BEHAVIORAL EFFECTS OF THREE SOCIAL CONDITIONS OF REINFORCEMENT ON AN INPATIENT TOKEN REINFORCEMENT SYSTEM

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CHAPTER 1

Introduction

The advent of behavior modification in the last decade has had a significant impact on the treatment of a variety of behavior disorders. Briefly stated, behavior modification is applied experimental psychology. The approach is "applied" because it deals with human behavior problems (e.g., deficient reading ability, head banging, enuresis, overeating) as opposed to laboratory analogues or theoretically relevant dependent variables. Behavior modification is related to experimental psychology because behavior modifiers attempt to develop methods for the alleviation of human suffering via scientific methods. Thus, such characteristics of science as controlled observations, unbiased measures, replicability of experimental findings, and commitment to empiricism are part and parcel of behavior modification (Krasner, 1971; Paul, 1969; Risley, 1969).

A complete list of the behavior disorders which have been successfully treated via behavior modification would be long, tedious, and quickly antiquated. The list would include, however, such prevalent psychological and educational problems as delusional speech, inability to study, focal fears, deficient assertive behavior, and disruptive classroom activity. A large array of behavior modification procedures have been deployed against this variety of behavior disorders. One procedure which is directed towards groups of people engaging in problematic behavior--the group operant system or "token economy"--is of focal concern herein.

Group Operant Systems

A group operant system is a behavior modification program capable of simultaneously modifying the behavior of several people. The behavioral procedure most frequently utilized is positive reinforcement. In addition, punishment procedures such as fining and time out may also be incorporated into a group operant system. The selection of specific operant procedures depends upon the nature of the target behavior and the characteristics of the patient population. Despite wide procedural variations, two overriding features are present in all group operant systems. First, the behavioral objectives of the treatment program and the monitoring and recording of its actual behavior effects are highly specified. That is, the goals of the intervention procedures are stated in behavioral terms and periodically assessed. In so doing, the success or failure of treatment can be determined easily and is, at least potentially, "public" knowledge.

The second major feature of group operant systems is the use of response contingent reinforcement procedures: Individuals within the system receive reinforcement after making certain specified responses. Some operant systems make use of contingent primary reinforcement in the form of food or cigarettes. Most systems, however, employ conditioned reinforcers, stimuli which gain their reinforcing value by being paired with prepotent reinforcers. Once earned, conditioned reinforcers such as tokens or points can be exchanged for a variety of "backup reinforcers" such as food, candy, cigarettes, and free time.

Examples of Group Operant Systems

Group operant systems employing tokens are frequently labeled "token economies." In psychiatric token economies, staff members give tangible conditioned reinforcers such as metal disks (e.g., Ayllon & Azrin, 1965, 1968) or paper money (e.g., Logan, 1970) to patients contingent upon the occurrence of some designated behavior. Four such token systems will now be described.

Ayllon and Azrin (1965) first reported the development of a token operant system in a psychiatric institution. Female chronic psychotics receiving no other psychological or medical treatment participated in a group program designed to modify work (e.g., washing dishes, mopping floors) and self-care (e.g., combing hair, brushing teeth) behaviors. Tokens resembled poker chips and could be exchanged for a variety of backup reinforcers such as privacy (e.g., choice of room), privileges (e.g., off-ward or town visits), social interaction with staff, devotional and recreational opportunities, and commissary items. Marked reinforcement effects were demonstrated by Ayllon and Azrin in each of six separate experiments. In each of the six, contingent token reinforcement yielded dramatically higher job performance rates than noncontingent reinforcement regardless of whether the tasks were initially "preferred" or "non-preferred" by patients.

Using small, plastic file cards as conditioned reinforcers, Atthowe and Krasner (1968) conducted a token program on a closed Veterans Administration Hospital ward with 60 male patients. Three subgroups participated in separate token procedures each of which

required different levels of patient self-control and activity. In the eleven month treatment period, staff reinforced leaving the dormitory area, bed making, urinary continence, social behaviors, and cleaning the ward with both tokens and praise. Further, undesirable behaviors such as cursing were "fined." Reinforcement was effective in increasing bed making, leaving the dormitory area, and urinary continence. Atthowe and Krasner also found a general increase in patient activity as reflected in attendance at group meetings, patient leaves, and canteen visits using a pretreatment period as a comparison period. Twenty-four of the 60 patients were discharged by the end of the 11-month treatment period, although 11 of these patients were readmitted within nine months.

Thirty-four violent and confused female chronic psychotics with a variety of diagnoses participated in a token economy carried out by Steffy, Hart, Craw, Torney, and Marlett (1969). Initially, patients displayed few social skills and engaged in inappropriate eating and sleeping behaviors. Eating and sleeping behaviors were particularly problematic for staff and were therefore chosen as target behaviors. In addition to paying for meals, tokens could be used to buy candy made available on the ward several times a day. Records of eating and sleeping behaviors and general behavior rating scales reflected patient improvement during the token program. After one year of the operant system, 16 patients were transferred to nursing homes and three to other psychiatric wards.

Finally, Winkler (1970) increased the frequency of appropriate self-care, social, and work behaviors with patients quite similar to

those described by Steffy et al. (1969). Chronic female patients were "motivated" to pay fines for undesirable behavior because non-payment resulted in doubling of token prices for all commissary items and privileges. Winkler reported improvement in attendance and participation at morning exercise (in an interdependent condition in which 21 patients were required to attend and participate before any patient could receive tokens), getting up, dressing, bed making, and shoe cleaning. Of additional interest is Winkler's observation that staff absenteeism dropped 24% during the six months the token operant system was in operation.

Research on token economies and similar group operant systems has been reviewed at length elsewhere (Appendix A; Carlson, Herson, & Eisler, 1972; Kazdin & Bootzin, 1972). In general, patients in token programs have fared quite well when compared to patients receiving no treatment or more traditional forms of treatment offered in psychiatric institutions. Token systems are capable of changing the inappropriate behaviors of patients within the institutional setting. Nevertheless, there are still many questions concerning the specific variables and procedures which make for an effective group operant system. One such question concerning the comparative effects of different patient reinforcement conditions is examined in the current research.

Social Conditions of Reinforcement

Conditioned reinforcers may be earned in a variety of ways in group operant systems. In Ayllon and Azrin's (1965) pioneering program, reinforcers were contingent upon individual patient behavior.

That is, it made no difference whether other patients also engaged in a target behavior. Winkler (1970) utilized a "group" contingency in which 21 or more patients were required to attend an exercise group before any single patient could receive reinforcement. Still other behavior modifiers have used contingencies in which reinforcers for an entire group were dependent upon the performance of a single individual (e.g., Carlson, Arnold, Becker, & Madsen, 1969; Greenburg & O'Donnell, 1972; Kubany, Weiss, & Sloggett, 1971). At variance in these diverse reinforcement systems is the social condition under which individuals were reinforced. Some programs required group performance whereas others did not. Some programs specified which individuals must engage in an activity before reinforcers were distributed, and others did not. In brief, the "social conditions of reinforcement" differed among these group systems.

Two aspects of the broad topic "social conditions of reinforcement" are of special interest in the present research. The first involves the exploration of the major dimensions of social conditions of reinforcement and how these may be related to each other. These dimensions organized within a classification scheme are discussed in the next chapter. Second, the research problem involves three specific social conditions of reinforcement within a token reinforcement system. The three social conditions as well as the experimental goals are presented in Chapter 3.

CHAPTER 2

A Classification of Social Conditions of Reinforcement

To paraphrase Kenneth Colby (1972, p. 272), before we can develop further in psychology we must have a way of classifying the phenomena with which we propose to deal. Once properly classified, important variables affecting a phenomenon are delineated and ordered, and can than be systematically investigated. Failure to sort, specify, and clarify the important dimensions of a phenomenon retard scientific investigation of that phenomenon.

The growing variety of social conditions of reinforcement in group operant systems identifies a need for classification in this area. A way of specifying the important features of these reinforcement procedures is necessary before intelligent questions can be formulated about the different systems. For instance, does the interdependent group procedure employed by Winkler (1970) result in quicker acquisition of work behaviors than the individual reinforcement procedures employed by Ayllon and Azrin (1965)? If so, which aspects of the interdependent reinforcement procedure accounts for its superiority? Neither question can be answered at this time. One reason is that there is currently no conceptual scheme within which the differing social conditions of reinforcement can be represented and investigated. The development of such a scheme is the purpose of this chapter.

Basic Social Conditions of Reinforcement

The social conditions of reinforcement are represented by the many ways individuals may be reinforced for desirable behavior within a group setting. Such conditions are "social" because they involve interpersonal relationships which differ among the conditions. They are referred to as conditions as opposed to reinforcement contingencies or schedules because an individual may not be reinforced even if his/her behavior satisfies reinforcement criteria. Certain group-behavioral requirements may determine the receipt of reinforcement.

Analysis of some simple variations in social conditions of reinforcement may facilitate an understanding of these conditions. In most operant systems, one specified individual reinforces a second individual. For instance, a ward nurse may give a patient five tokens for making his/her bed. A quite different condition occurs when many students praise or otherwise reward a fellow student for doing well on a spelling test. In the case involving the student, there are several reinforcing agents who are probably not designated or specified prior to the time reinforcement is given. An additional example not like either of the above takes place when a certain percentage of delinquents in a halfway house is required to attend a ward cleaning group before anyone in the halfway house can be given merit points. Once the group requirement has been satisfied, the delinquents who actually receive the points may or may not be required to meet some additional criteria.

Three dimensions upon which all operant reinforcement procedures can be located are evident in these examples. First, reinforcement

can be given by an individual or group. Thus, a nurse may reward a patient or a class may reward a fellow student. The first dimension, then, is the reinforcing agent dimension. Second, some individual or group always receives the reinforcer(s). These people are the reinforcer recipients. The recipients may be required to meet a response requirement. Thus, the second dimension is the recipient response requirement dimension. The third reinforcement dimension--the group response requirement dimension--refers to a behavioral criterion which must be satisfied by the group before its members are eligible for reinforcement. The chronic patients in Ayllon and Azrin's (1965) token program earned tokens dependent only upon their own behavior. A group requirement was not utilized. In Winkler's (1970) program, however, a group requirement existed which had to be satisfied before individuals within the group could be reinforced.

All three dimensions--reinforcing agent, recipient response requirement, and group response requirement--appear as labels of the three axes of Figure 1. Each dimension and its subdimensions are examined carefully in the sections that follow.

Reinforcing Agent Dimension

The reinforcing agent is the person or persons who awards reinforcement to others contingent upon the meeting of individual or group response criteria. In the typical clinical setting this is usually a nurse, aide, or psychologist. If there is only one reinforcing agent the situation may be described as a single (reinforcing agent)condition. In the token program designed by Steffy et al. (1969), for example, one aide rewarded patients contingent upon appro-

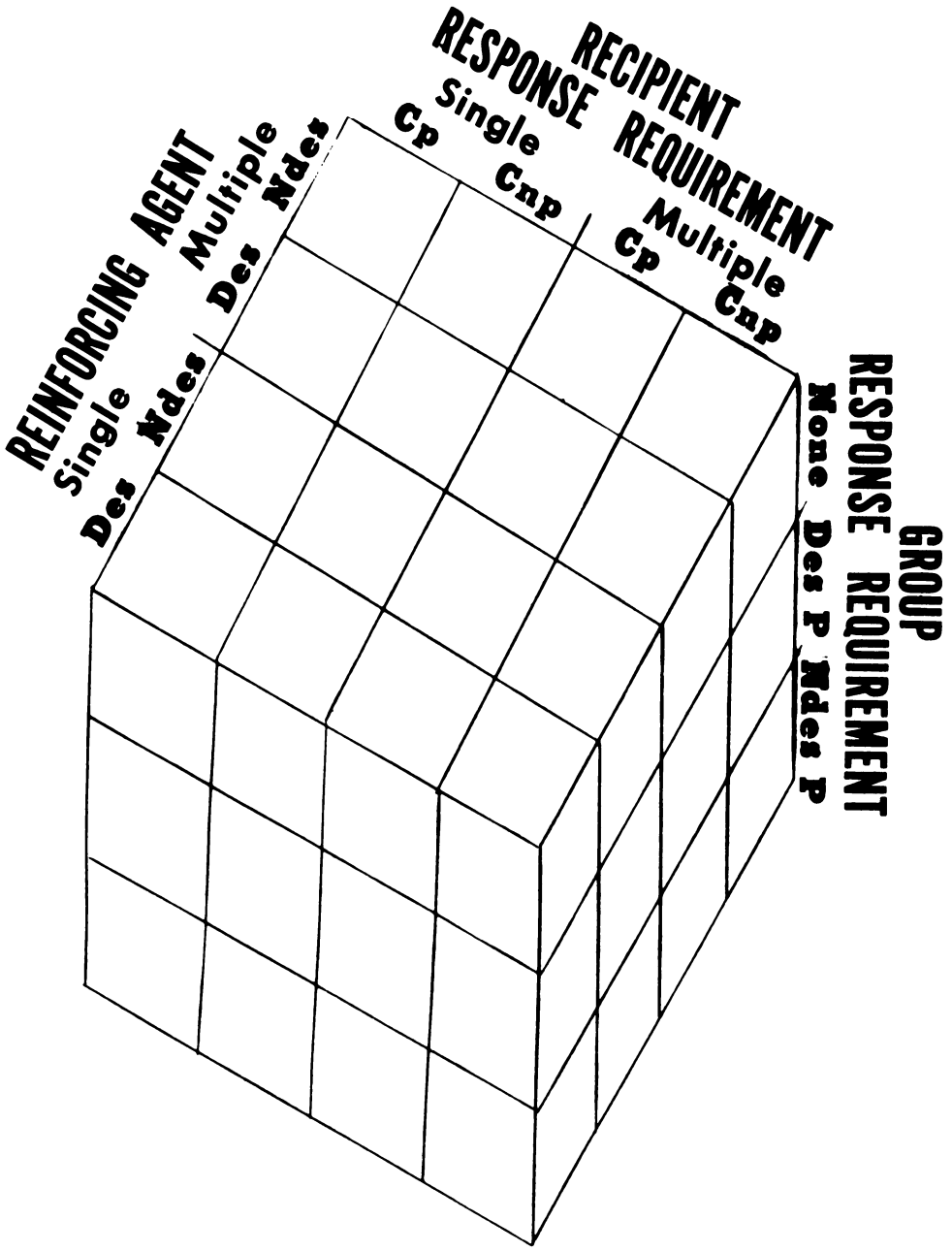

Figure 1. A classification scheme of the social conditions of reinforcement within group operant systems (Des = Designated, Ndes = Nondesignated, Cp = Contingency present, Cnp = Contingency not present, P = Person or persons).

priate eating behavior. On different days, different aides served as reinforcing agents. There was, nevertheless, only one aide dispensing tokens to patients at any given time.

A multiple (reinforcing agent) condition exists when several people are distributing the reinforcers simultaneously. In a study by Walker and Buckley (1972), classmates applauded a fellow student when it was announced he/she had engaged in appropriate social and academic behavior for 15 minutes. The group praise and other reinforcers were contingent upon appropriate behavior.

Currently, there is only scattered research supporting the importance of the single vs. multiple subdimension. Kale, Kaye, Whelan, and Hopkins (1968) and Lyon (1971) provide data which suggest that there is a difference between training by one or several experimenter-trainers. In their studies, the pro-social verbal behavior (e.g., greetings, responses to prompts) of withdrawn, chronic schizophrenics was reinforced. The investigators found increased transfer of pro-social verbal responses to an uninvolved experimenter after the subjects had been trained by several experimenters as opposed to one experimenter. Thus, the individual vs. multiple subdimension may tap an important variable with respect to the positive transfer of learned behavior.

Designated vs. nondesignated. The reinforcing agent, whether single or multiple, may be either a specific (i.e., designated) individual or group (e.g., ward aide, all ward nurses) or a nonspecified (i.e., nondesignated) person or persons. In Ayllon and Azrin's program, for instance, psychiatric aides reinforced patients with tokens

contingent upon certain work behaviors. Generally, the aides dispersing the tokens were specified prior to the work period. Thus, the aides were designated reinforcing agents. If the aides had been selected among hospital staff after the activity, the aides would be nondesignated reinforcing agents. Patients or staff in this second condition would not have known who the reinforcing agent was until the activity was completed.

The designation vs. nondesignation of a reinforcing agent may be important with respect to the acquisition, maintenance, and transfer of learned behavior. A condition in which the reinforcing agent is designated is probably one which leads to a quicker acquisition rate, a more consistent maintenance period, and a less transferable behavior than one with a nondesignated agent. Support for this position comes entirely from operant conditioning research with infrahuman subjects. Briefly, Catania, Silverman, and Stubbs (1974) and Wagner (1969) and others have found that organisms respond more frequently to stimuli associated with reinforcement than stimuli not correlated with reinforcement. Such "designated" stimuli are selectively attended and more quickly established as discriminative stimuli. Once associated with reinforcement, these stimuli are responded to more frequently than weaker stimuli on the same dimension (i.e., light) or other dimensions (i.e., sound, texture). In addition, stimuli which are less ambiguous (i.e., more designated) are responded to with less behavioral variability than ambiguous stimuli of the same dimension (Terrace, 1966). These and other studies (e.g., Honig, 1969) indicate that the designation-nondesignation of the reinforcing agent may have

important implications for the acquisition, maintenance, and transfer of learned behavior.

Summary of the reinforcing agent dimension. The reinforcing agent dimension categorizes those who distribute the reinforcers within a given social condition of reinforcement. The dimension is termed single if there is one reinforcing agent and multiple if there is more than one reinforcing agent. Further, the dimension is labeled designated if the reinforcing agent is specified prior to the social condition of reinforcement and nondesignated if the agent is not so specified.

Recipient Response Requirement Dimension

All operant systems have reinforcer recipients. The recipients in operant systems designed for treatment are often patients, students, or inmates. These recipients and the behavioral contingencies placed upon them are the focus of the second major dimension in the classification of social conditions of reinforcement.

The recipients are those who receive the reinforcement. They need not, however, be the ones who "earn" the reinforcement. For instance, in some classroom studies (e.g., Evans & Oswalt, 1968; Kulbany, Weiss, & Soggett, 1971) one student can satisfy reinforcement criteria thereby enabling the entire class the opportunity to obtain reinforcement. Only one student "earns" the reinforcement by satisfying a group requirement although many students may receive it.

Single vs. multiple. The number of people who are reinforcer recipients varies from one operant system to another. In most therapeutic programs, however, only one person is rewarded in one social

condition of reinforcement. The receipt of reinforcement by solely one individual is labeled a single (recipient) condition. For example, in Ayllon and Azrin's (1965) token system a patient earned tokens for herself. Every patient on the ward received tokens contingent only upon her own behavior. Thus, patients in the group system were in the same social condition of reinforcement although they did not receive tokens as a group.

If patients had received the tokens as a group, a multiple (recipient) condition would have existed. The recipient dimension is multiple if more than one person may be rewarded in one social condition of reinforcement (as in previous examples involving students and delinquents). Several studies suggest that multiple recipient conditions encourage more peer pressure (e.g., praise, warnings) than individual recipient conditions. Investigations with juvenile delinquents (Graubard, 1969), normal and exceptional elementary school students (Evans & Oswalt, 1968; Greenberg & O'Donnell, 1972; Kubany, Weiss, & Sloggett, 1971; Schmidt & Ulrich, 1969), and chronic psychotics (Winkler, 1970) found strong peer pressure in situations involving multiple recipients. Individuals in such group systems urge, threaten, and praise others for compliance and satisfactory fulfillment of contingencies related to obtaining reinforcement. Frequently, behavior is acquired quicker and maintained longer under group recipient conditions as opposed to individual or baseline conditions. More systematic research is needed concerning the strengths and problems associated with various recipient conditions before more definitive conclusions may be reached.

Contingency present vs. contingency not present. Recipients, whether one or several people, may be required to "earn" their rewards. For example, patients in Ayllon and Azrin's (1965) program earned tokens for satisfactory work behavior. It is only during the baseline or reversal phases that tokens were distributed noncontingently. Winkler (1970) required individual recipients to exercise even after the group requirement was satisfied. "Contingency present" denotes those systems in which a recipient response requirement exists whereas "contingency not present" signifies those situations not involving a recipient response requirement.

The effectiveness of contingent as opposed to noncontingent reinforcement is well documented. Ayllon and Azrin (1965), Lloyd and Garlington (1968), and others have demonstrated that contingent reinforcement, not just the presence of rewards, increases target behaviors. Nevertheless, the effects of recipient contingencies in conjunction with group requirements are unknown. The group requirement is unique to group systems and is considered later in a discussion of the third dimension.

Summary of the recipient response requirement dimension. The reinforcer recipients are those individuals who receive the reinforcement. The recipients need not, however, be the ones who "earn" the rewards. The dimension is labeled single if there is one recipient and multiple if there is more than one recipient. Lastly, the recipients may receive the rewards contingently or noncontingently. The presence or absence of recipient response requirements determines whether or not contingencies are present.

Group Response Requirement Dimension

The reinforcement of patient exercising in Winkler's (1970) token program illustrates the use of a group response requirement. In the morning, patients could earn tokens by attending an exercise group. At least 21 patients had to attend exercise group before any of the patients in attendance were given tokens. If 21 did not attend, no one earned tokens that morning for exercising. The group requirement in this case was the attendance of 21 or more patients. Thus, the group response requirement is the criterion which has to be met before anyone is eligible to receive reinforcement for making the target response (e.g., exercising in Winkler's program).

Few current operant systems utilize group response requirements. Instead, the behavior of single patients is reinforced regardless of the behavior of other patients or the group as a whole. The individual who does the "work" is typically the same individual who receives the reinforcement. For example, in Ayllon and Azrin's (1965) token system, reinforcement was dependent only upon the individual patient's meeting the response requirements. After the patient behaved appropriately, she was reinforced. There were neither additional individual contingencies nor other-patient contingencies which had to be satisfied before delivery of the reinforcement.

