MODIFICATION OF INTERACTIVE BEHAVIORS IN CHRONIC MENTAL PATIENTS¹

PAMELA S. BENNETT AND ROGER F. MALEY

WEST VIRGINIA UNIVERSITY

Four chronic mental patients, residents of a token economy treatment unit, were randomly assigned to an experimental or control condition and attended 10 thirty-minute treatment sessions. For the two experimental subjects, contingent reinforcement was received for interacting with each other according to instructions in four distinct phases of interpersonal behavior: talking to another person, attending and talking to another person, asking and answering questions in a dyad, and working cooperatively in the dyad to solve problems. The two control subjects were instructed to perform the same behaviors but received non-contingent reinforcement. The results indicated a strong contingent reinforcement effect on the performance of the treatment sessions' target behaviors. Several baseline, treatment, and post-treatment response measures indicated that the treatment effects had generalized to other areas of social behavior away from the treatment setting.

Behavior modifiers have demonstrated the effectiveness of contingency management programs in controlling a wide variety of behaviors exhibited by chronic mental patients. However, there is little information on the efficacy of such procedures when applied to interactive behaviors, an area of outstanding deficiency in most chronic patients. It has been theorized that the extreme social isolation exhibited by these patients is a consequence of having experienced "pain" in prior interpersonal relationships (Maley, 1973). Thus, a series of avoidance behaviors are learned to reduce contact with other people, resulting in the frequently observed withdrawal patterns. Whatever the reasons, it is obvious that most chronic patients find little, if any, reinforcement value in interacting with other people.

Research has shown that one of the many categories of modifiable behavior shown by the chronic patient is the frequency of verbalizations (Isaacs, Thomas, and Goldiamond, 1960; Sherman, 1963; Wilson and Walters, 1966). It has even been established that the contents of patients' verbalizations are modifiable, in that delusional and "sick" talk have been decreased with rational and "healthy" talk being increased (Richard, Dignam, and Horner, 1960; Ullmann, Forsman, Kenny, McInnis, Unikel, and Zeisset, 1965). However, few studies have been reported in which reinforcement was contingent upon one patient's responding appropriately to another patient. In the final phase of an "operant-interpersonal" treatment program, King, Armitage, and Tilton (1960) rewarded chronic patients for communicating with each other and for cooperating to solve problems.

The most extensive experimentation in the conditioning of interpersonal behavior has used "normal" adults (Oakes, Droge, and August, 1960, 1961; Oakes, 1962*a*, 1962*b*; Hastorf, 1965). In these studies, positive or negative reinforcement was delivered to the subjects

¹This research was supported in part by Research Grant Number MH 18576-01A1 from the National Institute of Mental Health. The authors express appreciation to Mike Harpold, Holly Welch, and the staff of the Behavior Therapy Unit at Weston State Hospital for help in collecting the data for this study. Reprints may be obtained from Roger F. Maley, Department of Psychology, West Virginia University, Morgantown, West Virginia 26506.

while they were participating in small (two- to four-member) groups. For example, Hastorf (1965) demonstrated that the perceived leadership status of a target group member could be influenced by reinforcing his participation in group discussions. The target person received positive (green) light flashes for any verbalization and negative (red) lights for silence. The three non-target group members received positive reinforcement only for agreeing with or addressing the target person and red lights for all other verbalizations. The results indicated that the target person's sociometric status and verbal behavior increased significantly, and the effect was maintained in the generalization stage.

Most behavioral treatment strategies, including token economy programs, are designed to reward patients for attending activities and other group functions, but seldom provide systematic reinforcement for verbal participation at meetings or for patient-to-patient interactions. It seems likely that chronic patients have little reinforcing value for each other and thus need to be trained in interactive and cooperative behaviors that build up the effectiveness of social reinforcers.

