*AN INSTITUTIONAL STAFF TRAINING AND SELF-
MANAGEMENT PROGRAM FOR DEVELOPING MULTIPLE
SELF-CARE SKILLS IN SEVERELY/PROFOUNDLY
RETARDED INDIVIDUALS*

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Although considerable attention has been given to the development of institutional staff training and management programs, the generalized effects of such programs on staff and resident behavior have seldom been examined. This study evaluated a program for teaching institutional staff behavioral training and self-management skills during self-care teaching sessions with severely and profoundly retarded residents. Following baseline observations in three self-care situations (toothbrushing, haircombing, handwashing), four direct care staff were sequentially taught to use verbal instruction, physical guidance, and contingent reinforcement in the toothbrushing program. During maintenance, staff were simultaneously taught to record, graph, and evaluate resident and their own behavior in the toothbrushing sessions. Staff were taught use of the training and self-management skills through a sequence of written instructions, videotaped and live modeling, rehearsal, and videotaped feedback. Observer presence and experimenter supervision were gradually decreased during the maintenance condition. Results indicated that during training and maintenance staff: (a) learned to use the training skills appropriately and consistently in the example situation (toothbrushing); (b) applied the skills in the generalization situations (haircombing and handwashing); and thereafter (c) maintained consistent and appropriate use of the skills with infrequent supervision. In addition, important changes in retarded residents' independent self-care responding occurred as staff training skills developed. Results are discussed in terms of their implication for future research and continued development of effective staff training and management programs.

DESCRIPTORS: staff management, self-management, maintenance, generalization, retarded residents, reliability of graphic analysis

Behavior modification research has frequently been concerned with the development of techniques for training institutional staff to be effective teachers of mentally retarded persons (Gardner, 1973; Greene, Willis, Levy, & Bailey,

1978). Staff research programs have addressed two basic issues, one dealing with staff training and one with staff management. In staff training programs it has been assumed that staff do not have the prerequisite skills necessary to teach adaptive behaviors. In contrast, staff management research has been concerned with motivating staff to use routinely the training skills they presumably already know how to apply. Although behavior modification studies directed at changing staff behavior have typically focused either on the training or the management issue, an increasing number of recent studies have been focusing on both of these objectives (e.g., Ivancic, Reid, Iwata, Faw, & Page, 1981; Mon-

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tegar, Reid, Madsen, & Ewell, 1977; Quilitch, 1975).

A critical test of the efficacy of a behavior modification program is whether experimental changes generalize over situations (Baer, Wolf, & Risley, 1968). The concern for generalization of effects is particularly important with staff in institutional settings because direct care personnel have training responsibilities for multiple residents and a variety of behavioral programs. Subsequently, it is impractical to train staff specifically for each program, situation, or resident for whom the staff are responsible. However, despite the importance of providing staff with a generic set of skills, only three investigations (Gladstone & Spencer, 1977; Ivancic *et al.*, 1981; Page, Iwata, & Reid, 1982) formally assessed generalization of institutional staff performance in the day-to-day job situation. Inconsistent results were found across these studies.

In addition to the issue of generalization, an important parameter regarding the effects of a behavior modification intervention is the durability of the effects over time. Recently, the staff training and management literature has been criticized for its lack of attention to the maintenance issue (Ivancic *et al.*, 1981). One potential approach for programming maintenance of treatment effects involves the use of a self-management strategy through which staff monitor and evaluate their own behavior. Self-monitoring has been advocated as a specific self-control technique because it is easily transportable, can be quickly taught, and therefore is potentially very efficient (*cf.* Thoreson & Mahoney, 1974). In addition, Stokes and Baer (1977) have suggested that effective use of self-recording can mediate the occurrence of generalization by establishing a response that is likely to be used in other situations. This strategy has a potential advantage in that if an individual is trained to monitor and direct his or her own behavior, the need for formal supervision may be reduced. Although self-recording procedures have been effectively used with both normal and retarded populations (*cf.* Herbert & Baer, 1972; Knapczyk & Liv-

ingston, 1973), self-recording has been a part of only a few staff management programs (Burg, Reid, & Lattimore, 1979; Burgio, Whitman, & Reid, 1983; Korabek, Reid, & Ivancic, 1981; Patterson, Griffin, & Panyan, 1976; Seys & Duker, 1978).

As Greene *et al.* (1978) and Ivancic *et al.* (1981) have emphasized, both staff behavior and resident behavior must be evaluated to determine the benefits of an intervention with staff performance. When this dual evaluation has been conducted in training programs with severely and profoundly retarded clients, the amount of client change reported has often been small (Burg *et al.*, 1979; Burgio *et al.*, 1983; Ivancic *et al.*, 1981; Page *et al.*, 1982). Moreover, when appropriate staff or resident data have been collected, they have often been inappropriately and incompletely analyzed. For example, studies have reported single-subject repeated measurement staff data (*e.g.*, Panyan, Boozer, & Morris, 1970) or resident data (*e.g.*, Andrasik & McNamara, 1977) collapsed across individual training sessions to form single data points. One of the reasons data have been simplified in this fashion is that they are difficult to analyze visually. This problem is particularly pronounced when data for numerous staff and residents over a large number of sessions must be examined. However, unless data are presented for each session, evaluation of functional relationships between staff and resident behavior change is difficult, if not impossible.

