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PYRAMIDAL TRAINING: A LARGE-SCALE APPLICATION WITH INSTITUTIONAL STAFF

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This study evaluated an indirect method of training 45 institutional direct care staff to conduct behavioral programs. Three supervisors were trained to improve teaching behaviors (instructions, prompts, and consequences) used by the direct care staff while working with severely and profoundly handicapped residents. In addition to training, daily feedback was provided to supervisors regarding performance of their staff. Results of a multiple baseline analysis across teaching behaviors (instructions, prompts, and consequences) and content areas (communication and gross motor skills) showed that providing training and feedback to supervisors resulted in increases in correct teaching behavior by direct care staff. However, teaching behavior newly learned in one content area (communication) did not generalize to the other area (gross motor skills). Data collected on resident behavior showed small but noticeable improvement in terms of correct responses and attending behavior during programming. Results are discussed in terms of the benefits of a pyramidal approach to training institutional staff.

DESCRIPTORS: attendants, institution, retardation, staff management and training

Training institutional staff to work effectively with handicapped and retarded individuals is an area of critical importance (Bensberg & Barnett, 1966; Gardner, 1973; Kazdin, 1973), and a number of investigations have examined methods of improving various aspects of staff performance. For example, studies have focused on implementing behavioral treatment procedures (Ayllon & Michael, 1959), providing health care (Iwata, Bailey, Brown, Foshee, & Alpern, 1976), engaging residents in activities (Quilitch, 1975), conducting toilet training and physical therapy programs (Greene, Willis, Levy, & Bailey, 1978), and incorporating teaching activities into daily care routines (Ivancic, Reid, Iwata, Faw, & Page, 1981).

Other research has attempted to evaluate several different methods of training staff. Many investigators have used classroom-type instruction, but few have examined behavior in situations approximating the actual work environment (see Gardner, 1973, for a review). Moreover, although other studies have documented actual changes in staff behavior, they were often conducted under less than natural conditions, or with persons other than direct care employees. For example, Gardner (1972*a*), observed trainees' application of skills while other employees played the role of residents; Gladstone and Sherman (1975) trained high school students; Fabry and Reid (1978) trained foster grandparents; and Koegel, Russo, and Rincover (1977) taught behavioral programming skills to teachers of autistic children in a classroom set-

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ting. The generalizability of these results to typical staff populations in institutions remains to be demonstrated. Recently, Watson and Uzzell (1980) examined the relative merits of academic versus practicum training with institutional staff. Practicum training was shown to affect actual job performance whereas academic training influenced primarily academic performance. In another study, Gladstone and Spencer (1977) found modeling to be an effective method of increasing contingent praise statements by direct care staff; however, the circumscribed nature of the target behavior (i.e., delivery of praise statements) limits generalizability to broader-based training efforts.

In spite of the existence of many procedures for managing staff behavior (see Iwata et al., 1976, for a review), there are no widely accepted methods for accomplishing the initial training necessary to shape performance to a point where maintenance contingencies can be instituted. The lack of available training programs may be due at least partially to problems inherent in any staff training effort: 1) the expense of training large numbers of staff; 2) the practical, logistical problems with scheduling staff away from regular duties; 3) the difficulty of providing individual contact and shaping of skills with large numbers of staff. These and other problems are compounded by the high rate of absenteeism and turnover of direct care employees (Zaharia & Baumeister, 1979).

One training model that appears promising makes use of a pyramidal strategy in which training is provided to a small number of staff who, in turn, are instructed to train additional staff. Jones, Fremouw, and Carples (1977) evaluated the effectiveness of pyramid training in a school setting where three teachers were trained in a classroom management skill program, with each subsequently training three other teachers to use the same skills.

The indirect approach characterized by the pyramid training of Jones et al. (1977) could be used in an institutional setting by first training supervisors who would then train direct care staff. Such an approach presents at least four advantages over the traditional strategy of intervening directly on staff. First, because the number of supervisory personnel is small relative to direct care staff, the number of employees requiring direct structured intervention may be greatly reduced. Second, supervisors could accomplish training in the work environment where the behaviors are ultimately expected to occur, thereby avoiding logistical problems associated with training large numbers of staff (e.g., providing resident coverage during training times). Third, once supervisors have been trained, they would be present in the work setting to maintain behavior acquired by direct care staff. Finally, the supervisor would be capable and available to train new staff as they enter the setting.

The major purpose of the present study was to extend the use of pyramidal training to an institutional setting. Instructions and feedback were provided to three supervisors in an attempt to improve the performance of 45 direct care staff. The dependent variable of primary interest was the use of correct teaching behaviors, adapted from Koegel et al. (1977), by the direct care staff. Additional data were collected in order to assess generalization of staff performance across settings, and to examine whether improvements in staff performance produced noticeable changes in resident adaptive behavior.

METHOD

Setting

The study was conducted at a 90-bed residential and outpatient facility serving severely and profoundly retarded children and adolescents. The specific setting for the study was a school program for 15 residents either too young (under 5 yr) or too old (18 yr and older) to attend special education classes in the public schools. Because most of the center's residents attended special education classes off the premises, a

sufficient number of direct care staff could be assigned to the school program to provide one-to-one instruction. Adults received speech, recreation, and occupational therapy, while preschoolers received training in communication, gross motor development, and sensory stimulation. Instructional periods were approximately 20 min in length separated by 10 min for putting away instructional materials and transporting residents to the next training area. Educational programs were written by professional staff and administered by direct care staff under their supervision.

