JOURNAL OF APPLIED BEHAVIOR ANALYSIS 1973, 6, 419-423 NUMBER 3 (FALL 1973)

APPLICATION OF THE PREMACK PRINCIPLE TO THE BEHAVIORAL CONTROL OF EXTREMELY INACTIVE SCHIZOPHRENICS[1]

WILLIAM S. MITCHELL AND BERTRAM E. STOFFELMAYR

UNIVERSITY OF ABERDEEN

The four most inactive schizophrenic patients were selected by an observational technique from a ward of severely ill chronic patients. Of the four, two patients repeatedly refused to accept any dispensable rewards. Applying Premack's principle of reinforcement, consistent work behavior was shaped and maintained, using sitting as the reinforcer. The results indicate that the strict application of Premack's principle may have considerable therapeutic potential for those patients who, by refusing all tangible rewards, fail to respond to a reinforcement regime.

Recently, token economy programs have been developed for the rehabilitation of long-term schizophrenic patients, showing that the behavior of such patients can be brought under reinforcement control (Ayllon and Azrin, 1965; Schaefer and Martin, 1966; Atthowe and Krasner, 1968; Lloyd and Garlington, 1968; Winkler, 1970).

Unfortunately, Ayllon and Azrin, Atthowe and Krasner, and Winkler all report patients who failed to respond to the token regime. Thus, 18% of Ayllon and Azrin's sample and 10% of Atthowe and Krasner's did not respond. Despite the use of multiple reinforcers, reinforcer sampling and reinforcement exposure (Ayllon and Azrin, 1968) designed to increase the utilization of back-up reinforcers, these patients did not work for the available rewards.

Premack's principle (Premack, 1959) that any freely occurring high-frequency response will act as a reinforcer greatly extends the range of possible reinforcing events. Application of this principle has been shown to bring the behavior of nursery school children under reinforcement control (Homme, De Baca, Devine, Steinhorst, and Rickert, 1963) and has been applied clinically to the treatment of anorexia nervosa (Blinder, Freeman, and Stunkard, 1970). Ayllon and Azrin, who used events such as attendance at movies and interviews with psychologists as back-up reinforcers mediated by tokens, suggested that their unresponsive patients were those who showed so limited a behavioral repertoire that no behavior pattern could be used as a reinforcer. However, these authors did not use behaviors such as sitting, standing, and walking as reinforcers.

The present study then, was concerned with the direct application of Premack's principle, using sitting as a reinforcer with two extremely inactive chronic schizophrenic patients who repeatedly refused to accept any form of tangible reinforcer offered to them.

METHOD

Selection of Subjects

The study was conducted in a ward of long-stay schizophrenic patients in Aberdeen, Scotland. The ward with the most severely ill chronic patients was chosen. The ongoing treatment included industrial therapy, ward domestic work, and weekly group discussions.

Of the 42 patients in the ward, nine were not employed at any work outside the ward or at any domestic work in the ward. These patients remained on the ward and were employed at coil-stripping under the staff's supervision.

[1]Reprints may be obtained from William S. Mitchell, Department of Mental Health, University of Aberdeen, Foresterhill, Aberdeen, Scotland.

To select the most inactive patients from this group of nine, the patients were observed during the morning work period. Observations were made of all nine patients by recording the work behavior of three patients at a time for six 30-min sessions, during which the experimenter noted any instance of work that occurred in each 30-sec period. Work was defined as holding the coil in one hand while pulling off the wire from the coil with the other. An instance of work was any occurrence of the defined behavior during a 30-sec period. Interrater reliability was obtained by two observers independently observing three patients simultaneously during three 30-min sessions. The percentage of observation cells that were in agreement between the two observers divided by the total number of observation cells was 97.5%.

On the basis of these observations, the group of nine patients was subdivided into a group of four very inactive patients and a group of five less inactive patients.

Figure 1 of the frequencies of work for these nine patients over the six observation sessions shows the subdivision into two groups.

The four inactive patients worked for 6.9% of the intervals observed while the five more active patients worked for 83.3% of the intervals. The rest of the time the patients sat or paced in the ward.

