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REINFORCER SAMPLING: A TECHNIQUE FOR INCREASING THE BEHAVIOR OF MENTAL PATIENTS[1]

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Mental hospital patients in a motivating ward environment were using the available reinforcers less than was desired. A procedure for increasing the frequency of using reinforcers was developed: all patients were required to engage in the reinforcing event each time it was available but the duration of this required participation was limited so that the event was merely sampled. The effect of this required sampling was experimentally evaluated for three different reinforcers: going for a walk, watching a movie, and attending a music session. More patients used each of the three reinforcers and to a greater extent when the sampling procedure was used. Participation was increased even for those patients who had already been using the reinforcers, demonstrating that the technique did more than provide simple familiarization. Some familiarization was involved since the participation was slightly increased even after the sampling procedure was discontinued. The technique appears to be especially applicable when reinforcers are being delivered infrequently.

When an event is used to reinforce a response, some independent evidence is needed that the subject is familiar with the event, and that it is indeed a reinforcer. For that reason many studies of human behavior have obtained some prior estimate of the probable effectiveness of the intended reinforcer. Thus, Barrett (1962) asked the patient what music he preferred; Hutchinson and Azrin (1961) first ascertained that the patients were heavy smokers; Bijou and Orlando (1961) and Azrin and Lindsley (1956) had general knowledge of the preference of candy by children; Staats, Finley, Minke, and Wolf (1964) had the children preselect toys. In each of these instances, the experimenters were assured of the familiarity of the subject with the intended reinforcer.

Even when an event has been found by prior evaluation to be familiar to the subject and to be a reinforcer, it was found in an applied ward situation that the event was not being utilized as much as might have been expected. The situation was the motivating environment initiated by the authors and described elsewhere (Ayllon and Azrin, 1965; Ayllon and Azrin, in press). Mental patients were being given tokens upon the completion of a variety of desired behaviors; these tokens were in turn exchangeable for a variety of different reinforcing events. The extent to which the desired behaviors were performed depended on how many tokens the patients needed to engage in the reinforcing events. The more tokens the patients spent on the reinforcing events, the more tokens they needed and the more frequently they engaged in the desired behaviors. Many attempts had been made to increase the patients' utilization of the reinforcers, but in practice, some reinforcers were rarely utilized by specific patients. This situation was made the more anomalous because prior evidence indicated that the available reinforcers were effective with these same patients. All patients had been systematically given the opportunity to engage in all of the reinforcing events, and some had not only appeared to be enjoying themselves while being so engaged, but also had occasionally selected the event when it was freely available without the need to spend tokens. Yet, the same patients later were not exchanging their tokens to obtain the reinforcers. As a specific example, consider the attendance at musical sessions as one of the

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events for which this dilemma occurred. All patients were familiar with the event, and many seemed to be enjoying themselves greatly when they did attend; yet, they rarely attended even though they were continually reminded of its availability and could see other patients entering the room where the music session was held.

A possible solution to this problem was suggested by considering the selection of a reinforcer as a response to be strengthened. Almost all theories of reinforcement state that the probability of occurrence of a previously reinforced response is greatest when the stimulus situation is the same as had existed at the moment that the response had been reinforced previously (Skinner, 1938; Hull, 1943; Guthrie, 1935). The principle of stimulus generalization reflects this finding in revealing that the probability of the response increases as a function of the degree of similarity of the stimuli to those previously present at the moment of reinforcement. The highest degree of similarity would of course be identity. This line of reasoning suggested that if selection of an event by a patient is to be maximal, the situation should be identical to the situation that had previously existed when the selection resulted in delivery of the reinforcing event. To make the situation truly identical would mean not only reproducing all of the stimuli associated with the reinforcer but presenting the reinforcer itself. This course of action seems at first incapable of execution since the actual delivery of the reinforcer before the desired response rather than after it violates the usual sequence of operant conditioning. A possible solution is to present the reinforcer very briefly before the response, thereby reproducing all of the stimuli associated with the onset of the reinforcer; then the remainder of the reinforcer could be delivered after the desired response as required by the principle of operant reinforcement.

A second problem in following the above line of reasoning was how to arrange for the subject to engage in the initial part of the reinforcing event. For humans the availability of language provides a ready means. The individual may be instructed or otherwise directed to sample the reinforcer. The present experiment attempts to evaluate this "reinforcer-sampling" technique as a method of increasing reinforcer use. The specific question is whether this reinforcer-sampling procedure will cause mental patients in a motivating ward environment to spend tokens more frequently to obtain the reinforcing events.