Participants

Direct care staff. Forty-five staff participated. The five males and 40 females ranged in age from 18 to 60 yr. Length of employment at the time of the study varied from less than 1 wk to 17 yr; 70% had been employed less than 5 yr, 7% had worked at the center 5-10 yr, and 24% had been there longer than 10 yr. Amount of education ranged from less than a high school degree to less than 1 yr of graduate school; less than 10% had a college degree. Primary responsibilities were to resident living units and included daily client care, patient transport, and conducting self-help programs. Direct care staff had received no formal instruction in behavior modification at the time of the study. In addition to living unit responsibilities, staff were periodically assigned to work in the school program.

Each day approximately 15 of the 35 total day shift staff were scheduled in the school. Although unit supervisors generally attempted to assign all direct care staff to the school program with equal frequency, there were no systematic guidelines for doing so. Thus, some staff were assigned more frequently than others, and there were unequal numbers of work days between one school assignment and the next.

Supervisors. Participants included one supervisor from the Speech and Hearing Department, and two from Physical Therapy. The Speech and Hearing supervisor had a bachelor's degree and was completing work toward a masters degree in Special Education at the time of the study. The Physical Therapy supervisors, who were present on alternate days, were both completing bachelor's degrees. All three were female and ranged in age from 21 to 24 yr. None had any formal training in behavioral treatment methods. As with direct care staff, supervisors were not specifically selected as participants; they participated due to their presence in the designated settings.

Residents. Four residents comprising one group and aged 3, 3, 4, and 19 yr participated. All were classified as multiply handicapped, had no functional speech, and limited receptive language. None of the residents was ambulatory, nor did any exhibit independent toileting skills. All had progressed through various stages of a self-feeding program. Most recent psychological testing indicated that three of the residents were profoundly mentally retarded and the fourth was functioning in the severe range. All residents were dependent on staff for fulfillment of basic care needs. Three had seizure disorders and one had hydrocephalus. The 19-yr-old resident was also blind and had been grouped with the younger residents because of similar educational needs. This group of residents was selected from three available groups because of their overall higher level of entry skills and lower level of inappropriate behavior.

General Program Description

Each day when direct care staff reported to the school setting, they selected a resident with whom they would work, and were given a written description of a program to be administered. In the areas in which the study was conducted—communication and gross motor skills—a cassette tape recorder was used to cue direct care staff when to begin and end each of 25, 45-sec training trials. Taped instructions were as follows for each trial: "Begin trial," at which point staff were to present stimulus materials, verbal

instructions and, if necessary, prompts; after a 30-sec interval the tape instructed, "End trial," after which praise was to be delivered to those residents who had responded correctly; 5 sec later the tape instructed, "Record plus (if a correct response had occurred), minus (for incorrect responses), or zero (for no response);" 10 sec later the next trial began.

In communication, two types of programs were conducted on alternate days. Expressive language programs were designed to increase residents' vocal language, through the reinforcement of random or prompted vocalizations. Receptive language programs were designed to bring residents' motor behavior under control of vocal instructions; for example, presenting two stimuli (ball and shoe), instructing the resident to touch one, and providing reinforcement for correct responses. Both programs were tailored to individual deficits. Individualized gross motor skill programs included procedures aimed at increasing head control and independent sitting and standing. At least one supervisor was present in each area to monitor the appropriateness of program content and staff teaching techniques, as well as to oversee the general area.

At the time of the study, direct care staff had been given informal training in program implementation by supervisors in each area to which they were assigned. Typically, this consisted of verbal instructions and perhaps some demonstration. For example, supervisors informed direct care staff how to conduct an object identification component of a receptive language program by describing the following steps: (a) put a cup and a shoe on the table and tell the resident to touch one of them, (b) if a correct response is made, praise the resident, and (c) if an incorrect response is made, prompt the resident to touch. Thus, instructions were general in nature and lacking in behavioral specificity. For instance, direct care staff were not told exactly how to prompt, or at what point during a trial a prompt would be appropriate. Direct care staff were free, therefore, to conduct individual programs with a certain degree of "creativity." Because different direct care staff were usually assigned to the school on different days, there was little, if any, consistency in program implementation from one day to the next.

Data Collection

Three types of observation systems were used to collect data on direct care staff, supervisors, and residents.

Direct care staff teaching behaviors. Each of the four direct care staff in an area was observed during 45-sec intervals which coincided with the 45-sec trials conducted by the staff. Observers, who were cued by the same cassette recorder that guided staff through each trial, judged the staff's use of instructions, prompts, and consequences according to the following criteria:

1. *Instructions:* An instruction was considered the first attempt per trial to initiate a response. In most cases, the form of the instruction was specified in the program being implemented. An instruction was scored as correct if (a) it was clear and discriminable and occurred after a pause of at least 1 sec when no vocal behavior was directed toward the resident, (b) it specified the desired response, e.g., "Herb, touch the ball," not "Herb - ball," (c) it was uninterrupted, (d) the resident was attending to the trainer or task materials while the instruction was being presented, or was prompted to do so by the staff, and (e) the instruction was not accompanied by manual guidance of the response.

2. *Prompts:* A prompt was defined as any staff response that occurred subsequent to the initial instruction that attempted to evoke the desired response. Thus, a prompt could have been *verbal* (e.g., repeating the instruction, or a variation), *gestural* (e.g., pointing), or *physical* (e.g., manually guiding the resident to perform the correct response). A prompt was scored as correct if (a) it was not delivered sooner than 5 sec after the initial instruction, or previous prompt, in order to allow the resident time to respond, (b) the delivery of a physical prompt was accompanied by a verbal instruction, and

(c) if a physical prompt was used it evoked a correct response.

