THE EFFECTS OF SELF-REINFORCEMENT ON MEDICAL REHABILITATION PATIENT BEHAVIORS

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ABSTRACT

THE EFFECTS OF SELF-REINFORCEMENT
ON MEDICAL REHABILITATION
PATIENT BEHAVIORS

By

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This study attempted to assess the effects of self-directed behavior change on medical rehabilitation in-patients' behaviors. The treatments of self-monitoring (SM) and self-reinforcement (SR) were appled to three unique behaviors of each of three patients residing in a 72 bed medical rehabilitation treatment center in a midwestern city. The four hypotheses tested in this intensive case study (N=1) multiple baseline time series design were as follows: 1.) The implementation of a SM technique for selected patient behaviors will significantly change the occurrence pattern of behaviors in the desired direction over a pre-treatment baseline period (B); 2.) The implementation of a SR technique for selected patient behaviors will change the occurrence pattern of behaviors in the desired direction over the B period; 3.) The implementation of a SR technique will significantly change the occurrence pattern of selected behaviors in the desired direction over a SM period; 4.) As a result of the SM and SR interventions the pattern of occurrence of selected behaviors during the post-treatment extinction (E) period will be improved over the B period.

The results of the study showed no consistent support for any of the hypotheses. An analysis of the overall process however, indicated that those behaviors which obtained reinforcement from the behavior itself showed improvement under

the SM treatment. Those behaviors which did not obtain reinforcement from the behavior itself showed improvement in the SR phase. Further analysis showed that the meaningfulness of the behavior, the potency of the self-administered reinforcers and the patient's attitude toward the research project itself seemed to influence the outcome of the study. Finally, a consideration of the study in terms of how it was presented to the patients, as a research project as opposed to a treatment program, seemed to provide some further support for the treatment effect under hypothesis 4. In that hypothesis the post-treatment (E) behavior occurrence pattern was to be significantly better than the pre-treatment baseline (B) condition. In that the researcher suggested that the patients no longer needed to monitor or reinforce the selected behavior during this E phase, a reversal of sorts was expected. The pattern of behavior changed dramatically after the SR period to a level similar to the B in many cases. This would seem to confirm the benefit of this type of program as much as a positive change at the outset of the program, the SM period, which in some cases did occur.

The implications of this study would seem to indicate that the application of self-control strategies in a medical renabilitation setting may be a valid consideration for the treatment oriented staff members. Care must be exercised in training patients and staff in the understanding and implementation of self-control stategies. The staff needs to be aware of the need to develop a supportive environment for patient

attempts at self-control, particularly for those patients who perceive they are dependent upon external reinforcement (external locus of control). The benefits seen for initiation of this type of treatment program include increased patient activity time outside of regularly scheduled therapy periods, possible reduction in length of stay, possible reduction in treatment cost. The benefits to the staff are seen as increased time for work with the more severely disabled, increased feedback from the patient on off-therapy hour activity and an increased opportunity to assess progress in individual patients on specific behaviors.

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The Problem

Introduction

Throughout the centuries of recorded human history, mankind has been seen as the dominant species on the earth. From the earliest times humans have sought to control their environment and each other. They have conquered nations, founded religions, discovered and rediscovered basic scientific principles, walked on the moon, and transplanted human organs. As long as they have written or printed, people have extolled themselves and each other for their feats of brilliance in science, religion, art, philosophy, medicine, sports, and politics. Names like Marian Anderson, Galileo, Einstein, Mozart, Babe Ruth, Mead, Edison, Hammarskjold, Indira Gandhi, St. Augustine, abound in history to record the superachievements of human beings.

But almost as long as the chronicles of the great persons of history are the lengthy annals depicting the misfortune and inhumane treatment of those, who for a variety of reasons, lack the physical or mental capability for competing in certain aspects of their society. The countless myths and actual events written about the disabled human leave the average reader confused, mystified, and shocked. The stories of emotionally disturbed children locked in windowless rooms, of lepers banned from the city, of the retarded and emotionally disturbed crammed into bedlams, physically disabled children abandoned, of the deaf and blind being labelled retarded,

of epileptics being condemned as "possessed" by evil spirits, make healthy individuals squirm as they realize the extent of people's inhumanity to each other. In nearly all cases, these shunned persons are perceived by their society to be lacking a segment of "human-ness" and, therefore, they may, with impunity, be isolated or ignored.

Stigma of the Disabled

Although the number of overt acts of rejection or abandonment have been somewhat curtailed in the recent decades because of increased awareness and knowledge and, because of legislation, studies of attitudes about the disabled show that there is still a stigma attached to those who have an observable physical or mental deviation from the norm. Barker (1948) was an early promoter of the idea that the disabled, like the culturally outnumbered, are considered a minority and are, therefore, stereotyped in their role as are the other minorities. Beatrice Wright (1964), a leader in the field of equality for all, identified a variety of specific situations wherein the non-disabled view the disabled as completely lacking the ability to fit into any segment of society. English (1971) defined stigma as an attribute which dehumanizes the individual, maintaining that it is the way a so-called normal person views others who are different than himself. This seems to put the responsibility for stigmatizing on the "normal" population.

This stigmatizing process often leads to the segregation of the disabled person. For example, special education classrooms are part of a nationally legislated procedure to provide adequate education to all persons regardless of physical

or mental ability. Sharland Trotter (1974) summarized a report written by Nicholas Hobbs, a psychologist at Vanderbilt University. His lengthy report discredited this process of educational labeling, indicating it often creates a gulf between the able-bodied and disabled by building and perpetuating social barriers, depersonalized customs, and restricted opportunities.

Another significant way the stigma is enforced is by a variety of civil laws passed "to protect society" from potential interaction with the disabled. These laws include restrictions on the disabled with respect to driving, voting, marrying, or working. Revisions in these laws, along with major changes in building construction codes, mass transportation policies and techniques, employment compensation incentives, and other socially controlling regulations, will help the disabled, but they may still be seen as "second class" citizens. As English indicated, "Stigma exists in the lives of most disabled persons, and generally it represents the most salient and frustrating problem to be overcome in rehabilitation" (1971, p. 2).

Role of Rehabilitation

In the midst of this clash between the production-minded, impersonal and health-oriented society and the personal ambition of the physically disabled individual lies the medical rehabilitation program of our country. For those who have the capacity to relearn lost physical functions or who will benefit from learning new physical coping behaviors over an extended period of time, the medical rehabilitation treatment

concept is essential. The task of the medical rehabilitation staff is to assist the physically disabled to overcome their psychological and physical limitations by teaching them new coping behaviors as well as reteaching old adaptive behaviors (Fordyce, 1967). The goal of rehabilitation programs is to assist disabled persons to become productive and complete individuals and thereby restore their sense of first class citizenship.

From the patient's perspective, the entire rehabilitation process is often a long and arduous one. For most it is a physical struggle with injured nerve pathways, atrophied muscles, lost limbs, or malfunctioning sensory modalities, as they attempt to regain a sense of "self-dignity and worth" (Raninowitz and Mitsos, 1964). It is psychological combat between weakened bodies and a cultural value system that rewards healthy nondisfigured bodies and unimpaired functioning. It is an intense relationship with trained professionals which attempts at all costs to re-establish the disabled individual into a familiar environment. It is, then, the "interwoven fabric of value judgments, mutual expectations, and effective bonds that creates the design of the rehabilitation picture" (Rabinowitz and Mitsos, 1964, p. 3).

This dissertation proceeds from the personal observations provided by Goldiamond (1973). Based on his determination that a medical rehabilitation treatment program can be best effected through the application of a self-controlled contingency management program, the idea for this study was germinated. Because of his observation that those individuals who were able to maintain a relatively normal life style even though

confined to a medical rehabilitation center were the patients who made the greatest gains in treatment, the earlier observation regarding the need for most individuals to be productive and self-enhancing seems supported. Therefore, it seemed meaningful to develop a research study to empirically test the effects of a self-controlled behavior modification program on medical rehabilitation patient behaviors. The meaningfulness of this study is seen primarily for the thousands of patients who daily are confined to sterile, rigid and often impersonal institutions wherein all characteristics of a previous enjoyable life-style are non-existent and where personal controls are unrewarded.

Purpose

It has been noted by Rabinowitz and Mitsos (1964) and Rothschild (1970) that the process of rehabilitation is often a psychologically demanding one. The rehabilitation patient must of necessity work through the psychological impact created by the limitation of the disability. This readjustment is further complicated by the fact that the patient is in a strange environment. It has been mentioned that this environment often includes authoritarian roles, physical confinement, and an estrangement from all normal social activities, and often becomes, in effect, a dependency producing system.

In a most thought provoking study, Willems (1972), through an extensive review of patient activity levels, found that the patients' independent behavior activity was directly correlated with their freedom of activity. He found that behavior occurring in the cafeteria and hallways was significantly more

independent than those which occured within treatment areas of the rehabilitation center. He simply raised the question in his report about the goals of the treatment programming in the rehabilitation center.

Ronco (1972), in discussing the theory of architectural planning for hospitals, considered the psychological impact the hospital setting has on patient behaviors, noted the effects of physical and psychological confinement along with the lack of privacy and familiar support systems. He remarked that although the lack of clocks, calenders, familiar furniture may be minor items, their collective absence is a major factor to consider when assessing patient behaviors. In effect, he said, the patient is seen as being under the "complete control of the system" with disruption of familiar behavior patterns and the lack of autonomy being the ultimate result.

