JOURNAL OF APPLIED BEHAVIOR ANALYSIS 1976, 9, 417-431 NUMBER 4 (WINTER) 1976

A PERFORMANCE-BASED LOTTERY TO IMPROVE RESIDENTIAL CARE AND TRAINING BY INSTITUTIONAL STAFF

BRIAN A. IWATA,[1] JON S. BAILEY, KATRINA M. BROWN, TERRY J. FOSHEE, AND MICHAEL ALPERN

WESTERN MICHIGAN UNIVERSITY, FLORIDA STATE UNIVERSITY, AND SUNLAND CENTER, TALLAHASSEE, FLORIDA

Two experiments were conducted on four units of a residential facility for the multiply-handicapped retarded in an attempt to improve daily care and training services. Experiment I compared the effects of two procedures in maintaining the work performance of attendants, using an A-B design on two units. One procedure consisted of implementing specific staff-resident assignments, the other consisted of allowing attendants who had met performance criteria to be eligible for a weekly lottery in which they could win the opportunity to rearrange their days off for the following week. Results showed that the lottery was a more effective procedure as measured by the per cent of time attendants engaged in predefined target behaviors, and by their frequency of task completion in several areas of resident care. Experiment II replicated and extended these results to the area of work quality on two additional units, using a multiple-baseline design. The performance lottery was found to be an effective economical procedure that could be implemented by supervisory staff on a large scale.

DESCRIPTORS: work performance, institution, staff management, work behavior, reinforcement, lottery, time off, attendants

The care, training, and habilitation of the institutionalized retarded has become a major social issue in recent years, as evidenced by reports and essays describing the substandard conditions under which many of these persons live (Blatt, 1970; Rivera, 1972); by the development of national accreditation standards for the operation of residential facilities (Accreditation Council for Facilities for the Mentally Retarded 1971); and by the growth of legal action concerning the rights of the retarded (President's Committee on Mental Retardation, 1975).

One area of residential treatment in which substantial progress has been made is that of program development (Gardner, 1971; Watson, 1972*a*). However, as Kazdin (1973) noted, successful program implementation cannot occur unless appropriate staff performance is both developed and maintained. Since attendant-level staff often number as much as 50% of an institution's entire employee population, and since they are in direct contact with residents, such staff obviously constitute an invaluable pool of behavior-change agents. However, observational studies of attendants' behavior on the ward have indicated that they spend relatively little of their total work time interacting with residents in training (Harmatz, 1973) or in social play (Daily, Allen, Chinsky, and Veit, 1974). These desirable interactions account for less than 1% of staff time in some instances. It has also been reported that as much as 20% to 40% of their time may be spent in "leisure-time" activities such as reading newspapers or watching television (Bensberg and Barnett, 1966), and that typical attendant-resident interactions may actu-

[1]We would like to express appreciation to Charles M. Kimber, Jayne M. Alley, Dora Brannon, and Arthur Trunkfield for their much needed administrative support and approval of this project, and to the following persons who assisted in observer training and data collection: Marjorie Barber, Felix Caballol, John Dehner, Tom Dickman, Terry Fitzpatrick, Robert Hinson, Philip Jarman, Jack May, Jytte Methmann, Walter Preston, Tom Shea, Judy Stanley, Mike Stevens, and Dexter Sutherland. Reprints may be obtained from Brian A. Iwata, Psychology Department, Western Michigan University, Kalamazoo, Michigan 49008, or Jon S. Bailey, Psychology Department, Florida State University, Tallahassee, Florida 32306.

ally be conducive to maintaining inappropriate resident behavior (Warren and Mondy, 1971).

Numerous investigations have attempted to evaluate the effects of inservice training on staff performance (Gardner, 1973; Iwata, Note 1). Using measurement procedures such as paper and pencil tests and ability inventories performed in controlled situations, it has been demonstrated that inservice programs can increase both verbal knowledge (Cochran and Steiner, 1966; Gardner, 1972*a;* Johnson and Ferryman, 1969) and training skills (Gardner, 1972*b;* Panyan and Patterson, 1974). On the other hand, studies in which staff or resident behavior was repeatedly monitored under natural conditions have suggested that instructions, training, and the development of job assignments may be expected to have relatively small (Martin, 1972), temporary (Hollander, Plutchik, and Horner, 1973; Panyan, Boozer, and Morris, 1970), or negligible effects (Hollander and Plutchik, 1972; Katz, Johnson, and Gelfand, 1972; Quilitch, 1975) on attendants' actual work performance.

More positive results have been obtained through the use of contingencies on staff behavior. Frequent monetary bonuses, either alone (Katz *et al.,* 1972), or in combination with other procedures such as assignments (Martin, 1972; Pommer and Streedbeck, 1974) and rankings (Pomerleau, Bobrove, and Smith, 1973), are extremely effective techniques. Additional reinforcers have included commercial trading stamps (Bricker, Morgan, and Grabowski, 1972; Hollander and Plutchik, 1972; Hollander *et al.,* 1973) and extra time off from work (Watson, 1972*b*).

In spite of the effectiveness of these procedures, however, a potential problem exists in respect to their economic feasibility. The stated or estimated costs of the above programs have ranged from the least expensive (Bricker *et al.,* 1972) of $32 over 24 sessions involving nine attendants, to the most expensive (Pomerleau *et al.,* 1973) of $40 to $80 per week involving 12 attendants, of whom three received money. Given these figures, few institutional administrators would probably be either able or willing to implement large-scale incentive programs. Thus, there appears to be a need to develop effective, low-cost staff-maintenance procedures.

One such procedure is feedback from supervisors. This technique, which is an integral component of most staff reinforcement programs, is efficient and requires little or no monetary expenditure. Panyan *et al.* (1970) found that attendant performance in resident training programs gradually deteriorated following an inservice course in behavior modification. Ward feedback charts, depicting both group and individual staff performance, were used to increase the number of daily training sessions to levels comparable to or higher than those observed immediately following the course. Subsequent studies (Fielding, Errickson, and Bettin, 1971; Quilitch, 1975; Welsch, Ludwig, Radicker, and Krapfl, 1973) further demonstrated the effectiveness of staff feedback independent of more costly forms of reward.

The situations in which feedback may be used by itself, however, may be limited. Pommer and Streedbeck (1974) found that feedback via public notices was insufficient to maintain staff performance over time in the absence of scheduled reinforcement. Martin (1972) and Pomerleau *et al.* (1973) also found that the effects of feedback were not as great as those obtained when feedback was paired with a monetary bonus. It appears that the effects of feedback may be due to its association with other consequences of a reinforcing or punishing nature, and that subtle or nonscheduled consequences may have been a treatment component in previous studies using feedback alone.