3. *Consequences:* A consequence was considered any verbal interaction initiated by staff that either occurred subsequent to a resident response or followed the taped instruction, "End trial," or did not fit the definitions of an instruction or prompt. A positive consequence was scored as correct if: (a) it was immediate, i.e., within 2 sec of a response, (b) it was unambiguous; saying "no" with a smile, or "good girl" with a frown were considered ambiguous, (c) it was contingent, i.e., positive consequences only following correct responses, (d) if edible or material reinforcers were used, their delivery was accompanied by verbal praise, (e) if the resident emitted a correct response prior to the end of the trial, the trainer continued to interact with the resident in a positive manner; this was scored if there was at least one positive interaction independent of the reinforcement for correct responding, and (f) any correct responses, even those physically prompted, were followed by positive consequences. Correctly delivered negative consequences such as extinction, local timeout, and reprimands were not scored.

If any of the components were performed incorrectly, the entire behavior (i.e., instruction, prompt, or consequence) was scored incorrect for that trial.

Supervisors. A combination 30-sec time sampling and 10-sec partial interval procedure was used to observe behaviors exhibited by the supervisor in each program area. An observer located in a position to observe the supervisor and all four direct care staff/resident pairs was cued via cassette tape with an earplug at the start of successive 10-sec intervals. Observers were cued to monitor the supervisor during every third interval (or every 30 sec). During the remaining intervals, individual residents were observed on a 60-sec time-sampling basis (see *Resident nontask-related behavior*). Supervisor behavior was scored according to the following categories, more than one of which could be scored during any interval.

1. *Praise:* Any verbal approval of any aspect of direct care staff performance.

2. *Instructions:* Any supervisor response to a question by direct care staff that pertained to programming or supervisor appearing to listen to direct care staff asking a question, or providing information to direct care staff that did not fit into the Praise category. Also included was any verbal or physical interaction between supervisor and resident during which direct care staff assigned to that resident was present.

3. *Direct interaction:* Any direct physical or verbal contact, between supervisor and a resident, during which the assigned direct care staff was not present.

4. *Observing:* Supervisor's head was oriented toward direct care staff and supervisor was within 15 ft. of the staff member.

Resident nontask-related behavior. The 30-sec momentary time-sampling and 10-sec partial interval procedure described for supervisors also yielded data on nontask-related behavior exhibited by the four residents during active programming. The same observer who collected supervisor data also collected resident data, using the following definitions:

1. *Appropriate attending:* Attending to instructions or prompts, or complying with physical guidance. Attending was scored only if no disruption occurred during the interval.

2. *Disruption:* Any instance of striking, kicking, pulling hair, spitting directed at another person, or any instance of aggression with or against inanimate objects, e.g., throwing stimulus materials or toys. Also scored was motor behavior that disrupted training or that was inappropriate regardless of the circumstances, e.g., visible resistance to physical guidance, and any disruptive noise emitted by resident, primarily crying and screaming.

Resident correct responses. The observer who rated direct care staff behavior also scored resident responses to instruction. Resident responding was observed in the same manner as direct care staff, i.e., 45-sec intervals. Responses were

scored as either *correct, incorrect,* or *prompted* according to the following definitions:

1. *Correct:* Resident performed response as specified in program, within the specified amount of time.

2. *Prompted:* Resident performed correct response as specified in program, but did so with assistance of trainer.

3. *Incorrect:* Resident made no response or performed a response which did not meet criteria specified in program, either in terms of topography or latency.

In summary, two separate observation systems were used during each session. The sequence of observation intervals is shown for both systems in Table 1. Observer A recorded data on direct care staff teaching behavior and resident correct responses, while Observer B scored supervisor and resident nontask-related behavior. Both observation systems used a sequential schedule of sampling (Thompson, Holmberg, & Baer, 1974). After sampling the behavior of all participants (direct care staff and four residents for Observer A and supervisor and residents for Observer B) the identical schedule was repeated for the remainder of each session.

Table 1

Sequence of Schedule Observations

Observer A		
Interval	*Length*	*Subjects Observed*
1	45 sec	Direct Care Staff-Resident 1
2	45 sec	Direct Care Staff-Resident 2
3	45 sec	Direct Care Staff-Resident 3
4	45 sec	Direct Care Staff-Resident 4
5	45 sec	Direct Care Staff-Resident 1
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24	45 sec	Direct Care Staff-Resident 4
Observer B		
Interval	*Length*	*Subjects Observed*
1	10 sec	Resident 1
2	10 sec	Resident 2
3	10 sec	Supervisor
4	10 sec	Resident 3
5	10 sec	Resident 4
6	10 sec	Supervisor
7	10 sec	Resident 1
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120	10 sec	Supervisor

Observer training. Six staff (four research assistants, one clerk, and the first author) participated as observers. Observer training consisted of: (a) studying written response definitions, (b) discussing the definitions and use of data sheets, (c) viewing a videotape of programs being conducted by direct care staff in the school setting, and recording data on the actual data sheet, (d) practicing data collection in the school setting, with feedback and discussion after each interval of recording, and (e) recording data in the school setting under regular data collection conditions. The possibility of observer bias was reduced by the introduction of new observers intermittently throughout the study who were trained to the original criterion (Kazdin, 1977). In addition, observers other than the first author were uninformed regarding changes in experimental conditions.