None vs. designated vs. nondesignated. Those individuals satisfying the group requirement may be specified further depending upon whether or not they are designated prior to the reinforcement. Investigators in several classroom studies (e.g., Evans & Oswalt, 1968; Greenberg & O'Donnell, 1972; Kubany, Weiss, & Soggett, 1971) reinforced

entire classes dependent only upon the behavior of one student. The student who "earned" the class reinforcement was specified or designated prior to the social condition of reinforcement. Thus, a designated (group requirement) condition is one in which the participant(s) expected to meet group criteria are known prior to the social condition of reinforcement.

The individual or group who meets the group response requirement is not specified in some group operant systems. For example, Schmidt and Ulrich (1968) made extra gym time contingent upon a low level of classroom noise. Students who had to remain quiet were not specified prior to the monitored period. Rather, the entire class was expected to maintain a reasonable noise level in an effort to earn extra gym time. Required participants are not specified prior to the social condition of reinforcement in a nondesignated (group response) condition. Lastly, an operant system with no group response requirement is categorized under "none" in the proposed classification scheme.

Summary of the group response requirement dimension. The group response requirement is the criterion which must be satisfied before anyone in an operant system is eligible to receive reinforcement. If there is no group requirement, none is selected as the appropriate subdimension. In addition, two subdimensions concern those individuals who may satisfy the group requirement. A designated (group response) condition is one in which the individuals are specified prior to the social condition of reinforcement. The individuals are not specified in a nondesignated condition.

"Social Conditions" as a Basis for Further Classification

Positive reinforcement or reward conditioning (Woods, 1974) is frequently utilized in both the psychological clinic and the experimental laboratory. Its frequent use and importance in psychology prompted the decision to consider only social conditions of reinforcement in the present paper. Nevertheless, other operant procedures are readily amenable to similar classification schemes.

One such procedure is omission reward conditioning or "fining." In omission reward conditioning, reinforcers are withdrawn contingent upon inappropriate behavior. This procedure has been effective in reducing loud noise and other disruptive behavior in several classroom studies (Axelrod, 1973; Greene & Pratt, 1972; Long & Williams, 1973; Sulzbacker & Houser, 1968; Wolf, Hanley, King, Lachowicz, & Giles, 1970). In these and additional studies, reinforcing agents, usually teachers, withdrew reinforcers from the students if recipient and/or group response requirements were not met. Thus, omission training and other operant procedures can be systematized in the same way, following the same dimensions, as social conditions of reinforcement.

CHAPTER 3

The Experimental Problem

As the material already reviewed or cited demonstrates, applied research in clinical settings substantiates the beneficial effects of group operant systems with a variety of patient populations and problems. Additional proof of either the clinical potential or efficacy of reinforcement programs for psychiatric patients is unnecessary at this time. Currently, research is needed in the following three broad areas: (a) the refinement of operant system procedures leading to improvements in the acquisition, maintenance, and transfer of desirable patient behavior, (b) the clarification of the comparative behavioral effects of the numerous social conditions of reinforcement, and (c) the extension of group operant systems to diverse populations within institutional settings. The current research is directed towards the first two areas of inquiry and involves three social conditions of reinforcement.

The three conditions are investigated on the wards of a state mental hospital. All three are of "practical" importance in that they can be used in a variety of clinical settings. The three social conditions of reinforcement, arbitrarily designated A, B, and C, appear in Table 1.

Condition A is widely used in token systems (e.g., Atthowe & Krasner, 1968; Ayllon & Azrin, 1965) and is, consequently, an important condition for comparison purposes. In this condition, the single reinforcing agent is designated. The recipients earn tokens contin-

Table 1

Subdivisions of the Experimental Conditions

	Condition		
Dimension	A	B	C
Reinforcing Agent	Single Designated	Single Designated	Single Designated
Recipient Response Requirement	Single Contingency Present	Multiple Contingency Present	Multiple Contingency Not Present
Group Response Requirement	None	Nondesignated	Nondesignated

gent only upon their own behavior. No group requirement exists in Condition A as it does in Conditions B and C.

Conditions B and C are not as frequently utilized in operant systems as Condition A. There are, however, several reasons why these two conditions were chosen. Both can be readily manipulated during the first few months of a token system, both can be used as ward treatment approaches, and both can be easily understood and put into operation by ward staff. Lastly, there is some evidence (Winkler, 1970) that cooperation among patients increases with these social conditions of reinforcement.

Condition B is the social condition of reinforcement employed in Winkler's (1970) exercise group. There is a single, designated reinforcing agent and a multiple recipient condition with recipient contingencies. In the current experiment, 66% of the ward patients were expected to meet target behavior criteria before any individual patient was eligible for tokens. The criteria varied with each of the target behaviors although the group requirement (i.e., the 66%) remained constant for all reinforced behaviors.

The Condition C reinforcing agent and group requirement dimensions are the same as Condition B. Thus, 66% of the ward patients were required to engage in an activity before reinforcement was distributed for that activity. In Condition C, however, <u>everyone</u> on the ward received tokens once the group requirement was satisfied. There are no subsequent recipient requirements as in Condition B.

The behavioral characteristics of Conditions A, B, and C were investigated in a token system with chronic psychotics. The experi-

ment continued for a number of months and involved the assessment and manipulation of several behaviors chosen for their relevance to patient care and treatment. The token reinforcement of target behaviors enabled the collection of information concerning acquisition effects of the experimental conditions. Other monitored behaviors remained unreinforced in order to obtain data concerning positive transfer (i.e., the "generalization" of the reinforcement influence to behaviors other than those specifically reinforced). During non-token weeks, behaviors were monitored in a period of extinction to compare the relative maintenance effects of the three social conditions of reinforcement. The token and non-token weeks were "randomly" presented in a time series design. In the next chapter, the experimental design and procedures as well as other aspects of the project are described in detail.

CHAPTER 4

Method

Subjects

Female patients from two wards at Fulton State Hospital, Fulton, Missouri, participated in the 16-week project.

Experimental ward patients. A total of forty-five patients were involved in the project on the experimental ward. The approximate daily population numbered 30. The difference between the total and average number of patients on the ward is accounted for in patient discharges and transfers. Mean patient age at the start of the experiment was 40.7 years (SD = 14.25 years, range = 15.08 to 68.75 years). Mean years of hospitalization was 9.53 years (SD = 10.11 years, range = 0 to 34.67 years). The modal diagnostic category was schizophrenia, chronic undifferentiated type. In combination, all subcategories of schizophrenia composed about 66% of the patients' diagnoses.

Comparison ward patients. There were fewer and younger patients on the comparison ward than the experimental ward. Twenty-five patients resided on the comparison ward during the entire project. The average daily census was 11. In addition, the mean patient age was 35.01 years (SD = 12.34 years, range 17.83 to 73.0 years). Mean years of patient hospitalization was 10.63 years (SD = 7.59 years, range = 0 to 34.75 years). As on the experimental ward, a diagnosis of schizophrenia accounted for over 50% of the patients' diagnoses.

Staff

Patients interacted most with the psychiatric aides on the wards. There were two, three, or four aides during each of the three shifts.

In addition, a physician and ward nurse made daily "rounds" on the wards although their actual patient contact was minimal. Other staff members making occasional ward visits included a social worker, recreational therapist, and chaplain. Only the aides and experimenters were involved extensively with the project.

There were three experimenters working on a part- or full-time basis. The principal experimenter, the author, was a third year graduate student in clinical psychology. The two additional experimenters were permanent employees and were to continue the operant system after the dissertation project was completed. One was a third year clinical psychology graduate student with a M.A. and the other was a psychological technician with a high school education. Generally, the experimenters conducted and monitored most weekday activities while the aides participated most in the project during the weekends and early morning hours.

Staff Training

Staff training began soon after the project was approved by hospital administrative committees. Essentially, training was conducted on two levels. For nursing personnel, discussions and films centered around general conceptual and procedural points of token systems. Such topics as motivational and learning aspects of behavior, tokens as bribes, and the "aide dilemma" of attending to the most troublesome patients while ignoring the appropriate behavior of others were discussed on morning and afternoon shifts.

Training for the experimenters centered around textbook and empirical literature relevant to token systems. Areas of interest

included social conditions of reinforcement, reinforcement schedules, time out, time series designs, group comparison designs, and outcome studies of token systems. Again, open discussions and questions were encouraged during these training sessions. Both aide and experimenter training was completed prior to the initiation of the project.

Materials

The token reward program (Appendix B) utilized 2.75" X 1" (7 cm X 2.5 cm) pieces of commercial construction paper for tokens. To prevent counterfeiting, each token was stamped with a pattern not easily duplicated by patients. The posters explaining such things as the experimental phases, the target behaviors, the ways to spend tokens, and the daily schedule (Appendix C) were also printed on commercial construction paper and illustrated in sufficient size, simplicity, and detail to be easily read and understood by patients and staff. Lastly, patients were given envelopes for token storage. These envelopes were either left in the patients' personal belongings drawer or in the aide station.

Target Behaviors

Target behaviors are those behaviors which were publicly specified and reinforced with tokens. All activities and data recording related to target behaviors were conducted by the experimenters and/or aides. As occurs in most operant systems, tokens were distributed to patients by one staff member along with verbal praise for the "good" behavior. There were ten target behaviors in five general areas.

Meal line ups. Experimental patients were reinforced seven days a week with two tokens at each of three meals (i.e., breakfast, lunch,

dinner). Criteria for reinforcement included lining up with no staff assistance within 60 seconds of the meal call and standing within two feet of the ward door or a patient already in line. Due to some practical problems of distribution and monitoring at meal times, tokens were delivered according to the experimental condition after the meal period.

Three different rating symbols were used on the meal line-up forms (see Appendix D for the experimental ward, Appendix E for the comparison ward) and all other target-behavior forms. An "X" was marked for someone who was either not on the ward (e.g., a patient away for treatment) or was unable to come to the line (e.g., someone in the side room). A zero was recorded for a patient who was physically able to line up but failed and a tally mark denoted a patient who succeeded in meeting meal line-up criteria. In computing results, the decimal fraction used to represent the daily data equaled the total number of tally marks divided by the total number of tally marks and zeros (i.e., number of patients making the target response relative to the total potential number of participants).

Bed making. Appendix F contains the standards which were used in differentiating a well-made bed from a poorly-made bed. After these standards were explained to patients, bed making became part of the ward routine. Each weekday, Monday through Friday, bed-making time was announced by an experimenter at 8:45 a.m. This call signified that only five minutes were left for patients to make their beds. Beds were then checked by the experimenters and the zeros, vertical marks, and X's were recorded on a form similar to Appendix D. The

six tokens which could be earned for bed making were subsequently distributed to patients in accordance with the experimental condition.

Ward cleaning. Ward cleaning activities occurred between 9:05 a.m. and 9:20 a.m. each weekday and involved two target behaviors. Attending the activity was one target behavior for which the patient could earn four tokens. Satisfactory attendance was defined as standing within five feet of the ward utility closet or another patient already in the ward cleaning group. Patients had to attend within 60 seconds of the experimenter's call. Tasks during the cleaning period included dusting chairs, making unmade beds, washing walls, and sweeping the floor. Tasks were assigned and supervised by experimenters with the patients' individual skills and interests considered.

Successfully completing the cleaning activity could earn the patient another four tokens. Two major factors considered in judging completion were a patient's (a) maintaining 75% on-task behavior for the final two-thirds of the activity and (b) staying until the end of the period. Both attendance and completion were recorded on a form similar to that appearing in Appendix G.

Exercise group. The next two target behaviors involved the weekday exercise group which was held between 11:40 a.m. and noon. After many years of almost constantly sitting, many patients were in need of exercise. The exercises led by the experimenter were various group calisthenics and games suitable for chronic patients. Patients could earn four tokens for attendance within 60 seconds of the exercise call and another four for participation. Judgement of exercise attendance and participation involved task standards similar to the

ward cleaning attendance and completion criteria. Finally, data related to the exercise and current events discussion groups were recorded on a form similar to Appendix G.

Current events discussion group. A discussion group was held each weekday between 1:05 p.m. and 1:25 p.m. In this group, newspaper clippings and other material relevant to current events were discussed. Potentially, eight tokens could be earned, four for attendance and four for completion. Satisfactory discussion group attendance was defined as having arrived at the group meeting location within 60 seconds of the experimenter's call. Completion was simply defined as staying in the current events group for the final 15 minutes of the activity.

Backup Reinforcers

Backup reinforcers are those items or privileges for which tokens were exchanged. Some backup reinforcers such as cigarettes, coffee, and dances were noncontingently available prior to the experiment. Others such as games, radios, and embroidery materials were obtained from other hospital or community resources. Lists of the target behaviors, backup reinforcers, and exchange times were available in the program manual and on large posters attached to the ward walls (see Appendices B, C, H, and I). Two especially important token exchange times were auctions and free time periods.

Auctions. Three different types of auctions were held every token week. On Monday afternoons, rooms were auctioned to the highest bidder. Bidding began with the most desirable rooms, the single rooms, and continued as long as patients were interested.

On Tuesday afternoons, patients auctioned any of their own possessions they wished to sell. These items were usually cosmetics or jewelry. The largest and most interesting auction was the community auction which was held Friday afternoon. During the community auction, gum and cigarettes were sold to the highest bidder as well as more unusual backup reinforcers such as bouquets of flowers, tours of well-known sites, and gift coupons. These and other backup reinforcers were distributed noncontingently or randomly during Extinction weeks.

Free time periods. Knitting materials, painting sets, and other items were rented during the free time periods. If necessary, staff assistance was given although generally patients were encouraged to help each other and to become capable of doing the activities on their own. "Free times" occurred during scheduled late afternoon, evening, and weekend hours. It was during these hours that very little else was happening on the ward or at other places in the institution. Lastly, necessary data relevant to free time periods were kept on a form similar to Appendix J.

Transfer Behaviors

Many behaviors were monitored to obtain indications of positive transfer. In general, there were three areas of interest: midday medication line up, verbal interactions, and the miscellaneous form.

Midday medication line up. Midday medications were prescribed medications given to ward patients around 11:40 a.m. At this time each weekday, experimental ward patients receiving medication were called to the aide station by an aide or experimenter. Observers stood opposite the aide station door and recorded those patients

who arrived within 60 seconds of the medication call. The recording procedures already described in the target behavior section were used with a form similar to the one in Appendix K.

Verbal interactions. Every weekday, the verbal interactions which occurred on the experimental ward between 9:30 a.m. and 10:00 a.m. were monitored by an experimenter. By definition, verbal interactions were all verbal exchanges between two or more people. Thus, conversations concerning politics, a patient's delusions, and lunch were all treated alike. In addition, only the initiation of a conversation was recorded and not its duration. A verbal exchange lasting ten minutes was recorded the same way as one lasting ten seconds. More information concerning verbal interaction criteria can be found in Appendix L.

Three types of verbal interactions were monitored. The first were the patient-patient verbal interactions (PPVI). PPVI exchanges were conversations begun by one patient talking to another patient and were indicated via vertical marks. Patient-staff verbal interactions (PSVI) were initiated by either the patient (scored 1^{p}) or the staff or any non-patient (scored 1^{s}). The vertical marks (i.e., 1, 1^{s}, 1^{p}) were written daily on a form similar to Appendix K to represent separate conversations. Later, these marks were sorted and each of the three types of verbal interaction was totaled. Of some final importance is the fact that ward staff were never aware that verbal interactions were being monitored.

Miscellaneous form. Many potential indications of positive transfer were recorded on the miscellaneous form (Appendix M). Data

were recorded by a number of staff members at different times of the day and week. For easy availability, the form was located in the aide station. The following information was noted: (a) the number of letters sent from the ward by patients each day, (b) the number of letters received on the ward for patients each day, (c) the number of patients attending church every Sunday morning, (d) the number of patients placed in the side room each day, (e) the daily number of patients visited by people who were neither staff nor patients of Fulton State Hospital, and (f) the total number of tokens spent per day by 9:00 p.m.

Experimental Design

A time series design was employed on the experimental ward to investigate the behavioral effects of three social conditions of reinforcement. In a time series design, experimental conditions are alternated and repeated in distinct phases with the same subjects. In addition to the time series design on the experimental ward, one behavior, lunch line up, was monitored on the comparison ward. The comparison behavior was simply observed throughout the experiment. Patients on the comparison ward were not systematically rewarded for engaging in this or any other behavior. In summary, social conditions of reinforcement were manipulated on the experimental ward in a token system while important variables on the comparison ward stayed the same throughout the project.

The experimental design was a complicated one with six different phases. Symbolically, the design for experimental subjects was as follows: Baseline, Acquisition, A, E, C, E, B, E, C, E, A, E, B, E.

The Baseline and Acquisition phases were the introductory phases while A, B, and C signify experimental Conditions A, B, and C. E refers to a period of extinction.

Baseline. Baseline recording occurred for two weeks prior to the onset of the token system. During these two weeks, group activities were held, target behavior criteria were explained, and data were recorded. Schedules and activities were publicized verbally and via posters (e.g., Appendix B) on the ward walls. On the comparison ward, lunch line up was monitored after the monitoring was explained to comparison ward patients. This lunch monitoring continued in the same fashion throughout the 16-week experiment.

Acquisition. After Baseline, the token system was introduced in the two-week Acquisition phase. Meetings with patients were held to explain this and all other token and Extinction phases prior to the onset of each phase. Of particular help in elucidating the token system was the token reward program manual (Appendix C). This manual explained the target behaviors and the backup reinforcers as well as specifying meeting/activity times, side room (time-out) contingencies, and the use of the work evaluation slips. Functionally, the Acquisition phase was a "practice" token system in which tokens were contingent only upon an individual patient's behavior.

The tokens used during Acquisition and other token phases were color coded so that only tokens of that phase could be used during that phase. For instance, Acquisition tokens were yellow and only yellow tokens could be spent during the two-week Acquisition period. Tokens in Conditions A, B, and C were green, blue, and orange, re-

spectively. During Acquisition, patients were reminded of target behavior criteria, response contingencies, work evaluation slips, and were given first and second prizes ($2.00 and $1.00) for the first and second highest number of tokens earned. Questions were always encouraged and answered as promptly as possible. Lastly, any patients admitted to the ward after Acquisition received intensive, short-term guidance by an experimenter concerning the Token Reward Program.

Condition A. Unlike Acquisition, patients were expected to be familiar with token system operations during Condition A. Thus, subjects were no longer reminded of response criteria for the various target behaviors. Throughout Condition A a patient earned tokens contingent only upon her behavior. The behavior of others was irrelevant. Each of the two Condition A's, B's, and C's lasted one week.

Condition B. Condition B utilized a minimum 66% group response requirement. Thus, at least 66% of the patients on the ward were required to engage in a target behavior before any individual who made the target response was reinforced. The percentage was chosen because it subjectively appeared high enough to "motivate" patients yet not so high as to seem impossible to obtain.

Condition C. The 66% group requirement was also used during Condition C. Once the 66% group requirement was satisfied, all patients on the ward were reinforced with tokens regardless of their individual behavior. That is, there was no recipient response requirement.

Extinction. During Extinction, tokens were no longer used to reinforce behavior. Extinction periods were each one week and were identical to token weeks except that tokens were neither given for engaging in target behaviors nor required for purchasing backup reinforcers. However, all activities related to token earning and exchange were continued during Extinction.

Miscellaneous Aspects of the Token System

Work evaluation slips. Patients could earn tokens for attending such assigned treatment programs as occupational therapy, industrial therapy, and group therapy if these conflicted with ward token-earning activities. Though few patients were assigned to these programs, a system involving "work evaluation slips" (Appendix N) gave those who were assigned a chance to earn tokens for off-ward treatment.

There were several rules concerning the work evaluation slips. Of primary importance was the rule stating that no tokens could be earned via the slip if no tokens were earned for an activity on the ward. If tokens were earned on the ward, the performance rating was then used in determining how many tokens a patient should receive. A patient received 100% of the potential tokens for a "good" rating, 50% for a "fair" rating, and 0% for a "poor" rating. For example, if some patients on the ward earned the maximum eight tokens for the exercise activity, a patient returning to the ward with a "good" for that time period earned eight tokens. She received four tokens for a "fair" rating and zero tokens for a "poor" rating. Lastly, patients received no tokens when they returned to the ward if they

either failed to have their work evaluation slips completed or destroyed the slip after it was signed by a staff member.

Display of token earnings. The number of tokens earned by each patient was recorded on a large poster similar to Appendix O. By 5:00 p.m. each day, a patient could look at the poster and determine how many tokens she had earned that day. High token earnings became an item of interest and a source of pride for some patients.

"Unspecified" behaviors. Many behaviors occurred on the experimental ward which were not target behaviors and for which no staff response was specified. Staff members were told to react in whatever way they usually reacted to these "unspecified" behaviors. For example, if an aide usually scolded a patient for throwing a cigarette on the floor, token system procedures did not dictate a different response.

Use of the side room. The side room was a single room with only a mattress. Before the program, patients were placed in this room for various periods of time if they engaged in a violent or bizarre manner. Long periods of confinement would obviously limit participation in the token program and were of unknown punishment value. During the token system, therefore, patients were placed in the side room for 45 minutes for the first confinement and 1 1/2 hours for a second restriction in 24 hours. Staff members did not interact with any patient in the side room. Fortunately, a 1 1/2 hour confinement was never actually needed during the experiment.

CHAPTER 5

Results

Observer Reliability

How the reliability estimates were computed. Reliability estimates were computed for all monitored behaviors except those recorded on the miscellaneous form (Appendix M). Two staff members, one experimenter and an aide or second experimenter, periodically recorded meal line up, discussion group attendance, and other behaviors independently. The observers stood in close proximity to each other, yet not so close as to enable them to see each other's tally board.

Two reliability procedures were utilized in the present study. The first procedure was used with all behaviors except verbal interactions. The observers recorded who out of the total eligible patient population attended or participated in an activity (e.g., midday medicine line up, discussion group completion, exercise group attendance). One observer's tallies were compared to the tallies of a second observer. Agreement between the two observers was computed as a decimal fraction representing the number of observer agreements divided by the total number of agreements plus disagreements.