The purpose of the present study was to evaluate in a comprehensive fashion a multifaceted program for teaching and maintaining behavioral training skills by institutional direct care staff. Specific strategies were included to promote generalization of the training skills across different self-care programs with multiple residents. Self-management procedures were also incorporated in an attempt to program continued usage of the training skills once acquired by staff. Special attention was directed to evaluating the session-by-session effects of the program on both staff and resident behaviors. Because of the

complexity of the data set, the reliability of the visual analysis system was formally assessed. Finally, an acceptability measure was included to assess staff opinion of the training and management program.

METHOD

Subjects and Setting

The subjects were four direct care staff and 12 residents of a state facility for the developmentally disabled. The direct care personnel and retarded residents were selected from three separate living areas. The four staff trainees were females (average age, 25; average years on the job, 2.5) who had been recommended for training by their unit supervisors, based on the supervisors' opinions as to their need for training in resident teaching skills. Two of the staff were new employees, untrained in behavioral program implementation and the other two participants needed retraining. Prior to baseline, each participant was told by the experimenter (a unit psychologist with no administrative authority over the staff) that her supervisor had recommended her for training and asked if she would participate in a project designed to improve her resident teaching skills. Two staff participants had completed several years of college work, and the other two trainees had earned high school G.E.D. certificates.

The resident participants were assigned to the three living units according to age and sex. The three units included residents who were generally homogeneous in functioning level, as based on measures of IQ and adaptive behavior. All the residents were severely and profoundly retarded males and females (IQ range = 8 to 21), between the ages of 8 to 16. They possessed several daily living skills such as self-feeding and simple receptive language, but were deficient in more complex behaviors such as expressive language and self-grooming. Of these 12 residents, 3 had some simple verbal skills, 6 exhibited maladaptive behavior, and 11 typically responded to simple one-step instructions. The

residents included in this project were selected on the basis of low skill level in their self-care program.

For the purposes of the project, each of the four trainees was assigned three residents from the living unit she was working in and given specific behavioral objectives to pursue in three training programs directed at developing toothbrushing, handwashing, and haircombing skills. Each staff member conducted each of the same three self-care programs (toothbrushing, handwashing, and haircombing). Each resident, however, served in only one training program.

Observers and staff subjects were trained by the first author in a training house, physically separated from the residential building. The one-to-one teaching interactions between each staff trainee and her three assigned residents were conducted in the bathrooms on the resident living unit. Staff participants were given feedback in an administrative office of the residential building.

Materials

A Sony portable videotape recording system and Sony color monitor were used for training and feedback purposes. According to experimental condition, staff trainers were given written materials necessary to teach their residents in the three self-care programs, including baseline instructions, data sheets, training instructions, staff behavior definitions, and behavior recording instructions. Soap, towel, hairbrush, toothbrush, and toothpaste were kept in each resident's living area.

Behavior Definitions

Resident behavior. Each self-care skill program was divided into a chain of component responses (Table 1). Resident responses in the program were categorized in terms of whether the response was self-initiated, verbally instructed, or physically guided. *Self-initiated responding* was defined as the occurrence of one of the component toothbrushing, handwashing, or haircombing responses without any verbal or

Table 1

Component steps and instructions for three self-help programs.

TOOTHBRUSHING	
1. Pick up toothbrush	6. Brush your teeth
2. Wet the toothbrush	7. Rinse your mouth
3. Take cap off the tube	8. Wipe your mouth
4. Put paste on the toothbrush	9. Rinse toothbrush
HAIRCOMBING	
1. Pick up comb (or brush)	5. Comb left side hair
2. Wet comb	6. Comb back side
3. Comb front hair	7. Smooth with hand
4. Comb right side	
HANDWASHING	
1. Wet hands	5. Wash palms of hands
2. Pick up soap bar	6. Wash backs of hands
3. Rub soap between hands	7. Rinse hands
4. Put soap down	8. Dry hands

physical assistance from the staff trainee. *Instructed responding* was defined as the occurrence of one of the component responses following the specific verbal instruction for that response. *Guided responding* was defined as the occurrence of one of the component responses following or while physical assistance was given by the staff member to complete that response.

Staff behavior. The following basic behavior management skills were defined. *Verbal instruction:* a statement given by a trainee that directed the resident to complete a specific program response. Each instruction had to include the resident's name, a specific action verb, and a specific object to act on (e.g., "John, pick up the soap"). *Physical guidance:* any physical contact given by a trainee that helped a resident complete a specific task response. *Reward:* positive verbal statements (e.g., "very good, John") delivered within 3 sec of completion of a target response.

While conducting a self-care session, a staff member could use each of the three training skills appropriately or inappropriately based on resident responding or nonresponding. *Reward* was *appropriate* when given after any component response completion. *Appropriate verbal*

instruction was defined as a verbal statement that met the general definition of verbal instruction and that occurred only when the resident did not self-initiate a particular self-care response, or the withholding of a verbal statement by the trainee when the resident had self-initiated a particular self-care response. *Appropriate physical guidance* was defined as the use of physical contact only after the resident had not self-initiated a response and had not completed the response following the trainee's instruction for that response, or the nonuse of physical contact when the resident had self-initiated or had complied with an instruction to complete a particular response.

