

*EFFECTS OF SELF-EVALUATION ON PRESCHOOL CHILDREN'S USE
OF SOCIAL INTERACTION STRATEGIES WITH THEIR
CLASSMATES WITH AUTISM*

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This study investigated effects of a self-evaluation procedure on preschool children's use of social interaction strategies among their classmates with autism. Three triads of children (comprised of 1 trained normally developing peer, 1 untrained peer, and 1 child with autism) participated. A multiple baseline design across subjects was used to demonstrate that peers who were taught facilitative strategies increased their use of strategies only after the self-evaluation intervention was introduced. Improvements in social behavior of children with autism was associated with peers' increased strategy use. Untrained peers demonstrated little change in their social behavior. Treatment effects were replicated when trained peers were asked to use self-evaluation with other children with autism during other play times. Self-evaluation procedures enhanced the use of social interaction strategies on the part of normally developing peers during social skills interventions.

DESCRIPTORS: self-evaluation, social skills, preschool children, autism

A typical pattern of social interaction emerges when young children with handicaps are enrolled in regular classes. Socially competent peers tend to play with one another during free-play periods and often ignore or even reject classmates with handicaps. These behavior patterns emerge primarily because children with handicaps lack the social skills needed to perform adequately in the normal peer group, such as sharing toys, suggesting or complying with play ideas, and enacting dramatic play

roles (Strain, Guralnick, & Walker, 1986). Consequently, research has sought to promote more appropriate social skills on the part of youngsters with severe handicaps in integrated preschool programs (e.g., Goldstein & Ferrell, 1987; James & Egel, 1986; Odom & Strain, 1984; Shafer, Egel, & Neef, 1984; Strain, Shores, & Timm, 1977).

A much-studied method for enhancing participation of children with handicaps during play activities involves teaching interaction strategies to classmates and then prompting their use during interactions with the handicapped peers. Strategies that have been useful in engaging children with handicaps in play include social initiations (e.g., offering toys, suggestions, assistance, affection, and compliments). Prior research has yielded a number of consistent findings: (a) A class of 6 to 8 preschoolers can readily be taught these facilitative strategies, (b) children with a wide range of handicaps demonstrate substantial improvements in their social interactions after receiving frequent social

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overtures from their classmates, and (c) these improvements tend to be limited to situations in which teachers actively encourage peers to use the facilitative strategies. Our current technology for promoting social interaction may have inadvertently produced prompt-dependent behavior. Developing additional methods that rely less on teacher prompting seems to be an important initial step in promoting more widespread effects.

One strategy that may fill this instructional gap is the use of self-evaluation procedures. Self-evaluation procedures have been used widely in educational settings with both typical children (Bolstad & Johnson, 1972; Drabman, Spitalnik, & O'Leary, 1973; Glynn & Thomas, 1974; O'Leary & Dubey, 1979; Thomas, 1976) and children with handicaps (Holman & Baer, 1979; Rhode, Morgan, & Young, 1983; Robertson, Simon, Pachman, & Drabman, 1979; Shapiro, McGonigle, & Ollendick, 1980). In these studies, elementary-school children were able to learn to self-evaluate accurately; then the intervention procedures were removed systematically without a corresponding decline in child performance. Sainato, Strain, Lefebvre, and Rapp (1990) developed a self-evaluation package for preschoolers with autism to promote independent work. Children learned to match their self-evaluations to teacher evaluations along nine dimensions depicted in photographs. Reinforcement for accurate self-evaluations was sufficient to improve the rate of appropriate behavior during completion of worksheets. The use of pictures and the fact that preschool children were able to self-manage along a number of dimensions hold promise for the use of similar procedures in the social skills domain. Pictures of a variety of social behaviors could assist children in forecasting their use of facilitative strategies and in evaluating their performance after play periods.

Limited research has examined the use of self-evaluation procedures with preschoolers. No studies have investigated the potential of using self-evaluation as a means of promoting preschoolers' use of facilitative strategies in social behavior. Thus, the purpose of this study was to determine (a)

whether peer confederates' self-evaluation increased their use of facilitative strategies without high rates of teacher prompting, (b) whether peer confederates' independent use of facilitative strategies resulted in more frequent social behavior on the part of classmates with autism, (c) whether untrained peers increased their use of facilitative strategies after observing peer confederates, and (d) whether peers generalized strategy use to other classmates with autism.

METHOD

Participants

Participants were selected from 6 typical children and 6 children with autism who were enrolled in an integrated preschool in a large urban elementary school. A total of 8 children comprised three triads. Each triad included 1 child who was autistic, a peer confederate who was taught facilitative strategies, and another peer who was not taught strategies.

At the beginning of the study, the children with autism (Jason, David, and Bert) were 50, 56, and 43 months old, respectively. They were rated as moderately autistic on the Childhood Autism Rating Scale (Schopler, Reichler, DeVellis, & Daly, 1980). Their general cognitive index scores on the McCarthy Scales of Children's Abilities (McCarthy, 1972) were 80, 49, and 53. Standardized language assessment using the Sequenced Inventory of Communication Development (Hedrick, Prather, & Tobin, 1975) yielded receptive and expressive language levels of 24 and 20 months for Bert and 28 months both receptively and expressively for Jason and David.

Three typical peers, Sally (50 months old), Karie (47 months old), and Ernie (55 months old), served as peer confederates for Jason, David, and Bert, respectively. Their general cognitive index scores on the McCarthy Scales were 118, 150, and 119. The teachers nominated these 3 children because they were more compliant and played better. Two other children in the class served as the untrained peers, varying their assignments daily to

constitute the triads. Their ages were 46 and 50 months, and their general cognitive index scores were 125 and 121.

Setting

All the children in the classroom rotated through three activities during a 20- to 30-min free-play period each day. This schedule was adapted slightly so that each triad was observed daily for a 5-min session in a sociodramatic play activity set up in one corner of the classroom. Five sociodramatic play activities (cooking, housekeeping, beauty shop, doctor, and dress up) were incorporated into the daily schedule. The two classroom teachers alternated monitoring free-play sessions. Throughout the study, posters illustrating the use of facilitative strategies were placed on an easel so they could be seen easily by the children and teacher.