Method

The general experimental design was to compare the reinforcer utilization during a reinforcer-sampling procedure with utilization during the usual non-sampling procedure. Three different reinforcing events were studied: attendance at walks, movies, and musical activities. The comparison was made in an ABA design which counterbalanced the sequence of experimental conditions.

EXPERIMENT I

The experiment took place in the ward environment described in previous reports (Ayllon and Azrin, 1965; Ayllon and Azrin, in press). Although the ward housed a total of 45 patients, only 24 of them were regularly present during the time of day encompassed by this experiment. These 24 patients were considered as the subjects of this experiment.

The reinforcing event studied was a 15-min walk outside of the ward building. During this activity the patients walked about the hospital grounds accompanied by an attendant. The attendant had no knowledge that an experiment was being conducted. The walks were scheduled to occur twice daily, at 10 a.m. and 2 p.m. Two different attendants were used and participated equally in both experimental conditions. The attendants' work schedules, the patients' job assignments, and the available reinforcers for the patients were kept constant during this experiment. All other scheduled reinforcing events were absent at the time of the walk.

During the first four days, the attendant walked into each room on the ward and loudly announced that a walk was being scheduled. The patients who desired to go assembled indoors at the ward exit, where the attendant collected one token from each before taking the patients out as a group for the 15-min walk. This procedure had been followed with some variations on the ward for several months preceding the experiment.

During the next four days a reinforcer-sampling procedure was added. The attend-

ant announced the scheduled walk by going from room to room just as she had done in the previous procedure. All 24 patients were then required to assemble outside the ward exit door before electing whether to exchange a token for a 15-min walk. This procedure differed from the regular one in that it arranged for all patients to engage in the initial step of the reinforcing event, which was walking outside. Many of the usual stimuli available from going on a walk, fresh air, outdoor sounds, and outdoor sights, naturally impinged on the patients while they were assembled outside. To guarantee that the patients were exposed sufficiently to the outdoor stimuli, they remained assembled outside the ward exit for 3 min before they were asked whether they wished to exchange a token for the opportunity to go on the walk. Those patients who did not elect to exchange a token for a walk returned to the ward. The attendant then embarked on the walk with the rest of the patients in the same manner as in the previous procedure.

During the next four days, the reinforcer-sampling procedure was eliminated. The patients who elected to exchange a token for a walk assembled indoors at the ward exit door at the time of the announcement and did not go outdoors unless they exchanged a token.

Results

Only four of the 24 patients took part in the walks during the initial four-day period when they were not required to assemble outdoors. The other 20 patients did not participate in the walks although all of them had done so at some time during their stay in the ward environment. Figure 1 shows the effects of the outdoor assembly requirement for the four patients who had participated at least once in the walk during the initial four-day period. These patients had participated in walks 10 times prior to the outdoor assembly requirement. When outdoor assembly was required, they participated 17 times. When the outdoor assembly was discontinued, their participation in walks decreased to 11 times, similar to the initial level.

Figure 2 shows the results for the 20 patients who had not participated in the walks when the outdoor assembly was not required. Once outdoor assembly was required, six patients began participating in walks for a combined total of 14 walks. When the assembly requirement was eliminated, the number of patients participating decreased to three and the number of times they participated decreased to six. This level is still higher than

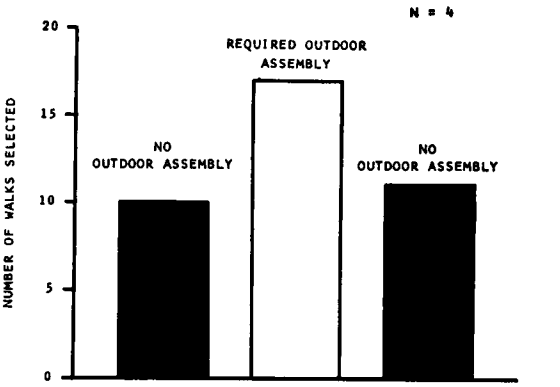

Fig. 1. The number of times that walks were selected by the four patients who participated at least once in the walk period prior to Reinforcer Sampling. The data are based on eight opportunities for walks for each subject.