Observation System

For each component response in the three self-help chains, resident and staff behavior were rated according to the definitions just described. During data collection in actual resident training sessions, the observer was positioned in a corner of the bathroom, approximately 2 m to the side of the staff/resident pair. When the staff trainee indicated that the session would start, the observer recorded occurrence of the target staff and resident behaviors on a data sheet designed for that specific self-care program. When reliability was conducted, a second observer stood next to the primary observer. When a resident training session was videotaped, the camera and operator were located in the same position that observers recorded data.

Observer training. Data collectors included two administrators, a speech and hearing therapist, a graduate student intern, and the first author. Although all observers were generally aware that the project focused on staff training, only the first author was aware of the design of the study or the experimental condition in effect. Observers were assigned to rate self-care sessions on a random basis and thus did not routinely watch any particular staff member or resident. Observer training consisted of reading behavior definitions, experimenter instructions, practice observing of videotapes, and experimenter feed-

back. To control for observer drift (Kazdin, 1977), all observers were retrained at least every 2 weeks on videotapes from experimental sessions. If at any time reliability checks showed agreement less than 80%, the observer was immediately retrained until the 80% level was again reached. All observers were informed prior to data collection training that the accuracy of their observations would be periodically monitored throughout the study.

Reliability assessment. Reliability checks on all data collectors were conducted by a second observer who simultaneously yet independently recorded occurrence/nonoccurrence of behavior. Reliability of data observation was conducted in approximately one out of every five self-care sessions. Thirty-six percent of these checks were conducted during actual self-care sessions, and the remaining 64% were done via videotape replay. All data collectors were assessed once a week and in each of the 12 staff-resident pairings over the course of the project.

Interobserver agreement was determined for both the occurrence and nonoccurrence of each resident and staff behavior and was calculated by summing agreements and disagreements across component responses in each self-care program

and dividing the number of agreements by agreements plus disagreements and multiplying by 100. A summary of all reliability percent agreements is presented in Table 2. In general, interobserver agreement means were 80% or higher across the six target behaviors and three experimental conditions. In the three instances in which reliability was below 80% agreement, the behavior occurred only once or twice in a training session, thereby heavily weighting a single disagreement.

Experimental Design

A multiple baseline design across three staff was used to evaluate the direct and generalized effects of separate staff training and management packages on the behavior of the staff and residents. Following the simultaneous occurrence of at least 10 baseline sessions for each of three staff persons, the treatment package was then introduced sequentially across staff. The fourth staff participant (Betty), added later in the project due to the transfer of the original fourth trainee, provided a direct A-B replication of the program's effects. During treatment, staff were taught the behavior management skills using toothbrushing as the teaching example pro-

Table 2

Percent interobserver agreement means and ranges in Baseline (BL), Treatment (TR), and Maintenance (MN).

		BL	TR	MN	BL	TR	MN
<i>Staff behavior</i>		<i>Occurrence</i>			<i>Nonoccurrence</i>		
Instruction	Mean	80	93	97	95	93	95
	Range	(0-100)	(50-100)	(67-100)	(50-100)	(50-100)	(50-100)
Guidance	Mean	93	95	95	96	95	97
	Range	(67-100)	(67-100)	(50-100)	(67-100)	(0-100)	(50-100)
Reward	Mean	95	95	96	87	74	74
	Range	(75-100)	(67-100)	(75-100)	(50-100)	(0-100)	(0-100)
<i>Resident behavior</i>							
Self-initiated	Mean	92	94	95	97	97	95
	Range	(50-100)	(50-100)	(50-100)	(33-100)	(67-100)	(50-100)
Instructed	Mean	84	91	76	98	98	95
	Range	(0-100)	(0-100)	(0-100)	(86-100)	(72-100)	(67-100)
Guided	Mean	93	92	92	95	95	94
	Range	(67-100)	(0-100)	(0-100)	(50-100)	(60-100)	(40-100)

gram, allowing for assessment of the effects of the treatment package on staff behavior and resultant changes in resident responding in the example and two generalization situations (hair-combing and handwashing). After the fourth staff member had been in the treatment condition for 10 sessions, the maintenance package was simultaneously introduced to the first three staff trainees. Maintenance was initiated with the fourth person 2 weeks later due to separate resident and staff injuries.

Procedures

Baseline. Prior to the start of the project each participant was informed that she would be working with three residents and that observers would collect data during these training sessions. In a 10-minute information session on the first day of baseline, each trainee was informed about the three residents she would be working with during the project and which self-care skill would be taught to each resident. For each target behavior, the specific component responses to be shaped were presented in writing to each staff person and the experimenter modeled and described the component self-care responses. In addition, a rationale concerning the importance of teaching self-care skills along with general training instructions were given. Specifically, the trainee was asked to use verbal instruction, physical guidance, and reward as necessary, and to record behavior using the project's data sheets. (It should be noted that most of the verbal interactions between the experimenters and staff participants in baseline, treatment, and maintenance, and experimenters and observers during observer training sessions were scripted. The experimenter read these instructions out loud as the trainer or observer read a copy of the same instructions. These instructional scripts are available from the first author.) Any questions from the staff concerning how to implement the behavior management procedures, how to rate behavior, or how to use the data sheets accurately were answered by telling her to do what she thought was best.

