THE TREATMENT OF "ANXIETY-DEPRESSION" VIA POSITIVE
REINFORCEMENT AND RESPONSE COST¹

JAMES JOHN REISINGER

LAURELTON STATE SCHOOL AND HOSPITAL

A target behavior program, structured within a token economy project, was implemented to modify the behavior of an institutionalized patient who exhibited excessive rates of crying and no smiling responses. To affect both responses concurrently, token costs were made contingent upon crying and token payments and/or social reinforcements were provided for smiling. The results indicated both the feasibility of eliminating "anxiety-depression" within an institutional environment and the efficacy of the treatment procedures 14 months after discharge.

Although clinical descriptions and treatment procedures for depression occupy a vast portion of the psychoanalytic literature, many inconsistencies have accompanied them (Lazarus, 1968). In contrast, the behavior therapy literature is at present limited in even discussing this disorder. In part, it may be that the latter state of affairs is due to the subjective connotations associated with the term "depression" (Lewinsohn, Weinstein, and Shaw, 1969).

Several attempts to explain depressed behavior have appeared within a behavioral context. One position, as proposed by Ferster (1965), stated: "When the aversive stimulus is the withdrawal of positive reinforcement, the resulting non-reinforcement of enough items in the individual repertoire weakens behavior sufficiently for a 'depression' to be observed (p. 25). . . ." Similarly, Lazarus (1968) suggested that depression is a state in which a subject's response frequency or quality diminishes as a func-

tion of reduced reinforcement. Unfortunately, while plausible, these explanations await empirical verification.

Behavioral reports of the successful treatment of depressed patients have focused almost exclusively upon the out-patient. For example, Burgess (1969) described a therapy program, located in a traditional counseling setting, that treated depressed patients who complained of anxiety associated with "performing" behavior. Contingency management, which provided positive reinforcement for appropriate behavior and extinction for depressed behavior, was the basic intervention technique.

Lewinsohn *et al.* (1969) described a comprehensive, clinical research program designed to investigate and modify the out-patient's depressed condition. The main goals were to restore an adequate schedule of positive reinforcement for the patient by training him to emit behavior that was likely to be reinforced by others and to engage the patient in activities that were intrinsically reinforcing.

The present study attempted to modify the depressed behavior of an institutionalized patient. Positive reinforcement was provided to the subject contingent upon the emission of an appropriate, low-frequency response (smiling), and response costs were applied for the occurrence of an inappropriate, high-frequency response (crying).

¹This study was conducted while the author coordinated a Behavior Modification Unit at Laurelton State School and Hospital. Appreciation is expressed to the Child Care Aides of Cottage 10, without whose dedication and cooperation this clinical research could not have materialized. Also acknowledged for their assistance in reviewing this manuscript are: Wendell Smith, Irvin Guyett, Donald Hartley, Charles Galloway, John P. Ora, and James Hogge. Reprints may be obtained from the author, Department of Psychology, George Peabody College for Teachers, Nashville, Tennessee 37203.

METHOD

Subject

A single, white female admitted to the institution in 1966, was 20 yr old and had been hospitalized for 6 yr before the present treatment program. The results of previous therapy efforts, as reported in the institutional records, indicated no appreciable change in the patient's behavior. A summary of both medical and psychological information yields the following description:

The patient cries without any provocation and feels that everyone hates her. She is rejected and ridiculed by her associates, so most of the time she is depressed and cries. The question occurs as to whether the diagnosis is accurately stated as borderline psychosis or hysteria. Characteristic functioning indicates behavior which is described as fearful and withdrawn, and final diagnosis is anxiety-depressive.

The current psychological reports confirmed the behavior pattern as one indicative of tendencies toward self-rejection and depression. Finally, the hospital ward records suggested that the patient displayed low rates of verbalization with main emphasis on topics involving fear, personal injury, and death.

Setting and General Procedure

The therapy program was conducted within a Behavior Modification Unit that serves as a residence for approximately 40 patients. The population was composed of the "failures", in terms of apparent inability to benefit or perform in regular institutional rehabilitation programs. The heterogeneity of the population suggested the need for both a general, structured token economy (Atthowe, 1964) and a program with sufficient flexibility to allow for concentration upon an individual target behavior for each patient (Ayllon and Azrin, 1968).

