

*SHARING IN PRESCHOOL CHILDREN:
FACILITATION, STIMULUS GENERALIZATION,
RESPONSE GENERALIZATION, AND MAINTENANCE*

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Three approaches to facilitating verbal and physical sharing and of the generalizability and durability of the behaviors that were trained were investigated. During a free play period, groups of preschool children were taught to share verbally, to share physically, or to share verbally and physically; another group was not trained. Immediately following free play, the children were observed in a different setting. Follow-up was conducted 4 weeks after training ended. Physical sharing that was durable and generalizable resulted only when children were taught to share verbally. Increases in physical sharing produced by training children to share only physically were not durable and did not generalize. Training both verbal and physical sharing produced results with a magnitude slightly greater than teaching just verbal sharing. Despite a lack of special programming, some of the treatment effects generalized to another setting and were maintained during the Follow-up. There was response generalization of the effects of training verbal sharing to physical sharing but not vice versa. Problems with the concept of response class, a methodological suggestion for studying response generalization, and possibilities concerning why generalization and maintenance occurred without specific programming are discussed.

DESCRIPTORS: physical sharing, verbal sharing, generalization, maintenance, preschool children

Almost a half century has passed since a researcher at the University of Southern California reported, "It appears as if it will be possible to establish preschool environments which will

tend to induce sharing behavior" (Currier, 1934, p. 75). Since the beginning of formal education many teachers have, no doubt, used a variety of techniques to develop sharing among children. Likewise, during the past 20 years a number of laboratory investigations of donating behavior have been conducted suggesting that sharing can be encouraged systematically among young children. Nonetheless, there is little empirical evidence that young children can be taught to share in school classrooms or in experimental playrooms. In fact, prior to this investigation, only three such studies had been reported.

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In the first, four children (6 to 9 years) were taken from their regular classroom to a playroom where training was conducted by an experimenter for 15 min per day (Cooke and Apolloni, 1976). Training was composed of instructions, modeling, prompting, and social praise. The procedure resulted in increased sharing of toys.

In the second study, preschool children were taken to a playroom where training was conducted by the experimenter for 15 min daily (Rogers-Warren and Baer, 1976). Each session was divided into a 10-min art period and a 5-min report period during which children could indicate whether or not they had shared. The use of modeling plus social reinforcement for any report of sharing was compared to modeling and social reinforcement for only true reports of sharing. The combination of modeling and reinforcement for true reports of sharing was more effective in increasing sharing.

In the third study, Barton and Osborne (1978) examined whether or not a paraprofessional behavior change agent could use behavioral techniques to encourage sharing in a natural setting. A kindergarten teacher used a positive practice package (Foxy and Azrin, 1972) during a 30-min free play period in the regular classroom to train five hearing impaired children to initiate and reciprocate verbal sharing. Whenever the teacher noticed a student not sharing, either verbally or physically, the teacher required the student to practice verbal sharing three times with another student. The use of this positive practice package resulted in an immediate increase in physical sharing.

Although it has been demonstrated that behavioral techniques can be used to establish sharing, there is little information about the durability of these findings. Cooke and Apolloni (1976) reported that in a 4-week follow-up, the children were still sharing more frequently than at the start of the experiment, but somewhat less than at the start of training. Barton and Osborne (1978) found that following summer vacation, 15 weeks after the termination of the experiment, physical sharing still occurred at a mean of 300% over baseline. However, in the absence of maturational controls, it is possible in both of these studies that some uncontrolled variables could have produced similar changes over time.

Similarly, information about the generalizability of the findings outside the training setting

is limited. Rogers-Warren and Baer (1976), the only ones to address this issue, observed the children in the regular classroom during 10-min generalization sessions which were conducted by a second experimenter. During generalization sessions, sharing was never praised, but other social behaviors (e.g., "playing nicely") were reinforced. The results of these sessions demonstrated that sharing generalized somewhat. However, there is the possibility that praising other social behaviors may have encouraged more sharing, and thus a replication without such reinforcement is needed before true generalization of sharing can be claimed.

Both Barton and Osborne (1978) and Rogers-Warren and Baer (1976) have recorded two classes of sharing: verbal sharing and physical sharing. However, no one has determined whether it is most effective to start training with verbal sharing, physical sharing, or both types of responses. In the previous studies, Barton and Osborne trained only verbal sharing whereas Rogers-Warren and Baer and Cooke and Apolloni (1976) trained both classes of sharing. Empirical data are needed to determine which approach is most efficacious.

The main purpose of the present study was to investigate the effects of training children to share verbally, to share physically, or to share verbally and physically. The effects were monitored in the training setting, in a nontraining setting, and over time.

A secondary purpose was to investigate the concept of response class. Members of a response class have been identified by: (a) common sense, (b) similarities in behavioral topography, and (c) functional analysis (Sajwaj, Twardosz, and Burke, 1972). Because predictions based on common sense and topographies are often misleading, a functional definition of response class usually is given by determining which behaviors, in addition to those being treated, are affected by the manipulation. Gerwitz (1971) argues that when a behavior is reinforced explicitly, a large number of other responses within the same response class are reinforced indirectly. According

to this view, if verbal and physical sharing are members of the same functional response class, one would expect reinforcement of verbal sharing to increase the probability of physical sharing and reinforcement of physical sharing to increase the probability of verbal sharing. Increases in physical sharing have occurred by training verbal sharing (Barton and Osborne, 1978). However, generalization in the opposite direction has not been verified, as no one has trained only physical sharing. In the present study generalization was tested in both directions.