Another potential low-cost procedure whose effects have not yet been demonstrated is allowing attendants access to preferred activities, contingent on the performance of desirable work behaviors. Ayllon and Azrin (1968) suggested the use of work-shift preference and vacation choice, although these were not empirically investigated by them. Other possibilities include

making preferential job assignments, and rearranging break or work schedules within allowable limits. Economic problems regarding the use of such procedures would be few, since they make use of existing activities. In addition, these activities could be varied across time, settings, and staff populations.

The present study sought to develop and evaluate a cost-effective staff reinforcement program based on existing reinforcers. The goal of the program was to increase daily care and training activities on the part of attendant personnel on four living units (approximately one-half of all units) of a 500-bed state residential facility for the multiply-handicapped retarded.

EXPERIMENT I

METHOD

Subjects and Setting

All attendant staff assigned to the day shift on Units A and B, and residents who lived on these units, served as subjects. Twelve attendants (10 female, two male), ranging in age from 24 to 57 (mean, 42) yr, and in education from 5 to 12 (mean, 9) yr, were assigned to Unit A. The resident population on this unit consisted of 57 nonambulatory and three ambulatory children, all classified as profoundly retarded. Fourteen attendants (10 female, four male), ranging in age from 22 to 54 (mean, 40) yr, and in education from 7 to 12 (mean, 8) yr, were assigned to Unit B. The resident population on Unit B consisted of 70 nonambulatory, profoundly retarded older adolescents and adults.

Observation

Throughout the study (49 consecutive days), daily records were kept on the amount of time that attendants engaged in six predefined categories of behavior, and on three categories of resident treatment.

Staff behavior. A momentary time-sampling procedure (Powell, Martindale, and Kulp, 1975), was used to determine the per cent of time that staff engaged in each of the following activities:

1. Indirect custodial work: staff member is engaged in maintenance work not involving direct contact with a resident. Examples include: clothing care, cleaning, bedmaking, and food preparation.

2. Direct custodial work: staff member is engaged in daily resident care activities. Examples include: bathing, feeding, dressing, and temperature taking.

3. Stimulation-training: staff member is maintaining physical contact, verbally interacting, or manipulating objects with a resident at times other than resident caretaking or is in the process of taking data for a training program. Examples include: reading to or playing with a resident, giving instructions, observing, and marking data sheets.

4. Off-task: staff member is on the unit, but is not engaged in any of the above activities.

5. Off-unit: staff member is not on unit.

6. Area supervision: at least one staff member is present in each of the major areas of the unit (two areas on Unit A; three on Unit B).

Observers consisted of supervisory staff from several of the facility's units, including Units A and B, and other nonattendant personnel. The procedure consisted of having the observer unobtrusively walk through the unit and record on a small card which of the above activities each attendant was engaged in, and whether or not there was adequate area supervision. Samples were taken at a variable time within half-hour intervals, for a total of 16 samples per day for each on-duty attendant. Attendants were informed that observations were being conducted, but they did not know who was performing the observations, nor were they aware of the target behaviors or the observation schedule.

Resident treatment. To determine the extent to which attendants were carrying out their routine duties, daily observations were performed in each of the following areas:

1. Dental care: following the morning and noon meals, observers viewed the area of the

ward where toothbrushing took place, and recorded whether or not each resident's teeth were observed to be brushed at least once daily.

2. Out-of-bed: throughout the day, observers recorded whether or not each resident was taken out of bed and placed in either a wheelchair or recliner, or on a floor mat at least once per day at times other than bathing or feeding.

3. Soiled clothing: two daily samples were taken between the hours of 10:00 to 11:00 a.m. and 1:00 to 2:00 p.m. during which observers visually or manually inspected each resident's clothing and recorded the presence of either urine or feces.

Reliability. Independent observations were performed on both units at least once during each phase of the study. Eleven checks for the staff behavior categories were obtained by having a second observer perform simultaneous but independent time samples with the primary observer over an entire 8-hr session. The procedure involved the primary observer indicating by way of either words or motions which attendant was to be rated at that particular moment. An agreement was scored if both observers recorded the same category for an attendant during a simultaneous observation. Reliability of occurrence percentages were calculated for each category by dividing the agreements of occurrence by the agreements of occurrence plus disagreements, and multiplying by 100. This procedure yielded the following ranges and means (indicated by parentheses): indirect custodial work: 73% to 93% (83%), direct custodial work: 76% to 100% (90%), stimulation-training: 73% to 100% (89%), off-task: 78% to 100% (87%), off-unit: 99% to 100% (99%), area supervision: 87% to 100% (97%).

Eleven reliability observations for the resident treatment categories of dental care and soiled clothing were also performed simultaneously with a primary observer, while out-of-bed was observed independently throughout the day. Reliabilities were calculated using the same formula as above, and yielded the following ranges and means (indicated by parentheses): dental care: 89% to 100% (97%), out-of-bed: 76% to 90% (83%), soiled clothing: 94% to 100% (98%).

Procedures

Baseline. During regularly scheduled weekly staff meetings, attendants on both units were reminded of the importance of providing adequate daily care services for all residents. In addition, the maintenance of supervision in each of the living unit areas was stressed, and the attendants were urged to take residents out of bed and to engage in stimulation and training activities with them.

The daily assignment system in effect at the beginning of the study was not changed during baseline, and consisted of the following. All attendants were responsible for performing general duties (feeding, changing, and interacting with residents, cleaning the unit, *etc.*), and no formal assignments were made in these areas. Written assignments pertained only to particular attendants designated to work in the bathing areas on a rotating daily basis. These persons were responsible for providing baths and toothbrushing for residents brought to the area by other staff; however, no one in particular was responsible for seeing that each resident received these services.

Staff assignments. Residents and staff were divided into program groups, with each staff member being responsible for four or five residents. Several individual staff groups were combined into larger groups to ensure that on-duty attendants would be responsible for the residents of an off-duty attendant. Under this system, each attendant was responsible for seeing that assigned residents received adequate daily care services, including stimulation activities. Attendants were still assigned to the bathing area on a rotating basis; however, each attendant was responsible for bringing assigned residents to the area.

Implementation of this procedure was in response to a facility-wide directive to incorporate recommendations based on the *Standards for*

residential facilities for the mentally retarded (Accreditation Council for Facilities for the Mentally Retarded, 1971). One of the standards called for the development of such staff-resident groups.