The value of the token (poker chip) was such that it could be used to purchase better sleeping facilities, access to television, off-

grounds trips, and so forth. Patients received tokens from a staff of Child Care Aides who were trained in the use of behavior modification procedures. Tokens were paid to patients when aides observed defined, appropriate responses. Social reinforcement, as described by Atthowe and Krasner (1968), accompanied the receipt of tokens. A fine, or a response cost (Weiner, 1962) procedure was also applied by aides who advised the respective patient of the amount and purpose for each fine. Staff maintained records for token payment and fines and a daily procedure included a "check-in" or banking period in which patients had the opportunity to exchange tokens for desired items or events and/or to pay fines. In all such transactions, tokens were exchanged hand-to-hand between patients and the staff.

Target Responses and Observations

The smiling response was defined as a slight opening of the lips, an upward turn of the corners of the mouth, and an increase in the protrusion of the skin covering the cheek bones (Hopkins, 1968). The crying response was defined as inarticulate sounds accompanied by tears from the patient's eyes. Crying episodes were defined as those time periods from 5 to 30 min duration in which the crying response was observed.

Both responses were observed and recorded by any combination of three aides from the pool of 12 employed in the unit. The experimenter had no control over the scheduling of staff that would be on-duty on any given day. The target responses were observed in the unit, three times per day, with each rating interval being 2 hr in maximum duration. Rating times were arranged in conjunction with meals as these times allowed for staff and patients to be in close physical proximity without introducing novel procedures into the unit routine. Observers were at least 10 ft apart to ensure separate judgements as to the appearance or nonappearance of target responses. After each rating period, data were posted in the aide office.

Reliability for target responses was calculated in two manners: (a) between aide ratings; and (b) between aide and student-volunteer ratings. For aide ratings, measures involved a random sample of 90 different rating occasions distributed across each treatment phase (*i.e.*, baseline to social reinforcement) of the study. A 94% level of agreement was found for notations, which indicated the occurrence of the target responses with agreements for each response being 90% or better. The student-volunteer and aide comparisons were made on two occasions in which undergraduates were touring the unit. On each occasion, two students were requested to assist in testing an experimental rating scale. The students were given written definitions of the target responses and then observed in the same time intervals as did the aides, except that students were not aware of the actual purpose of the ratings. These ratings yielded 98% agreement for the occurrence of the response; again, agreements for each response were above 90%.

To determine whether treatment procedures were being applied in accord with instructions, the experimenter reviewed check-in records each day. As the patient received a particular token (in that staff could identify it) for smiling and a fine slip for crying, it was possible to compare check-in information with observational data. Such a comparison revealed only five discrepancies throughout the study. While this information did not guarantee the precision with which treatment contingencies were being applied, the agreements suggest correct use of the procedures across treatment phases.

Procedure

Baseline (Weeks 0 to 2). Ward reports and pre-baseline observations of the patient suggested the plausibility of treating the depressive disorder by altering smiling and crying responses. Upon admission to the Behavior Modification Unit, frequencies of these respective responses were observed to establish their occurrence under typical hospital conditions (*i.e.*,

non-intervention). At the conclusion of baseline, the patient was informed by staff of two contingencies: (a) that crying was a behavior for which tokens usually had to be paid; and (b) that smiling was a behavior for which tokens could be received. No additional information relative to changes in the treatment procedures was provided to the patient for the duration of the study.

Positive Reinforcement and Response Cost (Weeks 2 to 8). Token reinforcement for smiling and token costs for crying were in effect on a continuous reinforcement schedule throughout the fifth week. In the remaining three weeks of this treatment condition, the schedule was altered to allow a maximum of one payment and one fine per observation period.

When the smiling response was observed, the aide approached the patient and presented a token to her. There was no verbal exchange from aide to patient at these times. In the response-cost procedure, the aide informed the patient of the amount and purpose of the fine (*i.e.*, "You will be fined one token for crying"). No other verbal exchange from aide to patient occurred.