METHOD

Subjects, Experimenters, and Observers

Thirty-two preschool children enrolled at the Child Development Center at Utah State University served. The children, who were between 3 years 0 months and 5 years 3 months ($M = 4$ years 2 months), were described by their teacher as average to bright. The center, which mainly serviced children of students attending the University, conducted morning and afternoon classes with 20 children enrolled in each. For purposes of simplicity, the remainder of this section refers only to the morning class, as the afternoon subjects received the same treatment in the same settings with only the experimenters, observers, and time of day being different. After the authors obtained parental permission, 8 boys and 8 girls were randomly selected to serve as subjects during the morning session. From this pool of 16 children, 4 groups were formed by assigning randomly 2 boys and 2 girls to each group.

Two undergraduate females served as experimenters and four undergraduates (male and female) were observers. All undergraduates were kept unaware of the purpose of the study.

Settings and Materials

All of the children enrolled at the center were allowed by their teacher to explore the four classrooms located in the building and to play with the available materials (*e.g.*, art supplies,

toys, and books). The only structured activities were art, music, and juice time. The study was conducted at the center Monday through Friday. However, on days when more than one child was absent from a group, the group did not meet. During each session the groups met separately in a training setting and then in a generalization setting.

Training setting. An experimenter conducted 16-min free play periods in Room X (2.4 m by 3.0 m) which was empty of all furnishings except for six toys. Each toy could be used by two or more children simultaneously. Using only social toys may have resulted in a slightly inflated baseline. Although no one has studied the effects of type of toy at the preschool level, it is known that social play occurs more among 7-year-olds when social *versus* isolate toys are provided (Quilitch and Risley, 1973).

In order to decrease the probability of habituation to the toys, two different toys were introduced each day. The pool of toys consisted of: a design board, a form puzzle, plastic needles, Lincoln Logs, Busy Blocks, Legos, a daisy chain, lids, string blocks, a graduated cylinder set, animals, and stacking blocks. If one member of a group were absent, only five toys were provided. These particular toys were available to the children only during the free play period.

Generalization setting. Immediately following the free play period, the children were taken to Room Y (2.8 m by 2.8 m) where a different experimenter conducted a 12-min art period in a manner similar to that described by Rogers-Warren and Baer (1976). The children worked on or around a large piece of paper (1.5 m by 1.5 m) located on the floor in an area 2.1 m by 2.4 m. In the center of the large paper were five sets of art materials and in front of each child was placed a sheet of typing paper. Each day one set of new materials was introduced from a pool of 10 (*i.e.*, crayons, pencils, magic markers, scissors, circle templates, construction paper, magazines, paste, paint, and rulers) and one set was removed. In order to make the art activity one in which sharing was desirable, the number

available in a particular set was always less than the number of children present. In addition, if one child were absent, only four sets were present. During the art period the experimenter sat outside of the working area (.3 m from its periphery) but was free to leave and reenter the area periodically.

Behavioral Definitions

Three child behaviors (*i.e.*, physical sharing, verbal sharing, and refusals to share) and two experimenter behaviors (prompts and reinforcement) were recorded. Refusals to share were recorded because there was a possibility that training only verbal sharing would result in an increase in refusals to share. The two experimenter behaviors were recorded to ensure that they only occurred during the treatment phase in the training setting.

Physical sharing. Physical sharing was defined as: (a) handing a material to another child, (b) allowing another child to take his/her material, (c) using a particular material that another had used during the same observation interval, or (d) simultaneously using a material with another to work on a common project. Two or more children were considered to be using a particular material simultaneously when they were facing each other or the material and each was using a part of it to work on a common project (*e.g.*, each child using separate logs to build one cabin). Physical sharing did not include instances where children indicated either verbally or nonverbally that they did not want to share physically with other group members (*e.g.*, crying, screaming, or complaining to the experimenter).

Verbal sharing. Verbal sharing was defined as all verbal attempts at initiating physical sharing or verbal acceptance of such attempts. This definition included: (a) requests to share another's materials, (b) compliance with a request to share materials, (c) invitations to share one's own materials, or (d) acceptance of invitations to share.

Refusals to share. Refusals to share were de-

finied as all instances of noncompliance to a peer's verbal attempt to share. Noncompliance included all instances where a child's behavior did not allow another peer to share physically after being so asked (*e.g.*, a child saying "no" or continuing to play with a toy alone). Failure to share physically after agreeing to do so was recorded as a refusal.

Experimenter behaviors. Prompts were scored whenever the experimenter suggested that a child physically or verbally share or modeled the correct response. Praise was scored whenever the experimenter approved verbally of a child's behavior.