Generalization probes were conducted at least once a week during another structured free-play time, approximately 1 hr later in the day. During the generalization probes, manipulative play materials such as blocks (rather than sociodramatic props) were available. Posters illustrating the strategies were placed in the area. In addition, the peer confederates were paired only with target children from the other triads.

Peer Confederate Training

Strategy training. The three peer confederates were taught the facilitative strategies together in the free-play area of the room during 15 20-min sessions. The strategies included:

1. Attention getters. "Getting your friend's attention" by (a) facing the target child, (b) saying the target child's name, and/or (c) tapping the target child's arm.

2. Play organizers. "Getting your friend to play" by (a) suggesting a play idea, (b) asking to join in a play activity, or (c) requesting the target child to take part in a play activity.

3. Shares. "Sharing with your friend" by (a) offering a toy or material to the target child, (b)

asking the target child for a toy, or (c) offering to trade toys with the target child.

4. Responses. "Talking back to your friend" by (a) repeating (imitating what the target child said), (b) restating, or (c) requesting clarification (e.g., "Please say that again").

Each of the strategies was introduced one at a time by the experimenter. The first step involved verbal instructions and modeling of the strategy by the experimenter and an adult "actor." The children practiced describing cartoon picture posters corresponding to each strategy. Each poster had one or two panels and showed a child using a strategy during interaction with another child.

Second, each child practiced using the strategies with the experimenter directing the child's activities with an adult actor. During practice with the actor, 1 child was prompted to use a strategy corresponding to a poster that the experimenter pointed to while the other peers watched. Third, the children practiced with the actor while the experimenter restricted prompts to pointing to the poster designating which strategy the child should try. The actor made it progressively more difficult for the child to evoke appropriate responses by initially ignoring the peers and by delaying responses for longer periods of time. The children practiced specific strategies with adult instruction until they were able to demonstrate successful use of the strategies on three consecutive opportunities without teacher prompting.

Once the peer confederates had mastered the use of all four strategies with the actor, each peer was allowed to practice his or her newly learned strategies with a target child as partner. The mastery criterion for this final training step was three successful uses of each strategy out of five attempts without teacher prompting.

Self-evaluation training. Self-evaluation training involved three training steps introduced across the facilitative strategies in an additive fashion: (a) forecasting and practicing with an adult, (b) role reversal training with an adult, and (c) training with a target child. Each peer confederate underwent self-evaluation training individually. Training

was conducted for six, six, and four sessions for Sally, Karrie, and Ernie, respectively. Training took place for 10 min a day in one corner of the classroom with the four posters mounted on a room divider. The child was given a self-evaluation book with miniature versions of the posters on separate pages. On the facing page was a "happy face" representing "yes" and a "frowning face" representing "no." These drawings were enclosed in plastic so the children could check "yes" or "no" with an erasable grease pencil.

As in strategy training, one strategy was introduced at a time. During forecasting training, the child was required to describe the picture in the book and tell the experimenter how to implement the strategy. After forecasting the use of a strategy, the child then practiced using the strategy with the adult actor. The actor allowed the child to be successful at first and eventually allowed him or her to be successful only about half the time. After each brief interaction with the adult actor, the experimenter asked the child to report whether he or she was successful by marking either the "yes" or "no" face in the self-evaluation book. The children were given stickers for accurate reporting and a prize at the end of the session. The mastery criterion for this training step was three consecutive accurate reports following interactions with the actor.

For the role reversal training step, the actor and child switched roles. The actor pretended to be the peer confederate and the child pretended to be the target child. The child was told to make it difficult for the adult actor to be successful. Following a brief interaction, the child was asked to evaluate whether the adult actor had succeeded in using a strategy in the social interaction (e.g., by getting the child's attention). After three consecutive accurate reports, additional strategies were introduced until the child could evaluate successful use for all four strategies.

Once the child had mastered the forecasting and accurate evaluation of his or her performance with the actor, each child underwent target child training. Each child practiced with 1 of the target children from a different triad. As in the original strategy training, the mastery criterion was three of five

successful uses of each strategy without prompting, but with 100% accurate self-evaluation.

Data Collection

Free-play observations. A continuous 10-s interval observation system was used to code interactions among the 3 children and the teacher during the first 5 min of play following the teacher's general instructions. Data were coded live and supplemented by audiotapes (using a Fostex 160 multitrack recorder/mixer) of each session. The 3 children wore vests with pockets on the back that held wireless microphones (Sampson ST-1 receivers and lavalier microphones). A fourth microphone recorded the 10-s interval signals and the teacher's verbalizations. The primary observer and reliability observer were required to listen to the audiotapes before submitting the final coding for each sample. Audiotapes were useful when children's utterances were difficult to understand or hear during live recording and in identifying the interval in which utterances began.

The following observation system was used to code interaction during free-play and generalization sessions. *Social behavior* was defined as manipulating the same object, talking to another child while looking at the other child, using the other child's name, looking at the same object, or responding to or acknowledging another child's utterance. The following categories were distinguished:

1. *Attention getters* were verbal and nonverbal behaviors that initiated interaction in which a child used another child's name, made eye contact, and/or tapped a child's arm.
2. *Play organizers* were verbalizations that specified or directed an activity, role, or play idea. Requests for assistance and requests for another child to engage in play were included.
3. *Shares* were verbal or nonverbal behaviors that accompanied requests, offers, or exchanges of play materials.
4. *Responses* were any verbal or nonverbal acknowledgment that occurred specific to a preceding initiation from another child. In addition to the responses taught directly as part of the response

strategy (i.e., repeating, expanding, and requesting clarification), other responses were subsumed by this category.

5. *Other initiations* were any behaviors that did not fit into previous categories, including commands, nonsocial utterances that provoked responses, and general statements not related to play activities.

6. *Negative behaviors* included hitting, yelling, pushing, or other inappropriate social behaviors.

7. *Nonsocial verbalizations* included humming, singing, echolalia, or general noises that did not evoke social responses.

The first four categories corresponded to the facilitative strategies taught to the peer confederates. Coding reflected to whom the positive social behavior was directed (i.e., the first five categories). Interactive behaviors were coded sequentially. Any social behavior following 3 s or more in which no social engagement was scored was considered an initiation.