The four inactive patients were selected as subjects in the present experiment. All had the diagnosis of schizophrenia, ages ranged from 55 to 60 yr (mean 56 yr) and length of hospitalization from 15 to 32 yr (mean 26 yr).

Reinforcer sampling (Ayllon and Azrin, 1968) was used to identify dispensable items that could be used as reinforcers. The patients were offered candies, cigarettes, fruit, and biscuits. Two patients, RD and GG, consistently accepted cigarettes and fruit, which were successfully utilized to shape and maintain working.

Of the other two patients, PM repeatedly refused to accept everything that was offered to him. Patient WL would occasionally accept candies but refused them during attempted shaping sessions.

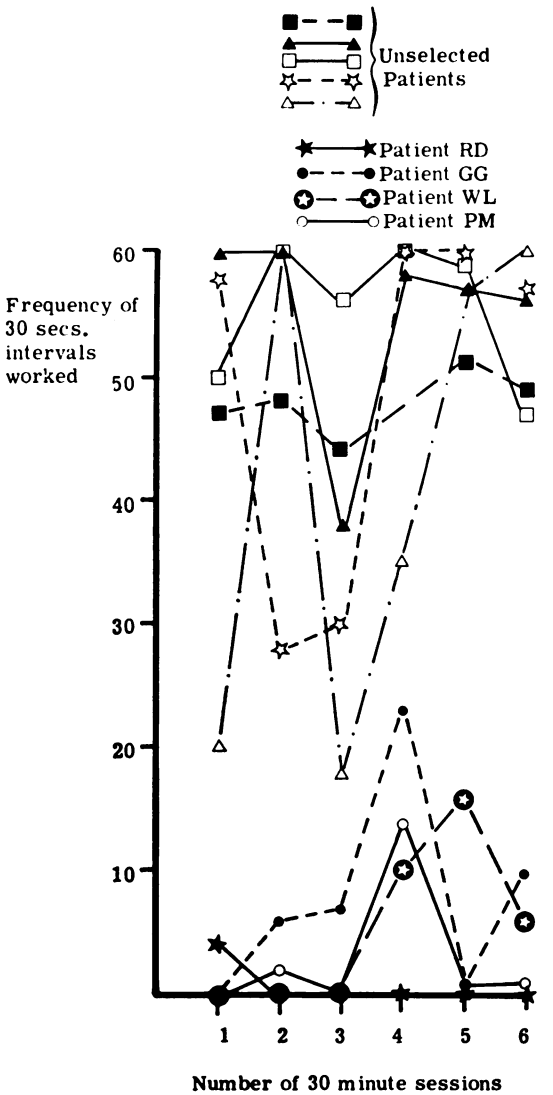

Fig. 1. Frequency of work in 30-sec intervals of nine patients in each 30-min session.

It was decided to use the Premack principle of response-reinforcement directly with patients WL and PM.

Response

The response selected to be reinforced was coil stripping, the type of activity most commonly used in the ward with very inactive patients. Coil stripping involved removing tightly

wound copper wire from coils measuring 6.3 cm by 3.8 cm (2.5 by 1.5 in.).

Measure

The dependent measure was the number of 30-sec intervals per 30-min session, during which the subject emitted one or more instances of work as defined for the observational study.

Setting

All experimentation was conducted in the ward day-room between 9.30 and 10.30 a.m. on week days. The day room measured 9.14 by 13.7 m and was divided into five areas by the experimenter for descriptive purposes.

Experimental Conditions

Baseline. WL and PM were observed during the ward work time for six half-hour sessions. Any instance of work that occurred in each 30-sec period was noted.

Instructions. To determine the effect of the presence of the experimenter on the frequency of sustained activity, both patients were given a coil by the experimenter and ordered once to work. The experimenter then sat with the patients through three half-hour sessions and said nothing more.

Instructions + reinforcement sessions. After both patients had refused all tangible rewards offered to them, it was decided that any response that occurred frequently when freely allowed would be used as a reinforcer. The observation data showed that the response that occurred with very high frequency was sitting, which was therefore selected as the reinforcer for both patients.