Verbal interactions required a second reliability computation procedure because two observers might record a different number of interactions. For example, one observer might tally ten patient-patient verbal interactions while the other might record only seven. Totaling the number of verbal interactions was the first step in this computation procedure. In the above example, the "combined total"

equals seventeen.

The second step was counting the number of times both observers tallied a verbal interaction for a given patient. The staff members in the example may have agreed six times. This sum is then doubled and divided by the "combined total." The reliability estimate in the example is 12/17 or .71. For both computation procedures, 1.00 indicates perfect agreement whereas 0.00 denotes no observer agreement.

Reliability estimates. A mean of all the daily reliability estimates was calculated for each monitored behavior. As illustrated in Table 2, observer agreement for the 15 behaviors was high. The means of the reliability estimates range from a low of .84 for patient-staff verbal interactions initiated by a staff member to a high of 1.00 for cleaning group attendance, cleaning group completion, exercise group attendance, and discussion group completion.

Statistical Transformation

Daily decimal fractions indicated the number of patient engaging in a behavior relative to the total number of patients available to engage in the behavior. These fractions were statistically transformed prior to computation. An arcsin transformation was performed to assure that the assumptions of the analysis of variance (i.e., interval data and normality of distribution) were met (Ferguson, 1971, p. 220; Winer, 1971, pp. 397-400). Weekly means and standard deviations of all monitored behaviors are presented in Appendices P and Q. Descriptive statistics of raw data are available in Appendix P. Appendix Q presents the same statistics on the transformed data.

Table 2

Observer Reliability Estimates of All Monitored Behaviors

		Overall		Range	
Behavior	TO[a]	M	SD	Low	High
Comparison					
Ward Lunch	37	.97	.07	.67	1.00
Breakfast	26	.98	.04	.84	1.00
Bed Making	33	.94	.06	.79	1.00
Lunch	41	.99	.04	.80	1.00
Supper	28	.98	.05	.77	1.00
Cleaning					
Attendance	32	1.00	.02	.93	1.00
Cleaning					
Completion	32	1.00	.01	.96	1.00
Exercise					
Attendance	35	1.00	.01	.96	1.00
Exercise					
Completion	35	.99	.02	.89	1.00
Discussion					
Attendance	33	.99	.03	.89	1.00
Discussion					
Completion	33	1.00	.01	.96	1.00

Table 2 (Continued)

Midday					
Medicine	36	.98	.04	.81	1.00
PPVI[b]	30	.90	.12	.64	1.00
PSVI-1[p]	30	.88	.08	.73	1.00
PSVI-1[s]	30	.84	.23	.00[c]	1.00

[a]TO = Total number of daily reliability estimates used in computing means.

[b]In this and other illustrations, PPVI is an abbreviation for patient-patient verbal interaction, PSVI-1[p] for patient-staff verbal interaction initiated by a patient, and PSVI-1[s] for patient-staff verbal interaction initiated by a staff member.

[c]One observer tallied one interaction while the second recorded none.

Target Behaviors

Baseline and Acquisition. Tests of daily target behavior data gathered during Baseline and Acquisition weeks yielded several significant differences. Of the ten *t* tests, six are significant at the .001 level, one at the .01 level, and one at the .05 level. As is evident in Table 3, the Acquisition mean is higher than the Baseline mean for each target behavior.

SCR, phase, and day effects during token weeks. Token weeks were the weeks following Acquisition during which tokens were used as reinforcers. The analysis of variance tested the daily target behavior records of patient performance for three main effects during these weeks. The first, SCR, refers to the social condition of reinforcement employed during the week: i.e., Condition A, B, or C. The levels of the second, the phase effect, differentiate the first from the second week of each social condition of reinforcement. The third, the day effect, specifies each weekday within the experimental weeks as a separate level. The error term *df* used in these and subsequent analyses was taken from the three-way interaction (SCR X phase X day) *df*. All target behaviors except lunch line ups were examined. The lunch line ups on the experimental and comparison wards are discussed later.

Table 4 presents the SCR, phase, and day effects on target behaviors during token weeks. The most potent effect was the phase effect. Initial token weeks were higher than the repeat phases for two SCR conditions on two target behaviors. Target behaviors related to breakfast, supper, bed making, discussion group, and exercise group

Table 3

Comparisons of Target Behaviors During Baseline and Acquisition

Behavior	*t*	*df*	*p*<	MB[a]	MA[a]
Breakfast	3.02	27	.01	.80	.90
Lunch	.80	27	.60	.84	.87
Supper	2.14	27	.05	.84	.90
Bed Making	2.03	18	.06	.56	.65
Cleaning Attendance	5.22	17	.001	.09	.35
Cleaning Completion	6.00	17	.001	.11	.36
Exercise Attendance	7.01	17	.001	.12	.33
Exercise Participation	5.54	17	.001	.15	.32
Discussion Attendance	9.54	17	.001	.09	.39
Discussion Completion	7.03	17	.001	.18	.43

[a]Both Baseline (MB) and Acquisition (MA) means are computed from raw score data. When the means are multiplied by 100, they represent the mean percentage of patients who engaged in the target behavior.

Table 4

SCR, Phase, and Day Effects on Target Behaviors

During Token Weeks

Behavior	Source	F	df	Direction[a]	Phase M[b] 1	2
Cleaning	Phase	19.84**	1,8	2 < 1	.46	.33
Attendance	SCR X	12.07**	2,8	B highest		
	Phase			in 1		
Cleaning	SCR X	7.28*	2,8	C highest	.46	.36
Completion	Phase			in 1		

[a]Specifies the relationship of analyzed means.

[b]These phase means are computed from raw scores. When the means are multiplied by 100, they represent the mean percentage of patients who engaged in the target behavior during that phase.

* $p < .05$

** $p < .01$

showed no significant effects from any source.

SCR, phase, and day effects during Extinction weeks. An Extinction week followed each token week. During Extinction weeks, no tokens were distributed. The SCR main effect in an analysis of non-token weeks separates the influence on daily target behavior data of the non-token weeks associated with each social condition of reinforcement. Thus, the effects of two Condition A, two Condition B, and two Condition C Extinction weeks are assessed separately. The phase and day effects have already been defined.

As seen in Table 5, the SCR effect is more influential during Extinction than token weeks. Both conditions which had a group requirement, B and C, produced more lasting effects than the traditional token program reinforcement procedure, Condition A. Of the two, Condition C was more effective in maintaining behavior during Extinction than Condition B.

The six target behaviors related to the cleaning, exercise, and discussion groups were most responsive to the various social conditions of reinforcement. The cleaning attendance data are representative of the change which occurred in all these target behaviors during the experimental conditions. In the two non-token weeks associated with Condition A, only 14% of the ward patients attended the cleaning group. The mean attendance rose to 19% and 30% in Conditions B and C, respectively. Similar data for other target behaviors are contained in Table 6 and Appendix P.

The phase effect had a significant impact upon target behaviors during Extinction as well as token weeks. The weekly phase means of

Table 5

SCR, Phase, and Day Effects on Target Behaviors

During Extinction Weeks

Behavior	Source	F	df	Direction[a]
Bed Making	Phase	8.27*	1,8	1 < 2
	Day	5.60*	4,8	Mon. & Wed. highest
	Phase X Day	6.20*	4,8	2 higher beginning of the week
Cleaning Attendance	SCR	12.78**	2,8	A, B < C
	Phase	12.65**	1,8	2 < 1
Cleaning Completion	SCR	5.02*	2,8	A, B < C
	Phase	5.63*	1,8	2 < 1
Exercise Attendance	SCR	65.10**	2,8	A < B < C
Exercise Participation	SCR	32.97**	2,8	A, B < C
	SCR X Phase	10.59**	2,8	C highest in 2
	SCR X day	4.99*	8,8	C highest beginning of the week
Discussion Attendance	SCR	6.11*	2,8	A < C

Table 5 (Continued)

Discussion Completion	SCR	5.74*	2,8	A < C

Note. Two other target behaviors, breakfast and supper line ups, had no significant effects from any source.

[a]Specifies the relationship of analyzed means. To be considered divergent, SCR conditions must be separated by at least as much as indicated by the least significant difference test (at the .05 level).

* $p < .05$.

** $p < .01$.

Table 6

Mean Percentage of Patient Involvement in Six Target Behaviors During Extinction Weeks

Behavior	SCR Condition		
	A(%)	B(%)	C(%)
Cleaning Attendance	14	19	30
Cleaning Completion	15	17	27
Exercise Attendance	11	16	30
Exercise Participation	15	17	29
Discussion Attendance	18	25	31
Discussion Completion	20	26	32

those target behaviors affected during Extinction weeks are presented in Table 7. First week frequencies were higher than repeat weeks for two target behaviors but lower for the other two. Lastly, there is a "hint" of a day effect in two target behaviors. Observed frequencies for the first few days of the week (Monday, Tuesday, Wednesday) were sometimes higher than those for the last days (Thursday, Friday).

Token and Extinction weeks. Target behaviors were monitored during both token and Extinction weeks. In a two-way analysis of variance, the type main effect differentiated patient behavior during token weeks from behavior recorded during Extinction weeks. In the second main effect, the token and non-token weeks were separated into the three social conditions of reinforcement, Conditions A, B, and C. The SCR main effect has been defined in previous sections. Table 8 presents the outcome of this analysis. The type effect was significant for nine target behaviors. As might be expected, behavior frequencies were higher in token than non-token weeks. Means are given in Table 8; standard deviations are available in Appendix P.

Target behavior frequencies during Condition C were usually higher than those recorded during either Condition A or B. As indicated before, the Condition C influence was particularly strong for the target behaviors related to the cleaning, exercise, and discussion groups. Four target behaviors have significant type X SCR interactions with behavior frequencies highest during token weeks in Condition B or C.

Comparison Behavior

Baseline and Acquisition. On the comparison ward, more patients

Table 7

Phase Means of Several Target Behaviors

Monitored During Extinction Weeks

Behavior	Phase[a] 1	2
Bed Making	.70	.76
Cleaning Attendance	.26	.16
Cleaning Completion	.23	.16
Exercise Participation	.20	.21

[a]These phase means are computed from raw scores. When the means are multiplied by 100, they represent the mean percentage of patients who engaged in the target behavior during that phase.

Table 8

Type and SCR Effects on Target Behaviors

Behavior	Source	F	df	Direction[a]	Means[b] T	Means[b] E
Lunch	Type	12.31**	1,78	E < T	.90	.85
Supper	Type	5.59*	1,78	E < T	.92	.89
Bed Making	Type	4.92*	1,54	E < T	.79	.74
Cleaning	Type	41.34**	1,54	E < T	.39	.20
Attendance	SCR	3.23*	2,54	A < C		
	Type X	3.51*	2,54	B token		
	SCR			week highest		
Cleaning	Type	38.08**	1,54	E < T	.41	.19
Completion						
Exercise	Type	95.02**	1,54	E < T	.40	.18
Attendance	SCR	17.62**	2,54	A, B < C		
Exercise	Type	53.55**	1,54	E < T	.39	.19
Participation	SCR	7.19**	2,54	A < C		
Discussion	Type	29.68**	1,54	E < T	.37	.23
Attendance	Type X	3.24*	2,54	C token		
	SCR			week highest		
Discussion	Type	35.52**	1,54	E < T	.44	.26
Completion	SCR	3.24*	2,54	A < C		

Note. Two other target behaviors, breakfast and supper line ups, had no significant effects from any source.

[a]Specifies the relationship of analyzed means. To be considered

divergent, SCR conditions must be separated by at least as much as indicated by the least significant difference test (at the .05 level).

[b]Means are computed from raw scores (T = token weeks, E = Extinction weeks). Percentage of patient involvement in a target behavior may be obtained by multiplying the mean by 100.

* $p < .05$

** $p < .01$

met the line up criterion during Baseline than during Acquisition, t (26) = 2.97, $p < .01$. An average of 95% of the patients lined up during Baseline as opposed to only 81% during Acquisition. The difference is probably due to the novel presence and reinforcing attention of the observers on the comparison ward. The novelty and attention effects gradually extinguished. No significant difference was found on the experimental ward. These findings suggest that confounding variables such as changes in hospital care or administrative procedures were probably not important variables in this experiment.

Token and Extinction weeks. Behaviors were monitored on the comparison ward during the weeks in which tokens were used as reinforcers on the experimental ward. These observed frequencies were compared to comparison ward frequencies gathered during the Extinction weeks of the experimental ward. No significant differences were found. Thus, it is unlikely that there were confounding variables systematically affecting the entire institution during token and Extinction weeks.

Lunch line up on the experimental and comparison wards during token and Extinction weeks. Two analyses of variance tested lunch line up on both the experimental and comparison wards. One analysis dealt with frequencies gathered during token weeks while the second handled frequencies recorded during Extinction weeks. Each analysis had four main effects. The two levels of the first main effect, the type effect, separated experimental ward data from the comparison ward data. In the SCR main effect, each social condition of reinforcement--Conditions A, B, or C--was considered a separate level. In the third main effect, the phase effect, the first week was segregated from the repeat week of each social condition of reinforcement.

Lastly, the seven levels of the day effect represented each day of the week.

No main effects or interactions were significant in the analysis of lunch line ups during token weeks. There were, however, two differences detected in the analysis of the Extinction-week frequencies. First, a higher percentage of patients lined up for lunch on the comparison ward than the experimental ward, F (1,38) = 15.16, $p < .001$. Approximately 92% of the comparison ward patients met lunch line up criteria as compared to 85% of the experimental ward patients. To a large extent, this difference may reflect the younger and more active patients on the comparison ward.

The second difference involves the day effect. More patients lined up for lunch on weekends than on weekdays, F (6,38) = 3.52, $p < .01$. This finding is best explained by the overall lack of ward and institutional activities occurring on weekends as compared to weekdays. Neither result, however, indicates the presence of confounding variables which would have affected all wards of the institution.

Transfer Behaviors

Baseline and Acquisition. Baseline frequencies of verbal interactions and midday medication line up were compared to Acquisition frequencies. A significant difference was found in only one transfer behavior, line up for medication. Fifty-eight percent of the patients lined up for medicine during Acquisition as compared to only forty-six percent during Baseline, t (19) = 2.38, $p < .05$. Interestingly, medication line up is similar to such reinforced target behaviors as meal

line ups and ward cleaning attendance. Positive transfer to medication line up may have occurred due to the similarity of the transfer behavior to target behaviors.

SCR, phase, and day effects during token weeks. The data concerning verbal interactions and midday medication line up were subjected to a three-way analysis of variance. For each transfer behavior, three main effects--SCR, phase, and day--were separately tested. The three main effects and the source of error variance have been previously described in an analogous target-behavior section.

No significant differences were found in the patient-patient verbal interactions, the patient-staff interactions initiated by the staff, or the midday medication line up. A phase influence was detected in the data concerning the patient-initiated conversations. Repeat weeks were higher than initial weeks, F (1, 8) = 5.65, $p < .05$.

SCR, phase, and day effects during Extinction weeks. As in the previous section, the transfer behaviors monitored during Extinction weeks were tested for three main effects, SCR, phase, and day of the week. No significant differences were found in the patient-patient verbal interactions, the patient-staff interactions initiated by the staff, or the midday medication line up. Several significant differences were found concerning the patient-initiated conversations. The day effect showed that patients began more conversations with staff on Thursdays and Fridays than Mondays and Tuesdays, F (4, 8) = 5.93, $p < .05$. Secondly, a significant phase effect indicated more verbalization during repeat than initial weeks, F (1, 8) = 16.20, $p < .01$. The SCR X phase interaction was also significant with more

conversation during Conditions A and B in the first weeks of each social condition of reinforcement, F (2, 8) = 4.58, $p < .05$. Together, these findings suggest that patients began conversations with staff more frequently during periods in which the token program exerted relatively little influence.

Token and Extinction weeks. A two-way analysis of variance tested the verbal interaction and midday medication frequencies for two main effects, type and SCR. There were no significant influences on the patient-staff verbalizations or midday medication line up. The patient-patient verbalizations (PPVI) were higher during token than Extinction weeks, F (1, 54) = 14.33, $p < .01$. Patients initiated a daily average of 4.87 conversations with other patients during token weeks as compared to only 2.50 conversations during Extinction weeks. The PPVI result suggests a "spread" or transfer of appropriate patient social interactions. During the experiment, interactions were reinforced during some target behaviors (e.g., cleaning completion, current events discussion). Appropriate verbal behavior may have transferred to other ward situations.

Miscellaneous effects. Information concerning several activities was recorded on the miscellaneous form appearing in Appendix M. One item, the weekly number of patients attending church on Sunday, was not analyzed because the activity was too influenced by the availability of ward staff. Patients were urged to attend church if there was an insufficient number of staff to both transport patients to church and maintain staff coverage on the ward.

Three other items--the daily number of letters received on the

ward, the daily number of letters sent from the ward, and the daily number of outside visitors to the ward--were statistically examined. The main effect, the SCR effect, differentiated the three social conditions of reinforcement as separate levels. No significant differences were found.

The daily numbers of tokens spent and earned were also recorded. An analysis of the number of tokens earned each weekday revealed no significant relationships. A significant difference was found in the daily number of tokens spent. Regardless of the social condition of reinforcement, more tokens were spent on Friday than any other weekday, F (4, 25) = 9.48, $p < .001$. The finding is easily attributed to the fact that the community auction took place on Fridays and large numbers of tokens were used to buy auction items.

Use of the side room. The frequency of placing patients in the side (i.e., time-out) room may be an indication of ward disarray. As illustrated in Figure 2, side room usage varied during the project's course. At first, there were more patients placed in the side room during token than non-token weeks. This difference is most dramatically seen in the contrast between Baseline (first two weeks) and Acquisition (third and fourth weeks). The change in side room usage later in the project, however, is especially interesting. More patients at that time were placed in the side room during Extinction than token weeks (see the last six weeks in Figure 2). As previously discussed, the only difference between Extinction and token weeks is that tokens were earned contingently and required for backup reinforcers in the latter but not the former. Token reinforcement pro-

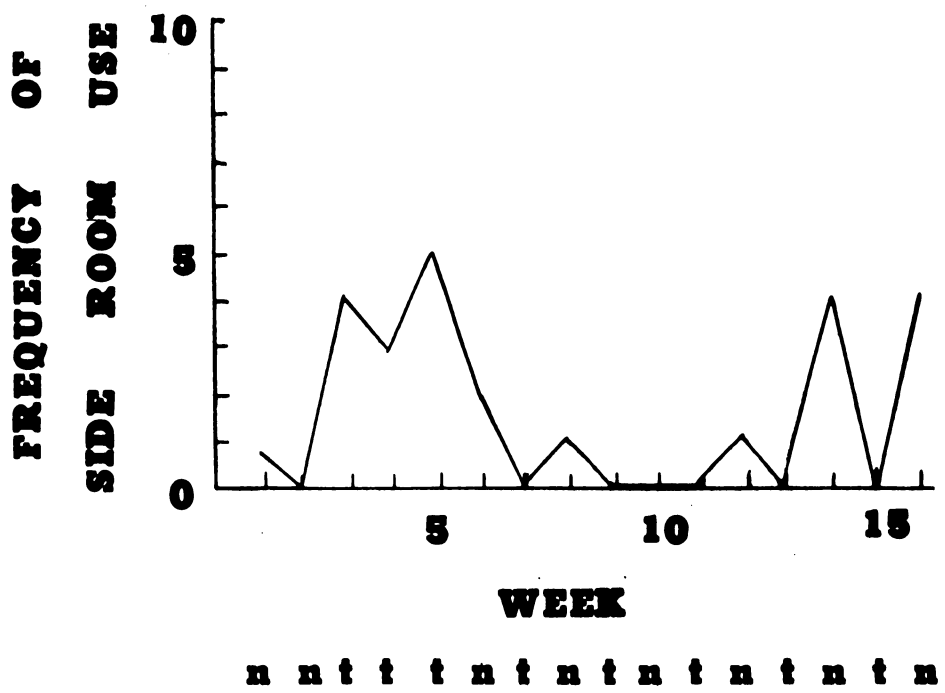

Figure 2. Weekly number of patients in side room during token (t) and non-token (n) weeks.

grams may encourage appropriate behaviors other than target behaviors.

Unplanned Observations

Patient interactions. Conditions B and C apparently stimulated patient interaction and awareness of others. For instance, some patients urged and/or pulled additional patients to ward activities during these conditions. Attention and other rewards were sometimes given by one patient to another contingent upon activity attendance and participation. In one case, a patient offered another patient a soda if she agreed to stay to the end of the current events group.

Condition C "bonuses." Condition C is the social condition of reinforcement with no recipient response requirement. Patients who had not earned their tokens individually expressed a variety of reactions. Some were happy about the surprise and enjoyed receiving the additional tokens. Others, however, were hesitant to take tokens they had not earned. Statements such as "I don't deserve this." or "I didn't do anything for this." were used in explaining the hesitation. The extent to which these attitudes affected behavior requires further evaluation.

Administrative differences. An important facet of any operant system is the effort required to maintain that system. Programs requiring more effort are less likely to succeed than those requiring less effort. In the present project, Condition C was the most difficult to administer. It was difficult for two main reasons. First, more patients were given tokens after the group requirement was met. Second, some people, particularly those who did not engage in the activity, were not readily available when tokens were dispersed. No

significant administrative problems were noticed during Conditions A and B.

CHAPTER 6

Discussion

The primary purpose of this investigation was to study the behavioral characteristics of three social conditions of reinforcement. Therefore, the acquisition, maintenance, and transfer features of these conditions are first explored. The effects of token contingencies regardless of the social condition of reinforcement, the limitations and practical suggestions of the present study, and the future directions indicated by this experiment are discussed in subsequent sections.

Effects of the Social Conditions of Reinforcement

Acquisition. No significant differences were found among the social conditions of reinforcement during periods in which target behaviors were reinforced with tokens. Limitations of this study which are discussed later may have contributed to these findings.

