

PARTICIPATORY MANAGEMENT: MAINTAINING STAFF PERFORMANCE IN A UNIVERSITY HOUSING COOPERATIVE

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To apply behavior analysis to normal adults in non institutional settings, we may have to encourage their participation in the design and implementation of behavioral technology. This study evaluates a technology by which the members of a student housing cooperative manage their own staff with a minimum of supervision by one of the program designers. This staff management system consisted of prompts, self-reports, spot checks, and contingent rent reductions. Six resident staff members performed substantially more of their assigned tasks when this system was used. In addition, the management system was acceptable to the members, was affordable, and maintained high levels of staff performance during a 5-year follow-up. Participation by the members in the design and implementation of this system appears to have been useful in helping the behavior analysts to develop an unusually durable management system.

DESCRIPTORS: staff management, cooperation, maintenance, countercontrol, adults, token economy

The Experimental Living Project was founded in 1969 to develop a practical system of cooperative living for university students that could be run by its members and be completely funded by their rent payments. Sunflower House, the resulting cooperative, relies on a token system to generate and maintain active cooperation by members in the basic chores of cleaning, food preparation, and home repair (Feallock & Miller, 1976). This system has been maintained since 1972 and has resulted in lower rents and more favorable ratings than is common in other student living arrangements (Lies & Miller, 1978; Miller, Lies, Petersen, & Feallock, 1976).

Management of Sunflower House requires a number of complex and time-consuming activities,

including (a) property management to handle such tasks as advertising, renting, and building maintenance; (b) behavior management to handle such tasks as maintaining the token economy and other behavioral procedures; and (c) program management to handle such tasks as purchasing supplies, planning meals, and supervising the finances. Paying professional managers to perform these services is beyond the means of the cooperative. As a result, most of the managerial duties are performed by the members. This has required a management system that can be operated by the members with little assistance from outside professionals. A team of behavior analysts worked with Sunflower House members to design a system based on three components that appear repeatedly in effective staff management systems.

First, effective systems use job specifications to prompt desired staff behaviors. Prompting generally involves manipulating antecedent stimuli such as posters that list appropriate behaviors (Ivancic, Reid, Iwata, Faw, & Page, 1981), activity schedules (Greene, Willis, Levy, & Bailey, 1978), and memos (Patterson, Griffin, & Panyan, 1976).

Second, effective systems include systematic observation of specified staff behaviors. Observation has involved a variety of methods, including time sampling (e.g., Greene et al., 1976; Montegar, Reid, Madsen, & Ewell, 1977), interval recording

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Please send reprints requests or requests for a more detailed description of the management system to the Director, Experimental Living Project, HDFL, KU, Lawrence, Kansas 66045.

(e.g., Katz, Johnson, & Gelfand, 1972), behavior inventories (e.g., Pomerleau, Bobgrove, & Smith, 1973), and outcome observations (e.g., Phillips, Phillips, Wolf, & Fixsen, 1973). Other researchers have reduced the time required to conduct these observations by using staff self-reports (e.g., Fixsen, Phillips, & Wolf, 1973; Santogrossi, O'Leary, Romanczyk, & Kaufman, 1973). Burg, Reid, and Lattimore (1979) used supervisors to observe independently the performance of staff members making self-reports.

Third, effective systems use a variety of consequences to maintain desired staff behaviors. Iwata, Bailey, Brown, Foshee, and Alpern (1976) used the opportunity to rearrange work schedules as a consequence for staff performance in an institution. Other researchers have used monetary rewards (e.g., Pomerleau *et al.*, 1973), public display of performance records (e.g., Barnard, Christophersen, & Wolf, 1974; Welsch, Ludwig, Radiker, & Krapfl, 1973), and oral performance feedback (e.g., Ivancic *et al.*, 1981).

Although the efficacy of management systems using these components is well documented, the conditions under which they were validated differ markedly from the conditions at Sunflower House. First, no demonstrations are comprehensive in the sense that they have targeted all of the important behaviors required of the staff. Most have been applied to a relatively circumscribed set of tasks such as writing reports, providing custodial care to dependent clients, teaching client skills, or delivering consequences for particular staff behaviors. Second, few studies have minimized close supervision by professional behavior analysts in order to control administrative costs. There is, in fact, evidence that the removal of close supervision can lead to the deterioration of behavioral programs (e.g., Bassett & Blanchard, 1977). Third, most studies have been conducted in settings with hierarchical structures such as schools, manufacturing plants, or mental institutions. Sunflower House has a democratic structure that requires behavior analysts to involve the staff in designing the system. Finally, prior studies have seldom demonstrated long-term maintenance of management systems. Parsons,

Schepis, Reid, McCarn, and Green (1987) demonstrated the continued effectiveness of a management system over a 2-year follow-up period, but virtually all other studies of staff management procedures report follow-up for substantially shorter periods of time.