Performance lottery. Weekly criteria were determined for the staff categories of stimulation-training (not having a "zero" rating for any day), and area supervision (80% each day). Criteria for the resident treatment categories of dental care and out-of-bed consisted of having performed these services for one's assigned residents on a daily basis; the criteria for soiled clothing consisted of being observed changing at least one resident's clothing during both of the daily checks. At the end of the week during the staff meeting, the unit director read aloud the names of those attendants who had met the criteria for the previous week. Slips of paper containing these names were then placed in a container and a winner's name was drawn. The winner was given the opportunity to rearrange days off from work for the following week. Since scheduling allowed only one out of every three weekends off, the lottery winner was usually able to arrange an extra weekend off. Instances in which the winner was already scheduled off for that weekend were compensated for by allowing the attendant to save the rescheduling option for the following week. Eligible persons who did not win the lottery and persons who did not meet criteria for inclusion in the lottery followed their regular work schedule.

Experimental Design

An A-B design with a partial replication was used. Concurrent baselines were taken across units on the six categories of staff behavior and the three resident-treatment categories. Beginning on Day 8, the combined procedures of staff assignments plus the performance lottery were implemented on Unit A; a partial treatment (assignments only) was implemented on Unit B. Beginning on Day 22, the complete treatment was instituted on Unit B with the addition of the performance lottery to the existing assignments.

RESULTS

Group Data

Staff behavior. Means for the categories of attendant behavior across experimental conditions are presented in Table 1. Little or no change occurred with respect to indirect custodial work and off-unit. Direct custodial work also changed very little on Unit A, whereas a gradual increase of 10% was observed on Unit B across conditions.

Figure 1 provides a more detailed account of two of the categories that showed clear changes: stimulation-training and off-task. Attendants on both units spent less than 4% of their time engaged in stimulation or training activities with residents during baseline. When staff assignments plus the lottery were implemented on

Table 1

Mean Per Cent of Attendant Time Spent in Each Behavioral Category for Experiment I[a]

Category	Baseline		Assignments (Unit B only)	Assignments plus Lottery	
	Unit A	Unit B		Unit A	Unit B
Indirect custodial work	24	22	24	23	28
Direct custodial work	36	28	37	39	37
Stimulation-training	3	1	3	21	12
Off-task	24	33	21	4	9
Off-unit	13	16	15	13	14
Area supervision	70	2	66	96	96

[a]Per cents for each unit exceed 100 since area supervision could be scored along with all other categories except off-unit.

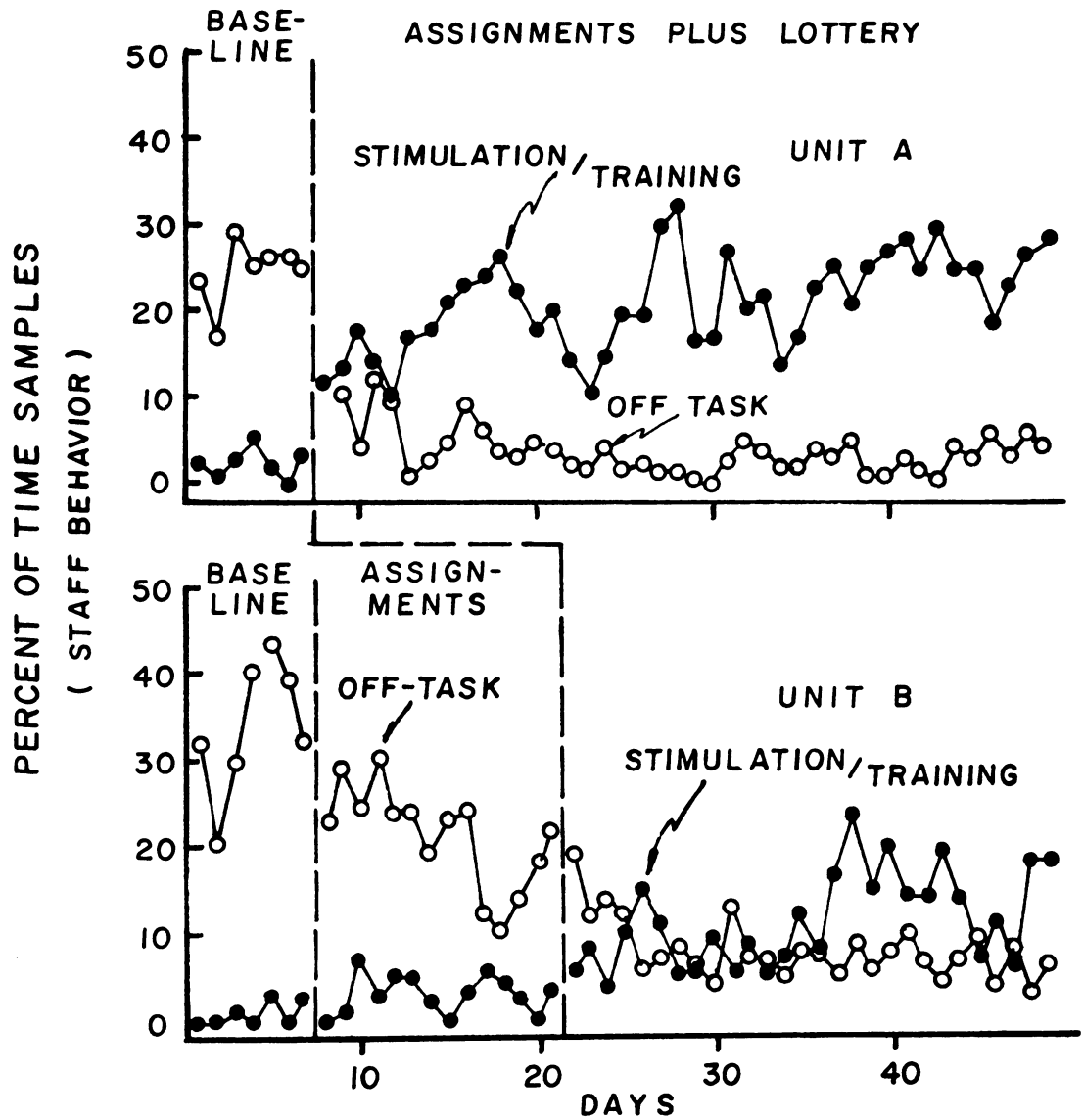

Fig. 1. Per cent of staff time engaged in stimulation-training activities and off-task during Experiment I.

Unit A, such activities increased by a mean of 18%. Assignments alone had a small and variable effect on the behavior of Unit B attendants, which increased 2% over the baseline level. The addition of the lottery on Unit B resulted in an additional 9% increase.

Off-task behavior constituted a large portion of attendant time on both units during baseline. Although no contingencies were applied directly to this category, results indicated that the experimental procedures led to desirable changes directly inverse to those observed in the area of stimulation-training. The addition of assignments plus the lottery on Unit A resulted in a 20% decrease in off-task, while assignments alone led to a 12% decrease on Unit B. After the lottery was implemented on Unit B, off-task decreased an additional 12%.