Maintenance. The maintenance effects of the three social conditions of reinforcement were observed during the Extinction weeks. Interestingly, Condition C was the social condition of reinforcement most effective at maintaining behavior during these weeks. Condition B was generally second most powerful while Condition A was clearly least influential. The relatively poor showing of Condition A is especially notable since it is the social condition of reinforcement most frequently utilized in ward treatment programs. The present results suggest that operant systems similar to Condition C are more effective than those similar to Condition A at maintaining behavior

after token reinforcement contingencies are withdrawn.

Why does Condition C have such a powerful effect? One explanation could lie in the particular arrangement of subdimensions found in Condition C. Perhaps recipient response dimensions with "multiple" or "contingency not present" subdimensions enhance single and/or cognitive factors which result in well maintained behaviors. On the other hand, it may be some interaction of the subdimensions which produces this strong maintenance effect. Indeed, the effects of subdimensions, whether single or in combination with others, are currently unknown. Only further research isolating the subdimensions and their interactions can affirm or negate these potential sources of variance as explanations of the experimental results.

A second explanation may lie with the "bonus effect" (Rickard, Melvin, Creel, & Creel, 1973) or "joy phenomenon" (Estes, 1948; Herrnstein & Morse, 1957; Walker, 1942). In these studies, reinforcers or discriminative stimuli indicative of potential reinforcement were presented to subjects in addition to any reinforcers the subjects had earned. Briefly, response frequencies were at least temporarily increased after these procedures. The increased number of responses after additional reinforcers are given is called the "bonus effect" while the increased responding in the presence of discriminative stimuli is labeled the "joy phenomenon." One may speculate that the potent maintenance characteristic of Condition C is related to a "bonus effect" or "joy phenomenon" inherent in Condition C.

All patients in Condition C received tokens once the group requirement was satisfied regardless of their individual performance.

Therefore, tokens were not individually earned by all patients. Some patients found it pleasant to receive these "gifts" whereas others found it annoying. Nevertheless, it seems unlikely that a "bonus effect" or "joy phenomenon" could have produced such a strong Condition C effect an entire week later during an Extinction week. To date, neither human nor infrahuman studies support this second explanation. Further research, however, is needed to provide more information concerning the temporal parameters associated with the "bonus effect" and "joy phenomenon."

Positive transfer. Few significant differences were found among the social conditions of reinforcement in the positive transfer data. Limitations of the present study which are discussed in later sections may have contributed to these findings.

Effects of Token Contingencies

Target behaviors. Regardless of the particular social condition of reinforcement, contingent token reward increased the frequency of target behaviors. More activity occurred during Acquisition than Baseline and in token as compared to Extinction weeks. Reinforcement procedures have often increased the appropriate behavior of chronic patients (Appendix A; Carlson, Herson, & Eisler, 1972; Kazdin & Bootzin, 1972) and their success in this study shall not be belabored.

Verbal interactions. The patient-patient verbal interactions (PPVI) were influenced by token contingencies. Patients spoke more to other patients during token than non-token weeks. There are at least two explanations for these results.

The first explanation utilizes the notion of an activity level.

That is, some environmental situations may produce an overall increase in the frequency of behavior. Both target and transfer behaviors would increase if the patients' activity level increased. However, an examination of Baseline vs. Acquisition results suggests that this is not the case. While many target behaviors increased in Acquisition, none of the three measures of verbal interaction yielded significant Baseline-Acquisition differences. Significant differences would have been predicted if it were simply an increase in activity level which generated an increase in verbal interactions.

A second explanation is that patient-patient verbal interactions increased in token as compared to Extinction weeks due to relatively more reinforcement of interactions during token weeks. Perhaps the patients' conversations were more effective in token weeks than non-token weeks in producing their desired effects upon the physical and social environment. For instance, patients may have helped each other more during token weeks by obtaining needed materials when requested in activities therapy. Further, verbal behavior was probably reinforced socially and tangibly with tokens (a) in some target behaviors (e.g., current events discussion), (b) in the administration of the token program, and (c) in the performance of some activities (e.g., ward cleaning). During Extinction weeks, patients relied more on staff members because staff members responded to verbal prompts more often than other patients. It is likely that it was the reinforcement of patient-patient verbal interactions themselves and not simply an increase in activity level which resulted in more patient-initiated conversations during token weeks.

Midday medication line up. More patients lined up for medicine during Acquisition than Baseline. As in the study of positive transfer by Liberman, Teigen, Patterson, and Baker (1973), some behaviors monitored as indications of positive transfer are more similar to target behaviors than others. It is the similarity to target behaviors in stimulus setting and in expected behaviors which may have accounted for the increased medication line up in Acquisition. In this project, medication line up was especially similar to ward cleaning attendance and meal line ups.

The medication line-up difference between token and non-token weeks was not maintained after Acquisition. The failure to maintain the difference may be understood by examining the meal line up results. After Acquisition, the frequency of meal line ups reached a "ceiling" level and the behavior seemed to be reinforced more by receiving the meals than the tokens. This may, in part, be because tokens were distributed after the meals. Nevertheless, the lack of a difference between token and non-token weeks in meal line up may have contributed to the lack of difference during the same time period in the medication line up behavior.

Limitations of the Present Investigation

The present study had several limitations. Included among these limitations were (a) a complex design, (b) a high group requirement, and (c) a limited comparison behavior.

Complex design. Many different experimental conditions were included in this research project. For example, there were six separate Extinction weeks. There were also three social conditions of rein-

forcement. For some staff members, the "rapid" change of conditions was bewildering. This change occurred so quickly that initially some ward staff were confused about and irritated with the complexity of the experiment. Frequent explanations were needed to elucidate the order and orderliness of the change of conditions.

Another aspect of the complex design is the empirical effect of the repetition of conditions. There were two Condition A's, two B's, and two C's as well as two Extinction weeks for each social condition of reinforcement. Frequently, the first week of a condition was higher than the second week of that same condition. Such results suggest that the experimental weeks were not independent of each other. Unfortunately for this study, phase independence is one of the assumptions underlying the use of a time series design. That is, an experimenter employing a time series design such as the one used in this study assumes each phase is separate from all other phases. The phases in the present study were apparently influenced by previous phases (cf., Perkins & Cacioppo, 1950).

The exact extent of the influence can not be stipulated. One indication that phase order did not totally determine the results is that Condition A frequencies were generally lower than Condition B frequencies. Condition B was the last condition of the series and would have been lower than Condition A if only phase order affected the results. Condition B was not lower. Nevertheless, the extent of phase influence on the experimental conditions is still unknown. A more promising question concerns alternative designs for this problem area and population.

Kazdin and Bootzin (1972) and Paul (1969) have warned of the potential dangers of time series (reversal) designs. These authors suggested the use of multiple baseline or group comparison designs as alternatives to the time series design. Of the two alternatives, the multiple baseline design is generally the most practical to implement within a state hospital.

A multiple baseline design is an experimental plan in which several behaviors are measured at baseline and then each is changed from baseline at a predetermined period. There are no phase reversals. Compared to group comparison designs, the multiple baseline design is less likely to disrupt institutional administrative and clinical programs and generally requires less staff. Use of a multiple baseline design also eliminates the need for phase reversals which are sometimes clinically undesirable. Perhaps the experiment should have involved only two social conditions of reinforcement and utilized a multiple baseline design. Such a project would have a more limited scope but would have avoided the confounding phase effect found in the present study.

High group requirement. Conditions B and C had a group requirement of 66%. Consequently, 66% of the ward population was required to engage in a behavior before tokens could be earned on the ward for that target behavior. This requirement was too high for chronic patients just beginning to participate in a group operant system.

There were at least two indications that the percentage requirement was too high. The first was the verbalizations of patients who doubted that 66% of the ward would go to an activity. Therefore, they

as individuals stated they were not going to "bother" to attend and/or participate in an activity. A second indication exists in the statistical findings. The first days of the week were occasionally significantly higher than the last days. During the token weeks, patients' attendance and participation were extinguished when the group requirement was not met in the beginning of the week. A less stringent group requirement would have avoided this extinction during token weeks. A pilot study conducted prior to the experiment could have provided the necessary information.

Limited comparison behavior. Only one comparison behavior was monitored in the present study due to a shortage of staff and time. No problems or confounding variables were discovered. Unfortunately though, the comparison behavior was lunch line up. This activity was not influenced by the social conditions of reinforcement on the experimental ward. The lack of evidence for confounding variables could be explained by the lack of responsiveness of the monitored behavior. That is, there may be no indication of confounding variables because lunch line up was not sensitive to experimental or confounding influences. Attendance of a cleaning, exercise, or discussion group would have been a better comparison behavior than lunch line up.

Practical Suggestions

Several practical suggestions have evolved from the present study. One concerns the efficacy of group operant systems as intervention techniques. As found in other studies, the token system employed in the present investigation was an effective means of changing low frequency behaviors. A more novel finding is the increase in patient-

patient conversations associated with the token weeks. Patients talked more to each other during token weeks.

Talking is a patient's most effective means of communication. Via verbal communication, patients can obtain information about themselves, other people, and other phenomena in the world. Chronic patients are likely to become more interested in and responsive to their environment as they become more talkative. In turn, they become more interesting to others. The "cycle" continues as the patient is encouraged in his/her verbal interactions.

An additional advantage associated with frequent verbal communication is the increased opportunity for the patients to establish cognitive control over their behavior. Some verbalizations associated with reinforcing stimuli may become internalized as cognitions (Skinner, 1974). Cognitions are less likely to be influenced by temporary social or environmental variation than change produced by external contingencies. This stability is needed in attempting to solve the problems of behavior maintenance following the behavior change produced in institutions. In fact, Donald Meichenbaum and his associates (Meichenbaum, Gilmore, & Fedoravicious, 1971; Meichenbaum & Goodman, 1971) have repeatedly and empirically demonstrated the therapeutic efficacy of "self-verbalizations."

The particular social condition of reinforcement utilized in group intervention/maintenance programs is also important. Generally, patients, clients, students, and others in group programs are rewarded or punished regardless of the group's behavior. These conditions seem "fair" in that each individual earns dependent only upon

how he or she performs. Unfortunately, this social condition may not be most desirable when efforts are directed at first changing and later maintaining behavior.

The present findings indicate that initially low frequency behaviors are more likely to be maintained after Acquisition if there are multiple recipients and group requirements. These subdimensions foster social interaction (e.g., praise from others, threats to others) and attention to social demands. In the present experiment, some patients urged and actually pulled additional patients to a ward activity in an effort to meet the group requirement. Patients were more responsive to social stimuli during Conditions B and C. It is this responsiveness to social stimuli which may have enhanced activity attendance/participation during Extinction.

Future Directions

The social conditions of reinforcement are a promising area of investigation. These conditions may influence behavioral acquisition, maintenance, and transfer in many ways and settings. Indeed, the present study is only a beginning in the analysis of the comparative behavioral effects of the social conditions of reinforcement.

Future investigators should first heed the procedural and design improvements (e.g., less stringent group requirement with chronic psychotics, different experimental designs for complex experiments) suggested in the above sections. Secondly, studies with a variety of populations would increase our knowledge of the social conditions of reinforcement. Conditions which may be effective in changing and/or maintaining behavior in one population may not be as influ-

ential in another population. Of particular importance would be the study of populations (e.g., students, workers) in less "total" environments than lock-up wards in a state hospital. Lastly, the many dimensions and subdimensions of the proposed classification scheme deserve further research. It is only by future research that the utility of the classification scheme as well as the practical implications of various social conditions of reinforcement will be uncovered.

CHAPTER 7

Summary

There are two main components of the present dissertation. The first is a proposal for a classification scheme of social conditions of reinforcement. In group operant systems (e.g., token economies, point systems), reinforcers are distributed to the individuals within the system in a variety of ways. Individuals in most group programs are reinforced contingent only upon their own behavior. In other systems, however, reinforcement for individual participants depends upon satisfaction of some group requirement. The proposed classification scheme identifies what may be important dimensions and subdimensions of these various social conditions of reinforcement.

The classification scheme of social conditions of reinforcement has the following three major dimensions: the reinforcing agent, the recipient response requirement, and the group response requirement. The reinforcing agent (single or multiple) refers to the designated or nondesignated people who distribute the reinforcers. The recipient is the individual or group who receives the reinforcer. The recipient may or may not be required to fulfill some behavioral contingency. Lastly, the third dimension taps the group requirements which must be met by a designated or nondesignated individual(s) within some group systems. There are 48 possible social conditions of reinforcement in the classification scheme. Only three were studied in the dissertation experiment.

The second component is the dissertation experiment itself. In

the experiment, the behavioral effects of three social conditions of reinforcement were explored in a token system with chronic female psychotics. Tokens were distributed contingent only upon the individual patient's behavior in Condition A. In Conditions B and C, however, 66% of the ward population was required to perform to criterion before patients within that population were even eligible for tokens. Condition B further required satisfactory behavior by the individual recipients themselves. Tokens in Condition C, on the other hand, were distributed to all patients once the group requirement was met.

Two wards, an experimental and comparison ward, were affected by the 16-week experiment. Most of the activity related to the project occurred on the experimental ward. One behavior, however, was observed on the comparison ward. Many patients on both wards were chronic schizophrenics. Thus, monitored behaviors such as meal line up, medication line up, and attendance of an exercise group were clinically meaningful.

Paper tokens were used by trained staff to reinforce appropriate behaviors designated as target behaviors. During token weeks, patients were praised and given tokens for a variety of target behaviors including discussion group completion, ward cleaning group attendance, and bed making. Tokens could be exchanged for a variety of backup reinforcers including use of private radios, extra snacks, and free time activities. During non-token weeks, tokens were neither distributed for engaging in target behaviors nor required for purchasing the backup reinforcers.

Several different conditions were varied in a time series design

on the experimental ward. There were three social conditions of reinforcement in addition to Baseline, Acquisition, and Extinction phases. During both token and non-token weeks, transfer behaviors such as patient-patient verbal interaction and medication line up were monitored to obtain some indication of the effects of reinforcement procedures upon behaviors not specifically reinforced (i.e., positive transfer). The overall experiment was designed to explore the acquisition, maintenance, and transfer features of each of the three social conditions of reinforcement.

No significant differences were found among the social conditions of reinforcement during the token weeks. There were, however, significant differences among the Extinction weeks. Generally, Condition C yielded the highest frequencies of all three conditions. Condition B was second while Condition A, the traditional social condition of reinforcement in token systems, was a poor third. Target behaviors related to the ward cleaning, exercise, and discussion groups were most responsive to the experimental conditions. Meal line up and bed making were typically not as affected. Across all social conditions of reinforcement, more appropriate behavior occurred on the experimental ward during the token weeks as compared to the non-token weeks.

Analyses of transfer behaviors yielded some significant differences. Medication line up was higher during Baseline than Acquisition. Further, patients initiated more conversations during token than non-token weeks. No differences, however, were apparent among the three social conditions of reinforcement.

Limitations of the present study may have seriously affected the

findings. Briefly, these limitations include a complex design, a high group requirement, and a limited comparison behavior. The complex design confused staff members and contributed to the lack of phase independence. The group requirement was too high and discouraged appropriate behavior during the token weeks. Lastly, lunch line up, the comparison behavior, was not sufficiently responsive to experimental conditions. Solutions involving design and procedural changes were suggested for the above problems.

Several practical suggestions evolved from this investigation. One dealt with the general utility of token systems with chronic patients. More novel suggestions concerned the special advantages of social conditions of reinforcement similar to Conditions B or C. Patients seem to be more responsive to and cognitive of social stimuli during these conditions. Such factors may facilitate the maintenance of appropriate behavior after a patient is discharged from an institution.

Future research needs to explore more dimensions and subdimensions of the classification scheme as well as less restricted subject populations. Via additional research, the classification scheme and related clinical suggestions can be thoroughly evaluated.

REFERENCES

Atthowe, J. M., & 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.

Axelrod, S. Comparison of individual and group contingencies in two special classes. Behavior Therapy, 1973, 4, 83-90.

Ayllon, T., & Azrin, N. The measurement and reinforcement of behavior of psychotics. Journal of the Experimental Analysis of Behavior, 1965, 8, 357-383.

Ayllon, T., & Azrin, N. The token economy: A motivational system for therapy and rehabilitation. New York: Appleton-Century-Crofts, 1968.

Carlson, C. G., Hersen, M., & Eisler, R. M. Token economy programs in the treatment of hospitalized adult psychiatric patients: Current status and recent trends. Journal of Nervous and Mental Disease, 1972, 155, 192-204.

Carlson, C. S., Arnold, C. R., Becker, W. C., & Madsen, C. H. The elimination of tantrum behavior of a child in an elementary classroom. Behavior Research and Therapy, 1969, 6, 117-119.

Catania, A. C., Silverman, P. J., & Stubbs, D. A. Concurrent performances: Stimulus-control gradients during schedules of signalled and unsignalled concurrent reinforcement. Journal of the Experimental Analysis of Behavior, 1974, 21, 99-107.

Colby, K. M. Interview: Kenneth Mark Colby. In A. E. Bergin & H. H. Strupp, Changing frontiers in the science of psychotherapy. New York: Aldine Atherton, 1972, p. 272.

Estes, W. K. Discrimination conditioning: II. Effects of a Pavlovian conditioned stimulus upon a subsequently established operant response. Journal of Experimental Psychology, 1948, 38, 173-177.

Evans, G. W., & Oswalt, G. C. Acceleration of academic progress through the manipulation of peer influence. Behavior Research and Therapy, 1968, 6, 189-195.

Ferguson, G. A. Statistical analysis in psychology and education (3rd edition). New York: McGraw-Hill Book Co., 1971.

Graubard, P. S. Utilizing the group in teaching disturbed delinquents to learn. Exceptional Children, 1969, 35, 267-272.

Greenberg, D. J., & O'Donnell, W. J. A note on the effects of group and individual contingencies upon deviant classroom behavior. Journal of Child Psychology and Psychiatry, 1972, 13, 55-58.

Greene, R. J., & Pratt, J. J. A group contingency for individual misbehavior in the classroom. Mental Retardation, 1972, 10, 33-35.

Herrnstein, R. J., & Morse, W. H. Some effects of response-independent positive reinforcement on maintained operant behavior. Journal of Comparative and Physiological Psychology, 1957, 50, 461-467.

Honig, W. K. Attentional factors governing the slope of the generalization gradient. In R. M. Gilbert & N. S. Sutherland (Eds.), Animal discrimination learning. New York: Academic Press, 1969.

Kale, R. J., Kaye, J. H., Whelan, P. A., & Hopkins, B. S. The effects of reinforcement on the modification, maintenance, and generalization of social responses of mental patients. Journal of Applied Behavior Analysis, 1968, 1, 307-314.

Kazdin, A. E., & Bootzin, R. R. The token economy: An evaluative review. Journal of Applied Behavior Analysis, 1972, 5, 343-372.

Krasner, L. Behavior therapy. In P. H. Mussen & M. R. Rosenweig (Eds.), Annual Review of Psychology. Palo Alto, Calif.: Annual Review, Inc., 1971.

Kubany, E. S., Weiss, L. E., & Sloggett, B. B. The good behavior clock: A reinforcement/time out procedure for reducing disruptive classroom behavior. Journal of Behavior Therapy and Experimental Psychiatry, 1971, 2, 173-179.

Liberman, R. P., Teigen, J., Patterson, R., & Baker, V. Reducing delusional speech in chronic, paranoid schizophrenics. Journal of Applied Behavior Analysis, 1973, 6, 57-64.

Lloyd, K. E., & Garlington, W. K. Weekly variations in performance on a token economy psychiatric ward. Behavior Research and Therapy, 1968, 6, 407-410.

Logan, D. L. A "paper money" system as a recording aid in institutional settings. Journal of Applied Behavior Analysis, 1970, 3, 183-184.

Long, J. D., & Williams, R. L. The comparative effectiveness of group and individually contingent free time with inner-city junior high school students. Journal of Applied Behavior Analysis, 1973, 6, 465-474.

Lyon, V. L. W. Conditioning and generalization of verbal responses in hospitalized schizophrenics. Dissertation Abstracts International, 1971, 32, 2403-B.

Meichenbaum, D. H., Gilmore, J. B., & Fedoravicius, A. Group insight versus group desensitization in treating speech anxiety. Journal of Consulting and Clinical Psychology, 1971, 36, 410-421.

Meichenbaum, D., & Goodman, J. Training impulsive children to talk to themselves: A means of developing self-control. Journal of Abnormal Psychology, 1971, 77, 115-126.

Paul, G. L. Behavior modification research: Design and tactics. In C. M. Franks (Ed.), Behavior therapy: Appraisal and status. New York: McGraw-Hill, 1969, pp. 29-62.

Perkins, C. C., & Cacioppo, A. J. The effect of intermittent reinforcement on the change in extinction rate following successive reconditionings. Journal of Experimental Psychology, 1950, 40, 794-801.

Richard, H. C., Melvin, K. B., Creel, J., & Creel, L. The effects of bonus tokens upon productivity in a remedial classroom for behaviorally disturbed children. Behavior Therapy, 1973, 4, 378-385.

Risley, T. R. Behavior modification: An experimental-therapeutic endeavor. In L. A. Hammerlynck, P. O. Davidson, & L. E. Acker (Eds.), Behavior modification and ideal mental health services. Alberta, Canada: University of Calgory Press, 1969.

Schmidt, G. W., & Aldrich, R. E. Effects of group contingent events upon classroom noise. Journal of Applied Behavior Analysis, 1969, 2, 171-179.

Skinner, B. F. About behaviorism. New York: Alfred A. Knopf, 1974.

Steffy, R. A., Hart, J., Craw, M., Torney, D., & Marlette, N. Operant behavior modification techniques applied to a ward of severely regressed and aggressive patients. Canadian Psychiatric Association Journal, 1969, 14, 59-67.

Sulzbacker, S. I., & Houser, J. E. A tactic to eliminate disruptive behavior in the classroom: Group contingent consequences. American Journal of Mental Deficiency, 1968, 73, 88-90.