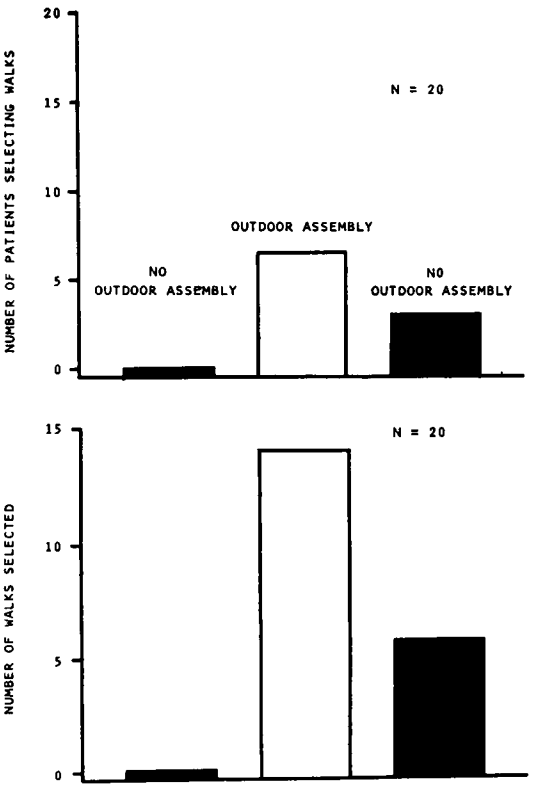

Fig. 2. Participation in walks for the 20 patients who had no participation in the walk period prior to Reinforcer Sampling. The data are based on eight opportunities for walks for each subject.

the initial level, indicating some residual or enduring effect of the outdoor assembly requirement.

For all patients considered together, the Wilcoxin matched-pairs signed-rank test (Siegel, 1956) indicated statistical significance for the increase in participation when sampling was introduced ($P < 0.01$) and for the decrease in participation when sampling was discontinued ($P < 0.02$).

Discussion

The results show that the reinforcer-sampling procedure had two distinct effects. First, it generated participation in walks by patients who had not been utilizing this reinforcer, and secondly, it increased the frequency of participation for those patients who already were participating.

EXPERIMENT II

The results of Exp. I indicated that the reinforcer-sampling procedure effectively increased the utilization of a reinforcer that consisted of going for a walk. It remained to be seen whether this active sampling would have the same facilitative effect on other types of reinforcers since the results may have been unique to specific properties of that reinforcer. The same general procedure was, therefore, followed in the present experiment, but using a different reinforcing event, one that occurred on, rather than off, the ward. The event was a music period which consisted of being in a room where various types of music were played.

Method

Thirty-three patients participated in this experiment. The general experimental design and procedure was similar to that of Exp. I. A room on the ward was set aside for a 1-hr period at 3 p.m. every Tuesday and Thursday for a period of four weeks. During this time, a phonograph was located in the room and various types of music were played in response to requests by the patients. Entrance to the room required one token. At the scheduled times, a ward attendant announced loudly in each room that the music period was now being held. All patients who desired to attend assembled outside of the music room and inserted a token into a turnstile located at the door. Insertion of the token allowed the individual to enter the music room. All other reinforcing events on the ward that might compete were eliminated at the time of the music session, as was also true in Exp. I for the walk activity. The records played on the phonograph were generally the same from day to day. The door to the music room was closed before the music began.

During the next four weeks, the patients were required to sample the music by assembling all 33 patients in an area immediately adjoining the entrance to the music room. While the patients were assembled in this area, the door to the music room was left open for 3 min so that the sound of music was clearly heard. The remainder of the procedure was identical to that used in the preceding four weeks. Each patient who wished to enter the music room inserted a token into the turnstile to gain admission.

During the final four weeks the music-sampling requirement was eliminated. The procedure followed by the patients in obtaining access to the music room was the same as during the first four weeks.

