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Evaluation and Training of Behavior Modification Skills in Institutional Staff: An Indirect Approach

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EVALUATION AND TRAINING OF BEHAVIOR MODIFICATION SKILLS IN INSTITUTIONAL STAFF:
AN INDIRECT APPROACH

by
Terry J. Page

A Dissertation
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
Degree of Doctor of Philosophy

Western Michigan University
Kalamazoo, Michigan
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Terry J. Page

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Western Michigan University

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INTRODUCTION

An extensive technology for promoting adaptive behavior changes in developmentally disabled populations has been developed and refined over the past 20 years. Methods based on operant principles have been empirically demonstrated to be effective in teaching a wide range of self-help behaviors such as toileting (Azrin, Bugle, & O'Brien, 1971; Azrin & Foxx, 1971, 1974), dressing (Minge & Ball, 1967), mealtime behaviors (Barton, Guess, Garcia, & Baer, 1970; O'Brien & Azrin, 1972; O'Brien, Bugle, & Azrin, 1972), and toothbrushing (Horner & Keilitz, 1975). The technology has been extended to modifying prosocial forms of behavior such as the acquisition of nonvocal language by multiply handicapped, retarded adults (Reid & Hurlbut, 1977), instruction following (Striefel, Bryan, & Aikens, 1974; Striefel & Wetherby, 1973), conversation among institutionalized peers (Wheeler & Wislocki, 1977), and greeting responses (Kale, Kaye, Whalen, & Hopkins, 1968; Stokes, Baer, & Jackson, 1974). Many inappropriate forms of behavior have also been successfully modified, including aggression (Bostow & Bailey, 1969), self-stimulation (Foxx & Azrin, 1973), and stealing (Azrin & Wesolowski, 1974). Recently, behavioral technology has been extended to teaching developmentally delayed persons a variety of skills necessary for successful community placement. Target behaviors have included pedestrian skills (Page, Iwata, & Neef, 1976), riding public transit buses (Neef, Iwata, & Page, 1978), leisure time skills (Johnson &
Bailey, 1977), housekeeping (Bauman & Iwata, 1977), money usage (Lowe & Cuvo, 1976), cooking (Bellamy & Clark, 1977), telephone usage (Leff, 1975), and clothing selection (Mutter & Reid, 1978).

In spite of the availability of proven behavior change methods, continued progress in the area of training developmentally disabled persons still faces a formidable hurdle. Because a considerable number of retarded persons reside in institutions, effective methods must be identified for training paraprofessional direct care personnel to implement programs within institutional settings. Direct care staff often number as much as 50% of an institution's employees (Iwata, Bailey, Brown, Foshee, & Alpern, 1976), and have more direct contact with residents than any other level of employee. Any systematic attempt to provide programming must, therefore, necessarily include direct care staff in a central role. Kazdin (1973a) in fact, has identified the need to develop effective staff training strategies as one of the most challenging problems facing behavior analysts in the field of developmental disabilities.

The role of direct care staff in an institutional setting has traditionally involved custodial care as the primary responsibility. The range of duties has entailed providing for residents' most basic needs, e.g., clean clothing, food, bathing. However, the concept of normalization (Wolfensberger, 1972), and recent litigation (Wyatt v. Stickney, 1972) and legislation (P. L. 92-223, Title XIX, Medicaid, for Intermediate Care Facilities for the Mentally Retarded and Persons with Related Conditions; P. L. 94-103, The Development
tally Disabled Assistance and Bill of Rights Act of 1975), have necessitated departures from the traditional role. Direct care staff are now expected to administer behavioral programs to teach independent self-help skills, rather than merely providing custodial care. In addition, responsibilities have been expanded to include the implementation of many other types of prescriptive programs available through a technology of behavioral programming.

The training of direct care staff to competently implement behavioral programming can be a troublesome undertaking. The direct care population of an institution is one of the lowest paid and least educated segments of employees. The mean turnover rate for direct care employees is estimated to be over 30% (Bensberg & Barnett, 1966), and absenteeism levels are considerably above those in most business and industrial settings (Zaharia & Baumeister, 1978).

In the germinal study on behavior analysis of staff behavior, Ayllon & Michael (1959) demonstrated that psychiatric nurses could be taught to respond differentially to "schizophrenic and mentally defective" patients. It was shown that changing the psychiatric nurses' behavior resulted in adaptive changes in the behavior of patients. Since the work of Ayllon & Michael, there have been many reported attempts at training attendant-level staff to more effectively manage the behavior of mentally ill and developmentally disabled populations.

One method initially recommended was to teach target skills
through inservice training (Bensberg & Barnett, 1966; Bensberg, Barnett, & Hurder, 1964; Fielding, Erickson, & Bettin, 1971). In-service training was shown to be effective in changing staff verbal skills regarding mental retardation (Cochran & Steiner, 1966), bringing about gains in basic information and improved attitudes (Johnson & Ferryman, 1969), and improving verbal skills in behavioral principles (Gardner, 1972a). Many of the reported approaches to staff training that relied on an inservice format suffered shortcomings in terms of documenting changes in the behavior of direct care staff, however. Although some investigators assessed employee performance on a pre-post basis (Gardner, 1972a; Gardner, Brust, & Watson, 1970; Panyan & Patterson, 1974; Watson, Gardner, & Sanders, 1971), few have examined behavior changes in a situation approximating the actual work environment. The dependent measures used by Cochran & Steiner and Johnson & Ferryman, for example, were obtained through administering trainees a survey, the SREB Information Survey and Opinion Scale (Bensberg & Barnett, 1966). Because performance on the survey reflected only verbal behavior and not job performance, the functional utility of inservice training for changing on-the-job performance was not demonstrated. Gardner (1972a) also relied on a similar measure of staff behavior, performance on a 229 item true-false test (BMT) on behavioral principles. While written measures can be informative regarding changed attitudes, and comprehension and retention of inservice material on the part of employees, ultimately, changes in job performance must be documented. Gardner
(1972b), in fact, concluded that while inservice training could be effective in changing verbal behavior, it often had little effect on practical application. Kazdin (1973a) has indicated a need not only for assessment of on-the-job performance, but also some documentation that acquired skills were being maintained over time in the work setting. Other studies in which staff or resident behavior was monitored under natural conditions have reported similar results. As discussed by Iwata et al. (1976), the use of instructions, training, and specific job assignments has been shown to have small (Martin, 1972), temporary (Hollander, Plutchik & Horner, 1973; Panyan, Boozer, & Morris, 1970), or negligible effects (Hollander & Plutchik, 1972; Katz, Johnson, & Gelfand, 1972; Quilitch, 1975) on actual job performance.

Several other approaches utilized an inservice training format, but extended and refined the didactic methods used. Gardner (1972b) investigated the relative effectiveness of lectures and role-playing during inservice training. Results showed that a group of direct care staff trained by role-playing, exhibited greater increases in behavior modification skills than a second group trained via a traditional lecture method. Unfortunately, the generalizability of employees' use of behavioral skills is questionable because data were collected while other direct care staff acted as residents, not during actual job performance. Panyan & Patterson (1974) demonstrated modeling to be more effective during inservice training than instructions alone or video feedback. Further, live modeling was
shown to be more effective than presenting a videotaped model.
Gladstone & Spencer (1977) examined the use of modeling only, and
found it to be an effective method of increasing contingent praise
statements by direct care staff. However, while modeling alone was
useful in improving the use of praise statements, the very circum­
scribed nature of the target behavior limits generalizability to
larger-scale training efforts. It remains an empirical question
whether such a procedure would prove practical when training the
entire repertoire of skills involved in implementing behavioral pro­
grams. Fabry & Reid (1978) demonstrated that a training package
consisting of instructions, prompts, modeling, and praise was ef­
f ective in teaching foster grandparents to train institutionalized
severely handicapped persons.

In one of the more innovative approaches to teaching behavior
modification skills, high-level retarded residents were trained to
bring about aversive behavior changes in other residents (Henker &
Whalen, 1969; Whalen & Henker, 1969, 1971). Training the residents,
however, was quite time-consuming, and may not be a practical alter­
native. The utility of the approach is further limited when serving
severely and profoundly retarded individuals.

