

*NORMAL CHILDREN AS TUTORS TO TEACH SOCIAL RESPONSES
TO WITHDRAWN MENTALLY RETARDED SCHOOLMATES:
TRAINING, MAINTENANCE, AND GENERALIZATION*

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The findings of the three experiments reported herein indicate that normal children can successfully teach social responses (i.e., delayed imitation, cooperative play, and verbalization of positive comments) to withdrawn mentally retarded peers. The effects of the intervention generalized across stimulus and response conditions, while the trained and generalized levels of responding were maintained after the end of the intervention. Moreover, the subjects developed social responding within their classrooms and play areas parallel to the intervention and continued to increase such responding after the interruption of the intervention. Direct edible reinforcement appeared to be necessary at least during the initial period of the intervention. Vicarious edible reinforcement seemed useful to prompt the appearance of responding. Vicarious social reinforcement was ineffective at the beginning of the intervention, but apparently acquired prompting power at a later stage of training. Generalization results indicated that the similarity between the response occasions used for training and those used for testing generalization played an important role. Yet, the extensiveness of training and the development of responding within the classrooms and play areas may also have had a relevant effect. The development of social responding within the classrooms and play areas appeared to be mainly the effect of new learning. This was perhaps due to vicarious and direct social reinforcement.

DESCRIPTORS: social responses, generalization, maintenance, peer tutoring, normal children, retarded children

One often-observed behavioral deficiency of severely mentally retarded children is their isolation from other children. Since many essential skills are learned and strengthened in the context of social interaction, promoting the interaction of retarded children with their peers has been the objective of several intervention programs. These programs were aimed at training imitation (Apolloni, Cooke, & Cooke, 1977; Guralnick, 1976; Paloutzian, Hasazi, Streifel,

& Edgar, 1971; Peck, Apolloni, Cooke, & Raver, 1978) as well as at increasing positive physical contact, communication, and/or cooperation (Gable, Hendrickson, & Strain, 1978; Morris & Dolker, 1974; Petersen, Austin, & Lang, 1979; Strain, 1975, 1977; Strain, Shores, & Kerr, 1976; Strain, Shores, & Timm, 1977; Strain & Timm, 1974; Whitman, Mercurio, & Caponigri, 1970; Young & Kerr, 1979).

The results of these studies show that the social behavior of retarded children can be promoted. However, the findings concerning the maintenance of the acquired repertoire and/or its generalization across stimulus and response conditions are, overall, modest. Whitman et al. (1970) reported that during the training period the cooperative play of their subjects generalized to the classroom and involved peers and material not present in the training setting. Never-

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theless, after the end of the intervention the trained and generalized performance declined. Strain (1977) obtained generalization of positive physical and vocal responses across individuals and settings only for some of the subjects even though probing was carried out while training was still in progress. Apolloni et al. (1977) found evidence of stimulus and response generalization, but the probing sessions were conducted parallel to the intervention. Moreover, the stimulus generalization data may be better interpreted as short-term maintenance of responding. In fact, during the probing sessions the subjects remained in the training setting with the peer model employed during the training sessions. Morris and Dolker (1974), Gable et al. (1978), Peck et al. (1978) and Petersen et al. (1979) reported that the trained responses were also maintained during non-training periods. Yet, their results are to be interpreted with caution since the evidence for maintenance was based on data collected immediately after the training sessions were terminated and for periods lasting only between 3 and 6 min. Finally, Strain (1975) found that dramatic play had carry-over effects only for those children who presented some social interaction during baseline.

If the significance of any intervention has to be determined on the basis of criteria such as maintenance and generalization, additional research seems to be needed in order to define training strategies that can ensure their achievement. Moreover, although social interaction has been described as a process of interpersonal reinforcement (Strain & Timm, 1974; Whitman et al., 1970) only Cooke and Apolloni (1976) have attempted to teach learning disabled children to provide appropriate positive contingencies to peers. With regard to the issues of maintenance and generalization, one could hypothesize that the direct involvement of several children (tutors) in the training and administration of reinforcement, and the use of reinforcement contingencies likely to be present outside the training setting may facilitate

the maintenance of the trained responses and the generalization across individuals and settings. The use of a large number of training occasions for each of the responses may promote response generalization or generalization across cue stimuli (i.e., discriminative stimuli for responding). With regard to the possibility of teaching retarded children to provide positive contingencies to their peers, one could speculate that it is feasible if appropriate situations are created as discriminative stimuli for the emission of the positive behaviors and these are followed by reinforcing events.

EXPERIMENT 1

The main aims of this experiment were (a) to prepare three groups of normal children to teach three mentally retarded schoolmates responses such as delayed imitation of body positions, cooperative play, and verbalization of positive comments, i.e., "that's good" and "thank you," and (b) to evaluate whether the extensive training carried out within each target response (several training occasions), the use of social contingencies alone during the last period of training, and the use of several children as tutors would facilitate the maintenance of the trained responses as well as generalization across stimulus and response conditions. Additionally, this experiment was directed at assessing whether (at the beginning of training) vicarious reinforcement would prompt responding in subjects whose operant level on the target behaviors was expected to be zero.

METHOD

Participants

Three mentally retarded children, two females and one male, whose ages were 8.5, 10.3, and 9.1 years, respectively, participated in this experiment. Their IQs as measured by the Leiter International Performance Scale (Leiter, 1969) were 58, 44, and 51. They were spending a large portion of their school day with normal

children in classrooms and play areas (i.e., covered areas in the playground). The classrooms contained no more than 14-16 children. Similarly, in the play areas the participants were integrated with groups of approximately 15 children. All participants were also provided with individual treatment which was aimed at enhancing their communication and self-help skills. Their behavior had shown some progress within the situation of individual treatment, i.e., they responded to simple commands of the remedial teacher and addressed a few verbal requests to her. However, they consistently isolated themselves from their peers (showing only occasional visual attention to them), did not present any sign of response to peers' invitations or commands, and withdrew from or screamed at their proximity and contact.

Target Responses

The target responses were delayed imitation of body positions, cooperative play, verbalization of "that's good" and verbalization of "thank you." Delayed imitation of body positions consisted of the participants taking specific positions

when modeled by a peer (tutor or prober). Cooperative play involved interaction with a peer in the way shown by two peer models. The verbalization of "that's good" consisted of using this phrase contingent upon the accomplishment of an activity by one of the peers. Finally, the verbalization of "thank you" consisted of using this phrase upon receiving an object from one of the peers. Twenty different response occasions (positions, activities, or objects) were selected for each of the target responses. Ten of these occasions were used for training. The other 10 were used for testing generalization. Table 1 presents some examples of these response occasions.

Settings and Material

The training setting was a 6 m × 7 m room containing five chairs, two desks, a variety of school material stored in a cabinet located in a corner of the room, and a number of other objects and toys necessary for training the target responses or testing generalization. The generalization setting was a 8 m × 12 m playroom which included equipment such as trampolines, swings, and suspended ladders in addition to a

Table 1

Examples of the response occasions selected for training or testing generalization on the four target behaviors.

	<i>Training</i>	<i>Generalization Testing</i>
<i>Delayed Imitation</i>	Hands on top of head. Arms extended sideways. Hands on knees. Hands over eyes.	Squatting on a chair. Standing with one foot on a chair. Standing with feet in a container. Leaning upon a desk.
<i>Cooperative Play</i>	Walking backwards and forwards holding the peer's hands. Leaning in turns backwards and forwards while holding the peer's hands. Giving the arm to the peer to help him or her hop on one foot. Taking the peer's hands and clapping them.	Helping the peer to move a desk. Helping the peer to fill up a container with sand. Helping the peer to pull a wooden board with a rope. Helping the peer to roll an heavy cylinder.
<i>That's Good</i>	Knocking down a skittle with a ball. Playing the harmonica. Singing a little song. Cleaning the desk with a wet sponge.	Throwing a ball into a basket. Playing the trumpet. Telling a short tale. Cleaning the floor with a wet cloth.
<i>Thank You</i>	Picture book Bell Toy car Flashlight	Post card Whistle Plastic cup Set of keys

desk, a few chairs and other objects and toys needed for probing the target responses.

Tutors, Probers, Observers, and Reliability

Twelve normal fourth-grade children, eight females and four males, were selected for implementing the intervention (tutors). The girls were divided into two groups of four, and each group worked with one of the female participants. The boys worked with the male participant. Furthermore, 16 normal fourth- and fifth-grade children, eight females and eight males, were selected for probing the participants before and after the treatment (probers). The probers were divided according to their sex into four groups of four.

Four research assistants, two males and two females, acted as observers. They were scheduled to carry out the observations in pairs during the training of tutors and probers as well as during 20 days scattered throughout the study (i.e., when they had to evaluate the performance of tutors and probers and to record the target responses). For the rest they observed individually. During the study they were positioned behind one-way windows and fitted with headphones.

Interobserver reliability on scoring the performance of tutors and probers (correct vs. incorrect) and on recording each of the target responses was computed by dividing the number of agreements by the agreements plus disagreements and multiplying by 100.