Training. Each staff member was taught how and when to verbally instruct, physically guide, and contingently reward resident self-care responses in the example program, toothbrushing. No training or feedback information was given about how to train residents in the remaining two self-care programs. On the first day of treatment each trainee was individually taught appropriate use of the behavior management skills in a single session of approximately 60 minutes (range = 50 to 75 minutes). Training was implemented by the first author through instructional, modeling, rehearsal, and feedback procedures. More specifically, the experimenter described the rationale and details of the program. The staff person was given definitions of the instruction, guidance, and reward responses (See *Behavior Definitions*) and an explanation of the function of each of these training skills. She was told that the resident's behavior would dictate her own training responses. The staff trainee was also given a general explanation of the importance of fading as the resident learned how to complete the target behaviors on his or her own.

Next, the staff member was shown two 5-minute videotape segments, portraying the experimenter using the instructional, guidance, and reward procedures in a staged toothbrushing session with a unit administrator and also in a face-washing session with a resident not involved in the project. Thus, each trainee was exposed to one tape specifically involving a program which she would later implement as well as a different program example that the staff person would not be involved in teaching during the project. The purpose of the second program example was to promote generalization. In the staged toothbrushing videotape, the experimenter-model followed a script designed to include all possible types of resident responses and examples of both appropriate and inappropriate use of instruction, guidance, and reward. Prior to viewing the tapes, the staff participant was asked to note that the model responded on the basis of the resident's behavior, went very slowly, and gave the resident every opportunity to complete the responses with

as little trainer assistance as possible. After viewing these tapes, the experimenter answered any questions concerning the tapes.

The participant was then asked to practice using the instruction, guidance, and reward procedures with the experimenter playing the role of a resident in a toothbrushing program. The experimenter followed a script and went through the entire sequence of toothbrushing component responses, responding in different ways to simulate a wide variety of resident behavior occurrences. This practice training phase was videotaped. Immediately after this rehearsal the experimenter gave corrective and positive feedback to the trainee while viewing the videotape. The rehearsal phase was repeated as necessary until the staff member correctly responded 90% of the time to the experimenter's toothbrushing behavior. At the end of this first training session the experimenter summarized the training session and indicated that the three training skills of instruction, guidance, and reward are useful in any self-care program.

In the subsequent treatment sessions, each staff person was given verbal feedback concerning performance in the toothbrushing program and her client's response to that training. Feedback was given on days 2, 3, 5, 8, 11, then once a week, and finally once every 2 weeks following completion of the initial training session. During feedback a videotape of that day's session was reviewed by the experimenter with the staff trainee. The feedback given by the experimenter at these sessions was similar in format to the feedback given during the initial training session, emphasizing correct application of the behavior management skills. In addition, improvements in resident toothbrushing were pointed out. Feedback sessions averaged 10 minutes in length (range = 5 to 15 minutes) across the four staff.

Maintenance. In the maintenance condition, each staff participant was taught to record and graph resident and her own behavior and interpret the graphs using the toothbrushing program as the teaching example. No training or feedback

information was given about the use of these skills in the trainee's remaining two self-care program assignments. On the first day of maintenance, each staff trainee was taught use of the recording, graphing, and interpreting skills in one training session. This session lasted approximately 60 minutes (range = 45 to 90 minutes) for each person.

Training was conducted by the first author through the use of instructional, modeling, rehearsal, and feedback procedures. Specifically, the experimenter discussed with each staff member the value of recording resident and her own behavior while conducting self-care training sessions. The trainee reviewed the behavior definitions and then was given data sheets (previously available during baseline and treatment sessions) for the three program assignments and instructions for using the recording system. Each participant was trained as a behavior rater for toothbrushing in the same manner as the project's data collectors (see *Observer training*). Observer training continued until there was 90% experimenter-to-trainer agreement on the practice videotape. The staff trainee then looked at two different tapes (toothbrushing and facewashing) which showed the experimenter recording behavior while conducting the self-care programs. She was then asked to use both the behavior management and recording skills in a practice toothbrushing session with the experimenter playing the role of a resident. This session was videotaped. The videotape was reviewed, scored, and corrective feedback was given to the staff member concerning her use of both the training procedures (instruction, guidance, and reward) and the observational system.

When the trainee was applying the training procedures correctly and rating her own and resident behavior reliably (both to a 90% criterion), she was instructed how to graph session data and how to interpret those graphs. Using resident behavior in the toothbrushing program as an example, each participant was taught how to calculate the daily percentages of self-initiated, verbally instructed, and physically guided responses

from the data sheet and how to convert those numbers to points on a graph. Similarly, each participant was taught how to calculate and graph her own data. Finally, she was instructed how to evaluate both resident and her own graphs from a specific day's results and to discriminate general data trends across sessions. At the end of this session, the experimenter pointed out the applicability of these skills to all self-care programs and each trainee was instructed to turn in data sheets on a daily basis to the experimenter's mailbox.