Specifically, the present study sought to modify the interactive behaviors of withdrawn, low-verbalizing chronic patients by the systematic application of reinforcement for social responses (talking, attending, questioning, and answering) within a dyadic setting. Additional measures were obtained to investigate the generalization of interactive behaviors from the treatment setting to other settings and other areas of social functioning not specifically reinforced during the treatment sessions.

METHOD

Subjects

Four female patients from the Behavior Therapy Unit at Weston State Hospital in Weston, West Virginia, had a mean length of hospitalization of 6.3 yr, and all were diagnosed

as chronic schizophrenics. The selection criterion was based on scores obtained from staff ratings of frequency of interaction for the entire 20 patients housed on the Behavior Therapy Unit. The four patients receiving the lowest ratings were selected and divided into two groups matched on their rating scores. A coin was then flipped to determine which group was assigned to the experimental and the control condition.

Apparatus

The experimental room was in a 20 by 8 ft (6 by 2.4 m) research trailer. A control panel and two black, hooded reflector boxes, each containing four green Christmas tree lights, were placed on a small table. The boxes were placed at the center edge of two adjacent sides of the table with the control panel located on a third side. The lights within each box were visible only to a person sitting directly in front of them. Labels were placed above the four lights in each box to identify the desired responses associated with each light; the labels read "talking", "paying attention", "asking questions", and "answering questions". Each box was equipped with a black construction-paper shield which could be used to conceal two of the lights. All lights were connected to the control panel switches which were operated by the experimenter. Whenever a light was turned on, its corresponding timer was activated, thus providing a record of the length of time the light was on.

Time charts, broken down into 5-min intervals, were used to record the length of time the patients engaged in the desired responses during the sessions. Magazines and pictures were placed in the center of the table to provide stimulus material for conversation.

Procedure

Experimental group. The subjects in the experimental group attended ten 30-min treatment sessions held on the weekdays of two consecutive weeks. A standard set of oral in-

structions defining the desired response and informing the subjects of the contingencies of reinforcement in operation was given before each session. Although the desired responses differed across sessions, the amount of obtained reinforcement was always dependent upon the length of time each individual's lights were on throughout any one session. For every 50 sec of target behavior performance, one token was earned. These were the same tokens used on the treatment unit and could be spent for any item in the ward store (Ruskin and Maley, 1972).

Besides relating instructions and operating the control panel, the experimenter presented two suggestions for discussion topics at the beginning of each session. The experimenter's participation for the remainder of each session was limited to offering occasional short statements of approval (*e.g.* "good", "you're doing well") and recording the timer readings at the end of each 5-min interval, thus providing a cumulative record of the length of time the lights were on. The tokens were distributed in the experimental room at the end of each session. The experimenter was observed through a one-way mirror by two psychologists for two sessions. They were in 100% agreement with the experimenter's judgements of subject responses meeting reinforcement criteria. The experimenter had been carefully trained and had three months of experience in shaping interactive behaviors in chronic mental patients.

Training was divided into four phases with different target behaviors in each phase. Phase I covered the first two sessions during which any verbal production, regardless of content or to whom it was directed, was reinforced. Each subject's "talking light" was turned on at the beginning of any verbal response and left on until the person stopped talking. A subject was considered to have stopped talking when 3 sec (measured by the experimenter counting silently) had elapsed following the last word.

Phase II covered the third and fourth sessions. During this phase, reinforcement was contingent upon attending behavior and talking.

"Attending" was defined as "facing the other subject when she is talking". "Talking" retained its Phase I definition. The experimenter operated the first two lights in each box (labelled Talking and Paying Attention) the same way in which the first light had been operated in Phase I. For example, if Subject A began talking, her "talking" light was turned on for the duration of her speech. If Subject B's head was at that time facing Subject A, B's "Paying Attention" light was turned on the moment when the experimenter determined B began facing A. This light was turned off when approximately 3 sec had elapsed after B ceased facing A, or when A stopped talking, whichever occurred first. Only attending between subjects was reinforced.