Reliability

Interobserver agreement was assessed on all dependent measures by having a second observer independently score at least one third of all sessions simultaneously with each primary observer. After summing agreements and disagreements across all observation intervals, the following indices of interobserver agreement were determined: (a) interval agreement, calculated by dividing the total number of agreements by agreements plus disagreements, and multiplying by 100; (b) occurrence agreement, calculated by dividing the number of agreements on occurrence of responses by agreements on occurrence plus disagreements, and then multiplying by 100; and (c) nonoccurrence

Table 2

Percent Interobserver Agreement

	Communication			*Gross Motor Skills*		
	Interval	*Occur.*	*Nonoccur.*	*Interval*	*Occur.*	*Nonoccur.*
Direct Care Staff						
Instructions	81	83	79	89	83	89
Prompts	84	71	89	83	68	83
Consequences	90	83	93	84	68	84
Supervisors						
Praise	100	0	100	100	0	100
Instruction	93	75	92	91	93	81
Direct Interaction	100	64	100	98	75	98
Observing	93	91	80	91	68	88
Residents						
Attending	88	56	87	90	79	83
Disruption	92	84	86	90	73	86
Residents						
Correct Response	98	68	98	97	80	96
Prompted Response	93	83	88	85	68	79
Incorrect Response	94	90	88	87	76	79

agreement, calculated by dividing the number of agreements on nonoccurrence of responses by agreement on nonoccurrence plus disagreements, and multiplying by 100. The results of reliability assessments are shown in Table 2. For all behavior categories, interval agreement averaged above 80%, and either occurrence or nonoccurrence agreement was 79% or higher. The zero scores for occurrence agreement on supervisor praise were due to that behavior's very low level of occurrence. Primary observers scored praise in 0.3% of all intervals in communication and in zero intervals in gross motor skills.

Procedures

Baseline. During baseline, data were collected in the communication and gross motor areas, on (a) direct care staff teaching behavior, (b) supervisor behavior, (c) resident responses to instruction, and (d) resident nontask-related behaviors. Supervisors and direct care staff were aware of the presence of observers in each area, and had been told that data were being collected to evaluate the effectiveness of programming in the school. When baseline conditions were implemented, observers had been present in the area intermittently for approximately 6 mo, during which time observation procedures were developed and refined. Thus, continued observer presence may have served to reduce reactive effects of observers during experimental conditions (Johnson & Bolstad, 1973).

Supervisor training. Intervention consisted of training individual supervisors to discriminate correct teaching behaviors on the part of direct care staff and to instruct, prompt, and praise the occurrence of those behaviors. Training was provided by the first author during three 15-30 min sessions.

At the first training session supervisors were told that baseline observations had highlighted several deficiencies in staff teaching behavior, and that as supervisory personnel, they were in a position to remedy the problems. Next, supervisors read a written handout containing operational definitions of correct methods for direct care staff to present instructions to residents. The handout was then discussed and supervisors were asked to observe the direct care staff in their area more closely, and try to increase staff use of correct instructions. Specific strategies that supervisors could use in changing direct care staff be-

havior were then discussed. The importance of clear instructions, descriptive praise, and constructive feedback to staff were explicitly stated and supervisors were asked to incorporate such methods into their daily supervision routines. In addition, relevant examples of hypothetical problems and suggested supervisory strategies were presented. For example, supervisors were told that staff might be more receptive if the supervisor initially phrased instructions as suggestions rather than direct orders. Another strategy presented to supervisors was to try to precede constructive feedback with some form of praise statement; e.g., "You gave that last instruction nicely, but next time try to remember not to manually guide the response right away."

During the second training session emphasis was placed on components of prompting correct responses, and during the third, supervisors were taught the correct aspects of providing consequences to residents. The format was identical to that of the first session with the exception that behavioral supervisory techniques were not discussed.

Beginning with the category of correct instructions, supervisors were given feedback by the first author regarding the performance of direct care staff in their area the previous day. For example, a supervisor might be told that direct care staff instructions had improved over previous days, and that she should continue what she was doing when interacting with staff in her area. Or, a supervisor might be informed that correct direct care staff prompts had decreased, and that she should attend more carefully to the ways in which direct care staff were conducting programs. Feedback was limited to only the teaching behaviors on which the supervisors had already received training, and feedback sessions varied in length from 1 to 12 min.

After the communication supervisor had been trained to modify all three teaching behaviors, and direct care staff in that area were not achieving at least 80% correct teaching behavior, daily feedback of a more specific nature was provided. Specific feedback consisted of verbal feedback as well as showing supervisors graphed data collected the previous day on direct care staff teaching behavior and data collected on residents and the supervisor herself. Also, instances of correct and incorrect teaching behaviors on the part of direct care staff were discussed in more detail than previously. Finally, supervisors were asked to work toward a goal of 80% correct teaching behaviors in both areas.

Maintenance. During maintenance, the supervisor was instructed to continue her supervision of direct care staff. Data continued to be collected five days per week but feedback to the supervisor was reduced to two days per week. The feedback was identical in nature to specific feedback except that each feedback session pertained to the preceding two or three days as opposed to only one day. This condition was terminated when the school year ended.

Follow-up. At intervals of 5, 7, and 8 wk after the termination of maintenance conditions, follow-up data were collected. Follow-up sessions were conducted during a summer school program which had convened two weeks following the last day of the maintenance condition. At the beginning of the summer program, supervisors were asked to continue attempting to improve the teaching skills of staff. No feedback was provided to supervisors, however, until the first follow-up session was conducted 3 wk later. Specific feedback, limited only to the observed follow-up session, was provided on the day after each session.

Experimental Design

Two different multiple baseline designs (Baer, Wolf, & Risley, 1968) were used. One was a multiple baseline across settings, the communication and gross motor skills areas. After the collection of baseline data, training and feedback were initiated with the communication supervisor, while the supervisors in gross motor skills remained under baseline conditions. After training and feedback were completed with the communication supervisor, both gross motor

skills supervisors were exposed to training and feedback. The second multiple baseline was across staff teaching behaviors within each area. Following baseline, supervisor training to modify direct care staff teaching behavior was initiated only on instructions, with prompts and consequences remaining under baseline conditions. Prompts were the target of intervention only after a change had occurred with instructions, and so on. In gross motor skills, after intervening on instructions, prompts and consequences were exposed to intervention simultaneously because of time restrictions associated with the end of the school year, and the scheduled resignation of one supervisor.