Any teacher involvement with the triad during the observations were coded in four categories: (a) general directions to the group, (b) verbal prompts to individual children, (c) praise statements, and (d) physical assistance prompts.

Self-evaluation ratings. During the self-evaluation phase, the peer confederates and the experimenter completed a self-evaluation rating scale for each of the four facilitative strategies. These ratings were obtained to assess whether children performed the facilitative strategies successfully (i.e., obtained a social response from the target child) during the free-play period and to assess whether children's self-evaluations matched the experimenter's assessment. After the session, the children marked "yes" or "no" on each of four small pictures (contained in their self-evaluation books) depending on whether they thought they had obtained a response from the target child for each of the strategies. These self-evaluations were compared with assessments on a summary sheet that included photocopies of the pictures and the experimenter's evaluation. The percentage agreement between child and teacher ratings ranged from 25% to 100% ($M = 77\%$), 75% to 100% ($M = 85\%$), and 50% to 100%

($M = 93\%$) for Sally, Karrie, and Ernie, respectively.

Experimental Design and Conditions

A multiple baseline design across subjects was used to evaluate the effects of the self-monitored use of the facilitative strategies. The self-evaluation training package was implemented after an initial baseline and a baseline that followed teaching of the facilitative strategies.

Baseline. During baseline and all subsequent conditions, teachers introduced the sociodramatic play activities and gave two or three general ideas of how to play with the available materials. In addition, the teacher pointed to the posters illustrating the four strategies and reminded children to "get your friend to look at you, get your friend to play with you, remember to share with your friend, and remember to talk back to your friend." Conditions of teacher involvement specified that the teacher (a) enforce classroom rules and keep the children in the free-play area; (b) limit prompting of social interactions between children to no more than 10 times during a 5-min session; and (c) within these constraints, prompt if there was no interaction for two consecutive 10-s intervals. During the initial baseline condition, these prompts were limited to general directions to the group (e.g., "Remember to play nicely together"). This prompting regimen was instituted to place a ceiling on the number of prompts children were given and to ensure that ample encouragement to interact was provided. Hence, the necessity of prompting peers to use specific facilitative strategies could be assessed during baseline.

Posttraining baseline. After 15 days of teaching the facilitative strategies, triads were observed again during play. The teacher was asked to introduce the activity, monitor children's behavior, and prompt in the same way as in the initial baseline condition. This condition assessed whether knowledge of facilitative strategies was sufficient to promote performance of the strategies, even though strategy use was not prompted specifically.

Self-evaluation. Once the level of social interaction had stabilized for the three triads, Sally was

taught to self-evaluate. During this intervention condition, the experimenter first asked Sally to forecast how she would try to get her friend to play with her. Sally flipped through her self-evaluation book as she reviewed how she would use each strategy. She then joined the rest of her triad and the teacher introduced the activity as in the previous conditions. Posters illustrating the four strategies remained present in the play area. Teachers were told to continue to prompt as in the baseline conditions.

During the play session, the experimenter used the self-evaluation rating scale to record whether Sally met the criterion of two successful uses of three of the four strategies. Immediately following the session, the experimenter and Sally met and the child evaluated her performance. After the child's self-evaluation, the experimenter showed the child the rating sheet, and the experimenter marked each picture with a star when they had agreed there were at least two successful uses of a strategy. The child was allowed to select a small toy if there were three strategies starred. If the child did not meet the criterion, she was told that she could try again the next day.

Once increases in strategy use by Sally and concomitant increases in social interaction by Sally's partner (Jason) were evident, self-evaluation training began with Karrie. Following replication of these effects during play sessions with the second triad, self-evaluation training was initiated with Ernie.

Generalization. To assess whether peer confederates generalized their use of facilitative strategies, probes were conducted during another structured play time with peers paired with different target children. Posters illustrating the strategies were placed in the area. Unlike the baseline conditions, teachers were instructed not to prompt children to interact during the 5-min sessions. This absence of prompting provided an opportunity to evaluate whether instructions to self-evaluate alone would be sufficient to promote generalization. The 2 peer confederates who did not generalize their use of facilitative strategies were asked to self-evaluate their performance in this setting, using the same pro-

cedures as in the self-evaluation condition. A multiple baseline design across these 2 subjects was implemented.

Reliability

Reliability was measured by a second observer, who independently coded 40% of the 197 free-play and generalization sessions. Prior to these observations, data collectors were trained to a criterion of 80% interobserver agreement for three consecutive sessions. Interobserver agreement was calculated based on occurrences recorded within intervals for each session. For the peers and target children, agreement on one of the seven behavior codes as well as agreement on directionality (i.e., to whom social acts were directed) were required. Agreement for one of four codes was required for teacher intervention categories. Interobserver agreement for the peers ranged from 48% to 100%, with a mean of 84.8%. Interobserver agreement for Jason averaged 88.8% (range, 66% to 100%), for David 87.9% (range, 60% to 100%), and for Bert 87.5% (range, 50% to 100%). Interobserver agreement for the teacher categories averaged 92.9% (range, 50% to 100%). Mean interobserver agreement fell below 75% for 1 subject in one condition. Low occurrence rates and difficulties in discriminating to whom utterances were directed for David resulted in a mean agreement of 71% during his initial baseline condition.

RESULTS

Peers' Use of Facilitative Social Interaction Strategies

Figure 1 shows the frequency of use of the facilitative strategies for the 3 peer confederates. All 3 used few facilitative strategies during the initial baseline. Following strategy training, their frequency of strategy use varied little from the initial baseline condition. The frequency of strategy use rose for all 3 with the introduction of the self-evaluation intervention. The frequency of strategy use improved to a markedly higher level with Sally than with the other peer confederates.