Training of Tutors and Probers

Each group of tutors was trained by one of two female teachers during sessions of approximately 20 min. At the beginning the teacher provided the children with general explanations about the task that they were to conduct with their retarded peers. Subsequently, she proposed that one child of the group act as experimenter while the others would act as models or partners for the participants. At this point all members of the group received the list of 20 body positions to be used for training and testing generalization on delayed imitation. The teacher

helped the children to organize the presentation of some positions, then, taking the role of a potential participant, urged them to perform as if they were conducting a real session. Their performance on each position was considered to be correct when the teacher and at least one of the two observers independently agreed that a number of steps was appropriately executed: (a) the tutor experimenter suggested to one of the tutors the position to demonstrate, (b) this tutor called the participant by name and said "Look," (c) showed the position, received social and edible contingencies from the tutor experimenter, and said to the participant "Now you do like I did," (d) finally, the tutor experimenter delivered social and edible contingencies to the participant if he or she imitated the position within 5 sec from the tutor's invitation to do so. The training was completed when the group had performed correctly on each position during two executions of the entire list of positions.

The training on cooperative play, and the verbalization of "that's good" and "thank you" was carried out in a like manner. Furthermore, the preparation of the probers was conducted in the same way as the preparation of the tutors except that the probers did not have to use contingencies of reinforcement. At the end of their training tutors and probers received children's books. In addition, they obtained a token for each day of work throughout the study if the performance of their group was 100% correct.

Experimental Design

In order to control for the effectiveness of the first phase of the intervention a multiple baseline across behaviors design (Baer, Wolf, & Risley, 1968) was used for each participant. That is, baseline and preintervention probing led to the start of intervention on delayed imitation. When this behavior had been at the 80% level or above for 3 consecutive days, treatment began on cooperative play. Then, it was extended to the verbalization of "that's good," and finally to the verbalization of "thank you." The second phase of the intervention

started simultaneously on all behaviors when the level of the last behavior treated also had been 100% for 3 consecutive days. The end of the second phase was followed by three series of probes which assessed maintenance and generalization.

Baseline

Baseline data were collected while the tutors presented within the training setting the positions, activities, and objects selected for training. Each baseline day included four sessions of about 8-12 min that involved delayed imitation, cooperative play, verbalization of "that's good," and verbalization of "thank you," respectively. The first three sessions were conducted throughout the morning with an interval of about 45 min between them. The fourth session was conducted in the early afternoon.

During each session on delayed imitation three tutors shared the presentation of the 10 positions to be imitated. The tutor experimenter always acted as coordinator. Before showing a position the peer, performing as model, called the participant by name and said "Look." Immediately after presenting the position (this was shown for about 2-3 sec), the peer said "Now you do like I did." The participants obtained a positive score if they imitated the position within 5 sec from the tutor's invitation to do so.

With regard to cooperative play, each of the 10 activities presented within a session was performed by two tutors for 20 sec. At the end of the demonstration the third tutor (one of the three in turn) took the body position that he or she was supposed to have for the execution of the activity, called the participant by name, and said "Let's do like they did." The participants received a positive score if they displayed a 5-sec cooperation with the tutor who invited them (in the way shown by the other two tutors) within 5 sec from the invitation.

As to the verbalization of "that's good," each of the 10 activities presented within a session involved the participation of two tutors, i.e., one accomplished the activity while the other

said "that's good" upon the completion of the activity. One of the three tutors in turn was just assisting. The participants obtained a positive score if they repeated "that's good" within 5 sec from the time the tutor verbalized it. Similarly, with regard to the verbalization of "thank you," the presentation of each object required the participation of two tutors. One of the tutors (a) selected two exemplars of the same object, (b) brought one exemplar to the other tutor who said "thank you" upon receiving it, then (c) took the second exemplar and gave it to the participant. A positive score was recorded if the participant verbalized "thank you" within 5 sec from receiving the object.

During baseline no reinforcement was available. However, at the end of each session all four tutors made positive remarks about the participants' appearance, e.g., "Your hair is beautiful and I like your shirt."

Intervention

After the beginning of the intervention the order of the four daily sessions, with regard to the target responses involved, varied on a random basis.

Phase I. Because the operant level of the participants was expected to be zero on each of the target responses, and because physical prompting was known to upset the participants, vicarious reinforcement was used to prompt the appearance of responding. That is, the tutor experimenter reinforced the other tutors as soon as they modeled the responses by smiling, repeating twice "How nice" and simultaneously administering the edibles most liked by the participants, e.g., ice cream and raisins. If the participants exhibited correct responding they received (from the tutor experimenter) the same contingencies obtained by the tutors. The criteria for correct responding were as during baseline.

Phase II. At the beginning of the second phase vicarious reinforcement was eliminated, but the participants continued to receive edibles and praise on a continuous schedule (praise was delivered by all tutors). Subsequently, the time

required for cooperative play was increased to 10 sec, while five models on the verbalization of "that's good" and "thank you" were withdrawn. That is, on five of the 10 occasions available within a session, the participants had to verbalize "that's good" without a tutor modeling the response. Likewise, on five occasions the participants received an object and had to verbalize "thank you" without a tutor receiving the same object and modeling the response before them. When the participants' responding was again 100%, the time for cooperative play was increased to 15 sec and the models on "that's good" and "thank you" were completely eliminated. This was followed by the introduction of tokens in substitution of edibles. At first the tokens were provided on a continuous schedule and traded immediately for the edibles, then, trading was postponed to the end of the sessions. Subsequently, the amount was reduced to three tokens a session delivered on a variable ratio schedule. Finally, there was just one token at the end of each session, and trading was possible only after the fourth session. Parallel to this last period, praise started to be intermittent. During the last 3 days of the phase tokens were no longer available while praise was provided with an average of five times per session.

Pre- and Postintervention Probing

Preintervention probing overlapped with the initial portion of the baseline and was carried out over 22 inconsecutive days divided in two identical series. During the first 2 days of each series the probers (one group of boys and one group of girls) assigned to every participant presented within the training setting the response occasions selected for training. The next 3 days served for tutors and probers, respectively, to present within the generalization setting the response occasions selected for training. The following 3 days served for tutors and probers to present within the generalization setting the response occasions selected for testing generalization. The last 3 days were used by tutors and

probers to present within the training setting the response occasions selected for testing generalization. The conditions in effect were as during baseline.

Postintervention probing was organized in three series divided from each other by intervals of 7 to 9 days. The first series, which started immediately after the end of the intervention, corresponded to the pre-intervention series. The second and third series included an additional day (the first of the series) which served for the tutors to present within the training setting the response occasions used for training. The conditions were as during baseline except that the time required for cooperative play was 15 sec, no models were available for "that's good" and "thank you," and the order of the sessions with regard to the responses probed was random.

RESULTS

Interobserver Reliability and Performance of Tutors and Probers

Interobserver agreement was consistently 100% both on scoring the performance of tutors and probers and on recording the target responses. Tutors and probers were 100% correct throughout the entire study. Their preparation required seven to nine training sessions.

Intervention

The results are summarized in Figure 1 which for the first phase of the intervention presents the median performance of the participants, while for the second phase reports their mean level of responding. The operant level of the participants was zero on every behavior during the entire baseline. At the beginning of the intervention the administration of vicarious reinforcement (particularly the edibles) after the demonstration of each body position brought the participants to increase their visual attention for (and gradually also their physical proximity to) the tutors while they modeled the positions. This led to the appearance of the participants'