Rothschild (1970) also discussed the concept of the patient's dependency on medical professionals. She indicated that one of the basic assumptions in the role of the sick person is the willingness to follow essential medical direction. She does indicate, however, that once the patient's physical condition has stabilized, their participation becomes essential in planning their rehabilitation program. According to Rothschild, "It is always assumed that disabled people . . . are interested and willing to master their environment and go on struggling with life and meeting its requirements" (p. 76). Although this may be the ideal, it seems apparent from the the literature that patient's input is often neglected, personal ideas for independence conveniently displaced by administrative regulations.

Schontz (1975) took up this matter of patients' rights in the introduction to his book on the psychological aspects of illness and disability. He perceived the role of the patient to be one of an active participant, staff and patient working cooperatively. It was his belief that in the rehabilitation of an individual, the individual should be considered as an "indivisible whole". He felt that the patient should be the "peer of those who treat him, not their subordinate" (p. VI), and advised that patients not only have the right to make decisions relative to their own programs, but they also have a right to be heard and to defend themselves against decisions which are made by the institution in which they are kept.

The intent of the study reported here was to attempt through the technique of self-controlled behavior, to assist patients to assume more responsibility for their behaviors while they are inpatients in a medical rehabilitation center. The need for self-control has been seen as an essential ingredient in the rehabilitation program for most physically disabled. The opportunity to practice the skill of behavioral control while an inpatient is viewed as a primary step to the later mastery of the social reintegration phase where the self-control will be a crucial element in successful readmission to traditional social roles. Teaching the patients that they can and do have control of certain contingencies and behaviors even in a seemingly dependency-producing environment may prove to be an invaluable resource to those who dislike the routines and impersonal nature of their present life style. The capacity

to control themselves and the reinforcements in their present environment may be the essential ingredient in their treatment program which keeps them from becoming "lackadaisical" as Goldiamond (1973) suggested.

The value of this self-control concept is seen as having a practical side as well. Since patients are generally in treatment for 2 to 3 hours per day, much of their time in a treatment center is spent waiting for the next appointment time. If this waiting period could be changed from a time of inactivity to one of self-initiated and self-controlled therapeutic activity the potential for increasing staff reinforcement as well as self-perceived progress seems greater. In addition, the potential for a shorter treatment program seems possible.

Questions to be Addressed

Among the possible questions which a study of this nature provides, the following are to be considered. They are stated here in a rather general way, but will be restated later in a testable manner.

The concerns in this study relate to the patient's ability to take some personal responsibility for increasing their tolerance for physical activity, for managing some aspects of their rehabilitation activity. Since rehabilitation patients are usually seen as being acted upon rather than acting, being directed as opposed to being directive, being told vs. telling, the principles of self-managed behavior and the patient's rights seem to be in direct opposition to what actually is happening. But in the realization that patients engage in certain activities over which they do and should have control,

whether implied or expressed, there may be some opportunity to test the theory of self-directive behavior in a medical rehabilitation center.

For this reason, then, the study concentrated on two primary questions: Does the active self-monitoring of a selected behavior cause a change in the occurrence pattern of that behavior? And, does the application of self-reinforcement of selected behaviors cause a change in the behaviors more than that noticed during either the self-monitoring or a no-treatment phase of that behavior? These questions were the focus of this study.

The Need for Rehabilitation Research

J. V. Basmajian (1975), a noted physician researcher at Emory Rehabilitation Research Institute, in a recent address to the graduating class of physical therapists at the University of Alabama, challenged that group of newly graduated professionals to become active researchers in their new appointments. He discussed the need for continued research in the existing therapeutic procedures, new drugs, and novel treatment approaches, bioengineering for the physically disabled and exploratory work on neuromuscular function. His criticism of the present status of the medical rehabilitation field is that it is based on "intensive relationships" and not on the logic and support of a scientific principle. He maintained that "rehabilitation activities often respond slowly and obliquely to scientific progress because they have no base of science that is uniquely their own" (p. 607).

James McDaniel (1969) reflected a similar attitude regarding the lack of scientific unity in the field of rehabilitation medicine. In his work on the relationship between physical disability and human behavior, McDaniel commented on the "paucity of hard data" which efficiently relates the effects of a particular injury or disability to probable outcome behaviors for the individual. He claimed that although there is information available, it is usually scattered in the widely diverse areas corresponding to the services offered in a comprehensive treatment facility. In other words, research findings are available in speech pathology, physical and occupational therapy, medicine, vocational rehabilitation, and social work, but there is little interdisciplinary research which will benefit all at the same time. McDaniel believed that the behavioral science field, because of its commonality across these disciplines, should become the "prime interface" between the groups.

Fordyce (1971) also noted the relative absence of an effective data base in rehabilitation services, particularly the lack of data concentrating on contingency management in rehabilitation. It was his feeling, as stated earlier, that rehabilitation is a behavioral science. Success or failure of the medical rehabilitation program can best be judged by observing the patient's behavior. Application, then, of proven learning theory principles to individual treatment programs should provide a necessary input into rehabilitation literature.

Friedlander (1974) discussed the need for further research in learning and conditioning in the field of rehabilitation. He observed that there is little application of research in learning and conditioning to rehabilitation work with the disabled. It was his feeling that the reason for the lack of such applications is because both fields are fairly new and relatively little work has been done with the disabled. His requirements for research in the area include practicality and applicability for existing personnel as opposed to the need to add newly trained staff in order to provide service. In addition, it must be simple enough for those trained in other areas to use, it must deomonstrate cost effectiveness, and it must have relationship to the entire issue of accountability in the rehabilitation center. He attributed some of the resistance to utilization of research to rehabilitation personnel who are afraid of being displaced by new research findings which perhaps assist the patients more than the intensive relationships characteristic of rehabilitation work. For that reason he advocated that research must be implemented through the staff in order to avoid further resistance.

Perhaps part of the reason for the apparent lack of research in the field of medical rehabilitation is best explained by Reppucci and Saunders (1974). They described a variety of potential problems related to the introduction of behaviorally oriented social innovation programs into the natural environment. Of particular importance to the idea of conducting research of a behavioral nature in a medical rehabilitation

setting, are the problems associated with institutional constraints, the limited resources of staff, time, and funds, the inflexibility necessitated by research designs, and the frequent scientifically stifling compromises between research principles and the daily operation of the facility. Considering these potential roadblocks to conducting applied research in the field setting, it becomes understandable how scientific progress might be slowed. Wright (1972), in listing the principles for rehabilitation psychology, offered a variety of ideological alternatives for the practitioner. She noted that basic research must be of a practical nature, that any research to be conducted with a rehabilitation population should be geared primarily to "problem resolutions". This issue of practicality provides a very significant input in a time of economic inflation. With the spiralling cost of living, there is a corresponding rise in health care costs. Unfortunately, private insurance packages, state-supported medicare and medicaid benefits and personal finances are inadequate to meet these increased costs. A recent executive order by the Governor of the State of Michigan (1975), made in an attempt to control state finances, indicated that a variety of medical services previously paid for under the medical assistance programs will no longer be covered. Such services as occupational therapy and speech therapy, dental services, hearing services, vision services, and restricted psychiatric inpatient services have been arbitrarily removed from the possible payment list. Such massive curtailment of funding for the medical rehabilitation process not only creates tension in the employment

market, but must also force a reevaluation of the methods and types of services the health care professions provide. In this context, Wright's comments are most appropriate. New and innovative research must be conducted in such a manner that it leads to problem resolution both on a personal and programatic level.

The need for research of this nature, therefore, seems rather clear. The cost effectiveness of any treatment program and the direct observable benefit to the individual patient for any specific treatment demands a research attitude. The lack of systematic application of established principles of behavioral management in a setting where specific behaviors are being constantly refined seems almost ludicrous. The need to provide a treatment system which enhances the time effectiveness of the professional, which increases the productivity of the patient time, and which promotes increased rehabilitation behavior provides the rationale why this study was done.

Theory

The principles of learning theory are extremely broad and a great deal has been written about them. Of particular importance to this study, however, are selected principles from learning theory in particular operant behavior and contingency management. In addition, there is a recent advance in the field of behavior science called self-controlled behavior modification. This concept is set in opposition to the more traditional behavior modification approaches which depend on "other-controlled" or externally controlled

programs of behavior management. The theory of self-directed or self-controlled behavior is the basic concept to be considered as background for the study.

It is essential that we include a brief overview of the entire concept of learning theory before proceeding with an elaboration of the above topic areas, however. Learning theory is one perception of personality development which concentrates on specific behavioral developments, as opposed to the nontangible constructs, theoretical constructs, or other nonobservable effects, as being responsible for personality development. Simply described, learning theory claims that a personality is developed because of a series of reinforcing or punishing consequences of behavior. The reinforced behaviors have an increasing probability of recurrence, while those behaviors which result in aversive consequences of punishment decrease in the probability of recurring. Through several periods of reinforcement or punishment of this type, the person's predictable behavioral pattern is formed. Through this process, the individual develops sequences of behavior which promote individual growth. In addition, antecedent cues or situations occuring just prior to a reinforced or punished behavior become related to the prediction of the recurrence of the behavior. The ability to recognize cues and to understand consequences of behavior forms a basis upon which behavioral control is predicted. Within this broad concept of learning theory are countless principles, techniques, and definitions.