Following this training session, each participant was observed daily for 2 weeks in the three self-care program assignments. Each trainee was then given systematic feedback concerning her training, recording, and graphing skills but only as used in the toothbrushing program. After the maintenance feedback session at the end of the 2-week period, each staff member was informed that observer presence during daily sessions would be reduced. Thus, although daily sessions were still conducted by the staff, observation of these sessions decreased to three times per week for 1 week and then further reduced to one observation per week for the remainder of the project. The maintenance condition lasted from 6 to 9 weeks, depending on the individual trainee. At the end of the project, each staff participant was given a \$25 gift certificate, a certificate of participation in the project, and a memo documenting the training experiences, the skills learned, and the training efforts during the project. This memo was placed in each participant's personnel file.

Staff Acceptability Questionnaire

Approximately 5 days after the final maintenance assessment, the experimenter distributed a questionnaire to each trainee. The questionnaire was constructed to assess each participant's view of the efficacy, helpfulness, likeability, and ease of applicability of the training and maintenance procedures; each trainee's view of her preparedness to administer these procedures and how the present project's training procedures

compared with other programs in which each had been involved. A sample of the 23 items in the questionnaire is presented in Table 3.

RESULTS

The percentages of appropriate use of verbal instruction, physical guidance, and contingent reward by staff in the example situation (toothbrushing) and the two generalization situations (haircombing and handwashing) are presented in Figures 1, 3, and 5, respectively. For assessment purposes, use of any one of the training skills was considered independent of use of the other two skills. Thus, performance of instruction, guidance, and reward each could be 100% appropriate on any given day. The percentages of resident self-initiated, verbally instructed, and physically guided responding in the toothbrushing, haircombing, and handwashing programs are presented in Figures 2, 4, and 6, respectively. These three categories were interdependent and summed to 100%.

Reliability of Graphic Analysis

Four PhD psychologists with training and experience in behavior analysis were asked to analyze the six figures using a visual inspection response code. Two of the raters were closely involved in the staff project, whereas the remaining latter two raters had been informed only that staff research was taking place). Raters were given the figures and a copy of the response code and asked to make decisions concerning whether significant change occurred across each of the experimental conditions for each of the staff and resident responses. For example, a decision concerning change in the instruction skills of Betty from baseline to treatment and from treatment to maintenance was made. Specifically, raters were asked to indicate where there was change, no change, or a marginal clinical change which could not be functionally related to change in condition. In addition to data points, axis labels, and change of condition lines, each graph also displayed

Table 3
Staff Responses to Training Questionnaire

1. I think the project's system helped me to teach self-care skills better:	Helped Very Much 4	Helped Some 0	No Difference 0	Hurt Some 0	Hurt A Lot 0
2. I liked the methods used to teach me the behavior management skills:	Liked Very Much 3	Liked 1	No Difference 0	Disliked 0	Disliked Very Much 0
3. I think the feedback sessions helped me to learn about my teaching performance:	Helped Much 3	Helped 1	No Difference 0	Hurt 0	Hurt Much 0
4. I think watching the videotape of my session during feedback helped me learn:	Much Faster 4	Faster 0	No Difference 0	Slower 0	Much Slower 0
5. I think the project's use of recording, graphing, and evaluating behaviors:	Helped Very Much 2	Helped 2	No Difference 0	Hurt 0	Hurt Much 0
6. Use of the maintenance skills helped me to observe and respond to the kids:	Helped 3	Helped 1	No Difference 0	Hurt 0	Hurt A Lot 0
7. Graphing the data and comparing my graphs to yours was:	Very Good Idea 2	Good Idea 2	No Difference 0	Bad Idea 0	Very Bad Idea 0
8. When I was taught how to evaluate the graphs, this knowledge aided the programs:	Much More Easily 1	Easily 3	No Difference 0	Less Easily 0	Much Less Easily 0
9. When I knew an observer was watching my program, I felt:	Very Comfortable 0	Comfortable 2	No Difference 2	Uncomfortable 0	Very Uncomfortable 0
10. I liked the idea of fading out the observers and doing the sessions independently:	Very Good Idea 2	Good Idea 2	No Difference 0	Bad Idea 0	Very Bad Idea 0
11. When I was doing the program completely on my own, I felt:	Very Capable 3	Capable 1	No Difference 0	Unsure 0	Very Unsure 0
12. I think my use of training system with the kids' learning:	Helped A Lot 3	Helped 1	No Difference 0	Hurt 0	Hurt A Lot 0
13. At the end of the project, I felt my kids were:	Much Better 3	Better 1	No Difference 0	Worse 0	Much Worse 0
14. Compared to other training programs, this program helped me teach the kids:	Helped Much More 1	Helped More 3	No Difference 0	Hurt 0	Hurt Much 0
15. Compared to other training programs, learning this training method was:	Much Easier 1	Easy 3	No Difference 0	Hard 0	Much Harder 0

a mean line, a trend line, and a numerical estimation of variability (Johnston & Penny-packer, 1980) for each condition. The decision

rules given to the raters outline general procedures used in single subject data analysis and specifically the use of the graphic features of

mean, trend, and variability for making visual inspection decisions. Each feature was defined and elaborated by a series of relevant questions to form a response code for making the three behavior change decisions. This response code is available from the authors.

