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THE CLASS SPECIFIC EFFECTS OF COMPLIANCE TRAINING WITH "DO" AND "DON'T" REQUESTS: ANALOGUE ANALYSIS AND CLASSROOM APPLICATION

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Two experiments are reported in which the relationship between compliance with "do" and "don't" requests was examined with developmentally disabled children. In Experiment 1, a multiple baseline design across subjects with counterbalanced treatment conditions was used to evaluate a compliance training program composed of four phases: (a) baseline, during which no consequences were delivered for compliance, (b) reinforcement for compliance with one targeted "do" request, (c) reinforcement for compliance with one targeted "don't" request, and (d) follow-up with reinforcement on a variable ratio schedule for compliance with any "do" or "don't" request. Results of probes conducted before and after training within each condition indicated that generalized compliance occurred only with requests of the same type as the target exemplar ("do" or "don't"). In Experiment 2, these results were replicated in a classroom setting. Following collection of baseline probe data on student compliance, a teacher training program was successfully implemented to increase reinforcement of compliance first with one "do" and subsequently with one "don't" request of a target student. Results of multiple baseline probes across "do" and "don't" requests indicated that the teacher generalized and maintained reinforcement of compliance with other requests of the same type and to other students, with a resulting increase in student compliance with the type of requests reinforced. The impact of treatment on both teacher and student behavior was socially validated via consumer ratings. Implications of these findings with respect to response class formation and compliance training programs are discussed.

DESCRIPTORS: compliance, generalization, response class, classroom, developmentally disabled children

Noncompliance has been repeatedly identified in the literature as one of the most serious, frequent, and pervasive behavior problems of deviant children (Christophersen, Barnard, Ford, & Wolf, 1976; Forehand, 1977; Johnson, Wahl, Martin, & Johansson, 1973; Patterson & Reid, 1973; Taplin & Reid, 1977; Tavormina, Henggeler, & Gayton, 1976; Wahler, 1969). It has been suggested that noncompliance is a primary characteristic of several forms of child psychopathology (Johansson, Note 1) and is a predictor of difficulties during adulthood (Kagan & Moss, 1962). Accordingly, noncompliance has been the focus of a number of investigations in both laboratory (clinic) and applied (home and school) settings. A number of studies have suggested that child noncompliance is a behavior that is functionally related to other child behaviors which may be members of a

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common response class (Budd, Green, & Baer, 1976; Nordquist, 1971; Russo, Cataldo, & Cushing, 1981; Wahler, 1975; Wahler & Nordquist, 1973; Zeilberger, Sampen, & Sloane, 1968). In addition, the response class relationship of compliance among requests has been addressed. Results of studies by Bucher (1973), Whitman, Zakaras, and Chardos (1971), and Martin (1971) indicated that reinforcement for compliance with a subset of requests produced collateral increases in compliance with other requests. As is typical of most investigations in this area, however, these studies were limited to compliance with "do" requests, routinely defined as the initiation, completion, and/or maintenance of a desired response following a request to perform a specified task. Few studies have addressed children's compliance with "don't" requests involving the termination or inhibition of a behavior, although type of request has been identified as a potentially important dimension in need of investigation (Forehand, 1977; Patterson, Ray, Shaw, & Cobb, 1969). In addition, observational data suggest that "stop" or "don't" requests are more likely to be issued to deviant children, and that children are often noncompliant with such requests (Green, Forehand, & McMahon, 1979). However, the effectiveness of training programs on compliance with "don't" requests, and the existence of a response class relationship among such requests, has yet to be demonstrated.

Furthermore, the response class relationship between compliance with "do" and "don't" types of requests has not been systematically investigated. In extensive observations of 33 families, Johansson (Note 1) assessed children's compliance with both "do" ("positive") and "don't" ("negative") requests. Results indicated that children exhibited similar rates of compliance with both types of requests, and that parents reinforced compliance with both types of requests at a similar rate. However, since the parents reinforced compliance with a variety of the same type of requests ("do" or "don't") and also reinforced compliance with both types of requests simultaneously, an analysis of the response class relationship of compliance within and between types of requests cannot be determined.

The present study reports two experiments designed to evaluate the effects of a training procedure on compliance with "do" and "don't" requests. In Experiment 1, an analogue investigation was conducted to assess the collateral effects of reinforcement for compliance with one request on compliance with other requests both within and between request categories (i.e., "do" and "don't"). Experiment 2 sought to extend the analysis and to replicate the basic findings of Experiment 1 in a classroom setting.

EXPERIMENT 1

METHOD

Participants

Three male and three female students enrolled in a special education program for children with severe behavior disorders participated in this experiment. Ages ranged from 6 to 8 yr (mean—6.7 yr). Of the six students, three had been diagnosed autistic in accordance with the criteria established by the National Society for Autistic Children (Ritvo & Freeman, 1978). The other three students were diagnosed as severely developmentally delayed and exhibited many "autistic-like" behaviors. All displayed maladaptive self-stimulatory behaviors, tantrum behaviors, and inappropriate play, social behavior, and affect. All students had language deficits: three of the children were nonverbal and three exhibited some expressive (vocal) language, though much of it inappropriate (e.g., echolalia). Most recent IQ scores ranged from unscoreable to 50 as measured on standardized assessments (e.g., Leiter International Performance Scale, Stanford-Binet, Cattell). All students had been identified by school personnel as exhibiting problematic noncompliant behavior, and were selected on the basis of teacher referral and granting of parental permission.

Setting

All training took place in a 15.5 m × 22.7 m unused classroom in the school. Probe sessions evaluating student compliance before, during, and after training were conducted in this classroom as well. The room contained several tables and chairs, shelves with arts and crafts materials along two walls, a chalkboard along a third wall, and a pottery wheel, table, and materials in a 1.5 m × 1.8 m corner area. Prior to conducting sessions, various toy and play materials were placed around the room for access by the students. In addition, the room was "salted" with objects commonly available in natural environments, but which might be considered inappropriate for manipulation by children because of ownership by others and their potentially dangerous, fragile, or valuable nature (e.g., matches, a watch, and a set of keys). Sessions ranged in length from 5 to 45 min (depending on the behaviors engaged in by the students and whether training or probe trials were being conducted), and occurred 3 days per week.

Target Behaviors

Both "do" and "don't" requests targeted for compliance training assessment were selected on the basis of classroom observation and consultation with teachers. Experimenters conducted a series of 15-min observation sessions in the classroom throughout the school day and recorded the requests issued by teachers and aides, specific children to whom the requests were directed, and whether or not compliance occurred. Those requests most frequently issued but seldom complied with, and considered important by the teacher, were identified for each student. These observations and teacher interviews yielded five "do" requests, which were common to all students, and fourteen "don't" requests, four to eight of which were selected for individual students. Table 1 shows operational definitions of compliance with the requests for each student. ("Request" is used synonymously with the more conventional term "command," and is not intended to imply that the instructions were phrased in the form of a question. We prefer this term because, as a society, we usually request rather than command people to do things, even though we often arrange contingencies such that the instruction is one that has a likelihood of being followed.)

