JOURNAL OF THE EXPERIMENTAL ANALYSIS OF BEHAVIOR VOLUME 7, NUMBER 4 JULY, 1964

REINFORCEMENT AND INSTRUCTIONS WITH MENTAL PATIENTS[1]

T. AYLLON AND N. H. AZRIN

ANNA STATE HOSPITAL

An attempt was made to modify a socially desirable response of mental patients. It was found that instructions to the patients had no enduring effect unless accompanied by reinforcement. Also, it was found that reinforcement was not effective unless the reinforcement procedure was accompanied by instructions that specified the basis for the reinforcement. Maximum change in behavior was obtained when the reinforcement procedure took advantage of the existing verbal repertoire of the patients. A significant methodological finding was that substantial modification of the behavior of psychotics could be achieved by briefly delaying, rather than withholding, food reinforcement.

For normal humans, verbal instructions appear to be a technique extensively and effectively used to generate a wide range of responses. The modern educational system is an example. In working with psychiatric patients, however, verbal instructions are usually quite limited in effectiveness. Indeed, a defining characteristic of psychosis is the failure of a patient to modify some behavior when instructed to do so. For example, talking to one's self is a behavior which is frequently observed despite numerous instructions given to the patient to alter such peculiar behavior. A second technique extensively used to modify the behavior of normals is reinforcement; *e.g.*, providing monetary reward (Dews and Morse, 1958) or grades (Skinner, 1954). Lindsley (1956) has used this reinforcement technique successfully to modify the behavior of individual mental patients.

The present experiment attempts to ascertain the relative effectiveness of instructions and reinforcement with mental patients when each condition is used singly and in combination.

[1]This investigation was supported in part by a grant from the Mental Health Fund of the State of Illinois Department of Mental Health and by Public Health Service Research Grant 4926 from the National Institute of Mental Health. The investigation was made possible through the active interest and advice of R. C. Steck, Supt., and the staff of Anna State Hospital. Reprints may be obtained from T. Ayllon, Behavior Research Lab., Anna State Hospital, 1000 North Main St., Anna, Illinois.

EXPERIMENT I

Method

The investigation was conducted in a ward of 43 female patients in a mental hospital. The ward was organized as a clinical research unit to which only authorized personnel were allowed access. The experiment was carried out in the ward dining room. In the standard serving procedure, an attendant gave each patient a food tray as the patient filed past the counter where the food was available. In practice, each patient took the food tray without difficulty. A problem was that 18 of the patients failed to pick up all of the cutlery (a knife, a fork, and a spoon) which was available on the same counter as the trays. Of these 18 patients, some picked up one utensil, others picked up another. Some patients picked up none of the utensils, and, consequently, ate their meal with their hands. The response of obtaining cutlery was studied in part because this response can be considered a prerequisite for establishing socially acceptable eating behavior.

Subjects

The 18 patients who failed to pick up all of the utensils were the subjects of this study. Of the 18 subjects, 15 were classified psychiatrically as schizophrenic and three as mental defective. The median age for this group was 48 with a range of 33 to 65. The median duration of continuous hospitalization was 13 years. Eleven patients were receiving tranquilizers.

Procedure

Mealtime was arranged so that the 18 subjects ate their meals at a time different from that of the other 25 patients on the ward. An attendant stood by the serving counter on which the utensils were located and made an entry on the record as to whether a given patient picked up a knife, fork, and spoon. The patients passed the serving counter in single file. A second attendant gave each patient a food tray. This baseline period lasted for 10 meals.

A reinforcement procedure was then introduced for an additional 20 meals. If a patient picked up all three utensils, she was immediately given her choice of a piece of candy, a cigarette, an extra cup of coffee, or an extra glass of milk. These extra items were not available to the patients by any means other than performing the desired response. No instructions were given to the patients. On a few occasions, a patient inquired as to why she did or did not receive the reinforcement. No explanation was given other than to state that "we happen to have some extras today" or "we don't happen to have any extras today."

After 20 consecutive meals, instructions were added to the reinforcement procedure. As each patient approached the attendant, the attendant stated, "please pick up your knife, fork, and spoon, and you have a choice of extra milk, coffee, cigarettes, or candy." This procedure was maintained for 10 meals.

A tape recorder was placed nearby to record the instructions actually given by the attendant. Also, a one-way mirror was used to monitor the interaction. The attendants were informed of the use of the tape recorder and one-way mirror.