RESULTS

The effects of supervisor training on direct care staff teaching behavior are shown in Figure 1. Mean percent correct instructions, prompts, and consequences for all staff in each area are plotted across daily sessions. In communication, correct instructions averaged 30% during baseline. Following the introduction of supervisor training and feedback, instructions increased to a mean 77% correct. Instructions increased further during maintenance, averaging 94% correct. Similar increases can be seen for correct prompts. Supervisor training and the introduction of feedback for prompts were followed by a mean increase to 50% from a baseline level of 4%. Maintenance resulted in a further increase to 77%. Similar, though less marked, changes can be seen for correct consequences. The baseline mean was 38%, whereas the mean following supervisor training was 65%. During maintenance, there was a slight increase to a mean 66%. It should be noted that although mean increases were obtained during maintenance with all three teaching behaviors, performance during this condition was not different from performance during the final sessions of the preceding condition. Maximal performance was achieved during supervisor training and feedback, and maintained at similar levels during the subsequent maintenance condition. In gross motor skills, correct instructions increased from a baseline mean of 21% to a mean of 80% following supervisor training and the introduction of feedback. Similar changes can be seen for correct prompts, where the baseline mean of 27% increased to a mean of 88% following intervention. Correct consequences increased from a baseline mean of 38% correct, to 76% following intervention.

Teaching behaviors in both areas remained high during the three follow-up sessions conducted. Means in communication were 97% for instructions, 69% for prompts, and 83% for consequences. In gross motor skills, instructions averaged 84%, prompts 73%, and consequences 74% correct. No generalization of teaching behaviors can be seen in Figure 1, across either areas or different skills within each area.

Figure 2 shows ranges and means for direct care staff teaching behaviors across experimental conditions. Examination of condition ranges reveals improvements in staff use of correct teaching behavior. In communication the range for percent correct instructions was 0-63% during baseline, 29-100% after supervisor training, 75-100% during maintenance, and 91-100% in follow-up. The range for prompts was 0-44% in baseline, 4-82% after supervisor training, 53-100% during maintenance, and 50-100% in follow-up. For consequences the range was 0-100% both during baseline and following supervisor training, 0-88% in maintenance, and 50-100% during follow-up. A new staff member was present on the one day on which zero correct consequences occurred after supervisor training. She was the only one of the four staff present who had an opportunity to provide consequences for correct responding and failed to do so on all nine opportunities. In gross motor skills, the range for instructions was 0-55% during baseline, 29-100% after supervisor training, and 79-96% in follow-up. For prompts the range was 0-82% in baseline, 75-100% following supervisor training, and 54-100%