Several investigators have examined the effects of information
feedback systems in training (Gardner, 1973). Under the rubric of
information feedback systems, Gardner discussed methods such as cue­
ing trainers via an earphone, the use of other signalling devices,
and audiovisual taping. Feedback has been used extensively in the

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staff management literature. The use of feedback has been shown to be effective in maintaining previously acquired staff behavior when presented orally (Montegar, Reid, Madsen, & Ewell, 1977), as well as through the display of pertinent data (Greene, Willis, Levy, & Bailey, 1978). As Gardner (1973) cautioned, however, its use in facilitating the acquisition of staff behaviors has not been fully determined.

In one attempt at using feedback as a training method, Cone & Sheldon (Note 1) analyzed the effectiveness of auditory cueing. After finding that viewing a training film had little effect on direct care staff teaching behaviors, an auditory prompting device was used to tell staff when to deliver antecedent and consequent verbal behavior to residents. The device was useful in changing direct care staff target behaviors in desired directions. Unfortunately, though, the procedure does not appear practical for training large numbers of employees. Cooper, Thompson, & Baer (1970) utilized a feedback system consisting of four levels to train preschool teachers to respond appropriately to children's behavior. The four levels of feedback, 1) definitions of appropriate behavior, 2) success rate per 10-min. period, 3) daily success rate, and 4) failure rate, were systematically introduced and significantly increased teachers' attending to appropriate behavior.

Additional studies have reported the use of feedback in conjunction with teaching methods. Steiner & Cochran (1966), for example, examined what they termed the simulated critical incident
technique. As used in the evaluation and training of direct care staff, this consisted of the following steps: 1) task-analyzing some aspect of an employee's job, 2) identifying those responses critical to successful performance, 3) setting up laboratory conditions where employees were asked to perform the job, 4) rating employees before and after correct methods were taught, and 5) giving immediate feedback on any errors upon completion of the post test. The simulated critical incident technique, while not still referred to as such, can be seen to serve as the basis for effective staff training. With the exception of rating employees in a laboratory situation, all the steps appear essential for effective training. However, because ratings were undertaken in a laboratory setting, generalizability to actual job performance could not be assured.

In another study relying on several teaching procedures, Gladstone & Sherman (1975) utilized a training package to teach generalized behavior modification skills to high school students working with retarded children. The package, implemented following repeated baseline measures, consisted of videotaped modeling, behavioral rehearsal, and corrective feedback and praise. The Gladstone & Sherman study was important in several respects. First, it reported the successful evaluation and modification of specific teaching behaviors measured under normal situations. Second, data on the retarded children's improved performance were reported. Third, generalization of trainee skills were documented; the high school students were able to teach different children to follow instructions they had not been
trained to teach. While the model presented in the Gladstone & Sherman study is encouraging, the fact that high school students were trainees, and not direct care paraprofessionals, dictates cautious interpretation.

In a related area, several investigators have examined methods of training teachers to use behavioral principles. Barnard, Christopherson, & Wolf (1974), for example, reported the successful application of a supervisory skill package to the teaching behaviors of paraprofessional tutors in a remedial reading program. The package, consisting of written handouts and instructions, tests, videotapes, feedback from supervisors, and publicly posted feedback, was effective in producing marked changes in tutors' completeness, some improvements in their accuracy, but none in their promptness.

In another important contribution to the staff training literature, Koegel, Russo, & Rincover (1977) reported the development of a reliable, valid instrument for assessing behavior modification skills used by teachers of autistic children. Using operational definitions of correct teaching behaviors, Koegel et al. assessed teachers' baseline performance, and then trained target skills by way of a written training manual, video tapes, and intermittent verbal feedback. The study was particularly important because, as did Gladstone & Sherman (1975), it reported the successful evaluation and modification of specific teaching skills. In addition, results showed that teachers generalized learned skills to teaching other behaviors, and maintained skills for up to four months after train-
In a different approach to training teachers, Jones, Fremouw, & Carpioes (1977) validated the effectiveness of pyramid training. Three teachers were trained in a classroom management skill package, with each subsequently training three other teachers to use the same package. The primary dependent variables, student disruptiveness and productivity were shown to change in desired directions as teachers were exposed to training in the use of the skill package.

The primary purpose of the present investigation was to demonstrate the effectiveness of an indirect approach to teaching behavioral programming skills to direct care employees. Specifically, direct care staff teaching behaviors in the form of instructions, prompts, and consequences were the dependent measures. As indicated, the preponderance of staff training literature to date has relied on targeting staff behavior directly. That is, staff behavior has been identified as deficient in some respects, with subsequent training undertaken to directly change behaviors in desired directions. An exception to the direct approach was the pyramid training of Jones et al. (1977). While effective in changing teacher behaviors, pyramid training and similar indirect approaches have not been shown to be successful with paraprofessional institutional employees. This study examined an indirect method of staff training. Direct care staff were trained indirectly by way of intervening on supervisory personnel. Supervisors were trained to change ongoing direct care staff teaching behaviors in the actual work environment. Dependent variables related to the performance of direct care staff were the
use of correct instructions, prompts, and consequences while implementing educational programs with residents. Dependent measures of supervisors' behavior were the extent to which they observed direct care staff conducting programs, and their use of praise, corrections, and instructions when interacting with the direct care staff. A major advantage of such an indirect approach, if successful, would be a saving in terms of training time. Because the number of supervisory personnel is small, relative to direct care staff members, the number of employees requiring direct structured intervention is greatly reduced. A second advantage consists in the fact that supervisors can accomplish training in the work environment, where the behaviors are ultimately expected to occur. As such, generalization from a training setting to the work environment need not be programmed. A third advantage concerns the problem of maintaining behavioral changes over time in the work setting, a critical consideration in any staff training endeavor. With the indirect approach proposed here, supervisors, once they were trained, would be present in the work setting to maintain behaviors acquired by direct care staff.

A related purpose was to assess generalization of direct care staff behaviors to novel settings. Generalization was assessed in a different work setting than the one in which training took place, where employees taught residents a different class of behaviors.

The third purpose was to assess collateral changes in resident behaviors as a result of training direct care staff to implement behavioral programs. Data were collected on several classes of
resident behaviors during programming times, as well as their correct responses to the training tasks.
METHOD

Setting

The investigation took place at a 90 bed residential and outpatient facility serving the severely and profoundly developmentally disabled. Ninety percent of the population were children under 18 years of age.

The specific setting for the experiment was an in-house school program for the facility’s residents either too young (under 5 years) or too old (18 years and older) to attend special education classes in the public school system. The author was responsible for directing the operation of the program. While attending the in-house school, residents received one-to-one instruction in several areas. Adults were provided speech, recreation, and occupational therapy. Preschool residents received training in communication, gross motor development, and sensory stimulation.

Educational programs were written by professionals from the appropriate discipline (e.g., Speech and Hearing Therapist in speech and communication, Occupational Therapist in occupational therapy and sensory stimulation, Recreation Therapist in recreation, and Physical Therapist in gross motor development). Programs were prescriptive in nature, and part of each resident’s overall Individual Program Plan (Accreditation Council for Facilities for the Mentally Retarded; Public Law 92-223, Title XIX). Programs were administered by direct care staff under the supervision of professionals.
Each day when direct care staff reported to the school setting, they selected a resident with whom they would work that day. In each area, supervisors gave direct care staff a written description of the program for the resident they had selected, and a brief verbal description of how the program should 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 trials. Taped instructions were as follows for each trial: "Begin trial," at which point direct care staff were to present stimulus materials, verbal instructions, and if necessary, prompts; after a 30-second interval the tape instructed direct care staff, "End trial," after which praise was to be delivered to those residents who had responded correctly; 5-seconds later the tape instructed, "Record plus (if correct response had occurred), minus (for incorrect responses), or zero (if no response had occurred);" 10-seconds later the next trial began. Each session, 25 trials were conducted within the framework of the 45-second intervals described above.

In communication, two types of programs were run on alternate days. Expressive language programs attempted to facilitate increases in residents' vocal language; for most of the residents, this consisted of providing reinforcement for random vocalizations. Receptive language programs were designed to bring residents' motor behavior under control of vocal instructions; for example, presenting two visual stimuli (ball and shoe), instructing the
resident to touch one, and providing reinforcement for the correct response. Both types of programs were tailored to individual resident's particular deficit areas. Gross motor skill programs were also individualized and included procedures aimed at increasing head control, independent sitting and standing. At least one professional was present in each area to function in a supervisory capacity. Primary supervisor responsibilities were monitoring appropriateness of program content and direct care staff teaching techniques, as well as generally overseeing their particular 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 regarding the implementation of specific programs. For example, supervisors informed direct care staff how to conduct an object identification component of a receptive language program by describing the following steps: 1) put a cup and a shoe on the table and tell the resident to touch one of them, 2) if a correct response is made, praise the resident, 3) if an incorrect response is made, prompt the resident to touch. Thus, while instructions were provided to direct care staff, they pertained only to the specific behaviors involved in conducting individual programs. The instructions were not sufficiently specific to address the behaviors comprising effective behavioral programs. 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 residents on different days, there was little, if any, consistency in program implementation from one day to the next.