The target behavior was removing three coil wrappings of wire while the experimenter was not in the patient's presence.

The procedure was divided into two stages: initial shaping sessions when the patient received reinforcement for working in the presence of the experimenter and later sessions when he received reinforcement for working in the absence of the experimenter.

These sessions were carried out with the patients individually. In the final four sessions, both patients worked together.

During the shaping sessions, the experimenter approached the patient and asked him to stand. If the patient remained seated, the experimenter would tip the subject's chair forward until the patient stood up. The patient was then given a coil and told that once he had removed a small amount of wire he would be allowed to sit. The experimenter remained standing beside the patient. After the patient removed a few inches of wire, the experimenter took the coil from him and told him that he could sit for a short time. After 90 sec, the experimenter once again asked the patient to stand, returned the coil to him and instructed him to begin working. This procedure was repeated for the remainder of the session but the amount of coil to be removed was gradually increased to one coil wrapping. In subsequent sessions, the amount of work was gradually increased to three coil wrappings. By Session 14, WL was removing three coil wrappings before reinforcement was given, while PM achieved this by Session 17.

In Sessions 10 to 16, the experimenter stood between 3 m and 4.5 m from the patients while they worked. From Session 17, the experimenter sat in a corner of the ward approximately 12 m from the patient. After the patient had removed three coil wrappings, the experimenter approached took the coil from the patient and allowed him to sit for 90 sec.

Instructions only. This was a return to the pre-reinforcement conditions. Both patients were given a coil and were ordered once to work but were not asked to stand. The experimenter remained seated 12 m from the patient. After 30 min, the coils were collected. No feedback was given to the patients.

Reinstatement sessions. In Sessions 34 and 35, the patients were asked to stand while working. The work material was removed and the patients were allowed to sit, contingent on the removal of three coil wrappings of wire. The experimenter withdrew and sat 12 m from the

patients, while they worked. In the subsequent sessions, the patients were allowed to remain seated while working. After the patient completed the predetermined amount of work, the experimenter took the coil from the patient and allowed him to rest for 90 sec. In Session 38, it was necessary to instruct WL to stand while working because his work frequency had dropped in the previous session.

RESULTS

Figure 2 shows the frequencies of work for both patients in all experimental conditions.

When the selection and baseline sessions are combined, WL worked for 4.5% of the intervals and PM for 2.5%. During the Instructions sessions, when the experimenter was present, there was no increase in work for either patient. In Session 10, the work frequency increased for both patients and was maintained throughout the reinforcement regime. WL worked for 80% of the observations and PM for 79%.

Both patients show a marked reduction in work frequency during the reversal condition, the frequencies returning to a pattern very similar to the pre-reinforcement period.

In the reinstatement sessions, work frequency increased to 67% of the observations for WL and to 89.3% of the observations for PM. WL's overall performance was depressed because of the dip in Session 37.

The graphs underestimate the consistency of work for these patients during the reinforcement and reinstatement conditions. This is because reinforcement time (sitting without working) is included in the 30-min session. Therefore, the number of intervals worked could not exceed

