates. During the initial train invitations phase (Sessions 11–24), 56% of Amanda's invitations

were accepted by their recipients. This proportion increased to 91% during the group intervention phases; Amanda in turn accepted 77% of the invitations extended to her from peers throughout the group contingency phases. Finally, this high acceptance ratio maintained after the termination of the group interventions.

Table 1 depicts the mean rate of two corollary behaviors—negatives and directives—for each experimental condition. Amanda and her classmates exchanged high rates of negative behaviors throughout the baseline I and train invitations conditions. However, when direct reinforcement contingencies nearly eliminated Amanda's negative behaviors during the first group contingency phase (Sessions 30–37), the peer rate decreased to zero. Furthermore, negatives remained at near zero levels after all experimental contingencies had been removed. In contrast to Betty, Amanda maintained a stable and fairly high rate of directive statements throughout most of the experiment.

DISCUSSION

The results of this study suggest that certain forms of peer responses may contribute to the maintenance of children's social behaviors. Two forms of peer responses to invitations extended by the target children were examined: rate of invitations that were directed to the target children (i.e., reciprocal invitations) and immediate acceptance or refusal of the target children's invitations. Peer invitations were scored throughout the free play sessions; acceptance and refusal were scored within the 15 seconds following an invitation. Researchers have maintained that the maintenance of a newly acquired behavior may be facilitated by peers' reciprocal use of it and the immediate peer response to it (cf. Bryant & Budd, 1984; Charlesworth and Hartup, 1967; Greenwood, Hops, Todd, & Walker, 1982; Strain et al., 1976; Tremblay et al., 1981). In our study, the peers' reciprocal exchange of the behavior appeared to be a significant variable.

The importance of peer reciprocity to the maintenance of social behavior may be deduced from