This experiment evaluated the effectiveness, acceptability, cost, and long-term durability of a comprehensive staff management system. The system consisted of prompts, self-reports, spot checks, and contingent rent reductions. It was designed to be operated by the staff of a student housing cooperative with a minimum of supervision by professional behavior analysts. The members participated extensively in the design of the system.

METHOD

Participants and Setting

The participants were 7 staff members who lived and worked at Sunflower House, a behaviorally run housing cooperative for 30 students at the University of Kansas. These staff members were selected because they had been appointed for a one-semester term to one of the seven targeted staff positions at the time the study began. All were enrolled at the University of Kansas in a variety of fields of study and had been members of the cooperative for at least 3 months prior to the start of this experiment. Seven other staff members who held jobs such as treasurer and purchaser were not included in the study because poor performance in those jobs could have had serious financial consequences for the cooperative. The members holding these critical jobs remained subject to contingencies of the management system throughout this study. Their positions were part of a comprehensive staff management system.

Sunflower House uses behavioral technology to promote equitable sharing of the household work, responsible leadership, and democratic control of the program by the members (Miller, 1976; Miller *et al.*, 1976). The cooperative is funded entirely by the rental payments of the members, so the program's existence depends on providing services

Table 1
Sunflower House Staff Jobs

Position title	Weekly credit salary	Number of tasks/ week	Hours of work/ week
Internal supervisor	30	37-46	1.50
Cleaning coordinator*	30	36-50	1.50
Comptroller	20	16-32	1.00
Credit recorder*	30	41-47	1.50
Education coordinator*	25	20-41	1.25
Food coordinator*	25	42-61	1.25
Food shopper*	25	11-42	1.25
Inspection coordinator*	25	20-42	1.25
Major repair coordinator	45	15-30	2.25
Menu changer	25	10-23	1.25
Purchaser	45	32-35	2.25
Routine repair coordinator	45	36-50	2.25
Renter*	25	2-77	1.25
Treasurer	35	22-37	1.75

* The seven positions included in the study.

that are appealing enough to attract and retain members.

Prior to the start of this study, the researchers described the experimental procedures to the members of the cooperative, who then voted to conduct the study. The members serving in the targeted staff positions signed consent forms.

The Worksharing System

Most of the work required to operate the cooperative was completed by the members. All members agreed to contribute 5 to 7 hr of work per week as a condition of joining the cooperative. Two types of work were required: routine household chores, such as cleaning the living room and cooking a meal, and staff jobs, such as supervising the meal program and keeping the financial records. All members earned at least half of their worksharing credits every week by completing routine chores. These chores were specified with detailed job checklists, and the work was inspected by other members of the cooperative. Jobs judged to be at least 70% completed earned worksharing credits exchangeable for a reduction in rent of up to \$80 per month (from \$220 base rent). The worksharing credits were assigned on the basis of the percentage of job tasks completed (i.e., at least 90% of the tasks completed earned 100% of credits available,

at least 80% completed earned 80% of credits, and at least 70% completed earned 70% of the credits). Jobs judged to be less than 70% completed resulted in no credits and a \$2 fine. All money collected as fines was contributed to the general operating fund of the cooperative.

Fourteen members of the cooperative earned a portion of their worksharing credits by doing staff jobs. Members who held staff jobs had to pass a vote of confidence by the general membership and complete written and on-the-job training. Staff jobs included such tasks as planning and posting work schedules, ordering supplies, paying bills, calculating the monthly rental fees, and recruiting new members. Table 1 lists the staff jobs, the amount of work required in a typical week, and the weekly credit salaries. Worksharing credits and fines were awarded for staff performance in basically the same manner as for the routine chores. The few exceptions are explained in the Procedure section.

Observation and Response Definitions

Although the management system included an observation component of its own, a separate observation system was added for this experiment. Weekly staff performance served as the primary dependent variable. Three primary observers and

two reliability observers recorded staff performance every week. The membership of the cooperative did not have access to the results of these observations during the experiment.

Staff performance was defined as the percentage of staff tasks completed each week. This was calculated by dividing the number of tasks completed by the number of tasks required. Observations generally involved checking some permanent product of staff behavior. For example, to determine whether the food shopper had balanced the checkbook, the observer checked to see if the checkbook and supporting materials had been completed accurately. To minimize the effects of reactivity, the observations were conducted with no special effort to alert the staff members that the observations were being made.