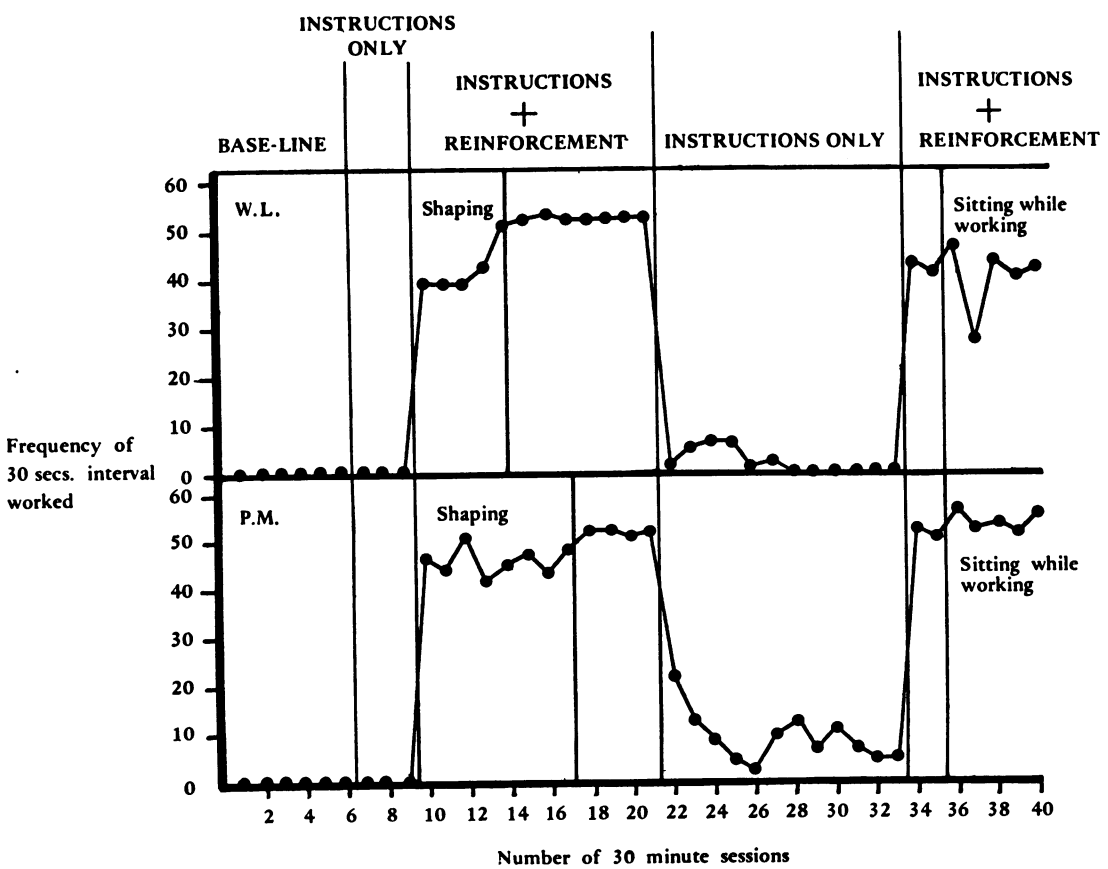

Fig. 2. Frequency of work in 30-sec intervals of two patients in each 30-min session.

60 (the total number of intervals per session) minus the number of intervals of reinforcement.

DISCUSSION

The present results show that patients whose behavior was outside the control of the nursing staff and who refused to accept tangible rewards can be brought under reinforcement control when a high-frequency response is made contingent on the occurrence of the desired response. Sitting without work material, when made contingent upon the completion of a predetermined amount of work, rapidly increased the frequency of working. When sitting without work material was no longer made contingent on working (Instructions only condition), the response frequency fell to a level comparable to the baseline.

The importance of using both components of the reinforcer—sitting without work material—is demonstrated in a comparison of the Instructions-only condition and Sessions 36 to 40 of the Reinstatement condition. In the Instructions-only condition, the patient was seated with the work material present throughout the session. Work frequency was very low. In Sessions 36 to 40 of the Reinstatement condition, the patient was seated while working and the work material removed contingent upon the completion of a predetermined amount of work. Here, the work frequency is high. The drop in work frequency in Session 37 for patient WL would suggest, however, that the change in stimulus condition from standing while working to sitting while working was disruptive for this patient.

There are differences between the application of Premack's principle in this experiment and its use by Ayllon and Azrin. Ayllon and Azrin used the high-probability response as a back-up reinforcer mediated by tokens, whereas in the present experiment, the opportunity to engage in the high-frequency response came immediately after the desired response occurred.

The present experiment questions the opinion of those who suggest that positive rewards do not exert any consistent control over the behavior of schizophrenic patients (Buss and Lang, 1965). The present results suggest that even the most severely inactive patient will respond to a reinforcement regime. The strict application of Premack's principle then may have considerable therapeutic application for those patients, who in refusing to accept any tangible reward, do not respond to the token regime.

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Received 27 October 1971.
(Revision requested 13 December 1971.)
(Final acceptance 9 April 1973.)