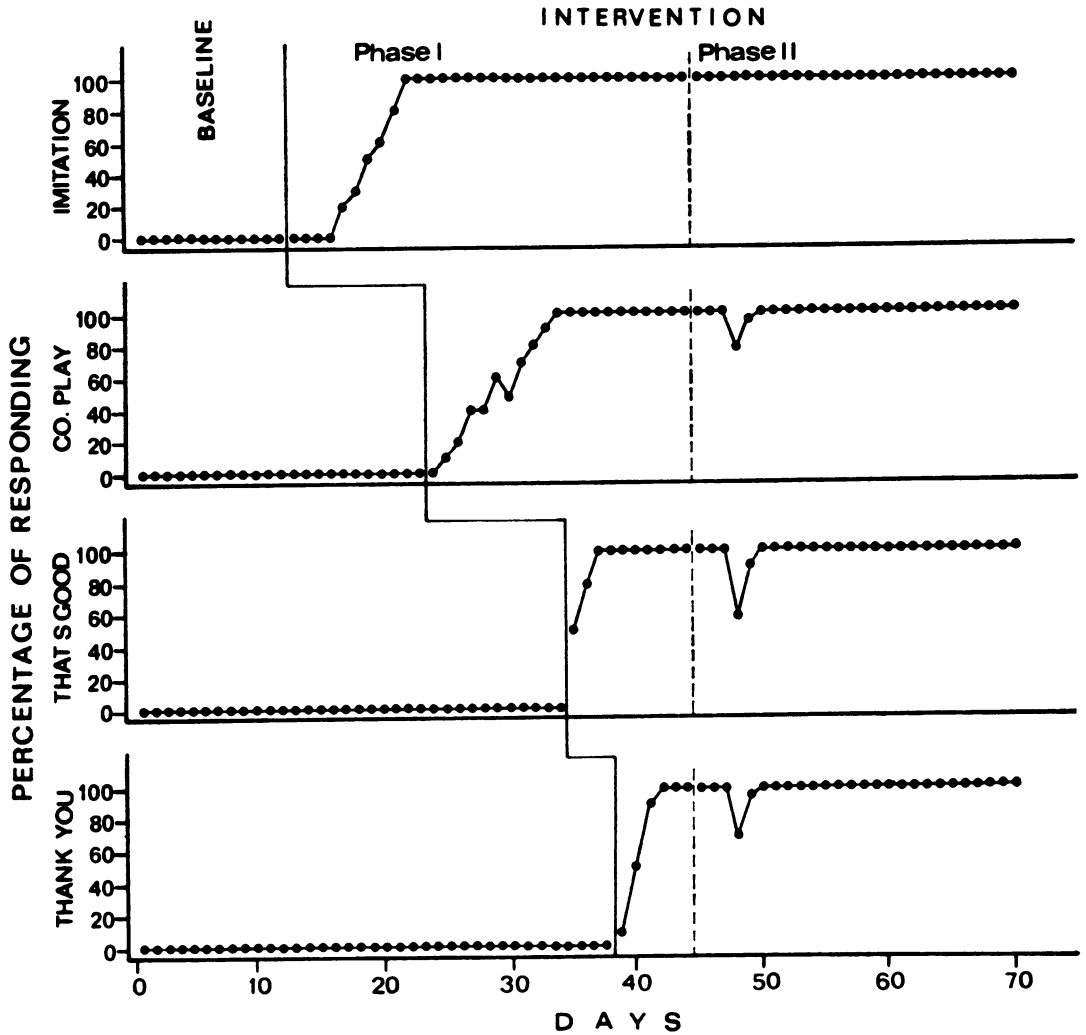


Fig. 1. The data on the acquisition of the target behaviors (Phase I of the Intervention) are the median slopes. That is, for each behavior the graph presents the performance of the subject who needed the median number of days to achieve the 100% level of responding. During baseline as well as from the achievement of the 100% level to end of Phase I, the performance of the subjects was equivalent. The data points presented in the second phase of the Intervention (which was of the same length for all subjects) are means for the three subjects.

imitation. Their responding followed by the same contingencies delivered to the tutors reached the 100% level in a short time.

The implementation of the treatment on the other behaviors provoked similar effects and the appearance of responding was rather rapid. The 100% levels of responding obtained during the first phase of the intervention were maintained until the end of training except for a momentary

decline on cooperative play and the verbalization of "that's good" and "thank you." This occurred during the second phase of treatment when the time required for cooperation was increased to 10 sec and the first five models were eliminated.

Pre- and Postintervention Probing

Throughout the two series of preintervention probing the participants' responding was zero.

On the contrary, during the first series of post-intervention probing (this series started with the probers of the same sex as the participants, who presented within the training setting the response occasions used for training), the participants' performance was consistently at the 100% level. That is, they responded to all response occasions (those used for training and those selected for testing generalization) presented by the tutors, the probers of the same sex, and the probers of the opposite sex. The use of the generalization setting did not interfere with responding. During the second series of probes (this series, as the third, started with the tutors presenting within the training setting the response occasions used for training) the performance was at the 100% level except on one occasion. That is, one participant displayed a 90% responding on "that's good" when the probers of the opposite sex presented within the generalization setting the activities selected for testing generalization. During the last series of probes, all participants again responded at the 100% level under each of the conditions.

EXPERIMENT 2

The results of Experiment 1 suggest that (a) normal children can teach social responses to withdrawn mentally retarded peers, (b) the training effects generalize across stimulus and response conditions, and (c) the trained and generalized levels can be maintained over time. Yet, the data do not allow one to define the effect of the single training procedures on the intervention results, on the generalization levels, or on the maintenance of them both. Therefore, Experiment 2 was planned with three aims. First, it was directed at investigating which of different reinforcement procedures (i.e., vicarious social reinforcement, vicarious edible reinforcement, vicarious and direct edible reinforcement, direct social reinforcement, and direct social and edible reinforcement) was sufficient to replicate the training results of Experiment 1. Second, it was aimed at investigating whether

the reinforcement procedure sufficient to bring about and/or maintain 100% levels of performance during the intervention was also sufficient to promote the maintenance of the trained and generalized results after the interruption of the intervention. Third, it was aimed at assessing whether during the study the participants developed social interaction with their normal schoolmates, i.e., outside the training setting.

METHOD

Participants

Three mentally retarded girls, all severely withdrawn, participated in this experiment. One girl also presented forms of autistic behavior such as looking into the space, playing with her fingers, and rocking. Their ages were 9.0, 9.7, and 12.1 yr. Their IQs as measured by the Leiter International Performance Scale were 52, 41, and 40. They were spending a large portion of their time with normal children in classrooms and play areas. The classrooms contained only 14-15 children. Similarly, within the play areas the girls were integrated with groups of about 15 children. Furthermore, they were provided with daily sessions of individual treatment which were carried out in a small room. During these sessions a teacher assistant taught them communication and self-help skills. Although their interaction with the teacher assistant was showing some progress, their interaction with the other children was almost nonexistent. They did not respond to peers' invitations or instructions, did not display any sign of imitation, and withdrew from physical contact.

Target Responses

The target responses trained as well as the response occasions used for training and testing generalization were the same as in Experiment 1.

Settings and Material

The training setting was a quiet room of approximately 5 m × 5 m containing a few

chairs and desks in addition to the material needed for training and testing generalization. One wall of the room was covered by a 1.5-m high mirror, while the wall opposite to it had a large one-way window. The generalization setting was a hallway of about 3 m \times 13 m. It was often frequented by children walking through, and contained a few plants in addition to the material needed for probing.

Tutors, Probers, Observers, and Reliability

Fifteen normal fourth- and fifth-grade girls were selected to act as tutors. Twelve of them constituted three groups of regular tutors. The other three girls were reserves. The probers were twenty-four normal fourth and fifth graders, twelve males and twelve females. They were divided according to their sex in six groups of four children. The preparation of tutors and probers (none of them was a classmate or a playmate of the participants) was carried out as in Experiment 1.

The observers were three female research assistants. They conducted the observations individually except during the training of tutors and probers, during the observation sessions carried out in the classrooms and play areas and during 20 days of the study. In all these instances they were scheduled to observe in pairs. They were visible to the participants only in the play areas. The computation of interobserver reliability on each of the behaviors recorded was executed as in Experiment 1.

Experimental Design

Baseline and preintervention probing were followed by Intervention I. For each participant this occurred according to a multiple baseline across behaviors design (Baer et al., 1968). That is, vicarious social reinforcement was introduced simultaneously on delayed imitation and cooperative play. When responding on any of these behaviors had achieved the 80% level or after 8 days of unsuccessful training, the intervention was simultaneously extended to the verbalization of "that's good" and "thank you."

In case training proved effective, postintervention probing followed. If training proved ineffective, all behaviors were returned to baseline and subsequently Intervention II began.

Intervention II differed from Intervention I only in that vicarious edible reinforcement replaced vicarious social reinforcement. If Intervention II proved ineffective, a new baseline was implemented and then Intervention III started.

The first phase of Intervention III was also conducted according to a multiple baseline across behaviors design. Vicarious and direct edible reinforcement were the experimental package. Training started on delayed imitation. After the participants had achieved the 80% level of responding, training was extended to cooperative play. Then, following the same criterion, the treatment involved the verbalization of "that's good" and "thank you" respectively. When the level of responding had been 100% on all behaviors for 3 consecutive days, the second phase of Intervention III started. This continued until the participants were under control of intermittent edible reinforcement. During the third phase, which as the previous one started simultaneously on all behaviors, a continuous schedule of direct social reinforcement replaced intermittent edible reinforcement. In case direct social reinforcement maintained the participants' responding, postintervention probing followed. Otherwise, the fourth phase of Intervention III (i.e., direct edible reinforcement) was implemented. At the end of this phase postintervention probing took place. However, if the participants' performance showed marked declines probing stopped and Intervention IV (i.e., direct social reinforcement) began. If ineffective to increase responding, this was replaced by Intervention V (i.e., direct social and edible reinforcement). At the end of Intervention V new probing took place. To ensure that differences in responding during the two probing periods were the effect of Intervention V rather than the result of longer training, the duration of the fourth phase of Intervention III was made to vary for the three participants.

The participants' interaction with their normal schoolmates throughout the different parts of the study was assessed by means of observation sessions carried out in the participants' classrooms and play areas.

Baseline

All conditions were as in Experiment 1.

Intervention I

Immediately after the demonstration of each response, the tutor(s) who had performed as model(s) received social contingencies, i.e., the tutor experimenter and the tutor(s) not involved in the demonstration of the response smiled while repeating twice "How nice." The criteria for correct responding were as during baseline.

Intervention II

Immediately after the demonstration of each response, the tutor(s) who had performed as model(s) received edibles from the tutor experimenter. The criteria for correct responding were as during baseline.

Intervention III

Phase I. The conditions were as in Intervention II except that direct edible reinforcement was also present. That is, the tutor experimenter provided the participants with the same edibles given to the models at each correct response. If by the end of the fifth training session on delayed imitation the participants had not shown any responding, immediately before the sixth session they were provided with edibles, three times noncontingently. This approach was aimed at enhancing the prompting effect of vicarious edible reinforcement. When the participants reached the 100% level also on "thank you," vicarious reinforcement was eliminated and training continued with direct edible reinforcement alone.