The observers rated each task as complete, not complete, or not required. The "not required" category was necessary because conditions did not always permit the opportunity to perform a task. For example, the purchaser could not balance his checkbook until the bank statement arrived. The use of three possible outcomes (complete, not complete, and not required), instead of the standard two, reduced the probability of chance agreement.

Reliability was assessed at least once during each condition by comparing each primary observer's records with the records of the reliability observer, who independently observed approximately 10% of each staff member's job. Reliability was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. An agreement was scored if both observers recorded the same outcome for a particular job task. Reliability ranged from 77% to 88% with a mean of 83%.

Follow-up observations were made 5 years after the completion of the experiment. One observer scored all the tasks for all the staff involved in the study using the list of job tasks as they had evolved up to that point in time. A second observer independently observed a sample (approximately 10%) of the staff behaviors. Using the calculation procedures described above, reliability during follow-up was 97%.

Co-Worker Ratings

As a measure of the importance of the staff jobs targeted in this study, we asked the staff members to evaluate the effects of their co-workers' performance on their ability to perform their own jobs. Each staff member rated the performance of other staff members whose jobs were related to their own. For example, the food coordinator rated the food shopper's performance by indicating the degree to which he agreed with the following statement: "I received all of the supplies that I requested, which allowed me to stock the kitchen and pantry properly." Ratings could range from "1, strongly disagree" to "7, strongly agree." The staff members rated a total of 26 similar statements at the end of each experimental condition. We selected this carefully targeted rating procedure because in previous studies we had found that the members did not discriminate the good and poor performance of their housemates when asked the more general questions common to social validation procedures.

Procedure: Sunflower House Management System

The staff was supervised by an internal supervisor who implemented the staff management system described below. The second author was the internal supervisor during the three experimental conditions. During the 5-year follow-up, this position was held by a series of other members of the cooperative.

Prompts for staff behavior. The internal supervisor posted a two- to four-page job description for every staff position on a bulletin board in the lounge of the cooperative. These forms specified the tasks and the deadlines for each staff job. Table 2 displays a sample section from one of the staff job descriptions.

Observation of staff behavior. The internal supervisor also posted a self-report checklist—a one-page abbreviated form of the job description—for each staff job. The staff members reported their own performance at the end of every week by marking each task on their self-report as complete, not complete, or not required. In addition, the

internal supervisor inspected a sample of 10% to 20% of the tasks assigned for each staff member every week.

Consequences for staff behavior. Every week, after the staff members had completed their self-reports, the internal supervisor recorded the results of his observations directly on the self-reports and circled any discrepancies between his observations and the self-reports. The staff members earned worksharing credits based on their self-reported performance and the corrections made by the internal supervisor. Credits were awarded on the basis of the percentage of job tasks completed as explained above. In addition, staff members could receive up to three \$2 fines every week: one for completing fewer than 70% of their required tasks, one for recording their performance inaccurately on their self-reports, and one for missing one or more of the tasks designated as critical for their particular jobs. Credits and fines were posted on the bulletin board and used by the credit recorder to calculate each staff member's monthly rental payment.

Experimental Design

The experimental design consisted of a B-A-B reversal design with the B conditions corresponding to the use of the staff management system and the A condition corresponding to the withdrawal of the staff management system. The conditions were as follows.

Management system. Staff performance was observed with the management system in effect.

No management system. Staff performance was observed with the management system withdrawn. The job descriptions were removed from the bulletin board. The internal supervisor announced at the weekly meeting of the cooperative membership that he would suspend his spot checks and that staff members were no longer required to complete self-reports. Staff members received their full credit salaries independent of their performance, and no fines were assigned. This condition was limited to 4 weeks to permit a reversal before the staff positions were turned over to new members at the end of the semester.

Management system. Staff performance was ob-

Table 2
Sample of Tasks Required of the Credit Recorder

List the date and each member's name and room number on a new copy of the Credit Balance Sheet.
Enter last week's final balance on the new Balance Sheet.
Enter this week's bonus from the Credit Budget Worksheet at the top of a new Balance Sheet.
List in order and separate by dots the credits earned by each member for each job completed.
Enter absence points for members absent this week.
Calculate and enter the credit total on the Balance Sheet.
Enter this week's credit rent.
Subtract the weekly rent from the credit total and enter the trial balance.
Complete the above steps by 6:00 p.m. Tuesday.

served with the management system reinstated. The staff job descriptions were reposted on the bulletin board, and the internal supervisor announced that staff members again needed to complete weekly self-reports.