The graphs and response code were mailed to two raters and personally handed to two raters. After these materials were received, the experimenter contacted each rater, by phone or in person, to review the task and answer any questions. Each rater's decisions were compared individually to the first author's decisions for agreements and disagreements of occurrence of the change, no change, and positive but nonfunctionally related change response categories. Agreement percentage was calculated by dividing the number of agreements of occurrence by the number of agreements plus disagreements of occurrence for each category, and multiplying by 100. Percent agreement averaged 86% (range 81% to 91%) for change decisions, 86% (range 79% to 91%) for no change decisions, and 52% (range 35% to 68%) for change that was judged as clinically positive, but not functionally related to the change in condition.

Training Example Situation

Staff performance: Toothbrushing. During baseline for the toothbrushing sessions (Figure 1), three of the four staff used instruction and guidance appropriately on an average of less than 50% of the trials, with a pattern of inconsistent daily usage of these skills. The fourth trainee, Sandy, although generally more appropriate in her use of instruction and guidance, also evidenced a similar inconsistent daily use of the training skills. Staff were more proficient, yet still inconsistent in their use of reward. Following training and feedback sessions, the staff participants consistently used instruction and guidance in a more appropriate fashion with each trainee correctly using these training skills above an average of 84%. Positive changes in the level of use of reward occurred with three staff; however, Becky and Mary still rewarded inconsis-

tently. Sandy showed little change but remained quite appropriate in her use of reward. During the maintenance condition, the four staff members sustained appropriate use of instruction, guidance, and reward, with all means above 94%.

Resident performance: Toothbrushing. No overall improvement in self-initiated responding with resident toothbrushing was noted during baseline (Figure 2). Sam, John, and Mark required physical assistance on the average over 60% of the time, whereas Sally needed only slightly less physical guidance (mean = 47%). Resident response to verbal instruction was low during baseline, averaging 11%. During staff training, all residents demonstrated level changes and upward trends in self-initiated responding. Sam and John showed increases in means as much as 38%, with many individual sessions above 70% self-initiated performance. Sally also showed a reliable increase in this response category. Although an increase in Mark's self-initiated toothbrushing occurred, the magnitude of change was not as great as the other three residents. Corresponding to the increases in self-initiated responding, decreases in physically guided behavior occurred, averaging 38% across the four residents. In contrast, resident response to staff instruction was variable during treatment; Sam and Mark showed an increase in instructed responding but John and Sally showed no appreciable change. During the maintenance condition, the four residents either showed no change or continued these upward trends in self-initiated and downward trends in physically guided responding. Sam, John, and Sally were completing daily sessions independently above an average of 70%, with several individual sessions at or near 100%. Mark's mean improvement in self-initiated responding was 27% during maintenance.

Generalization Situations

Staff performance: Haircombing. Prior to training in the example situation the staff, with the exception of Sandy, were variable and frequently inappropriate in their use of instruction

Fig. 1. Daily percentages of appropriate use of instruction, guidance, and reward by Becky, Mary, Sandy, and Betty (top to bottom) in baseline, treatment, and maintenance of the example situation, toothbrushing.

and guidance during the generalization situation of haircombing, with baseline sessions below an average of 41% (Figure 3). Although somewhat

inconsistent, Sandy's mean use of appropriate instruction (78%) and guidance (55%) was higher than the other trainers. Staff were gener-

Fig. 2. Daily percentages of self-initiated, verbally instructed, and physically guided toothbrushing behavior of Sam, John, Sally, and Mark (top to bottom) in baseline, treatment, and maintenance.

ally more appropriate but still inconsistent in their use of reward. Following training in toothbrushing, Becky and Mary demonstrated marked gains in their use of appropriate instruction and guidance, with each trainee improving by at least an average of 40% in this generalization situa-

tion. Betty showed smaller increases in appropriate use of these skills but Sandy showed no apparent change. Betty was the only staff person to demonstrate an overall improvement in use

of reward. During maintenance all staff sustained or demonstrated gains in their use of instruction and guidance, with Becky, Mary, and Sandy showing appropriate skill usage near

Fig. 3. Daily percentages of appropriate use of instruction, guidance, and reward of Becky, Mary, Sandy, and Betty (top to bottom) in the haircombing generalization situation.

100%. Betty increased her appropriate use of instruction and guidance by averages of 53% and 56%, respectively. All four staff rewarded near the 100% level in maintenance.

Resident performance: Haircombing. During baseline, Dale, Roy, and Dan required physical guidance to complete haircombing sessions over 70% of the time (Figure 4). Although Sheila

Fig. 4. Daily percentages of self-initiated, verbally instructed, and physically guided haircombing behavior of Dale, Roy, Sheila, and Dan (top to bottom).

averaged about 40% self-initiated responding, she also required considerable physical help (mean of 46%) to complete baseline sessions. Following staff training in toothbrushing, two residents, Dale and Roy, demonstrated overall increases in self-initiated haircombing responses (31% and 38%, respectively), decreases in physically guided responding, but little change in instructed responding. A similar but less noticeable increase in Sheila's self-initiated responding and decrease in physically guided responding occurred, with a mean change of 16% and 13%, respectively. Dan did not show any systematic changes in his haircombing behavior. During maintenance all four residents either sustained or improved on treatment levels of self-initiated responding and sustained or decreased guided responding.