One of these important principles is that of operant behavior. Skinner (1953) defined operant behavior as "behavior that has an effect on the surrounding world" (p. 59). In other words, operant behavior is a physical response to a stimulus or cue in the environment which causes a measurable effect on that environment. Skinner noted that persons are constantly interacting with the environment. Each activity which the person finds rewarded by the environment will increase in the probability of its recurrence; those which meet with some sort of punishment will, through conditioning, decrease in their probability of recurrence.

In the field of rehabilitation, operant behaviors are foremost in importance. Learning the use of new prostheses, relearning the use of injured limbs, and reestablishing nerve pathways by repetitive physical activity are all examples of operant behavior. Those activities which are reinforced by accomplishment soon become part of the behavioral repertoire of the patient. Those activities that result in pain, embarrasment or failure generally are not individually pursued by the patient because they are punishing in their consequences. The goal of rehabilitation therapies might be restated in operant terms as follows: Rehabilitation is the reshaping of patient behaviors which will ultimately lead to a successful effect upon the environment where successful effect means that the patient approaches the premorbid acceptable level of such a behavior.

Contingency management is also an important concept in this particular study. Contingency management is related to the concept of operant behaviors. Contingency management is the control of the various stimuli or reinforcements which affects the probability of recurrence of a selected behavior. By controlling the situation or the specific rewards which ususally serve to produce or maintain the behavior, the behavior itself can be controlled. In the rehabilitation setting the prospects for contingency management are varied. Specific patient behaviors occur only in selected areas of the hospital. As Willems (1972) pointed out, patients engaged in a certain level of behavior in their rooms but evidenced considerably different levels of that behavior in therapy. Patients generally never sleep outside of their own room and may never exercise themselves when in their own room. In another situation, the patient may try feeding himself in the therapy area, but may demand to be fed when in his own room. Hence we see that the environment may serve as a cue for specific behaviors.

We also find reinforcement or punishment for certain behaviors being provided by the staff, family, or other patients. Patients who are talked to by therapists while performing therapy activities may feel reinforced. Staff may criticize patients for other behaviors, the criticism serving as a punishment and deterrent to further behaviors of that nature. Patients may also receive a great deal of intrinsic pleasure by performing certain behaviors, such as

learning to feed themselves again or moving previously paralyzed muscles. They may feel considerable embarrasment over reshaping bladder and bowel functions which before were quite standard.

The variety of contingencies which can be expected to be brought to bear on a patient in a rehabilitation center are varied. The successful management of these contingencies is, therefore, important to the efficient rehabilitation of the patient. Contingency management is an extremely important variable to the successful implementation of any operant behavior modification program.

Self-Directed Behavior

Within the behavior modification field an increasing amount of consideration has recently been given to the possibility of a self-directed program of behavior change. The alternate terms self-directed, self-controlled, self-regulated, self-managed behavior change all refer essentially to the same concept, to the principle that man has the capacity to control his own destiny. The variety of approaches to the principles of self-control will be discussed later. Now, however, the concepts of self-controlled behavior and the essential ingredients contained therein must be identified.

Self-Control Defined

Skinner (1953), in one of the original writings on the topic of behavioral self-control, envisioned it as "the reinforcement of those behaviors which make punished behavior less probable" (pp. 3-30). Skinner called this process the "self-determination of conduct". When the punishing effects of certain behavior are reduced, the behavior doing the

reducing is rewarded. When that behavior is rewarded, its probability increases and the individual then is seen as controlling himself. Skinner listed a variety of techniques wherein self-control is obtained. These include acts like the use of drugs, punishment, operant conditioning, distraction, aversive stimulation. He advocated the use of these techniques by the individual just as they would be applied in any externally controlled behavior modification program.

Perhaps the most complete review of self-controlled behavior theory and application to date is that of Mahoney and Thoreson (1974). They agreed with the basic principle that behavior is controlled either by antecedents and/or cues to behavior. If a person wishes to change a given behavior, he must recognize both the typical consequences of the behavior as well as the cues for that behavior. They indicate that research has verified that for self-control to be effective, at least one of three elements must be present--self-observation, environmental planning, or behavioral programming.

The concept of self-observation allows a variety of technical alternatives including the use of graphs and charts or any other systematic record of behavior. The use of any form of immediate feedback device by which the individual can judge progress is recommended. Self-observation is simply the routine, accurate reporting of the activity level of a behavior that a person does for himself. Environmental planning, according to Mahoney and Thoreson, involves "changing the environment so that either the cues that precede the behavior or the consequences that follow it are changed" (p. 23).

This may necessitate avoiding situations which elicit the behavior or avoiding those situations in which a choice is allowable. The final recommended procedure is behavioral programming. This last recommendation involves altering the consequences of a behavior in such a way that the frequency of that behavior is changed. A variety of techniques can be used, including positive self-reinforcement, self-punishment, or any internal or external consequence which will change the frequency of the behavior.

Goldfried and Merbaum (1973) perceived self-control to be a personal decision-making process. They saw self-control as a result of conscious deliberation of the options for behavior and the selection of those actions which accommodate the goals the person has chosen for himself. They indicated that the areas of human behavior which can be self-controlled include maladaptive physiological or instrumental behaviors. The physiological behaviors, they explained, are best controlled by self-administered aversive conditioning, auto-suggestion, or relaxation. They recommended that the instrumental or more overt behaviors be controlled by covert conditioning or self-reinforcement techniques. It was their observation that the literature on self-control seemingly concentrates on weight control and smoking habits, although they noted a few reports of marital problem solving and study habit remediation with the self-control concepts.

In a somewhat more theoretical evaluation of the topic of self-control, Klausner (1965) provided considerable input. He considered self-control to be the freedom from external

social dictates or the internalizing of authoritarian dictates. According to Klausner, self-control is the ability to control the environment and its impact. He indicated, however, that self-control is not so much total control of self but rather the control of selected aspects of the self. In a review of 290 articles on the topic, Klausner catagorized self-control programs into control of overt performance, physical and psychological drive control, intellectual or cognitive thought control, and control of affect. He also devised the recommended methods of controlling techniques between direct and indirect control. Indirect control is the control of segments of a larger complex of behavior until the entire complex can be controlled directly at the outset. He conceptualized the controlling methods in four distinct ways. Efforts of synergy are the skills of controlling the environment and hence the individual himself. Efforts of conquest are the skills necessary for the facilitation or inhibition of drives. Efforts of harmony are those skills needed for controlling the behaviors to correspond with physical constitution and personality. Finally, a fourth level of controlling behavior is that type of self-control skill which is used to overcome threats to one's self while acting in a desired manner to achieve certain goals. This level Klausner labelled the effort to transcend.

Cautella (1969) described self-control in a manner similar to that of Skinner. He saw self-control as a response repertiore in which "the individual can make responses to increase or decrease a response probability that is perceived as injurious to the individual himself or to others" (p. 324).

He endorsed the concept of self-control because he felt the individual is more apt to maintain a level of new behavior if he is responsible for that change. Cautella described the method of self-control within an operant framework, which utilizes reinforcement and punishment, or reciprocal inhibition which utilizes the processes of relaxation, thought stopping, or covert sensitization.

Goldiamond (1965) described self-control as a functional relationship between man and his immediate environment. The environment he generally refers to provides the reinforcement for selective behaviors. These reinforcers he also called "critical consequences" for behavior (1974). By analyzing and controlling the environmental reinforcers for a given behavior, the person is able to control his own behavior. Hence a basic understanding of man's relation to his environment is important.

Kanfer and Phillips (1969) considered the self-control process from a therapeutic standpoint and called it instigation therapy. They defined instigation therapy as a technique by which the individual

> utilizes specific suggestions and assigned tasks in the patient's usual daily environment, formulated on the basis of the patient's verbal report of the symtomatic behaviors, their context and their consequences . . .Self-reinforcement by the patient and the natural occurence of reinforcements contingent upon adequate patient behaviors in his usual environment are used to achieve self-control. (p. 474)

They added that self-control is a most effective method of behavior change since it is accomplished in the stimulus situations in which the behavior change is desired. The ultimate

success of the self-control program rests basically on the patient's self-reports and adequate reinforcement. We will discuss the concept of self-reinforcement in more detail later.

Martsen and Feldman (1972) saw the principle of self-control both as a thought oriented process wherein the individual has his mind set on controlling some behavior and as a specific behavior oriented self-control where the individual performs some function to control his behavior. Essential to their concept is a need for clear definition of the behavior to be controlled as well as an understanding of the person's attitude, insight, consciousness level. The personal awareness (consciousness) of the need to control an attitude which persuades or reinforces the commitment to change and the insight to realize how the change will affect the total person is essential to the self-control strategy.

Rimm and Masters (1974) defined the process of self-control as replacement of nonproductive behaviors with productive behavior. As others have indicated, the importance of the personal awareness of stimulus situations in the environment which affect the probability of the desired behavior and the response consequences to the desired behavior are emphasized. These authors also felt that alternative or competing behaviors are essential as are the use of principles of approximation (or shaping) to the desired behavior, chaining of behaviors, and the control of the early parts of the chain, and the importance of self-monitoring.

Finally, Watson and Tharpe (1972) in an instruction book for behavioral control define self-controlled behavior as the

process of "directing the relationships between your environment and your behavior" (p. 23). They, like all the others, emphasized the importance of understanding the relationship of behavior to antecedent cues and consequences. They also advocated the use of self-monitoring, self-reward, and punishment programs in whatever manner facilitates the occurence of the appropriate behavior.