The fifth, sixth, and seventh sessions comprised Phase III. In this stage, the subjects were required to modify their verbalizations into questions and answers related to questions. Reinforcement was no longer available for attending behavior nor for any verbalizations other than inter-subject questions and answers. No questions or answers directed to the experimenter were reinforced. The last two lights in each box (labelled Asking Questions and Answering Questions) were operated during this phase. The specific reinforcement criteria for asking a question required the subject to face the other subject and pose a question. The experimenter turned on a subject's "Asking Questions" light as soon as it was evident that the subject was asking a question while facing the other subject. The light was turned off when approximately 3 sec elapsed without further speech emitted in question form. In order for an "answer" to meet reinforcement criteria, the subject was again required to face the other subject and respond with information clearly relevant in content to the preceding question. For example, if Subject A asked Subject B, "How long have you been married?", answers such as "I've been married 20 years", or "I've never been married" would be reinforced. If B responded with her age or the number of children

she had, her light would not be turned on because these answers are irrelevant to the information demanded by the question. The experimenter operated the "Answering Questions" light in the procedure similar to the operation of the "Asking Questions" light. When it was evident that a subject was producing a relevant response while facing the other subject, her light was turned on. It was turned off approximately 3 sec after the last word of the answer was spoken.

The task of Phase IV, which covered the final three sessions, required cooperation between the subjects. They were again instructed to ask and answer questions as defined in Phase III, but before either subject received reinforcement, a sequence of one subject posing a question and the other responding to it had to be completed. In this phase, an additional reinforcement criterion for answers required them to be longer than two words. Each completed sequence was worth 10 sec of token-earning time. After a question-response sequence was completed, the experimenter switched on the light labelled "Asking Questions" for the subject who posed the question, and the "Answering Questions" light for the subject who responded, and left both lights on for 10 sec. The first two lights in both boxes were shielded so that the experimenter could operate them to provide a record of the actual time spent by each subject asking and answering questions.

Control group. The two control group subjects also attended ten 30-min sessions in the experimental room with the same experimenter. The control group was given the same instructions as the experimental group regarding the desired responses of each phase, but was not informed of any reinforcement contingencies or of the meaning of the lights. One or two of the lights for each control subject were turned on randomly throughout the session, equalling the mean amount of total "light time" earned by the experimental subjects during their corresponding session. In all of the control group sessions, two lights in each box were shielded, thus al-

lowing for the recording of the amount of time spent engaged in the target behaviors. At the end of each session, each control subject received the mean amount of tokens earned that day by the experimental subjects. The experimenter offered the same suggestions for topics to discuss that had been given in the experimental session, but did not give any statements of approval. The control group thus served to control for the effects of attention from the examiner, instructions, placebo effects due to special treatment, and the passage of time on an active treatment ward that used unscheduled social reinforcement for patient-to-patient interactions.

Measurements

Treatment session data. The amount of time spent engaged in the target behaviors was recorded every 5 min throughout each session by reading the cumulative timers. Recording data by 5-min intervals facilitated an examination of behavior changes during sessions as well as a comparison of inter-subject performance patterns.

Generalization measures. As residents of a ward operating on a token economy system, the patients could earn tokens in various categories such as grooming, ward maintenance, jobs, activities, *etc.* Baseline, treatment, and post-treatment (each lasting 14 days) records were obtained for each patient's total token earnings, job earnings, and activity earnings.

Twenty 1-min behavioral observations were made by the ward staff on all subjects each day of the baseline, treatment, and post-treatment periods, resulting in 840 observations per subject. Six staff members who were naive as to the nature of the study and the control-experimental grouping of the subjects, were trained in the observation procedure. Specifically, the observer would approach the area on the ward where a subject was located and observe her unobtrusively for 1 min. If, during that interval, the subject was observed audibly verbalizing while

facing another patient, the observer recorded a "1" for that event in the subject's daily tally sheet. If the subject was not observed talking to another patient, a "0" was recorded for the observation interval. Only verbalizations to other patients, not staff members, were counted as valid interactions. The observations were randomized throughout the day with a minimum of 20 min between observations of the same subject. Each observer was spot-checked three times per week to ensure that the observation was being conducted correctly.