Phase II. During this phase the time required for cooperative play was 15 sec (as opposed to 5 sec in Phase I). Furthermore, at the start of the phase the models on the verbalization of "that's

good" and "thank you" were provided only on five occasions. After the participants had shown 100% responding for 3 consecutive days the other models, too, were withdrawn. Subsequently reinforcement was made intermittent. During the first 2 days just a few responses passed without reinforcement, but during the third day about 40% of the responses were not reinforced. If the participants maintained the 100% level across all 3 days, Phase III began.

Phase III. All four tutors smiled and repeated twice "How nice" each time the participants responded.

Phase IV. During the initial part of this phase, direct edible reinforcement was continuous. Besides, the first day included vicarious edible reinforcement as well. This was used during the sessions on delayed imitation and cooperative play (the first two of the day) and for the first two response occasions on "that's good" and "thank you." For the latter behaviors, the use of vicarious reinforcement involved the reintroduction of models. During the rest of the study, however, no modeling re-occurred on them. Similarly, the time for cooperative play continued to be 15 sec. For Subject 1 direct edible contingencies remained continuous until her responding was 100% on all behaviors. Subsequently, reinforcement was delivered on a variable ratio schedule which was slowly brought to 1:5. Three consecutive days of 100% responding under this ratio ended the phase. For Subjects 2 and 3, continuous reinforcement was maintained during the first 5 and 10 days of the phase, respectively. Then, a variable ratio schedule was gradually thinned until reaching the ratio 1:5. Five days of 100% responding under this ratio ended the phase.

Intervention IV

The conditions were as during the third phase of Intervention III.

Intervention V

Intervention V started with a continuous schedule of direct reinforcement including edi-

bles and social contingencies (these were as in the third phase of Intervention III). During the first training session (delayed imitation) vicarious edible reinforcement was also present. Direct social and edible reinforcement were maintained on a continuous basis until the participants had performed at the 100% level for at least 3 consecutive days and for as many days had shown consistent reactions to the social contingencies. That is, the observers had noted that they smiled to the tutors and/or had eye contact with the tutors during most of the reinforcement occasions. Afterwards, edible reinforcement was delivered on a gradually thinner schedule and eventually was discontinued. This was followed by a gradually more intermittent administration of the social contingencies, and when the participants had responded at the 100% level for 3 consecutive days under a variable ratio 1:5 the intervention ended.

Pre- and Postintervention Probing

Preintervention probing was as in Experiment 1 except that only one series of probes was implemented. Postintervention probing included two series of probes. The first contained 4 more days than the first series of Experiment 1. These were the initial days which served for the tutors to present within the training setting the response occasions used for training. The second series, which started 3 or 4 days after the end of the first one, corresponded to the second series of Experiment 1. The conditions during probing were as in Experiment 1.

Observation Sessions

Observation sessions of 30 min were carried out along the training and probing periods. Every 30-min session was made up of a 15-min observation conducted in the participants' classrooms (while the children were engaged in collective activities) and a 15-min observation conducted during the same day in the play areas. The participants' responses that were recorded (regardless of whether spontaneous or prompted) included delayed imitation of body

positions or activities, cooperative play, verbalization of "that's good," verbalization of "thank you," verbalization of other words, active physical proximity, and active physical contact. Delayed imitation was recorded any time they reproduced a position or activity shown by a normal peer within the previous 5 sec. Cooperative play was recorded when they joined a peer in the execution of an activity for 5 sec or longer. Verbalization of "that's good" and verbalization of "thank you" were recorded each time they uttered these expressions toward their peers. Verbalization of other words was recorded when they addressed a word or a combination of words (excepted "that's good" and "thank you") toward their peers. Active physical proximity consisted of the participants moving to a distance of less than 1.5 m from a peer and looking at him or her. Similarly, active physical contact consisted of any physical contact with a peer started by the participants.

In addition to the participants' responses, the observers also recorded whether the normal peers administered social and edible contingencies during the execution of the responses or within 3 sec from their completion.

RESULTS

Interobserver Reliability and Performance of Tutors and Probers

Interobserver agreement was consistently 100% on scoring the performance of tutors and probers and on recording the target responses, while it varied between 95% and 100% on recording the participants reactions to social reinforcement. During the observation sessions carried out in the classrooms and play areas, interobserver agreement was regularly 100% (i.e., the observers agreed on recording the responses as well as the presence or absence of reinforcement on them) except on active physical proximity (86-100%) and active physical contact (80-100%). Tutors and probers were scored as consistently correct except during three sessions in each of which one error occurred.

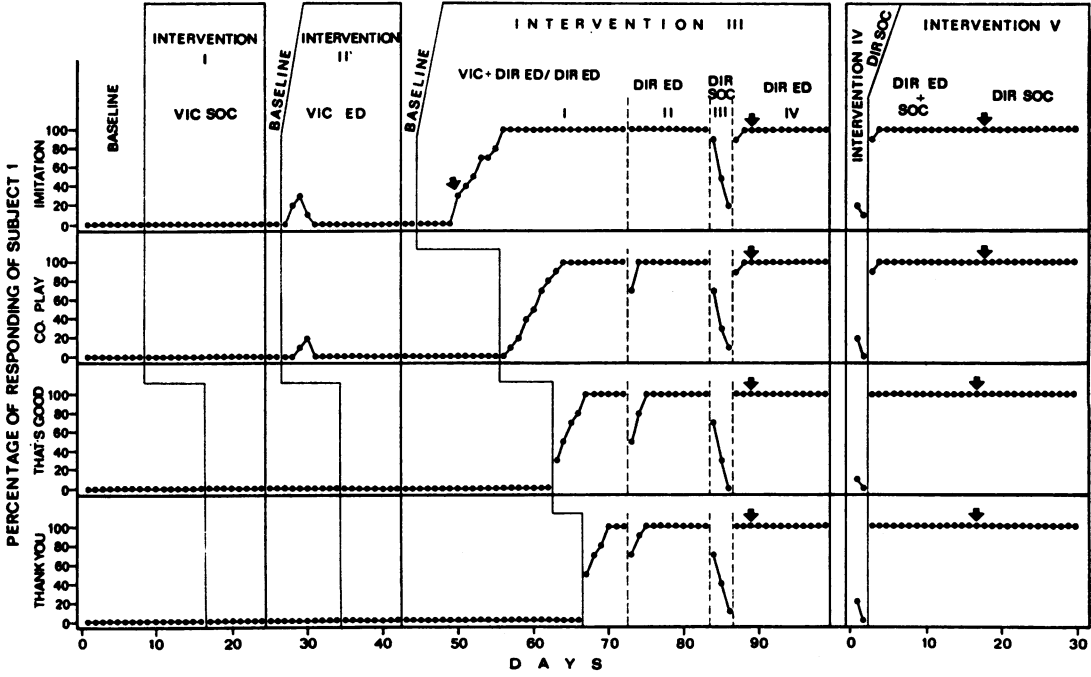


Fig. 2. Each data point represents the percentage of responding of Subject 1 within a session. The Roman numerals under Intervention III indicate the different phases of this intervention period. The arrow on Delayed Imitation (first phase of Intervention III) indicates the noncontingent use of direct edible reinforcement before that session. The arrows in the fourth phase of Intervention III indicate the beginning of intermittent reinforcement. The arrows in Intervention V indicate the elimination of edibles.

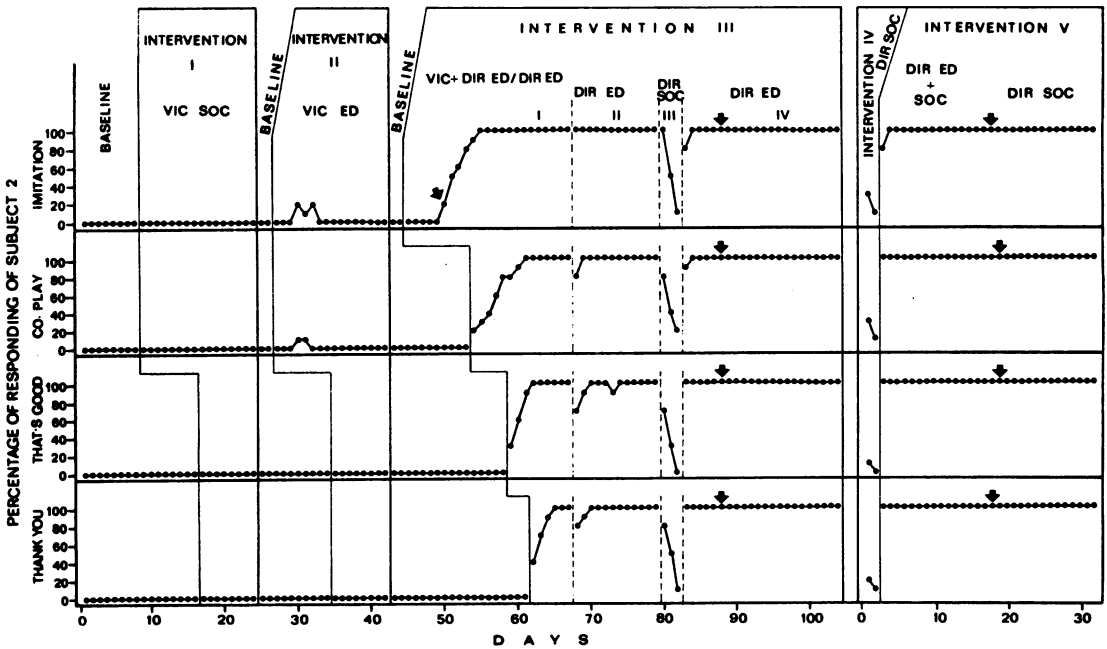


Fig. 3. The data for Subject 2, plotted in the same manner as in Figure 2.