Results

The results are presented separately for those patients who had been attending the music period (Fig. 3) and those who had not (Fig. 4). Thirteen of the 33 patients attended the music period during the initial four weeks when there was no music-sampling requirement. Figure 3 shows that the number of

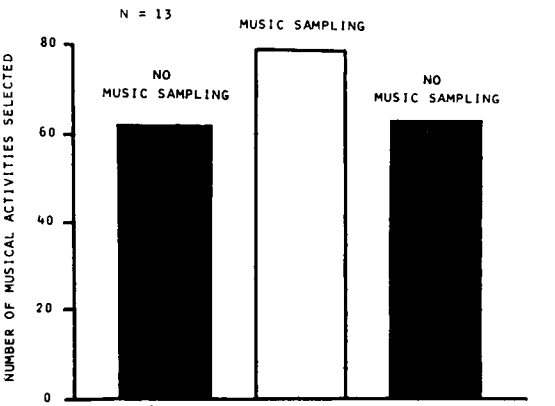

Fig. 3. The number of times musical activities were selected by the 13 patients who participated at least once in the musical period prior to Reinforcer Sampling. The data are based on eight opportunities to attend a music period by each subject.

times that these 13 patients attended increased from 62 to 79 when the music-sampling requirement was used. When the sampling requirement was terminated, attendance decreased to its previous level.

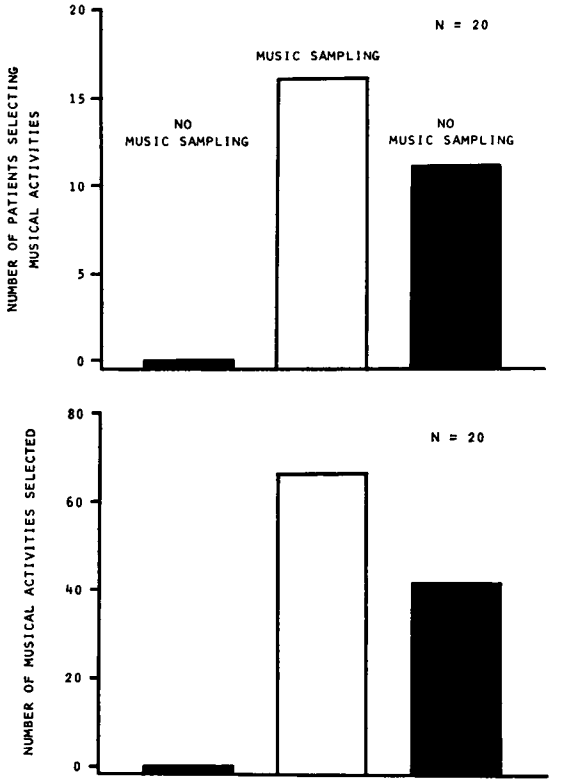

Fig. 4. For the 20 patients who did not attend the musical period prior to Reinforcer Sampling. The data are based on eight opportunities to attend a music period by each subject.

Figure 4 shows that the assembly requirement produced a large increase in participation for those patients who had not initially attended. Figure 4 shows that 16 of these 20 nonparticipators now began attending. This attendance decreased when assembly at the music room was no longer required, but 11 of the patients still continued to attend. This is the same enduring effect of the reinforcer sampling procedure seen in Exp. I for going on a walk.

For all patients considered together, the Wilcoxon test indicated statistical significance for the increased attendance when sampling was introduced ($P < 0.02$) and the decreased attendance when sampling was discontinued ($P < 0.05$).

Discussion

The reinforcer-sampling procedure was especially effective in increasing attendance at the music period. Out of 20 patients who had not been attending the activity, 16 began attending during the sampling procedure and 11 of the 16 continued to do so even after the sampling procedure was terminated. The present findings confirmed those of Exp. I in demonstrating that the effect is not one of simple familiarization: attendance at the music period, as well as at the outdoor walks, increased even for those patients who had recently attended the events.

EXPERIMENT III

The present experiment attempted to determine the effectiveness of the reinforcer-sampling procedure for a third type of reinforcer: attendance at a movie.

Method

Thirty-nine patients participated. The films were of the same type normally shown in commercial movie houses and were about 1 to 2 hr in duration. A film was shown every Thursday night at 7 p.m. A different film, selected by the hospital recreation department, was shown on each movie night. All other reinforcers on the ward were eliminated during the film showing, including the usual availability of the TV set or the radio on the ward. As in the previous two experiments, the attendant entered each room on the ward and announced that a film was being scheduled. Also, for several days before each film, posters on the ward advertised the film's title. A special room was set aside where the film could be shown. At the time of the movie showing, a turnstile was placed at the room entrance and access could be gained by inserting one token into the turnstile. The experimental design was similar to that of Exp. I and II in that the patients first had access to the reinforcer without a required sampling procedure, then the sampling procedure was used for an equal period of time, and finally the sampling procedure was eliminated.