Training Procedures

"Do" request compliance training. Each student was individually trained to comply with one of the five "do" requests. During training, this was the only request made (i.e., the other four requests were never issued during these sessions). The target request was arbitrarily selected for each student and consisted of "give (bring) me ——" for Students 1, 4, and 6; "sit down" for Student 2; "open (close) the door" for Student 3; and "come here" for Student 5. A trial was initiated by the experimenter stating the request and ended when the student either performed the specified behavior or after 10 sec had elapsed, whichever occurred first. Reinforcement in the form of descriptive praise (e.g., "Good listening; you came when I called you!") and paired with either an edible (e.g., piece of pretzel or cracker) or physical contact (e.g., hugs, tickles) was presented following trials in which compliance occurred. Following trials in which compliance did not occur, the experimenter provided the student with feedback in the form of a verbal description (e.g., "No treat this time because you didn't follow directions; you didn't sit down when I asked, so now we have to practice") and a remedial trial. Remedial trials consisted of the experimenter repeating the request and physically guiding the student as necessary in performing the specified behavior. Correct responses during remedial trials were followed by social reinforcement ("Good"). After delivery of social reinforcement (for both remedial and training trials), the student was allowed to return to whatever activity he or she was engaged in until the next trial was initiated, typically 10 to 20 sec later. Each training

Table 1

Response Definitions of Requests

Students	*Request*	*Definition*
	*"Do" Requests:**	
1-6	Come here	Move to within 2 feet of and facing experimenter
1-6	Sit down	Alter position such that buttocks are on flat surface with trunk upright and perpendicular to floor
1-6	Stand up	Alter position such that body weight is distributed on both feet with legs and trunk upright and perpendicular to floor
1-6	Open (close) the door	Pull (push) door such that there is visible space (no visible space) between door and door jamb
1-6	Give (bring) me ____	Place specified object in experimenter's outstretched hand
	*"Don't" Requests:***	
1	Leaving	Outside of room or within two feet of and facing door
1-6	Touching	Body part in physical contact with specified object targeted as inappropriate for manipulation
1-6	Stimming	Nonvocal, inappropriate repetitive movement consisting of picking (S^1), tapping or spinning objects (S^2), hand flapping ($S^{2\&6}$), stroking lips (S^3), hand clenching accompanied by facial contortions (S^4), or running back and forth while touching genital area (S^5)
1-6	Playing in area	Body within boundaries of corner area containing pottery wheel and arts and crafts equipment
1,6	Climbing	Both feet off floor with trunk leaning against and body weight distributed on piece of furniture other than chair
2	Hitting	Forcefully striking another person with hands, fists, or object
2	Spitting	Expulsion of saliva away from mouth or face
2,6	Eating/in your mouth	Inedible substance touching or past lips
3	Humming	Producing continuous monotone vocal noise
4,5,6	Talking to self	Any vocalization of words not directed toward another person, other than singing
5,6	Spinning	Moving body in 360° circles
5	Hands in pants	Any portion of the hands past the knuckles inside and beyond the waistband of the pants
6	Lying on the floor	Trunk area in contact with floor

*"Do" requests consisted of instructions to initiate a response. Compliance was defined as completion of the specified behavior within 10 seconds of request delivery.

**"Don't" requests consisted of instructions to terminate an ongoing behavior. The behavior specified in the request was preceded by "don't" (e.g., climb), "stop" (e.g., spinning), "no" (e.g., playing there) or "not" (e.g., in your mouth). Compliance with "don't" requests was defined as the cessation of the specified behavior within 10 seconds of request delivery and its continued absence for an additional 10 seconds.

session consisted of five trials, not counting remedial trials. "Do" request training sessions usually lasted 5 min or less. Probes were conducted (as described later) after each training session in which the student was compliant on 80% (four out of five) of the trials.

"Don't" request compliance training. Each student was individually trained to comply with one arbitrarily selected "don't" request. No other requests were made during this time. The target "don't" request was "no climbing" for Student 1; "don't touch" for Students 2, 3, and 6; and "no playing there" for Students 4 and 5. Conditions were similar to those in the previous phase. A trial was initiated when the student engaged in the targeted inappropriate behavior, and the experimenter issued the "don't" request. The trial was terminated when either the behavior continued to occur after 10 sec or when the student had not engaged in the specified behavior for 10 sec. If, as a result of the student engaging in the target behavior, harm to the

student or damage to an object was imminent before the 10 sec had elapsed, one of the observers intervened with the minimal amount of interference necessary to prevent harm and/or damage. Compliance was followed by delivery of reinforcement (descriptive praise plus physical contact or an edible). Noncompliance was followed by verbal feedback plus a remedial trial. For example, the experimenter would say, "Don't touch" and guide the student's hand away from the object; when the student refrained from touching the object for 10 sec, the experimenter delivered social reinforcement ("Good"). Following administration of reinforcement, the student was allowed to return to a free play situation until he or she again engaged in a behavior providing an opportunity for delivery of the target request and the initiation of a trial. Trials were conducted in this manner for each session until 80% compliance was achieved, with the exception of Students 2 and 4. For these students, reinforcement for compliance was changed from a CRF to a VR2 schedule. This slight alteration of the training procedure was made on the basis of subsequent probe data which suggested that these two students were responding differentially to the reinforced training and unreinforced probe trial conditions. The duration of "don't" training sessions varied between 5-45 min and was generally longer than that of "do" training sessions, primarily because the experimenter needed to wait until the targeted "don't" behavior occurred.

Follow-up. Training consisted of reinforcing compliance to any of the randomly determined "do" or "don't" requests on a VR3 schedule. Other than this, training procedures were identical to those in the previous two conditions, with one exception for Student 5. Toward the end of the experimental condition, two changes were made in the training procedure with this student on the basis of the probe data in which he failed to meet the established criterion for termination. First, incorrect (noncompliant) responses were followed by a positive practice procedure in which the experimenter made the request and used physical prompting as necessary to guide the student in performing the specified behavior; the student was required to "rehearse" the behavior in this manner five times per remedial trial. Second, the criterion for conducting a probe was increased from 80% correct responding for one session to 100% correct responding for two consecutive sessions.