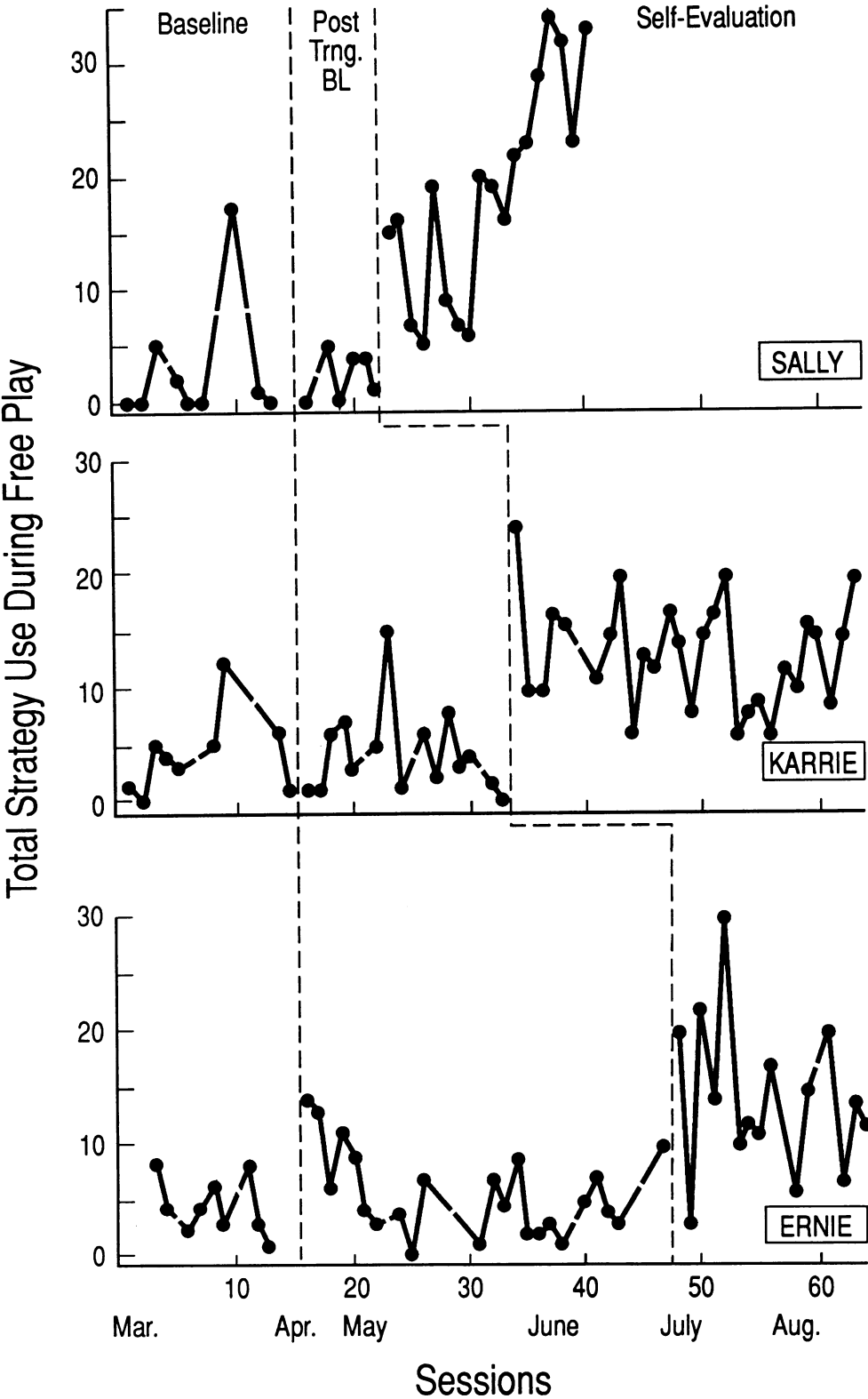


Figure 1. Total number of facilitative strategies used by the 3 peer confederates per session.

We anticipated that untrained peers might begin using the strategies modeled by the peer confederates to increase their involvement in the triads. However, the untrained peers demonstrated little change in their rate of interaction with the target children, which ranged from a mean of 0.4 to 1.5 social acts during the initial baseline condition to a mean of 0.8 to 1.5 social acts during the self-monitoring intervention condition.

Teacher Prompting

Figure 2 shows the frequency of general directions plus teacher physical and verbal prompts to any of the children in each triad. Reductions in teacher prompting were most evident with each of the triads during the self-evaluation intervention. This reduction was mainly attributable to fewer prompts to the target children. The bars in Figure 2 represent the frequency of prompts directed to Sally, Karrie, and Ernie. Prompts to peer confederates remained low throughout the study.

Individual differences in prompting levels were evident for the target children. The teachers tended to intervene more often with the triad including David, who was the lowest functioning (least interactive) child. The mean number of prompts to Jason averaged 0.7 during the initial baseline condition and was reduced to 0.3 during the self-evaluation condition. Bert was prompted most often in the posttraining baseline condition ($M = 2.6$ prompts per session) and least often in the self-evaluation condition ($M = 1.8$). David received the most prompts, averaging 6.0 prompts during the initial baseline condition; these were reduced to 2.7 prompts per session in the self-evaluation condition.

Target Children's Social Interaction

Figure 3 shows the frequency of social behavior for the 3 target children. Bars indicate those social behaviors initiated to trained and untrained peers. The target children all demonstrated low rates of social interaction during baseline conditions. Increases in the frequency of social behavior occurred only after the self-evaluation intervention was implemented with their corresponding peer confed-

erate. The greatest gains were evidenced by Jason, who was somewhat more interactive than the other target children, but who also fell into a routine of answering questions initiated by Sally, his peer confederate (e.g., "What is this, Jason?"). These questions are not reflected in Sally's data (Figure 1) because they were not coded as trained facilitative strategies but as "other" social utterances. Comparatively small improvements were seen in the rate of target subjects' initiations to peers.

The frequency with which facilitative strategies and other initiations were used by trained and untrained peers and the percentage of responses by target children are summarized in Table 1. The fourth strategy, responses, was not included; the frequency and success rates could not be isolated for this strategy, because this category was broader than simply the response strategies taught. Note that attention getter, play organizer, and share strategies were used during baseline, and even though they were not used frequently, they sometimes evoked appropriate social responses by the target children. A high percentage of responses by target children was most evident for the sharing strategy. Even though the frequency of using the sharing strategy increased during intervention, the target children's response rate remained relatively high. Attention getters did not show a significant increase in frequency. However, this strategy was not coded when it accompanied one of the other initiation strategies. Consequently, it was coded most often when the peer had difficulty gaining the target child's attention. The most dramatic increases in peers' frequency of use and target children's responses occurred for the play organizer strategy.