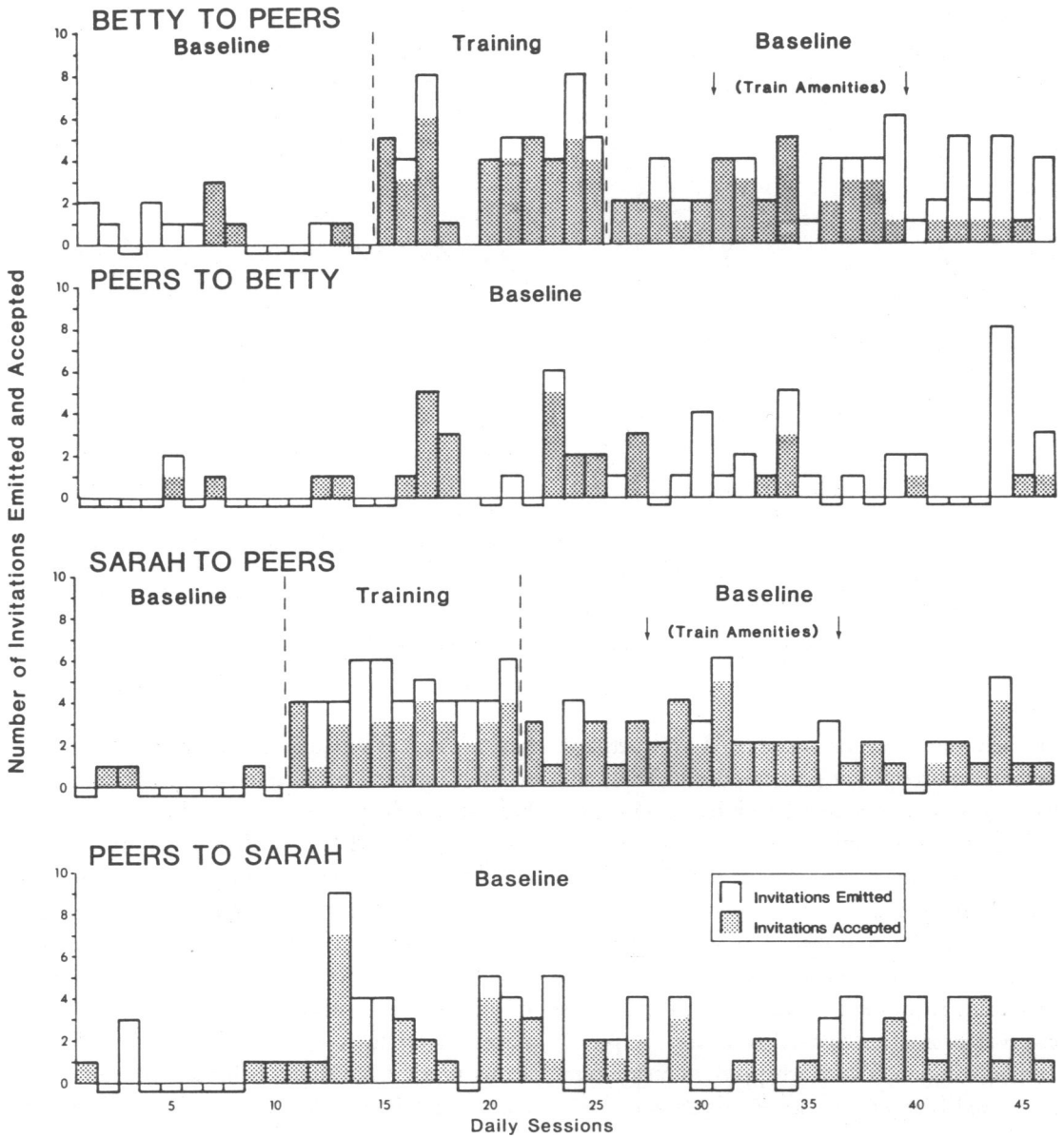


Figure 2. Daily number of play invitations emitted and accepted by Betty, Sarah, and their peers.

the following relationships evident in this study: (a) Betty's and Sarah's invitations, which were consistently reciprocated with peer invitations, maintained in the later absence of experimental contingencies; (b) their social amenities, which were not consistently reciprocated, did not clearly maintain in the later absence of experimental reinforcement; (c) Amanda's invitations were not reciprocated during the initial training phase and did not main-

tain during the subsequent baseline II phase; (d) Amanda's invitations were maintained later in the absence of direct experimental contingencies, when peer invitations to Amanda were ensured with experimental contingencies (i.e., group contingency 2); and (e) Amanda's invitations decreased during the final baseline phase when the peers also exhibited fewer invitations.

Taken together, these results suggest that some

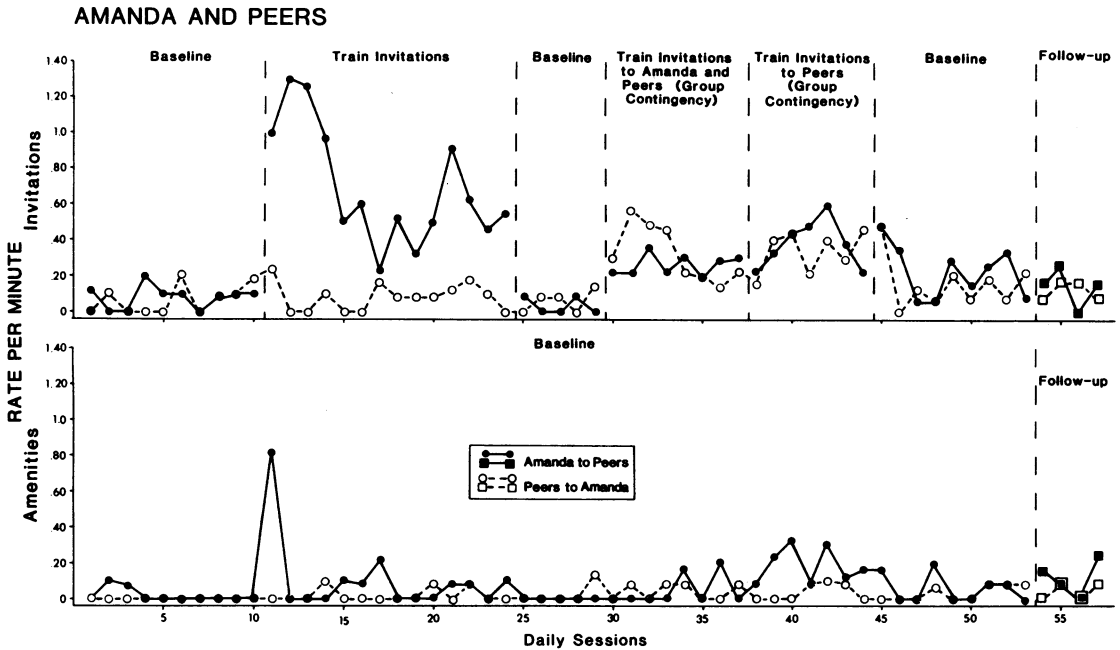


Figure 3. Daily rate of Amanda and peers' play invitations and social amenities.

social behaviors may be maintained and perhaps occasioned by reciprocal peer responses. These results suggest that the mutual exchange of a behavior may function effectively to trap (i.e., reinforce) the behavior in the later absence of the original training conditions.