Probes

Probes were conducted for individual students before any training was begun (baseline) and within training conditions after each session in which criterion had been met as specified above. Once baseline data were collected, probe sessions took place as soon as criterion on training occurred and the student had time available in his or her school schedule. Thus, a probe session for a student may have been conducted on the same day as training criterion occurred if the schedule permitted, or the next day during the standard session time. Sessions usually lasted 30 min or less. Performance was assessed using the definitions listed in Table 1. A probe consisted of the random presentation of two trials for each of the five "do" requests, and an equal distribution of 10 trials among each student's targeted "don't" requests. The order of presentation of "don't" requests was necessarily controlled to some extent by the behaviors the student engaged in at any particular time. However, in order to assess compliance with all of the targeted "don't" requests, some opportunities for delivery of a "don't" request were ignored if two trials for a specific request had already been presented. The purposes of the probes were to assess (a) the effects of training on compliance per se, (b) generalization of training effects with one request to compliance with other requests of the same type ("do" or "don't"), and (c) the effects of compliance training for one type of request on compliance with another type of request. Except for the initial delivery of each request, no experimenter-student interaction occurred. When a criterion of at least 90% compliance for three consecutive

probe sessions was obtained with requests of the same type as the most recently trained target exemplar (i.e., "do" or "don't"), training in the next condition was initiated. (The condition termination criterion was based on probe trials for both target and nontarget requests, and therefore may not be reflected in Figure 1 because target (trained) items were excluded in the calculation of these data.) Training in the final follow-up condition was terminated for individual students when a criterion of a mean of 90% compliance to both "do" and "don't" requests for three consecutive sessions was obtained during probe sessions.

Experimental Design

This study used a multiple baseline design across subjects (Baer, Wolf, & Risley, 1968), with the order of compliance training for "do" and "don't" requests counterbalanced across two groups of three subjects to control for sequence effects. Baseline data consisted of a minimum of two probes. Training was begun with Student 1 on compliance with a "do" request and with Student 4 on compliance with a "don't" request, continuing sequentially through the remaining conditions. Baseline probes continued for the other students until training was successively implemented with each.

Request Delivery Assessment

Data were collected on voice emphasis of the experimenter in order to assess whether student compliance was controlled (confounded) by differential request delivery within (i.e., "do" and "don't" requests) and between (i.e., baseline and training) conditions. Randomly selected probe sessions for each student in each condition were tape-recorded. A total of 31 tape-recorded sessions were presented to two graduate student observers, naive to experimental manipulations, who independently scored each of the tapes in a random order. Observers rated each request in a session as delivered with either low, neutral, or strong emphasis, according to the extent to which voice tone, inflection, intensity, or magnitude would ordinarily be expected to control responding. Observations were then scored according to the percentage of low, neutral, and strong deliveries with each type of request ("do" and "don't") per session for each condition and with each student.

Data Recording and Reliability Assessment

Training trials. Every trial was scored by the therapist as correct (compliant) or incorrect (noncompliant), as defined in Table 1. Reliability measures were taken randomly on 61% of the sessions by an independent observer. Following each trial, the primary observer delayed delivery of consequences for several seconds until the reliability observer had scored the response, in an effort to avoid observer bias. Observers' records were compared on a per response basis, and interobserver reliability scores were computed by dividing the number of agreements by number of agreements plus disagreements and multiplying by 100. Reliability checks yielded a mean score of 99.6%.

Probe trials. Every trial was scored by the therapist as correct (compliant) or incorrect (noncompliant), as defined in Table 1, and the percent compliance for "do" and "don't" requests computed. Independent observations were made during randomly selected probe sessions as well as those indicating maximum experimental effect (i.e., when criterion was met), in all conditions for each student. Reliability checks were conducted by one of the experimenter/trainers or a graduate student naive to the experimental conditions in effect. The formula described above was used to compute agreement percentages for occurrences of correct responses, nonoccurrences of correct responses, and occurrences plus nonoccurrences for both "do" and "don't" requests. Occurrence, nonoccurrence, and occurrence plus nonoccurrence reliability scores based on 71% of all probe sessions yielded means of 98.0% (93.3%), 95.9% (90.0%), and 98.7% (95.9%), respectively, for "do" ("don't") requests. Reliability data on the therapist's scorings obtained with the naive (graduate student)

observer were comparable to those obtained with one of the other experimenter/trainers.

Command delivery. Observer records were compared on a per response (request) basis, and an agreement scored if both observers rated the request as delivered with the same level of emphasis (i.e., low, neutral, or strong). Percent agreement (agreements/agreements + disagreements × 100) calculated for each of the 31 tape-recorded sessions ranged from 78.9% to 100% with a mean of 90.0%.

RESULTS

Figure 1 shows the results of the counterbalanced multiple baseline across students, expressed as the percentage of compliance with nontarget (untrained) "do" and "don't" requests. Probe sessions consisting of eight trials each for "do" and "don't" requests (excluding the two targeted for training) with two trials per request, are presented across experimental conditions. These data are summarized in Table 2, which shows the mean percent compliance with nontarget "do" and "don't" requests for individual students in each condition. Also shown in this table are the mean percentages calculated with the target requests included. Baseline data show relatively low levels of compliance, though all students complied with every request at least once, suggesting a maintenance rather than an acquisition problem. When compliance with a target request was trained (reinforced), there was a substantial increase in the percent compliance to the other requests of the same type ("do" or "don't"). Conversely, the percent compliance with the type of requests of which the trained target was not an exemplar either decreased or remained stable. This effect was observed with Students 1-3 when compliance with one "do" exemplar was first trained. The mean percent increase in compliance with nontarget "do" requests from baseline to training was 23.7%, 33.3%, and 37.2% for Students 1-3, respectively. When target requests are included in the baseline means, the increases are even more substantial. The mean percent compliance with "don't" requests concurrently decreased for Students 1 and 3 and increased slightly for Student 2. Analogous results were obtained with Students 4-6, for whom compliance with a "don't" exemplar was first trained. Compliance with other, nontarget "don't" requests increased by a mean of 23.9%, 27.5%, and 44.4% for Students 4-6, respectively, while compliance with "do" requests either decreased (Students 4 and 5) or increased to a lesser extent (Student 6). These results were replicated when conditions were reversed (i.e., when Students 1-3 received compliance training with a "don't" exemplar, and Students 4-6 with a "do" exemplar.

For Students 2 and 4 in the reinforcement of "don't" request condition, initial increases in compliance were not maintained, and data suggested these students were discriminating between training (reinforcement) and probe (no reinforcement) conditions. Following a decrease in responding from previously established levels for three consecutive sessions, compliance during training was reinforced on a VR2 schedule in an attempt to increase resistance to extinction during probes. Percent compliance with "don't" requests subsequently increased.