**Subjects**

**Supervisors.** Three persons in supervisory positions participated. All were subordinate to the author. One worked in the Speech and Hearing Department, and two in Physical Therapy. The supervisor from Speech and Hearing had a bachelor's degree and was working on a masters degree in Special Education at the time of the study. The Physical Therapy supervisors were both completing their bachelor's degree and were technically considered Rehabilitation Therapy Assistants. All three supervisors were female and ranged in age from 21-24 years. None had any formal training in behavioral programming techniques.

**Direct Care Staff.** Forty-seven direct care staff were included as participants. Four were male and 43 were female with their approximate ages ranging from 18-63 years. Although formal records of years of education were unavailable, informal assessment revealed that ten had not completed high school, one was a college graduate, and the remainder had high school educations. The author retained supervisory authority over direct care staff when they worked in the school program. Primary responsibilities of direct care staff were attention to residents' basic needs and the implementation of programs designed to teach self-help skills (dressing, feeding, toilet-
ing, washing, etc.) on the living units. In addition, staff were regularly assigned to work in the school program on a rotating basis. Each day approximately 15 of the 35 total staff of the day shift were scheduled to work in the school, where they implemented educational programs with residents under the direction of the supervisors in each area. Direct care staff were assigned to work in the school setting by their respective unit supervisor on a rotating basis. While unit supervisors 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 sometimes unequal numbers of work days between one assignment to the school and the next assignment.

Residents. Four residents aged 3, 3, 4, and 19 yrs. participated. These four residents comprised one of the two preschool groups. All were classified as profoundly mentally retarded, had no functional expressive speech, and limited receptive repertoires. None of the residents were ambulatory, nor did they exhibit independent toileting skills. All had progressed through various stages of a self-feeding program. They were selected primarily because they were the higher functioning of the two preschool groups, and, hence, their responding to programs was more conducive to reliable observations.

Data Collection

Three types of observation systems were employed to assess characteristics of programming in the school setting. The three systems yielded data on supervisors, direct care staff, and
Supervisors. A combination 30-second momentary time-sampling and 10-second partial interval procedure was used to observe behaviors exhibited by the supervisor in each area during the times active programming was being conducted by direct care staff. A time-sampling procedure dictates that observers look at a subject at the end of prescribed intervals and record the occurrence or nonoccurrence of a predetermined response class, or classes. When using a partial interval observation system, observers watch a subject for the duration of a prescribed interval and record whether a predetermined response, or responses, occurred at any time during the interval. Both are widely used observational methods in applied behavior analysis research (Powell, Martindale, Kulp, Martindale, & Bauman, 1977; Repp, Roberts, Slack, Repp, & Berkler, 1976). The two procedures were combined to collect data in the manner described below. An observer located in a position to observe all four direct care staff/resident pairs in an area was aurally cued by a cassette tape at the start of successive 10-second intervals. Cueing was done with an earplug to avoid obtruding on program implementation. Observers were cued to observe the supervisor at the start of every third interval or every 30-seconds. During the remaining intervals, individual residents also were observed on a 30-second time-sampling basis (as described below). The following categories of supervisor behavior were scored (under each category are operational definitions of behaviors which would be instances of the more general category).
1. **Praise**

   a. **Praise for on-task:** Approval statement was related to direct care staff engaging in programming related work. Examples of this could include arriving on time, paying attention to taped instructions, or any instance of training, stimulation, direct or indirect care. Not included were behaviors directly related to qualitative aspects of program implementation as described below.

   b. **Praise for programming:** Praise was in response to some qualitative aspect of direct care staff implementing an educational program. Examples include the quality or quantity of instructions, prompting, shaping, fading, reinforcing responses, using extinction, timeout, or any other behavior principles relevant to a program.

   c. **Praise for other behaviors:** Praise pertained to non-programming related behavior of direct care staff. Examples include comments about clothing, appearance, job performance in some area other than the school setting, and any other positive interactions directed toward direct care staff not covered in the on-task and programming categories.

2. **Correction**

   a. **Commission:** Providing comments to direct care staff
concerning a commission of an error on the part of that person. The error may have been related to on-task behavior or program implementation. Examples include feedback for talking inappropriately with another direct care staff, presenting a trial incorrectly, reinforcing an incorrect response, etc.

b. Omission: Comments to direct care staff regarding failure to engage in some behavior. The behavior in question may have been related to on-task or program implementation. Examples include failure to reinforce, not recording data, etc.

3. Instructions
   a. Question/Answering: Supervisor response to question by direct care staff that pertained to programming or supervisor listening to direct care staff asking a question.
   
   b. Interaction with resident: Any verbal or physical interaction between supervisor and resident during which direct care staff assigned to that resident was present.
   
   c. Neutral instruction: Providing information to direct care staff that did not fit into the Praise or Correction categories. This applied to instances in which the supervisor's comments were independent of the preceding direct care staff's behavior, e.g., in-
forming a staff member that a program had been changed.

4. **Direct Interaction**
   a. Interaction with resident: Included any direct contact, physical or verbal between supervisor and a resident, during which the assigned direct care staff was not present.

5. **Observing**
   a. Attending to direct care staff: Observing direct care staff conduct programs. General observation of more than one direct care staff was scored in this category, but only if supervisor's head was oriented toward direct care staff and supervisor was within 15 feet of resident.

**Resident Behaviors During Programming.** The 30-second momentary time-sampling and 10-second partial interval procedure described for supervisors also yielded data on behaviors exhibited by the four residents during active programming. The same observer who collected supervisor data also collected resident data, according to the following definitions:

1. **Appropriate attending**
   a. Responding: Resident was actively responding to instructions or prompts of direct care staff or supervisor.
   b. Passive compliance: (Applied only to gross motor skill programming). Resident was complying with physical guidance by direct care staff or supervisor to
the extent that he/she was not resisting or disrupting, either vocally or motorically; to be scored only if resident was involved in programming.

c. Vocalizations: (Applied only to expressive communication). Resident was emitting vocalizations that could be heard from a distance of 15 feet. This did not include crying or screaming, which are scored as noise (see below).

2. Aggression
   a. People: Any instance of striking, kicking, pulling hair, spitting, directed at another person, either staff or resident.
   b. Objects: Any instance of aggression with or against inanimate objects, e.g., throwing stimulus materials or toys, pounding them on the table, floor or other surface, or striking at them.

3. Disruption
   a. Motor behavior: Motor behavior that disrupted training, or that was inappropriate regardless of the circumstances, e.g., movement of body parts.

4. Noise
   a. Inappropriate vocalizations: Any disruptive noise emitted by resident. This would include primarily crying and screaming.

5. Other
   Any resident behavior that did not fit into any of the
above categories.

**General Guidelines:**

1. Aggression, disruption, or noise were scored if they occurred at any time during an interval.

2. Attending was scored only if aggression, disruption, and noise had not occurred during the interval, and attending had occurred during part of the interval.

**Direct Care Staff Teaching Behaviors.** The quality with which educational programs were administered by direct care staff was assessed by way of 45-second partial interval observations. Each of the four direct care staff in an area was observed for 45-seconds with an observer judging the staff's use of instructions, prompts, and consequences.

Direct care staff's instructions, prompts and consequences were scored according to the criteria outlined below.

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. Any responses on the part of the trainer subsequent to the initial instruction and prior to the resident's response, were considered prompts.

   a. The instruction was clear and discriminable and occurred after a pause of at least 1-second when no vocal behavior was directed toward the student.

   b. The instruction specified the desired response, e.g.,
"Herb, touch the ball", not "Herb - ball."

c. The instruction was uninterrupted.

d. When the instruction was presented, the resident was attending to the trainer, i.e., head and eyes oriented toward the trainer or task materials. If resident was not attending, trainer prompted this. Not applicable for the administration of attending programs or physical therapy programs in which resident was positioned in such a way as to make visual attending impossible, e.g., lying on stomach.

e. When an instruction initiating a trial was presented, the response was not manually guided.