Principles of Self-Control

From the theories noted above, and for this study, it appears that self-controlled behavior is, first of all, self-suggested. Although none of the authors cited specify how the behavior to be changed is to be identified, most authors implicitly agree with the idea of self-prescription (Bandura, Grusec, and Menlove, 1967; Bandura and Perloff, 1967). Once the behavior has been self-suggested, it must be clearly identified. At this point, a process of self-monitoring must begin with an awareness of situational cues which precipitate the behaviors and reinforcing consequences which, in turn, increase the probability of the recurrence of similar behaviors. The primary aspect of the self-controlled behavior is the ability to manipulate the environment to increase the probability of the behavior and/or management of the consequences of the behavior to facilitate its continuation. Of those latter concepts, some writers have added further observations which are essential.

Self- Vs. Other-Controlled Reinforcement

As a strong proponent of the self-control ideal, Mahoney (1971) has researched the concepts of self-imposed techniques

of reinforcement. His work will be considered in more detail later. Essential to his theory, however, is his observation of the value of "self-regulation" versus "other-regulation" of consequences. He noted that self-imposed regulation is more effective than externally imposed regulations. He found that there seems to be little difference between the effectiveness of appropriate uses of positive or negative reinforcement, but indicated that there is little supportive research on the application of self-punishment as a means of behavior control.

Bandura (1967b), another leader in the field of self-controlled behavior, indicated that self-regulation of behavior demands an initial explanation of the acceptable levels of the target behavior. Once these standards have been adopted, the person must then "self-administer rewards and punishments depending upon whether their performance falls short of, matches, or exceeds their self-prescribed demands" (p. 449). Bandura also found that those persons who desire to regulate their own behavior generally tend to maintain relatively high standards for themselves. He noted that the most important attribute of such a self-rewarding contract is its capacity "to maintain effortful behavior over time" (1967a, p. 112).

Kanfer and Duerfeldt (1967) compared the varying effects of self-control as opposed to other controlled reinforcement. They found, in a three phase experiment, that the process of self-reinforcement has longer lasting effects, that self-reinforced subjects tended to establish performance standards at levels of previously externally reinforced standards, and that they maintained a higher performance level when compared to the behavioral levels of externally reinforced persons.

Kanfer (1971) in a later study described the process of self-control and reinforcement. Speaking from a forecaster's viewpoint, he envisioned that the rapid rate of change in life settings demands that man be aware of the intense personal interactions he has with his environment. With the possibility of such change, man must be consistently able to adapt. He felt that this consistency will only be developed through "self-generated motivations and standards and means for maintaining" (p. 404) that consistency which, in turn, means defining contracts in therapy which utilizes the principles of internal reinforcement.

To further elaborate on reinforcement, Kanfer and Philips (1969) indicated such reinforcement can consist of self-evaluations of the person, therapist-related reinforcements or people, objects or reinforcing events in the daily life of the individual. It is imperative, however, that the reinforcement be under the direct control of the person himself and that it be administered only "when reinforcement is appropriate to his own behavior" (Kanfer, Bradley and Martson, 1962).

Kazdin (1973) added further thoughts to support the concept of self-directed reinforcement system. In his writing he attempted to explain why some externally imposed token economy reinforcement programs may fail. Among five explanations for a breakdown in effectiveness, Kazdin indicated that the behavior being rewarded may not be possible for the individual, that there may be a lack of understanding about the relationship between adequate performance and receipt of the reward, or that there may be a delay in receiving the reward.

As a potential solution Kazdin recommended including the patient in the development and administration of the contingency which is, in effect, the self-control principle which has been discussed.

In summary, the theoretical principle upon which this study was based is personally controlled behavior change. The particular skills of self-delineation of behavior change, self-established performance standards for the behavior, the utilization of self-monitoring techniques, and the application of a self-devised and controlled reinforcement program were emphasized. This study was applied to a small segment of a population which has traditionally not been conceived of as being self-directed, although the professional's expectation is that these people should become self-directed as a result of their treatment experience. The rehabilitation patient may be a prime candidate for the application of the principle of self-directed behavior change. Originally self-directed, this individual became instantaneously other-controlled and powerless as the result of a trauma or illness. Yet, through retraining, he or she may become maximally self-controlling in a dependency reinforcing situation.

Overview

The following chapter provides a review of the literature with respect to the application of behavior modification principles in the field of rehabilitation and the utilization of self-control principles with the rehabilitation patient. The hypotheses will be formulated and the specific procedures for

conducting the study are presented in chapter three. A description of the study results is presented in chapters four and five. The final chapter draws together the concepts as discussed and observed in the study. Based on the study, recommendations for the application of the data to other situations will be presented.

Chapter II

A Review of Literature

Behavior modification is without a doubt one of the most controversial of the theories of human behavior change, and it is probably the most widely applied. The growth of knowledge about behavior modification and the research in the field during the last two decades has created as much excitement and ambivalence in the area of psychology as did Freud's first proposals about the unconscious. The use of behavior modification is praised by many when it works, but has also led to governmental controls when it created pain and nearly animal-like experimental conditions (Trotter and Warren, 1974).

The utilization of behavior modification techniques in controlling institutional populations has provided a large volume of literature. The application of concepts such as operant conditioning, covert conditioning, token economies, systematic desensitization, aversive conditioning, and punishment have become standard treatment for behavioral disorders and standard procedures for behavior change programs in mental health institutions, prisons, schools, and workshops. Couch and Allen (1973) supported the idea of applying behavior modification principles in rehabilitation settings. They indicate, "Studies promoting the utilization of behavior modification in rehabilitation settings offered dramatic proof of its efficacy" (p. 88), and they note that many researchers see it as THE system of patient control.

As was cited in the first chapter, a new advance in the field of behavior modification is the process of self-controlled

behavior. This technique of modifying selected behaviors demands a self-realization of the cues which surround the behavior and the reinforcement contingencies which affect the behavior. In addition, we noted that self-controlled behavior necessitates the self-establishment of an acceptable standard for the behavior, self-monitoring, and a self-controlled reward system. Reviewed here will be that body of literature which evaluates these specific areas of self-controlled behavior in terms of its proven effects on behavior. In addition, the applicability of behavior modification programs and self-controlled programs as they have been applied to rehabilitation patients will be reviewed.

Self-Reinforcement

A major component within the self-control concept is the management of reinforcers that will promote or change the desired behavior. Bandura, one of the leaders in the field, has published, in conjunction with others, several articles on the topic (Bandura, Grusec, and Menlove, 1967; Bandura and Perloff, 1967; Bandura and Whalen, 1966). In these articles, the authors were generally concerned with the combined effects of role modeling on the self-establishment of reward standards and the effects of self-reinforcement on the individual. In a study of 80 children, Bandura and Perloff reported that the reinforced subjects as acombined group performed better at a given task than did non-reinforced group. They noted no significant difference in the performance of the externally or self-reinforced children. They did note however, that the self-reinforced group seemed to establish higher levels of

performance than was necessary in terms of minimal standards for reward. Bandura, Grusec, and Menlove discovered that when children (whether these were the same or different children is not clear) were exposed to role models, they tended to establish a standard for their own behavior in terms of the modelled standards even if the schedule was very demanding and lower performances possible to obtain the same reward. The common observation in each research team was the negative personal effect that the potential for failure had on the children as well as the undue expectations they often held for their own performance. Based on this research, it might be worthwhile, then, in any self-reinforcement program to be alert to the tendency of persons to be overly demanding in establishing behavior standards for the amount of reward obtained.

Hall (1972), in a doctoral dissertation, followed the lead of Bandura by testing the difference in productivity resulting from different reinforcement alternatives and personality characteristics. In his study of 60 subjects, he attempted to analyze the differences between reinforcment types, whether external or self, and the subject's perceived locus of control. He found, as did the earlier authors, that there were no differences in task production between the self-reinforced and externally reinforced groups. He also found that the reinforced groups both performed at a higher level than a no-reinforcement control group. He further noted that the generalized expectancy of reinforcement (locus of control) had no effect on task performance, thereby

indicating that the personality trait of perception of the locus of control of reinforcement produced no difference between groups.

Kanfer and Duerfeldt (1967), in a three-phase research design utilizing three groups, also tested the effects of self-controlled versus other directed reinforcement. Three groups of subjects were shown geometric designs and asked to select correct designs based on a pregiven criteria. Two of the three groups were initially reinforced for responses without any relationship to correctness; the third group was not reinforced for any response. The second phase of the study continued the non-contingent external reward system for one group, the second group was asked to reward themselves if they felt they were correct, while the control group continued on a no-reinforcement program. The final phase of this study was an extinction phase for all three groups. The results showed a significant difference in the final phase behavior with the self-reinforcement group correctly choosing more designs than the other groups. The evaluation of this study supports the hypothesis that "training in self-administered reinforcement enhances performance under extinction" (p. 244).

In a much different research design, Lovitt and Curtiss (1969) reported the results of a comparative study on reinforcement techniques. In a single case study design of a twelve-year-old student, the researchers found that self-administered rewards by the student for correct behavior prompted a higher performance for a specific classroom behavior

than either a teacher-dominated point system or other teacher-dictated reward. In the repeated measure experimental study, these findings were reproduced, thereby confirming the hypothesis that self-directed reinforcement program does produce more of a desired change in a specific behavior than does an externally devised system.