Thus, a viable solution to programming the generalization and maintenance of children's behavior gains is to select behaviors, such as invitations, that promote reciprocal behaviors by peers. A second solution is to teach peers to reciprocate the targeted behavior, as we did with Amanda's peers. Although researchers have suggested that the social behaviors of children are interdependent (e.g., Kazdin, 1981; Charlesworth & Hartup, 1967; Strain et al., 1976), few have demonstrated the development of reciprocal peer responses and their likely function as a behavioral trap for children's social behaviors. Similarly, few have demonstrated the maintenance of this trap in the absence of all external reinforcement contingencies.

Perhaps some social behaviors, such as invitations to share, are more effective in promoting reciprocal peer responses than are other social be-

haviors, such as verbal amenities. Invitations appear to have a natural reinforcement function for members of a play group (e.g., children who receive and accept invitations usually gain immediate access to a play material or playmate). If so, these responses are likely to be reinforced and maintained through a variety of natural consequences (e.g., the invited child who accepts an invitation may reciprocate with an invitation at a later time, thereby starting a cycle of invitation exchanges across time). Conversely, behaviors like amenities may lack this natural function in a play group. Researchers should examine other behaviors typically targeted for social skills development (e.g., compliments, greetings, play organizers) to determine their effects on a peer group and the probability that the peer group will either use and reciprocate these responses or respond immediately and appropriately to the target children's use of the response.

In this study the target children's maintenance of invitations was best predicted by the rate at which invitations were reciprocated by peers, rather than by peers' acceptance or rejection of the offer.

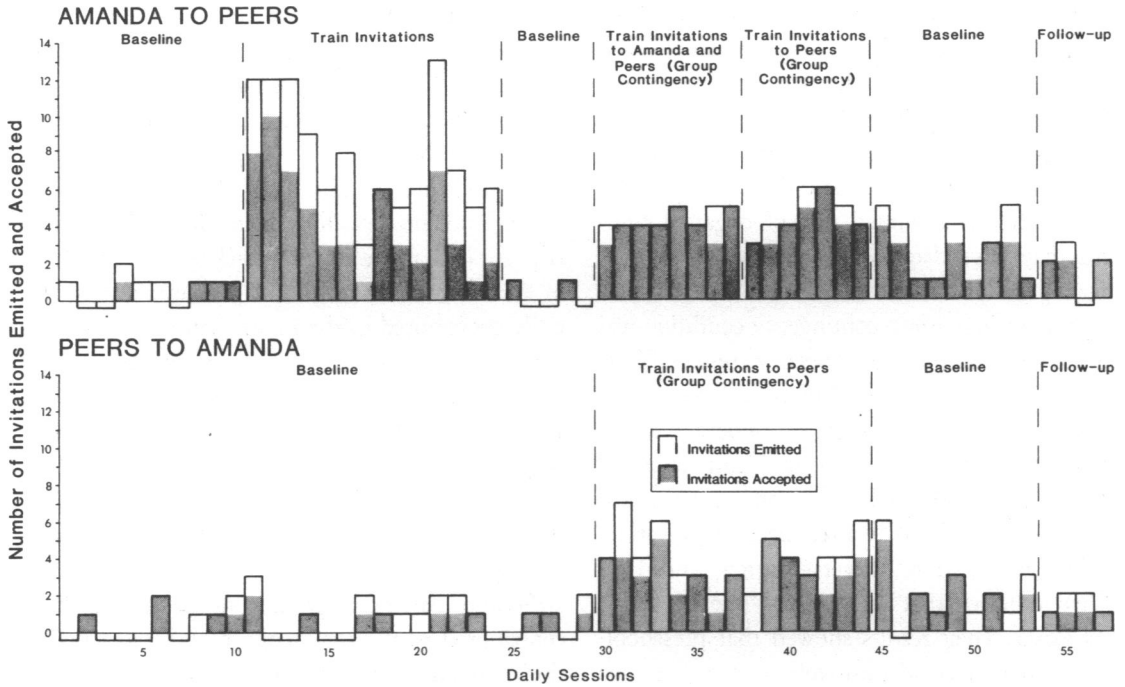


Figure 4. Daily number of play invitations emitted and accepted by Amanda and peers.