Staff performance: Handwashing. During baseline handwashing sessions (Figure 5), staff were inconsistent or infrequent in their use of all three skills, with means ranging from a low of 19% (Betty's use of guidance) to a high of 76% (Sandy's use of reward). Following staff training in toothbrushing, Becky, Mary, and Betty showed improvement in their use of instruction and physical guidance during handwashing sessions. Although Betty increased her use of the three training skills she remained, relative to the other staff, an inconsistent trainer. Sandy also showed level changes and reduction in variance across response categories, but data overlap between conditions was more common than with the other staff. During maintenance, Becky, Mary, and Sandy showed small additional gains in their use of the training skills above treatment performance levels, whereas Betty demonstrated substantial improvement in her use of appropriate instruction and guidance, and a smaller improvement in her use of reward.

Resident performance: Handwashing. During baseline, no substantial changes in resident handwashing occurred (Figure 6). Three residents, Rick, Lynn, and Steve, completed on the average less than 18% of handwashing sessions on their own, responded infrequently to staff instruction,

and required considerable physical assistance to complete daily training sessions. The fourth resident, Tim, self-initiated at a 78% level during baseline. Following staff training in toothbrushing, Rick, Steve, and Lynn showed increases in self-initiated and decreases in physically guided handwashing behavior. Tim, who already was quite independent, showed only small mean increases in his self-initiated handwashing behavior. No marked improvement in resident response to staff instruction was noted during this condition. During maintenance, treatment levels of responding were generally sustained.

Staff to Resident Behavior Change Relationships

Comparison of Figures 1 and 2, 3 and 4, 5 and 6 show in general that a positive relationship existed between trainee skill proficiency and resident independent responding in the self-care programs. During baseline, inconsistent trainer performance related to uniformly low percentages of independent resident responding and high percentages of physically guided behavior. With two exceptions, increases in staff's appropriate use of instruction and guidance were closely followed by changes in resident self-initiated or physically guided self-care responding or both. Ten residents showed improved self-initiated or guided performance levels relative to baseline in an average of 9 days (range = 3 to 15 days) following a stable change in staff appropriate use of instruction and guidance. The exceptions were: (a) Betty's improvements were not reflected in any systematic changes in Dan's haircombing performance, and (b) Tim frequently washed his hands independently during baseline. The positive staff to resident behavior change relationships are further suggested by the fact that in no instances did resident behavior change before staff first showed a change.

Project Questionnaire

The results from the staff questionnaire indicated an overall positive evaluation of the training procedures. Staff indicated that the treatment

and maintenance procedures significantly increased the effectiveness of their self-care training efforts, enhanced the speed of resident learning of independent behavior, and were presented in a fashion that promoted easy and rapid application of the skills. In addition, staff responses suggested that the fading of observers and transferring responsibility for the self-care programs

Fig. 5. Daily percentages of appropriate use of instruction, guidance, and reward by Becky, Mary, Sandy, and Betty (top to bottom) in the handwashing generalization situation.

increased their feeling of training competence. Finally, staff indicated that the program would generally be useful in self-care training situa-

tions. Staff responses to a sample of 15 items of the 23 questionnaire items are presented in Table 3.

Fig. 6. Daily percentages of self-initiated, verbally instructed, and physically guided handwashing behavior of Tim, Rick, Lynn, and Steve (top to bottom).

DISCUSSION

The results of this study suggest, both experimentally and clinically, that the program was successful in teaching direct care staff to: (a) use basic behavior management skills in an appropriate and consistent manner in a training situation; (b) apply those skills in other generalization situations; (c) maintain consistent and appropriate use of the skills with infrequent supervision; and (d) effect important changes in severely and profoundly retarded residents' independent self-care responding.

Perhaps the most significant and encouraging results obtained relate to the generalization of direct care staff teaching behavior. In the majority of staff research projects, staff use of behavioral procedures has not typically been programmed or even assessed across generalization training situations. Although some investigators have addressed this problem in recent years, assessment in these studies has been limited by circumscribed target skills (e.g., Gladstone & Spencer, 1977; Ivancic *et al.*, 1981), or has not found generalization of staff behavior, despite attempts to program its occurrence (e.g., Page, *et al.*, 1982). The results here suggested positive change across staff in the generalized use of appropriate instruction and guidance across two different self-care programs, but little change in use of reward. Any one of several factors alone or in combination could be responsible for these generalized changes. First, during training, staff were exposed to diverse examples of the training skills, so as to promote the development of a self-care teaching response class. Second, staff were given explicit verbal prompts to use the training system across any self-care situations. Third, a number of common programmatic and physical stimuli (Stokes & Baer, 1977) such as the bathroom training settings, the similarity of the self-care skills, and the observers, may have served to promote the occurrence of generalization. For example, the professional staff observers, who were a normal part of the training environment, may have come to function as

discriminative stimuli for staff to use the skills appropriately. Fourth, the periodic feedback sessions, though typically only 5 to 10 minutes long, were designed to ensure continued usage of the training skills in the example situation. If generalization is viewed as the occurrence of similar behavior under nontrained conditions (Stokes & Baer, 1977), ensuring appropriate and consistent use of the relevant training behaviors in the example situation would seem at minimum a necessary requirement for generalization to occur. Finally, the fact that the staff participants were willing to participate on a somewhat voluntary basis (*i.e.*, in response to the experimenter's request following the recommendation of their supervisor) may have affected the results relative to participation by staff persons who were clearly mandated to participate. Future research needs to examine the contributions of each of these program components to the generalization process.