Results

Figure 1 shows that less than 10% of the patients picked up the cutlery at any one meal prior to the reinforcement procedure. When the reinforcement procedure was put into effect, no discernible change was noted in the proportion of patients that picked up the cutlery. Nor was there any obvious tendency for the behavior to increase during the 20-meal period of reinforcement. However, when the instructions were added to the operant consequence procedure, the behavior increased immediately. On the first meal in which instructions were given, almost half of the patients made the appropriate response. By the 5th meal, about 12 of the patients were responding appropriately. This number remained fairly constant for the remaining five meals. The procedure was then discontinued (not shown). After one year, six patients continued to emit the appropriate response.

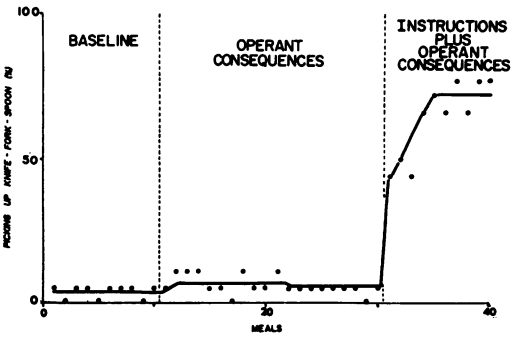

Fig. 1. The percentage of patients making the correct response (picking up knife, fork, and spoon). During the "Baseline" period, no operant consequences and no instructions were given regarding the response. During the "Operant Consequences" period, extras such as candy, cigarettes, *etc.*, were given for the response. During the "Instructions plus Operant Consequences" period, the patients were instructed to make the response and were given the extras upon doing so. The curves were fitted visually.

Discussion

The reinforcement procedure was ineffective in altering the behavior of patients. Observations of individual patients provided a possible explanation. Only three of the 18 patients took cutlery even occasionally. When the reinforcement procedure was introduced, these three patients found themselves suddenly offered a choice of the extras. When a patient was first given the extra reinforcement, she usually asked the attendant for the reason, but, of course, the appropriate explanation could not be given since the main purpose of the experiment was to discover the effect of reinforcement in the relative absence of verbal instructions. For the remaining 15 patients, the reinforcement was not delivered because of the continued absence of the response.

The failure of the reinforcement procedure to produce any change in the appropriate behavior stood in contrast with a large apparent change in the verbal behavior of the patients. They began asking each other and the attendant why the reinforcement was available to

some patients and not to others. The failure to provide a statement of the relationship between the availability of the reinforcement and their behavior appeared to constitute a prime factor in the failure of the performance to change.

The outcome of this experiment strongly suggested that the reinforcement procedure could not be effective without recognition of the major role played by the existing verbal repertoire of the patients. A possibility exists that instructions alone might have been sufficient to produce the changed performance without a reinforcement procedure. The following experiment sought to ascertain the extent to which instructions alone would affect performance. In addition, it explored the effectiveness of a different type of operant consequence.

EXPERIMENT II

Subjects

Twenty female patients, 12 of whom had been used in Experiment I were used. Nineteen of the 20 patients had psychiatric classifications of schizophrenia; one patient was diagnosed as mental defective. The median age for this group was 50 with a range of 22 to 73. The median duration of continuous hospitalization was 13.5 years. Twelve patients were receiving tranquilizers.

This experiment was conducted 10 months after Experiment I. The patients were selected from a group of 43 on the basis of their failure to pick up a knife, fork, and spoon at each meal. The 23 patients on the ward who were picking up these three items were excluded from this study.

Procedure

The response selected was the same as that used in the previous experiment; *i.e.*, the obtaining of a knife, fork, and spoon prior to being served at mealtime. The operant consequence differed from that used in the previous experiment. The patient was allowed immediate access to the serving counter if the appropriate response was made. If the appropriate response was not made, there was a delay in gaining access to the serving counter. This delay consisted of going to the end of the serving line. If the patient was already the last in line, then a delay of approximately 5 min was introduced before allowing access to the serving counter. All 20 of these patients ate as a group, separate from the other patients on the ward.

The instructions were similar to those described in Experiment I. Each patient was told by the attendant to "please pick up a knife, a fork, and a spoon."