Observations conducted during the initial train invitations condition indicated that peers accepted 66% and 56% of the invitations extended by Sarah and Amanda, respectively. Despite the similar probability of acceptance, Sarah's invitations were maintained over time, whereas Amanda's declined to low rates. Although a certain level of peer acceptance may be a necessary precondition for the maintenance of invitations, our results suggest that peer acceptance may not be sufficient to ensure maintenance. These results suggest that researchers not focus only on a given invitation and the immediate peer response to the invitation, as has been the case frequently in the past (e.g., Bryant & Budd, 1984; Greenwood et al., 1982; Tremblay et al., 1981), but look also for reciprocal occurrences of the invitation.

A comparison of Amanda's results with those for Betty and Sarah suggests that certain conditions may be necessary before peers will reciprocate invitations consistently and independently. The conditions include: (a) a decrease in (or absence of) behaviors that compete with invitations, such as

negative behaviors or directive commands; (b) an appropriate rate of invitations, distributed across members of the peer group; and (c) the availability of a peer, not already engaged in an activity who can respond. Each of these conditions will be discussed.

The peers' differential rate of reciprocating in-

Table 1
Mean Rates per Condition of Negatives and Directives Exchanged by Amanda and Peers During the Free Play Activity

Condition	Negatives		Directives
	Amanda	Peer	Amanda
Baseline I	0.18	0.07	0.69
Train invitations	0.10	0.07	0.46
Baseline II	0.06	0.04	0.86
Group contingency 1	0.01	0.00	0.55
Group contingency 2	0.00	0.01	0.42
Baseline III	0.01	0.00	0.56
Four week follow-up	0.00	0.00	0.51

itations to Betty and to Amanda may have been related to the girls' rate of negative actions and remarks. Betty's rate of directive statements decreased dramatically during the train invitations condition, whereas Amanda's negative and directive behaviors did not decrease during this condition. Amanda's continued rate of negative comments may have deterred peer invitations to her. In fact, peer invitations to Amanda occurred reliably only when a group contingency condition was implemented, during which peers were specifically reinforced for extending invitations to Amanda and Amanda was punished with a response cost for directing negative actions and statements to peers.

The rate and stimulus conditions under which invitations occur also may affect peer reciprocation. Research by Warren, Rogers-Warren, and Baer (1976) indicates that an optimal rate of share-offers exists. Their results showed that preschool-aged children respond positively to a rate of two share offers per 5-minute period and generally ignore additional offers. In this study, Betty and Sarah typically extended invitations at this rate (i.e., six per 15-minute free play activity or two per 5 minutes).

The distribution of invitations also should be considered. Betty and Sarah distributed 53% of their offers across the first half of free play and 47% across the second half. Likewise, they directed their invitations across most members of their peer group. In contrast, Amanda often invited at an excessive rate and without regard to the timing of her invitation, even though she contacted a wide variety of peers with her invitations. For example, she sometimes made a dozen offers per activity and moved from one play group to another without waiting for any group's response to her offer or request.

The undesirable rate and timing of Amanda's invitations plus the continued display of negative behaviors indicated that additional social skills training was required. The group contingency condition provided an opportunity to teach Amanda to invite at a normal rate, to identify the appropriate social conditions for an invitation, and to

reduce her negative comments. In addition, the group contingency appeared to be the simplest procedure to promote positive peer responses to Amanda's invitations and to ensure reciprocal invitations to her.

Finally, three qualifications should be made regarding potential confounds in this study. First, it is possible that the training package for amenities, in addition to the reciprocal peer invitations, initially contributed to the maintenance of Betty and Sarah's invitations. Inspection of the baseline II data, however, suggests that this is unlikely; both Betty and Sarah made invitations at a stable rate of two or three during the brief baseline phase, which preceded the train amenities condition. They did not alter this rate of invitations either during or after the train amenities condition.

Second, Amanda's group contingency may have contributed to the maintenance of Sarah's invitations. Again, data presented in Figure 1 indicate that the onset of Amanda's group contingency during Sarah's baseline, did not alter Sarah's rate of invitations. Sarah continued to invite peers to play at a rate of two to three times per session. Furthermore, care was taken to exclude Sarah from active participation in Amanda's group contingency. Sarah was never appointed to direct an invitation to Amanda or to prompt her peers to direct an invitation.