Data Collection

During each free play period two observers were located in adjacent corners of Room X, and during each art period two different observers were situated in Room Y approximately .3 m from the periphery of the large sheet of paper and about 2 m apart. A partial interval recording technique (Bijou, Peterson, Harris, Allen, and Johnston, 1969) utilizing 5-sec observation and 5-sec record intervals was used. Each observer monitored one child for 1 min (6 intervals) and then switched to another child for the next minute. The sequential order of monitoring the children was different for the two observers. However, for 25% of all the observation intervals, both observers monitored the same child. Therefore, for each child, data were gathered for 7 min (42 intervals) during free play periods and 5 min (30 intervals) during art periods. To ensure that a representative sample of the children's behavior was obtained, the sequential order of monitoring the children was counterbalanced across days such that each child was observed approximately an equal number of times during each time interval. The experimenters were monitored continuously in both rooms.

Observer Reliability

Prior to the experiment all observers were trained to a reliability of 85% on each behavior

that had been defined operationally. During the experiment reliability was checked daily. Observer reliability was calculated for each of the responses using the Exact Agreement-Response Intervals Only Procedure (Repp, Deitz, Boles, Deitz, and Repp, 1976). Agreement was defined as both observers recording a certain behavior for a particular individual for a given observation. Agreement on nonoccurrences were not included in the computation. Reliability then was computed for each of the behaviors by dividing the total number of cell agreements by the total number of cell agreements and disagreements. This number then was multiplied by 100. The mean interobserver reliability during the free play periods for verbal sharing, physical sharing, refusals to share, experimenter praise, and experimenter prompting were, respectively: during the morning sessions 95%, 97%, 80%, 87%, and 85%; and during the afternoon sessions 96%, 95%, 100%, 100%, and 89%. During the art periods the mean interobserver reliability for verbal sharing, physical sharing, and refusals to share were, respectively: during the morning sessions 88%, 97%, and 83%; and during the afternoon sessions 91%, 96%, and 93%. No observer reliability was calculated for the two experimenter behaviors during the art periods because these behaviors only occurred during free play periods, and then only in the treatment phase.

Experimental Design

Three experimental groups and one control group were used in the present experiment. During the free play periods the experimental groups received the following sequence of conditions: Baseline, Treatment, Baseline, and Follow-up. The control group received a similar sequence during the free play periods except that the second phase was a baseline condition. For all four groups the following sequence of conditions was employed during the art periods: Baseline, Baseline, Baseline, and Follow-up.

The control group was used for two reasons. First, research on sharing in the natural en-

vironment (Barton and Osborne, 1978; Cooke and Apolloni, 1976) indicated a high probability that the effects of training would continue during nontreatment phases. If this happened, functional control of the children's behaviors would need to be established through the use of a no-treatment group (Hartmann and Atkinson, 1973). Second, to demonstrate that the treatments produce long-term changes in sharing that were greater than would be expected from maturational or other uncontrolled variables, a control group was needed (Kazdin, 1973).

Procedure

Baseline. During the baseline phases, the experimenters never prompted or praised verbal or physical sharing. In addition, the experimenters were instructed not to praise the children for any other behavior. However, the experimenters were encouraged to praise the product of each child's behavior or the material being used by the child (e.g., "That is a pretty drawing!"; "That is a neat toy!") twice per period in order to maintain rapport with the children. Each baseline condition was conducted for 8 sessions.

Treatment. During the treatment phase (Sessions 9 through 16) each experimental group received the same training package. However, for one group it was applied only to verbal sharing (Group V), for another it was applied only to physical sharing (Group P), and for a third group it was applied jointly to verbal and physical sharing (Group VP). The training package was an expansion of the one used by Cooke and Apolloni (1976) and included instructions, modeling, behavioral rehearsal, prompting, and praise.

Prior to the beginning of each free play period for Groups V, P, and VP, the experimenter trained the children in the appropriate mode to share. While conducting this training, the experimenter followed a different script for each group.¹ However, all the scripts consisted

¹Requests for reprints of the training scripts can be made to the senior author.

of the same general sequence. First, the children were provided with a rationale for the importance of sharing and then they were given instructions in the appropriate mode on how to share. For example, the experimenter instructed Group V by saying "We can share by asking someone else to play with a toy with us," Group P by saying "We can share by playing with a toy with someone else," and Group VP by saying "We can share by asking someone else to play with a toy with us and by playing with the toy with them." Second, the experimenter selected one of the children (counterbalanced across sessions) to model the behavior. The model was requested to share a number of times in the appropriate mode with the experimenter and was praised when the requested behavior was emitted. Third, the remaining children were requested to rehearse the model's behavior. Practicing sharing in the appropriate mode was prompted and praised. The prompt and praise statements by the experimenter were always specific to the appropriate mode (*e.g.*, for Group V, "I liked the way you asked Aubrey to play with your toy"; for Group P, "I liked the way you played with Evelyn's toy with her"; for Group VP, "I liked the way you asked Ralph to play with your toy and the way you actually played with your toy with him"). In addition, each praise statement included a reference to the word "sharing" (*e.g.*, "That was good sharing"). Finally, the experimenter reviewed with the children what they had learned and indicated that they could begin playing with the toys (*i.e.*, the free play period was started). Thus, during the pre-session training members of Group V were taught only verbal initiation of physical sharing and verbal acceptance of such attempts. For these children physical sharing was never instructed, modeled, prompted, or praised by the experimenter. If, during the behavioral rehearsal, two Group V members shared verbally and then physically, the experimenter ignored the physical sharing and only praised the verbal sharing. Children in Group P were taught to play together but verbal sharing was never in-