Follow-up. During the 5-year period following the completion of these conditions, several members of the cooperative, none of whom had any formal behavioral training, served as the internal supervisor. To ensure the integrity of the management system, periodic inspections of samples of staff performance were conducted by two nonresident behavior analysis graduate students who served as external supervisors. Staff performance was observed at the end of this 5-year period.

The start of the experiment and the changes in experimental conditions were announced to the members in neutral terms during the regular weekly meetings of the membership. Any communication from the experimenters was designed to avoid conveying any predicted or desired change in staff performance.

RESULTS

Figure 1 displays the effects of the management system on the mean performance of all 7 staff members. During the last 2 weeks of the first management system condition, performance averaged 83% and showed a slight upward trend. When the management system was withdrawn, performance deteriorated to a mean of 63% in the final 2 weeks

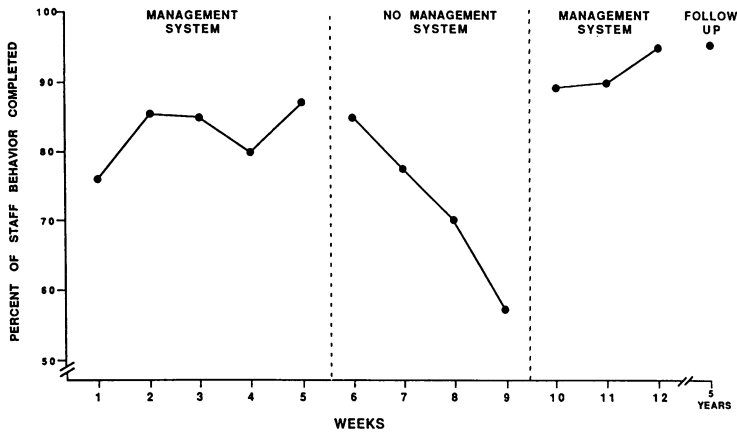


Figure 1. Mean percentage of staff behaviors completed during each of the three experimental conditions.

and showed a rapidly descending trend. Finally, when the management system was reinstated, performance recovered and showed an upward trend. The mean during the final 2 weeks of the reversal condition was 93%. The results show that staff performance was substantially higher when the management system was in effect. The 5-year follow-up observation revealed that the staff continued to perform 95% of their required tasks under the management system.

Table 3 shows the mean performance of staff members during the last 2 weeks of each experimental condition. The mean performance of 6 staff members ranged from 7% to 51% higher when the management system was in effect. The 7th staff member, the food shopper, showed stable and near perfect performance throughout the experiment,

completing 98% to 100% of her assigned tasks during all experimental conditions. The data show that the performance of every staff member was either higher or unchanged during the conditions when the management system was in effect.

The co-worker ratings reveal the level of staff satisfaction with high and low staff performance. When staff members completed 80% or more of their job tasks their co-workers rated their performance a mean of 6.5 out of 7. When staff members completed fewer than 80% of their tasks, their peers rated their performance a mean of only 3.1. These data suggest that the co-workers were substantially more satisfied when staff members completed most of their assigned tasks.

DISCUSSION

This study analyzed the effects of a behavior management system on the performance of 7 staff members in a student housing cooperative. The percentage of tasks completed was substantially higher when the management system was in effect. The decrease in performance when the management system was withdrawn and the subsequent increase when it was reinstated suggests that the management system, and not other unknown variables, was responsible for the improved performance.

An analysis of the performance of individual staff members revealed that 6 of the 7 staff members completed more of their assigned tasks when the management system was in effect. The food shop-

Table 3
Individual Staff Member Performance

Staff member	Mean performance last 2 weeks (%)		
	Management system	System withdrawn	Management system
Cleaning coordinator	78	72	93
Food shopper	100	100	98
Food coordinator	88	71	95
Renter	100	60	92
Inspection coordinator	78	27	64
Education coordinator	83	69	93
Credit recorder	87	77	91

per's performance remained near perfect in all conditions, perhaps due to the strong social consequences that would likely have followed failure to buy the food needed for the meals. In none of the individual cases did a staff member perform worse while the system was in effect. These results indicate that use of the management system resulted in high levels of performance for all staff members.

The overall acceptability of the management system was assessed by asking the members of the cooperative to vote on whether to retain the management system after the experiment was completed. In a secret ballot, the members voted unanimously in favor of retaining the system as a permanent part of the program. The members have continued to use the management system essentially unchanged for more than 5 years since the vote. The substantially higher ratings given when co-workers completed most of their assigned tasks suggest that the behaviors targeted by the management system were important to the staff. It seems reasonable to conclude that the management system was acceptable to the members of the cooperative, including those who held staff positions.