The experimental design included an initial period of observation (10 meals) during which no instructions and no consequences were arranged. During the second period (110 meals), instructions were given to each patient at each meal, but no consequences were provided for emitting the appropriate response. During the third period (110 meals), the instructions were continued, but now the operant consequence involved allowing immediate access to the serving counter when the appropriate response was made.

Results

Figure 2 shows that the appropriate response was rarely, if ever, emitted during the initial period in which no instructions and no consequences were provided. But on the first day in which instructions were given, about 40% of the patients emitted the appropriate response. This percentage increased to about 60% after about five meals. The percentage of patients that emitted the response on a given day was quite erratic during the first 20 days, varying between 40% and 70%. During the last 10 meals under this instructional procedure, about 25% of the patients were emitting the appropriate response at each meal. When immediate access to the serving counter was arranged as an operant consequence (third period), the percentage of patients emitting the appropriate response increased to 80% during the first four meals. By the fifth meal, and thereafter, between 90% and 100% of the patients were making the appropriate response. This percentage remained constant for as long as this procedure was maintained.

An incidental outcome of the procedure was that if the patients obtained the cutlery, they also used the cutlery.

Discussion

As noted earlier, verbal interaction constitutes the primary basis of most existing methods of psychotherapy including psychoanalysis, non-directive therapy, group therapy, psycho-

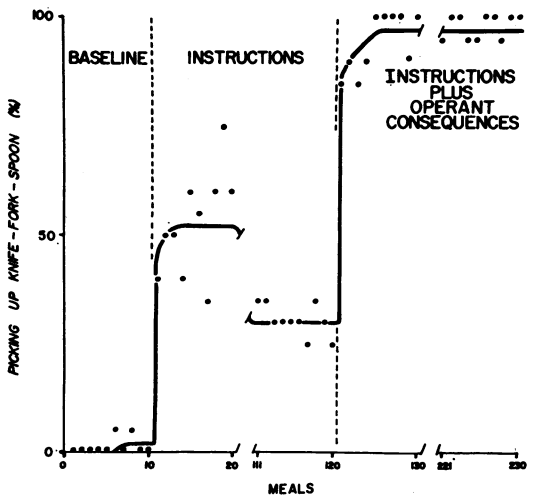

Fig. 2. The percentage of patients making the correct response (picking up knife, fork, and spoon). During the "Baseline," neither operant consequences nor instructions were given regarding the response. During the "Instructions" period, the patients were instructed to make the response. The data for the transitional period involving 90 meals has been omitted. During the "Instructions plus Operant Consequences" period, patients were instructed to make the response which was followed by immediate rather than delayed access to food. The data for the period involving 90 meals has been omitted.

drama, interpersonal therapy, *etc.* In all such therapies, the patient is offered either verbal advice, verbal interpretation, or verbal agreement. As Skinner (1957) has pointed out, these verbal statements may be considered as discriminative stimuli that specify the direction of change that is desired by the therapist. Yet, discriminative stimuli are known to be ineffective unless the behavior results in favorable consequences. This ineffectiveness was seen in the present study when instructions were provided repeatedly, but without programming favorable consequences for following the instructions. These results suggest that some of the difficulties in current methods of psychotherapy may well arise from the absence of programmed consequences.

In the present study, instructions were found to be effective initially for some patients, probably because of their previous history. This initial effectiveness was reduced when reinforcement was not provided for the behavior that was specified by the instructions. The substantial increase, albeit transient, as a result of instruction cannot be ignored. Instructions *per se* were partially effective. It appears that instructions can initiate behavior but reinforcement is needed to motivate and maintain the behavior. It would seem that for humans, instructions and reinforcement are complementary.

By utilizing the existing verbal repertoire of humans, the instructions eliminate the necessity of arduous and impracticable shaping procedure such as must be used with animals (Ferster and Skinner, 1957). Yet, for methodological considerations, previous studies of reinforcement with humans have minimized or eliminated instructions entirely (Azrin and Lindsley, 1956; Ayllon and Michael, 1959). Later studies have found it necessary to utilize instructions to obtain changes of human behavior in a reasonable period of time (Azrin, 1958; Ayllon and Haughton, 1962; Weiner, 1962; Dews and Morse, 1958; Holz, Azrin, and Ayllon, 1963). The use of instructions is in accord with the theory and practice of operant conditioning. Behavioral changes should proceed from the existing behavior repertoire of the organism (Ferster, 1953). For example, the exploratory behavior of rats often is utilized to initiate a bar-pressing. Similarly, the existing behavior of discrete pecks by pigeons has led experimenters to select the response of key-pecking. In the present study, the existing verbal behavior of patients was used to achieve the desired response of obtaining cutlery. Failure to utilize the existing verbal repertoire of humans places great constraints on any attempt at behavioral modification.