structed, modeled, prompted, or praised by the experimenter. If during the behavioral rehearsal Group P members preceded physical sharing with verbal sharing, the former was praised whereas the latter was ignored. For members of Group VP, both verbal and physical sharing were taught. If a group member engaged in only one of these behaviors, the behavior emitted was praised and the other was prompted. To control for the additional amount of time that the experimenter was spending with the experimental groups, the experimenter read a short story to Group C prior to beginning free play for Sessions 9 through 16.

During the free play periods the experimenter prompted and praised sharing among the experimental groups as did Cooke and Apolloni (1976). However, each member only received up to a maximum of four prompts and four praises for sharing. Prompts and praise were given exclusively for sharing in the appropriate modes. Children in Group VP were always prompted first to share verbally, and then, if necessary, to share physically. In addition, the experimenter was instructed not to praise any other behavior, any product of behavior, or any material being used.

Follow-up. Four weeks after the termination of the treatment phase, a follow-up phase was conducted for 5 days. All the groups were observed during both free play and art periods. None of the components of the training package were employed. Therefore, the follow-up phase was conducted in the same manner as the baseline phases.

RESULTS

The data for the dependent measures of physical sharing, verbal sharing, and refusals to share are described separately. For each subject, the proportion of intervals during which each target behavior occurred was computed for both settings by dividing the number of intervals in which the behavior was scored by the total number of observation intervals. Session

means for each behavior were computed for each group by averaging the children's scores.

Physical Sharing

The percentage occurrence of physical sharing for each group is presented in Figure 1 for both the training and generalization settings. Although most of this data can be analyzed visually, statistical analyses were employed because two experimental groups shared more at the end of the study than at the onset and because some of the differences between the groups were difficult to evaluate visually. The data were submitted to a 3-way analysis of variance (ANOVA). Specifically, a 4 (group) \times 2 (sex) \times 2 (time of day) ANOVA was used. When the sex and time of day variables did not interact significantly with the group factor, a 1-way ANOVA was used.

It was hypothesized prior to the study that the order of increases in physical sharing from most to least would be: Group VP, Group P, Group V, and Group C. Therefore, the following three contrasts were used, (a) Groups VP, P, and V to Group C, (b) Groups VP and P to Group V, and (c) Group VP to Group P. When these predictions proved false but a significant *F* ratio for the ANOVA was obtained, appropriate *post hoc* multiple comparisons were conducted using the Sheffé test as a stringent control for experimenter-wise error rate (Ferguson, 1976). For the *post hoc* comparisons the minimal significance level was set at .10 as recommended by both Sheffé (1959) and Ferguson (1976).

Baseline. A 1-way ANOVA of the percentage physical sharing in the training setting during the initial baseline yielded a significant group effect, $F(3,28) = 4.09$, $p < .025$. The *post hoc* comparisons indicated that Groups V and P shared the toys marginally more than Group C (both $p < .10$). For the generalization setting, a 1-way ANOVA revealed a significant group effect, $F(3,28) = 3.62$, $p < .05$. Subsequent use of *post hoc* comparisons disclosed that

Group P shared the art materials marginally more than Group VP, $p < .10$.

The analyses of the baseline data provide two important findings. First, regardless of the group, the children shared the toys ($M = 7.6\%$) approximately three times more often than the art materials ($M = 2.3\%$). Second, some of the groups physically shared at different levels prior to treatment. Therefore, all analyses of the data for the remaining three phases involved the use of the analysis of covariance (ANCOVA) with the data from the initial baseline as the covariate.

Treatment. A 3-way ANCOVA of physical sharing in the training setting during the treatment phase disclosed a significant group effect, $F(3,15) = 217.5$, $p < .001$. Subsequent *a priori* tests indicated that the experimental groups physically shared more than Group C, and Groups VP and P physically shared more than Group V (both $p < .001$). The Sheffé test showed no additional group differences in physical sharing (all $p > .10$). Thus, regardless of the experimental condition, children who received the training package physically shared more than children in the control group. This finding, albeit of a lesser magnitude, was obtained even with Group V.

The data from the generalization setting were analyzed using a 3-way ANCOVA which yielded a significant group effect, $F(3,15) = 36.94$, $p < .001$. Only one *a priori* contrast was significant. All three experimental groups physically shared more than Group C, $p < .10$. These data indicate that the children who were taught to share physically (Groups P and VP) in the training setting showed a corresponding increase in that behavior in the generalization setting. In addition, even though Group V was not trained to share physically, they showed an increase in physical sharing in the generalization setting.