Terrace, H. S. Stimulus control. In W. K. Honig (Ed.), Operant behavior: Areas of research and application. New York: Appleton-Century-Crofts, 1966.

Wagner, A. R. Incidental stimuli and discrimination learning. In R. M. Gilbert & N. S. Sutherland (Eds.), Animal discrimination learning. New York: Academic Press, 1969.

Walker, H. M., & Buckley, N. K. Programming generalization and maintenance of treatment effects across time and across settings. Journal of Applied Behavior Analysis, 1972, 5, 209-224.

Walker, K. C. The effect of a discriminative stimulus transferred to a previously unassociated response. Journal of Experimental Psychology, 1942, 31, 312-321.

Winer, B. J. Statistical principles in experimental design. New York: McGraw-Hill Book Co., 1971.

Winkler, R. C. Management of chronic psychiatric patients by a token reinforcement system. Journal of Applied Behavior Analysis, 1970, 3, 45-55.

Wolf, M. M., Hanley, E. L., King, L. A., Lachowicz, J., & Giles, D. K. The timer-game: A variable interval contingency for the management of out-of-seat behavior. Exceptional Children, 1970, 37, 113-117.

Woods, P. J. A taxonomy of instrumental conditioning. American Psychologist, 1974, 29, 584-596.

APPENDIX A

GROUP OPERANT SYSTEMS IN PSYCHIATRIC INSTITUTIONS:

A LITERATURE REVIEW

GROUP OPERANT SYSTEMS IN PSYCHIATRIC INSTITUTIONS: A LITERATURE REVIEW

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All social systems are more or less structured and generally support certain behavioral objectives. Thus, educational classrooms, businesses, and fraternal organizations employ implicit or explicit rules of conduct that encourage and support behavior considered desirable. When a social system involves the deliberate use of operant reinforcement and related procedures to achieve specified behavioral objectives with a group of individuals, it can be called a group operant system. The present paper focuses on group operant systems such as "token economies" and point programs in psychiatric institutions.

Group operant systems in psychiatric institutions generally have therapeutic or rehabilitative objectives. Thus, specific target behaviors such as bathing or delusional talk are designated as desirable or undesirable by the system managers (e.g., hospital staff), the patients, or both of these groups. Target behaviors undergo punishment, response blockage, or other response decreasing procedures if designated as undesirable and reinforcement, response exposure, and other techniques if considered desirable.

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Types of Operant Systems

A variety of group operant systems involving many different reinforcers, populations, and target behaviors currently exist. Two general types are (a) those systems utilizing conditioned reinforcers and (b) those making use of primary reinforcers and/or primary aversive stimuli. Group operant systems using conditioned reinforcers to modify behavior can be further subdivided into token systems employing tangible conditioned reinforcers and point systems using "exchangeable" but intangible conditioned reinforcers of a standard unit size. Primary operant systems apply primary positive reinforcers or primary aversive stimuli in changing behavior. Clearly, this typological method of classification is not without fault in that some operant systems fail to fit neatly into any of the three categories. A credit card, for example, is a single tangible object like a token yet it may actually represent a whole variety of values. For the purposes of the present review, however, this classification scheme aids in conceptualizing the current array of group operant systems in that most can easily be considered as either token, point, or primary systems.

Group operant systems utilizing conditioned reinforcers have made use of such reinforcers as tokens (e.g., Ayllon & Azrin, 1968a), paper money (e.g., Logan, 1970), credit cards (e.g., Lehrer, Schiff, & Kris, 1970), and points (e.g., Boren & Colman, 1970; Phillips, Phillips, Fixsen, & Wolf, 1971). Token systems use standardized, tangible conditioned reinforcers. Consequently, tokens can actually be given to and manipulated by a patient. Point operant systems, on

the other hand, employ standardized, intangible conditioned reinforcers which are not actually handled by patients. It is the intangible nature of points that restricts their usefulness with relatively "regressed" patients but allows a great deal of flexibility compared to the more cumbersome tokens (e.g., averaging rates of earning, ease of transportation) when used with more "intact" patients. At some designated time in both token and point programs, then, backup reinforcers are "bought" on the basis of the amount of collected tokens or points with the appropriate deductions being made for any "purchases." Backup reinforcers may include foods, commissary items, and privileges of various sorts depending mostly upon the availability of desired goods, services, and privileges.

Unlike conditioned reinforcement systems, there is no vehicle of exchange in group operant systems utilizing primary reinforcers and primary aversive stimuli to achieve specific behavioral goals. Instead, primary reinforcers such as food, and rest or primary aversive stimuli such as electric shock or slaps are given directly to the participant contingent on predetermined target behavior. Such operant programs have been used almost exclusively with mental retardates (e.g., Birnbrauer, 1967; Roos & Oliver, 1969). Thus, a child may be reinforced with candy for his appropriate use of the toilet for elimination. Primary systems, as well as the preceding conditioned reinforcement systems, were developed to a large extent out of previous "token economy" methodology.

In these early studies, obvious similarities between the "outside" economic world and group operant systems in psychiatric insti-

tutions led investigators (e.g., Ayllon & Azrin, 1968a) to label group operant systems "token economies." However, continued application and extension of the original "token economy" has resulted in obsolescence of this first label for several reasons. Prominent among these reasons is the fact that the majority of research on "token economies" draws from an operant rather than an economic model of operation. In addition, it makes little sense to speak of "star economies," "point economies," "shock economies," "candy economies," "privilege economies," etc. following the exact nature of the programmed reinforcer. As an appropriate descriptive label, then, group operant system reflects the basic operant conceptualization better than "token economy," while the three operant system subdivisions of structured environments more clearly describe procedural differences (i.e., use of token, merit, or primary reinforcers) among various existing psychiatric programs.

The purpose of the present paper is to review the literature involving the use of group operant systems with institutionalized, adult psychiatric patients. Only two types of group operant systems, token and point systems, are used with much frequency in psychiatric institutions. Accordingly, the current review will include only token and point systems in inpatient psychiatric institutions. These systems consistently and deliberately utilize operant learning procedures in an effort to modify inappropriate behavior and establish desirable responses. Programs designed to modify the behavior of mental retardates (e.g., Ullmann & Krasner, 1969, pp. 569-571) or juvenile delinquents (e.g., Phillips, 1968; Tyler & Brown, 1968) and those institutional environments involving extensive academic procedures (e.g.,

Cohen & Filipzak, 1971; McKee & Clements, 1971), milieu therapy (e.g., Jones, 1953; Lafave, Lawby, Burke, Cohen, Barrington, & Lee, 1965), or day care treatment (e.g., Golub, 1969) are not covered.

History and Development of Group Operant Systems

Patients in psychiatric institutions have traditionally received only custodial care (Goffman, 1961; Ullmann, 1967). In the past, those judged deviant by society were abandoned and left in large, understaffed institutions. Indeed, the geographical isolation of these "insane asylums" from surrounding communities mirrored the immense hopelessness and anguish of the patients inside the walls of the mental hospitals. It is only recently that treatment of any substantive nature has evolved within these settings.

Initially, the treatment that evolved was of an individual or "doctor-patient" type, and generally followed the therapeutic procedures prescribed by various psychoanalytic schools, though the brief life of moral therapy (Ullmann & Krasner, 1969, pp. 125-127) in the first part of the nineteenth century provides at least one notable exception to this trend. It was actually not until the development of group and mileau therapies (e.g., Jones, 1953), however, that the major emphasis in treatment shifted from individual verbal-cognitive orientations to ward social and environmental restructuring approaches. Jones demonstrated that aides and nurses could be used effectively to change patients' attitudes and deviant behaviors. Scheduled therapeutic activities employed to develop responsible patients as well as a friendly ward atmosphere included group discussions, psychodrama,

dances, sports, and viewing of films concerning job training and social problems. Fairweather (1964) and Fairweather, Sanders, Maynard, Cressler, and Beck (1969) have also emphasized group treatment as opposed to individual psychotherapy. Patients living in a "lodge" located in the community were reinforced via staff praise and/or monetary "rewards" for desired self-care and vocational behaviors. As patients became more self-sufficient (e.g., able to hold jobs outside of the lodge setting), rewards increased as did social interaction with the community. Compared to modern group operant systems, both Jone's milieu therapy and Fairweather's lodge system were (a) less specific in designating "target" behaviors, (b) less deliberately based upon operant learning principles and procedures, and (c) not as likely to systematically collect information on specific behavioral effects for later evaluations of their treatment programs. Nevertheless, both group treatment orientations aided in the evolution of modern group operant systems.

In addition to an emphasis on group treatment, operant procedural developments are essential to the growth and expansion of operant programs. Early books by B.F. Skinner (1953, 1959) frequently recommended operant procedures for use in the modification of human as well as infrahuman behavior. The application of operant methodology in clinical settings was initiated by a student of B. F. Skinner, O. R. Lindsley. Lindsley (1956, 1960) explored the response characteristics of chronic psychotics to a variety of reinforcement schedules. Gradually and with increasing frequency, clinicians began to use operant procedures for the actual modification of "clinical" behavior.

For example, Zimmerman and Zimmerman (1962) positively reinforced children's appropriate classroom behaviors (e.g., spelling behaviors, remaining quiet) thus increasing the frequency of desired responses. Ayllon and Azrin (1965) first expanded individual operant methodology and established a clinical group program of positive reinforcement procedures called a "token economy." The "token economy" was successful with chronic psychotics resulting in increased frequencies of desired patient behaviors. Thus, both individual and group applications of positive reinforcement methodology have proven effective in modifying behavior.

Today, a variety of group operant systems attempt to modify many different target behaviors within many different populations. Operant systems (e.g., Ayllon & Azrin, 1968a; Kazdin & Bootzin, 1972; Montgomery & McBurney, 1970) are characterized by objective and deliberate specifications of the reinforcers, target behaviors, and operant contingencies between reinforcers and target behaviors. Both staff and patients know when and in what manner certain behaviors are reinforced. In addition, data concerning the frequency of target behaviors are kept to insure a record of the fulfillment and continuation of treatment objectives. These behavioral data are needed to assess the strengths as well as the inadequacies of a particular program. In many operant systems, behavioral records are kept both on the individual level and for the whole group.

Research on Group Operant Systems In Clinical Populations

Traditionally, clinical psychology and psychiatry have relied upon case studies for the discovery as well as the justification of a variety of treatment procedures. It is only recently since the 1950's that scientific experimentation has been utilized within clinical settings as a means of evaluating therapeutic techniques. As a result of this experimentation, useful data have evolved regarding various psychological treatment approaches. In addition, interesting questions have even been raised concerning research technique itself. The present research section is therefore separated into two sections covering (a) issues relevant to research design and methodology and (b) research results from the actual application of group operant systems in clinical populations.

Research Design and Methodology

Two general issues of importance to operant system research are (a) choice of the design, or the "structure" of the experiment, and (b) selection of an appropriate method of data analysis. In some instances, these two issues are interrelated. For example, a research design involving matched groups requires a different kind of data analysis than a design in which only one subject is observed during various baseline and experimental conditions. At other times design and analysis may present separate and independent problems. That is, a research design may be appropriate for a particular question but the resulting data may be statistically mishandled. Also, a design may be so inadequate and poorly put into operation that there is no

effective method to analyze the data. For the purposes of the present paper and since design and data analysis can be distinct problems, the two issues are separated with experimental design being dealt with first.

Operant system experimentation utilizes either group comparison or time series designs with the latter being most prevalent. Group comparison designs involve contrasting one or more control groups with one or more experimental groups. The independent variable (i.e., the experimental treatment or therapy procedure) is expected to have more of an effect on the experimental groups if it evidences any effect at all. In the time series design, alternating experimental conditions are compared. For example, in the frequently used ABAB design A may refer to a baseline or control condition while B refers to an experimental treatment. The use of the time series design rests upon two assumptions, one of phase independence and the second of phase reversibility. Briefly, phase independence refers to effects which are limited to individual control or experimental conditions and separate from all other conditions while phase reversibility deals with the capacity of the experimenter to achieve the serial conditions as desired.

Once the assumptions of phase independence and reversibility are met, the experimenter can advantageously utilize time series designs (Campbell & Stanley, 1966, pp. 37-47). Three important advantages of time series designs are (a) own-subject control, (b) small number of subjects required, and (c) easy implementation of the design within the rules of most institutions. First, since a subject serves as his

own control in time series designs, the amount of error due to subject variance is reduced in relation to most group comparison methods. Second, own-subject control makes it possible to use fewer subjects since separate control groups are not required. Third, the time series design is easy to employ within many institutions because it requires relatively little change in normal institutional procedures. For instance, subjects do not have to be randomly assigned to control and experimental groups nor are additional staff usually necessary for the implementation of group operant systems within a time series design. This practical advantage is of particular importance in the area of operant systems since much operant system research is conducted within institutions.

Despite the above-mentioned advantages of time series designs, however, Baer, Wolf, and Risley (1968), Davison (1969), Gentile, Aubrey, and Klein (1972), and Paul (1969) have warned that frequently the assumptions of phase reversibility and phase independence are not met and consequently, the data from studies employing this design are uninterpretable. Therefore, instead of time series methods, these authors recommend multiple baseline (i.e., several target behaviors are measured at baseline and then each is changed from baseline at a predetermined period) or group comparison designs. Both multiple baseline and group comparison designs have the advantage over time series designs of not being as affected by multiple measurements and conditions which covary along with the independent variable. Indeed, these designs should be used when time series assumptions of phase independence and phase reversibility can not be met.

In summary, then, time series, multiple baseline, and group comparison designs all have some advantages and some disadvantages which need to be considered by a potential experimenter. Unfortunately, the requirements of control groups for group comparison procedures and the extended time necessary for multiple baseline methods may rule out their use in much research in institutional settings. Consequently, the time series design seems particularly good in the area of group operant systems if the assumptions of phase independence and phase reversibility are satisfied. Experimenters using time series designs can employ several procedures to insure that the design assumptions are met. For example, careful monitoring during phases to document phase changes reduce the likelihood of phase independence problems. Phase monitoring might consist of rating the extent to which operant procedures are used by ward personnel. Also, phase durations need only be long enough to demonstrate the effect of the treatment, and short phase durations increase the likelihood that the effect will be reversible. In fact, the reversibility of behavior changes following operant procedures has been criticized in clinical literature (e.g., Kazdin & Bootzin, 1972) and in most operant experiments it is an assumption which can easily be met. If both monitoring and short phase durations are employed as in the Ayllon and Azrin (1965) study, the time series design may prove to be completely adequate.

The second issue, that of the selection of the appropriate method of data analysis, is less controversial than the design issue, but nevertheless merits discussion as one potential problem affecting data analysis and interpretation. Allen and Magaro (1971) suggest that by

combining data from high responding and low responding subjects, significant group differences can reflect changes in only high responding subjects. Allen and Magaro argue that individual response differences should not be glossed over with group-data statistics. The utility of their suggestion most definitely depends upon the degree of variation in subject responsiveness within an operant system. Unfortunately, no criteria are currently available to aid in deciding what is large or small variation. It does appear, however, that those group systems with "large" variation in subject responsiveness should avoid group inferential statistics in favor of analysis of individual or sub-group behavior change data while data with less variation may legitimately be analyzed with group-data statistical techniques. Clearly though, the important issue of what is "large" or "small" variation has yet to be resolved.

Applications of Group Operant Systems

In this portion of the paper, research concerned with the effects or effectiveness of group operant systems is reviewed. The experimenters in these studies have addressed themselves to the question of the efficacy of operant systems either in comparison to no-treatment conditions or other treatment approaches. Twelve studies of token systems are reviewed in the second section, and the third section consists of a summary of some current problems in group operant system research.

Token studies. Ayllon and Azrin (1965) first reported the development of a token group operant system in a psychiatric institution. Forty female chronic psychotics receiving no other psychological or

medical treatment participated in an operant system designed to modify work (e.g., washing dishes, mopping floors) and self-care (e.g., grooming behaviors). Tokens resembling poker chips were used as conditioned reinforcers and provided the means for immediate reinforcement of desired behaviors. Backup reinforcers for which the tokens could be exchanged included privacy (e.g., choice of room), privileges (e.g., off-ward or town visits), social interaction with staff, devotional and recreational opportunities, and commissary items. Marked reinforcement effects were demonstrated by Ayllon and Azrin in each of six separate experiments. In each of the six, the experimental design was of the time series or ABA variety (contingent, non-contingent, contingent conditions) with the contingency of token reinforcement for job performance being manipulated as the independent variable. Contingent token reinforcement yielded dramatically higher job performance rates than non-contingent reinforcement regardless of whether the tasks were initially "preferred" or "non-preferred" by patients.

Employing much the same group methodology as Ayllon and Azrin, Schaefer and Martin (1966) modified "apathy" in female chronic schizophrenics. For three months, 20 randomly selected patients participated in a token program while another 20 patients on the same ward received only custodial treatment. The experimental group was reinforced with brass tokens for personal hygiene (e.g., showering, manicuring, dressing appropriately), social interaction (e.g., asking questions, saying good morning), and work performance (e.g., cleaning tables, emptying wastepaper baskets). Token program patients "paid"

for meals, sleeping accommodations, and various privileges while control group patients received all meals, rooms, and privileges on a "free" basis. Schaefer and Martin reported significantly less "apathy" as measured by a behavioral checklist for experimental as contrasted to control patients. Unfortunately, outcome data on specific target behaviors was not reported.

In a third token study, Lloyd and Garlington (1968) alternated contingent and non-contingent token reinforcement conditions with 13 female schizophrenics who had each been hospitalized for at least five years. Token reinforcement and staff praise were given contingent upon appropriate self-care, bed making, and eating behaviors. Later, tokens could be exchanged for a variety of commissary items and privileges. An ABAB design alternating contingent with non-contingent token reinforcement for desired target behaviors successfully demonstrated that contingent token reinforcement, not just the mere presence of tokens, increased target behaviors.

Using small, plastic file cards as conditioned reinforcers, Atthowe and Krasner (1968) attempted a token program on a closed Veterans Administration Hospital ward with 60 male schizophrenic and organic chronic psychotics. Three different patient groups participated in three separate token group procedures each of which required different levels of patient self-control and activity. In the eleven month treatment period, staff reinforced leaving the dormitory area, bed making, urinary continence, social behaviors, and cleaning the ward with both tokens and praise, and "fined" undesirable behaviors such as cursing. Although reinforcement was effective in increasing

bed making, leaving the dormitory area, and urinary continence, appropriate information concerning the other target behaviors and the fining procedure is unavailable. Atthowe and Krasner also found a general increase in patient activity as reflected in attendance at group meetings, patient leaves, and canteen visits using a previous no-treatment period for comparison. Twenty-four of the 60 patients were discharged by the end of the 11-month treatment period, although 11 of these patients were readmitted within nine months.

In a fifth study, Marks, Sonoda, and Schalock (1968) compared "token reinforcement" and "relationship" treatments. Two groups of 22 chronic schizophrenic males were matched by pairs on the basis of a hospital adjustment measure, and a variety of intelligence, projective, ability, and behavioral measures served as dependent variables. For reinforcement therapy patients, amount and time of token reinforcement and target behaviors were determined solely by each patient's therapist while relationship therapists attempted to "communicate" with their patients in a "non-directive" manner. Treatments were given to both groups in a balanced order. Marks et al. found no consistent differences between therapies although they did find that reinforcement therapy required less staff time.

Thirty-four violent and confused female chronic psychotics with a variety of diagnoses participated in a token system set up by Steffy, Hart, Craw, Torney, and Marlett (1969). Patients displayed few social skills and engaged in inappropriate eating and sleeping behaviors. Since meals and bedtime were particularly problematic for staff, desired eating and sleeping behaviors were reinforced with

tokens and staff praise. In addition to paying for meals, tokens could be used to buy candy made available on the ward several times a day. Records of eating and sleeping behaviors and general behavior rating scales reflected patient improvement in the desired directions during the token program. After one year of the operant system, 16 patients were transferred to nursing homes and three to other psychiatric wards.

In the seventh outcome study, Winkler (1970) encouraged many appropriate self-care, social, and work behaviors with patients quite similar to those described by Steffy et al. (1969). Chronic female patients were "motivated" to pay fines for undesirable behavior because non-payment resulted in doubling of token prices for all commissary items and privileges. Although other responses were apparently modified, Winkler reported results within an ABA design only on attendance at morning exercises, completion of morning exercises (in an interdependent condition in which 21 patients were required to be present and participate before any patient could receive tokens), getting up, dressing, bed making, and shoe cleaning. Both staff and patient data were very promising. Of particular interest is the observation that staff absenteeism dropped 24% in the six months the token operant system was in operation compared to the previous six months.

In a somewhat complex program, Lloyd and Abel (1970) reported token system outcome data obtained from 39 male and 19 female chronic psychotics. Although all patients lived within the same token program rules, patients were assigned to three groups on the basis of token earning activity and self-care behaviors. Group A "off-token ward"

participants made plans to leave the hospital. Those failing to show evidence of leaving the hospital (e.g., continued vocational training and letters home) lost their private rooms and other privileges and returned to Group C. Group B patients earned tokens, lived on the ward, had ground and town privileges, could rent a variety of rooms, and were entitled to all hospital recreation functions. Certain token earning levels were required to stay on Group B status and to rise from Group C. Lastly, Group C patients were restricted to the ward except for meals and special work or recreational activities. After 27 months of the token program, Lloyd and Abel found only three general trends. First, younger patients and those with fewer hospitalizations tended to leave the hospital the quickest. There were no consistent relationships between terminal group position, age, time in hospital, drugs, or diagnosis and hospital release. Second, an analysis of movement patterns among the three groups revealed that two-thirds of the patient group changes were in the direction of increased socially acceptable behavior. Finally, patients' family visits and discharges during the token program were more numerous than pre-token system periods.