2. Prompts: A prompt was considered any trainer response that occurred subsequent to the initial instruction that attempted to evoke the desired response. Thus, a prompt could have been verbal and consisted of either repeating the instruction or a variation, gestural consisting of pointing or gesturing intended to evoke the response, or physical consisting of manually guiding the resident to perform the correct response.

   a. Whenever a physical prompt was used, it occurred to the extent that it evoked a correct response.

   b. Simultaneously with a physical prompt being delivered, the desired response was specified verbally.

   c. A prompt was not delivered sooner than 5-seconds after the initial instruction, or previous prompt, in order
to allow the resident time to respond.

3. **Consequences**
   a. Consequences were immediate, i.e., within 2-seconds of a response.
   b. Consequences were unambiguous. Saying "no" with a smile, or "good girl" with a frown was considered ambiguous.
   c. Consequences were contingent, i.e., only positive consequences following correct responses and ignoring or verbal negatives following incorrect responses, or no response.
   d. Positive events were not provided to residents prior to their responding, or if only a partial response had been made.
   e. If edible or material reinforcers were used, their delivery was accompanied by verbal praise.
   f. 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 a continuous interaction until the end of the trial, or if there was at least one positive interaction independent of the reinforcement for correct responding.
   g. Any correct responses, even those physically prompted, were followed by positive consequences.
If any of the components were performed incorrectly, the entire behavior (i.e., instruction, prompt, or consequence) was scored incorrect for that trial.

**Resident Correct Responses.** The observer who rated the quality of programs implemented by direct care staff also scored responses of the four residents. Residents were observed in the same manner as direct care staff, i.e., 45-second intervals. Responses were scored as either correct, incorrect, prompted, or no response according to the criteria outlined below:

1. **Correct:** Resident performed response as specified in program, within the specified amount of time.
2. **Incorrect:** Resident emitted some response following instruction from direct care staff; however, response did not meet criteria specified in program, either in terms of topography or latency.
3. **Prompted:** Resident emitted correct response, as specified in program, but did so only with assistance of trainer.
4. **No Response:** Resident failed to emit response following instruction or prompt from direct care staff.

There were, thus, two separate observation systems used during each session. The sequence of observation intervals is shown for both systems in Table 1. Observer A recorded data on supervisor and resident behaviors during programming, while Observer B scored direct care staff teaching behaviors and resident correct responses. With both observation systems, a sequential schedule of sampling (Thompson, Holmberg, & Baer, 1974) was employed. After sampling the behavior of

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Table 1: Sequence of scheduled observations for Observers A and B during daily data collection sessions in communication and gross motor skills.
### Table 1
Sequence of Scheduled Observations

<table>
<thead>
<tr>
<th>Interval</th>
<th>Observer A</th>
<th>Interval</th>
<th>Observer B</th>
<th>Subjects Observed</th>
<th>Subjects Observed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Length</td>
<td>Subjects Observed</td>
<td>Length</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>10-sec.</td>
<td>Resident 1</td>
<td>1</td>
<td>45-sec.</td>
<td>Direct Care Staff-Resident 1</td>
</tr>
<tr>
<td>2</td>
<td>10-sec.</td>
<td>Resident 2</td>
<td>2</td>
<td>45-sec.</td>
<td>Direct Care Staff-Resident 2</td>
</tr>
<tr>
<td>3</td>
<td>10-sec.</td>
<td>Supervisor</td>
<td>3</td>
<td>45-sec.</td>
<td>Direct Care Staff-Resident 3</td>
</tr>
<tr>
<td>4</td>
<td>10-sec.</td>
<td>Resident 3</td>
<td>4</td>
<td>45-sec.</td>
<td>Direct Care Staff-Resident 4</td>
</tr>
<tr>
<td>5</td>
<td>10-sec.</td>
<td>Resident 4</td>
<td>5</td>
<td>45-sec.</td>
<td>Direct Care Staff-Resident 1</td>
</tr>
<tr>
<td>6</td>
<td>10-sec.</td>
<td>Supervisor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>10-sec.</td>
<td>Resident 1</td>
<td>24</td>
<td>45-sec.</td>
<td>Direct Care Staff-Resident 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120</td>
<td>10-sec.</td>
<td>Supervisor</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
all subjects (supervisor and four residents for Observers A and four direct care staff and residents for Observer B) during the appropriate interval, the identical schedule was repeated for the remainder of each session.

**Observer Training.** A total of six employees of the facility participated as observers throughout the course of the study. Four were research assistants, one was a clerk, and the remaining one was the author. Observer training consisted of the following procedures: (1) reading response definitions; (2) being told how data were to be recorded on the data sheets; (3) viewing a video tape of programs being run by direct care staff in the school setting, and recording data on the actual data sheet; (4) practicing data collection in the school setting, with feedback and discussion after each interval of recording; and (5) recording data in the school setting under regular data collection conditions. When observers met a criterion of three consecutive sessions with 80% agreement on occurrence, they were considered trained. Any possibility of observer bias was reduced by the fact that new observers were introduced intermittently throughout the study and trained to criterion (Kazdin, 1977).

**Reliability.** Reliability of the observation system was assessed by calculating interobserver agreement on all dependent measures described above. A second observer independently scored at least one third of all sessions simultaneously with each primary observer. Following sessions in which reliability was assessed, observers' records were compared, and agreements and disagreements tallied. For supervisor and resident behavior during programming, an agree-
ment was scored when both observers had recorded the same behavior as occurring during a given interval. A disagreement was scored for any interval in which observers recorded different behaviors. Interobserver agreement was assessed on praise, corrections, instructions, direct interactions, and observing for supervisors. For resident behaviors, agreement was assessed on two categories, 1) attending and 2) the total of aggression, disruption, and noise. For direct care staff teaching behaviors, interobserver agreement was assessed on instructions, prompts, and consequences, with an agreement scored for each interval in which observers agreed on the correctness or incorrectness of the behaviors. A disagreement was scored whenever one observer recorded a behavior as correct and the other observer scored the same behavior as incorrect. For resident correct responses, an agreement was scored for those intervals in which observers agreed a correct response had either occurred or not occurred, and a disagreement was scored when only one observer recorded a correct response as occurring.

After summing agreements and disagreements, the following indices of interobserver agreement were determined: 1) interval agreement, calculated by dividing the total number of agreements by agreements plus disagreements, and multiplying by 100; 2) occurrence agreement, calculated by dividing the number of agreements on occurrence of responses by agreements on occurrence plus disagreements, and then multiplying by 100; 3) nonoccurrence agreement, calculated by dividing the number of agreements on nonoccurrence of responses by agree-
ment on nonoccurrence plus disagreements, and multiplying by 100
Hartmann, 1977; Hawkins & Dotson, 1975; Hopkins & Hermann, 1977;
Kelly, 1977).

For individual direct care staff teaching behaviors in both
communication and gross motor skills, agreement was: 84%, 83%, and
86% for interval, occurrence, and nonoccurrence agreement, respec­
tively, on instructions; 82%, 70%, and 87% for interval, occurrence,
and nonoccurrence agreement, respectively, on prompts; 87%, 77%, and
91% for interval, occurrence, and nonoccurrence agreement, respec­
tively, on consequences. Interval, occurrence, and nonoccurrence
agreement in the communication area only were: 81%, 83%, and 79%,
respectively, for instructions; 84%, 71%, and 89%, respectively, for
prompts; and 90%, 83%, and 93%, respectively, for consequences. In­
terval, occurrence, and nonoccurrence agreement in the gross motor
skills area only were 89%, 83%, and 92%, respectively, for instruc­
tions; 83%, 68%, and 39%, respectively, for prompts; and 84%, 68%,
and 89%, respectively, for consequences.

Procedures

Baseline. During baseline, data were collected in the communi­
cation and gross motor areas on (1) supervisor behavior; (2) direct
care staff teaching behaviors; (3) resident behaviors during pro­
gramming; and (4) resident correct responses. Data were collected
as four direct care staff implemented individualized programs with
four residents. At least one supervisor was present in an area to
monitor training by direct care staff. Supervisors and direct care

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staff were aware of the presence of observers in each area.

**Supervisor Training.** Intervention consisted of training supervisors in the essentials of correct direct care staff teaching behaviors and prompting them to assume more active supervisory positions in their respective areas. Data collection was continued in each area. Training was accomplished via three 30-minute workshop training sessions. Each session was conducted by the author and consisted of reading written handouts, followed by a brief discussion of accepted methods of teaching developmentally delayed children, followed by descriptions of supervisory methods that could be used in changing teaching behaviors of direct care staff. When describing correct teaching behaviors, the author paraphrased the descriptions on the written handout, which were identical to the operational definitions used by observers (see Direct Care Teaching Behaviors). A sample written handout is included in Appendix A.