Generalization of Strategy Use

Table 2 summarizes the use of facilitative strategies for the peer confederates and the social behavior of their new target subjects in the generalization setting. In probes during the baseline and posttraining baseline conditions, Sally, Karrie, and Ernie used the strategies in the generalization setting at rates comparable to or slightly lower than in the primary intervention setting. Once the self-evaluation intervention was implemented in the primary

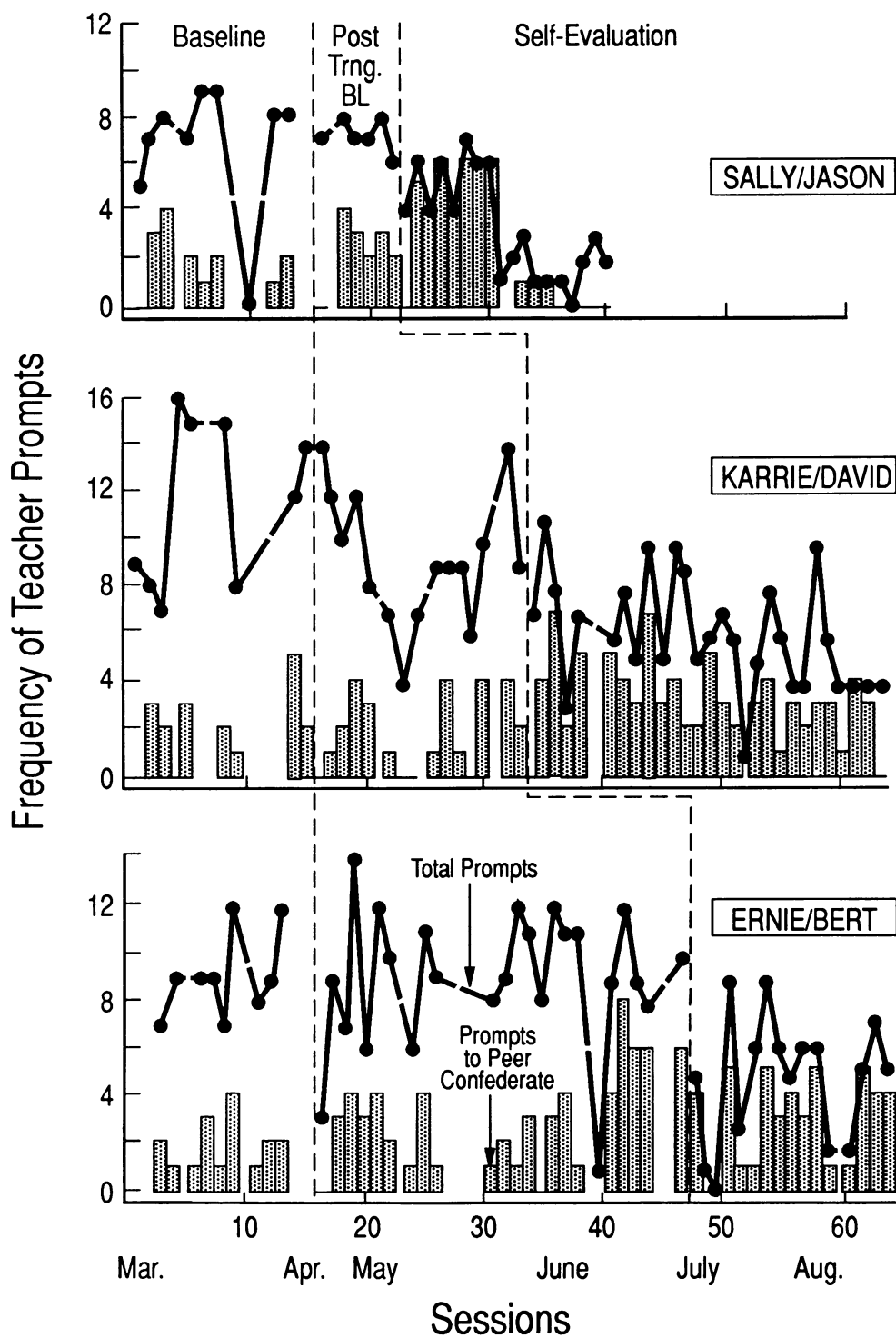


Figure 2. Total number of teacher prompts for each triad per session. Bars represent the number of prompts to the peer confederates.