Third, Sarah and Amanda may have contributed significantly to each other's rates of peer invitations. To determine if this confound existed, data samples were obtained on the direction of peer invitations, both given and received. During the time period sampled (Days 15 to 28 for Sarah, and Days 45 to 52 for Amanda), Sarah and Amanda each received invitations from 9 of their 13 classmates. Only 30% of the sampled 36 invitations that Sarah received were initiated by Amanda. Only 9% of the sampled 22 invitations that Amanda received came from Sarah. These findings suggest that Sarah and Amanda exchanged play invitations with many of their classmates. Even though Sarah and Amanda sometimes received invitations from one another, these ex-

changes did not account for a majority of the invitations that they received from peers (i.e., reciprocal peer invitations).

The results of this study relate to that literature concerned with maintenance strategies (e.g., Fowler & Baer, 1981; Walker & Buckley, 1972), group-oriented contingencies (e.g., Greenwood & Hops, 1981), peer reciprocity (e.g., Strain & Shores, 1977), and the peer entrapment effect (e.g., Baer & Wolf, 1970). Future researchers may now pursue a variety of different questions. For example, how large need the peer group be that reciprocates and presumably reinforces certain target behaviors to ensure the trapping of behavior? Another question relates to the specific exchange of target behaviors: Are those children who receive the most invitations from the target child most likely to reciprocate with the greatest number of offers and requests to the target child? If so, are these behaviors reciprocated during that same play activity, that same day, or that same week? In this study, peers who extended invitations in a session often were not the same peers who received an invitation during that session. Children invited to play one day might not reciprocate with an invitation until another day.

Finally, the specific function of peer reciprocity must be clarified. The results of this investigation only suggest that reciprocal peer invitations maintained the target children's play offers and requests over time. Future researchers might experimentally "turn on" and "turn off" reciprocal peer invitations to determine their effects on a target child's invitations. This type of functional analysis will determine whether the reciprocity of a child's social behavior from peers can indeed function as a reinforcer to maintain that behavior over time.

REFERENCES

- Allen, K. E., Hart, B., Buell, J. S., Harris, F. R., & Wolf, M. M. (1964). Effects of social reinforcement on isolate behavior of a nursery school child. *Child Development*, *35*, 511-518.
- Baer, D. M., & Wolf, M. M. (1970). The entry into natural communities of reinforcement. In R. Ulrich, T. Stachnik, & J. Mabry (Eds.), *Control of human behavior* (Vol. 2) (pp. 319-324). Glenview, IL: Scott, Foresman.
- Barton, E. J., & Ascione, F. R. (1979). Sharing in preschool children: Facilitation, stimulus generalization, response generalization, and maintenance. *Journal of Applied Behavior Analysis*, *12*, 417-430.
- Berler, E. S., Gross, A. M., & Drabman, R. S. (1982). Social skills training with children: Proceed with caution. *Journal of Applied Behavior Analysis*, *15*, 41-54.
- Bryant, L. E., & Budd, K. S. (1984). Teaching behaviorally handicapped preschool children to share. *Journal of Applied Behavior Analysis*, *17*, 45-56.
- Charlesworth, R., & Hartup, W. W. (1967). Positive social reinforcement in the nursery school peer group. *Child Development*, *38*, 993-1002.
- Cooke, T. P., & Apolloni, T. (1976). Developing positive social-emotional behaviors: A study of training and generalization effects. *Journal of Applied Behavior Analysis*, *9*, 65-78.
- Fowler, S. A., & Baer, D. M. (1981). "Do I have to be good all day?" The timing of delayed reinforcement as a factor in generalization. *Journal of Applied Behavior Analysis*, *14*, 13-24.
- Greenwood, C. R., & Hops, H. (1981). Group-oriented contingencies and peer behavior change. In P. S. Strain (Ed.), *The utilization of classroom peers as behavior change agents* (pp. 189-259). New York and London: Plenum Press.
- Greenwood, C. R., Hops, H., Todd, N. M., & Walker, H. M. (1982). Behavior change targets in the assessment and treatment of socially withdrawn preschool children. *Behavioral Assessment*, *4*, 273-297.
- Hart, B. M., Reynolds, N. J., Baer, D. M., Brawley, E. R., & Harris, F. R. (1968). Effect of contingent and non-contingent social reinforcement on the cooperative play of a preschool child. *Journal of Applied Behavior Analysis*, *1*, 73-76.
- Herman, S. H., & Tramontana, J. (1971). Instruction and group reinforcement in modifying disruptive group behavior. *Journal of Applied Behavior Analysis*, *4*, 113-119.
- Hopkins, B. L. (1968). Effects of candy and social reinforcement schedule on the modification and maintenance of smiling. *Journal of Applied Behavior Analysis*, *1*, 121-129.
- Kazdin, A. E. (1981). Vicarious reinforcement and punishment processes in the classroom. In P. S. Strain (Ed.), *The utilization of classroom peers as behavior change agents* (pp. 129-153). New York and London: Plenum Press.
- Paine, S. C., Hops, H., Walker, H. M., Greenwood, C. R., Fleischman, D. H., & Guild, J. J. (1982). Repeated treatment effects: A study of maintaining behavior change in socially withdrawn children. *Behavior Modification*, *6*, 171-199.
- Powell, J., Martindale, A., & Kulp, S. (1975). An eval-