Only when compliance with both "do" and "don't" requests was reinforced on a variable ratio schedule during follow-up training were high levels of compliance obtained on probes with both types of requests for all students. Although high levels of compliance were immediately established for Student 5 during this condition, a more stringent mastery criterion and the addition of positive practice remedial trials were imposed during training following 26 probe sessions in which criterion for termination was not obtained. Subsequently, compliance immediately increased to criterion levels. (Due to the length of this condition and the stability of responding, only the first and the last five sessions are plotted.)

Generally, fewer probe sessions were required for students to meet criterion on compliance to "do" requests (mean = 6.5) than "don't" re-

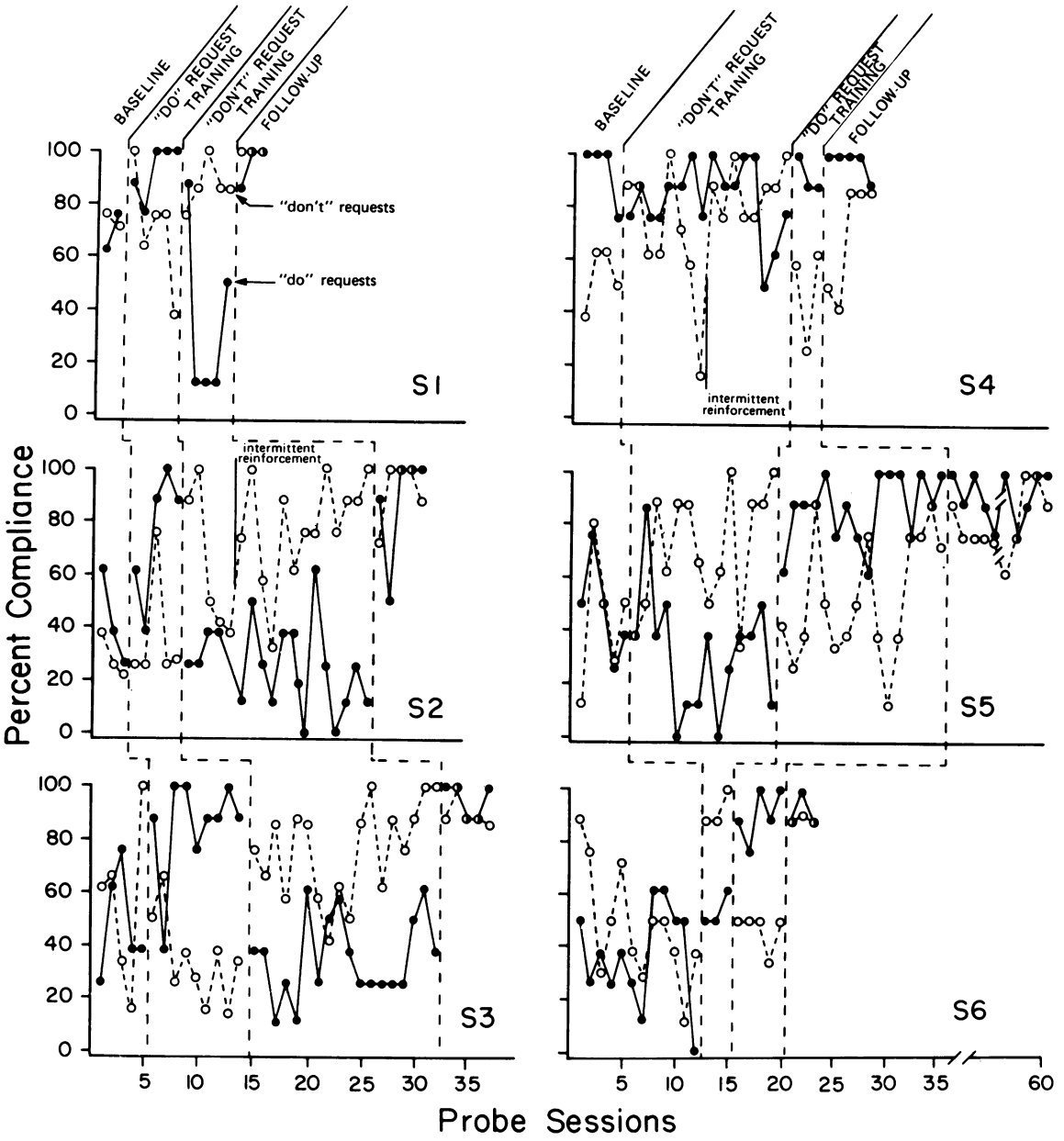

Fig. 1. Percent compliance to nontarget "do" (closed circles) and "don't" (open circles) requests during probe sessions for Students 1-6 across experimental conditions.

quests (mean = 12.2). The exceptions were Student 6, who required two more sessions to meet criterion with "do" requests than "don't" requests, and Student 1, for whom there was no difference. The total number of training sessions conducted for each student (with 5 trials per session) ranged from 11 (Student 6) to 129 (Student 5), with a mean of 48.

The results of request delivery assessments during probes indicate that the differential effects of compliance training with "do" and "don't" requests were not attributable to voice

Table 2

Mean percent compliance with nontarget (target plus nontarget) "do" and "don't" requests across experimental conditions for each student.

		Baseline	*Compliance Training "Do"*	*Compliance Training "Don't"*	*Follow-up*		*Baseline*	*Compliance Training "Don't"*	*Compliance Training "Do"*	*Follow-up*
"Do"	S1	68.8 (60.0)	92.5 (92.0)	55.0 (36.0)	95.8 (96.7)	S4	93.8 (85.0)	83.6 (82.5)	91.7 (93.3)	97.5 (98.0)
"Don't"		73.2 (75.0)	70.0 (60.0)	87.1 (88.0)	100.0 (100.0)		53.1 (57.5)	77.0 (80.6)	48.2 (46.7)	70.0 (78.0)
"Do"	S2	41.7 (36.7)	75.0 (76.0)	25.7 (21.2)	87.5 (84.0)	S5	37.9 (42.0)	30.4 (20.4)	86.7 (83.3)	85.0 (85.2)
"Don't"		28.2 (26.7)	35.7 (32.0)	74.1 (72.4)	91.8 (94.0)		43.9 (38.0)	71.4 (73.6)	52.2 (35.8)	77.3 (79.3)
"Do"	S3	47.5 (36.0)	84.7 (84.4)	39.3 (30.6)	95.0 (93.3)	S6	36.5 (44.6)	54.2 (46.7)	90.0 (92.0)	91.7 (93.3)
"Don't"		55.8 (54.0)	34.4 (33.3)	76.0 (79.4)	89.6 (90.0)		47.3 (48.2)	91.7 (93.3)	46.7 (50.0)	88.8 (90.0)

intensity of the experimenter. No systematic differences in request delivery were observed, either between experimental conditions or between types of requests within the same condition, for any of the students. For all students, the majority of requests were scored as delivered with neutral emphasis, although for 25 of the 31 taped sessions, both low and strong emphasis of delivery were occasionally observed. However, these instances of nonneutral voice emphasis were not consistently associated with either a specific condition nor type of request presented.