For a seven-week period, the patients could enter the movie room simply by inserting one token into the turnstile immediately after the attendant announced that the movie was being held.

During the next seven weeks, all patients were required to assemble in one part of the area in which the movie was to be shown. This assembly occurred immediately after the attendant announced the showing of the film throughout the ward. The turnstile now separated the two areas of the room instead of being located at the entrance to the entire room. The film was shown for 5 min while the patients were assembled; then the usual notification was given of the opportunity to view the remainder of the movie by the usual procedure of inserting one token. Those patients who did not insert the token were required to leave the room. The reinforcer-sampling procedure in this case was required viewing of the first 5 min of the movie.

During the final seven-week period, the procedure was identical to that of the first seven weeks in which there was no required viewing; the patients were not required to assemble in the movie room during the first few minutes of the film.

Results

Twenty of the 39 patients selected the movie prior to the movie-sampling requirement. Figure 5 shows that their attendance increased about 20% from 72 to 89. This attendance was maintained even after the sampling requirement was eliminated.

Figure 6 shows that attendance also increased for the 19 patients who had not attended the movie period during the first seven weeks. Four of these nonparticipating patients began attending when the movie sampling was required and continued doing so even after it was no longer required. Their attendance increased from zero to seven once sampling was required and decreased to four times when it was no longer required.

For all patients considered together, the Wilcoxin test indicated statistical significance for the increased movie attendance when sampling was introduced ($P < 0.05$). No decrease in attendance was observed when sampling was discontinued.

Discussion

The present results confirm the results of Exp. I and II in demonstrating that exposure to the initial part of a reinforcing activity increases participation in it and that this increase occurs both for those patients who had recently been attending and for those who had not. The effect of the sampling procedure

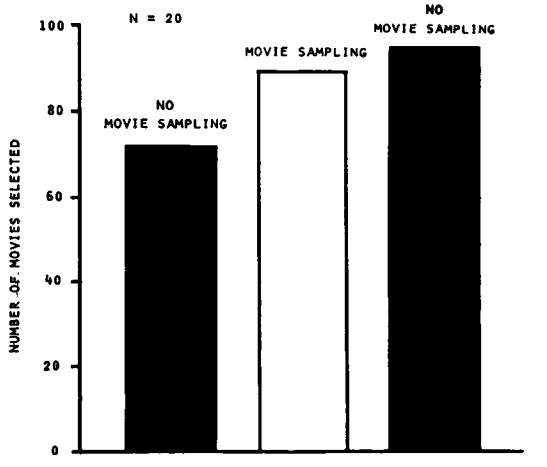

Fig. 5. The number of times movies were selected by the 20 patients who participated at least once in the movie period prior to the Movie Sampling. The data are based on seven opportunities to attend movies by each patient.

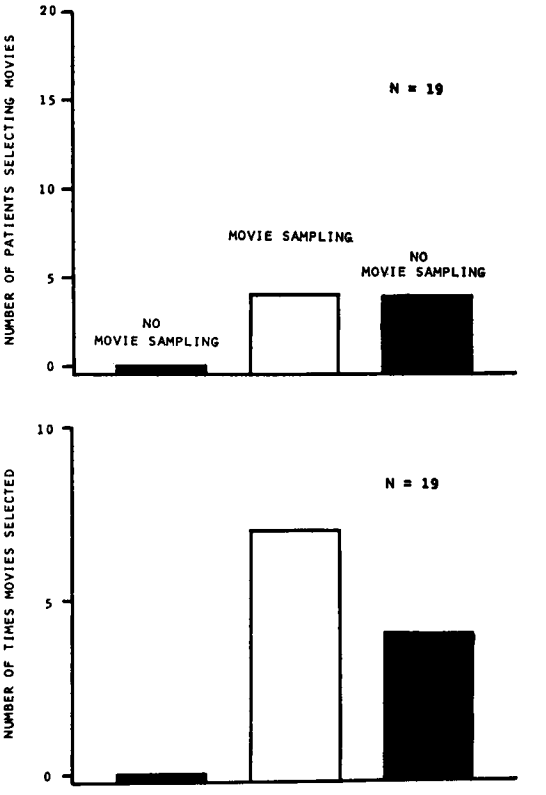

Fig. 6. For the 19 patients who did not attend the movie period prior to the Movie Sampling. The data are based on seven opportunities to attend movies by each subject.

for movies and the reversibility of the effect were not as great as for the walks and the music periods. The reason for this is unknown, but may have been caused in part by the long period of time encompassed by this experiment (21 weeks) and the associated difficulty of maintaining strict comparability of extraneous factors over that period of time.