In another single subject study, Nurnberger and Zimmerman (1970) applied the concept of self-controlled behavior to study habits. They found, through the use of self-administered punishment, that a graduate student significantly changed his behavior with respect to work on his dissertation. The student increased his study behavior when he required the researchers to spend the student's money on social programs with which the student was in basic disagreement, if his behavior was below a self-established standard. It is also surmised by this writer, although not described in the article itself, that the reinforcement gained by the student for productive behavior undoubtedly served to increase his motivation to continue such goal directed behaviors.

Bolstad and Johnson (1972) provided yet another observation on the application of self-controlled versus other-controlled reinforcement in school age children's behavior. In a well designed study, the researchers used a four-group design in five classrooms in each of two separate locations and done over five time periods to test their hypotheses. The treatments were controlled across time. In addition, controls were imposed upon the students for reliability of self-monitoring reports. The authors found, generally, that

by reinforcing appropriate in-class behaviors they decreased disruptive in-class behaviors. They noted no significant differences between the self-reward and external reward groups in terms of behavior change. They found further that the self-rewarded group on occasion tended to reward themselves more liberally than did the externally reinforced group, an observation also made by Kanfer and Duerfeldt at the conclusion of their study (1967).

It was noted in the previous chapter that the utilization of behavioral self-control is widely used in weight control programs. This area of behavioral control strategy seems to utilize both the principles of stimulus control and self-reinforcement. The overall results of studies in this area seem to correspond to the previously described observations. Mahoney (1973), for example, found that teaching self-control of eating habits in weight reduction diet, rather than just controlling the quantity of intake, provided a more effective way of controlling weight. He also noted that this self-reward program increased the motivation for weight control over a longer period of time than the more traditional weight control programs which emphasize limited intake.

In another comparative study, Mahoney, Maura, and Wade (1973) found that there was a significant difference in weight loss between groups using self-reward, self-punishment, or a combination of the two to control eating. They found that the self-reward group lost the most weight over a period of time. The self reward - self-punishment group was less effective in weight loss than the first group but more effective

than the self-punishment only group. This would seem to indicate that the utilization of self-reinforcement has more applicability than self-punishment, however, there may be some consideration given to applying both principles in a self-control study.

Another study which combined the use of principles of stimulus control and self-directed reinforcement was reported by Penick, Filion, Fox, and Stunkard (1971). Through the use of an elaborate program of stimulus control and prompt reinforcement, the researchers sought to increase those behaviors that would promote weight loss. As hypothesized, the group using the self-reinforcement principles lost more weight than the control group which was participating in a traditional group therapy and information exchange format. There was a wide variation in the weight loss of the self-controlled group, however, which negated the statistical significance necessary for proving the hypothesis. Despite the lack of significance, the authors reported that the results were considered superior in the self-controlled group.

Based on the data presented in the above studies, there are some general conclusions which can be drawn. Without any doubt, there is reason to believe that the use of reinforcement, whether externally controlled or self-directed, enhances the likelihood of a target behavior change. Although the literature is not conclusive on the differences between the externally controlled and self-directed reinforcement programs, there are some subtle points to be made. It seems apparent that the use of self-directed reinforcement causes individuals

to set higher goals for themselves in terms of an acceptable standard of behavior. Once established, this behavior pattern seems to exist for a longer period of time than does the behavior pattern of an externally reinforced group. These considerations are of utmost importance when considering the behaviors of the patients in a medical rehabilitation setting. If the patients can be helped to produce a selected behavior more often and over a longer period of time, a substantial gain might be noted in their rehabilitation program. Since a major portion of the patients' time is spent in situations that are not immediately reinforcing, the teaching of the principles of self-reinforcement in those situations would perhaps help increase the likelihood of those behaviors necessary for a successful and efficient rehabilitation. The possibility of strengthening rehabilitation behavior patterns in usually non-rewarding settings is a major reason for completing a study of this nature.

Self-Monitoring

Self-controlled behavior requires the self-management of reinforcers and it also requires self-monitoring. This concept of self-recording and its overall effect on behavior change has been addressed by a few authors.

Walls (1969), for example, stated in his discussion of the application of behavior modification to rehabilitation that the most expeditious plan in observing behaviors is "to have the client count and record his own behavior". He went on to note that "in many cases no reinforcement other

than auto-recording may be necessary to accelerate desired behavior" (p. 174). Mahoney and Thoreson (1974) supported this same contention when they indicated that self-monitoring may be more than an assessment tool, it could also be a treatment strategy. They called this possibility the reactive component of self-monitoring and suggested that a baseline of self-monitoring is essential to understanding other specific treatment effects. The self-monitoring becomes a potential confounding effect for the experimental treatment. It must, therefore, be dealt with in this study as a secondary hypothesis.

Jeffrey (1974), in discussing the concept of self-monitoring, observed that the effects of self-monitoring must be ascertained in any research study. He recommended a procedure whereby a multiple time series or reversal design with self-monitoring as part of the treatment strategy should be considered.

Kazdin (1974), in an extensive review of the literature wherein self-monitoring was part of an experimental approach, found studies where the self-monitoring had an effect on the behavior and studies where it apparently had no effect. It was his conclusion that self-monitoring has not been consistently influential in behavior change. He also addressed the issue of the reactivity of self-observation. It was his belief that whether or not the reactivity issue was or was not a problem depended on how the self-gained information was to be used. He noted that in many cases, the effects of self-monitoring seem to lose their impact on behavior change over time anyway and, therefore, need not be addressed in a study on self-control.

In addition to the importance of self-reinforcement and self-monitoring, it was noted in the previous chapter that a program of self-reward necessitates the self-establishment of a particular standard of behavior. This issue of personal involvement seems to relate closely to the concept of patients' rights as it is applied in a medical setting (Quinn and Somers, 1974). Among the many patients' rights listed in their article, these authors included the following: the right to participate in decisions about treatment, the right to discuss treatment program alternatives, and the right to have staff hear and understand their complaints and ideas about program changes. These principles seem to be intimately related to the entire process of self-standard setting for selected behaviors.

The self-establishment mechanism and result of allowing patient input into the system is described by several authors. Saper (1974) described a group therapy program in a psychiatric setting. In this descriptive study, he told how the patient's long- and short-term goals were developed with the patient. A major component of this program was the regular contact the patient had with all members of the treatment staff. Of particular note in the program was the inclusion of the patient's immediate family in both structured and informal social situations with patients and staffs. Although no conclusions were reached, the idea of patient-staff communication was advised.

Skipper, Tagiacozzo, and Mauksch (1964), reporting on observations made of patient and staff communication processes, noted an interesting potential "anti" argument on the issue of patients' rights. In the era of rising medical malpractice suits, they found that the more that the hospital staff wanted to protect themselves from errors and mistakes, the less oriented they became to communicating with patients. At the same time, they noted the "pro" argument which supports the issue of patient involvement: the amount of communication that existed between patient and staff was directly proportional to the level of patient cooperation and to the clear perception of patient needs by the staff. In summary, Skipper et al. maintain that the interpersonal communication process is essential for effective patient care and treatment planning.

In a somewhat similar manner, Armacost, Turner, Martin, and Holt (1974), in another descriptive study, described a technique used with so-called "problem patients" in a chronic disease section of a California V.A. hospital. When frustrated by a number of patients who refused to follow treatment programs, hospital regulations, and staff orders, the nursing staff received consultation from a psychiatric nurse. The prominent recommendation was the apparent need to increase the staff-patient interaction through regularly scheduled meetings. This resulted in decreased hostility, less resistance, and fewer antisocial behaviors on the part of patients and in an overall "improvement in patient behaviors and nurses' attitudes" (p. 292).

In an attempt to encourage patient involvement in goal setting, Becker, Abrams, and Onder (1974), at the University of Michigan, applied the principle of patient and family participation in treatment goal setting in a rehabilitation center. She found, again in a descriptive study, that when the patient and family were included in the admission conference, there seemed to be an enhancement of patient-family communication, better patient-staff understanding of treatment goals, and a reduction in the amount of sabotage of treatment plans by the patient.

From these reports, it seems clear that including patients in goal setting and treatment planning produces some positive benefits. There appear to be greater amounts of patient cooperation and reduced patient-staff conflict. In addition, if the patient is included as a primary participant in goal setting, there is a greater likelihood of the patient's cooperation in reaching the goals. Furthermore, the more the patients are involved in setting the standards for their behaviors, the less likely they will be to complain about the care, and the more motivation they will have to reach the objectives.

It has been noted so far that the principle of reinforcement of appropriate behaviors does influence the probability of the recurrance of the behavior. It has also been seen that the application of self-reinforcement is at least as effective, if not more so, than externally applied reinforcement. Evidence has been cited demonstrating that including patients in goal setting and treatment planning seems to promote a

better patient attitude and behavior patterns and increased patient-staff interaction. Let us now extend the review of the research to determine whether behavior modification techniques when applied to medically disabled patients has any effect on their behavior patterns.

Behavior Modification and Rehabilitation

It has been mentioned earlier that the field of medical rehabilitation is closely allied to the area of behavioral science. Couch and Allen (1973) indicated support for the growth of the use of behavior modification techniques in rehabilitation facilities. They indicated the "apparent simplicity and built-in accountability" of behavior modification provides a sound rationale for the use of the technique. Staats (1964) maintained that the application of behavior modification principles is badly needed in the field of rehabilitation, especially since new behaviors are being learned in those situations where reinforcement is generally weak. Let us consider then, the variety of behavioral studies employed in the area of medical rehabilitation. There are countless studies of behavior modification with the retarded and emotionally disturbed. However, since this study is geared to the applicability of behavior modification in medical rehabilitation settings, the review will concentrate only on that portion of the disabled population.