Extinction (Weeks 8 to 10). This condition was initiated for both target responses to determine the effects of prior experimental treatment. While reinforcement and cost procedures under the control of staff were terminated, there was no manner by which all potential reinforcers (*e.g.*, peer attention) could be controlled.

Reversal (Weeks 10 to 12). Contingencies were reversed in contrast to the initial positive reinforcement and response-cost procedures. The reinforcement schedule was such that one payment for crying and one fine for smiling could have occurred in an observation period. This schedule was maintained for the remaining treatment conditions (*i.e.*, positive reinforcement and response cost, and "fading").

Positive Reinforcement and Response Cost (Weeks 2 to 16). The original contingencies were reinstated, except that an additional social

reinforcement component was paired with token payment. The aide, when presenting the token, would smile and say: "You look much better when you are smiling." The fining procedure remained exactly as it had been in the initial application of the response-cost procedure.

"Fading" (Weeks 16 to 20). This procedure was employed to decrease and eliminate fines and payments for the target responses. Crying responses were ignored and social reinforcement alone, as described in the previous treatment phase, was provided for the smiling response. Introduction of this procedure was attempted for two reasons: (a) the patient was nearing discharge status, as the disorder was negligible; and (b) to ensure maintenance of the established behavior, it was decided to attempt a transfer of control to social reinforcers as might be found in a community situation.

Follow-up. The patient was discharged at the conclusion of the "fading" condition and thus it was not possible to continue securing data on target responses. Information relative to the patient's post-treatment adjustment was therefore necessarily based upon community agency reports.

RESULTS

Baseline measures indicated a zero frequency of smile responses, whereas crying was recorded at a rate of 30 and 28 episodes for the first and second weeks respectively. These baseline rates per response were consistent with pre-baseline reports and observations regarding the patient's behavior.

Token reinforcement, to establish the smile response, resulted in a maximum frequency of 27 smiles in the final week of the phase. The rapid increase in smiling rates, within the initial three weeks, occurred during the use of continuous reinforcement, while the leveling-off effect, in the last three weeks, occurred during intermittent scheduling. Any qualitative change in the smile response was not reflected in the data. The decrease in crying resulted in only two epi-

sodes in the final week of the treatment phase. The contrast, in changes for both responses, was marked as smiling rates approached the initial baseline frequency of crying and crying episodes approached the baseline frequency of smiling.

During the extinction phase, smiling decreased to a low of 11 responses in the final week. The termination of response-cost procedures resulted in an increase in crying to nine episodes in the concluding week of the condition. The changes in both response rates were evident, but perhaps were not sufficient to indicate a substantial degree of control exerted by the experimental procedures.

Reversal of the original contingencies resulted in a decrease in smiling to three responses per week and an increase in crying to 18 episodes per week. Reversal thereby served to magnify the trends noted in the extinction procedure and thus demonstrated the control over target responses by treatment techniques.

The reinstatement of original contingencies resulted in a rapid and favorable change in response frequencies. The final week of this phase indicated that smiling increased to 23 responses and crying decreased to two episodes. The concluding phase of the study maintained both the increase in smiling and the decrease in the frequency of crying. As such, the data suggest an effective transfer control for the responses from tangible to intangible reinforcement.

The most reliable indicator of post-treatment effectiveness was that within the 14 months after discharge there was no recommendation for re-hospitalization and no referral for additional treatment. As the patient has continued to function in the community, it can be assumed that the depressive behavior remains stabilized at a low rate.

DISCUSSION

The study demonstrated both an adequate definition and a sufficient application of behavioral techniques for the modification of the depressed behavior of an institutionalized patient.

Fig. 1. Treatment program to establish smiling responses and to extinguish crying episodes.

Initially, the intervention procedure of token reinforcement increased the smiling response. Simultaneously, response costs resulted in the decreased frequency of the crying response. Later, smiling was maintained by pairing token reinforcement and social reinforcement and then by social reinforcement alone. Crying was extinguished by withdrawal of aide attention.