CONCLUSIONS

The increase in utilization of movies, walks, and music periods indicates that the reinforcer-sampling procedure may be a general technique for increasing utilization of reinforcers. Especially encouraging was the finding that the facilitative effect often persisted to some extent even after the reinforcer-sampling procedure was terminated.

From a practical point of view, it may not be desirable to use reinforcer sampling merely on a short-term basis. Given that this procedure does facilitate reinforcer utilization, it seems appropriate to adopt it as a standard procedure for as long as the reinforcer is being used to maintain the desired behavior. The results of the present experiments led to just this standard and general use of the reinforcer sampling technique for almost all reinforcers in the motivating ward environment in which this experiment took place. Additional examples of the effectiveness of this reinforcer-sampling technique are described more fully in a report (Ayllon and Azrin, in press) of how the motivating ward environment was initiated and developed.

From a strictly logical point of view, the present results seem anomalous. In each experiment, this facilitative effect was not simply a matter of familiarizing the patients with the general nature of a reinforcer, since the facilitative effect occurred for patients who had regularly been utilizing the reinforcers as well as for those who had not. For each of the reinforcers studied, the patients had all been told about the reinforcer, all had experienced it several times in the past and some were even currently using it. Therefore, the effectiveness of the technique does not seem to depend on providing information or familiarization. The patients already "knew" what the reinforcer was; the technique appeared to trigger participation in it.

One limitation in using this reinforcer-sampling technique would seem to be possible satiation. In each instance of the present application, the patient was exposed to only a small portion of the reinforcing activity. It is quite likely that, had the individual been exposed to longer periods, decreased utilization might have resulted. In the extreme case, if the individual had been given access to the entire duration of the reinforcer activity, there would be no need to exchange a token for that participation.

To the extent that this technique has general applicability, it suggests that when an event is to be used as a reinforcer, the individual should be made to sample the event actively at the time that the desired response is to be made. In the present application of this technique, the desired response was exchanging tokens, but the same technique is probably effective when no tangible conditioned reinforcer is used.

Many applied studies of reinforcement have used procedures that approximate the reinforcer-sampling technique by conspicuously displaying the reinforcer to the subject at the time that the desired response is to be made. For example, Lovaas, Berberich, Perlaff, and Schaeffer (1966) and Risley and Wolf (1967) held a spoonful of food poised directly in front of the child's face while awaiting the desired vocal response. Similarly, Isaacs, Thomas, and Goldiamond (1960) displayed chewing gum conspicuously to the mental patient while awaiting vocalization. Staats, *et al.* (1964) conspicuously displayed the toy that was to be used as the reinforcer while nursery school children were engaged in reading problems. The reinforcer-sampling technique would suggest further that the individual be made to sample the reinforcer actively as well as simply viewing it. So, for example, in the Staats experiment, sampling could consist of the child playing with the preferred toy for a short duration and then given the opportunity to earn it. The reinforcer-sampling technique would appear to be most useful when a reinforcer is given infrequently; frequent delivery of a reinforcer inherently provides a sampling procedure in that each delivery constitutes a brief sampling with respect to the subsequent deliveries. Thus, the technique would thereby be useful before the first spoon of food in a session in the procedure such as that of Lovaas *et al.* (1966) and

Risley and Wolf (1967) in which food is delivered frequently within a session.

The present procedure did not determine which aspect of the reinforcer-sampling procedure was the critical factor. For example, the results may have been caused by the interruption of the patients' ongoing activities that was a result of the required sampling. Or the results may have been influenced by imitation: during the required sampling, the patients observed other patients giving tokens and participating in the reinforcing activity. Alternatively, one may view a reinforcing activity as a chain of responses that is more likely to be completed if one of the terminal portions of the behavior chain can be primed. Or, as noted previously, some of the results can be accounted for in terms of some notion such as familiarization or refamiliarization. The present study did not isolate one of these factors to the exclusion of the other. This confounding is a weakness from an analytic point of view. From an applications viewpoint, the sampling procedure may be considered as an administratively simple means of facilitating reinforcer utilization by a group of individuals by combining these known learning factors of imitation, stimulus intensity, interruption of competing reinforcers, familiarization, refamiliarization, and unity of a response chain.

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