Their preparation took six to eight training sessions.

Intervention I and II

The participants' performance during the five intervention periods is reported in Figures 2, 3, and 4. As shown by the figures, the participants' responding was zero during the initial baseline and remained so during Intervention I.

When Intervention II (i.e., vicarious edible reinforcement) was implemented on delayed imitation and cooperative play, some responding occurred for all participants, even though it soon extinguished. When Intervention II was introduced on the verbalization of "that's good" and "thank you," only Subject 3 showed some responding. Thus, Intervention II was discontinued.

Intervention III

The use of vicarious and direct edible contingencies during Phase I resulted in the acquisition of responding by all participants. However, the noncontingent administration of the edibles seemed crucial to reestablish the prompting effects of vicarious edible reinforcement (extin-

guished in Intervention II), and thus to facilitate the appearance of responding. This was consolidated by direct edible reinforcement and did not show declines after the elimination of vicarious reinforcement. At the beginning of Phase II, in concomitance with the increased time required for cooperative play and the elimination of five models on the verbalization of "that's good" and "thank you," a momentary decline was observed in the participants' performance of these behaviors.

During Phase III, the use of social contingencies did not maintain responding. During Phase IV, the application of a continuous schedule of direct edible reinforcement (which in the first day was combined with vicarious edible reinforcement) was effective to reestablish quickly the 100% level of performance. This level was maintained until the end of the phase despite the transition to a variable ratio of reinforcement (1:5).

Postintervention Probing I

The participants' performance during Post-intervention Probing I (i.e., the probing implemented after the fourth phase of Intervention

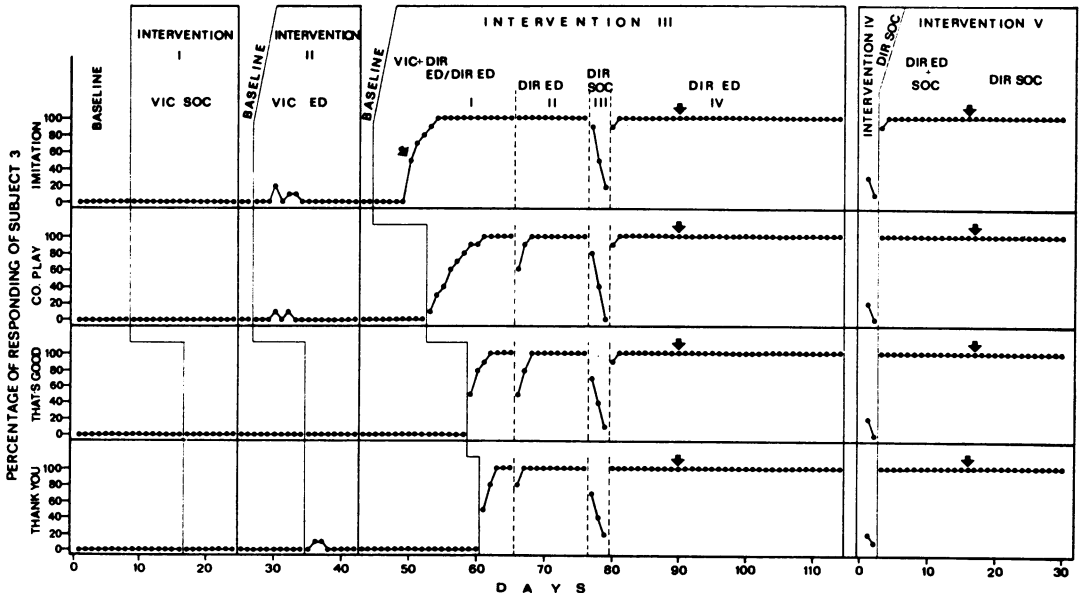


Fig. 4. The data for Subject 3, plotted in the same manner as in Figure 2.

III) together with their performance during Preintervention Probing and Postintervention Probing II is reported in Figure 5 (the data points are means for the three participants). During Postintervention Probing I all participants displayed a marked decline in responding despite the different durations of the fourth phase of Intervention III. Thus, probing was interrupted and Intervention IV began.

Intervention IV and V

As shown in Figures 2, 3, and 4, Intervention IV was not effective to increase responding. However, Intervention V promoted a quick recovery of the 100% level. Moreover, the participants' reactions to the social contingencies appeared consistent (three consecutive days in which they smiled back to the tutors and/or had

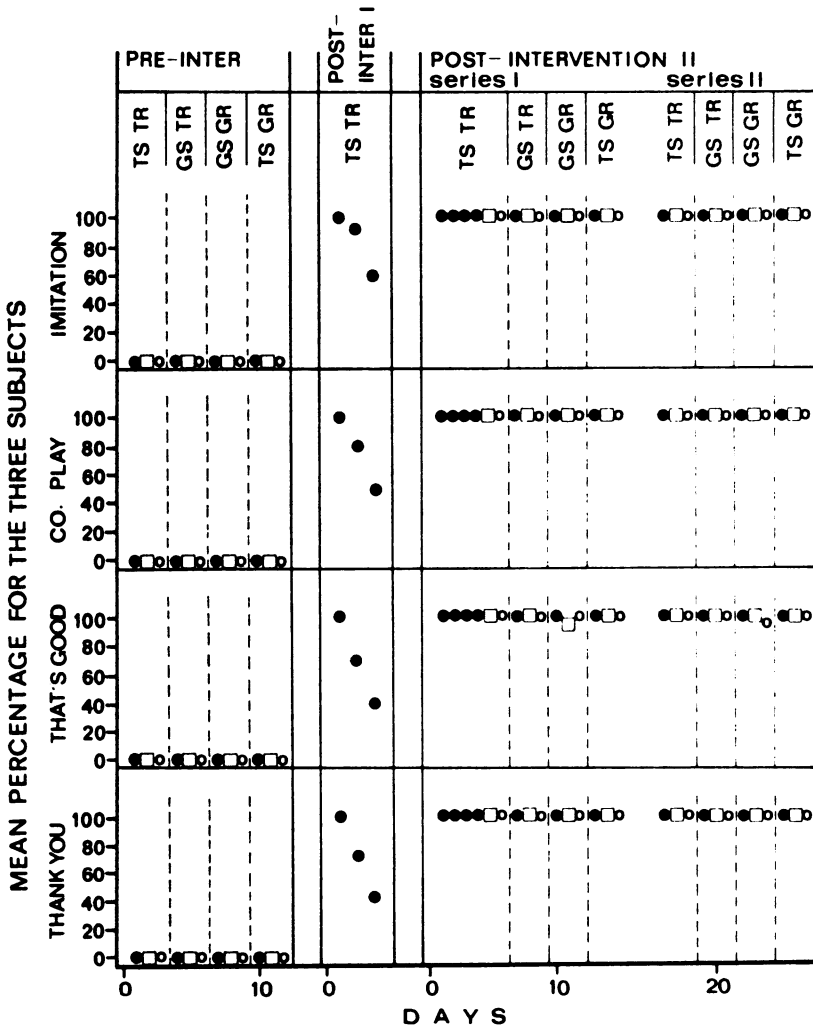


Fig. 5. Each data point represents the mean percentage of responding for the three subjects within a probing session. The dots indicate the percentage of responding with the tutors (the first dot in the preintervention represents the mean performance during baseline). The squares and open circles indicate the percentage of responding with the probers of the same sex and of opposite sex, respectively. TS, TR, GS, and GR stand for training setting, response occasions used for training, generalization setting, and response occasions used for testing generalization, respectively.

eye contact with tutors during more than 90% of the reinforcement occasions) 8 to 10 days after the beginning of Intervention V and remained regularly present until the end of this intervention period.

Postintervention Probing II

During Postintervention Probing II, which started immediately after the end of Intervention V, the participants performed consistently at the 100% level except on two occasions (See Figure 5). Both occasions concerned the verbalization of "that's good," i.e., Subject 1 had a 90% performance during the first series of probes, while Subject 2 had a 90% performance during the second series of probes.

Observation Sessions

The data reported in Figure 6 under different headings refer to sessions which were respectively collected within the last 8 days of Intervention I, the last 8 days of Intervention II, the last 3 days of the first and second phase of Intervention III, and the first 2 days of the third phase of Intervention III, the last 6 days of the fourth phase of Intervention III, the first 2 days

of Postintervention Probing I, the last 4 days of Intervention V, and the last 3 days of each series of Postintervention Probing II. The data points concerning the frequencies of the participants' behaviors and the contingencies following the behaviors are means for the three girls. As shown in the figure, all behaviors were at a zero level during Intervention I and Intervention II. Delayed imitation, cooperative play, verbalization of "thank you," and active physical proximity were sporadic during Intervention III. Some of them were occasionally noted also during Postintervention Probing I. However, all behaviors occurred consistently and with an increasing trend during Intervention V and Postintervention Probing II. Furthermore, the participants were repeatedly observed to perform behaviors or respond to cueing stimuli largely different from those used during training. For example, cooperative play included activities such as painting, washing, and cleaning, while the verbalization of "that's good" and "thank you" occurred in situations such as assisting at a game performed by the peers or receiving help from the peers.