The first workshop following baseline was focused on 1) correct ways for direct care staff to present instructions while implementing programs with residents, and 2) behavioral supervisory techniques. Supervisors were told that baseline observations had highlighted several deficiencies in direct care staff teaching behaviors, and that as supervisory personnel, they should attempt to remedy the problems. First, desired methods of direct care staff presenting instructions to residents were discussed. Supervisors were told to observe the direct care staff in their area more closely, and try to bring direct care staff instructions to residents more in line with the targeted behaviors. Next, specific strategies that super-
visors could use in changing direct care staff behavior were discussed. The importance of clear instructions, descriptive praise, and constructive feedback were explicitly stated and supervisors were instructed to incorporate such methods into their daily supervision routines. In addition, relevant examples of hypothetical problems and suggested supervisory strategies were presented.

The second training session centered on correct components of prompting residents. The format was identical to that used to train correct instructions except that behavioral supervisory techniques were not discussed.

During the third inservice, supervisors were taught the correct aspects of providing consequences to residents. The format was identical to that of the second session.

**General Feedback.** Beginning with supervisor training on correct instructions, a general feedback condition was in effect. Each day, prior to the beginning of school, supervisors were given feedback by the author regarding the performance of direct care staff in their area the previous day. For example, a supervisor being given general feedback 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 the teaching behaviors on which the supervisors had re-
ceived training. Thus, after supervisor training on instructions, daily general feedback was limited to direct care staff use of instructions. After supervisor training on prompts, feedback was given regarding prompts, as well as instructions. After supervisor training on consequences, feedback took the form of information on all three teaching behaviors. Feedback sessions varied in length from one to twelve minutes.

Specific Feedback. After supervisors had been trained in all three correct teaching behaviors, and if direct care staff in their area were not achieving at least 80% correct teaching behaviors daily, specific feedback was begun. Specific feedback sessions were identical in format to general feedback sessions with the following exceptions. Specific feedback took the form of showing the supervisor data collected the previous day on direct care staff teaching behaviors as well as data collected on residents and the supervisor herself. Instances of correct and incorrect teaching behaviors on the part of the direct care staff in their area were discussed. In addition, supervisors were told of the goal of 80% correct teaching behaviors.

Maintenance. When correct teaching behaviors were at least 80% in an area (communication or gross motor skills), a maintenance condition was begun in that area. During maintenance, supervisors were told to continue their supervision of direct care staff. Data were collected five days a week but feedback to supervisors was reduced to two days per week. The feedback was identical in nature to that during the specific feedback condition. This condition was imple-
mented in the communication area only; it could not be introduced in gross motor skills due to the end of the school year.

Data Analysis

Analysis of data in applied behavior analysis research typically takes the form of within-subject comparisons (Baer, 1977; Hersen & Barlow, 1976; Risley, 1970). Two criteria for change have been posed for evaluation by way of within-subject methodology (Risley, 1970). The first, experimental evaluation, refers to a comparison of behavior before and after some intervention. The comparison is accomplished through a visual inspection of graphically displayed data. When behavior can be seen to have occurred at an acceptably higher (or lower) level after intervention has been systematically applied, experimental control can be inferred. The second criterion, clinical evaluation, addresses the question of whether behavior has changed in a clinically, or therapeutically, significant way. Clinical evaluation refers to whether the behavior of subjects in an experimental investigation has changed to a degree that is therapeutically beneficial to them. As with experimental evaluation, clinical evaluation is accomplished via inspection of data. While both types of evaluation are similar in that they involve a determination of whether behavior has changed to an acceptable degree, different criteria are invoked in judging the significance of change. For example, if self-abusive behavior can be seen to have decreased from a rate of 100 per hour to 75 per hour after some intervention has been systematically applied, an acceptable experimental change might be inferred.
The clinical significance of the change would be questionable, however, due to the high rate at which the harmful behavior can still be seen to occur. In this example, clinical significance would be achieved only through changing the rate of self-abusive behaviors to a point where the subject's potential for risk is greatly reduced from the baseline level.

Sidman (1960) has termed the visual analysis of graphically displayed data, criterion-by-inspection, and recommended its use. Hersen & Barlow (1976) further emphasized the acceptability of visual inspection, and indicated that evaluation via inferential statistics has not been regarded as essential in assessing therapeutic change in applied behavior analysis research. Other authors have also presented compelling arguments eschewing inferential statistical analyses of data in favor of visual inspection. Baer (1977) for example, discussed the advantages and disadvantages of within-subject designs versus group-designs. Baer's arguments relate closely to the criterion of clinical significance proposed by Risley (1970). In order for treatment to affect behavior in a clinically significant fashion, the effect must be an observable one. If visual inspection of data does not allow for a conclusion of significant change, then clear-cut therapeutic benefits to the subject have probably not been achieved, regardless of the level of statistical significance computed. As discussed further by Parsonson & Baer (1978), visual inspection will allow for both experimental and clinical evaluation of obtained results.
Experimental Design. Two different multiple baseline designs (Baer, Wolf, & Risley, 1968; Hersen & Barlow, 1976; Kazdin, 1973b; Pechacek, 1978) were used to show functional control over behaviors in the school setting, and allow for an examination of any generalization. Control of supervisor behavior was analyzed through a multiple baseline design across subjects, the communication supervisor and the two gross motor skills supervisors. In addition, a multiple baseline across behaviors, correct teaching behaviors within each area (communication and gross motor behaviors), was used to show control of direct care staff behavior.

After the collection of baseline data, supervisor training was begun with the communication supervisor, while the supervisors in gross motor skills remained under baseline conditions. After training and specific feedback were completed with the communication supervisor, both gross motor skills supervisors were exposed to training and specific feedback conditions.

Within each training area (communication and gross motor skills), direct care staff correct teaching behaviors received intervention within the framework of a multiple baseline design. Following baseline, supervisor training to modify direct care staff teaching behaviors was begun, only on instructions, with prompts and consequences remaining under baseline conditions. After a change occurred in instructions, the category of prompts was exposed to intervention, with consequences remaining under baseline conditions. Consequences were the target of intervention only after a change had occurred with prompts.
Additionally, the use of the two multiple baseline designs described above made it possible to examine generalization of direct care staff correct teaching behaviors from communication to gross motor skills. When direct care staff teaching behaviors were exposed to intervention in communication, they were still under baseline conditions in the gross motor skills area. Thus, any generalization of skills from communication to gross motor skills would show up in increases in correct teaching behaviors in the latter area.

Duration of Conditions

Total length of the study was approximately 6 mos. The first day of baseline data collection was Dec. 4, 1978 in communication and Dec. 5, 1978 in gross motor skills. Supervisor inservice training on instructions and general feedback were implemented in communication on Jan. 18, 1979. (Data collection was discontinued from Dec. 13, 1978 to Jan. 3, 1979 because the school was not in operation due to the holiday season.) On Feb. 9, 1979, the communication supervisor was given inservice training on prompts. Consequences inservice training in communication was implemented on March 9, 1979, and specific feedback started on April 16, 1979. Instructions inservice and specific feedback were instituted in gross motor skills on April 30, 1979. On May 9, 1979, maintenance was begun in communication. Inservice training on prompts and consequences in gross motor skills occurred on May 29, 1979. June 6, 1979 was the final day of data collection.
RESULTS

The effects of supervisor training on direct care staff teaching behaviors are shown in Figure 1. Percent correct instructions, prompts, and consequences are plotted across blocks of two sessions. The number of daily trials observed varied from 16 to 24 and the number of staff varied from two to four. Correct instructions were at a mean level of 23% during baseline, with a range of 0-63%. Following supervisor inservice training and the introduction of general feedback, instructions increased to a mean 75% correct; the range was 29-100%. Correct instructions increased further during specific feedback, to a mean of 93% and a range of 79-100%. During the maintenance condition, an increase to a mean 94% correct, with a range of 75-100%, occurred. Similar increases can be seen for correct prompts. Supervisor inservice training and the introduction of general feedback for prompts were followed by a mean increase to 44%, from a baseline level of 4%; the increase in ranges was from 0-44% during baseline to 4-82% following intervention. Similar, though less marked, changes can be seen for correct consequences. The baseline mean was 38% with a range of 0-100%, while following intervention the mean was 65% correct with a range of 0-100%. Specific feedback resulted in a mean 63% correct consequences and a range of 40-100%. During maintenance, there was an increase to a mean 66%, with a range of 0-88%. The one day on which zero correct consequences occurred was when a new staff member was in the
Figure 1: Percent correct direct care staff teaching behaviors in communication. Percent correct instructions, prompts, and consequences are plotted across blocks of two sessions.