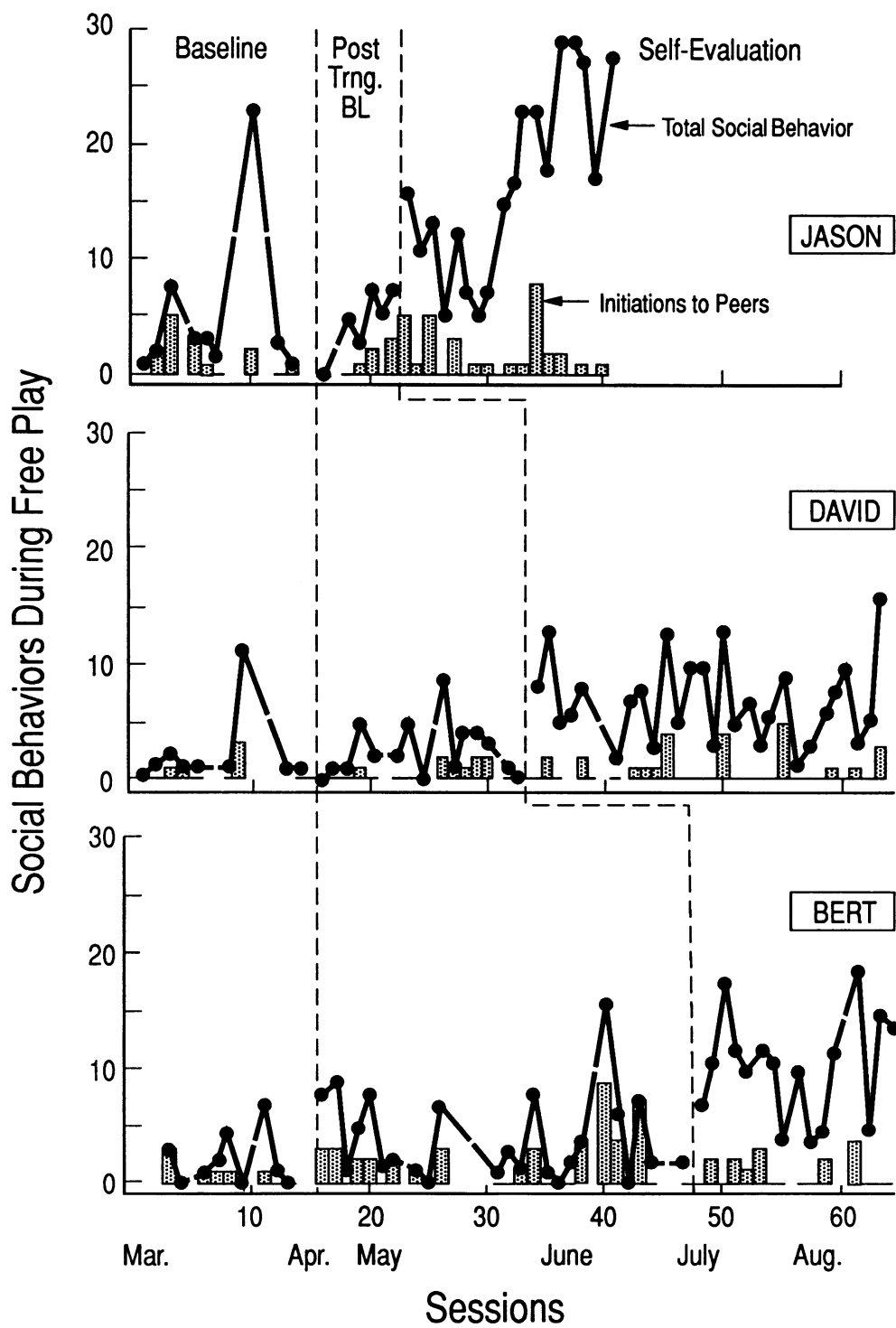


Figure 3. Total social behavior of the 3 target subjects per session. Bars represent the number of initiations to trained and untrained peers.

Table 1
Mean Number of Initiations per Session from Peers and Mean Percentage of Target Child Responses to Initiations During Free Play

					Self-evaluation intervention	
Baseline			Posttraining baseline			
Jason						
Attention getters	0.4	0%	1.0	33%	1.6	43%
Play organizers	2.2	50%	1.8	45%	4.4	70%
Shares	1.4	85%	1.8	100%	13.3	78%
Other initiations	0.4	25%	1.2	43%	1.6	24%
David						
Attention getters	1.1	0%	0.9	0%	1.7	2%
Play organizers	4.8	19%	3.4	20%	5.8	40%
Shares	1.6	43%	2.9	57%	8.1	46%
Other initiations	0.3	0%	0.6	0%	0.9	20%
Bert						
Attention getters	0.6	0%	1.1	12%	0.9	7%
Play organizers	4.2	16%	2.7	28%	4.6	62%
Shares	1.0	100%	2.4	58%	12.1	52%
Other initiations	0.8	0%	0.7	6%	0.3	25%

intervention setting, little change in strategy use by Karrie and Ernie was observed in the generalization setting. Sally demonstrated a clear increase in strategy use in the generalization setting, but at rates lower than in the primary intervention setting.

Because of Karrie's and Ernie's lack of generalization, the self-evaluation procedures were implemented with them in a multiple baseline fashion. After this intervention, the frequency of their strategy use tripled. This increase is reflected in Table 2 by the mean number of strategies used by Karrie and Ernie during five self-evaluation sessions in-

dicated under the generalization condition. During these self-evaluation sessions, a corresponding increase in Jason's social behavior was demonstrated, but his rate did not reach as high a level as in the primary intervention setting.

DISCUSSION

As in previous research, simply teaching peer confederates strategies for facilitating social interaction was not sufficient to facilitate their use of the strategies with their handicapped classmates.

Table 2
Peers' Strategy Use and Target Children's Total Social Behavior in the Generalization Setting

	Baseline			Posttraining baseline			Self-evaluation in					
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	Self-evaluation intervention			Generalization setting		
Sally	3	0.0		3	0.7	(0.6)	8	5.0	(4.1)	—		
Karrie	3	3.0	(0.0)	7	3.7	(2.9)	10	2.4	(2.0)	5	9.0	(5.2)
Ernie	4	4.0	(1.4)	9	2.8	(2.3)	6	2.0	(2.1)	5	12.6	(4.2)
Jason	3	3.0	(1.0)	8	3.3	(2.3)	12	2.6	(2.7)	10	8.6	(8.0)
David	3	1.7	(1.5)	6	0.3	(0.5)	6	1.0	(0.9)	—		
Bert	3	4.3	(3.7)	4	2.5	(1.7)	8	2.6	(2.6)	—		

Note. Sally left the program before the self-evaluation intervention was implemented in the generalization setting. This condition was implemented only with Jason. *n* refers to the number of observations conducted in the generalization setting during each experimental condition.

This study extended previous research in several ways. First, we used a self-evaluation training package to modify the social behavior of normally developing preschool children who served as peer confederates for their classmates with autism. Second, procedures for teaching children to self-evaluate a rather sophisticated class of social skills were detailed. Third, increased strategy use by peers subsequent to the self-evaluation intervention was associated with improvements in the social behavior of children with handicaps. Unfortunately, the analysis of generalization across play times and children was limited because children left the program at the end of the school year. Nevertheless, it appeared that when asked to do so, peers could self-evaluate their use of facilitative strategies with other handicapped children during other play times.