Results for the category of area supervision were similar to those of stimulation-training. The extremely low level of supervision observed on Unit B during baseline was due to the fact

that there was an additional wing located in the middle of the unit, perpendicular to the main corridor. Although attendants were often observed in the middle of the unit, the absence of an attendant within the wing resulted in a negative score for area supervision. The implementation of staff assignments on Unit B resulted in levels of supervision similar to those found on Unit A during baseline. Addition of the lottery led to consistently high levels of supervision on both units.

Resident treatment. Figure 2 presents data for the categories of dental care and out-of-bed activities. A majority of residents on Unit A

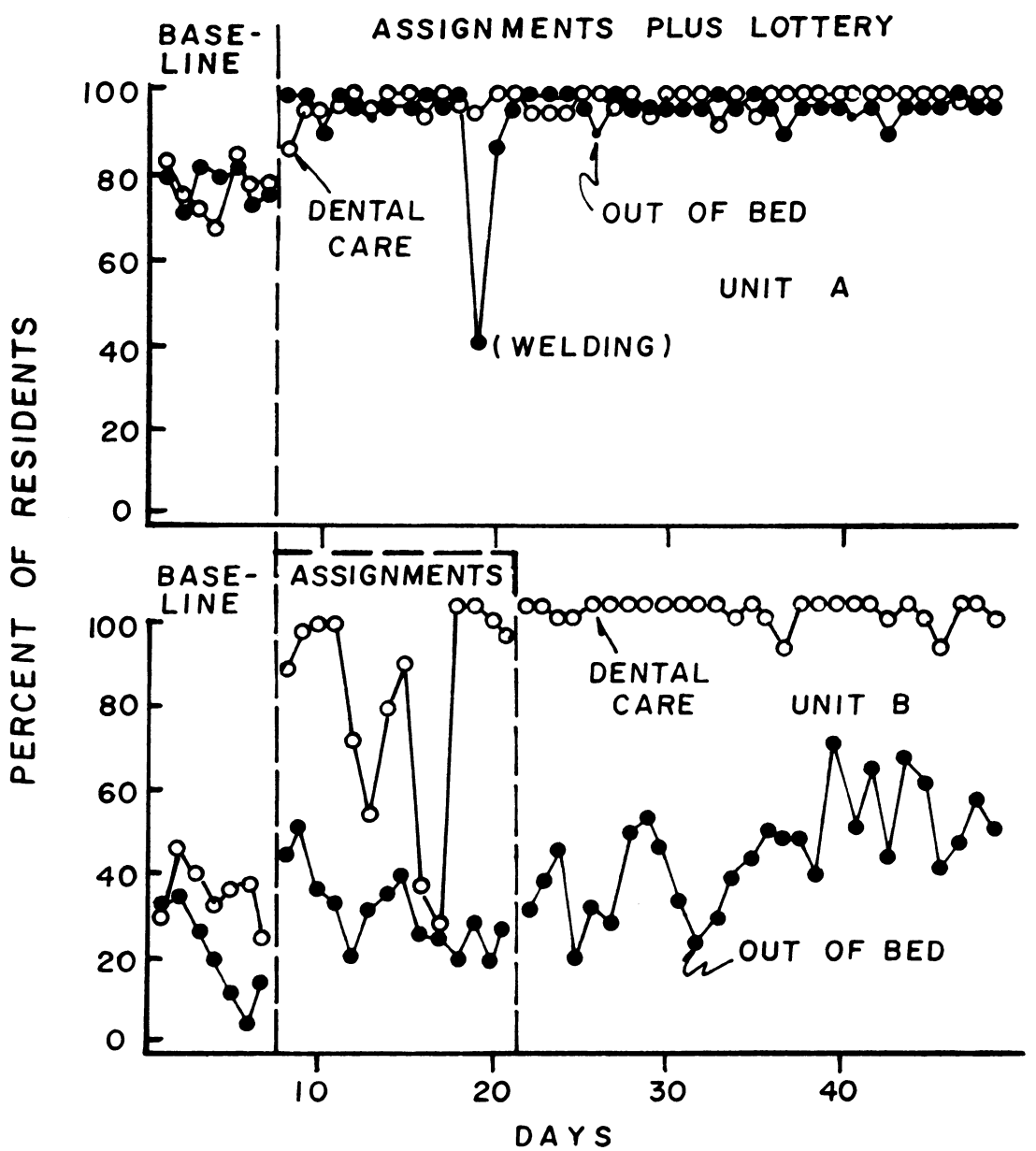

Fig. 2. Per cent of residents receiving at least one daily toothbrushing and per cent participating in out-of-bed activities at least once per day. Resident movement on Unit A was restricted on Day 19 due to repairs involving the use of welding equipment.

(mean, 77%) received at least one daily toothbrushing during baseline; this average was increased to 98% during the lottery phase. On the other hand, daily toothbrushings averaged only 35% during baseline on Unit B. Assignments alone produced a large increase (mean, 81%), although the daily percentage appeared to vary considerably. A high and stable performance level was achieved (mean, 95%) after the lottery was instituted on Unit B.

Similar results were observed in the out-of-bed category. Baseline means for Units A and B were 78% and 20%, respectively. Addition of the lottery on Unit A resulted in a mean increase to 86% of residents who were included in out-of-bed activities. An exception to this increase occurred on Day 19; unit repairs involving the use of welding equipment prevented a number of residents from being allowed out of bed. Assignments alone on Unit B produced an increase to 31%; addition of the lottery increased this average to 44%.

Figure 3 shows the total number of residents found in soiled clothing during the two daily observation periods. The lottery on Unit A led to a mean decrease from 65 to 13 instances of soiled clothing. Assignments on Unit B brought about a mean reduction from 75 to 35; addition of the lottery further decreased this average to 25.

Individual Data

An examination of individual subjects' data indicated that group mean changes were representative of individual staff performance. In every instance, individual means during the treatment phases were superior to those found during baseline for all staff behavior and resident treatment categories used in determining eligibility for the lottery. Such was also the case for the nontarget category of off-task. However, not all staff members consistently met weekly criteria in each category. Mean percentages of attendants eligible for the lottery on Units A and B were 38% and 26%, respectively.

EXPERIMENT II

METHOD

Subjects and Setting

Attendants assigned to the day shift on two units similar to those in Experiment I, and residents who lived on the units, served as subjects. Twelve attendants (nine female, three male), ranging in age from 22 to 49 (mean, 32) yr, and in education from 6 to 14 yr (mean, 10), were assigned to Unit C. The resident population on this unit consisted of 33 nonambulatory older adolescents and adults, and 18 ambulatory geriatric residents, all of whom were classified as severely or profoundly retarded. Thirteen attendants (eight female, five male), ranging in age from 20 to 46 yr (mean, 37), and in education from 8 to 13 yr (mean, 10), were assigned to Unit D, whose population consisted of 61 nonambulatory, profoundly retarded older adolescents and adults.