Discussion

Results of this study indicated that reinforcing compliance with one request produced generalization only to other requests of the same type ("do" or "don't"). For several students, compliance with nontarget type requests in the first two training conditions decreased below previous baseline levels. This suggests that for some of the students, the differential effects may have been due to behavior contrast. Future research is necessary to explore this possibility.

The present findings hold several implications for conducting maximally effective compliance training programs. The occurrence of generalized compliance supports the findings of Bucher (1973), Martin (1971), and Whitman et al. (1971) with "do" requests and extends them with the inclusion of "don't" requests. Taken together, these data suggest that reinforcement may be used both economically and effectively, and need not follow compliance with all requests. Since the number and variety of instructions that could potentially be issued exceed those to which any child has been exposed, compliance with classes of requests is important. However, the differential effects of compliance training indicate that reinforcement should be delivered for compliance with both types of requests; presenting consequences for compliance with "do" requests cannot be expected to affect compliance to "don't" requests and vice versa. When this strategy was used during the follow-up training condition of the present study, students were compliant with both "do" and "don't" types of requests. Although the use of the sequential design cannot rule out the possibility that this effect would not have been ob-

tained in the absence of compliance training with the respective requests in the prior conditions, results of previous compliance studies (e.g., Johansson, Note 1) suggest that this is unlikely.

The controlled conditions associated with the analogue approach used in this investigation allowed an analysis of compliance to "do" and "don't" requests not possible in previous observational studies. However, replication in a more applied (e.g., classroom) setting operating under less structured conditions would permit evaluation of the external validity of the conclusions and the usefulness of the procedures developed in an analogue situation. Therefore, a second experiment was conducted to determine whether the general methods and findings of Experiment 1 could be transferred to and replicated in an applied, classroom setting. In addition, an attempt was made to extend Experiment 1 by assessing natural (baseline) rates of teacher reinforcement of compliance to "do" and "don't" requests, and the effects of a teacher training procedure on increasing compliance.

EXPERIMENT 2

METHOD

Participants and Setting

Five male and five female students in a special education program for children with severe behavior disorders participated in this experiment. All of the children had been diagnosed as developmentally delayed, with IQs ranging from unscoreable (due to their noncompliance in the testing situation) to 50. Ages ranged from 6 to 8 yr. Six of the 10 students had participated in Experiment 1.

The teacher aide used in this study was a 38-yr-old female with a high school education, who had worked in the program for 15 yr. For part of the day, she independently supervised between three to five children participating in recreational and fine motor table top activities in a separate classroom. During the remainder of the day she joined one of the other three classrooms and assisited the teachers with ongoing activities. She was selected for participation in the study on the basis of (a) the suggestion of other teachers and school administrators, (b) her request for training and assistance in managing the children, and (c) prebaseline observations indicating that noncompliance and other behavior problems most frequently occurred with the children in her classroom.

The study took place in a 15.5 m $\times$ 22.7 m classroom. Typically, teachers from the other classrooms would send individual children to the room for 30-min blocks of time, where the teacher aide would supervise their participation in activities such as putting together puzzles, stringing beads, coloring, and listening to stories through earphones while following the words in their books. Of the ten students, between three and five were present in the classroom at any given time. The room contained a large U-shaped table and chairs where the children worked, and a corner shelf with various educational and play materials. In the corner of the room farthest from the table was a door opening into an alcove which separated adjacent classrooms, used primarily for a fire exit. On the 3 days per week during which the study was conducted, a Sony AVC-3260S videotape camera was placed in the doorway and positioned such that all the children as well as the teacher could be observed through the 75-mm Sony zoom lens. A Sony VO-2610 deck was located in the alcove such that the camera could be turned on or off at any particular time to allow for covert recording of behaviors. The camera remained in the room throughout the school day, whether or not behavior was being recorded, to permit both adaptation to its presence and unobtrusive observation and recording. Both teacher training and probe sessions were of 15-min duration.

Target Behaviors

During the sessions, observers recorded (a) each request issued by the teacher aide, (b) the type of request issued ("do" or "don't"), (c) the student to whom the request was directed, (d) whether or not compliance occurred, and (e) con-

sequences delivered by the teacher aide for compliance or noncompliance. A request was defined as any vocal instruction to initiate a response ("do" requests) or to terminate an ongoing behavior ("don't" requests). Examples of "do" requests included "turn around," "sit down," "put the puzzle on the shelf," and "string the beads." Examples of "don't" requests included "no hitting," "be quiet," and "don't wipe the paste on your shirt." Repetitions of the same request were noted but not scored as separate requests unless the same request had not been delivered for a period of 10 sec or unless a different request was first presented to the same student. Compliance with "do" requests was scored if the student to whom the request was addressed either completed (e.g., for "sit down") or initiated (e.g., for "string the beads") the behavior within 10 sec and maintained that status for an additional 10 sec (e.g., the student remained seated or continued to string the beads, as indicated by the request), unless otherwise instructed. Compliance with "don't" requests was defined as cessation of the specified behavior within 10 sec of the instruction, and the absence of that behavior for 10 sec after its initial termination. Reinforcement for compliance was scored if, after the student followed the instruction as defined, the teacher aide delivered praise, edibles, or a requested item.

Training Procedure

"Do" request training. During this condition, the teacher aide was trained to reinforce compliance of one child with one specific type of "do" request. The target child was selected on the basis of data from Experiment 1 indicating that he (Student 6) had responded most quickly to the contingencies in effect. This strategy was chosen to increase the probability that the teacher aide's appropriate implementation of the procedure would be immediately reinforced by a positive change in the student's behavior. The target request consisted of any instruction to initiate manipulation of a toy or instructional material. This selection was made according to the request most frequently issued to the target student during baseline, so that ample natural opportunities would exist to provide teacher training.

Following collection of baseline data, a conference was held between the teacher aide and one of the experimenters. The teacher aide was told that in a previous study conducted with one of the children in her classroom, it had been established that the child was more likely to comply with requests when praise and edible reinforcement were delivered contingent on instruction following, and when physical prompts were used following noncompliance. The experimenter then informed the teacher that a trainer would assist her in implementing this procedure with the student to facilitate generalization of compliance to the classroom setting. An index card containing a written description of a 4-step compliance procedure was provided, which the teacher aide kept on a clipboard by her seat in the classroom for convenient referral. The four steps were explained to her and consisted of the following: (a) Deliver *request once;* (b) *Wait* for child to respond; (c) If child complies, immediately reinforce with *praise* and piece of *popcorn;* (d) If child does not comply, physically *prompt* response and then *praise.* The experimenter explained that although assistance would be limited to the one student and for one type of behavior, the teacher aide should look for other appropriate opportunities in which to apply the procedure. Other than this, she was to conduct her classroom as she normally would.