Reinforcement programs have been applied to a variety of behaviors in the medical rehabilitation setting. In the area of improving the physical performance of the patient, several reports are worth noting. Hollis (1974) reported on a series

of studies employing the operant conditioning approach in training patients in the use of artificially powered prosthetic devices. He described particularly a variety of positive reinforcement techniques applied in the retraining of selected hand muscles. These reinforcement techniques included the observation of colored liquid movement in plastic tubes and electronic signal feedback for the use of appropriate muscle movement in arms and hands. As opposed to teaching a patient to "move a finger or muscle", the therapist instead taught the patient to control the movement of the colored liquid and the feedback of the electronic impulse signals. With the immediate observable reinforcement obtained through external sources, the patient almost unknowingly strengthened hand muscles more easily and with considerable less frustration.

In attempting to decrease the frequency of skin breakdown in the spinal cord injured, wheelchair-bound patient, a major problem facing such individuals, Malament, Dunn, and Davis (1975) reported an effective behavioral method. Using a time-buzzer-pressure switch combination, the patients were taught through negative reinforcement to raise themselves periodically in their wheelchairs. By repositioning themselves within a selected time span, the pressure sensitive switch was automatically reset and a buzzer system deactivated. In the three-phase experiment, which used a small number of subjects, the authors found that the patients became effective in timing their repositioning so as not to overact in a given period, but to prevent the 15 second buzzer from sounding.

Through the pictorial representation of the data of the five patients, this scheme was seen as effective in promoting body repositioning. No statistical analysis was computed, however, to verify the apparent success of the system.

Fordyce, Fowler, and DeLateur (1968) attempted to alter the reinforcement received for low back pain patients. They found that demanding more activity of the patient, encouraging the patient to make daily graphs of activity levels, and self-monitoring caused the patient chronically disabled by low back pain to realize a significant improvement in overall activity levels. They also noted a decrease in the subjective evaluation of pain.

Friedlander (1974) described in some detail the various technological materials produced for the benefit of patient rehabilitation. His technological system utilizes the scientific process of "specifying tasks, providing reinforcement, and keeping detailed accounts" (p. 144). Through the use of separately mounted and experimentally controlled T.V. switches on opposite sides of his bed, a severely immobilized and retarded young patient learned to control to a certain extent his small environment and to "avoid a characteristic regression . . . as (had) happened before" (p. 145) when the patient had similar surgery. In another experiment, designed to motivate a severely physically disabled child to grasp objects, the author was able to train a relatively absent grasping function to produce 600 responses in 15 minutes. The self-obtained reward earned by the patient for the grasping reflex was the playing of the Happy Birthday song.

Another activity Friedlander was able to promote included the movement of the heel and toe of a young adolescent who was wearing a full body cast for a broken leg. By the use of a timer switch activated by his heel and toe, the patient could listen to a favorite radio station. This activity was not only reinforcing to the patient from the standpoint of the music, but was also physically beneficial to the patient in terms of continued movement of the affected leg muscles. Another study by Friedlander reported on assisting severely involved patients in the relearning of activities of daily living such as pulling drawers, opening doors, etc., all of which were rewarded by the lighting of electric lights when done well.

Along similar lines in the treatment phase for rehabilitation patients, others have also succeeded in increasing appropriate behaviors when applying behavioral principles. Goodkin (1966) used the behavioral analysis idea to define specific rehabilitation related behaviors. The application of rewarding appropriate behavioral management programs, including self-evaluation of speech patterns in two separate aphasic patients, seemed to expedite the total rehabilitation program. In another case with a positive reinforcement of approach behaviors, a cerebral palsied child was helped to overcome the fear of falling; this case is described by Meyerson, Kerr, and Michael (1967). Booraem and Seacat (1972), in a study of three patients, found that the use of a financial incentive for a selected physical therapy activity resulted

in an improvement of more than one standard deviation in the behavior over a baseline period. Unfortunately this study did not appear to control for several possible confounding variables.

Along with the apparent success of the application of reinforcement for patients in treatment, other work has been done to promote patient attendance in therapy through the use of behavior modification techniques, also with some success. Ince (1969) reported on the application of the reinforcement principle to stimulate patients to attend therapy. By encouraging patients to make their attendance in the apparently enjoyable speech therapy activities contingent or dependent upon their participation in other important therapeutic activities which they often missed, the staff of a rehabilitation center was able to increase patients' attendance in the less frequently attended programs. To increase the desired behavior in the less desired therapy, the staff was instructed to call the speech therapist when the patient had attended the required physical or occupational therapy hours. Without this verbal report the patient was not admitted to the speech therapy. Along the line of therapy attendance, Zschokke, Freeberg, and Errickson (1975) found that by posting a chart and subtly recognizing patient attendance in occupational therapy they increased the patient attendance in this therapy setting. They found further that by requiring a patient to attend a certain amount of time in order to attend subsequently a special social activity held each week, the patient attendance increased even more.

All of these studies seem to support the recommendations of Sieg (1974) and Wanderer (1974) that occupational therapists should adopt the behavioral model in their treatment programs. They felt that by recording rates, keeping time-motion studies, and establishing a measurable standard of behavior along with defining specific behaviors which meet the clients' needs, therapists fit precisely into the behavioral model. Wanderer adds, further, that patients can be taught to bring their responses under control "by training them to control the functional antecedents of those responses" (p. 207). This quotation cogently reflects the philosophy of self-directed behavior and is the view taken in this study.

Finally, in an extensive review of the literature of the application of behavior modification principles in rehabilitation settings, Walls (1969) provided considerable support for the application of behavioral principles to rehabilitation. In his all-encompasing survey, Walls found that application to individuals, application to groups, and applications in institutions had positive results. The behaviors which he found could be changed included speech disorders, prevocational behavior, disruptive classroom behaviors, verbal and social skills, and self-destructive behaviors.

It should be pointed out that nearly all the studies described fall within the framework of an externally operated and manipulated behavior management style. In most cases, the behaviors were defined by others although the reward was on occassion controlled by the patient. In few cases is there mention made of the patient's involvement in the

standard setting or in the determination or administration of the rewards. Meyerson, Michael, Mowrer, Osgood, and Staats (1960) allude to this as a typical problem in rehabilitation. It was their feeling that the intrinsically motivated will show a decided behavior change over the extrinsically reinforced. They stated that "the problem of rehabilitation often consists of a disabled person who . . . should be doing something other or something more than he is doing" and they go on to ask the inevitable question, "How can a person be stimulated and paced so that he does what he 'should' and 'wants' to do it?" (p. 73). This solution of allowing the patient the opportunity to get involved in establishing standards of behavior, establishing rewards for that behavior, and then initiating a program to change the behavior may provide the answer. It, therefore, forms the basis of the hypothesis of this study.

Design

It has been shown in the last several sections that the theory of self-directed behavior seems to be supported. The theory has been applied in a wide variety of locations with apparent success. It has also been shown that the application of behavior modification principles has been successfully employed in rehabilitation settings to promote desired behavior change. One author, Goldiamond (1973) has subjectively described his personal attempt to apply self-control behavior principles within a medical rehabilitation setting with some apparent success. There has been little scientific evidence however, to validate his claim or to push the

frontier of self-control into the medical rehabilitation facility. Therefore, in an attempt to validate Goldiamond's observation and to also attempt to understand the dynamic effects of self-monitoring and self-reinforcement on behavior change in a medical rehabilitation setting, the intensive case study or an N of 1 research design has been chosen.

Case Study Approach

The supporting rationale for the case study approach to research is provided by several authors (Chassen, 1967; Dinsmoor, 1973; Gottshalk, 1968; Holzman, 1963; Kiesler, 1971; Lazarus and Davison, 1971; Leitenberg, 1974; May, 1971; Shapiro, 1966; Thoreson, 1972). Each of these authors noted among many other reasons that research of this type emphasizes the careful monitoring of each individual with respect to the target behaviors. Since this is a necessary element in behavioral area research, the case study approach seemed very reasonable.

Another rationale for choosing the case study approach is the diversity of the population in a medical rehabilitation center. Because one patient's medical condition is different from another's, since each treatment program is varied with the severity of the disability, it is practically impossible to establish a true comparative group study. Establishing comparative groups on some selected demographic variable would necessitate the use of several medical centers or time lapse study, both of which promote confounding possibilities. The use of a single subject study permits the subject to be his/her own control and the various hypotheses

can be tested in a within-subject manner (Chassen and Bellack, 1966). If more than one research subject is used, a comparison across the subjects is also a potential evaluation consideration.

A final consideration given to the choice of the intensive case study approach is based upon its effectiveness in defining treatment effects on the individual. As Chassen, Thoreson, Lazarus and Davison, and Shapiro indicated, the problem with the comparative group design is that a statistically significant effect may, in fact, reflect a true effect in very few individuals but the influence in those is strong enough to elevate the entire group norm. These authors noted, further, that the effect of treatment on the individual persons involved is lost to the researcher.