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setting. 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.

Direct care staff teaching behaviors in gross motor skills are shown in Figure 2. Percent correct instructions, prompts, and consequences are plotted across blocks of two sessions. The number of daily trials observed varied from 18 to 24. Correct instructions increased from a baseline mean of 21% and range of 0-55% to a mean of 80% and range of 29-100% following supervisor training and the introduction of specific feedback. Similar increases can be seen for correct prompts. The baseline mean of 27% correct and range of 0-82% correct improved to a mean of 88% and range of 75-100%. Correct consequences in the gross motor skills area also showed changes following supervisor inservice training and the introduction of specific feedback. The baseline mean was 38% correct with a range of 0-100%, while the mean was 76% following intervention, with a range of 45-91%. Because of the limited data available for correct prompts and consequences following intervention in the gross motor skills area, cautious interpretation of changes in these variables may be necessary. However, the fact that these two teaching behaviors did change in desired directions is encouraging.

Thus, specific direct care staff teaching behaviors all showed improvement as a result of intervention. Correct instructions, prompts, and consequences increased when supervisor inservice training and feedback conditions were implemented. The increases were at least two-fold in all but one case (consequences in communica-
Figure 2: Percent correct direct care staff teaching behaviors in gross motor skills. Percent correct instructions, prompts, and consequences are plotted across blocks of two sessions.
Figure 2

SUPERVISOR TRAINING & SPECIFIC FEEDBACK

INSTRUCTIONS

PROMPTS

CONSEQUENCES

PERCENT CORRECT TEACHING BY DIRECT CARE STAFF IN GROSS MOTOR SKILLS

BLOCKS OF TWO SESSIONS

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tion), and much more in others (e.g., from 4% to 44% with prompts in communication). The criterion of 80% correct was achieved for instructions in communication (94%), and instructions (80%) and prompts (88%) in gross motor skills. Criterion was not met for prompts (77%) and consequences (66%) in communication, and for consequences in gross motor skills (76%).

Table 2 shows the percent of 10-sec. intervals during which supervisors were observed praising, giving instructions to direct care staff, interacting directly with residents, and observing. The number of daily intervals observed varied from 20-40, but was 36 or more during 93% of all sessions. The communication supervisor was observed giving instructions only 10% of all intervals and observing 87% of intervals during baseline. Direct interaction with residents was observed during .6% of intervals, and praise statements were never recorded. As the communication supervisor was exposed to in-service training and feedback conditions, instructions to staff became more prevalent and observing decreased, to 44% and 56%, respectively, during the specific feedback condition. In the maintenance condition, instructions to staff decreased to 26% of intervals, and observing increased to 67%. Direct interactions with residents continued to occur infrequently, and few praise statements were recorded. No correction statements were recorded for the communication supervisor throughout the course of the study.

As can be seen in the bottom portion of Table 2, different results were obtained with supervisors in gross motor skills. During baseline, instructions to staff were recorded in 77% of the intervals,
Table 2: Percent of 10-sec. intervals during which communication supervisor (top portion) and two gross motor skills supervisors (bottom portion) were scored as praising, giving instructions to staff, interacting directly with residents, and observing.
Table 2

Number and Percent (in parentheses) of Intervals Supervisors were Scored as Praising, Giving Instructions, Directly Interacting with Residents, and Observing

<table>
<thead>
<tr>
<th>Communication</th>
<th>Total Intervals</th>
<th>Praise</th>
<th>Instructions</th>
<th>Direct Interactions</th>
<th>Observing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>508</td>
<td>0 (0)</td>
<td>49 (10%)</td>
<td>3 (.6%)</td>
<td>440 (87%)</td>
</tr>
<tr>
<td>Instructions Inservice(^a)</td>
<td>492</td>
<td>2 (.4%)</td>
<td>127 (26%)</td>
<td>3 (.6%)</td>
<td>324 (66%)</td>
</tr>
<tr>
<td>Prompts Inservice(^a)</td>
<td>583</td>
<td>5 (.9%)</td>
<td>154 (26%)</td>
<td>32 (5%)</td>
<td>416 (71%)</td>
</tr>
<tr>
<td>Consequences Inservice(^a)</td>
<td>606</td>
<td>1 (.2%)</td>
<td>215 (35%)</td>
<td>3 (.5%)</td>
<td>372 (61%)</td>
</tr>
<tr>
<td>Specific Feedback</td>
<td>500</td>
<td>1 (.2%)</td>
<td>220 (44%)</td>
<td>0</td>
<td>279 (56%)</td>
</tr>
<tr>
<td>Maintenance(^b)</td>
<td>555</td>
<td>1 (.2%)</td>
<td>147 (26%)</td>
<td>3 (.5%)</td>
<td>374 (67%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gross Motor Skills</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>2,150</td>
<td>0 (0)</td>
<td>1,659 (77%)</td>
<td>126 (6%)</td>
<td>411 (19%)</td>
</tr>
<tr>
<td>Instructions Inservice(^b)</td>
<td>568</td>
<td>0 (0)</td>
<td>253 (45%)</td>
<td>0 (0)</td>
<td>316 (56%)</td>
</tr>
<tr>
<td>Prompts &amp; Consequences Inservice(^b)</td>
<td>250</td>
<td>0 (0)</td>
<td>105 (42%)</td>
<td>0 (0)</td>
<td>138 (55%)</td>
</tr>
</tbody>
</table>

\(^a\) - General feedback also included in this condition.
\(^b\) - Specific feedback also included in this condition.
while observing was seen in only 19%. Direct interactions with residents were recorded during 6% of intervals. After inservice training and specific feedback were implemented, instructions to staff decreased to 42% of intervals following inservice training on prompts and consequences. The percent of intervals in which observing was recorded increased to 56% following inservice training on instructions, and was 55% after training on prompts and consequences.

Figure 3 shows resident attending and correct responses in communication and gross motor skills in bar graph form. Percent of 10-sec. intervals during which attending was observed is represented by the striped bars. Daily number of intervals observed varied from 38 to 80. The second set of bars reflect percent correct responses. The shaded portion shows the percent of trials on which residents responded correctly without prompting. The number of daily trials observed varied from 18 to 24. During baseline in communication, attending was observed 7% of intervals. Correct responses averaged 47%, and unprompted correct responses occurred during 3% of all trials. Following supervisor inservice training on instructions and the introduction of general feedback, attending increased to 15% of all intervals. Correct responses occurred on 41% of all trials, and unprompted correct responses occurred an average of 6% of trials. After inservice training on prompts, attending increased to 21%. Total correct responses and unprompted correct responses decreased to 37% and 3% of all trials, respectively. Attending increased to 22%, and correct responses and unprompted
Figure 3: Percent of 10-sec. intervals during which residents were scored as attending (striped bars), total percent correct responses (open bars) and percent unprompted correct responses (shaded bars).
Figure 3

RESIDENTS IN COMMUNICATION

TOTAL UNPROMPTED INTERVALS OF RESPONSES

ATTENDING BASELINE INSTRUCTIONS PROMPTS CONSEQUENCES SPECIFIC FEEDBACK MAINTENANCE

INTERVALS OF ATTENDING TOTAL CORRECT RESPONSES UNPROMPTED CORRECT RESPONSES GENERAL FEEDBACK

RESIDENTS IN GROSS MOTOR SKILLS

BASELINE INSTRUCTIONS PROMPTS & CONSEQUENCES SPECIFIC FEEDBACK

PERCENT

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correct responses increased to 56% and 14%, respectively, following inservice training on consequences. During specific feedback, attending decreased to 21% of all observations. Correct responses increased to 61% of observed trials, and unprompted correct responses were observed 60% and 8% of all trials, respectively. In gross motor skills, attending was recorded during 42% of all baseline intervals, 61% after inservice training on instructions and the implementation of specific feedback, and 50% following inservice training on prompts and consequences. Correct responses and unprompted correct responses occurred during 52% and 21% of all trials, respectively, during baseline. Increases to 70% and 36%, respectively, were observed after instructions inservice training and specific feedback were instituted. Following inservice training on prompts and consequences, correct responses increased to 82% of all trials, while unprompted correct responses decreased to 28%.
DISCUSSION