The contingencies on the participants' re-

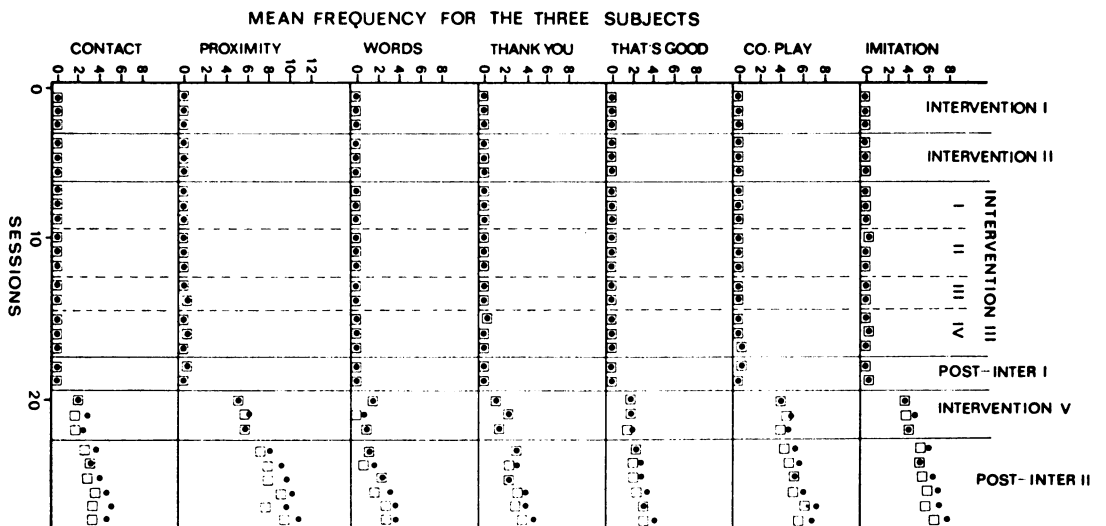


Fig. 6. The dots represent the mean frequency of responding for the three subjects during the observation sessions. The squares represent the mean frequency of reinforcement following the subjects' responses.

sponding had a high frequency and (except on one occasion) were social, i.e., praising, smiling, nodding, and applauding.

EXPERIMENT 3

The results of Experiment 2 suggest that during the intervention, edible reinforcement is necessary to bring about stable responding, while social contingencies can maintain such responding after they have been repeatedly paired with edibles. If during the intervention performance is dependent on direct edible reinforcement, a rapid extinction of responding follows the interruption of the intervention. On the contrary, if during the intervention performance is brought under control of social contingencies, the trained and generalized levels of responding are maintained after the interruption of the intervention. Finally, the data suggest that the participants show little interaction with their peers (outside the training setting) during the training period in which edibles are used, while they develop some consistent interaction during the training period in which social contingencies are applied. Such interaction is maintained and even increases during the final probing.

These results and the findings of Experiment 1 leave three main questions open. Such questions concern the factors determining the generalization responding, the maintenance of the trained and generalized levels of performance, and the development of social responding outside the training setting. As to the first two questions, one may formulate a number of hypotheses in an attempt to explain the results obtained. For example, one may speculate that generalization is mainly due to the similarity between the stimuli and responses used for training and those used for testing generalization, as well as to the extensiveness of training (several tutors and response occasions). Likewise, one can hypothesize that the maintenance of the trained and generalized levels of responding during probing is promoted by (a) the positive comments made to the participants by tutors and probers at the end

of each session, (b) expressions with reinforcing potential (e.g., eye contact, facial and head movements or subtle smiles) probably exhibited by tutors and probers during the sessions, and (c) the development of social responding outside the training setting which extends the intervention beyond its interruption. With regard to the development of social responding outside the training setting, however, there are no immediate explanations. The frequent observation that the responses were largely different from those trained or occurred in relation with cueing stimuli markedly different from those used during training seems to suggest that at least a large part of such responding was not due to generalization. On the other hand, the finding that such development takes place during the training period in which the participants' performance is under control of social contingencies may encourage one to speculate that responding develops mainly as an effect of new learning prompted by vicarious social reinforcement. That is, the participants start performing responses for which the peers receive social reinforcement and continue performing those responses because of direct social contingencies.

All of the aforementioned questions deserve detailed investigation. Yet, the last one appears to have particular relevance since the responding that develops outside the training setting expands the participants' repertoire beyond the limits of the generalization process. Furthermore, such responding continues to grow even after the end of the intervention. A first attempt to research the conditions promoting the appearance of social responding outside the training setting could be directed at testing these hypotheses. That is, one may investigate (a) whether after the participants have been taught some form of responding and their performance is under control of social contingencies, vicarious social reinforcement acquires the power to prompt the appearance of new responses, and (b) whether generalization is low or absent when response occasions markedly different from those used for training are presented in a setting differ-

ent from the one in which training took place and by children other than the tutors.

The investigation of these issues was the purpose of Experiment 3.

METHOD

Participants

Two males and one female, ages 12.3, 13.1, and 10.9 years, participated in this experiment. The respective IQs as determined by the Leiter International Performance Scale were 37, 35, and 45. The two boys were daily integrated with normal children during free-play periods and during sessions of occupational therapy. They possessed basic self-help skills and could speak some words and short sentences. Yet, they lacked any interaction with other children, and displayed behaviors such as staring into the space and walking around without an apparent goal.

The girl was integrated with normal peers except during sessions of individual treatment. Her behavior was characterized by restlessness, lack of attention for other children, and occasional tantrums.

Target Responses

The responses trained and the occasions used for training were the same as in the previous experiments. The occasions selected for testing generalization included those used in the previous experiments as well as new ones considered to be markedly different from those used for training. The new occasions (some examples are reported in Table 2) were comparable to those to which the participants of Experiment 2 had developed responding within the classrooms and play areas. Their selection was made just before the postintervention probing of Experiment 3 began, so as to include only occasions that had not been available to the participants or to which they had not developed responding (outside the training settings) parallel to the intervention period.

Table 2

Examples of the new response occasions used to test generalization in Experiment 3.

<i>Delayed Imitation</i>	Putting the hand in front of the mouth and saying "Aaa . . ." Composing a 3-piece puzzle. Making a simple drawing on the blackboard. Putting on a big dress.
<i>Cooperative Play</i>	Drying the toys that the peer washes. Saying "Jump" as the peer jumps. Finding the objects corresponding to the pictures that the peer presents. Folding the sheets of paper that the peer brings onto the table before putting them into a box.
<i>That's Good</i>	A peer skates fast. Two peers perform dancing with rings around their waist. A peer wins a short race over another peer. A peer says "I can lift this bar" while doing so.
<i>Thank You</i>	Helping the child to sit on a swing and pushing him or her gently. Preparing a glass of milk and saying "That is for you." Putting a sticker on the child's shirt or blouse. Saying "Here is a flower" while throwing a paper flower to the child.

Settings and Material

The training settings were a 4 m × 5 m room, in which one wall was covered by a mirror while the wall opposite to it had a one-way window, and a 6 m × 7 m classroom. The generalization setting was a 6 m × 6 m physical therapy room. The last two settings also had one-way windows and contained the objects and toys needed for training and probing.

Observers, Reliability, Tutors, and Probers

The observers were two female and one male research assistants. They carried out the observations individually except during the preparation of tutors and probers as well as during 15 days of Intervention II and 5 days of Postintervention Probing in which they were scheduled in pairs. During the study they were positioned behind the one-way windows and fitted with headphones. Interobserver reliability was computed as in the previous experiments.

The tutors were 24 normal fourth and fifth graders, 12 males and 12 females, who were divided in six mixed groups of four children each. The probers were 12 normal fifth graders, 6 males and 6 females, who constituted three mixed groups.

Three groups of tutors were prepared only on the response occasions selected for training delayed imitation. The other three groups of tutors and the probers were prepared on all response occasions, including the new ones selected for testing generalization.

Experimental Design

Preintervention probing and baseline were followed by Intervention I (vicarious social reinforcement) which was implemented simultaneously on all behaviors. During Intervention I (as in baseline) three groups of tutors presented the response occasions concerning delayed imitation in the small training room, while the remaining tutors presented the response occasions concerning the other behaviors within the classroom setting. If Intervention I did not increase responding after 9 days Intervention II began. For each participant the first phase of Intervention II was introduced according to a multiple baseline across behaviors design (Baer et al., 1968). The use of settings and tutors remained as in Intervention I. Training started on delayed imitation and involved a reinforcement package. This was gradually reduced to direct social reinforcement alone. If the participants maintained their 100% responding, the treatment was extended to cooperative play. When this behavior was also 100%, training started simultaneously on the verbalization of "that's good" and "thank you." The intervention on the last three behaviors (conducted in the classroom and by tutors other than those training delayed imitation) involved the use of vicarious and direct social reinforcement.

The second phase of Intervention II started simultaneously on all behaviors when their levels were 100%. The classroom was the only setting used. The treatment was carried out only

by the tutors who had been training cooperative play and the verbalization of "that's good" and "thank you." The end of this phase was followed by postintervention probing.

Baseline

The conditions were as in the previous experiments.