Selected scales from the Ellsworth MACC Behavioral Adjustment Scale (MACC), the Psychotic Reaction Profile (PRP), and the Maley Behavior Rating Scale (MBRS) were completed twice weekly during the six-week baseline, treatment, and post-treatment period by staff members on the Behavior Therapy Unit. The rating procedure consisted of a rating team

of five or six staff members meeting twice each week to rate each subject on all items of the three scales. A final score on each scale represented the consensus ratings of the rating team. These scales are used for evaluating treatment program effectiveness and are routinely completed on all of the unit's residents. The raters did not know which patients were in the experimental or control group.

All four scales of the MACC (Ellsworth, 1971) were considered related to social functioning. The scales (Mood, Cooperation, Communication, and Social Contact) each contain four items which are rated on a five-point scale and can be combined to yield a Total Adjustment score. The PRP (Lorr, O'Connor, and Stafford, 1960) includes a scale called "Withdrawal" which was used in this study. The Withdrawal scale is composed of 38 items which are answered true or false. The MBRS

Fig. 1. The amount of time each subject spent talking per 5-min interval during the two sessions of Phase I.

Fig. 2. The relative amount of time each subject spent talking and attending per 5-min interval during the two sessions of Phase II.

(Maley, 1973) is a 60-item true-false behavior inventory designed specifically for use with chronic patients. Three of the five MBRs scales were used in this investigation: Communication, Cooperation-Mood, and Social Skills.

RESULTS

Treatment Sessions

As shown in Figures 1, 2, 3, and 4, a progressively wider discrepancy occurs between the

Fig. 3. The relative amount of time each subject spent asking and answering questions per 5-min interval during the three sessions of Phase III.

performance levels of the experimental and control subjects over the four treatment phases, indicating a strong treatment effect. The experimental subjects, as contrasted to the control

subjects, showed a sharp increase in time engaged in each interactive behavior and maintained these high levels of responding throughout all of the treatment phases.

Fig. 4. The relative amount of time each subject spent asking and answering questions per 5-min interval during the three sessions of Phase IV.

Group means for time spent in each response category during each phase are presented in Table 1. Not only are there large differences between each group's mean values, but there are also clear opposite trends in time spent responding across the four phases. In Phase I, the experimental subjects talked for a mean of 6.10 min per session. By the final phase, where their talking was limited to answering and asking questions, their total mean output per session was 13.59 min. These data are reversed for the control subjects, who in Phase I talked a mean

of 0.98 min per session, and by Phase IV asked and answered questions for a mean of only 0.10 min per session.

Table 1

Group means for minutes spent responding on target behavior for each experimental phase.

Phase	Target Response (s)	Experimental Group	Control Group
I	talking	6.10	0.98
II	talking	8.96	0.48
	attending	5.50	0.15
III	questions	5.81	0.17
	answers	5.32	0.13
IV	questions	7.51	0.07
	answers	6.08	0.03

Generalization Measures

Ward observations. Figure 5 shows the number of times out of 140 observations that each subject was observed talking to another patient on the ward during the baseline, treatment, and post-treatment weeks. During the baseline period, all subjects were responding at a low rate of interaction. However, during the treatment phase, the experimental subjects' observed talking rose sharply to 36 and 43 occasions respectively, while the control subjects remained near their baseline with only 7 and 12. In the post-treatment period, the number of on-target observations reached an even higher level at 75 and 44 for the experimental subjects; the control subjects maintained their comparatively low levels of responding with scores of 7 and 9.