During training sessions the trainer sat in the back of the classroom, facing the teacher aide, and with the students' backs to her. Following each delivery of the target request to the target student, the experimenter recorded the request, whether or not compliance occurred, the consequence, and whether or not the teacher aide performed the steps of the procedure correctly without prompting. If the teacher aide did not immediately follow the steps of the procedure after initial request delivery, the experimenter

held up either one, two, three, or four fingers to indicate the respective step on the index card to which the teacher aide was to attend. The experimenter did not intervene when requests other than the target request were issued, or when requests were issued to any children other than to the target student. At the end of the 15-min session, the experimenter reviewed the recorded data with the teacher aide, on a trial-by-trial (request) basis. The experimenter praised the teacher aide for each trial in which the procedure was followed correctly, and provided feedback for incorrect teacher responses. Training was continued in this manner until the teacher aide responded correctly without prompts on at least 90% of the trials.

"Don't" request training. Training procedures were identical to those in the previous condition with the exception of the student and type of request targeted. The teacher aide was taught to reinforce compliance of one child to one specific "don't" request. The target child (Student 5 of Experiment 1) and request ("No stimming") were selected on the basis of baseline data indicating a high frequency of self-stimulatory behavior with that student. This selection strategy was used to maximize teacher training opportunities. Prior to training, the teacher aide was informed that she no longer appeared to require assistance in obtaining compliance to "do" requests with the previous target child; instead she would be given assistance with another child who appeared to continue to engage in inappropriate self-stimulatory behavior when instructed to stop. The teacher aide was instructed to apply the same 4-step procedure on the index card with respect to "don't" requests to "stop stimming" with this student, as well as to any other situations she felt were appropriate. She was also asked to name several other situations in which the procedure might be used with respect to "don't" requests. As in the previous condition, an observer scored each presentation of the target request to the student for the occurrence of compliance, appropriate delivery of consequences by the teacher aide, and whether experimenter prompting was required. No attempts were made to interfere with the normal classroom routine except to signal the teacher aide to attend to a respective step on the index card with the target request and student as necessary. At the end of each session, the data were shown to the teacher aide, and praise and feedback provided. Training was continued until the teacher aide provided consequences for compliance to the target request with the target student as specified, on at least 90% of the trials, without prompts.

Probes

Classroom probes were conducted before training and after criterion was met within each training condition, and consisted of 15-min observation sessions during which no experimenter interaction occurred. The purposes of the probes were to assess (a) the effects of teacher training on students' compliance with both "do" and "don't" requests, (b) generalization of teacher training effects to the normal classroom environment in the absence of experimenter intervention, (c) generalization of teacher training effects to nontargeted requests and students, and (d) natural (baseline) rates of reinforcement for compliance with "do" and "don't" requests. During the first 10 sessions of baseline, probe data were collected in vivo by observers in the classroom. Following session 10, probe data were recorded and scored from videotape. Although permission had been obtained from the teacher aide for her classroom to be videotaped, she was not informed of the specific times when probe sessions were conducted, and equipment was placed to permit covert recording. Probe data were collected for each condition until stability was achieved.

Data Recording and Reliability Assessment

Reliability checks were conducted during randomly selected teacher training and probe sessions. Independent observations were made of all target behaviors by one of the experimenter/trainers or a graduate student naive to the ex-

perimental condition in effect. An agreement was scored if both observers recorded the same request, occurrence (nonoccurrence) of compliance by the targeted student, and the delivery (absence) of reinforcement following compliance. Observer records were compared on a per response (request) basis, and interobserver reliability scores were computed by dividing the number of agreements by agreements plus disagreements and multiplying by 100. Reliability checks on one of the three teacher training sessions for "do" requests and on one of the two training sessions for "don't" requests yielded agreement scores of 100% and 87.5%, respectively, for occurrence plus nonoccurrence reliability.

Data were collected during probe sessions on number of requests, percentage of requests complied with by students, and percent compliance with requests reinforced by the teacher aide, for both "do" and "don't" requests. Reliability checks on 47% of all probe sessions yielded mean occurrence plus nonoccurrence agreement scores of 97.3% (85.3%) for requests, and 90.6% (91.2%) for compliance, with "do" ("don't") requests; and 91.5% for reinforcement of compliance.

Experimental Design

This study used a multiple baseline across behaviors ("do" and "don't" requests), with both moving and cumulative treatment arrangements (Bailey & Bostow, 1979). Following collection of baseline data, teacher training on reinforcement of compliance was initiated with a "do" request, and subsequently withdrawn prior to beginning training on reinforcement with a "don't" request while collection of probe data continued throughout for both types of requests. This successive application and withdrawal of treatment has been labeled a "moving" treatment arrangement, and in the present study, was used to assess generalization and maintenance of teacher behavior (reinforcement). A "cumulative" treatment arrangement was used to assess the effects of teacher-delivered reinforcement on students' compliance with "do" and "don't" requests. As a function of teacher training, treatment (reinforcement of student compliance) was applied to "do" and "don't" requests in succession, and kept in effect while each was treated.

Social Validation

Staff of the special education program serving the students in this study rated six pre- and six posttreatment randomly selected videotaped probe sessions. The observers consisted of three teachers, three teacher aides, a speech and language therapist, and school liaison. All the staff worked directly and were familiar with all of the children in the study, as well as with the participating teacher aide. Two to three observers viewed between three and five videotaped sessions each with pre- and posttreatment videotaped sessions presented in a random order. After viewing each tape, observers were asked to rate the session on a Likert-type scale from 1 (very little) to 7 (very much) along three dimensions: (a) to what extent does the teacher provide reinforcement for the children following her instructions, (b) to what extent do the children follow the teacher's instructions, and (c) overall quality of the classroom environment and teacher-student interactions. The purpose of collecting these data was to provide a measure of the importance of teacher and student behavior change as judged by relevant consumers and professionals (Kazdin, 1977; Wolf, 1978).