- uation of time sampling measures of behavior. *Journal of Applied Behavior Analysis*, **8**, 463-469.
- Quilitch, H. R., & Risley, T. R. (1973). The effects of play materials on social play. *Journal of Applied Behavior Analysis*, **6**, 573-578.
- Risley, T. R. (1977). The social context of self-control. In R. B. Stuart (Ed.), *Behavioral self-management strategies, techniques and outcome* (pp. 71-81). New York: Bruner-Mazel.
- Rogers-Warren, A., & Baer, D. M. (1976). Correspondence between saying and doing: Teaching children to share and praise. *Journal of Applied Behavior Analysis*, **9**, 335-354.
- Solomon, R. W., & Wahler, R. G. (1973). Peer reinforcement control of classroom problem behavior. *Journal of Applied Behavior Analysis*, **6**, 49-56.
- Stokes, T. F., & Baer, D. M. (1976). Preschool peers as mutual generalization-facilitating agents. *Behavior Therapy*, **7**, 549-556.
- Stokes, T. F., Baer, D. M., & Jackson, R. L. (1974). Programming the generalization of a greeting response in four retarded children. *Journal of Applied Behavior Analysis*, **7**, 599-610.
- Stokes, T. F., Fowler, S. A., & Baer, D. M. (1978). Training preschool children to recruit natural communities of reinforcement. *Journal of Applied Behavior Analysis*, **11**, 285-303.
- Strain, P. S., Kerr, M. M., & Ragland, E. U. (1981). The use of peer social initiations in the treatment of social withdrawal. In P. S. Strain (Ed.), *The utilization of classroom peers as behavior change agents* (pp. 101-128). New York and London: Plenum Press.
- Strain, P. S., & Shores, R. E. (1977). A review of research and educational implications. *Exceptional Children*, **8**, 526-530.
- Strain, P. S., Shores, R. E., & Kerr, M. M. (1976). An experimental analysis of "spillover" effects on the social interaction of behaviorally handicapped preschool children. *Journal of Applied Behavior Analysis*, **7**, 31-40.
- Strain, P. S., & Timm, M. A. (1974). An experimental analysis of social interaction between a behaviorally disordered preschool child and her classroom peers. *Journal of Applied Behavior Analysis*, **7**, 583-590.
- Timm, M. A., Strain, P. S., & Eller, P. H. (1979). Effects of systematic response dependent thinning procedures on the maintenance of child-child interactions. *Journal of Applied Behavior Analysis*, **12**, 308.
- Tremblay, A., Strain, P. S., Hendrickson, J. M., & Shores, R. E. (1981). Social interaction of normally developing preschool children: Using normative data for subject and target behavior selection. *Behavior Modification*, **5**, 237-253.
- Van Hasselt, V. B., Hersen, M., Whitehill, M. B., & Bellack, A. S. (1979). Social skill assessment and training for children: An evaluative review. *Behavioral Research and Therapy*, **17**, 413-437.
- Wahler, R. G. (1967). Child-child interactions in free field settings: Some experimental analyses. *Journal of Experimental Child Psychology*, **5**, 278-293.
- Walker, H. M., & Buckley, N. K. (1972). Programming generalization and maintenance of treatment effects across time and across settings. *Journal of Applied Behavior Analysis*, **5**, 209-224.
- Walker, H. M., McConnell, S. R., Holmes, D. I., Todis, B. I., Walker, J., & Golden, N. (1983). *The Walker social skills curriculum: The ACCEPTS program*. Austin, TX: Pro-ed Publishers.
- Warren, S. F., Baer, D. M., & Rogers-Warren, A. (1979). Teaching children to praise: A problem in stimulus and response generalization. *Child Behavior Therapy*, **1**, 123-137.
- Warren, S. F., Rogers-Warren, A., & Baer, D. M. (1976). The role of offer rates in controlling sharing by young children. *Journal of Applied Behavior Analysis*, **9**, 491-497.

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