Another significant aspect of this study related to the maintenance procedure used. Past staff training and management research has used several maintenance strategies, such as a single postcheck after observation and treatment procedures have ceased, while staff were asked to continue training sessions (Gladstone & Spencer, 1977); a single postcheck following reduced use of the treatment procedures (Fabry & Reid, 1978); and gradual fading of the treatment procedures and decreasing the frequency of observation (Ivancic *et al.*, 1981). Although these maintenance procedures have reported varying degrees of success, they lack a component for transferring the external agent's supervision and monitoring of use of the training procedures to the staff participants. Consistent with the speculation of others (Thoreson & Mahoney, 1974), the results in this study suggest that teaching staff self-control procedures while fading external supervision components may constitute an optimal maintenance program. In contrast to previous studies' focus on increasing general resident interactions with self-control procedures (Burg *et al.*, 1979; Burzio *et al.*, 1983), the present study's self-control

procedures were directed at maintaining specific staff and resident behaviors. However, because this maintenance program was preceded by the treatment condition, the independent contribution of the self-control package cannot be evaluated. Nevertheless, it is clear that while the maintenance program was in operation, staff performance was sustained as external supervision was faded.

Although the current results are encouraging, the potential for reactive effects of observer presence on staff behavior requires examination in interpreting the results. As suggested previously (Greene et al., 1978; Repp & Dietz, 1979), observer reactivity may be a problem in staff programs, especially during intermittent recording conditions of maintenance. Opportunity for the occurrence of such reactive effects was present in that four of the five observers were professional-level personnel, two of whom had direct administrative responsibility for staff participants Becky, Mary, and Betty. However, several procedural conditions plus staff and resident data suggest that reactivity did not substantially contribute to the present results. First, observers were randomly assigned throughout the project to rate the 12 staff-resident pairings, avoiding differential association of any single observer with a particular staff-resident pair. Second, observers had regular work assignments which required them to interact daily with line staff on the three living areas, suggesting that being a project observer did not appreciably enhance the already existent reactivity related to these professional staff. Third, in a recent study, Ivancic et al., (1981) reported no differences in staff training behavior when staff were observed overtly or covertly by professional staff raters. Finally, resident data improved or were maintained during the 6 to 9 weeks of infrequent and intermittent maintenance observations. If staff were using the training skills only when the observer was sporadically present during this time, it is unlikely that the residents would have improved or maintained their skills. Nevertheless, future research needs to examine, and where pos-

sible control, more completely the influence of observers in staff training projects.

The definitive criterion for assessing the effects of a staff training and management program is positive change in resident behavior. Recent studies have reported both substantial (e.g., Greene et al., 1978) and minimal (e.g., Burg et al., 1979; Ivancic et al., 1981; Page et al., 1982) client gains in this respect. In the present study, mean increases in *independent* responding during the treatment and maintenance conditions ranged from 38% (Sally) to 67% (Sam) in toothbrushing. In addition to these changes in the example situation, several residents in the generalization situations showed substantial increases in independent self-care responding. Of the eight residents involved in the haircombing and handwashing programs, four showed average gains in self-initiated responding during treatment and maintenance in excess of 47% (Dale, Roy, Rick, and Steve), whereas the remaining four residents showed overall improvements of less than 25% (Sheila, Dan, Tim, and Lynn). Nevertheless, these four residents did show upward, but more gradual improvements in self-initiated responding during treatment and maintenance. These results are particularly encouraging given the fact that severely and profoundly retarded individuals were the target clients in the project.

Because of the amount and complexity of the data, the reliability of the visual inspection procedure was assessed and found adequate, using both raters involved and independent of the project. Visual inspection of graphic data presents problems analogous to the problems involved in establishing the reliability of human observational systems. It is surprising given the extensive attention to establishing the reliability of observation systems that similar attention has not been given to examining visual analysis rating procedures for the dependent behaviors, despite the recognized need for such attention (Jones, Vaught, & Weinrott, 1977). If applied researchers are to continue to evaluate visually complex data sets such as those found in the staff

training and management area, it seems imperative that more time be devoted to assessing the reliability of the graphic analysis procedures used.

Finally, it should be stressed that due to the complexity of the training package used, it is not possible to assess empirically the contribution of each of the separate components. However, the staff self-report data may be useful in this regard. All four trainers indicated on the staff survey that use of videotape feedback (i.e., actually seeing themselves performing) greatly aided their learning of the training system. In addition, the staff reported that the rehearsal components enhanced their understanding and implementation of the training skills.

In summary, the staff training and management program implemented in this study shows great promise. Future research is needed to assess the effectiveness of the teaching package used in other program areas and in group training situations, including its efficiency. In this latter regard, it should be noted that the training program was found to be very time efficient, with each participant receiving only 3-4 hours of individual instruction from the experimenter during the 6 months of the project. This minimal amount of professional supervision in combination with the degree and rapidity of behavior change observed in both staff and retarded residents indicates that this teaching package is practical as well as effective.

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