The affordability of the management system was evaluated by an analysis of costs. The two major costs of operating the system included paying the internal supervisor to implement the system and paying a nonresident behavior analyst to spot-check the internal supervisor's work. The internal supervisor's job requires 8 to 10 hr per month and is completed by a resident who is paid \$4 per hour (about \$40 a month). A behavior analysis graduate student is paid \$50 per month for the 3 to 4 hr required to spot-check the internal supervisor's work. Thus, the total cost of operating the staff management system is \$90 per month or \$3 per member. These modest costs have been included as a regular part of the cooperative budget for more than 5 years.

The durability of the management system is shown by the continued high level of staff performance observed 5 years after the experiment was completed. These results, and those described above, suggest that the staff management system is effective in producing and maintaining high levels of

staff performance over long periods of time. Furthermore, it does so in a manner both acceptable and affordable to the members of the cooperative.

One limitation of this study is that the B-A-B design does not provide a preintervention baseline measure of staff performance. We chose this design because formal preintervention data were unavailable at the time we started the study. The management system had been developed in the experimental setting through a process of trial and revision over a period of 8 years. Reestablishing preintervention conditions was simply not possible. Our experience in working in this setting suggests that the level of performance during the withdrawal condition provides a reasonable estimate of baseline performance. However, a final conclusion must await replication in another cooperative where the members have no experience with the management procedures and preintervention data may be gathered.

A second methodological concern is that the relatively brief withdrawal condition provides only weak evidence that staff performance would have remained poor if the management system had not been reintroduced. Two observations suggest, however, that the deterioration in staff performance resulting from withdrawal of the management system was not temporary. First, the management system was designed in response to years of poor staff performance under conditions nearly identical to the withdrawal condition. Second, the performance of routine household chores in the same setting remained poor during a 17-week withdrawal of a similar set of procedures in an earlier study (see Feallock & Miller, 1976). These two observations suggest that staff performance would not have improved spontaneously if we had been able to arrange for a longer withdrawal condition.

We did not attempt an analysis of the various components of the management system in this study. Future research concerned with further reducing the costs of an intervention based on similar components might undertake such an analysis.

The long-term maintenance of the staff management system with only a minimum of direct supervision by a behavior analyst stands in marked contrast to the frequent observation that behavioral

interventions are not maintained in the absence of close supervision (e.g., Bassett & Blanchard, 1977; Bushell, 1978; Couch, Miller, Johnson, & Welsh, 1986; Hopkins, 1987; Wolf, Braukmann, & Kirigin-Ramp, 1983). Discovering the conditions that fostered this result may contribute to improving the maintenance of behavioral interventions.

Behavior analysts have often suggested that participation by the consumers of a behavioral intervention will enhance cooperation and maintenance. For example, Reese, Howard, and Reese (1978) asserted that "people will be more interested in maintaining a program that they have helped to design than one to which they have contributed nothing" (p. 36). Although there is little empirical evidence to support this assertion, other behavior analysts have recommended practices that increase participation by consumers (e.g., Christophersen, Cataldo, Russo, & Varni, 1984; Phillips *et al.*, 1973; Stolz, 1981; Wolf, 1978).

The members of Sunflower House participated extensively in the development of the management system evaluated in this study. We solicited opinions about target behaviors, reinforcers, procedures, practicality, and costs. As a group, the members had the final say on whether new procedures would be tested and retained. This arrangement created contingencies for our own behavior as program developers that may have contributed to the design of procedures that the users found practical and acceptable. This arrangement goes one step beyond generating consumer evaluations (Wolf, 1978) by creating unavoidable contingencies on our behavior.

Involving the members in the design and operation of the behavioral program at Sunflower House was required by its democratic organization. The resulting cooperation provides one model for minimizing issues of control and countercontrol that, Skinner (1978, p. 27) has argued, will not lead to the "most productive order."

In contrast, many behavioral programs have been installed in hierarchical organizations in which the ultimate users have only a minimum of control over the design of the procedures they must use. When behavioral procedures are not convenient and practical, the users have an incentive to adjust the

procedures to their needs. This unsanctioned modification may be as likely to derail a tightly designed behavioral program as it is to improve it, especially if the users were given no control over the design of the procedures. Furthermore, it has the potential for generating unproductive countercontrol.

The cooperative structure of Sunflower House appears to have been useful in helping us to produce a durable management system. Behavior analysts working in more traditional settings may produce more durable programs if they increase the degree to which consumers collaborate in the design and adoption of those programs. Creating institutionalized cooperative structures within traditional settings may offer the most effective way to generate and maintain such collaboration.

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