Observation

Staff behavior. The observation categories were the same as those in Experiment I with the exception of area supervision, which was deleted because it did not appear to be a problem on either of the two units. As in Experiment I, time samples were collected once within a half-hour interval throughout the day shift.

Dental care. Informal observations indicated that excessive soiled clothing and a lack of out-of-bed activities were not serious problems on either of the two units, and these categories were deleted from the study. However, a major resident problem on Units C and D was that of dental care. In Experiment I, this category was measured by observing an attendant brush a resident's teeth. However, such a procedure did not ensure that the quality of brushing would be adequate. To obtain such a measure, the staff dentist assisted in providing a written outline of his procedures for conducting an oral examination, and his criteria for assigning dental grades. An oral examination consisted of visually inspecting all areas of the teeth and gums,

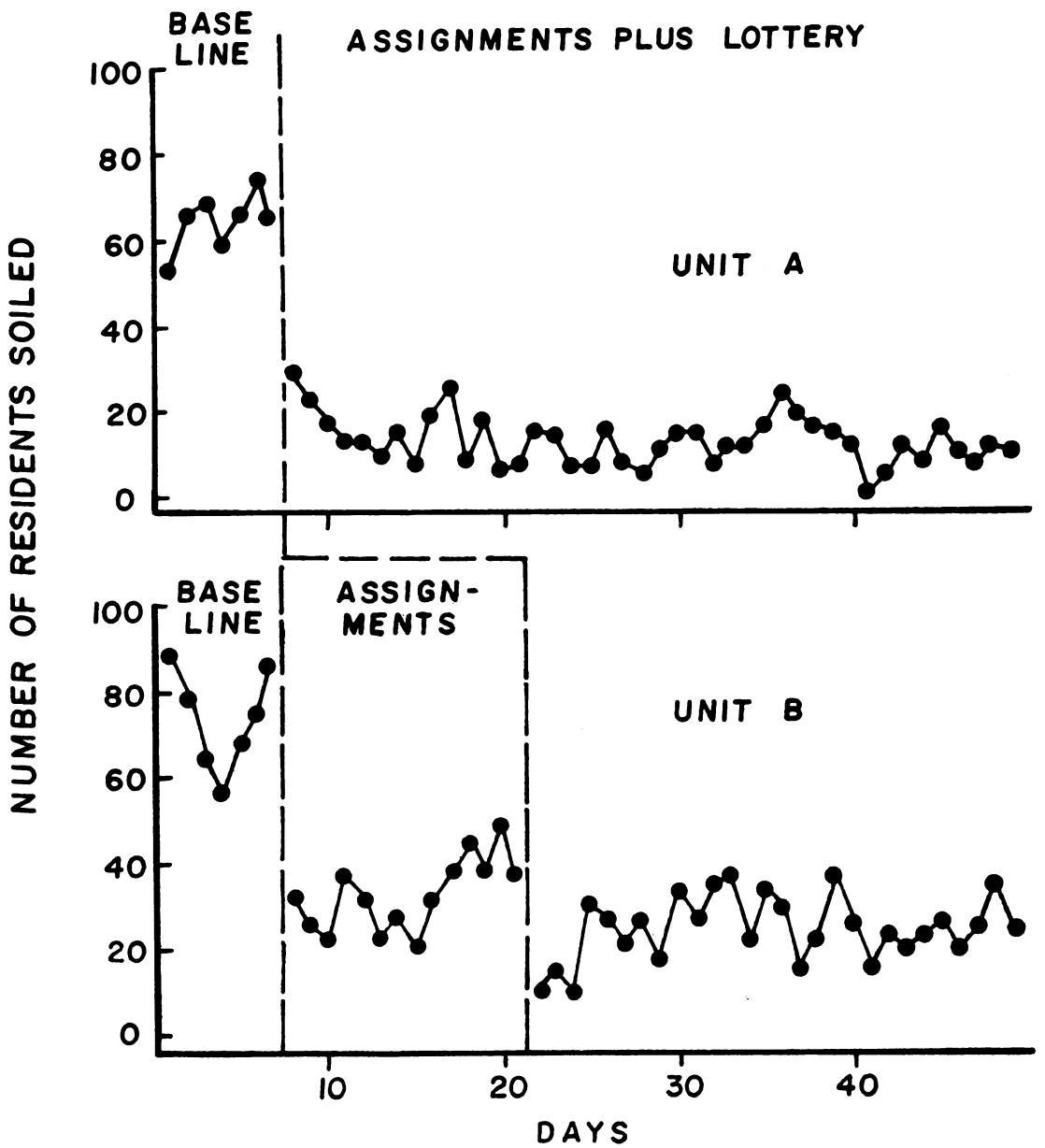

Fig. 3. Total number of residents found in wet or soiled clothing during two daily observation periods.

taking a scraping from the teeth using a tongue depressor, and assigning a grade from A (complete absence of tartar, plaque, sordes, and food particles from all areas of the mouth) to F (indication of tartric development on most areas of the teeth). Trained, nonattendant observers examined all residents' teeth each day after the morning shift had gone off-duty.

Reliability. Independent observations for the time-sample categories were conducted in a manner similar to that in Experiment I, except that reliability data were taken in 2- to 3-hr blocks, instead of over an entire 8-hr session. This procedure enabled a naive university student to serve as the reliability observer instead of another staff member. Reliability observations were conducted an average of twice weekly using a schedule that ensured that the entire 8-hr shift

would be adequately sampled. Reliability of occurrence percentages were calculated for each category and yielded the following results: indirect custodial work: 94%, direct custodial work: 94%, stimulation-training: 95%, off-task: 89%, off-unit: 99%.

The dentist's assistant, naive to the purposes of the study, provided reliability observations for the dental-care data. Each day during the week (Monday through Friday), after observers had finished the regular grading, he graded a percentage of residents' teeth on both units, so that over a one-week period, each resident received a reliability grade in addition to the regular grades. The following reliabilities of occurrence were obtained for each grade: A: 92%, B: 85%, C: 90%, D: 89%, F: 85%.

Procedures

Baseline. The baseline for this experiment was comparable to the staff-assignments condition for Unit B during Experiment I. Residents and staff had already been divided into program groups, and the importance of providing adequate daily care, stimulation, and training activities was stressed during the regular weekly staff meetings.