Davison summarized all of the above considerations, giving four additional supporting reasons for such a design:

> 1. It (Single Case Study Design) reduces . . . the 'error variance' by eliminating the usual confounding between variations in behavior associated with different values of the independent variable and the variations between individuals.
> 2. This design may be used with considerable effectiveness . . . in clinical practice . . . in which each individual represents a unique case.
> 3. The within-subject design makes it possible to study differences between individuals in the characteristic way.
> 4. The functions which are apparent when the individual design is employed may be lost or distorted when average values are substituted as required by the group design. (p. 508)

In assessing the variety of research designs to use for this experience one must consider the hypotheses to be tested. Since the credibility of the research reviewed with respect to self-controlled behavior seems to be influenced somewhat by the research on self-monitoring there seems to be a need first

of all to distinguish between self-monitored behavior patterns and behaviors being self-rewarded. Since the intensive case study will be used which negates the potential to place persons into self-monitoring only and self-reinforcement only groups in true experimental fashion, the most logical and most defensible research design to use is the Multiple Baseline Time Series Design as recommended for intensive case studies by Thoreson (1972).

Multiple Baseline Time Series Design

The benefits of the multiple baseline time series design must now be considered. The typical single baseline time series design employs a periodic measuring process of a behavior with the introduction of an experimental change into the series of measurements at a preselected point. This quasi-experimental approach, however, provides no control over the potentially confounding effect of an unrelated event, which occurred at the same time as the experimental treatment, causing the observed behavior change. Alternative actions to control for this possible confounding effect would be the establishment of a certain amount of isolation of the experimental subjects or the use of a reversal design. The reversal design allows the subject to return to a previous type of behavior after a treatment. It is difficult to manage and justify, especially when behavior change is the goal of the treatment. Reversal in this case is highly illogical and anti-human.

The best alternative to control for the potential effects of internal confounding factors is the use of a multiple baseline time series design. Thoreson describes the use of such a

design as most applicable when an experimenter is "concerned with (1) the effects of a treatment on several behaviors of the person, (2) the effects of multiple treatments administered by different persons simultaneously or (3) the effects of a treatment on the same behavior in different settings" (p. 28). Wolf and Risley (1971) added the observation that this design can also be useful when carried out (1) across two or more different responses under the same environmental condition(s) and on the same subject(s), or (2) across two or more environmental conditions with the same response(s) and on the same subject(s), or (3) across two or more subjects with same response(s) and under the same environmental condition(s). Hence, there are a variety of application possibilities for a design of this nature. The value of the multiple baseline is that it also controls for the potential confounding effect of history by introducing the experimental treatment at several selected points in time. If the experimental treatment promotes the desired change at each interval, the treatment will be viewed as effective.

Gottman, McFall, and Barnett (1972) advocated the utilization of a multiple baseline study, observing that such a design is most beneficial in those situations where selected variables cannot be controlled and/or where a control group concept is impossible. They indicated the multiple baseline design provides the analytical advantages of a single group pre-post type of design where the researcher can observe the overall treatment effects and permits a post-hoc analysis of results over a time period. Finally, it provides for a control of

the possible confounding effects by removing the effects of history with multiple starting points.

Finally, Jeffrey (1974) described the essentials of implementing the multiple baseline research design. He indicated that to successfully implement a multiple baseline design, three independent behaviors should be observed. Treatments are then applied to each behavior until a change is observed. If the target behaviors change when the treatment is introduced, a cause-effect relationship can be inferred.

The design of this experiment, then, is geared to observing the effects of a treatment on specific individuals and specific behaviors. By initiating the experiment with different individuals and at different times while maintaining a concise data base over time, the mandate of Thoreson (1972) can be met. He postulated that research in counseling must get back to "the basics" meaning there is a need for "direct observation, careful description, and systematic planned interventions with individual subjects" (p. 4). The intensive case study applying the multiple baseline research design provides the structure for fulfilling such a statement.

Analysis

As was previously noted, one of the benefits of conducting an intensive case study is to assess the specific effects of a treatment program on the individual subjects. This analysis can be both statistical and nonstatistical in nature. One needs simply to observe the graphs of the data obtained and draw some general conclusions about the treatment effects. This

approach generally coincides with the detailed post-hoc analysis of the data to further understand the treatment effect, however. In a multiple baseline design involving three independent behaviors and repeated over a few subjects, all time-lagged with respect to their initiation into treatment, one can analyze the effects of treatment within each subject and comparisons can also be made across subjects.

The analysis of the intensive case study has been perceived differently by several authors (Chassen, 1967; Holtzman, 1963; Namboodiri, 1972; Shine and Bower, 1971). These authors prefer to treat the data gathered in a static manner using the t or F statistical tests. The difficulty imposed by such an analysis is the potential violation of the assumptions underlying the statistical tests. Most prominent among these assumptions is the question of whether the daily observations are statistically independent. Varying techniques have been devised to circumvent the problem however, but with questionable validity.

Another proposed way of assessing the effects of treatment on behavior is a dynamic analysis. Instead of concentrating on the analysis of the data as it is grouped through summations, and statistically comparing the values of the grouped data, the dynamic analysis of data keeps each of the data points separate. The analysis is done based on the general distribution of the data points. This method, described by White (1971, 1972) is built from a relatively simple computation of the median slope of the distribution of points for any period of the research with a comparison of the slopes for each phase.

This computation of trend lines improves greatly over the least squares regression line in its predictability. White (1971, 1972), in a study of 166 previously completed research studies of classroom behaviors, found that the median slope method proved to be the most effective predictor of future performance over either the more typical regression model, or a "Quickie Method", a shorter method of calculating the median slope, or a corrected median slope method.

The median slope of the data is that trend line which divides the data points in half. This method is not then greatly influenced by the extreme deviation of one or two grossly deviant data points. What the median slope line becomes, then, is that line above or below which 50% of any given individual's data points can be expected to fall. By projecting this slope into the future, the researcher can test whether the number of data points actually falling above or below the projected trend line is significantly different than expected. The regression line, on the other hand, tends to be more affected by major deviations of scores. Because of this influence, the slope of the line may be significantly changed and may not provide accurate prediction for future data.

With the application of a dynamic analysis of an N of 1 study the advantages seem important. Although a static analysis of some data may show no significant differences between two or more sets of data, the dynamic analysis may show that the data, in fact, was proceeding in dramatically different directions. It might also show, for example, that the observed

differences between two sets of data was predicted, in fact, based on the trend analysis of the data. Hence, for the purpose of using all the data collected in this study, the median slope technique will be employed.

Instrumentation

In an intensive case study on self-control, considerable observational data will naturally be collected. Rice and Glenn (1973) found in assessing a large number of patient personalities in a rehabilitation center that the personalities generally fell into three categories on the 16 Personal Factors Test. Some they considered "Normal Adjusted", who simply needed to develop interpersonal skills. A second group they found to be "Assertive Aggressive" with the recommendation that this group needed to control appropriate and inappropriate behaviors. The third group were considered "Passive Aggressive", with a tendency toward higher anxiety, apprehension, and tenseness. This group needed to learn to express themselves more openly and thereby control undue anxiety.

The Edwards Personal Preference Schedule (1953) is a 225-item forced choice questionnaire. It was designed for research in counseling purposes to provide a quick and convenient measure of 15 personality variables. One population on which this test was standardized was a college sample composed of 749 college women and 760 college males with an age range from 15 to 59. A second norming sample was comprised of male and female adults (8,963 in total) selected from a nationwide consumer purchasing panel. Means and standard deviations were computed for each of the 15 subscales.

The internal consistency scores derived by a split-half calcution ranged from .60 (Deference) to .87 (Heterosexuality). The stability scores range from .74 (Achievement and Exhibition) to .87 (Order). Finally, an intercorrelation of the 15 subscales was conducted with the highest correlation at .46 and the second highest at .36 thereby showing that the subscales are seemingly quite independent. Validity studies have been conducted showing a relationship between EPPS scales and other personality measures. Self-ratings on the 15 subscales have compared highly with actual EPPS scores. It thus appears that the test itself has sufficient reliability and validity to be useful in understanding personality characteristics in general.

For this study, selected subscales were picked which seemed to have the closest relationship to the concepts of rehabilitation. For this reason the subscales of Achievement, Deference, Autonomy, Succorance, Endurance and Aggression, a total of 130 questions will be used. In this study, the individual scores obtained have little meaning when compared to national norms, but have considerable meaning in terms of internal comparisons and the information they supply with respect to the individual patient personality and behavior patterns.

The Self Evaluation Questionnaire, a state-trait anxiety inventory (STAI, Spelberger, 1970) is a self-report measure of two separate anxiety constructs: state anxiety (A-State) and trait anxiety (A-Trait). This inventory of 40 brief statements asks the reader to rate on a 4 point scale how they

feel "at this moment" (A-State) and on a 4 point scale how "they generally feel" (A-Trait). The value of administering this test will be to assess the personality of the patients involved, not in terms of a national norm but in order to provide data on which speculation can be made relative to the patients' behavior patterns in the study.

The STAI has been normed on 484 college undergraduates, 982 college freshmen, and 377 high school students. In addition, normative data has been calculated for male neuropsychiatric patients, general medical and surgical male patients, and young male prisoners. The stability of the A-Trait subtest was shown to range from .84 to .73 over 104 days for the college undergraduate males and from .76 to .77 for the corresponding female group. The A-State subscale are substantially lower, as expected, ranging from .33 to .54 and .16 to .31 respectively. Internal consistency reliability measures show a range from .83 to .92 for both subscales thereby showing a good overall internally reliable test.