In contrast with most psychiatric token systems, Henderson and Scoles (1970) investigated the behavior of relatively young, non-chronic patients. Forty male patients were randomly assigned to a state hospital, general hospital, or "Spruce House." Those at Spruce House, a building in the local community, were contingently reinforced for involvement in jobs (e.g., janitor, kitchen steward), social programs (e.g., dances, athletics, discussion groups), and individual

skills improvement programs (e.g., literacy program). Tokens exchangeable for merchandise and privileges were given in increasing amounts as patient responsivility, social participation, and community contact in a task increased. After a 549-day period following discharge, Spruce House patients had a lower total hospitalization and rehospitalization time than other patients although the initial treatment stay of Spruce House patients was somewhat longer. In addition, participants in the token program spent more time employed and more time in the community.

A group comparison study by Shean and Zeidberg (1971) matched 26 male token system patients with 26 male custodial ward patients on the basis of age, diagnosis, and length of hospitalization. Utilizing small cardboard cards as conditioned reinforcers, the token ward was designed to increase work, self-care, and social behaviors and decrease "extreme or bizarre" activity. Dependent variables included both behavior frequency and Motility-Affect-Cooperation-Communication Scale (Ellsworth, 1962) assessments of behavior change. After an analysis of data collected at six and twelve month periods during the one year token program, Shean and Zeidberg found that, in general, the token ward patients had improved in the direction of socially desired behavior significantly more than had the custodial ward patients. Token group subjects attended physical education and occupational therapy meetings, increased time away from the state hospital, and decreased medication usage. Although group contingencies were generally effective, Shean and Zeidberg reported that some behaviors (e.g., physical assault, stealing, episodic drinking) were not greatly

influenced by group contingencies, and concluded that modification of these behaviors would probably require individual treatment.

In the eleventh token system study to be reviewed, Gripp and Magaro (1971) employed five rating scales to assess social behaviors as dependent variables in their token program with 45 disruptive psychotic females. Tokens were given for a variety of on-ward and off-ward jobs and individualized treatment activities. Staff members attempted to reinforce all patients for some activity, no matter how small, and resorted to primary reinforcers when patients seemed unresponsive to tokens. After a six month token system, Gripp and Magaro concluded that the token group had significantly "decreased in those scale factors most associated with psychotic behavior." Approximately three-fourths of the measured scale factors changed. The presentation of the results, however, is so confusing that the reader is left with no idea of how many patients were affected by the treatment or of how quickly the behaviors were modified.

Lastly, Lawson, Greene, Richardson, McClure, and Padina (1971) developed a token program with 41 criminally insane patients in a maximum security correctional hospital. Patients were described as "low functioning" and had a variety of criminal convictions (21 convictions were for murder or manslaughter, 15 for robbery, 4 for grand larceny, and 1 was for assault). Prior to the 91-day program, patient activity was observed and only those patients with a high degree of inactivity were chosen. Tokens were given by a staff trained in behavioral procedures for desired work and rehabilitative behaviors and could be exchanged for foods, commissary items, and other similar

backup reinforcers. An analysis of the data revealed that patient behavior and token earning were improved, with both generally being positively correlated with inmate activity. In addition, 14 patients were transferred to higher functioning wards, two were discharged, and three were transferred to other wards due to continued token theft.

Point studies. Compared to token program reports, there is a paucity of literature relevant to point operant systems. Apparently, the chronic, "regressive" characteristics of most of the patients involved in many of the previously discussed token programs suggested to researchers that tangible tokens would be more practical to disperse, exchange, and establish as conditioned reinforcers than would intangible points. In other words, tokens appear to be conceptually easier for patients to understand, but as less "regressed" patients become involved in operant programs, point systems should be more frequently utilized and reported.

Henderson (1969) instituted a Social Adjustment Laboratory (SAL) for the most abusive and "acting out" patients of Spruce House, a token system (Henderson & Scoles, 1970) already described. The SAL room had four clocks, one each for "Bad Talk," "Good Talk," "Bad Action," and "Good Work." Apparently considering only the behavior of the total patient group, the SAL counselor activated the clocks upon observing "good" and "bad" patient motor and verbal behavior. Work tasks, for which patients were reinforced, included soap packaging, sign making, splicing of recording tape, and construction of file boxes, pencil holders, and togs. Clock points given along with social praise were exchangeable for extra servings of food, cigarettes, candy, passes,

telephone calls, recreational activities, and various commissary items. In concluding his report, Henderson presented three case histories suggesting that the SAL point system was successful, and that treatment effects transferred to situations other than the SAL room.

In a point operant system with a high turnover of both patients and staff, Colman and Baker (1969) modified the activity of young delinquent soldiers who had initially emitted a wide array of inappropriate behavior including homocide, threatened suicide, fighting, and hallucinations. Over half of the 48 patients admitted in one year's time had civilian police records. Points earned for activities which were unspecified in Colman and Baker's report could be exchanged for TV and pool privileges as well as snacks and authorized absences. In addition, fines were dispensed for unauthorized absences, fighting, and suicide threats. Defining success as completion of duty tour or return to a regular Army unit, Colman and Baker found that the point system had a 69.5% success rate compared to a 28.3% success rate on a "comparison ward."

In a subsequent and more thorough report from the same military ward setting, Boren and Colman (1970) described the effects of various reinforcement and punishment procedures on a number of specific target behaviors. First, points exchangeable for ward privileges (e.g., semi-private room, weekend pass) were given contingent upon participation in morning exercises. Comparisons of varying reinforcement rates with and without the presence of an "officer model" substantiated reinforcer but not model effectiveness in increasing the frequency of patient exercise participation. Attendance at an early morning ward meeting

surprisingly dropped off when non-attendance was fined ten points. The same attendance behavior was maintained at a high level under the conditions of point reinforcement and a "chained" schedule in which meeting attendance was required before daily points could be earned. Using an elaborate interdependent condition in which an individual's point earning depended on other patient behavior as well as his own, Boren and Colman found they could produce fairly high and stable rates of patient participation in a speech exercise. The interdependent social condition of reinforcement proved most effective when participating patients received more reinforcement than the non-participant listeners. Finally, point reinforcement but not social praise effectively increased patient consideration of "here and now" and "personal problems."

Summary of current problems in group operant system research

Group operant systems have been found to be effective in modifying a variety of target behaviors including participation in vocational activities (e.g., Ayllon & Azrin, 1965; Gripp & Magaro, 1971; Henderson, 1969; Shean & Zeidberg, 1971), self-care behaviors (e.g., Atthowe & Krasner, 1968; Lawson et al., 1971; Lloyd & Garlington, 1968; Shean & Zeidberg, 1971; Steffy et al., 1969; Winkler, 1970) and social interactions (e.g., Atthowe & Krasner, 1968; Boren & Colman, 1970; Lawson et al., 1971; Lloyd & Abel, 1970; Schaefer & Martin, 1966; Shean & Zeidberg, 1971; Winkler, 1970). In addition, Ayllon and Azrin (1965) and Lloyd and Garlington (1968) showed that it is the contingent reinforcement of appropriate behavior rather than the mere presence of

conditioned reinforcers which resulted in the modification of undesired behaviors. While the body of available literature provides overwhelming evidence of the general efficacy of group operant systems, many of the individual studies reviewed here contain one or more significant flaws in their experimental designs, and numerous important questions relevant to both the process and the outcome of this particular approach to behavioral treatment remain unanswered.

Experimental problems in operant systems can be presented within Campbell and Stanley's (1966, pp. 5-6) conceptual framework regarding internal and external validity. Internal validity refers to variables influencing the "interpretability" of an experiment while external validity deals with the generalizability of results across different populations. Internal validity in operant system research may be limited by at least one or more of the following six variables:

1. No reversal phase(s) or comparison group(s) (e.g., Henderson, 1969; Lawson et al., 1971; Lloyd & Abel, 1970)

2. Poor comparison group(s) (e.g., Colman & Baker, 1969; Gripp & Magaro, 1971; Henderson & Scoles, 1970; Marks et al., 1968)

3. Poorly monitored experimental phases (e.g., Gripp & Magaro, 1971; Lloyd & Garlington, 1968; Marks et al., 1968; Steffy et al., 1969)

4. Inconsistent application of operant contingencies (e.g., Gripp & Magaro, 1971; Lloyd & Abel, 1970; Marks et al., 1968; Steffy et al., 1969)

5. Poor data recording technique (e.g., Colman & Baker, 1969; Gripp & Magaro, 1971) or failure to record most relevant data (e.g.,

Lawson et al., 1971; Marks et al., 1968)

6. Unplanned events which may have some influence on results, such as running short of backup reinforcers (e.g., Lawson et al., 1971) and patient transfers (e.g., Shean & Zeidberg, 1971).

Many of these internal validity problems in the studies cited could have been avoided by better planning. Unfortunately, the degree to which the data were affected by these problems relevant to internal validity is difficult to determine, but there can be little question but that, in some of the studies at least, the confidence that could otherwise have been placed in the meaningfulness of the reported results has been seriously curtailed.

In contrast to the many internal validity problems, there are relatively few difficulties with external validity in operant system research. Nevertheless, some problems do exist. All operant system studies were conducted on experimental wards or programs with chronic patients. More variety in the type of patients is clearly possible. Also, most researchers have modified easily measured target behaviors. Only Boren and Colman (1970), Henderson (1969), and Schaefer and Martin (1966) changed verbal behavior or general behavior patterns which might be indicative of "mood states." Finally, some studies employed restrictive patient or staff selection (e.g., Ayllon & Azrin, 1965; Gripp & Magaro, 1971; Henderson, 1969; Lawson et al., 1971; Lloyd & Garlington, 1968). Despite problems in either design or reporting, however, group operant systems do appear to work in a consistent and predictable fashion. Indeed, the limits of generalizability seem to be more associated with the practical problems of programming operant procedures

with various populations. It is simply easier to modify behavior in a ward of chronic psychotics than, for example, behavior in a small town or other more "natural" setting. The generalizability limits of group operant system procedures have not been reached and, consequently, have yet to be determined.

Technological Concerns

Technological concerns, as the term is used here, relate to practical ways of improving the effectiveness or efficiency of a treatment procedure. The technology must be relatively practical (i.e., simple) in order for it to be implemented easily on a large scale basis within psychiatric institutions. There are six main areas of technological concern: (a) the designation and development of target behaviors, (b) staff training, (c) solutions to problems of reinforcer "flow," (d) reinforcement schedules, (e) social conditions of reinforcement, and (f) positive transfer of responses and response transfer. Other issues such as the design and planning of an operant system have received no empirical attention and are therefore not covered. Lastly, if present trends are any indication, investigations into technological matters should comprise the majority of operant system literature in the future. This area promises of both an increasing quantity as well as quality of experimental data.

Designation and Development of Target Behaviors

The foremost issue in initiating a group operant system is one of first deciding upon, and later developing, selected target behaviors. As was suggested by Ayllon and Azrin (1968a), target behaviors are

usually chosen for their importance to the outside world and the ease in which they can be measured. Reinforcing self-care and vocational activities important to the non-institutional world helps insure the patients' continued stay in the outside community after discharge. Behaviors which are readily assessed are first chosen because of their convenience in demonstrating behavioral effects. Eventually, however, behaviors not as easily measured but nevertheless important to normal, everyday living (e.g., appropriate conversations) must be considered and modified when necessary.

Once selected, the development of the target behaviors becomes of primary concern. Prompting, shaping, response exposure, and enforced initial responding are four effective procedures for developing target behaviors. Prompting, or verbal or written instructions to emit the desired behavior, is probably the most effective method of initiating target behaviors. All operant systems can use prompting by publically announcing and instructing patients as to which behaviors are to be reinforced and in what manner the reinforcers are to be distributed. Prompting has led to quicker performance of grooming and eating in psychiatric patients than only token or primary reinforcement (Ayllon & Azrin, 1964; Suchotliff, Greaves, Stecker, & Berke, 1970). However, maintenance or the sustained performance of a response initiated by prompting required pairing with tokens (Ayllon & Azrin, 1964). For example, Ayllon and Azrin (1964) demonstrated that instructions and reinforcing consequences were more effective than either instructions or reinforcement alone in maintaining desirable dining hall behaviors.

Both response shaping and response exposure (i.e., "modeling"),

the second and third methods of developing target behaviors, have received little systematic study within group operant systems. Response shaping is the differential reinforcement of successive approximations to a particular response. In a clinical setting, Ayllon and Azrin (1968a, pp. 108-110) successfully reinforced patients for vocational and eating behaviors which increasingly approximated desired target behaviors. The third procedure, response exposure, has also received less attention than might be expected. Response exposure procedures (Ayllon & Azrin, 1968a, pp. 174-175) increased token exchange for popcorn and soda backup reinforcers but failed to increase exercise in a point system already described (Boren & Colman, 1970).

Lastly, the effectiveness of enforced initial responding (e.g., being "forced" to engage in an occupational therapy project for a few minutes) has repeatedly been demonstrated. Ayllon and Azrin (1968a, 1968b) utilized enforced responding to increase attendance at a church, an amusement fair, and a movie as well as increasing walking, and listening to music. O'Brien, Azrin, and Henson (1969) also augmented meeting attendance via enforced responding. In an experiment comparing "visual priming" (i.e., actually a response exposure procedure in which patients viewed others eating food) and "oral priming" (i.e., patients tasted food), Sobell, Schaefer, Sobell, and Kremer (1970) reported "visual priming" less effective than "oral priming" in developing eating behaviors though both were significantly different than pre-treatment measures. Unfortunately, such variables as differential attention, aversive social situations, and olfactory cues confuse data interpretation. Taken together, however, it appears that prompting, shaping,

response exposure, and enforced initial responding are effective procedures which can be used by the behavior modifier to develop a wide array of target behaviors.

Staff Training

A second technological issue is that concerning staff training. As would be the case with many ward treatment programs, the success of any operant systems depends to a great extent upon the training and preparation of the personnel involved. Group operant systems often utilize unique procedures and techniques that many ward personnel may find complicated and hard to understand. The area of staff preparation, then, can be critical to the establishment and survival of a ward operant program. Unfortunately, only two experiments have been published concerning staff training. Briefly, Loeber (1971) and Fixsen, Phillips, and Wolf (1972) found that the dispersal of reinforcers and the accuracy of behavior ratings could be modified via contingent monetary and point reinforcement. Neither experiment, however, provides any information concerning the best method or the necessity of staff training prior to the development of an operant system.

Although experimental findings are practically non-existent, the presumed importance of staff training is reflected in the publication of a number of training manuals for correctional and psychiatric staff (e.g., Pooley, 1969; Schaefer & Martin, 1969). In addition, many clinicians (e.g., Lawson et al., 1971; Montgomery & McBurney, 1970; Shean & Zeidberg, 1971) have developed training manuals uniquely suited for their group operant systems. Smith, Hart, and Milan (1971) described a correctional officer training program which lasted 90 hours and included free discussion, role playing, practicum, recording and graphing

of behaviors, and instruction in positive reinforcement, punishment, time-out, escape, avoidance, extinction, stimulus control, schedules of reinforcement, and fading. Practicum involving the application of operant procedures in the prison with individual problem inmates was viewed as a particularly valuable adjunct to lecture material. Indeed, the practical or on-the-job training is probably the single most important facet of staff training and should not be ignored in favor of classroom training. In many cases, successfully functioning operant systems with trained staff evidence changes in staff attitudes and expectations. It is to these changes in staff attitudes and expectations that we turn next.

Surprisingly, changes in staff attitudes and expectations have received little empirical attention. Winkler (1970) and Gripp and Magaro (1971) reported unsystematic observations of improved staff morale. Yet, it was not until McReynolds and Coleman's (1972) study that staff attitude change was empirically investigated. Prior to their successful token system, staff estimated that only 20% of the ward's patients were responsive to treatment. "After one year of the token program, ward staff reported feeling that 100% of the patients were responsive to staff and patients and that 30% of the patients were capable of adjustment outside the hospital." Finally, more favorable expectations were expressed by the staff on the token ward compared to staff on a similar non-token ward.

Reinforcer "Flow"

A third technological problem that has arisen in some operant systems is that of regulating the "flow" of reinforcers to control

such problems as token stealing, hoarding, excessive spending, and accidental loss of reinforcers. A number of adjustments appear to be helpful. For example, Liberman (1968) and Atthowe and Krasner (1968) used a periodic devaluation of tokens to reduce token hoarding while Phillips et al. (1971) encouraged point "savings" by giving interest for such savings. Winkler (1970) color coded tokens in his system and thereby reduced the problem of token thefts. Finally, Lloyd and Abel (1970) and McReynolds and Coleman (1972) organized a patient bank as a means of holding tokens for patients who proved incapable of managing their own earnings. It is clear from these examples that any number of innovative procedures can be used as system adjustments to regulate reinforcer exchange. Two procedures that have not yet been widely used, but which might effectively limit the "hoarding" of tokens, are (a) reinforcing particular rates of "spending" and (b) holding occasional "clearance sales" (e.g., auctions) of backup reinforcers.

Reinforcement Schedules

A different technological variable, reinforcement schedules, may eventually yield a solution to some of the reinforcer exchange problems discussed above. To date, however, reinforcement schedules have not been investigated in adult psychiatric operant systems. Indeed, the sparse literature that does exist is with children in operant systems and concerns treatment stability or maintenance effects from intermittent schedules rather than the schedules' effects on reinforcer "flow." Phillips et al. (1971) faded reinforcement from the usual 100% to an 8% schedule with juvenile delinquents at "Achievement Place." Interestingly, room cleaning was maintained for six months on this

intermittent 8% schedule. However, failure of intermittent schedules has also been reported in classroom studies by Haring and Hauck (1969) and Meichenbaum, Bowers, and Ross (1968). Although there were confounding variables concerning "physiological limits" and response complexity, Haring and Hauck found better acquisition and maintenance of reading behavior with continuous as opposed to intermittent conditioned reinforcement schedules. When Meichenbaum, Bowers, and Ross (1968) instituted a variable interval (VI) schedule, appropriate classroom behavior decreased. Meichenbaum et al. anecdotally observed that the behavioral outcome appeared to result from the students' perceived "unpredictableness of reinforcement on the VI schedule" though confounding variables of time, order, and amount of reinforcement confuse data interpretation. Taken together, these studies serve best to indicate that more data are needed to clarify the roles of cognitive factors in reinforcement schedules.

Social Conditions of Reinforcement

An important technological area in both group systems and normal social life lacking systematic investigation as primary research is that of social conditions of reinforcement. There are at least six social conditions of reinforcement and these six are graphically presented in Table 1. In the individual condition, a patient's responses are reinforced regardless of other patients' responses. The reinforcer may be given to the patient on a response contingent basis as in Ayllon and Azrin's (1965) token program or on a non-contingent basis. Reinforcement in the dependent condition relies solely upon the activity of a selected or special group member. If the selected or special

Table 1

Social Conditions of Reinforcement

Type	Contingent	Non-Contingent
Individual	Reinforcement depends only upon each patient's behavior	Reinforcement given as "gift" to each patient
Dependent	Reinforcement depends upon each patient's behavior as well as the behavior of selected patient(s)	Reinforcement depends only upon behavior of selected patient(s)
Interdependent	Reinforcement depends upon each patient's behavior as well as the total group "effort"	Reinforcement depends only upon the total group "effort"

individual(s) performs to criteria, other group members may receive reinforcement if they have also met some response criteria or may be simply given the reinforcement in a non-contingent fashion. Finally, an interdependent social condition of reinforcement exists if individuals within a group are "interdependent," that is, if the group must meet a group performance criteria before individuals within a group are reinforced. Reinforcement for individual group members may be contingent or non-contingent as in the two previously mentioned social reinforcement conditions. In the remainder of the present section, only the dependent and interdependent social conditions of reinforcement are considered.

No technological research in operant system literature has systematically manipulated all dependent or interdependent social reinforcement dimensions. Non-contingent-dependent conditions in which reinforcement of appropriate classroom behavior by a problem child also resulted in reinforcement for the child's peers has been shown effective in increasing the frequency of the problem student's desired classroom behavior (Greenberg & O'Donnell, 1972; Patterson, 1965; Walker & Buckley, 1972; Wolf, Hanley, King, Lachowicz, & Giles, 1970). In a clinical setting, an analysis of the data revealed that non-contingent-dependent modes of reinforcement were more effective in increasing speech behavior with delinquent soldiers when the selected individual received more reinforcement than other group members given reinforcement on a non-contingent basis (Boren & Colman, 1970). Winkler (1970) found that contingent-interdependent reinforcement procedures maintained morning exercising in psychotics while Phillips (1968)

discovered that juvenile delinquents performed better in a cleaning task under contingent-interdependent "manager" than non-contingent-interdependent "group" punishment conditions. In addition, a 100% contingent-interdependent reinforcement condition (i.e., all members of a group had to perform to criteria) produced and maintained appropriate classroom activity as well as contingent-individual procedures (Herman & Tramontana, 1971). Contingent-interdependent reinforcement also seemed useful in altering the behavior of "refractory" psychiatric patients (Pomerleau, Bobrone, & Harris, 1972) and disturbed children (Carlin & Armstrong, 1968).

Only Glaser and Klaus's (1966) investigation of 3-man teams of normal high school students provides any data comparing three social conditions of reinforcement. Contingent-individual, contingent-interdependent, and non-contingent-interdependent modes of reinforcement were explored with time interval estimation and pattern recognition tasks. Although possible experimental problems exist concerning the adequacy of the reinforcer (i.e., feedback informing the subject of a correct response), varying tasks, and varying task difficulty, results suggested that contingent-individual, contingent-interdependent, and non-contingent-interdependent reinforcement conditions yielded the maximum, medium, and minimum response rates, respectively. Unfortunately, the current hodge-podge of research efforts does not really allow for well-founded generalizations concerning the most effective and stable social conditions of reinforcement for the acquisition and/or maintenance of behavior. In addition, social conditions of punishment and many procedural variables of both punishment and reinforcement

conditions remain to be systematically explored.