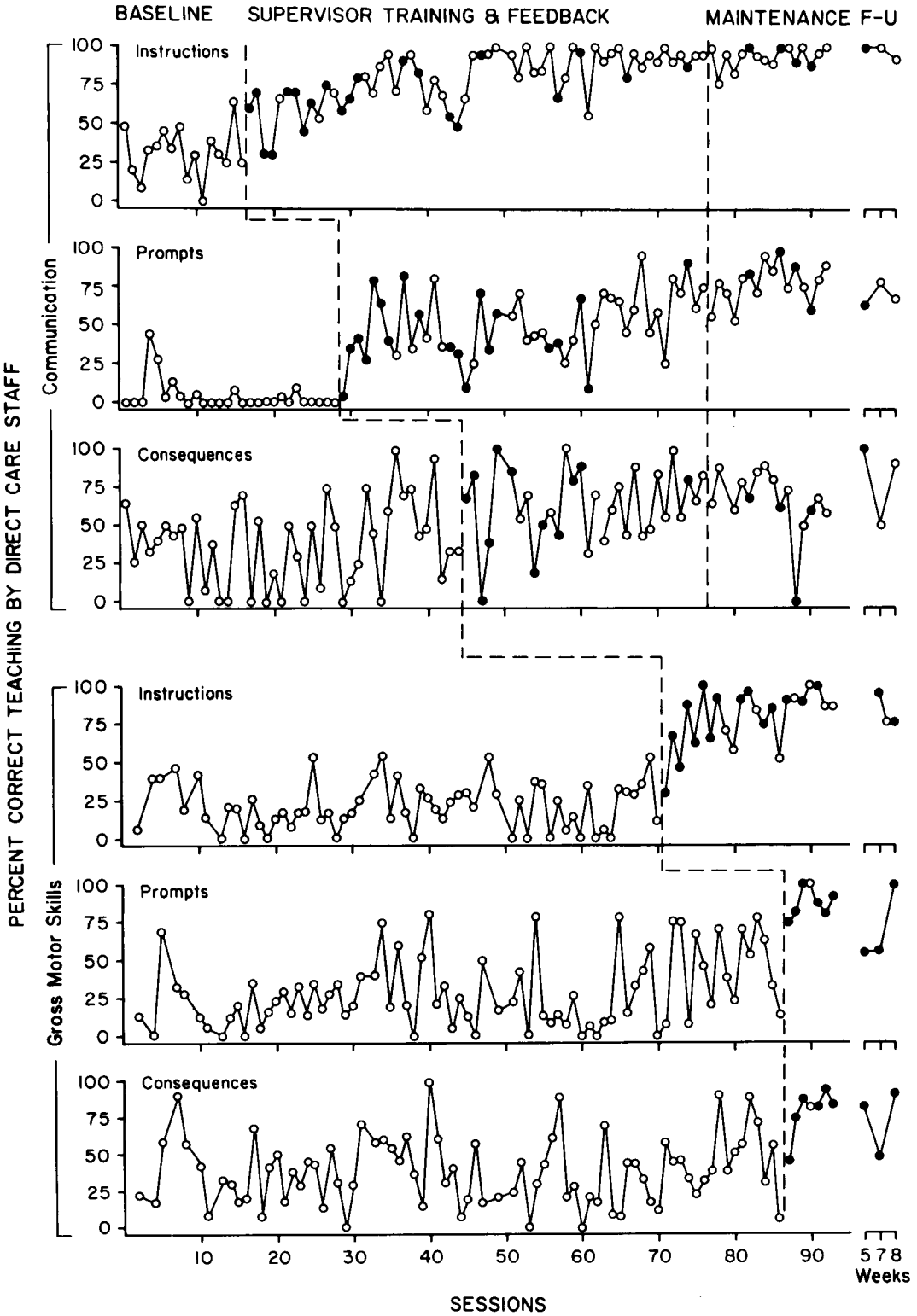

Fig. 1. Mean percent correct instructions, prompts, and consequences by direct care staff in communication and gross motor skills across sessions. Closed circles denote treatment sessions in which one or more new staff (i.e., those not previously exposed to intervention) were present.

in follow-up. The range for consequences was 0-100% during baseline, 0-91% after supervisor training, and 47-81% in follow-up. As Figure 2 shows, generally the overall ranges decreased and lower limits of ranges increased as teaching behaviors were intervened upon. This can be seen most clearly with instructions in communication. The initial increases over baseline performance were at least twofold in all but one case (consequences in communication), and much more in others (e.g., from 4% to 44% with prompts in communication). The criterion of 80% correct was achieved for instructions (97%) and consequences (83%) in communication, and instructions (84%) in gross motor skills. Criterion was not met for prompts (69%)

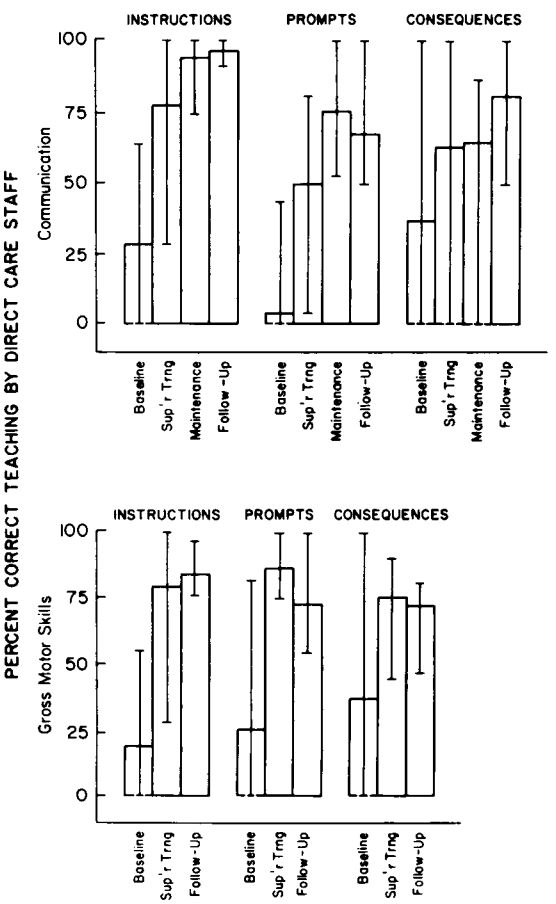

Fig. 2. Ranges and means for percent correct instructions, prompts, and consequences by direct care staff in communication and gross motor skills across experimental conditions.

in communication, and prompts (73%) and consequences (74%) in gross motor skills. Data collected on individual direct care staff were consistent with reported mean data. Following supervisor training in communication, 94% of staff showed increases in the use of correct instructions, 96% improved their use of correct prompts, and 63% improved their use of correct consequences. In gross motor skills, increases in correct teaching behavior were shown by 96% of staff with instructions, 88% with prompts, and 89% with consequences.

Direct care staff performance on all measures was variable during either baseline, intervention, or both, and the magnitude of change from baseline to intervention was not large with some behaviors (e.g., consequences in communication). These factors raise the possibility that observer error resulted in specious effects. However, an examination of reliability indices indicated that with all behaviors in both areas, the mean change from baseline to intervention exceeded any change in level of behavior that could be attributed to observer error.

Table 3 shows the percentage of 10-sec intervals during which supervisors were observed praising, giving instructions to direct care staff, interacting directly with residents, and observing. During baseline the communication supervisor interacted with staff infrequently, and was scored as observing during 87% of intervals. As she was exposed to training and feedback conditions, instructions to staff became more prevalent with a concomitant decrease in observing. Direct interactions with residents continued to occur infrequently and few praise statements was recorded. As can be seen in the bottom portion of Table 3, different results were obtained with supervisors in gross motor skills. During baseline, instructions to staff were frequent, with relatively little observing of staff scored. After training and specific feedback were implemented, instructions decreased and observing increased. No praise statements were scored in gross motor skills.

Table 4 shows percent correct responses by

Table 3

Frequency and percentage (in parentheses) of intervals of praise, instructions, direct interaction, and observing by supervisor in communication and gross motor skills.