Behavior rating scales. The ratings on the experimental subjects improved over baseline scores on all selected scales of the three behavior-rating forms. Scores obtained during the treatment and post-treatment periods for the experimental subjects indicated improvement in withdrawal, social contact, mood, and communication skills. Subject E2 showed particularly large differences between baseline and post-treatment ratings; for example, this subject showed a mean MACC total adjustment scale score of 51.5 during the baseline weeks which

rose to a mean of 68 during the post-treatment weeks. Of the control subjects, C1's ratings improved from baseline to post-treatment on the cooperation-mood scale of the MBRs. Ratings on all other selected scales for both control subjects showed either no improvement or deterioration in rated social functioning from baseline to post-treatment.

Token earnings. Because of the inflationary fluctuations on the Behavior Therapy Unit, each subject's token earnings for activities, job performance, and total tokens earned were converted to Z scores for average tokens earned per day for each week. There were consistent increases from baseline levels to post-treatment for the experimental subjects in all three categories of earnings. For example, Subject E1 went from 0.68 during the first week of baseline to 0.86 on the second week of post-treatment, and Subject E2 showed a corresponding increase from -0.31 to 0.66. For the control subjects, the corresponding changes were: C1 from 1.16 to -0.32, C2 from -1.14 to 1.32. Total job earnings increased over the same period for the experimental subjects (E1 from -0.65 to 0.50, E2 from -0.54 to 1.29), while showing decreases for the control subjects (C1 from 1.4 to 0.15, C2 from -0.65 to -0.84). Tokens earned for participation in activities also showed improvement for the experimental subjects (E1 from -1.5 to -0.58, E2 from 0.41 to 1.40), while remaining relatively stable for the control subjects (C1 from -0.30 to -0.25, C2 from -1.9 to -1.7).

DISCUSSION

The present results demonstrate the efficacy of treatment procedures employing instructions and contingent reinforcement in modifying withdrawal from social contact in chronic mental patients. Consistent and large differences occurred between the two experimental subjects and the two control subjects on the treatment-session measures and the generalization measures. These results are especially note-

Fig. 5. Total number of times the subjects were observed talking to other patients on the ward per week.

worthy in view of the fact that all of the patients were residents of an active, behaviorally oriented treatment program.

Considering the post-treatment data, it is evident that there was an increase in several of the measures after the treatment sessions were

terminated. The behavior ratings on the experimental patients continued to improve on the PRP Withdrawal scale as well as on several of the MBRS and MACC scales. Particularly noteworthy are the post-treatment increases in ward talking observations for the experimental patients; they clearly were considerably more socially responsive than their initial baseline measures. This increase probably occurred because social activity itself became reinforcing, thus eliminating the need for the type of reinforcers used in the treatment sessions. This conclusion is supported by informal staff observations, which indicate that these patients sought out other people and appeared to be much more "relaxed" and "spontaneous" in their interactions with others.

Examination of the generalization measures reveals that the experimental subjects engaged in improved social behaviors beyond those responses reinforced during the treatment sessions. The behavior of the two experimental patients on the ward strongly suggests that they learned more than stereotyped responses to a specific stimulus situation. As Kazdin and Bootzin (1972) pointed out, there has been a paucity of reports of response generalization from token reinforcement programs. The present study, using more global, multiple-response measures, did demonstrate considerable response generalization.

Although this study provides evidence that the reinforcement procedures substantially contributed to the treatment effects, no appreciable light was shed on the relative contribution of several other components of the treatment method. However, informal observations during the study provide some hints as to the significant process variables and suggestions for future research. It seems quite feasible that socially withdrawn behavior in chronic mental patients is due not only to the lack of reinforcers for such behavior, but is also a consequence of the absence of appropriate, socially effective models in the environment. Treating a dyad is one way of promoting attention to models and forcing

patients to observe others being reinforced for appropriate behaviors. Another issue related to process variables concerns the degree to which verbal approval contributed to the treatment effect. Although there is no way to determine which type of reinforcer (verbal or lights) produced more responses, E2 appeared to pay more attention to the examiner than to her lights. The reverse, however, was true for E1.