Baseline. A 3-way ANOVA of physical sharing in the training setting during the third phase disclosed a significant group effect, $F(3,16) = 19.69$, $p < .001$. Subsequent *a priori*

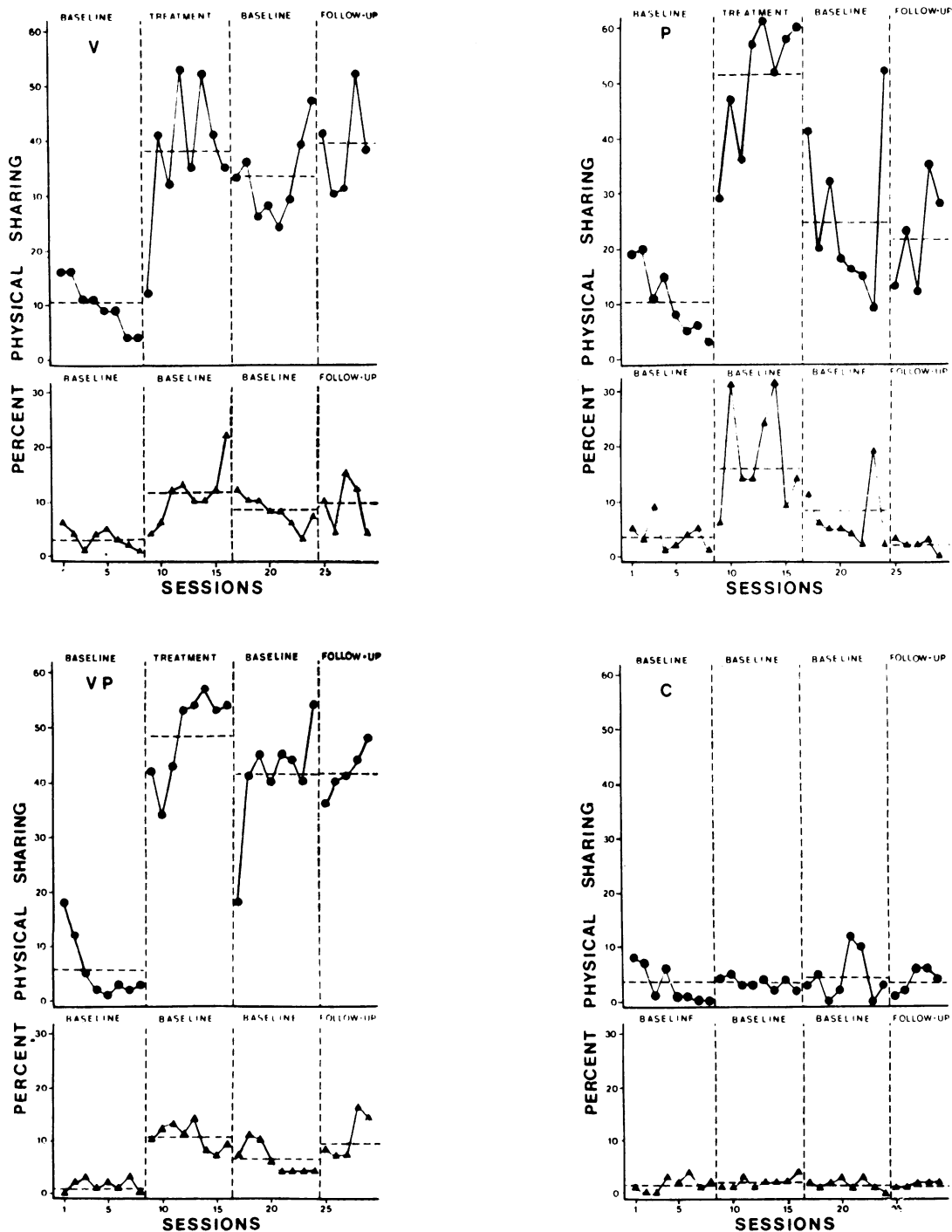


Fig. 1. Mean percentage physical sharing for each group in the training setting (circles) and in the generalization setting (triangles). The symbols V, P, VP, and C indicate the groups that were trained to share verbally, trained to share physically, trained to share both verbally and physically, and not trained, respectively. Follow-up began approximately 4 weeks after treatment termination. Means for each phase are represented by dashed horizontal lines.

tests showed that the experimental groups physically shared more than Group C and that Group VP physically shared more than Group P (both $p < .001$). Use of the Scheffé test yielded no additional significant differences (all $p > .001$). Thus, all three experimental groups continued to share physically after termination of the treatment. However, as can be seen from Figure 1, only Groups V and VP continued to share at approximately the same level as during treatment.

For the data from the generalization setting, a 3-way ANCOVA revealed a significant group effect, $F(3,15) = 19.26$, $p < .001$. Subsequent *a priori* contrasts showed that the experimental groups physically shared more than Group C, $p < .001$. Additional *post hoc* comparisons were nonsignificant ($p > .10$). Visual analysis of Figure 1 indicates that whereas Groups V and VP continued to share physically at approximately the same rate in the generalization setting as during the previous phase, Group P shared less frequently.