The results of this study demonstrated that it was necessary to arrange consequences for the patients in addition to providing instructions. This same finding occurred for the attendants. Repeated instructions had been given to the attendant to ensure her making the appropriate statement to each patient. Yet, the tape recording and visual observations revealed that the attendant did not always follow the instructions during the first two days in which instructions were being given. The attendants were then confronted with the tape recordings and with the observational notes. The effect of providing this feedback or consequence for their behavior was fairly immediate; on the fourth day, and thereafter, no deviations from the prescribed procedure were noted. The results strongly indicate that any procedure that uses attendants to modify the behavior of patients must also provide operant

consequences for the attendants. These findings agree with previous findings (Azrin *et al.*, 1961) that college students also deviated appreciably from the prescribed performance in the absence of behavioral consequences for the deviations.

It appears that reinforcement procedures are especially useful for dealing with mental retardates for whom verbal instructions alone are necessarily limited in effectiveness. Experiment I included three mental retardates who had not performed the appropriate response prior to the initiation of the experiment. Under the combined reinforcement-instructions period of Experiment I, all three of the retardates began making the appropriate response. Two of the three retardates continued making the appropriate response during the 10-month period after Experiment I was completed when no reinforcement or instructions were provided.

A major methodological discovery was the surprising effectiveness of a slight delay in obtaining food. Food as a reinforcer has been used previously with patients by Ayllon and Haughton (1962) who made eating contingent upon the response in the same way that is usually done in an animal experiment; *i.e.*, no response, no eating. One of the serious constraints in using such a procedure with humans, of course, is the existence of cultural taboos regarding the deliberate denial of food to an individual. Experiment II attempted to solve this problem by arranging a slight delay in obtaining the meal rather than by the complete denial of the opportunity to obtain the meal. In spite of the apparent triviality of this small delay, all 20 of the patients acquired the desired response. It appears, then, that the slight delay in eating offers a high degree of effectiveness and avoids the practical problems involved in the denial of food.

REFERENCES

Ayllon, T. and Haughton, E. Control of the behavior of schizophrenic patients by food. *J. exp. Anal. Behav.*, 1962, **5**, 343-352.

Ayllon, T. and Michael, J. The psychiatric nurse as a behavioral engineer. *J. exp. Anal. Behav.*, 1959, **2**, 323-334.

Azrin, N. H. Some effects of noise on human behavior. *J. exp. Anal. Behav.*, 1958, **1**, 183-200.

Azrin, N. H., Holz, W., Ulrich, R., and Goldiamond, I. The control of the content of conversation through reinforcement. *J. exp. Anal. Behav.*, 1961, **4**, 25-30.

Azrin, N. H. and Lindsley, O. R. Reinforcement of cooperation between children. *J. abnorm. soc. Psychol.*, 1956, **52**, 100-102.

Dews, P. B. and Morse, W. H. Some observations on an operant in human subjects and its modification by dextro-amphetamine. *J. exp. Anal. Behav.*, 1958, **1**, 359-364.

Ferster, C. B. The use of the free operant in the analysis of behavior. *Psychol. Bull.*, 1953, **50**, 263-264.

Ferster, C. and Skinner, B. F. *Schedules of reinforcement*. New York: Appleton-Century-Crofts, Inc., 1957.

Holz, W. C., Azrin, N. H., and Ayllon, T. Elimination of behavior of mental patients by response-produced extinction. *J. exp. Anal. Behav.*, 1963, **6**, 407-412.

Lindsley, O. R. Operant conditioning methods applied to research in chronic schizophrenia. *Psychiat. Res. Rep.*, 1956, **5**, 118-139.

Skinner, B. F. The science of learning and the art of teaching. *Harvard Educational Review*, 1954, XXIV, 86-97.

Skinner, B. F. *Verbal behavior*. New York: Appleton-Century-Crofts, Inc., 1957.

Weiner, H. Some effects of response cost upon human operant behavior. *J. exp. Anal. Behav.*, 1962, **5**, 201-208.

Received January 14, 1964