Communication	*Baseline*	*Instructions*	*Prompts*	*Consequences*	*Maint*	*F-U*
Total Intervals	508	492	607	1106	555	106
Praise	0	2(/4%)	5(.8%)	2(.2%)	1(.2%)	0
Instructions	49(10%)	27(26%)	154(25%)	435(39%)	147(26%)	41(39%)
Direct Interaction	3(.6%)	3(.6%)	32(5%)	3(.3%)	3(.5%)	0
Observing	440(87%)	324(66%)	416(69%)	651(59%)	374(67%)	49(46%)

Gross Motor Skills	*Baseline*	*Instructions*	*Prompts and Consequences*	*F-U*
Total Intervals	2,196	568	250	108
Praise	0	0	0	0
Instructions	1,659(76%)	253(45%)	105(42%)	56(51%)
Direct Interaction	126(6%)	0	0	0
Observing	411(19%)	315(56%)	138(55%)	51(47%)

individual residents across experimental conditions. No data are presented for Resident 4 during baseline in communication because she did not enter the program until the communication supervisor had begun receiving instructions training. Although the data show considerable variability across conditions, improvements can be noted. During the maintenance condition in

Table 4

Percent total correct responses (prompted plus unprompted) and percent correct unprompted correct responses for residents in communication and gross motor skills.

Communication		*Supervisor Training and Feedback*					
Resident		*Baseline*	*Instructions*	*Prompts*	*Consequences*	*Maint*	*F-U*
1	Total	70	52	43	51	70	20
	Unprompted	6	2	7	17	9	0
2	Total	43	8	21	72	95	100
	Unprompted	2	0	3	12	17	0
3	Total	28	46	58	65	73	75
	Unprompted	0	0	0	4	8	0
4	Total	[a]	50	46	28	48	45
	Unprompted	[a]	0	2	3	10	10

Gross Motor Skills		*Supervisor Training and Feedback*			
Resident		*Baseline*	*Instructions*	*Prompts + Consequences*	*F-U*
1	Total	74	91	95	77
	Unprompted	39	53	32	33
2	Total	33	58	60	100
	Unprompted	2	7	0	0
3	Total	57	61	74	82
	Unprompted	17	35	12	44
4	Total	52	81	95	96
	Unprompted	24	57	61	83

[a]No data available for Resident 4 during baseline in Communication.

both communication and gross motor skills, all residents were responding above baseline levels either on (a) both measures (Residents 2 and 3 in communication and Residents 3 and 4 in gross motor skills), (b) total correct responses (Residents 1 and 2 in gross motor skills), or (c) unprompted correct responses (Resident 1 in communication). Increases in correct responding can be noted during follow-up for Residents 2 and 3 in communication (total correct) and for Residents 2 (total) and 3 and 4 (both total and unprompted) in gross motor skills.

Table 5 shows the percentage of intervals in which individual residents were observed attending across conditions. As with the data on correct responding shown in Table 4, variability is evident. However, most residents did demonstrate improvements on this measure. During the final condition the majority of residents (1, 2, and 3 in communication and 2, 3, and 4 in gross motor skills) were attending more than during baseline. Increases during follow-up can be noted for Resident 4 in communication and Residents 2, 3, and 4 in gross motor skills.

DISCUSSION

Results suggest that improvements in direct care staff teaching behavior were a function of training and feedback provided to supervisors. Percent correct instructions, prompts, and consequences increased in both communication and gross motor skills only after the respective supervisors had been exposed to intervention. In communication, teaching behavior improved over baseline when supervisor training and feedback were introduced, and remained high during maintenance and follow-up. In gross motor skills, teaching behavior also improved when supervisor training and feedback were introduced. Thus, results show that training supervisors to intervene on direct care staff teaching behavior can effect desired changes in program implementation.

Based on changes observed in staff teaching behavior, the procedures used here appear to be an improvement over those reported in previous investigations in institutional settings. Whereas other staff training studies have focused on verbal skills regarding mental retardation (Cochran & Steiner, 1966) or behavior modification (Gardner, 1972*b*), this study examined employee behavior in the natural work setting. By documenting changes in actual direct care staff performance, these results can be seen as an extension of studies in which trainees were high school students (Gladstone & Sherman, 1975) or foster grandparents (Fabry & Reid, 1978), as

Table 5

Percent Intervals of Attending Residents in Communication and Gross Motor Skills

Communication		*Supervisor Training and Feedback*				
Resident	*Baseline*	*Instructions*	*Prompts*	*Consequences*	*Maint*	*F-U*
1	11	28	32	40	24	17
2	6	10	12	8	19	15
3	1	5	11	2	3	2
4	[a]	32	19	28	39	53

Gross Motor Skills		*Supervisor Training and Feedback*		
Resident	*Baseline*	*Instructions*	*Prompts + Consequences*	*F-U*
1	69	87	72	63
2	17	30	4	34
3	54	62	48	57
4	28	74	66	78

[a]No data available for Resident 4 during baseline in Communication.

well as the teacher training programs of Jones et al. (1977) and Koegel et al. (1977).

Pyramidal training methods as used here also appear to have several advantages over the more traditional paradigm in which staff behavior is the direct target of intervention. First, the number of staff requiring direct, structured contact is greatly reduced by intervening on the supervisory level. Here, three supervisors were trained in lieu of providing direct instruction to 45 direct care staff. Second, supervisors can conduct training in the course of daily performance routines. Scheduling large numbers of staff away from daily responsibilities was therefore avoided. Third, once supervisors are trained they remain in the setting to facilitate maintenance of staff skills. Fourth, after being trained, supervisors can provide the initial training required for new employees entering the work setting. In this study, correct teaching behavior was maintained at high levels in spite of the entrance of new staff throughout intervention and follow-up conditions.