Performance lottery. Weekly eligibility criteria were established in the areas of stimulation-training (maintaining a weekly average of 15% of time engaged in these activities) and dental care (maintaining grades of B or better for one's assigned residents). The procedures for conducting the lottery were the same as in Experiment I.

Experimental Design

The present design was that of a multiple baseline across units (Baer, Wolf, and Risley, 1968). The lottery was implemented on Unit C beginning on Day 15, and on Unit D beginning on Day 29.

RESULTS

Group Data

Staff behavior. As Table 2 shows, the per cent of time spent in the various categories was quite similar for both units during baseline. Relatively small changes occurred across conditions in the categories of indirect custodial work, direct custodial work, and off-unit. Changes similar to those found during the lottery condition in Experiment I were observed in the categories of stimulation-training and off-task. Figure 4 provides the daily percentages for both of these categories.

Dental care. Table 3 shows the mean per cent of residents receiving dental grades of A through F. Changes observed across conditions for both units consisted of an increase in the per cent of residents receiving grades of A and B, and a decrease in C, D, and F grades. Figure 5 provides the daily percentages for the A and F categories. There was a gradual decreasing trend in A grades on both units during baseline, which

Table 2

Mean per cent of attendant time spent in each behavioral category for Experiment II.

	Assignments		*Assignments plus Lottery*	
Category	*Unit C*	*Unit D*	*Unit C*	*Unit D*
Indirect custodial work	21	20	23	26
Direct custodial work	27	27	28	26
Stimulation-training	5	5	17	20
Off-task	29	30	11	12
Off-unit	18	17	20	16

Table 3

Mean per cent of residents receiving dental-care grades of A through F.

	Assignments		*Assignments plus Lottery*	
Grade	*Unit C*	*Unit D*	*Unit C*	*Unit D*
A	12	9	19	31
B	24	26	43	38
C	24	26	20	20
D	22	20	12	9
F	18	19	6	2

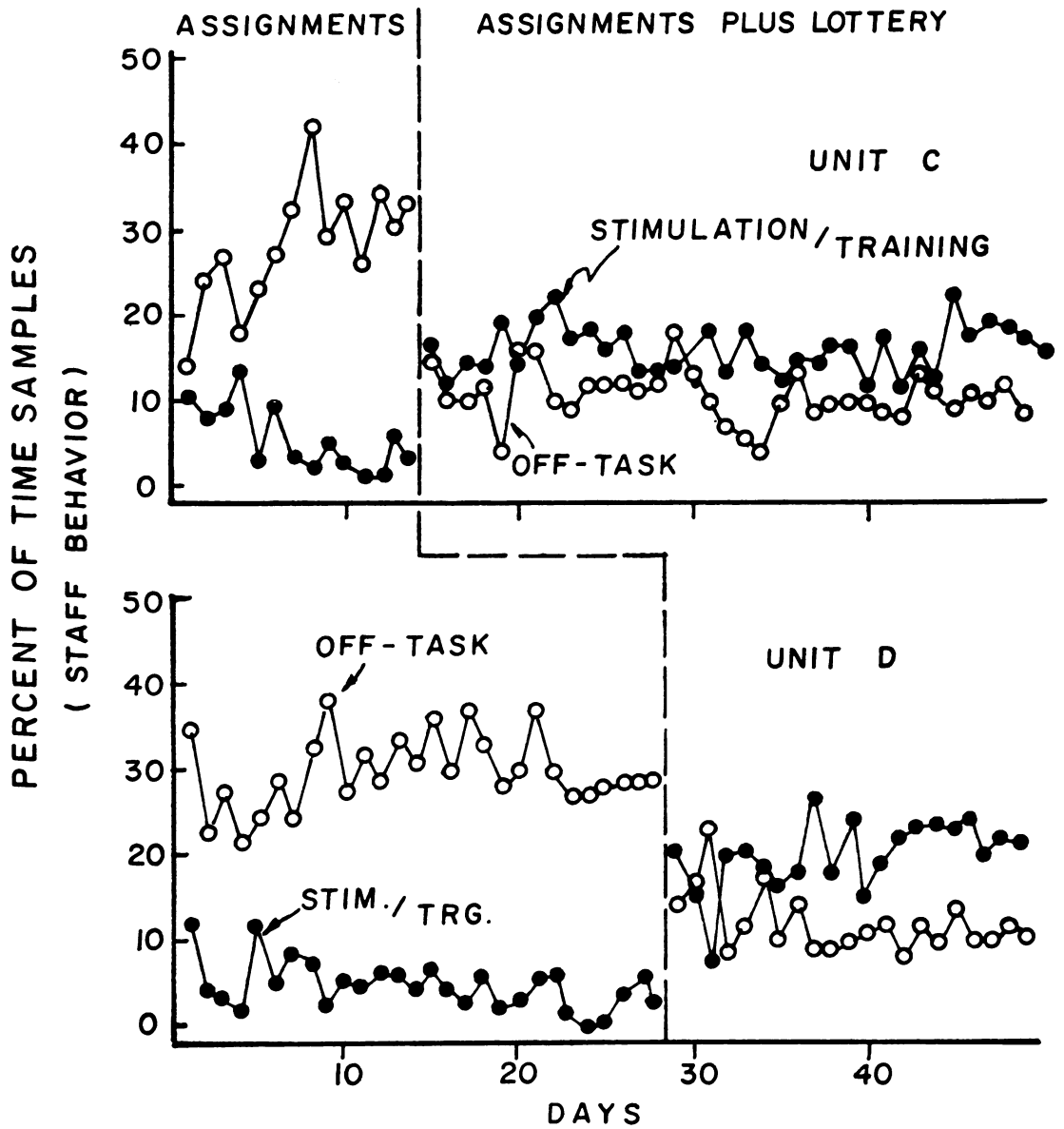

Fig. 4. Per cent of staff time engaged in stimulation-training activities and off-task during Experiment II.

was reversed when the lottery was implemented; the opposite effect was observed with respect to F grades.

Individual Data

Decreases in off-task and increases in stimulation-training, as well as the percentage of residents who received daily dental grades of B or better, were observed for all staff members across conditions. An average of 32% and 41% of the attendants on Units C and D, respectively, were eligible for the lottery each week.

GENERAL DISCUSSION

Experiment I compared the effects of two procedures in maintaining appropriate work behavior by attendant-level staff. One procedure involved assigning staff members the responsibility of providing services to specific residents.