Positive Transfer of Responses and Response Transfer

The sixth and last technological problem is the transfer of conditioned behavioral effects. Indeed, the transfer of treatment consequences to situations other than the operant system (i.e., positive transfer of responses) has been increasingly emphasized by many researchers in the past few years and remains perhaps the most challenging technological problem in the area (Baer, Wolf, Risley, 1969; Kazdin & Bootzin, 1971, 1972). Some techniques employed to increase positive transfer, such as using intermittent reinforcement schedules and reinforcing behaviors relevant to the non-institutional world, have already been covered and need not be mentioned further. Two other procedures for enhancing positive transfer, delayed reinforcement and peer- and self-reinforcement, merit consideration.

One method of enhancing positive transfer is by delaying reinforcement. Compared to continuous reinforcement, delayed reinforcement may augment positive transfer since delayed reinforcement more adequately mimicks reinforcement present in the community. Reinforcement delay can occur in at least two fashions: (a) by delaying presentation of the conditioned reinforcers and (b) by delaying exchange of the conditioned reinforcers for backup reinforcers. As previously described, Phillips et al. (1971) and Atthowe and Krasner (1968) weaned patients from relatively immediate to weekly conditioned reinforcer receipt, thus illustrating the first method of reinforcement delay. Unfortunately, their experiments were not designed to evaluate the effectiveness of the reinforcement delay procedures in increasing

positive transfer although the researchers felt an increase in positive transfer would be a likely result of delayed reinforcement. The second method has been investigated by Sletten, Hughes, Lamont, and Ognjanov (1968) who varied backup reinforcer exchange frequency (i.e., twice a day vs. three times weekly) and type of conditioned reinforcer (i.e., money vs. tokens) with 20 psychotic patients. Sletten et al. found no significant differences between groups with either variables. However, confounding variables of conditioned reinforcer equivalency, patient selection, availability of the conditioned reinforcers, and dependent variable limitations cloud these data considerably necessitating better research with the same variables. Delayed reinforcement may, however, prove to be a relatively weak procedure for increasing positive transfer of responses compared to the utilization of self- and peer-reinforcement.

Although self- and peer-reinforcement procedures remain to be systematically developed in psychiatric institutions, investigations from other areas of behavior modification are suggestive of promising future possibilities. For example, Browning and Stover (1971, p. 125) discussed a successful case of an emotionally disturbed child who was first contingently given merit points by the staff for desired behaviors. As the child engaged in increasingly complex behavior, he became increasingly more self-reinforcing (i.e., writing his own merit point reinforcers). In addition, Kazdin (1971) reported multiple case histories of successful client-administered token reinforcement with retardates and Pomerleau et al. (1972) explored the use of pairs of psychiatric patients within a group operant system, each pair

member being responsible for the other's behavior as well as his own. Finally, after investigating positive transfer with disruptive classroom students, Walker and Buckley (1972) concluded that peer reprogramming (i.e., enlisting a student's peers to reinforce appropriate activity) was a "powerful technique" in transferring desirable behavior from special to regular classrooms. Other means of changing the social environment outside the institution such as family or vocational reprogramming (e.g., Hunt & Azrin, 1972) are encouraging of beneficial effects but remain to be systematically explored.

In a review of operant system literature concerning positive transfer and response transfer, Kazdin and Bootzin (1971) found that response transfer, or the spread of treatment effects to responses that were not of initial focus, has received even less attention than the positive transfer of conditioned responses. Ayllon and Azrin (1968a, p. 168) revealed possible anecdotal evidence of response transfer when they found that a patient who had been shaped to eat food also greatly decreased her reports of psychotic hallucinations. However, more data are needed to establish evidence for the existence of the phenomenon in operant systems and for the development of practical applications of response transfer if it does exist in group systems. In concluding statements, Kazdin and Bootzin (1971) suggested that multiple-response measures and measures of a more global nature may be helpful in assessing the occurrence of response transfer in group operant systems.

In summary then, a growing literature concerning the technological issues of group operant systems has emerged. Six issues were dis-

cussed although surely the number of issues will rise as the literature develops. Some technological areas which currently need more research are reinforcement schedules and social conditions of reinforcement. In general though, the most challenging technological problem is that of transferring appropriate behavior from institutional to non-institutional settings. Techniques such as delayed reinforcement and peer- and self-reinforcement were suggested as procedures which may enhance positive transfer.

Summary and Future Extensions

Group operant systems have fared quite well when compared with more traditional forms of treatment in psychiatric institutions in dealing with a variety of behavior disorders and system participants. Behaviors which have been modified include assaultive, eating, dressing, vocational, and other behaviors as well as inactivity or "apathy." However, group operant systems need continued development in several technological areas which have already been discussed. Of particular interest are the three technological areas of (a) reinforcement schedules, (b) social conditions of reinforcement, and (c) positive transfer of conditioned responses.

The extension of group operant systems into situations other than psychiatric institutions may yield even more surprising and dramatic behavioral change than that recorded in the studies already reviewed. For instance, anti-litter campaigns in a movie theater (Burgess, Clark, & Hendee, 1971) and in a summer camp for emotionally disturbed children (Rickard & Saunders, 1971) and treatment of marital discord (Stuart,

1969) have already successfully utilized group operant techniques. County jails, community mental health centers, nursing homes, and areas where social control is negligible are also suitable places for operant system procedures. In addition, a more extensive structuring of a client's interpersonal environment in modern communities may aid both the individual and society in rehabilitation and, more importantly, prevention of undesirable criminal and psychiatric behaviors. Instead of seeing a therapist once or twice a week, such an individual experiencing interpersonal difficulties might have interactions with others in his environment structured in a fashion designed to produce the desired behavior change. Another form of structuring the natural environment includes programming interactions of several members of a family while they are in the community (e.g., Hunt & Azrin, 1973). Finally, total community or sub-community operant systems within larger cities may eventually represent the epitome of social utopias for which Man has been striving throughout his history (e.g., Skinner, 1948).

References

Allen, D. J., & Magaro, P. A. Measures of change in token-economy programs. Behavior Research and Therapy, 1971, 9, 311-318.

Atthowe, J. M., & 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., & Azrin, N. Reinforcement and instructions with mental patients. Journal of the Experimental Analysis of Behavior, 1964, 7, 327-331.

Ayllon, T., & Azrin, N. The measurement and reinforcement of behavior of psychotics. Journal of the Experimental Analysis of Behavior, 1965, 8, 357-383.

Ayllon, T., & Azrin, N. The token economy: A motivational system for therapy and rehabilitation. New York: Appleton-Century-Crofts, 1968a.

Ayllon, T., & Azrin, N. Reinforcer sampling: A technique for increasing the behavior of mental patients. Journal of Applied Behavior Analysis, 1968b, 1, 13-20.

Baer, D. M., Wolf, M. M., & Risley, T. Some current dimensions of applied behavior analysis. Journal of Applied Behavior Analysis, 1968, 1, 91-97.

Birnbrauer, J. S. Preparing "uncontrollable" retarded children for group instruction. Paper read at American Educational Research Association Convention, 1967.

Boren, J. J., & Colman, A. D. Some experiments on reinforcement principles within a psychiatric ward for delinquent soldiers. Journal of Applied Behavior Analysis, 1970, 3, 29-38.

Browning, R., & Stover, D. Behavior modification in child treatment. New York: Aldine-Atherton, 1971.

Burgess, R. L., Clark, R. N., & Hendee, J. C. An experimental analysis of anti-litter procedures. Journal of Applied Behavior Analysis, 1971, 4, 71-75.

Campbell, D. T., & Stanley, J. C. Experimental and quasi-experimental designs for research. Chicago: Ran McNally, 1966.

Carlin, A. S., & Armstrong, H. E. Rewarding social responsibility in disturbed children: A group play technique. Psychotherapy: Theory, Research and Practice, 1968, 5, 169-174.

Carlson, C. S., Arnold, C. R., Becker, W. C., & Madsen, C. H. The elimination of tantrum behavior of a child in an elementary classroom. Behavior Research and Therapy, 1969, 6, 117-119.

Cohen, H. L., & Filipczak, J. A. Programming educational behavior for institutionalized adolescents. In H. C. Rickard (Ed.), Behavioral intervention in human problems. Elmsford, N.Y.: Pergamon Press, Inc., 1971, Pp. 179-200.

Colman, A. D., & Baker, S. L. Utilization of an operant conditioning model for the treatment of character and behavior disorders in a military setting. American Journal of Psychiatry, 1969, 125, 101-109.

Colman, A. D., & Boren, J. J. An information system for measuring patient behavior and its use by staff. Journal of Applied Behavior Analysis, 1969, 2, 207-214.

Davison, G. C. Appraisal of behavior modification techniques with adults in institutional settings. In C. M. Franks (Ed.), Behavior therapy: Appraisal and status. New York: McGraw-Hill, 1969, Pp. 220-278.

Ellsworth, R. B. The MACC behavioral adjustment scale. Form II. Beverly Hills: Western Psychological Services, 1962.

Fairweather, G. W. Social psychology in treating mental illness: An experimental approach. New York: Wiley, 1964.

Fairweather, G. W., Sanders, D. H., Maynard, H., Cressler, D. L., & Beck, D. S. Community life for the mentally ill: An alternative to institutional care. Chicago: Aldine, 1969.

Fixsen, D. L., Phillips, E. L., & Wolf, M. M. Achievement place: The reliability of self-reporting and peer-reporting and their effects on behavior. Journal of Applied Behavior Analysis, 1972, 5, 19-30.

Gentile, J. R., Aubrey, A. H., & Klein, R. D. An analysis-of-variance model for the intrasubject replication design. Journal of Applied Behavior Analysis, 1972, 5, 193-198.

Glaser, R., & Klaus, D. J. A reinforcement analysis of group performance. Psychological Monographs: General and Applied, 1966, 80, (13).

Goffman, E. Asylums: Essays on the social situation of mental patients and other inmates. Chicago: Aldine, 1961.

Golub, H. P. The effects of a token economy on the behavior of patients in a Veterans Administration day treatment center. Dissertation Abstracts International, 1969, 30 (6-B), 2908.

Greenberg, D. J., & O'Donnell, W. J. A note on the effects of group and individual contingencies upon deviant classroom behavior. Journal of Child Psychology and Psychiatry, 1972, 13, 55-58.

Gripp, R. F., & Magaro, P. A. A token economy program evaluation with untreated control ward comparisons. Behavior Research and Therapy, 1971, 9, 137-149.

Haring, N. G., & Hauck, M. A. Improved learning conditions in the establishment of reading skills with disabled readers. Exceptional Children, 1969, 35, 341-352.

Henderson, J. D. The use of dual reinforcement in an intensive treatment system. In R. C. Rubin & C. M. Franks (Eds.), Advances in behavior therapy. New York: Academic Press, 1969, Pp. 201-210.

Henderson, J. D., & Scoles, P. E. Conditioning techniques in a community-based operant environment for psychotic men. Behavior Therapy, 1970, 1, 245-251.

Herman, S. H., & Tramontana, J. Instructions and group versus individual reinforcement in modifying disruptive group behavior. Journal of Applied Behavior Analysis, 1971, 4, 113-119.

Hunt, G. H., & Azrin, N. H. A community-reinforcement approach to alcoholism. Behavior Research and Therapy, 1973, 10, 91-104.

Jones, M. The therapeutic community. New York: Basic Books, 1953.

Kagel, J. H., & Winkler, R. C. Behavioral economics: Areas of cooperative research between economics and applied behavioral analysis. Journal of Applied Behavior Analysis, 1972, 5, 335-342.

Kazdin, A. E. Toward a client-administered token reinforcement program. Education and Training of the Mentally Retarded, 1971, 6, 52-55.

Kazdin, A. E., & Bootzin, R. R. The token economy: An examination of issues. Paper presented at the Association for the Advancement of Behavior Therapy, Washington, D. C., September, 1971.

Kazdin, A. E., & Bootzin, R. R. The token economy: An evaluative review. Journal of Applied Behavior Analysis, 1972, 5, 343-372.

Lafave, H. G., Lawby, L. R., Burke, J. L., Cohen, M. E., Barrington, K., & Lee, H. Intensive rehabilitation for chronic patients. Mental Hospitals, 1965, 16, 25-27.

Lawson, R. B., Greene, R. T., Richardson, J. S., McClure, G., & Padina, R. J. Token economy program in a maximum security correctional hospital. Journal of Nervous and Mental Disease, 1971, 152, 199-205.

Lehrer, P., Schiff, L., & Kris, A. The use of a credit card in a token economy. Journal of Applied Behavior Analysis, 1970, 3, 289-291.

Liberman, R. A view of behavior modification projects in California. Behavior Research and Therapy, 1968, 6, 331-341.

Lindsley, O. R. Operant conditioning methods applied to research in chronic schizophrenia. Psychiatric Research Reports, 1956, 5, 140-153.

Lindsley, O. R. Characteristics of the behavior of chronic psychotics as revealed by free-operant conditioning methods. Diseases of the Nervous System, Monograph Supplement, 1960, 21, 66-78.

Lloyd, K. E., & Abel, L. Performance on a token economy psychiatric ward: A two year summary. Behavior Research and Therapy, 1970, 8, 1-9.

Lloyd, K. E., & Garlington, W. K. Weekly variations in performance on a token economy psychiatric ward. Behavior Research and Therapy, 1968, 6, 407-410.

Loeber, R. Engineering the behavioral engineer. Journal of Applied Behavior Analysis, 1971, 4, 321-326.

Logan, D. L. A "paper money" system as a recording aid in institutional settings. Journal of Applied Behavior Analysis, 1970, 3, 183-184.

McKee, J. M., & Clements, C. B. A behavioral approach to learning: The Draper model. In H. C. Rickard (Ed.), Behavioral intervention in human problems. Elmsford, N.Y.: Pergamon Press, Inc., 1971, Pp. 201-222.

McReynolds, W. T., & Coleman, J. Token economy: Patient and staff changes. Behavior Research and Therapy, 1972, 10, 29-34.

Marks, J., Sonoda, B., & Schalock, R. Reinforcement versus relationship therapy for schizophrenics. Journal of Abnormal Psychology, 1968, 73, 397-402.

Meichenbaum, D. H., Bowers, K., & Ross, R. R. Modification of classroom behavior of institutionalized female adolescent offenders. Behavior Research and Therapy, 1968, 6, 343-353.

Montgomery, J., & McBurney, R. D. Operant conditioning-token economy. Camarillo, Calif.: Camarillo State Hospital, 1970.

O'Brien, F., Azrin, N., & Henson, K. Increased communication of chronic mental patients by reinforcement and response priming. Journal of Applied Behavior Analysis, 1969, 2, 23-29.

O'Leary, K. D., & Drabman, R. Token reinforcement programs in the classroom: A review. Psychological Bulletin, 1971, 75, 379-398.

Patterson, G. An application of conditioning techniques to the control of a hyperactive child. In L. P. Ullmann & L. Krasner (Eds.), Case studies in behavior modification. New York: Holt, Rinehart & Winston, 1965, Pp. 370-375.

Paul, G. L. Behavior modification research: Design and tactics. In C. M. Franks (Ed.), Behavior therapy: Appraisal and status. New York: McGraw-Hill, 1969, Pp. 29-62.

Phillips, E. L. Achievement Place: Token reinforcement procedures in a home-style rehabilitation setting for "pre-delinquent" boys. Journal of Applied Behavior Analysis, 1968, 1, 213-223.

Phillips, E. L., Phillips, E. A., Fixsen, D. L., & Wolf, M. M. Achievement Place: Modification of the behaviors of predelinquent boys within a token economy. Journal of Applied Behavior Analysis, 1971, 4, 45-59.

Pomerleau, O. F., Bobrone, P. H., & Harris, L. C. Some observations on a controlled social environment for psychiatric patients. Journal of Behavior Therapy and Experimental Psychiatry, 1972, 3, 15-21.

Pooley, R. C. The control of human behavior in a correctional setting. Center for the Study of Crime, Delinquency, and Corrections, Southern Illinois University, Report supported by OLEA Grant No. 241.

Rickard, H. C., & Saunders, T. R. Control of "clean-up" behavior in summer camp. Behavior Therapy, 1971, 2, 340-344.

Roos, P., & Oliver, M. Evaluation of operant conditioning with institutionalized retarded children. American Journal of Mental Deficiency, 1969, 74, 325-330.

Rotter, J. B. Social learning and clinical psychology. Englewood Cliffs, N.J.: Prentice-Hall, 1954.

Schaefer, H. H., & Martin, P. L. Behavioral therapy for apathy of hospitalized schizophrenics. Psychological Reports, 1968, 19, 1147-1158.

Schaefer, H. H., & Martin, P. L. Behavioral therapy. New York: McGraw-Hill Book Co., 1969.

Shean, G. D., & Zeidberg, Z. Token reinforcement therapy: A comarison of matched groups. Journal of Behavior Therapy and Experimental Psychiatry, 1971, 2, 95-105.

Skinner, B. F. Walden two. New York: The MacMillan Co., 1948.

Skinner, B. F. The possibility of a science of human behavior. New York: MacMillan, 1953.

Skinner, B. F. Cumulative record. New York: Appleton-Century-Crofts, 1959.

Sletten, I., Hughes, B., Lamont, J., & Ognjanov, V. Work performance in psychiatric patients (token vs. money). Diseases of the Nervous System, 1968, 29, 261-264.

Smith, R. R., Hart, L. A., & Milan, M. A. Correctional officer training in behavior modification: An interim report. Report prepared for U. S. Dept. of Labor under Contract No. 82-41-69-06, 1971.

Sobell, L. C., Schaefer, H. H., Sobell, M. B., & Kremer, M. E. Food priming: A therapeutic tool to increase the percentage of meals bought by chronic mental patients. Behavior Research and Therapy, 1970, 8, 339-345.

Steffy, R. A., Hart, J., Craw, M., Torney, D., & Marlett, N. Operant behavior modification techniques applied to a ward of severely regressed and aggressive patients. Canadian Psychiatric Association Journal, 1969, 14, 59-67.

Stuart, R. B. Operant interpersonal treatment for marital discord. Journal of Consulting and Clinical Psychology, 1969, 33, 675-682.

Suchotliff, L., Greaves, S., Stecker, H., & Berke, R. Critical variables in the token economy. Proceedings of the 78th Annual Convention of the American Psychological Association, 1970, 5, 517-518.

Tyler, V., & Brown, G. O. Token reinforcement of academic performance with institutionalized delinquents. Journal of Educational Psychology, 1968, 59, 164-168.

Ullman, L. P. Institution and outcome: A comparative study of psychiatric hospitals. New York: Pergamon Press, 1967.

Ullman, L. P., & Krasner, K. A psychological approach to abnormal behavior. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1969.

Walker, H. M., & Buckley, N. K. Programming generalization and maintenance of treatment effects across time and across settings. Journal of Applied Behavior Analysis, 1972, 5, 209-224.

Winkler, R. C. Management of chronic psychiatric patients by a token reinforcement system. Journal of Applied Behavior Analysis, 1970, 3, 45-55.

Wolf, M. M., Hanley, E. L., King, L. A., Lachowicz, J., & Giles, D. K. The timer-game: A variable interval contingency for the management of out-of-seat behavior. Exceptional Children, 1970, 37, 113-117.

Zimmerman, E. H., & Zimmerman, J. The alteration of behavior in a special classroom situation. Journal of the Experimental Analysis of Behavior, 1962, 5, 59-60.

APPENDIX B

WEEKDAY AND WEEKEND SCHEDULES

Weekday Schedule

6:00 a.m. - Good morning!

7:45 - Morning medicine

8:00 - Line up for breakfast

8:45-8:50 - Bed making time

9:00 - Morning activities

9:05-9:20 - Ward cleaning

10:00-11:00 - Recreation time

11:20 - Noon cig, mail call

11:30 - Midday medicine

11:40-12:00 - Exercise group

12:15 p.m. - Line up for lunch

1:00 - Afternoon activities

1:05-1:25 - Current events discussion group

1:30-4:00 - Recreational events at times

2:00-3:00 - Free time activities, coffee

4:00 - Afternoon medicine

4:05-4:30 -
Mon. - Auction rooms, rent room decorations
Tues.- Patient exchange time
Wed. - 12S community meeting
Fri. - Auction

4:30-5:30 - Free time

4:30 and on -
M-W-Fri. - Start ironing
T-Th-Sat.- Start bathing

5:45 - Line up for supper

7:30-9:00 -
Wed. - Movies
Fri. - Dances
1st and 3rd Thurs. - Bingo

8:00 (or after, if activity) - Evening medicine

9:30 - Good night!

Weekend Schedule

Saturday	Sunday
9:00-10:00 - Free time activities	1:30-2:30 - Walk around grounds/to canteen
1:00-5:00 - Free time activities, walk during first half	3:00-5:00 - Free time activities
7:00-9:00 - Free time activities, coffee	7:00-9:00 - Free time activities, coffee

APPENDIX C

TOKEN REWARD PROGRAM MANUAL

12S Token Reward Program

Most of you on 12S do little all day. Indeed, much of your day is spent in a rocking chair. Life for you now presents few demands and even fewer privileges. In order to be discharged from the hospital or to transfer to an open ward, however, you need to be more active and develop more responsibility for what you do and how you do it.

We hope to help you develop this responsibility with the 12S Token Reward Program. Basically, what this involves is earning something when you do something well. For good behaviors, you can earn tokens (pieces of paper like money) which can later be used to buy or rent various items or privileges. The following tells more about the 12S Token Reward Program.

How can you earn tokens?

Every day you can receive two tokens at each meal for quickly lining up to go to the meal after the meal call. On weekdays, you can earn six tokens for making your bed well when this is announced at 8:45 A.M. Later in the morning at 9:05 you can get four tokens if you quickly attend ward cleaning activities and another four tokens if you complete the cleaning activities. We have a morning exercise group just before lunch (11:40-12:05). For this you can obtain four tokens for attending after the activity call and four tokens for exercising.

In the afternoon you can also earn tokens. You are given four tokens if you quickly attend a current events discussion group and

another four if you stay at the discussion group (1:05-1:25 P.M.). In addition, you can always earn tokens for off-ward activities such as OT, IT, or educational classes. For these activities you are given a work evaluation slip to be completed by the staff member in charge of the activity.