RESULTS

Figure 2 shows the results of the multiple baseline across "do" and "don't" requests, expressed as the percentage of compliance and percent compliance reinforced for all students. The two sets of data show close correspondence across experimental conditions. During baseline, the mean percent compliance with "do" requests was 33%, and the mean percent reinforcement of compliance was 12%. Compliance with "don't" requests was more variable, possibly due to the fact that few such requests were presented (range = 0-6). Compliance averaged 27% and

no reinforcement for compliance with "don't" requests was observed. Following implementation of the teacher training procedure designed to increase reinforcement for compliance with one "do" request with a target student (training sessions preceded probes indicated by arrows), reinforcement of compliance with "do" requests in general increased dramatically and maintained at a relatively high level (mean = 44%). Concomitant increases were observed in overall student compliance with "do" requests (mean = 75%). Compliance and reinforcement of compliance with "don't" requests remained stable until the teacher training procedure was initiated with one "don't" request to a target student, after which there was an increase to a mean of 80% and 56%, respectively. Only on the fourth posttreatment probe session did reinforcement of compliance with "don't" requests return to baseline levels (0%), with a concomitant decrease in compliance (38%). A "booster" training session was subsequently presented, after which both reinforcement of compliance and compliance with "don't" requests returned to and were maintained at relatively high levels.

The number of "don't" requests presented also increased following training (range = 6-27) although no systematic changes were observed in the number of "do" requests from baseline (range = 2-57) to treatment (range = 9-43). To some extent, number of requests varied according to the number of children present. However, presentation of "don't" requests also depended in part on the occurrence of aberrant behaviors.

An analysis of the percent compliance with individual "do" and "don't" requests and students during baseline and training is presented in Table 3. "Do" and "don't" requests were categorized to encompass varieties of instructions most frequently issued. For example, "do" requests such as "turn the page" and "do the puzzle" were categorized as manipulation of materials, and "stand up" or "come here" as other gross motor (as differentiated from "sit down," which was more frequently stated). Examples of "don't" request categories included "no laughing" (noise), "stop rocking" or "no spinning" (self-stimulation) and "don't touch" (object related). Mean percent student compliance increased substantially from baseline to training with all six categories of "do" requests. Increases ranged from 24.5% (other gross motor) to 52.0% (get materials). Similar increases ranging from 18.2% (other) to 66.7% (aggression) were observed across all five categories of "don't" requests. An analysis of individual student data on compliance with all "do" requests shows a considerable increase from baseline to training for nine of the ten students. The exception, Student 6, was issued "do" requests on only one of the sessions during the training condition. Compliance with "don't" requests also increased for eight of the students. (The other two students did not have an opportunity to comply since no "don't" requests were issued to them during the training condition.)

Consumer ratings from videotaped probe sessions obtained for assessment categories of teacher reinforcement, student compliance, and quality of environment/interactions yielded mean pre (post) training scores of 2.2 (5.9), 3.7 (6.7), and 3.9 (6.3), respectively, out of a possible 7. Posttraining ratings ranged from 5 to 7, indicating a high degree of consistency among respondents. Though pretraining scores spanned the entire range, this probably reflects session-to-session variability in teacher and student behavior since there was high correspondence between observer ratings of the same tapes.

Discussion

The present results support the findings of Experiment 1 that compliance with "do" and "don't" requests may serve as functionally distinct response classes. There was no evidence of generalization of student compliance between "do" and "don't" requests, and increases occurred only when consequences were applied to each, respectively. Similarly, the effects of the teacher training procedure were class-specific in

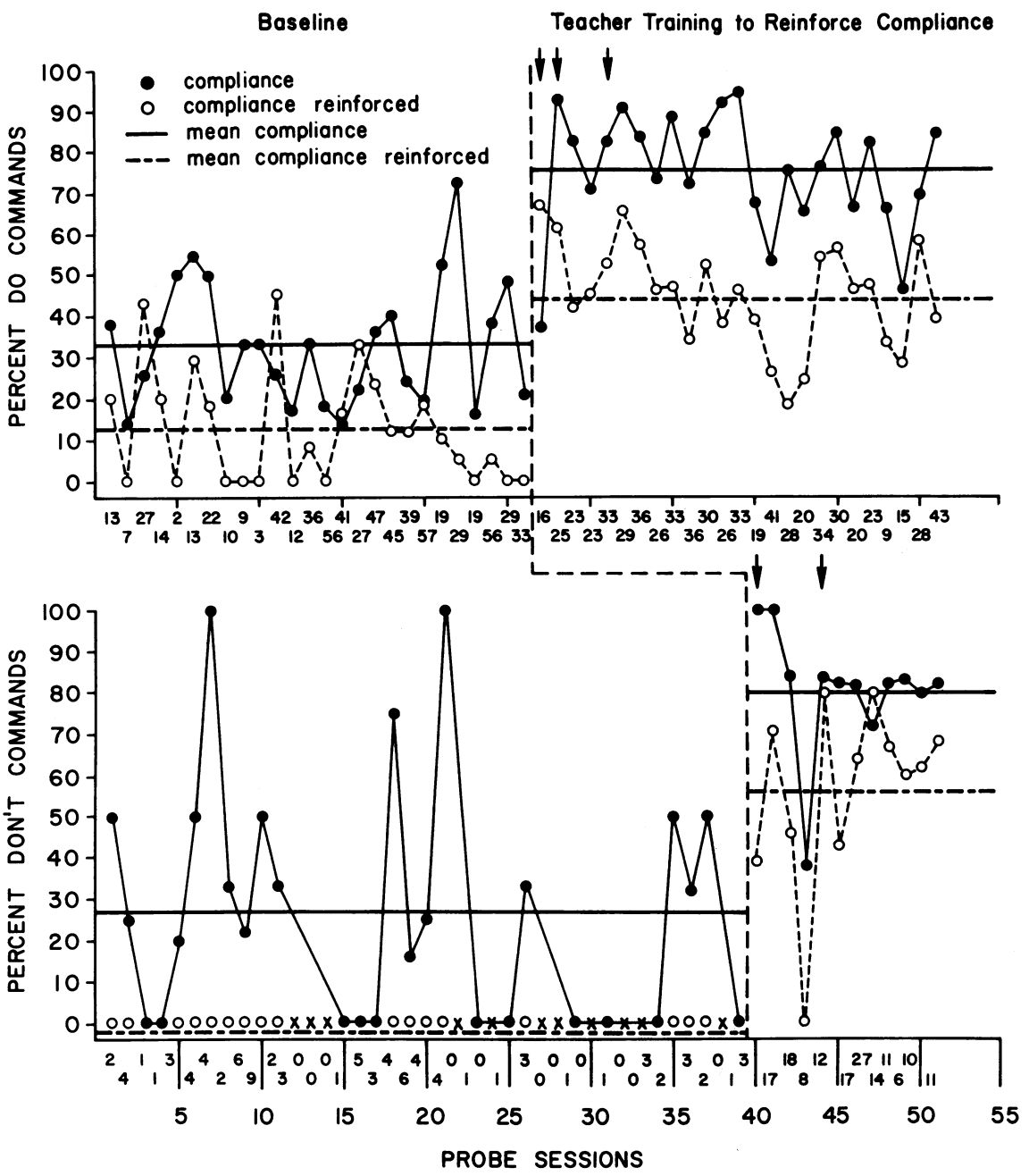

Fig. 2. Percent compliance (closed circles) and percent compliance reinforced (open circles) for "do" and "don't" requests during probe sessions across experimental conditions. Solid (dashed) lines denote condition means for compliance (compliance reinforced). The number of requests issued per session are presented along the abscissas. Sessions in which no "don't" requests were presented by the teacher, precluding data for compliance or reinforcement of compliance, are indicated by X's. Arrows indicate probe sessions that were preceded by teacher training.

that reinforcement did not generalize across "do" and "don't" categories.