Two aspects of the data require discussion. First, while the extinction procedure indicated a change in response rates, it may be argued as to whether a believable demonstration of control of the dependent variables was achieved. As the time available for treatment of the patient was limited, extinction was discontinued and reversal of the original contingencies was initiated. The procedural change does not answer any question regarding the probable outcome if extinction had continued; however, reversal in itself provided the necessary demonstration of the effects of the experimental procedures. The second point that needs to be clarified occurred during "fading", when reinforcement control was being transferred from token to social reinforcement. In the first week of this treatment condition, a

decrease in smiling was observed. Assuming that extraneous variables were controlled, the most logical explanation for the decrease lies in the rate at which the tokens were withdrawn. As token reinforcement had maintained the smiling response to this time, it is plausible that the abrupt change from some tokens to no tokens was too rapid. Nevertheless, the transfer was successfully completed, as indicated by the increase in smiling rates.

The present study provides an example of the clinical situation in which the problem already existed and for which the solution had to be determined within the immediate circumstances (Ora and Reisinger, 1971). As such, the results must be evaluated and the procedures must be applied elsewhere with due caution. That depression is not always a function of environmental consequences has been illustrated, for instance, by favorable results with drugs (*e.g.*, Glick, 1964). It has also been suggested (*e.g.*, no author, 1968) that treatment considerations include not only environmental and chemical perspectives but genetic elements as well. Furthermore, all or any combination of these con-

siderations may vary according to different types of depression (e.g., Karkowski, 1968). It is reasonable therefore to propose that clinical research proceed to develop intervention strategies based upon investigations of in-patient and in-environment variables, with further studies focused upon the complex interactions of such variables.

REFERENCES

- Atthowe, J. M. *Ward 113 program: incentives and costs—a manual for patients*. Veterans Administration Hospital, Palo Alto, California, 1964.
- Atthowe, J. M. and Krasner, L. Preliminary report on the application of contingent reinforcement procedures (token economy) on a chronic psychiatric ward. *Journal of Abnormal Psychology*, 1968, **73**, 37-43.
- Ayllon, T. and Azrin, N. *The token economy*. New York: Appleton-Century-Crofts, 1968.
- Burgess, E. P. The modification of depressive behaviors. In R. D. Rubin and C. M. Franks (Eds.), *Advances in behavior therapy*, 1968. New York: Academic Press, 1969. Pp. 193-200.
- Ferster, C. B. Classification of behavior pathology. In L. Krasner and L. P. Ullmann (Eds.), *Research in behavior modification*. New York: Holt, Rinehart, & Winston, 1965. Pp 6-26.
- Glick, B. S. Double-blind study of tranylcypromine and phenelzine in depression. *Diseases of the Nervous System*, 1964, **25**, 617-619.
- Hopkins, B. L. Effects of candy and social reinforcement, instructions, and reinforcement schedule learning on the modification and maintenance of smiling. *Journal of Applied Behavior Analysis*, 1968, **1**, 121-130.
- Karkowski, A. J. Activity study of doxepin: a new antidepressant. *Psychosomatics*, 1968, **9**, 89-95.
- Lazarus, A. A. Learning theory and the treatment of depression. *Behaviour Research and Therapy*, 1968, **6**, 83-90.
- Lewinsohn, P. M., Weinstein, M. S., and Shaw, D. A. Depression: a clinical-research approach. In R. D. Rubin and C. W. Franks (Eds.), *Advances in behavior therapy*, 1968. New York: Academic Press, 1969. Pp 231-240.
- No author. Treatment of depression. *British Medical Journal*, 1968, **5598**, 164-165.
- Ora, J. P. and Reisinger, J. J. *The Regional Intervention Project: a behavioral service delivery system for preschoolers*. Paper presented at the annual meeting of the American Psychological Association, Washington, September, 1971.
- Weiner, H. Some effects of response cost upon human operant behavior. *Journal of the Experimental Analysis of Behavior*, 1962, **5**, 201-208.

Received 9 February 1971.

(Revised 30 November 1971.)