Tokens can be earned on the ward in three different ways during the first few months of the program. In the first way, tokens are earned by each person regardless of what others do. In the second and third conditions, 66% of you must first do well at a behavior before either everybody is given tokens or just those performing good behaviors are given tokens. You will be notified ahead of time as to what token-giving condition is taking place for the week. In order to keep the tokens, an envelope is provided for each resident in her personal belongings drawer. Care of the token is your own responsibility and stolen or lost tokens can not be replaced.

What can you buy with the tokens?

Like money, tokens can be exchanged for a variety of items and privileges. Every day you can buy for one token one cigarette each hour on the hour from 8:00 A.M. to 4:00 P.M. A cup of coffee during late afternoon free time, an extra shower, and an extra change of clothes at any time costs one token each. Requested medicines (i.e., "prn's") such as aspirin as well as unscheduled parties, hair dressing, and special events are one token each while movies, bingo, and dances run two tokens each. There are a variety of free time activities such as games and embroidery which cost two tokens per hour while a private radio with room entrance is somewhat more expensive at two

tokens per one-half hour. Room entrance without the radio may be obtained at any time for two tokens per one-half hour. Also during free time, tokens can be exchanged for canteen coupons at the rate of one token for five cents in coupons. In addition, you can spend two tokens for one-half hour of letter writing at any time (note that this does not affect the "free" writing during the usual Saturday morning period). Taking one hour walks during Saturday and Sunday free times with aides around the grounds costs two tokens or if you walk to the canteen it costs four tokens. A pass not requiring staff attention (e.g., G1, G2) may be used any appropriate time but its use costs four tokens. Lastly, auctions are held Monday and Thursday at 4:05 P.M. with all items being sold to the highest bidder. Rooms are auctioned on Monday afternoon and many different kinds of items are auctioned on Thursday afternoon.

As you can see, tokens can be exchanged for many items and privileges. The free time periods during which games and embroidery materials can be rented, coffee bought, and tokens exchanged for canteen coupons are 2:00-3:00 P.M. and 4:30-5:30 P.M. each weekday, 11:00-12:00 A.M., 1:00-5:00 P.M. (walks with aides early in free time period), and 7:00-9:00 P.M. on Saturday and 3:00-5:00 P.M. and 7:00-9:00 P.M. on Sunday. Make use of and earn as many tokens as possible.

Finally,

The 12S Token Reward Program is designed to be helpful to you. The program does this by specifying good behaviors and their reward. Persons screaming loudly, destroying property, or demonstrating other undesirable behavior will be placed in the side room for exactly 45

minutes for the first "offense." Hopefully, nobody will have to be placed in the side room. If you have any questions or comments concerning the program, please speak up during the weekly 12S community meeting held every Wednesday from 4:05-4:30 P.M.

These following lists simply summarize what has already been said. What can you earn tokens for?

Activity	Tokens
Every Day	
1. Lining up for each meal after meal call	2 each meal
Weekdays Only	
1. Making your bed well (when announced at 8:45 A.M.)	6
2. Help with cleaning the ward (at 9:05 A.M. until 9:20 A.M.)	
a. attending after activity call	4
b. completing cleaning activities	4
3. Attending and/or participating in any assigned treatment activity such as OT, IT, therapy sessions, etc.	maximum that could have earned if on ward
4. Exercise group (11:40-12:05)	
a. attending after call	4
b. participating in activity	4
5. Current events discussion (1:05-1:25 P.M.)	
a. attending after call	4
b. completing activity	4

What do tokens buy?

	Item or Privilege	Token Cost
1.	Cigarettes from 8:00 A.M. to 4:00 P.M. (can get every day on the hour each hour)	1 per cig.
2.	Coffee, 1 cup during late afternoon free times, refills as they last	2 per cup
3.	Extra shower (bathing any time other than the usual Tuesday, Thursday, Saturday showers)	2
4.	Extra change of clothes (at any time)	1
5.	Free time activities	
	a. games, embroidery, etc.	2 per hour
	b. private radio and room entrance for renting patient	2 per 1/2 hour
6.	Room entrance (at any time)	2 per 1/2 hour
7.	Coupons for use in canteen, exchanged only during free times	1 = 5¢ in coupons
8.	Letter writing for 30 minutes (at any reasonable time other than Saturday mornings)	2 per 1/2 hour
9.	Requested medicines	1
10.	Dances, movies, bingo	2
11.	Unscheduled parties, hair dressing, special events	1

12.	One hour walk with aide around grounds on Saturday and Sunday free times (weather and staff conditions permitting)	2
13.	One hour walk with aide to canteen during Saturday and Sunday free times (if staff and weather conditions permit)	3
14.	Various auction items (auctions on Monday and Thursday at 4:05 P.M.)	?
15.	Posters, paintings, flowers, and other room decorations (rented only on Monday at the auction)	7 per week
16.	Use of a pass not requiring staff escort (at any appropriate time)	4

APPENDIX D

MEAL AND BED FORM

MEAL AND BED FORM

_____
Date

Patient	Breakfast 60"	Bed Making	Lunch 60"	Supper 60"

_____ _____ _____ _____

(Rater should initial appropriate column)

APPENDIX E

COMPARISON WARD MEAL FORM

7S Meal Form

Rater _____ Date _____

Patient	Lunch

APPENDIX F

BED-MAKING CRITERIA

Bed-Making Criteria

Patients received no tokens (i.e., bed was not "well made") if points totaled four or more. In addition, no tokens were given for beds with any gross deficiencies (e.g., bed spread on the floor) or with the pillow not in proper position at the front of the bed.

One point was given for each of the following:

1. Every wrinkle four or more inches long
2. A bed spread which did not cover the blankets, pillow, etc.
3. A bed spread not tucked under the pillow
4. Unfolded extra blanket(s)
5. A bed spread touching the floor
6. A "cuffed" bed spread
7. Crooked bed frame

APPENDIX G

WARD CLEANING, EXERCISE, AND DISCUSSION GROUP FORM

WARD CLEANING, EXERCISE GROUP, DISCUSSION GROUP FORM

____
Date

Patient	Ward Cleaning		Exercise Group		Discussion Group	
	Attend	Complete	Attend	Complete	Attend	Complete

APPENDIX H

HOW TO EARN TOKENS

How To Earn Tokens

Activity	Token Pay
1. Lining up for meals	2
2. Making your bed	6
3. Cleaning the ward	
a. attendance	4
b. completion	4
4. Attending and/or participating in other assigned activity	max. that would earn on ward
5. Exercise group	
a. attendance	4
b. participation	4
6. Current events discussion	
a. attendance	4
b. completion	4

APPENDIX I

HOW TO SPEND TOKENS

How To Spend Tokens

1.	Cigarettes (8:00 a.m. to 4:00 p.m.)	1 per cig.
2.	Coffee, 1 cup	1 per cup
3.	Extra shower, extra change of clothes	1
4.	Games, viewmaster, embroidery, etc.	2 per hour
5.	Private radio and room entrance for renting resident	2 per 1/2 hour
6.	Room entrance	2 per 1/2 hour
7.	Coupons	1 = 5¢ in coupons
8.	Requested medicine	1
9.	Letter writing	2 per 1/2 hour
10.	Dances, bingo, movies	2
11.	Unscheduled parties, extra hair dressing, special events	1
12.	Various auction items	?
13.	Posters, other room decorations	7 per week
14.	30 minutes to 1 hour walk around grounds	2
15.	30 minutes to 1 hour walk to canteen	3
16.	Use of pass not requiring staff escort	4

APPENDIX J

FREE TIME ACTIVITIES SHEET

Free Time Activities Sheet

Patient	Item	Time In	Time Out	Date

APPENDIX K

TRANSFER FORM

TRANSFER FORM

____
Date

(Initial Verbal Interactions)

Patient	Midday Med.	PPVI	PSVI

APPENDIX L

VERBAL INTERACTION CRITERIA

Verbal Interaction Criteria

Verbal interactions were recorded according to the following criteria:

1. The patient initiated a verbal exchange.
2. A pause of three minutes or more preceded a separate conversation.
3. If an on-going group was involved, a separate conversation took place if a member of the group spoke to the "new" person first. It was <u>not</u> a separate conversation if the new person spoke to the group first.
4. A patient's talking to herself was not marked as a conversation.
5. Raters recorded only if they saw the initiation of the conversation.
6. A PSVI-1^{p} occurred if a patient spoke while going to the aide station door and the patient was neither called to the aide station nor talking to herself.
7. A verbal interaction need not have received a verbal reply from the person to whom the "interaction" was addressed. Nevertheless, there must have been some indication that the initiating person was talking to someone else (e.g., head movements, smiles).
8. Cigarette and blood pressure reading interactions around 10:00 a.m. were not marked. Further, conversations within five feet of the cigarette or blood pressure areas were not recorded.

APPENDIX M

MISCELLANEOUS FORM

Miscellaneous Form

Date					
Number of letters sent					
Number of letters received					
Number attending church					
Number placed in side room					
Number of outside visits					
Number of tokens spent					

APPENDIX N

WORK EVALUATION SLIP

Work Evaluation Slip

Name _____

Activity _____

Staff member's initials _____

Please circle one:

Poor Fair Good

APPENDIX O

DAILY TOKEN EARNINGS POSTER

Daily Token Earnings

Patient	Date							
Extra Information								

APPENDIX P

RAW DATA DESCRIPTIVE STATISTICS

Raw Data

Week	Comp. Lunch M	SD	Breakfast M	SD	Bed Making M	SD
1st Baseline	.94	.08	.76	.15	.55	.14
2nd Baseline	.96	.08	.83	.06	.56	.08
1st Acquisition	.82	.12	.90	.07	.63	.09
2nd Acquisition	.80	.20	.91	.08	.68	.12
1st A Token	.80	.25	.88	.09	.75	.05
2nd A Token	.91	.12	.92	.08	.78	.10
1st A Ext.	.93	.12	.92	.06	.68	.09
2nd A Ext.	.92	.13	.87	.08	.75	.12
1st B Token	.92	.08	.86	.08	.80	.02
2nd B Token	.91	.12	.92	.06	.82	.06
1st B Ext.	.92	.11	.86	.11	.74	.07
2nd B Ext.	.93	.06	.90	.08	.80	.14
1st C Token	.82	.10	.92	.05	.75	.03
2nd C Token	.93	.11	.88	.05	.79	.07
1st C Ext.	.87	.16	.88	.06	.70	.04
2nd C Ext.	.95	.11	.83	.08	.75	.09

Raw Data

Week	Exp. Lunch M	Exp. Lunch SD	Supper M	Supper SD	Midday Med. M	Midday Med. SD
1st Baseline	.83	.08	.83	.06	.44	.11
2nd Baseline	.85	.06	.86	.07	.47	.15
1st Acquisition	.86	.04	.86	.04	.47	.15
2nd Acquisition	.88	.07	.93	.06	.52	.07
1st A Token	.86	.07	.91	.08	.59	.14
2nd A Token	.84	.07	.90	.05	.48	.08
1st A Ext.	.86	.04	.91	.05	.52	.13
2nd A Ext.	.84	.07	.90	.05	.48	.08
1st B Token	.89	.07	.92	.05	.57	.03
2nd B Token	.94	.05	.91	.06	.59	.08
1st B Ext.	.82	.12	.85	.06	.53	.08
2nd B Ext.	.87	.03	.89	.07	.49	.15
1st C Token	.91	.08	.92	.05	.59	.10
2nd C Token	.85	.08	.88	.06	.56	.10
1st C Ext.	.80	.12	.89	.07	.58	.10
2nd C Ext.	.84	.09	.89	.05	.64	.08

Raw Data

Week	Cleaning Attend. M	Cleaning Attend. SD	Cleaning Complt. M	Cleaning Complt. SD	Exercise Attend. M	Exercise Attend. SD
1st Baseline	.08	.06	.12	.07	.12	.02
2nd Baseline	.10	.17	.11	.13	.12	.09
1st Acquisition	.29	.07	.33	.06	.33	.08
2nd Acquisition	.41	.11	.39	.08	.33	.07
1st A Token	.43	.06	.43	.04	.35	.10
2nd A Token	.35	.11	.33	.09	.36	.06
1st A Ext.	.17	.09	.18	.06	.13	.06
2nd A Ext.	.11	.05	.12	.05	.09	.02
1st B Token	.57	.08	.62	.12	.17	.04
2nd B Token	.26	.10	.28	.17	.31	.13
1st B Ext.	.24	.06	.22	.09	.17	.04
2nd B Ext.	.14	.05	.11	.07	.14	.04
1st C Token	.38	.10	.32	.12	.51	.17
2nd C Token	.39	.12	.47	.20	.40	.05
1st C Ext.	.36	.11	.30	.10	.30	.02
2nd C Ext.	.24	.06	.24	.06	.30	.05

Raw Data

Week	Exercise Part. M	Exercise Part. SD	Disc. Attend. M	Disc. Attend. SD	Disc. Complt. M	Disc. Complt. SD
1st Baseline	.14	.05	.08	.06	.17	.04
2nd Baseline	.16	.06	.10	.08	.19	.12
1st Acquisition	.36	.06	.37	.05	.44	.07
2nd Acquisition	.29	.08	.41	.05	.43	.07
1st A Token	.31	.05	.41	.07	.46	.07
2nd A Token	.34	.05	.32	.05	.37	.04
1st A Ext.	.19	.09	.20	.08	.23	.07
2nd A Ext.	.11	.06	.15	.06	.17	.04
1st B Token	.56	.13	.22	.04	.23	.04
2nd B Token	.32	.13	.42	.14	.45	.17
1st B Ext.	.16	.02	.22	.04	.23	.04
2nd B Ext.	.17	.07	.27	.09	.28	.08
1st C Token	.47	.17	.37	.12	.40	.13
2nd C Token	.37	.06	.35	.18	.57	.26
1st C Token	.24	.06	.28	.08	.30	.07
2nd C Token	.34	.07	.33	.11	.34	.12

Raw Data

Week	PPVI		PSVI-1^{p}		PSVI-1^{s}	
	M	SD	M	SD	M	SD
1st Baseline	6.50	1.73	11.00	1.41	3.00	2.16
2nd Baseline	5.00	3.83	6.75	3.78	3.25	2.63
1st Acquisition	6.40	3.05	9.40	2.88	3.00	1.41
2nd Acquisition	5.20	4.32	9.00	2.35	2.00	1.87
1st A Token	5.20	1.48	11.20	4.44	4.40	2.88
2nd A Token	5.40	4.16	9.80	2.28	3.20	.84
1st A Ext.	2.00	3.08	8.80	2.17	5.20	3.03
2nd A Ext.	3.60	3.29	5.00	2.00	1.40	.89
1st B Token	5.20	.84	12.40	2.30	2.60	2.70
2nd B Token	3.20	1.10	5.00	3.67	1.40	.89
1st B Ext.	3.00	.71	10.40	4.72	1.80	.84
2nd B Ext.	1.60	2.30	4.60	3.91	2.80	1.30
1st C Token	4.00	1.58	7.80	4.03	3.00	2.55
2nd C Token	6.20	3.83	6.80	3.90	2.20	1.10
1st C Ext.	2.80	1.79	6.20	2.68	6.60	4.51
2nd C Ext.	2.00	1.58	6.20	3.11	2.40	3.78

APPENDIX Q

TRANSFORMED DATA DESCRIPTIVE STATISTICS

Transformed Data

Week	Comp. Lunch M	Comp. Lunch SD	Breakfast M	Breakfast SD	Bed Making M	Bed Making SD
1st Baseline	2.61	.23	2.15	.38	1.68	.27
2nd Baseline	2.67	.23	2.32	.17	1.69	.02
1st Acquisition	2.30	.29	2.51	.22	1.83	.18
2nd Acquisition	2.26	.48	2.56	.25	1.94	.26
1st A Token	2.29	.61	2.47	.27	2.11	.13
2nd A Token	2.54	.31	2.59	.24	2.18	.27
1st A Ext.	2.59	.32	2.61	.23	1.93	.18
2nd A Ext.	2.56	.34	2.42	.24	2.10	.27
1st B Token	2.56	.24	2.40	.25	2.23	.05
2nd B Token	2.55	.34	2.58	.20	2.28	.17
1st B Ext.	2.56	.33	2.42	.30	2.08	.16
2nd B Ext.	2.58	.17	2.53	.28	2.24	.35
1st C Token	2.30	.28	2.58	.17	2.10	.07
2nd C Token	2.59	.29	2.50	.22	2.26	.15
1st C Ext.	2.43	.41	2.47	.20	1.97	.10
2nd C Ext.	2.64	.30	2.31	.21	2.10	.21

Transformed Data

Week	Exp. Lunch M	Exp. Lunch SD	Supper M	Supper SD	Midday Med. M	Midday Med. SD
1st Baseline	2.33	.25	2.30	.18	1.45	.23
2nd Baseline	2.37	.19	2.38	.21	1.52	.32
1st Acquisition	2.36	.14	2.37	.11	1.84	.14
2nd Acquisition	2.46	.25	2.64	.20	1.61	.14
1st A Token	2.40	.23	2.56	.28	1.76	.29
2nd A Token	2.52	.17	2.76	.08	1.59	.14
1st A Ext.	2.37	.14	2.56	.18	1.61	.25
2nd A Ext.	2.32	.18	2.52	.20	1.52	.16
1st B Token	2.48	.24	2.58	.19	1.71	.07
2nd B Token	2.65	.18	2.57	.20	1.76	.16
1st B Ext.	2.30	.30	2.37	.17	1.64	.17
2nd B Ext.	2.42	.11	2.50	.21	1.54	.30
1st C Token	2.55	.23	2.57	.16	1.76	.22
2nd C Token	2.37	.25	2.45	.18	1.69	.20
1st C Ext.	2.24	.30	2.48	.22	1.73	.19
2nd C Ext.	2.36	.27	2.47	.18	1.85	.17

Transformed Data

Week	Cleaning Attend. M	Cleaning Attend. SD	Cleaning Complt. M	Cleaning Complt. SD	Exercise Attend. M	Exercise Attend. SD
1st Baseline	.55	.20	.67	.24	.71	.08
2nd Baseline	.57	.47	.61	.37	.69	.24
1st Acquisition	1.13	.16	1.22	.13	1.22	.17
2nd Acquisition	1.39	.22	1.35	.17	1.23	.15
1st A Token	1.42	.13	1.43	.08	1.26	.20
2nd A Token	1.25	.23	1.21	.20	1.28	.13
1st A Ext.	.83	.26	.87	.16	.74	.17
2nd A Ext.	.65	.18	.69	.17	.62	.05
1st B Token	1.70	.17	1.82	.26	1.55	.17
2nd B Token	1.06	.26	1.10	.38	1.16	.27
1st B Ext.	1.02	.14	.97	.22	.85	.10
2nd B Ext.	.76	.15	.68	.19	.76	.11
1st C Token	1.31	.21	1.18	.26	1.61	.35
2nd C Token	1.35	.26	1.51	.43	1.37	.09
1st C Ext.	1.28	.23	1.14	.23	1.17	.04
2nd C Ext.	1.01	.14	1.02	.15	1.16	.11

Transformed Data

Week	Exercise Part. M	Exercise Part. SD	Disc. Attend. M	Disc. Attend. SD	Disc. Complt. M	Disc. Complt. SD
1st Baseline	.75	.15	.54	.22	.83	.12
2nd Baseline	.81	.17	.61	.27	.87	.31
1st Acquisition	1.29	.13	1.30	.10	1.45	.14
2nd Acquisition	1.13	.18	1.39	.11	1.42	.15
1st A Token	1.18	.11	1.40	.16	1.48	.15
2nd A Token	1.24	.11	1.19	.12	1.31	.08
1st A Ext.	.88	.24	.92	.20	1.00	.15
2nd A Ext.	.65	.18	.79	.16	.86	.11
1st B Token	1.69	.26	1.33	.14	1.36	.06
2nd B Token	1.19	.29	1.41	.30	1.47	.35
1st B Ext.	.81	.06	.97	.09	1.00	.10
2nd B Ext.	.84	.20	1.08	.19	1.10	.17
1st C Token	1.49	.36	1.31	.05	1.35	.27
2nd C Token	1.32	.11	1.24	.39	1.69	.57
1st C Ext.	1.03	.14	1.11	.18	1.15	.16
2nd C Ext.	1.24	.16	1.21	.23	1.23	.25

VITA

Joseph Kurt Neumann was born January 31, 1949, in Washington, D. C. to Heinz and Dolores Neumann. After attending public schools in New Jersey and Virginia, he received the following degrees: B.A. in psychology from the University of Maryland at College Park (1970); M.S. in general experimental psychology from the University of Idaho at Moscow (1971); Ph.D. in clinical psychology from the University of Missouri at Columbia (1975). Mr. Neumann married the former Janice Brown of Winchester, Virginia on August 15, 1971.

UNIVERSITY OF MISSOURI-COLUMBIA

THE GRADUATE SCHOOL

WE HEREBY RECOMMEND THAT THE THESIS BY

Joseph K. Neumann

ENTITLED BEHAVIORAL EFFECTS OF THREE SOCIAL CONDITIONS OF REINFORCEMENT ON AN INPATIENT TOKEN REINFORCEMENT SYSTEM

BE ACCEPTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR

THE DEGREE OF Doctor of Philosophy

William T. McReynolds
Dissertation Supervisor

William T. McReynolds
Director of Graduate Studies

Committee on Final Examination:

Joseph S. Thorpe
Robert N. McCallum
Judith K. Sturgeon
William J. Vorpe

Approved:

Lloyd E. Berry
Dean,

The undersigned, appointed by the Dean of the Graduate Faculty, have examined a thesis entitled BEHAVIORAL EFFECTS OF THREE SOCIAL CONDITIONS OF REINFORCEMENT ON AN INPATIENT TOKEN REINFORCEMENT SYSTEM

presented by Joseph K. Neumann

a candidate for the degree of Doctor of Philosophy

and hereby certify that in their opinion it is worthy of acceptance.

William T. McReynolds

Joseph L. Thorpe

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