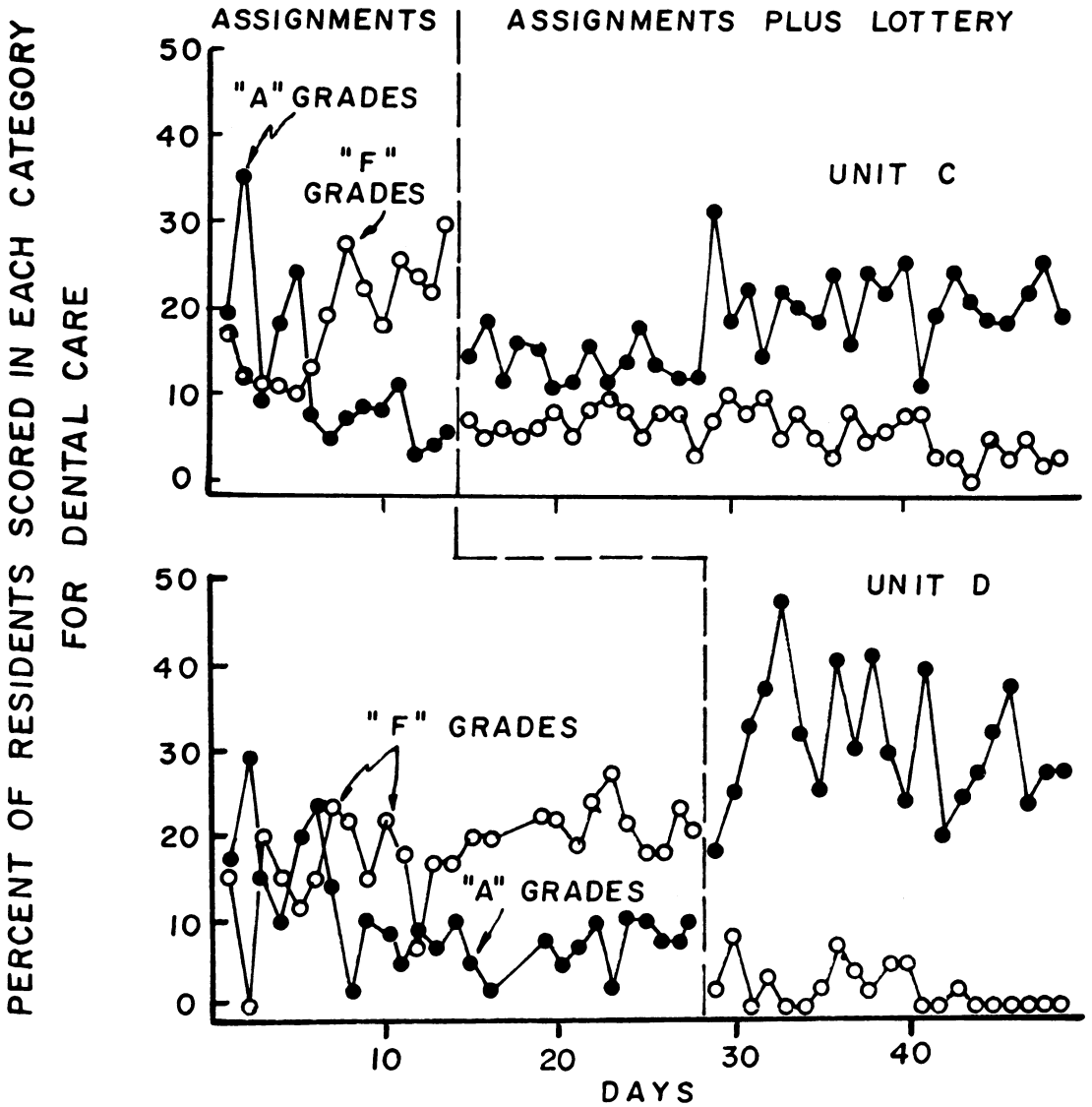

Fig. 5. Per cent of residents receiving daily dental grades of A (best) or F (worst).

The other procedure consisted of applying a contingency whereby staff who met performance criteria were eligible for a weekly lottery in which they could win the opportunity to rearrange their days off for the following week.

Results showed that the lottery on Unit A led to several beneficial changes. Substantial decreases were found in staff off-task behavior, and in the number of residents found in soiled clothing during daily checks. Additionally, staff spent more time engaging in stimulation and training activities with residents and provided better unit supervision. Increases were also seen in the number of residents who received daily toothbrushings, and the number included in daily out-of-bed activities.

Implementation of staff-resident assignments to the ward routine on Unit B led to partial improvements in the above areas; however, the changes did not compare to those observed on Unit A in terms of either their magnitude or stability. Subsequent implementation of the lottery on Unit B led to further improvements in all the above areas.

Due to the higher levels of performance on Unit A during baseline, and the fact that the assignments condition was never implemented on Unit A in the absence of the lottery, there existed the possibility that Experiment I did not allow an adequate comparison between the two procedures (assignments *versus* assignments plus lottery). Therefore, the second study employed a direct replication of experimental conditions across two additional units in which the baseline consisted of the assignments condition. The results of Experiment II supported the general findings of Experiment I, and extended them to the area of quality of care.

The present results support the use of a performance-based lottery as an effective yet economical staff-maintenance procedure. Although, as a result of the lottery, there was generally one less staff member present during the weekends, this absence was compensated for by that person's attendance on the two weekdays originally scheduled off. Thus, lottery winners were still required to work a 40-hr week.

It might be contended that the procedure of granting extra weekends off may not be possible due to the potential problem of staff shortage. Results of the present studies did not support such a contention. First, the contingency produced superior levels of resident treatment on all units in spite of an additional attendant's absence during the weekend. Second, the reductions in off-task behavior averaged 19% across the four units. Such a reduction exceeds 1.5 hr per day per attendant, or 12 hr per day given eight on-duty attendants as was generally the case on weekends. Thus, the present procedures led to reductions in off-task that were greater than an attendant's entire daily work contribution. Third, before conducting Experiment II, a general facility policy had been established whereby staff shortages were defined numerically for each unit. Whenever staff shortages exceeded these numbers, additional persons would either be: (a) borrowed from other units, or (b) called in from home, in order to make up the deficit. Facility attendance records indicated that this procedure was not implemented more frequently for Units C and D than for any other unit during Experiment II.

Although the present procedures produced noticeable changes in behavior, and staff records revealed an overall increase in each attendant's performance, individual staff performance varied across both time and behaviors. Approximately one-third of the attendants was eligible for the lottery during any given week, but only one or two attendants consistently met all performance criteria every week. In addition, several staff members generally performed extremely well in some areas, but poorly in others. Thus, it may be that the reinforcing value of the procedure does not remain constant for all persons, or that the nature or probability of reinforcement will not maintain certain behaviors. One way to increase the probability of reinforcement would be to use the lottery to determine the order of choosing reinforcers, one of which could be rearranging days off.