The data from the present experiment also extend the findings of Experiment 1 and enhance their external validity in several ways. First, the effects of the intervention obtained under the

Table 3

Mean percent compliance with "do" and "don't" requests for individual requests and students during baseline and training.

	"DO" REQUESTS					
	Get materials	*Put away materials*	*Manipulate materials*	*Sit down*	*Other gross motor*	*Other*
Baseline	19.2	29.2	35.9	50.7	59.3	51.6
Training	71.2	80.4	80.6	79.6	83.3	80.9

	"DON'T" REQUESTS				
	Noise	*Object related*	*Self-stimulation*	*Aggression*	*Other*
Baseline	51.0	48.7	25.0	0	37.3
Training	81.8	100.0	83.4	66.7	55.5

	STUDENTS									
	*1**	*2***	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
"Do" Requests										
Baseline	54.5	51.9	25.5	42.2	11.0	58.2	27.0	38.8	66.6	56.0
Training	89.9	77.8	64.5	76.0	66.5	50.0	56.9	62.5	88.1	98.8
"Don't" Requests										
Baseline	25.0	50.0	13.0	65.0	44.4	75.0	50.0	50.0	0	50.0
Training	100.0	77.3	50.0	N/O	73.3	82.2	75.0	N/O	78.0	100.0

*Target student for teacher training with "do" requests.
**Target student for teacher training with "don't" requests.

highly controlled conditions of Experiment 1 were replicated in a naturalistic classroom setting where multiple factors were allowed to vary. Second, the social validity data demonstrate the marked impact of these treatment effects. The consistently higher posttraining ratings for teacher reinforcement and student compliance support the clinical significance of the change in the corresponding objective dependent measures. However, it is not clear what variables controlled the higher posttraining ratings for the third category of quality of environment and interactions. Since the training procedure involved instructions to the teacher to issue a request only once, observers may have been responding to a reduction in "nagging" or repetition of requests. Similarly, the positive changes the teacher effected in the children's behavior may have produced a reciprocal change in the manner in which she covertly and overtly responded to them. Possibly, their increased compliance permitted her to devote more attention to instructional activities and appropriate behaviors.

Finally, the results suggest the efficacy of a relatively simple, unobtrusive, and conveniently administered teacher training procedure in effecting a durable and generalized increase in reinforcement of compliance.

GENERAL DISCUSSION

The investigation of response class relationships has recently been advocated as an economical alternative to the traditional approach of modifying one behavior at a time (e.g., Cataldo, Iwata, & Ward, 1982; Lovaas, Koegel, Simmons, & Long, 1973; Rincover, 1981; Russo et al., 1981). Rincover (1981), for example, has suggested that certain keystone behaviors be identified which, when modified, could facilitate change in numerous behaviors for which no systematic contingency has been applied. The present investigation extends the response class

literature by examining such phenomena with respect to compliance. The results replicate, in part, previous investigations demonstrating that compliance with "do" requests represents a functional response class. Martin (1971) argued that compliance or instruction-following behaviors are members of a response class because of their reinforcement history. Specifically, Martin suggested that since children typically receive reinforcement for following instructions, instructions become discriminative stimuli for reinforcement. As a result, all instruction-following responses are strengthened, even though all may not have been directly reinforced.

Although Martin's investigation only examined responses to "do" requests, the same logic can be applied to the findings of the present studies on compliance with "don't" requests. That is, reinforcement for stopping a behavior following an adult instruction results in "don't" requests becoming discriminative stimuli for reinforcement. As a result, there is a high probability that students will respond appropriately to such requests.

Similarly, "don't" requests may become discriminative stimuli for noncompliance if such instructions have not been previously associated with reinforcement. Experiment 1, in the controlled situation of an analogue study, demonstrated the possibility that response classes might be formed by differential reinforcement (i.e., compliance to one type of request increases only when an exemplar is reinforced). Experiment 2, on the other hand, in the initial phase (baseline), addressed the question of whether the conditions in the natural environment are such that they could provide differential reinforcement necessary for response class formation. Specifically, data from Experiment 2 demonstrated that the teacher's *reinforcement* of compliance with "do" and "don't" requests was class specific, which may have contributed to the development of that phenomenon with student compliance. The "normative" (baseline) data suggest that reinforcement may rarely be provided for compliance with "don't" requests. Indeed, it may be concluded on the basis of the literature that compliance to "don't" requests has largely been neglected in training programs, even though there are many situations in the natural environment where it would be critical for children to obey such instructions immediately (e.g., not to run into a busy street or touch a hot stove). Adults may be reluctant to reinforce the cessation of a behavior that they feel a child should not have been engaging in to begin with.

Possibly, then, children learn to differentiate between "do" and "don't" requests on the basis of whether compliance is likely to be reinforced. This may lead to speculation about the nature of the discriminative stimuli to which students responded in differentially generalizing their compliance since the specific words "do" and "don't" did not consistently, if ever, precede the respective instructions in the present studies (e.g., "sit down" is typically preferred to "do sit down"). Although the discriminative stimuli may not have been readily discernible, it is not clear that such distinctive cues are necessary for response class formation. A response class conceptualization may provide a behavior analysis strategy for many other complex behaviors that are not easily explained by a one to one contingency.

It may also be useful to examine not only the differential reinforcement history arranged by adults in the environment, but the naturally occurring contingencies associated with compliance to each type of request. "Do" requests require the student to initiate or engage in a particular activity that may or may not be reinforcing. In contrast, "don't" requests require the student to terminate a behavior or approach toward a stimulus that is presumably already reinforcing. Thus, the effects of training in the "do" request condition may not generalize to "don't" requests that, by definition, exert competing contingencies that interfere with compliance. Similar contingencies would be operating with "do" requests only if the individual happened to be engaging in a highly preferred activity when the instruction was issued. Because the stimulus con-

ditions immediately preceding delivery of "do" requests were not held constant in the present study, the impact of this variable on student compliance requires further investigation. Although it cannot be conclusively established that response class phenomenon account for the present results, it is perhaps the most parsimonious conceptualization and the most promising for future study.

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