Follow-up. Once again, a 3-way ANCOVA of physical sharing in the training setting during the final phase yielded a significant group effect, $F(3,12) = 21.38$, $p < .001$. The *a priori* contrasts showed that the experimental groups physically shared more than Group C, $p < .001$, and Group VP physically shared more than Group P, $p < .01$. Subsequent *post hoc* comparisons disclosed that Group V physically shared more than Group P, $p < .025$. These analyses indicate that Groups V and VP were sharing physically more during the follow-up sessions than Group P. Although the effects of training on each individual child are not presented, inspection of these data for Groups V and VP revealed that at the end of the study there was a wide range in the frequency of physical sharing among group members. This variability notwithstanding, seven of the eight children in each of these two groups were physically sharing during the final phase approximately equal to or greater than two times their operant levels.

For the generalization setting, a 1-way ANCOVA of physical sharing revealed a significant group effect, $F(3,24) = 10.93$, $p < .001$. Use of *a priori* contrasts indicated that the experimental groups physically shared more than Group C, $p < .005$, and Group VP physically shared more than Group P, $p < .001$. Furthermore, the use of *post hoc* comparisons showed that Group V also physically shared more than Group P, $p < .025$. Thus, at the end of the study Groups V and VP physically shared more in the generalization setting than Group P. In fact, during this last phase Group P physically shared less than during the initial baseline phase. Inspection of the individual subject data for Groups V and VP revealed that during the follow-up phase all eight members of each group physically shared at rates of two or more times their operant levels. However, there was less variability in the proportion of change among members of Group VP than those in Group V.

Verbal Sharing

The percentage occurrence of verbal sharing for each session for the groups is presented in Figure 2 for both the training and generalization settings. Because the results obtained for verbal sharing can be analyzed visually, no statistical analyses were employed (Michael, 1974).

In both settings during the initial baseline phase, none of the groups verbally shared more than 1% of the time. During the treatment phase in the training setting, Groups V and VP showed a large increase in verbal sharing over their operant levels. However, these gains in the training setting were lost when treatment was terminated and were never recovered. Furthermore, these temporary gains for Groups V and VP never occurred in the generalization setting. Groups P and C never showed an increase in verbal sharing in either setting throughout the study.