Results of this study revealed little difference in the peer confederates' use of facilitative strategies before and after the strategies were taught. Strategy use remained at low levels. This finding provides further support that teaching preschoolers social interaction strategies has little effect without further programming. In contrast to previous studies, a low rate of teacher prompting of peer confederates was sustained throughout the study. The teachers consistently averaged fewer than one prompt per minute. The few studies that reported the rate of teacher prompting testify to the brevity of prompting imposed in this investigation. To prompt strategy use during peer intervention conditions, Goldstein and Ferrell (1987) used approximately four to six prompts per minute, Odom, Hoyson, Jamieson, and Strain (1985) used approximately two to three prompts per minute, and Odom, Strain, Karger, and Smith (1986) used approximately one to two prompts per minute. The low rate of prompting in the present investigation was not sufficient to produce detectable changes in peer or target child behavior prior to the implementation of the self-evaluation intervention.

The use of illustrations during strategy training made for an easy transition to the self-evaluation intervention. Illustrations of facilitative strategies have been used previously to prompt peers during play sessions (Goldstein & Ferrell, 1987; Goldstein

& Wickstrom, 1986). For the self-evaluation intervention in the present study, the illustrations were used before play sessions to prompt peer confederates to forecast their use of social behaviors with their handicapped classmates. These pictures also provided a means for comparing the evaluations of the trainer with the children's self-evaluations and for providing specific feedback. Self-evaluation procedures rarely have been implemented with preschoolers (Sainato *et al.*, 1990) and had not been extended to social behavior. Nevertheless, self-evaluation procedures seem a viable alternative to the more typical use of high rates of teacher prompts during play.

Although Sally did not initially demonstrate more strategy use than the other peer confederates during the self-evaluation intervention, greater improvements ultimately were apparent for both Sally and her target subject, Jason. It appeared that Jason was somewhat more responsive than the other target subjects. Thus, natural reinforcement may have set up a reciprocal contingency accounting for the continued improvements in their interactions. Unfortunately, this contingency trap (Kohler & Greenwood, 1986) did not develop to the same extent with the other triads. One possible explanation was that David and Bert demonstrated more interfering behaviors (e.g., staring and negative behavior, respectively) than Jason did. It is also worth noting that Sally was the only peer who demonstrated increased rates of strategy use in the generalization setting (when paired with David and Bert) after the self-evaluation intervention was instituted in the free-play setting. Based on the effects of instituting the self-evaluation intervention in the generalization setting with Karrie and Ernie, however, it might have been possible to enhance Sally's strategy use further by asking her to self-evaluate as well. Unfortunately, she had left the program by the time the findings for Karrie and Ernie were obtained.

Without training on the use of facilitative strategies, the untrained peers were faced with the difficult task of infiltrating the play activity. This was especially demanding because the peer confederates were being reinforced for interacting with the target

subjects. In fact, attempts by the untrained peers to play with the peer confederates were sometimes rebuffed (e.g., "I'm busy right now"). Little change in behavior was demonstrated in the social behavior of the untrained peers over the course of the study. One may question whether these triadic interactions permit a fair test of learning by the untrained peers. Nevertheless, the lack of changes in the untrained peers' social behavior with target subjects indicates a need to train all the peers grouped with target children.

Some improvements in the selection of strategies taught to peers are possible. For example, establishing eye contact appeared to diminish in frequency as reflected in the data on strategy use. One might simply incorporate establishing eye contact as a component of the training of any social interaction skill. It was interesting to note that from the outset of the study, when peers used the sharing strategy, target subjects complied. It is possible, however, that this easy success could have resulted in an overuse of this strategy by peers. Play organizers, on the other hand, were met with more success over the course of the study. This may reflect the most important improvement in social behavior on the part of peer confederates as well as target children. Unfortunately, our data collection system did not allow us to inspect changes in the use of and responses to the response strategy specifically.

Changes in the social behavior of the children with autism occurred primarily in their responsiveness. No clear improvements were demonstrated in their initiations to peers. Jason was the most responsive target child, but little change was seen in the percentage of strategies to which he responded. David and Bert, on the other hand, did respond to play organizers and other initiations more often in the self-evaluation condition. They were typically unresponsive to peers' attempts to gain their attention, however, and peers did not use this strategy alone very often. It was interesting to see that David and Bert seemed fairly responsive to strategies that often appeared less demanding in terms of obligating a social response.

Although improvements in interactions occurred only after self-evaluation was instituted, one cannot

attribute these changes to self-evaluation alone. Teacher prompting and praising remained as part of the intervention package. The addition of contingent reinforcement in the self-evaluation condition resulted in a possible confounding effect. Successful strategy use and accurate self-evaluation by peer confederates were reinforced simultaneously. Contingent reinforcement of strategy use alone may have resulted in a desirable change in peers' behavior. Indeed, contingent reinforcement of strategy use, along with teacher prompting, has been used frequently to change peers' social behavior (Odom & Strain, 1984). Self-evaluation may prove to be a desirable alternative, however, because teachers' responsibility for prompting and reinforcing peers' strategy use can be reduced. Children's responsibility for implementing the intervention is increased, and intermittent reinforcement of self-evaluation by teachers may be sufficient to program further maintenance and generalization of strategy use (Stokes & Baer, 1977).

Further refinement of the self-evaluation intervention package may facilitate the practical application of these procedures. The training and implementation of self-evaluation procedures are fairly demanding of a teacher's time, at least initially. In a study of self-evaluation of independent seatwork for preschoolers with handicaps, Sainato et al. (1990) were able to withdraw sequentially components of the self-evaluation package (i.e., reinforcement, matching with the teacher, and self-assessment) and still maintain a high level of appropriate behavior. Subsequent investigations of self-evaluated social behavior might explore the effects of fading self-evaluation components and examine long-term benefits.

Self-evaluation also may facilitate generalization programming. Once peers demonstrated accurate self-evaluation in the primary intervention setting, no further training was required to promote strategy use with a new target child in a new setting. The children were simply instructed to self-monitor their use of the strategies, and their interactions quickly changed. It is possible that generalization could be accomplished without programming if target children are quite responsive. But until such natural

reinforcement takes hold, self-evaluation seems promising as a simple and flexible means of promoting generalized strategy use on the part of peer confederates.