The sheer number of direct care staff who participated is noteworthy in itself. The fact that 45 staff participated in this study suggests some degree of generality with respect both to methods and their outcome. In addition, the irregularity with which staff were assigned to work in the target setting increased the length of time required to demonstrate adequate control over teaching behavior. Due to the manner in which staff were assigned, there were often delays longer than a month between successive assignments of individual direct care staff. Also, new staff, naive to correct teaching behavior, were assigned to work in the school program and included as participants throughout treatment conditions. For instance, new staff participated during each of the three days of follow-up data collection. In communication, naive staff were included in the first follow-up session. In gross motor skills, new staff were present during the first and third session, and during the second session, staff naive to correct prompts and consequences were present. Thus, observable effects resulting from changes in supervisor behavior were necessarily diluted when compared to conditions under which the same target participants are present day after day.

Another important aspect of the results is the inclusion of client data, which until recently have been lacking in most staff training and management studies. Quilitch (1975) reported increases in the number of clients participating in recreational programs. Iwata et al. (1976) presented several types of client data, including measures of soiled clothing and quality of dental care. Burg, Reid, and Lattimore (1979) showed a decrease in disruptive and aggressive behaviors and an increase in cleanliness. Ivancic et al. (1981) reported small gains in clients' language skills. Greene et al. (1978) showed increases in distance ambulated and in range of motion, and Fabry and Reid (1978) reported small improvements as measured by a resident skills inventory. Data collected on resident behavior in this study reflect gains commensurate with those obtained by Fabry and Reid (1978) and Ivancic et al. (1981); although large changes were not observed, in both communication and gross motor skills, attending increased over baseline levels followed supervisor training and the introduction of feedback. Although variability is apparent and slight decreases were observed, attending remained higher than during baseline. Resident correct responses showed similar trends. The two types of client data document the effectiveness of the training procedures, particularly in light of the degree of retardation and multiplicity of handicaps of the residents trained in this study.

Alternative resident behaviors may have yielded a more representative measure of the effects of staff training. The behaviors examined here were being initially acquired by the residents. Both classes of behavior (language and gross motor skills), typically require longer periods of acquisition than the length of this investigation, particularly for severely and pro-

foundly handicapped children. It can be speculated that other behaviors, either more quickly learned or in a maintenance stage, would be more susceptible to changes in staff programming topographies.

There appear to be at least three possible explanations for the failure of staff teaching behavior to generalize from communication to gross motor skill programs. First, the programs conducted by staff in the two areas may be sufficiently different from one another that more extensive training in behavioral teaching methods is necessary for newly learned skills to generalize from one area to another. Resident target behaviors more similar to each other than language and gross motor skills may have yielded better generalization of staff behavior. Second, after training and feedback had begun with the communication supervisor, the gross motor skills supervisors remained under baseline conditions and continued to instruct staff as they had previously. Thus, at this point direct care staff were explicitly instructed to continue with baseline teaching procedures in gross motor skills. Third, the infrequency of staff assignments to the school program reduced the probability of generalization. Having the same target staff day after day would seem to increase the likelihood that staff behavior would generalize.

Data collected on supervisors are more difficult to interpret, since their behavior differed considerably both during baseline and following the implementation of treatment. The communication supervisor spent little time interacting with staff during baseline, but was observed doing so more often after intervention had begun. The opposite was true with the supervisor in gross motor skills. Anecdotal observations revealed, however, that most of the baseline instructions given in gross motor skills were program-specific, e.g., "Hold the child's head when you turn her over," or, "Support his back like this when he sits that way." After inservice training and feedback, though, instructions to staff decreased, and observing increased. One explanation for the difference is that the gross motor skills supervisors were necessarily required to spend more time observing the specific teaching behaviors after they had received inservice training in order to discriminate and correct improper direct care staff behaviors. Conversely, during intervention the communication supervisor had to spend comparatively less time observing and more time instructing in order to change direct care staff behavior. In spite of the differences observed, data indicate that supervisors in both areas progressed toward a more balanced ratio of time spent observing and instruction, and provide some evidence suggesting that changes in direct care staff behavior were a function of changes in supervisor behavior.

A further note on supervisor data concerns the small number of intervals scored as "praise." On many occasions, praise statements to direct care staff were overheard after a formal session had ended; these were not recorded because data collection was discontinued at the end of programming sessions. However, the relatively infrequent occurrence of supervisor praise might not be surprising within the context of this study, where supervisors were present at all times to observe directly whether or not staff were following their instructions. Under such conditions, the stimulus control provided by the supervisor's presence would be expected to produce rather high levels of staff compliance, thereby reducing the necessity of providing frequent reinforcement/punishment to staff. This arrangement is quite different from one in which a supervisor attempts to improve staff compliance in his or her absence (e.g., Montegar, Reid, Madsen, & Ewell, 1977).

An issue related to supervisor stimulus control is that of staff reactivity due to intermittent experimenter and continuous observer presence throughout the study. Although it is impossible to determine the extent to which reactivity contributed to the present results, it is highly unlikely that: (a) experimenter/observer presence would account for more behavior change than

the presence of the supervisor, and (b) that reactive effects would produce enduring changes such as those seen in the present study. Also, in a recent study closely related to this one, Ivancic et al. (1981) provided data suggesting that behavior exhibited by direct care staff was similar under conditions consisting of overt and covert observation.

In summary, the approach used here appears both effective and applicable to other staff training endeavors. In addition, the study represents one of the most large-scale, comprehensive attempts at changing direct care staff behavior in the natural work environment. Future research is needed to refine the process by analyzing more specific components that are necessary for changing supervisor and subsequently direct care staff behavior. Future research should also examine methods of expanding the breadth of staff behaviors trained. Effective training procedures must be identified for changing direct care behaviors that occur in less circumscribed settings, such as those involved in daily interactions on the living unit.

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