Intervention I

Immediately after the demonstration of each response, the tutor(s) who had performed as model(s) received social contingencies. That is, the tutor experimenter and the tutor(s) not involved in the demonstration of the response smiled and repeated twice "How nice" or "Great." The criteria for correct responding were as during baseline.

Intervention II

Phase I. During the initial part of treatment on delayed imitation the tutor acting as model received edibles as soon as he or she presented a position. The participants received the same edibles and social contingencies if they imitated the position within 5 sec from the tutor's invitation to do so. The social contingencies (delivered by all tutors) were as in Intervention I. When performance had achieved the 100% level for 3 consecutive days, vicarious reinforcement was withdrawn. However, direct social and edible reinforcement were maintained on a continuous basis until the participants' reactions to the social contingencies appeared consistent, i.e., 6 consecutive days in which they smiled to the tutors and/or had eye contact with tutors at least during 9 of the 10 reinforcement occasions. Afterwards, edible reinforcement was made progressively more intermittent and eventually was eliminated. Once the participants had performed at the 100% level for 3 consecutive days under social reinforcement alone, the intervention started on cooperative play.

The treatment on cooperative play began with the introduction of vicarious social reinforcement. However, direct social reinforcement

was added as responding showed failures to increase or declining trends. Training proceeded with both forms of reinforcement until the participants performed at the 100% level. Then, vicarious reinforcement was eliminated. This was followed by the beginning of treatment on the verbalization of "that's good" and "thank you" which was carried out in the same way. The criteria for responding were as in baseline.

Phase II. During the second phase, the time required for cooperative play was 15 sec. Furthermore, at the beginning the models on the verbalization of "that's good" and "thank you" were provided only on five occasions; then, they were completely eliminated. Three consecutive days of 100% performance following the elimination of the models led to the intermittent administration of reinforcement (i.e., direct social reinforcement). Its density was gradually reduced until reaching a variable ratio 1:5. Three consecutive days of 100% responding under this schedule ended the intervention.

Pre- and Postintervention Probing

Preintervention probing lasted 8 days and involved the response occasions used for training and the old ones selected for testing generalization (i.e., those used in Experiments 1 and 2). Postintervention probing lasted 18 days. The first 2 days served for the probers to present within the generalization setting the new response occasions selected for testing generalization. Days 3 and 4 served for the tutors (those employed during the second phase of Intervention II) and probers to present within the training setting the response occasions used for training. Days 5 and 6 were used as the first 2 days. Days 7 and 8 served for tutors and probers to present within the training setting the old response occasions selected for testing generalization. Days 9 and 10 served for the tutors to present within the training setting the new response occasions selected for testing generalization. The remaining 8 days were used by tutors and probers to present within the training or generalization setting the response occasions

used for training and the old ones selected for testing generalization. The conditions during pre- and postintervention probing were as in the previous experiments.

RESULTS

Interobserver Reliability and Performance of Tutors and Probers

Interobserver agreement was consistently 100% on scoring the performance of tutors and probers and on recording the target responses, while it varied between 90% and 100% on recording the participants' reactions to the social contingencies. The performance of tutors and probers was consistently correct except for one error made by a group of tutors.

Intervention I and II

The results of Intervention I and Intervention II are summarized in Figure 7. The participants' mean level of responding was zero during the initial baseline and during Intervention I. At the beginning of Intervention II, the use of vicarious edible reinforcement, in addition to direct edible and social contingencies, established the 100% level of responding on delayed imitation. This level was not disrupted by the elimination of vicarious edible reinforcement. Moreover, all participants acquired consistent reactions to the direct social contingencies 18 to 25 days after their achievement of the 100% responding. Subsequently, the gradual elimination of direct edible reinforcement did not interfere with performance which was maintained by direct social contingencies. At this point the introduction of vicarious social reinforcement on cooperative play prompted some responding for every participant. However, the 100% level was reached only after direct social reinforcement was added. The same phenomenon was also observed on the verbalization of "that's good" and "thank you."

At the beginning of the second phase of Intervention II the increased time required for cooperative play and the elimination of five

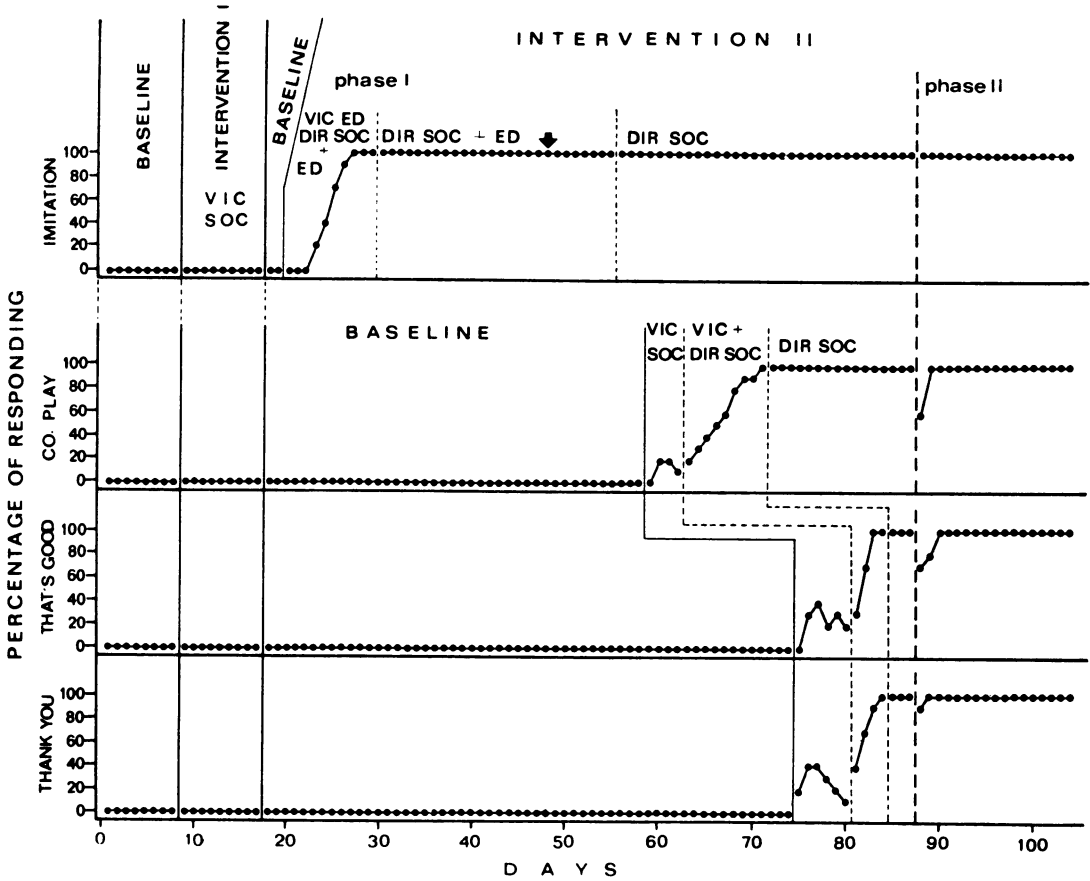


Fig. 7. The data points in the initial baseline and Intervention I are means for the three subjects. The data reported for Intervention II (the phases were of different length for the subjects) are median performances. In Phase I, the data on Delayed Imitation depict the performance of the subject who needed the median number of days to achieve 100% responding and consistent reactions to the social contingencies (the achievement of these reactions is marked by an arrow). The data on the other behaviors depict the performance of the subject with the median level of responding to vicarious social reinforcement. In Phase II, the data depict the performance of the subject with the median number of treatment days. The baseline performance between Intervention I and Intervention II was equivalent for all subjects.

models on the verbalization of "that's good" and "thank you" caused a momentary decline in performance of these behaviors.

Postintervention Probing

The results of postintervention probing are presented in Figure 8. The data points are means for the three participants. During preintervention probing no responding occurred. During postintervention probing the participants displayed 100% performance with tutors and probers on the response occasions used for train-

ing as well as on the old ones selected for testing generalization regardless of the setting.

When the new response occasions selected for testing generalization were presented by the probers in the generalization setting, performance was zero except for two responses which occurred on delayed imitation and one response which occurred on the verbalization of "thank you." When the new response occasions were presented by the tutors in the training setting, the mean percentage of responding varied between 3 (verbalization of "that's good") and 27 (delayed imitation).