The multiple baseline analysis of direct care staff teaching behaviors suggests that changes in dependent measures were a function of supervisor training and feedback. Percent correct instructions, prompts, and consequences increased in both communication and gross motor skills only after the respective supervisors had been exposed to intervention. The multiple baseline design, a variation of the time series design (Campbell & Stanley, 1963), is a widely accepted tool for demonstrating experimental control over a dependent variable (Baer, Wolf, & Risley, 1968; Hersen & Barlow, 1976; Kazdin, 1973b). In the present study, control is shown by the sequential application of the independent variable across six baselines, with concomitant changes in the individual baselines only at the point of intervention. Each of the baselines to which the intervention was applied may be conceptualized as separate A-B designs (where A connotes baseline conditions and R connotes intervention), with the A condition further extended for each succeeding baseline. The six baselines were correct 1) instructions, 2) prompts, and 3) consequences in communication, and 4) instructions, 5) prompts, and 6) consequences in gross motor skills. Because the percent correct occurrence of each of these behaviors can be seen to have increased only at the point at which supervisor training and feedback were applied to them, experimental control is shown. Although theoretically only two baselines are necessary for
a demonstration of control, Hensen & Barlow (1976) recommend a minimum of three to four. The fact that six baselines were analyzed in the present study increases the interval validity of obtained results. The initial effect observed with direct care staff instructions was replicated with the remaining five baselines.

In spite of the observable changes in direct care staff teaching behaviors from baseline to post-intervention, the variability evident in the data must be considered. Because a demonstration of control by way of a multiple baseline design consists in a visual comparison between baseline and intervention conditions, stable baseline data should be obtained before intervention is applied to any baseline. An examination of Figures 1 and 2 reveals some variability in five of the six baselines. The extant variability here does not diminish the demonstration of control, however. In spite of the day-to-day fluctuation, the data are stable within certain ranges. The fact that the measures all increased beyond their baseline ranges indicates experimental control. For example, instructions in communication, per block of two sessions, can be seen to vary between 18-45% during baseline. Although this does not constitute the ideal stable baseline, the data are stable within that range, and did, in fact, change after intervention was applied, to a range of 29-100%, across blocks of two sessions. Another way of determining the extent to which variability diminishes control is to visually compare the amount of overlap between baseline and intervention. That is, how many of the baseline data points over-
lap with those obtained during intervention, and \textit{vice versa}? In the present study, virtually no overlap exists with instructions and prompts in either communication or gross motor skills. A small amount of overlap can be seen for consequences in gross motor skills, and several instances of overlap can be noted for consequences in communication. In spite of the overlap with consequences in communication, the lowest data points plotted during intervention are considerably higher than the low data points during baseline. This, in addition to the overall mean increase in this baseline after intervention had been applied, allows for a conclusion that control is demonstrated. Thus, in spite of the degree of variability present in the data, the multiple baseline analysis shows experimental control over all six baselines.

Related to the issue of experimental control is the question of the clinical significance of observed changes in dependent measures. While always a more subjective determination than the question of experimental control, clinical significance appears to have been achieved in this study. The administration of the hospital indicated that direct care staff teaching behaviors had changed dramatically from baseline to termination of experimental conditions. Indeed, even though the author is no longer employed at the facility, the indirect method of training direct care staff examined in this study is still employed.

A further threat to the internal validity of this study, changes in instrumentation, can also be ruled out. Reliability of
the observed changes is demonstrated by way of interobserver agreement indices (Baer et al., 1968; Hopkins & Herman, 1977).

Based on changes observed in direct care staff teaching behaviors, the procedures used here can be considered an improvement over previous studies reported in staff training literature. Where changes in staff verbal skills regarding mental retardation (Cochran & Steiner, 1966), gains in information and improved attitudes (Johnson & Ferryman, 1969), and improved verbal skills in behavior modification (Gardner, 1972a) have been shown, this study examined employee behaviors in the natural setting. The fact that staff work behaviors were successfully changed and maintained from 2 wks. to 4 mos. (depending on when training was implemented) shows an improvement over other studies in which small (Martin, 1972), temporary (Hollander, Plutchik, & Horner, 1973; Panyan, Boozer, & Morris, 1970) or negligible effects (Hollander & Plutchik, 1972; Katz, Johnson, & Gelfand, 1972; Quilitch, 1975) on job performance were shown. While Gladstone & Spencer (1977) showed that modeling was an effective method of increasing contingent praise statements by direct care staff, the dependent variables analyzed in this study represent a broader analysis in that a larger number of categories of staff behavior were examined.

It should be further noted here that the three classes of direct care staff teaching behaviors - instructions, prompts, and consequences, as well as the specific components of which they are comprised, have an acceptable degree of face validity in the field
of applied behavior analysis. While the state of the art of behavioral programming does not allow for definitive statements on all aspects necessary and sufficient for effective programs, the particular dependent variables examined here are thought to be critical (Gladstone & Sherman, 1975; Koegel, Russo, & Rincover, 1977; Sulzer & Mayer, 1972).

The present study also extends the results reported in other successful staff training studies. Changing direct care staff teaching behaviors indirectly through supervisor inservice training would seem to be a more practical method of training large numbers of staff than the auditory prompting procedure used by Cone & Sheldon (Note 1). Likewise, the supervisor training reported here appears to be a more efficient way of affecting many staff members than the prompts, modeling, and praise package used by Fabry & Reid (1978) to train foster grandparents in an institutional setting. By training the supervisors, each of the 47 direct care staff in this study were influenced, even though they received no direct instruction. Logistical problems inherent in scheduling large numbers of staff are, thus, avoided.

The present study can be considered an extension of several studies reporting successful changes in teachers' behavior modification skills (Barnard et al., 1977; Cooper et al., 1970; Jones et al., 1977; Russo et al., 1977). The above studies are all characterized by methodologically rigorous assessment of actual teaching behaviors in the natural work environment. However, because subject populations consisted of teachers, generalizability to
paraprofessional institutional staff cannot be assumed. The present study, though, reports reliable assessment of direct care staff teaching behaviors in the institutional work setting. Results reported here also extend the results reported by Gladstone & Sherman (1975). While these authors utilized methodologically sound assessment of actual teaching behaviors, their use of high school students as subjects, rather than institutional staff, limits generalizability to other institutional settings. In addition, the present study furthers the technology described by Goncalves, Iwata, & Chiang (Note 2), who showed that intermittent feedback to supervisors led to improvements in rate of relevant comments and increased usage and accuracy of technical terms. While Goncalves et al. were able to demonstrate changes in supervisors' behavior, they did not report concomitant improvements in teaching skills of those persons monitored by the supervisors. The present study reports improvements in the behavior of the actual change agents who conduct training, direct care staff.

Another important aspect of the results reported here is the inclusion of client data. Only two staff management studies have reported gains in mentally retarded clients (Iwata et al., 1976; Quilitch, 1975), and only Greene et al. (1978) and Fabry & Reid (1978) have reported client gains in a staff training study. Greene et al. (1978) showed increases in the distance institutionalized retarded persons were able to ambulate, and increased range of motion in other clients, after a workshop and two feedback conditions. Fabry & Reid (1978) reported small improvements for resi-
dents, as measured by a resident skills inventory, after teaching foster grandparents to conduct training programs. Data collected on resident behaviors in this study reflect gains commensurate with those obtained by Fabry & Reid (1978). In both communication and gross motor skills, attending increased over baseline levels following supervisor training on instructions. In communication, attending increased further following training on prompts and consequences. And although slight decreases were observed following introduction of specific feedback and maintenance conditions, attending remained higher than during baseline. In gross motor skills, attending decreased following supervisor training on prompts and consequences, but was likewise higher than during baseline when experimental conditions were terminated. Resident correct responses showed similar trends. This variable decreased slightly after the communication supervisor was trained on instructions and prompts, increased following training on consequences and the introduction of specific feedback, and did not change during maintenance. Resident correct responses in gross motor skills increased following supervisor training on instructions as well as prompts and consequences.