It is also not known to what extent the use of instructions contributed to the outcome, even though Ayllon and Azrin (1964) demonstrated that instructions with schizophrenic patients were more effective than reinforcement alone in generating behavior. Since instructions were also used in the control patients' sessions, it may be concluded that they were not sufficient in themselves to improve social responsiveness, but little information has been gained as to the relative value of instructions when combined with contingent reinforcement.

Perhaps the major achievement of the present study lies in the fact that these procedures can be used by ward personnel with a minimal amount of training. Of special significance for the treatment of chronic patients is the implication that social responsiveness may be increased by applying systematic reinforcement within an interpersonal situation.

REFERENCES

- Ayllon, T. and Azrin, N. H. Reinforcement and instructions with mental patients. *Journal of the Experimental Analysis of Behavior*, 1964, 7, 327-331.
- Ellsworth, R. B. *The MACC behavioral adjustment scale*. Beverly Hills, California: Western Psychological Services, 1971.
- Hastorf, A. H. The "reinforcement" of individual actions in a group situation. In L. Krasner and L. Ullmann (Eds.), *Research in behavior modification*. New York: Holt, Rinehart and Winston, 1965.
- Isaacs, W., Thomas, J., and Goldiamond, I. Application of operant conditioning to reinstate verbal behavior in psychotics. *Journal of Speech and Hearing Disorders*, 1960, 25, 8-12.
- Kazdin, A. E. and Bootzin, R. R. The token economy: an evaluative overview. *Journal of Applied Behavior Analysis*, 1972, 5, 343-372.

- King, G. F., Armitage, S. G., and Tilton, J. R. A therapeutic approach to schizophrenics of extreme pathology: an operant-interpersonal method. *Journal of Abnormal and Social Psychology*, 1960, **61**, 276-286.
- Lorr, M., O'Connor, J. P., and Stafford, J. W. The psychotic reaction profile. *Journal of Clinical Psychology*, 1960, **16**, 241-245.
- Maley, R. F. Group methods and interpersonal learning on a token economy ward. In A. Jacobs and W. Spradlin (Eds.), *The group as an agent of change*. New York: Behavioral Publications, (in press).
- Oakes, W. F. Reinforcement of Bales' categories in group discussion. *Psychological Reports*, 1962, **11**, 427-435. (a)
- Oakes, W. F. Effectiveness of signal light reinforcers given various meanings on participation in group discussion. *Psychological Reports*, 1962, **11**, 467-470. (b)
- Oakes, W. F., Droge, A. E., and August, B. Reinforcement effects on participation in group discussion. *Psychological Reports*, 1960, **7**, 503-514.
- Oakes, W. F., Droge, A. E., and August, B. Reinforcement effects on conclusions reached in group discussions. *Psychological Reports*, 1961, **9**, 27-34.
- Richard, H. C., Dignam, P. J., and Horner, R. F. Verbal manipulation in a psychotherapeutic relationship. *Journal of Clinical Psychology*, 1960, **16**, 364-467.
- Ruskin, R. S. and Maley, R. F. Item preference in a token economy ward store. *Journal of Applied Behavior Analysis*, 1972, **5**, 373-378.
- Sherman, J. A. Reinstatement of verbal behavior in a psychotic by reinforcement methods. *Journal of Speech and Hearing Disorders*, 1963, **28**, 398-401.
- Ullmann, L. P., Forsman, R. G., Kenny, J. W., McInnis, T. L., Jr., Unikel, I. P., and Zeisset, R. M. Selective reinforcement of schizophrenics' interview responses. *Behaviour Research and Therapy*, 1965, **2**, 205-212.
- Wilson, F. S. and Walters, R. H. Modification of speech output of near mute schizophrenics through social learning procedures. *Behaviour Research and Therapy*, 1966, **4**, 59-67.

Received 4 December 1972.

(Revision requested 19 February 1973.)

(Final acceptance 9 July 1973.)