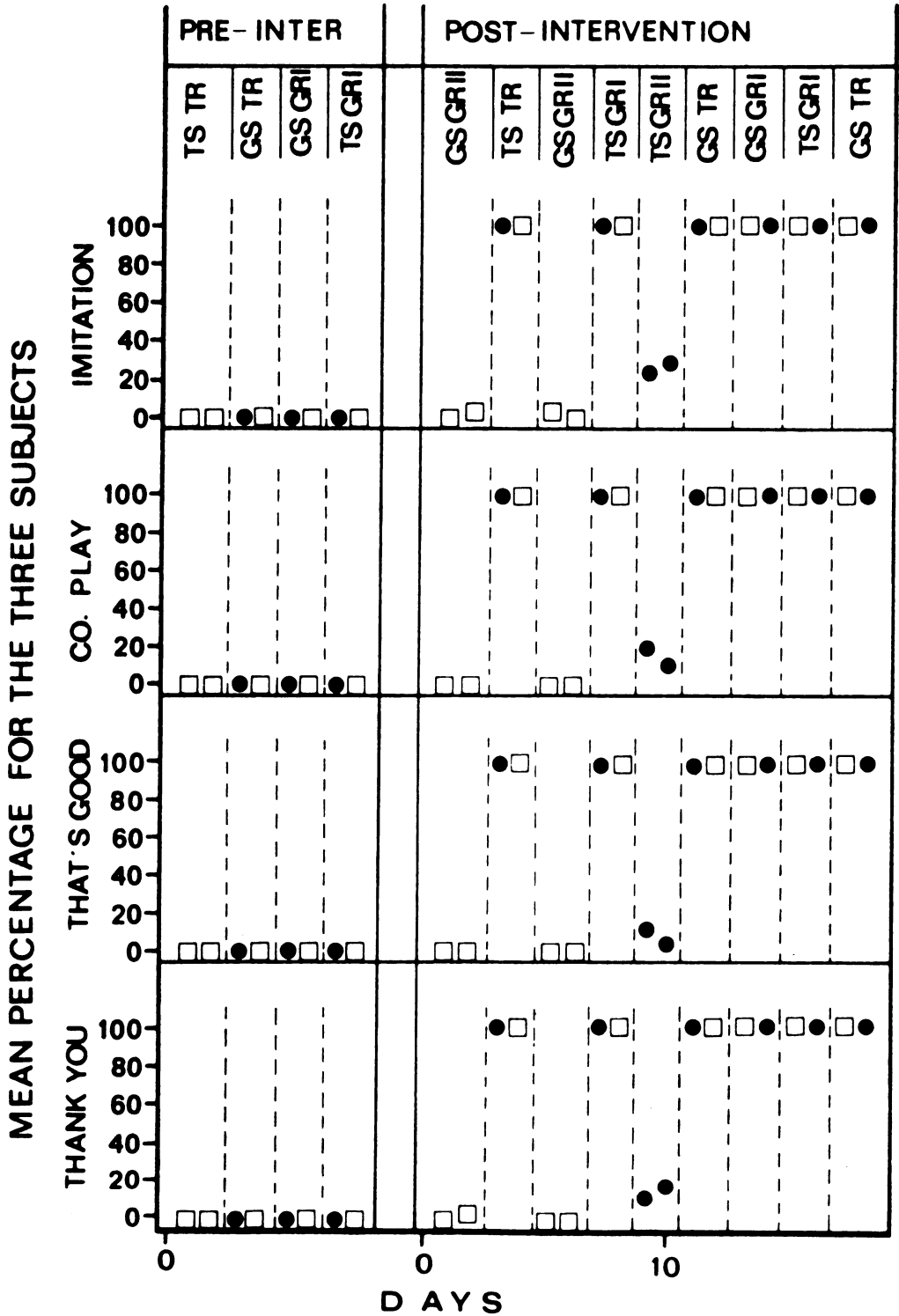


Fig. 8. Each data point represents the mean percentage of responding for the three subjects within a probing session. The dots and squares indicate the percentage of responding with tutors and probers respectively. TS, TR, GS, GR I, and GR II stand for training setting, response occasions used for training, generalization setting, old response occasions used for testing generalization, and new response occasions used for testing generalization, respectively.

DISCUSSION

The results of the three experiments suggest a number of considerations. First, normal children can effectively teach social responses to withdrawn mentally retarded peers. The findings that the tutors were highly and consistently reliable in conducting virtually alone the entire intervention programs underline the potential of normal children as coadjutors in the rehabilitation of retarded peers and reemphasize the conclusions of previous studies on peer tutoring (Strain, 1977; Strain et al., 1976; Strain et al., 1977; Strain & Timm, 1974; Young & Kerr, 1979).

Second, direct edible reinforcement appears to be necessary at least during the initial part of the intervention. Subsequently, if social contingencies have been regularly presented together with the edibles, these may no longer be required. That is, edibles can be slowly withdrawn from the behaviors on which they were used and do not need (as observed in Experiment III) to be reintroduced for training new behaviors.

Third, direct social contingencies do not seem to possess any reinforcing power until they have been repeatedly paired with direct edible reinforcement. This pairing conveys them the power to maintain the levels of responding established through direct edible reinforcement, after this is slowly withdrawn, and also to establish the 100% level on new behaviors.

Fourth, the application of vicarious edible reinforcement prompts some responding in children completely isolated. If this responding is regularly followed by direct edible reinforcement, the use of vicarious edible reinforcement on new behaviors with a zero level acts as a strong discriminative stimulus for responding. However, if vicarious edible reinforcement is used alone, the initial responding soon extinguishes. Moreover, the reintroduction of the same reinforcement after a brief baseline fails to produce any effect unless a few noncontingent occasions of direct edible reinforcement take place.

Fifth, as to vicarious social reinforcement, the following observations were made. After the participants have been trained to respond through a reinforcement package and their responding is maintained by the social component of the package, the application of vicarious social reinforcement on behaviors with a zero level provokes the appearance of responding. These prompting effects are evident even when vicarious social reinforcement is presented by individuals other than those who conducted the previous training and in a setting different from the one in which the previous training occurred. Finally, although effective to prompt responding, it does not bring about 100% levels of performance. The results concerning both forms of vicarious reinforcement seem to add to previous literature (Kazdin, 1973, 1977; Kazdin, Silverman, & Sittler, 1975; Strain et al., 1977; Strain & Timm, 1974). This literature has demonstrated the effectiveness of vicarious reinforcement to increase the existing levels of responding, while the findings of the present experiments indicate that vicarious reinforcement may also be used to prompt the emission of responses with a zero level. Thus, it can be used in substitution of verbal and physical prompting when these techniques prove ineffective or difficult to apply.

Sixth, as to the conditions promoting generalization, the data provide only limited evidence. The findings of Experiment 3, in accordance with the results of Experiments 1 and 2, suggest that generalization responding is high and stable when the response occasions presented for probing are similar to those used for training. In this case the use of children other than the tutors (even though similar to them) and the use of a setting different from the one in which training took place did not interfere with the participants' responding. When the response occasions presented for probing are markedly different from those used for training, some responding still occurs if the occasions are presented by the tutors in the training setting. However, responding is totally disrupted if the

occasions are presented by children other than the tutors and in a setting different from the one in which training took place. These results reemphasize the similarity between response occasions as a basic condition for generalization to occur (Stokes & Baer, 1977). Among the other possible conditions to which one may ascribe a role in the promotion of the generalization responding, three appear noteworthy. The probers who were similar to the tutors also acted as the tutors. Training was extensive with regard to the number of occasions related to each target response and the tutors involved. The development of social responding within the classrooms and play areas (observed in Experiment 2 and assumed in Experiments 1 and 3) widened the training context with regard to individuals, response occasions, and settings. Additionally, one may wonder whether the schedule used for the probing variables (tutors, probers, response occasions, and settings) facilitated the results.

Seventh, the findings of Experiment 3: (a) vicarious social reinforcement can acquire the power to provoke the appearance of responding on behaviors with a zero level while this responding can be consolidated by direct social reinforcement, and (b) generalization is virtually absent when response occasions markedly different from those used for training are presented by the probers in the generalization setting, seem to provide some suggestions as to the development of responding outside the training setting. That is, a large portion of the responding that develops in the classrooms and play areas (i.e., when the response occasions available are largely different from those used for training) is likely to appear as the result of the prompting effects of vicarious social reinforcement. This does not exclude that some responding may occur as the result of generalization (i.e., when the response occasions are similar to those used for training). In both cases, as also observed in Experiment 2, responding seems consolidated and maintained by direct social contingencies.

The findings of Experiment 3 and the aforementioned considerations may as well explain

why in Experiment 2 responding in the classrooms and play areas was virtually zero before Intervention V. In fact, prior to that intervention period, performance within the training setting was under control of edible reinforcement, while social contingencies were not even effective to maintain the established levels of responding.

Eighth, as to the variables promoting the maintenance of the trained and generalized responding throughout probing, no systematic investigations were carried out. Yet, a number of hypotheses could be forwarded. For instance, the positive comments made by tutors and probers at the end of each probing session may have acted as a powerful reinforcer reducing the difference between the last period of the intervention (when social reinforcement was intermittent) and probing. Besides, one cannot exclude that during probing expressions such as eye contact, head movements, and subtle smiles (probably exhibited by tutors and probers toward the participants) acted as reinforcers for responding. Similarly, the responding within each probing session may be seen as a chain in which the presentation of a new response occasion and possible expressions of tutors and probers acted as reinforcers for the performance of the previous response, while the positive comments at the end of the session acted as the final reinforcement. Lastly, probing was not the only time of the day when the participants were performing social responses. In fact, parallel to probing, they were engaged in a variety of interactions with their peers (classrooms and play areas) and received frequent reinforcement for their performance.

In conclusion, although further research is warranted especially on the issues of generalization and maintenance, it is encouraging to note that the effects of the intervention can spread outside the training setting and continue to grow after the end of the intervention. This seems to stress the therapeutic value of treatment for severely withdrawn retarded children. Moreover, the finding that the children could

be trained to verbalize positive comments and the reports of teachers and observers pointing out that the tutors found these verbalizations reinforcing, suggest that it may be possible to develop a program in which the interaction and training efforts of normal children are strengthened with the reinforcement provided by the retarded peers.

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