Future studies should examine the effects of additional low-cost procedures in reducing large-scale institutional problems. Furthermore, such procedures should be designed so that implementation and continued monitoring will not constitute an unmanageable workload on the part of supervisory personnel. In the present studies, all observations and data collection (except reliability data) were performed by the institutional staff. These persons carried full responsibility for their ongoing duties in addition to participating in the studies.

Due to unforeseen changes in supervisory staff, the lottery program was discontinued on two units after the studies were terminated. However, the lottery was continued on the other two units, and the time-sample procedure incorporated into the regular employee evaluation process.

REFERENCE NOTE

1. Iwata, B. A. *Attendant training in institutional settings.* Unpublished manuscript, Florida State University, 1974.

REFERENCES

Accreditation Council for Facilities for the Mentally Retarded. *Standards for residential facilities for the mentally retarded.* Chicago: Joint Commission on Accreditation of Hospitals, 1971.

Ayllon, T. and Azrin, N. *The token economy.* New York: *Appleton-Century-Crofts,* 1968.

Baer, D. M., Wolf, M. M., and Risley, T. R. Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis,* 1968, **1,** 91-97.

Bensberg, G. C. and Barnett, C. D. *Attendant training in southern residential facilities for the mentally retarded.* Atlanta: Southern Regional Education Board, 1966.

Blatt, B. *Exodus from pandemonium.* Boston: Allyn and Bacon, 1970.

Bricker, W. A., Morgan, D. G., and Grabowski, J. G. Development and maintenance of a behavior modification repertoire of cottage attendants through T.V. feedback. *American Journal of Mental Deficiency,* 1972, **77,** 128-136.

Cochran, I. L. and Steiner, K. E. Evaluation of an inservice training program using the SREB Information Test. *American Journal of Mental Deficiency,* 1966, **70,** 193-197.

Daily, W. F., Allen, G. J., Chinsky, J. M., and Veit, S. W. Attendant behavior and attitudes toward institutionalized children. *American Journal of Mental Deficiency,* 1974, **78,** 586-591.

Fielding, L. T., Errickson, E., and Bettin, B. Modification of staff behavior: A brief note. *Behavior Therapy,* 1971, **2,** 550-553.

Gardner, J. M. Behavior modification in mental retardation: A review of research and analysis of trends. In R. D. Rubin, H. Fensterheim, A. A. Lazarus, and C. M. Franks (Eds.), *Advances in behavior therapy.* New York: Academic Press, 1971. Pp. 37-54.

Gardner, J. M. Selection of non-professionals for behavior modification programs. *American Journal of Mental Deficiency,* 1972, **76,** 680-685. (*a*)

Gardner, J. M. Teaching behavior modification to nonprofessionals. *Journal of Applied Behavior Analysis,* 1972, **5,** 517-521. (*b*)

Gardner, J. M. Training the trainers: A review of research on teaching behavior modification. In R. D. Rubin, J. P. Brady, and J. D. Henderson (Eds.), *Advances in behavior therapy.* New York: Academic Press, 1973. Pp. 145-176.

Harmatz, M. G. Observational study of ward staff behavior. *Exceptional Children,* 1973, **39,** 554-558.

Hollander, M. A. and Plutchik, R. A reinforcement program for psychiatric attendants. *Journal of Behavior Therapy and Experimental Psychiatry,* 1972, **3,** 297-300.

Hollander, M. A., Plutchik, R., and Horner, V. Interaction of patient and attendant reinforcement programs: The "piggyback" effect. *Journal of Consulting and Clinical Psychology,* 1973, **41,** 43-47.

Johnson, D. and Ferryman, Z. C. Inservice training for non-professional personnel in a mental retardation center. *Mental Retardation,* 1969, **7,** 10-13.

Katz, R. C., Johnson, C. A., and Gelfand, S. Modifying the dispensing of reinforcers: Some implications for behavior modification with hospitalized patients. *Behavior Therapy,* 1972, **3,** 579-588.

Kazdin, A. E. Issues in behavior modification with mentally retarded persons. *American Journal of Mental Deficiency,* 1973, **78,** 134-140.

Martin, G. L. Teaching operant technology to psychiatric nurses, aides, and attendants. In F. W. Clark, D. R. Evans, and L. A. Hamerlynck (Eds.), *Implementing behavioral programs for schools and clinics.* Champaign, Ill.: Research Press, 1972. Pp. 63-87.

Panyan, M., Boozer, H., and Morris, M. Feedback to attendants as a reinforcer for applying operant techniques. *Journal of Applied Behavior Analysis,* 1970, **3,** 1-4.

Panyan, M. C. and Patterson, E. T. Teaching attendants the applied aspects of behavior modification: An empirical approach. *Mental Retardation,* 1974, **12,** 30-32.

Pomerleau, O. F., Bobrove, P. H., and Smith, R. H. Rewarding psychiatric aides for the behavioral improvement of assigned patients. *Journal of Applied Behavior Analysis,* 1973, **6,** 383-390.

Pommer, D. A. and Streedbeck, D. Motivating staff performance in an operant learning program for children. *Journal of Applied Behavior Analysis,* 1974, **7,** 217-221.

Powell, J., Martindale, A., and Kulp, S. An evaluation of time-sample measures of behavior. *Journal of Applied Behavior Analysis,* 1975, **8,** 463-469.

President's Committee on Mental Retardation. *Compendium of lawsuits establishing the legal rights of mentally retarded citizens.* Washington, D.C.: U.S. Government Printing Office, Department of Health, Education, and Welfare Publication No. OHD 75-21007, 1975.

Quilitch, H. R. A comparison of three staff-management procedures. *Journal of Applied Behavior Analysis,* 1975, **8,** 59-66.

Rivera, G. *Willowbrook: A report on how it is and why it doesn't have to be that way.* New York: Vintage, 1972.

Warren, S. A. and Mondy, L. W. To what do attending adults respond? *American Journal of Mental Deficiency,* 1971, **75,** 449-455.

Watson, L. S. Jr. *How to use behavior modification with mentally retarded and autistic children: Programs for administrators, teachers, parents and nurses.* Libertyville, Ill.: Behavior Modification Technology, 1972. (*a*)

Watson, L. S. Jr. The use of contingent reinforcement for training staff members and parents working with autistic and mentally retarded children. In D. A. Primrose (Ed.), *Proceedings of the Second Congress of the International Association for the Scientific Study of Mental Deficiency.* Amsterdam, Sweden: Swetz and Zeittinger, 1972. (*b*). Pp. 456-458.

Welsch, W., Ludwig, C., Radicker, J., and Krapfl, J. Effects of feedback on daily completion of behavior modification projects. *Mental Retardation,* 1973, **11,** 24-27.

Received 22 August 1975.
(*Final acceptance 23 March 1976.*)