One additional feature of this study deserving mention is the relatively large number of direct care staff on whom data were collected. Previous studies have examined the effects of training with as few as 11 (Koegel et al., 1977), seven (Jones et al., 1977), or six (Greene et al., 1978) direct care staff subjects. The fact that 47 staff were used as subjects in this study speaks to the
generality of obtained results. 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 behaviors. Due to the manner in which staff were assigned, there were many cases in which as much as one week elapsed between successive assignments. Observable effects resulting from changes in supervisor behavior were, thus, necessarily diluted when compared to conditions under which the same target subjects are present day after day. This, plus the fact that changes were maintained in the work setting for up to four and one-half months after initial intervention, represents a significant change in direct care staff behavior.

It should be noted that the essence of the staff training method analyzed here is a combination of behavioral procedures applied to the supervisors. Because the procedures were introduced as a package, an analysis of the contributions of individual components is not possible. It is, thus, not possible to discuss the relative effects on supervisor behavior of inservice instructions, written materials, and modeling, because they were implemented together along with one of two feedback conditions. It is possible, however, to observe the relative effects of the two types of feedback: general and specific. In communication, general feedback was begun concurrently with inservice training on correct instructions, and produced increases in all three direct care staff teaching behaviors. The introduction of specific feedback in communication, however, resulted in further improvements in all three teaching
behaviors. The differential effect observed during specific feedback might be attributable to any of several causes. First, the more explicit and precise nature of the specific feedback may have served a discriminative function for the communication supervisor. Whereas, general feedback consisted of general verbal descriptions of how direct care staff in her area had performed, specific feedback pinpointed specific deficiencies to be corrected. Specific feedback could, thus, have facilitated discriminations of correct and incorrect teaching behaviors. Second, being informed of the goal of 80% correct teaching behaviors and being shown a daily graph of progress toward that goal may have served as reinforcement of effective supervisor behaviors. Third, the effect observed during specific feedback may have been a natural extension of that observed during general feedback. Because the differential effect of specific compared to general feedback was not replicated in gross motor skills, there is the possibility that teaching behaviors were slowly improving, and would have attained comparable levels without the introduction of specific feedback. The supervisor could have become progressively more effective in changing direct care staff behaviors by that point in time. Or alternatively, the direct care staff could have shown a similar improvement during general feedback, independent of any change in supervisory behaviors.

The fact that all three correct teaching behaviors showed rapid changes in gross motor skills, speaks against the possibility that specific feedback had no differential effect. The changes from baseline levels in gross motor were greater and occurred with
more rapidity than was true in communication, where the initial feedback condition was general feedback. It should be noted here, however, that other variables may have facilitated the enhanced effect in gross motor skills. The most likely of these is prior exposure of direct care staff to instructions and feedback from the supervisor in communication. While teaching behaviors did not readily generalize from communication to gross motor skills, the prior exposure may have facilitated the effects of supervisor inservice training and specific feedback in gross motor skills.

In spite of the fact that results regarding increased effectiveness of specific feedback are at best, tentative, the procedures used in that condition have a practical appeal. While general feedback can be slightly less time-consuming to provide, the practicality of specific feedback can be enhanced by gradually decreasing the frequency of feedback sessions, and thus, reducing the response effort. Data obtained during the maintenance condition in communication lend support. This, in addition to the more precise nature of specific feedback, as used here, recommends its use in future staff training efforts.

The set of procedures that supervisors used to change direct care staff teaching behaviors was, likewise, a package, and not subjected to a component analysis. During inservice training, supervisors were taught to instruct direct care staff in the use of correct teaching behaviors, provide positive and constructive feedback, and model if necessary. Because data are inconclusive on the extent to which each of the methods were used, their rela-
tive effects on direct care staff behavior cannot be assessed.

Data collected on supervisors indicated differing strategies in communication and gross motor skills. 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 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 is that supervisors were necessarily required to spend more time observing the specific teaching behaviors on which they had received inservice training, in order to correct improper direct care staff behaviors. 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, of course, not recorded because data collection was discontinued at the end of programming sessions.

In spite of the unavailability of component analysis data on either supervisor inservice training or supervisor methods of changing direct care staff behavior, the approach used here is still applicable to other staff training endeavors. The effectiveness of the package, as a whole, represents a first step in changing direct care staff behavior in the natural work environment. Future
research is needed to refine the process by analyzing the components that are necessary and sufficient for changing supervisor and direct care staff behavior.

A possible concern with the present study is the fact that pressures related to losing one's job may have been at least partially responsible for changes observed in both supervisors and direct care staff. Although never stated by either direct care staff or supervisors, here, the possibility exists in that both levels of employees were subordinate to the author in terms of administrative responsibility. This relationship in no way limits the generalizability of results obtained here, though. Any institutional setting in which the present procedures may be replicated will have analogous lines of responsibility. Supervisors of direct care staff usually retain the threat of dismissal for uncooperative employees, as do those who supervise the first-line supervisors. In addition, no threats related to loss of job or suspension were ever stated or implied to either supervisors or direct care staff in this study.

In summary, the staff training procedures examined here provide a novel, effective means of improving direct care staff teaching behaviors. Future research is necessary not only to provide component analyses of training packages used here, but to expand 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.
REFERENCE NOTES


REFERENCES


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As explained in the inservice, a major concern in DTM is the quality with which Direct Care Staff implement programs. This hand-out is meant to serve as a supplement to those points made in the inservice.

Regarding general supervisory strategies, the following points are important:

1. Look for things to praise Direct Care Staff for. Your differential attention can have a meaningful impact on program quality.

2. Your praise and constructive comments should be made in a visible (i.e., loud and clear) manner. In this way, staff other than the one receiving praise may benefit.

3. Provide corrective feedback at once when Direct Care Staff teaching behaviors warrant it. But also, be sure to have positive statements outnumber negative ones.

Regarding the proper format for Direct Care Staff presenting Instructions to residents:

Instructions: An instruction shall be considered the first attempt per trial to initiate a response. In most cases, the form of the instruction is specified in the program being implemented. Any responses on the part of the trainer subsequent to the initial instruction and prior to the residents response will be considered a
prompt.

1. The instruction must be clear and discriminable, and occur after a pause of at least one second when no vocal behavior is directed toward the student. It must occur within ten sec. of the cue to begin a trial.

2. The instruction must specify the desired response, e.g., "Herb, touch the ball," not "Herb - ball," and only the desired response, e.g., "Herb, touch the ball," not "Alright Herb, let's pick up the ball and then give it to me."

3. The instruction must be uninterrupted.

4. When the instruction is presented, the resident must be attending to the trainer, i.e., not being disruptive, which includes aggressive against people or objects, inappropriate noise, and disruptive motor behavior. If resident does not attend, trainer should present at least one prompt. Not applicable for the administration of attending programs of physical therapy programs in which resident is positioned in such a way to make impossible, e.g., lying on stomach.

5. When an instruction initiating a trial is presented, the response should not be manually guided, except in P.T., where manual guidance is acceptable.

Prompts: A prompt shall be considered any response on the part of the trainer that occurs subsequent to the initial instruction, that attempts to evoke the desired response. Thus, a prompt could
be verbal and consist of either repeating the instruction, gestural consisting of pointing or gesturing intended to evoke the response, or physical consisting of manually guiding the resident to perform the correct response.

1. Whenever a physical prompt is used, it must occur to the extent that it evokes a correct response.

2. Simultaneously with physical prompt being delivered, the desired response must be specified verbally. As with Instructions, the exact response must be specified, and not a variation.

3. A prompt should not be delivered sooner than 5-10 seconds after the initial instruction, or previous prompt, in order to allow the resident time to respond.

4. When verbal prompts are used, they must specify exactly the desired response and can contain no extraneous words.

Consequences

1. Consequences must be immediate, i.e., within two seconds of a response.

2. Consequences must be unambiguous.

3. Consequences must be delivered after each correct response.

4. Consequences must be contingent, i.e., only positive consequences following correct responses and ignoring or verbal negatives following incorrect responses, or no responses.

5. Positive events must not be provided to residents prior
to their responding, or if only a partial response has been made, except in P.T. and Expressive Speech where reinforcement can be provided if a resident is completing part of the desired response. In this case, reinforcement must also occur at the end of the trial or required response.

6. If edible or material reinforcers are used, their delivery must be accompanied by verbal praise.

7. If the resident has emitted a correct response prior to the end of a trial, the trainer should continue to interact with the resident in a positive manner. Score this as correct if there is a continuous interaction until the end of the trial, or if there is at least one positive interaction independent of the reinforcement for correct responding. If trial ends two seconds or less after reinforcement for correct responding, do not mark incorrect if no additional positive interactions occur.

8. All correct responses, even those physically prompted, should be followed by positive consequences.