Refusals to Share

There were no increases in the rate of refus-

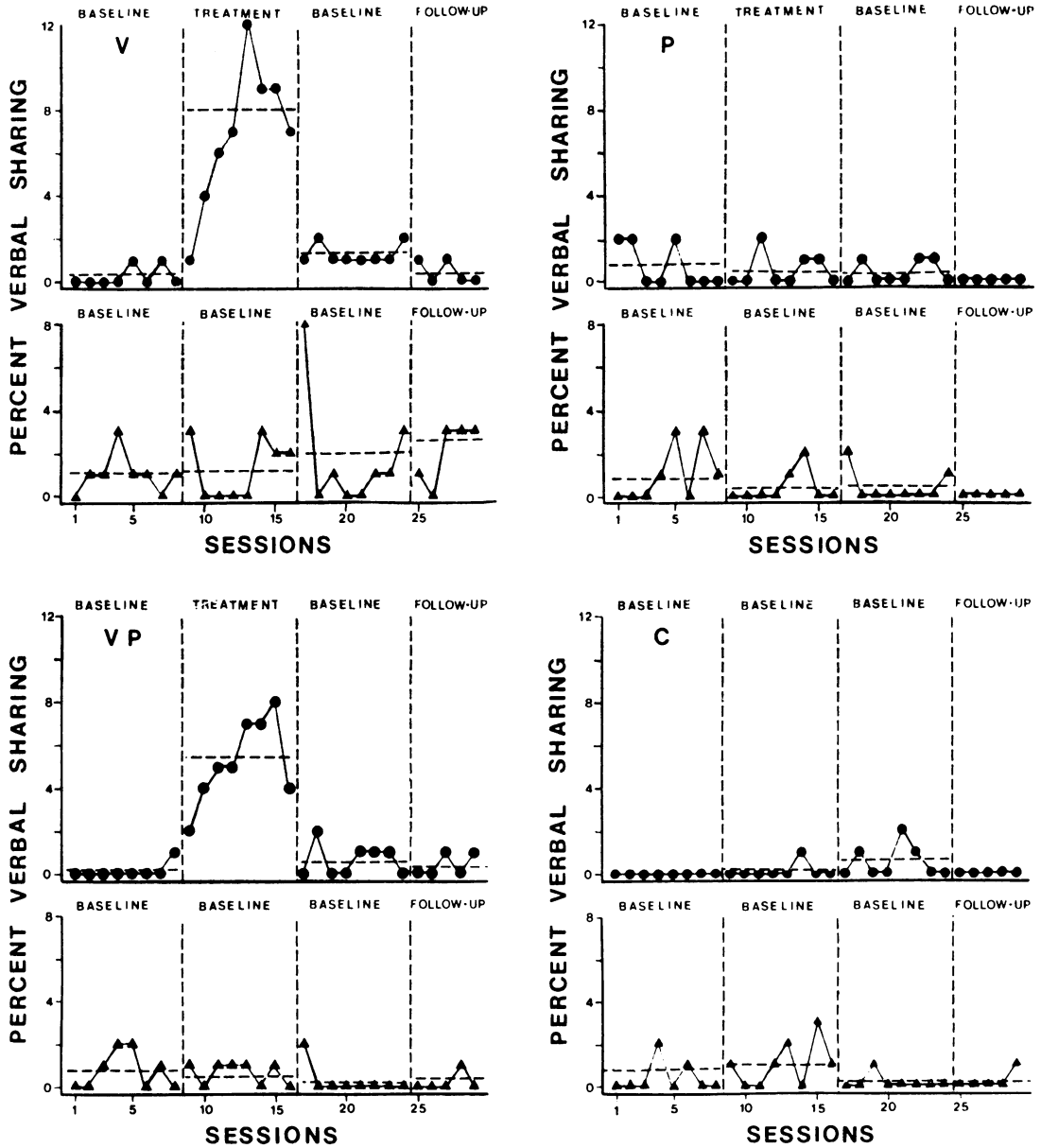


Fig. 2. Mean percent verbal sharing for each group in the training setting (circles) and in the generalization setting (triangles). The symbols V, P, VP, and C indicate the groups that were trained to share verbally, trained to share physically, trained to share both verbally and physically, and not trained, respectively. Follow-up began approximately 4 weeks after treatment termination. Means for each phase are represented by dashed horizontal lines.

ing to share in any of the groups in either setting throughout the study. Furthermore, refusals to share occurred infrequently, always less than 1% of each period. Therefore, these data are not reported.

DISCUSSION

Stimulus Generalization and Response Maintenance

In the present study, without using additional treatment strategies, stimulus generalization and

response maintenance occurred. These phenomena, however, were treatment and response specific. For all three experimental groups, only physical sharing generalized to another setting. Furthermore, only Groups V and VP demonstrated maintenance of physical sharing over time. The data provide support for Koegel and Rincover's (1977) argument that researchers need to distinguish between generalization and maintenance data. They noted that generalization can occur without maintenance and vice versa. Thus, the paucity of positive findings regarding the unprogrammed generalization and maintenance of gains produced by behavior modification programs may be related partially to a failure by many investigators to test for both.

The findings of the present study would be weakened if it were considered that the degree of stimulus generalization was clinically nonsignificant. Physical sharing for Groups V and VP increased to about 40% of the time in the training setting but only to 10% of the time in the generalization setting. Three sources of information suggest that the amount of generalization represented an important gain. First, pilot work for this study indicated that children were less likely to share art materials than toys. This reflects the fact that children rarely use art materials (*e.g.*, scissors) simultaneously with a peer to work on a common project. Therefore, art materials were chosen in the present study as a stringent test for stimulus generalization. Second, during the follow-up phase Groups V and VP shared the art materials approximately four times more often than at the study's onset and the toys approximately five times more often. Thus, the increase in physical sharing in the generalization setting was quite similar to that in the training setting. Third, in a previous study in which preschool children were taught to share, the reported increases in sharing art materials were about triple the baseline rate (Rogers-Warren and Baer, 1976). Thus generalization results of the present study are consistent with training results of the previous study.

The present investigation was not designed to account for why these phenomena occur but rather to determine if, in fact, they would occur. As a consequence, no empirical evidence for the determinants of stimulus generalization and response maintenance in this study can be provided. Several possible explanations, however, will be explored.

Stimulus generalization as well as response maintenance may have been a function of stimulus control. Specifically, the sharing developed during treatment may have come under the control of antecedent conditions. One way that researchers have brought the transfer of treatment gains to other settings has been to manipulate antecedent stimuli (Horton, 1975). Furthermore, other investigators have reported greater stimulus generalization to transfer settings as the similarity to the training setting was increased (Lieberman, Teigen, Patterson, and Baker, 1973). Many of the stimuli used in the present study in the generalization setting were different from those in the training setting; a different room, materials, experimenter, and observers were used. Even so, a number of stimulus conditions were the same or similar: (a) the group composition was the same, (b) the children were observed within the same school building, and (c) two observers and one experimenter were present in both settings. It may have been that one or a combination of these factors was responsible for the generalization and maintenance.

Stimulus generalization and maintenance also may have been related to the children's reinforcement history. During the treatment phase, the children were praised by the experimenter at a maximum rate of approximately once every 4 minutes. The use of praise rather than tangibles such as tokens may have been important. Lieberman *et al.* (1973) have noted that "social reinforcement may possibly facilitate generalization because it is the relevant factor in the settings where generalization is tested" (p. 63). Although the experimenter praised sharing only in the training setting during treatment, it is

possible that the children learned to reinforce each other's behavior. Furthermore, it may be that training sharing sets up a mutually reinforcing situation where the sharing of one child reinforces the sharing of another child (Mit-haug and Wolfe, 1976). Finally, because praise was used during the treatment phase on a variable-interval limited-hold schedule, the treatment might have produced physical sharing that was highly resistant to extinction (Ferster and Skinner, 1957).