Future research using this self-evaluation tactic might take several directions. First, the content of what children are asked to forecast and self-evaluate might be made more specific to the desired social behavior. Interestingly, the 3 children who participated as peer confederates in this study recalled specific examples of their social interactions with their handicapped peers while completing their self-evaluation books. For example, Sally reported specific episodes, such as, "I got David to cook with me." It might be easier to get children to forecast specific activity-related behaviors rather than more abstract statements about the use of general strategies. Second, a component analysis of this procedure might be conducted to determine the necessity of the children's verbalizations prior to free-play sessions regarding their social interactions with their handicapped peers. A number of studies have questioned whether the verbalization is functionally related to the target behavior (Baer, Detrich, & Weninger, 1988; Deacon & Konarski, 1987; Matthews, Shimoff, & Catania, 1987). Third, future research might investigate further the usefulness of the self-evaluation procedure for generalization programming of peers' social interactions. An interesting question to explore is whether the reporting and reinforcement components of the self-evaluation program might be delayed to enhance the generalization of these behaviors across a longer period.

REFERENCES

- Baer, R. A., Detrich, R., & Weninger, J. M. (1988). On the functional role of the verbalization in correspondence training procedures. *Journal of Applied Behavior Analysis*, 21, 345-356.
- Bolstad, O. D., & Johnson, S. M. (1972). Self-regulation in the modification of disruptive classroom behavior. *Journal of Applied Behavior Analysis*, 5, 443-454.
- Deacon, J. R., & Konarski, E. A., Jr. (1987). Correspondence training: An example of rule-governed behavior? *Journal of Applied Behavior Analysis*, 20, 391-400.
- Drabman, R. S., Spitalnik, R., & O'Leary, K. D. (1973). Teaching self-control to disruptive children. *Journal of Abnormal Psychology*, 82, 10-16.
- Glynn, E. L., & Thomas, L. D. (1974). Effects of cueing on self-control of classroom behavior. *Journal of Applied Behavior Analysis*, 7, 229-306.
- Goldstein, H., & Ferrell, D. R. (1987). Augmenting communicative interaction between handicapped and non-handicapped preschool children. *Journal of Speech and Hearing Disorders*, 52, 200-211.
- Goldstein, H., & Wickstrom, S. (1986). Peer intervention effects on communicative interaction among handicapped and nonhandicapped preschoolers. *Journal of Applied Behavior Analysis*, 19, 209-214.
- Hedrick, D., Prather, E., & Tobin, A. (1975). *Sequenced inventory of communication development*. Seattle: University of Washington Press.
- Holman, J., & Baer, D. M. (1979). Facilitating generalization of on-task behavior through self-monitoring of academic tasks. *Journal of Autism and Developmental Disorders*, 9, 429-446.
- James, S. D., & Egel, A. L. (1986). A direct prompting strategy for increasing reciprocal interactions between handicapped and nonhandicapped siblings. *Journal of Applied Behavior Analysis*, 19, 173-186.
- Kohler, F., & Greenwood, C. R. (1986). Toward a technology of generalization: The identification of natural contingencies of reinforcement. *The Behavior Analyst*, 9, 19-26.
- Matthews, B. A., Shimoff, E., & Catania, A. C. (1987). Saying and doing: A contingency space analysis. *Journal of Applied Behavior Analysis*, 20, 69-74.
- McCarthy, D. (1972). *Manual for the McCarthy Scales of Children's Abilities*. New York: The Psychological Corporation.
- Odom, S. L., Hoyson, M., Jamieson, B., & Strain, P. S. (1985). Increasing handicapped preschoolers' peer social interaction: Cross-setting and component analysis. *Journal of Applied Behavior Analysis*, 18, 3-16.
- Odom, S. L., & Strain, P. S. (1984). Peer-mediated approaches for promoting children's social interaction: A review. *American Journal of Orthopsychiatry*, 54, 544-557.
- Odom, S. L., Strain, P. S., Karger, M., & Smith, J. O. (1986). Using single and multiple peers to promote social interactions of young children with behavioral handicaps. *Journal of the Division for Early Childhood*, 10, 53-64.
- O'Leary, S. G., & Dubey, D. R. (1979). Applications of self-control procedures by children: A review. *Journal of Applied Behavior Analysis*, 12, 449-465.
- Rhode, G., Morgan, D. P., & Young, K. R. (1983). Generalization and maintenance of treatment gains of behaviorally handicapped students from resource rooms to regular classrooms using self-evaluation procedures. *Journal of Applied Behavior Analysis*, 16, 171-188.
- Robertson, S. J., Simon, S. J., Pachman, J. S., & Drabman, R. S. (1979). Self-control and generalization procedures in a classroom of disruptive retarded children. *Child Behavior Therapy*, 1, 347-362.

- Sainato, D. M., Strain, P. S., Lefebvre, O., & Rapp, N. (1990). The effects of a self-evaluation package on the independent work skills of handicapped preschool children. *Exceptional Children*, *56*, 540-549.
- Schopler, E., Reicher, R. J., DeVellis, R. F., & Daly, K. (1980). Toward objective classification of childhood autism: Childhood autism rating scale. *Journal of Autism and Developmental Disorders*, *10*, 91-103.
- Shafer, M. S., Egel, A. L., & Neef, N. A. (1984). Training moderately handicapped peers to facilitate the social interaction skills of autistic students. *Journal of Applied Behavior Analysis*, *17*, 461-476.
- Shapiro, E. S., McGonigle, J. J., & Ollendick, J. H. (1980). An analysis of self-assessment and self-reinforcement in a self-managed token economy with mentally retarded children. *Applied Research in Mental Retardation*, *1*, 227-240.
- Stokes, T. F., & Baer, D. M. (1977). An implicit technology of generalization. *Journal of Applied Behavior Analysis*, *10*, 349-367.
- Strain, P. S., Guralnick, M. J., & Walker, H. M. (Eds.). (1986). *Children's social behavior*. Orlando, FL: Academic Press.
- Strain, P. S., Shores, R. E., & Timm, M. A. (1977). Effects of peer social initiations on the behavior of withdrawn preschool children. *Journal of Applied Behavior Analysis*, *10*, 189-298.
- Thomas, J. D. (1976). Accuracy of self-assessment of on-task behavior by elementary school children. *Journal of Applied Behavior Analysis*, *9*, 209-210.

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