None of these explanations in isolation, however, adequately explains why stimulus generalization and response maintenance were response and treatment specific. Why verbal sharing did not generalize to art and why it was not durable are unclear. It may have been because of its relatively low rate of occurrence or a lack of necessity for verbal sharing once physical sharing was strongly established. Why Group P's physical sharing was not durable also is not known. It is possible that after the treatment phase was terminated and the experimenter no longer prompted physical sharing, the children in Group P did not know how to set up sharing situations appropriately because they had never been taught to share verbally. In addition, these children may have found physical sharing without preceding verbal requests to be aversive. Thus, when the experimental contingencies were no longer in effect, they may have physically shared less to avoid this aversive situation. Another hypothesis is that training in verbal sharing was in fact teaching the children to prompt their peers to share physically. Therefore, in the absence of treatment, physical sharing might have been prompted in Groups V and VP but not in Group P.

Response Generalization

When developing one type of sharing, was there a concomitant increase in the other kind of sharing? Children taught to share verbally (Group V) also shared physically at higher rates and this effect was maintained even in the absence of treatment. Children taught to share

physically (Group P) did not demonstrate an increase in verbal sharing. These results indicate that facilitation of sharing among preschool children produced response generalization. This generalization, however, was unidirectional. Sharing generalized only from the verbal to the physical mode and not in a reverse manner. Other investigators researching other behaviors have obtained response generalization (Twardosz and Sajwaj, 1972). However, this is the first study in which there was a test for a unidirectional change because the others contained training for only one response.

Why generalization across responses occurred is not clear. Such generalization typically is explained in terms of conditioning a functional response class (Gewirtz, 1971). Implicit in the definition of response class is a covariation of behaviors as a result of some manipulation (Sajwaj *et al.*, 1972; Wahler, 1975). The present data, however, indicate that just because Response B is affected by reinforcement of Response A, one cannot assume that Response A will be affected by similar consequences to Response B. Therefore, future investigations of response generalization need to be designed to determine if such generalization is unidirectional or reciprocal. The failure of previous methodologies to make such tests may have propagated an unnecessary concept that has possibly resulted in misconceptions about why response generalization occurs. Furthermore, the value of the label (*i.e.*, the term *response class*) as distinct from a mere verbal description of the phenomenon is questionable.

Despite the conceptual problem associated with the term response class, one explanation that may have accounted for the unidirectional response generalization was that training verbal sharing may have resulted in the facilitation of behaviors that were important to successful social interaction. Besides an increase in physical sharing, Group V also may have showed an increase in other behaviors such as smiling and praise. Although data to support this hypothesis were not gathered, it is known that young chil-

dren who verbalize more than their peers also physically share more (Barton, Note 1). On the other hand, according to the present findings, training in physical sharing does not appear to foster other social behaviors. This may be because such training is very response specific and appears unrelated to the child's other social interactions.

Most Effective Training Approach

Is it better when developing sharing to start training with the verbal, physical, or both response classes? Specifically, which type of training approach produces the largest immediate and generalized effects that are durable over time?

Children taught to share physically demonstrated the largest increase in physical sharing in both settings. However, when treatment was terminated, physical sharing decreased almost to its operant level. Furthermore, such training did not facilitate verbal sharing. Given these results, training children to share only physically is viewed as the least desirable means of encouraging sharing behavior.

Children taught to share verbally did so in the training setting while the treatment was in effect. However, there was no carry-over to the generalization setting and in the absence of treatment, verbal sharing returned to its operant level. On the other hand, there was a large sustained increase in physical sharing in both the training and generalization settings. These results combined with those from Group P have applied significance. They indicate that to develop physical sharing that generalizes and is durable, the trainer should teach preschool children how to share verbally. The effect of subsequent training of physical sharing, on the gains produced by the training of verbal sharing, is not known at present.

Training children jointly in verbal and physical sharing produced generally the same results as teaching only verbal sharing. During the follow-up phase the effects of the combined training approach were less variable in the

generalization setting than for only encouraging verbal sharing; however, in the training setting no such differences occurred. Therefore, it appears that if the facilitation of physical sharing is desired (*e.g.*, when lack of sharing leads to altercations and upsets classroom or familial harmony), then children, at a minimum, must be taught to share verbally.

Refusals to Share

Did training young children to share verbally without training physical sharing produce an increase in the rate with which they refused to share? If a child is prompted and reinforced for offering to share but his/her peers are allowed to refuse to share, one intuitively might expect an increase in refusals to share. However, in the present experiment this was not the case. Training children to share verbally did not result in an increase in refusals to share.

In a study of the frequency with which preschool children offered to share (Warren, Rogers-Warren, and Baer, 1976), it was discovered that as the share-offer rate increased, the rate of acceptance of such offers decreased. The present experiment was different from that study in several ways: (a) the ratio of materials to children was greater (*i.e.*, 3:2 instead of 1:1), (b) acceptance of share offers was prompted and praised, and (c) the observers did not record offers and acceptances differentially. Any of these factors may have accounted for the discrepant findings. Nonetheless, the present findings compared to those of Warren *et al.* (1976) provide evidence that it is not enough to teach children to offer to share but that they also must be taught to accept such offers.

Conclusion

The present experiment was an exploratory study of the development, generalization, and maintenance of sharing. Many questions have been raised by it and future areas of research are numerous. Issues concerning the best way to develop sharing, how to facilitate generalization and durability, and why generalization and re-

sponse maintenance occur without programming need further investigation.

REFERENCE NOTE

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