The concurrent validity of the STAI was done by correlating the obtained scores with three other personality tests. It showed a range of correlation between .41 and .85 over the three tests and separate comparison groups (college females, college males, and neuropsychiatric patients). Construct validity was addressed in separate experiments in which the A-State was expected to change, which it did with an alpha reliability coefficient ranging from .83 to .93. From this data, it would appear that the STAI will be an accurate and sensitive instrument to test the anxiety level

of the involved patients throughout the study. Once again, the results will be meaningful when compared within the study and will not be meaningful when compared to a larger population.

Another personality theory which on the surface seems to bear some relationship to the study derives from Rotter's Social Learning Theory (1954). In this theory, Rotter described the occurance of the behavior as dependent upon the expectancy that the behavior will lead to a particular reinforcement in that situation and the value of that reinforcement to the person. He arrived at the concepts of internal and external locus of control. These concepts he defined as follows:

> When a reinforcement is perceived by the subject as following some action of his own, but not being entirely contingent upon his action, then in our culture, it is typically perceived as the result of luck, chance, fate, as under the control of powerful others or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted in this way by an individual we have labelled this a belief in external control. If the person perceives that the event is contingent upon his own behavior or his own relatively permanent characteristics, we have termed this a belief in internal control. (Rotter, 1966, p. 1)

Some authors have attempted to apply this concept of locus of control to the disabled population. McDonald and Hall (1971) tried to correlate the effects a variety of hypothetical disabilities would have on those persons previously categorized on a locus of control scale. They asked 479 non disabled (emphasis mine) college students to complete an Attitude Toward Disability survey. They also asked the students to rate their perception of the debilitating effects of the various disabilities on a hypothesized male head of family, as well as

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on his surrounding society. The outcomes showed that externally classified students rated the disabilities as more personally debilitating than did their internally classified peers. The results showed that the externals also rated the effects of the disability on others as greater than did the internals. It must be emphasized that this is a hypothetical situation and that the students with no identifiable limitations took this test and projected themselves into the situation. It is uncertain whether disabled students would perceive the effects of their disability in a similar manner because such a study has not been found. Nevertheless, one might wonder whether the locus of control of the disabled does influence their behavior.

In a study of behavior patterns of hospitalized tuberculosis patients, Seeman and Evans (1962) found some additional interesting information regarding the difference in hospital behavior patterns between the internal and external control groups. The internal control group tended to ask more questions and showed an overall better knowledge of their condition than did the externally controlled group of patients. They also were noted to progress faster in their treatment. This result seems to correspond with that found by Ireland (1973) in a doctoral dissertation. He found that 25 male subjects who were given three separate tests of the I-E variety showed a significant correlation between their involvement in treatment and their locus of control scores once again with the internally controlled showing a greater awareness and knowledge about the situation.

Wendland (1972) attempted to investigate the correlations between institutionalization and the chronicity of disability with locus of control scores. In a study of 80 white males, 18 to 35 years of age with an I.Q. of more than 90 and all of whom had muscular and/or skeletal impairments, it was hypothesized that those individuals who had spent less than 1/3 of the days since they were disabled in a medical institution would have a higher external control score. The second hypothesis studied was that those individuals who were disabled for less than 1-1/2 years would have higher external control scores than those disabled longer than 1-1/2 years. The results of the study show that there was no correlation between the amount of time spent in the hospital and locus of control scores. However, a significant result at the .07 level occured when relating the onset of disability with the locus of control. The overall results from this study would seem to indicate that immediately post-disabled people tend to rely on the external means of reinforcement, but that over time the individual tends to become more internally controlled. One of the other observations that was noted in this study was that those individuals who were disabled by injury showed a higher external score than those who were disabled from birth. Results also showed that external locus of control persons tended to be younger, have more schooling, were institttutionalized less, and rated the disability more severe and the future less severe than did the internally controlled.

In a survey on the literature of locus of control and reaction to illness, Ripstra (unpublished manuscript, 1974) summarized the observations of several authors. She noted that internal locus of control patients seem to cope better with their illness than the external control group. It was her observation that in instances of long term illness or disability the locus of control model could be used as a rehabilitation variable.

Relation of Self-Control and Locus of Control

At this time it is important that the differences and relationship between the concepts of self-controlled behavior and locus of control be explained. It has been noted that self-controlled behavior in this study demands a self-awareness of the need for behavior change, a self-monitoring of the behavior, and a self-controlled reinforcement system. It has been noted that the locus of control concept is related to the issue of reinforcement as well. Locus of control refers to the person's perception as to whether they actually can control their own reinforcers. The subsequent life style bears out this perception.

Hence, in a study on self-control, persons may be likely to claim they are capable of controlling their behavior, such as controlling angry outbursts, overeating, or exercising, but, in fact, may live a life style which solicits reinforcement from others for the opposite behavior. On the other hand, persons may indicate they are unable to control their behavior while at the same time giving themselves suitable reinforcements for the behavior. Finally, the self-control and locus of control

may be in total agreement when the individual admits to not having control of his behavior or of the reinforcers. The theoretical link, then, between self-control and locus of control is an intriguing one. To further assess the recent work in this field, few studies are available. The two most related studies are presented here.

Jeffrey (1974) addressed the issue of self-control and locus of control. He noted that the process of self-control demands a change in the individual's perspective with regards to the responsibility for behavior. It was his observation, based on the survey work of Lefcourt (1966) and Rotter (1966), that the internally controlled individual will be more responsive to environmental cues for behavior, will be active in improving his own situation, will be more achievement oriented, and will be resistant to external interfering forces.

Bellack (1975), in a study of self-evaluation, self-reinforcement, and locus of control found some interesting relationships. He found that the internally controlled individuals as a group had higher self-evaluations and utilized more positive self-reinforcement and less negative reinforcement than did the externally controlled individuals. He wondered whether the external control individuals might have a personality characteristic related to self-regulation which the internal group does not have.

Since the locus of control concept seemed to have a definite relationship to the concepts of this study, a locus of control assessment of the patients in the study seemed

important. The major question was whether the patient's locus of control affects his use of the self-control concept.

To assess the patient's locus of control, a Rehabilitation Attitude Survey (Appendix C-1) was previously developed for use in this study. This questionnaire was rationally developed using items similar to that which appeared on Rotter's original I-E scales, but modified to reflect a person's attitude in a medical rehabilitation center. In addition, new items were developed which were also directly related to the patient's perspective of their treatment responsibilities. The scale was developed to measure both the trait and state locus of control scores. Several months prior to the onset of this study, the questionnaire was given to 22 adult patients. At the same time they were given the 29-item of the Opinion Survey developed by Rotter (1966). A correlation of the results of the instruments was completed showing an overall correlation of .53 ($p < .02$). It is felt that the Rehabilitation Attitude Survey reflects somewhat accurately the internal-external locus of control score of the individual particularly as it pertains to the medical rehabilitation center and in that regard provides additional data upon which to analyze the study outcome.

Another instrument used in the study was a Behavioral Rating Scale (Appendix C-2) of patient activity. This 35-item instrument was modified from a Job Behavior Scale developed by Fairweather (1964). The wording was changed to reflect the kinds of patient behaviors commonly found in a medical rehabilitation center. The instrument is a forced choice checklist

of typical patient activity levels and offers an "always" or "never" option for the staff members to describe patient activity. The scored responses were coded in the positive direction. One staff member most knowledgeable about the patient from each of the groups, Occupational Therapy, Physical Therapy, Nursing, and Social Service-Psychology, were asked to complete the Behavior Rating for the three participants in the study. To provide a comparative score, sixteen other inpatients at the time of the study were also rated by the staff. The results were then averaged for each patient and a rank order was established for the patients.

Chapter III

Methods and Procedures

The earlier chapters have noted the need for further research in the area of medical rehabilitation. It has also been suggested that the link between the behavioral science field and rehabilitation should be carefully addressed. The theory and practice of self-controlled behavior modification have been reviewed and the overall positive effect on selected behaviors has been noted. It then seems reasonable to study whether the introduction of a self-controlled behavior modification program into a medical rehabilitation setting has a positive effect on selected patient behaviors.

In this chapter the design and implementation procedures for such a self-directed reinforcement program in a medical rehabilitation center will be considered. The hypotheses of the study will be considered first. In subsequent sections the sample, the experimental procedures and, finally, the method of analysis used in assessing the effects of treatment will be discussed.

Hypotheses

The purpose of this study was to test whether the establishment of a self-directed reinforcement program had any effect on selected medical rehabilitation patient behaviors. As noted earlier, a self-reinforcement program necessitates the use of some self-monitoring technique, but self-monitoring itself may have a reactive effect on the behavior being observed. Hence, it was essential to separate out of this study the potential confounding effects of self-monitoring from self-reinforcement effects. For this reason, the design of the experiment was such that the following directional hypotheses could be tested:

Hypothesis 1:

The implementation of a self-monitoring (SM) technique for selected patient behaviors will significantly change the occurrence pattern of the behavior in the desired direction over a pre-treatment baseline period.

Hypothesis 2:

The implementation of a self-reinforcement (SR) program (Which includes self-monitoring (SM)) will significantly change the occurrence pattern of behaviors in the desired direction over a pre-treatment baseline (B) period.

Hypothesis 3:

The implementation of a SR program will significantly change the occurrence pattern of selected behaviors in the desired direction over a SM only period.

Hypothesis 4:

As a result of the SM and SR intervention, the occurrence pattern of selected behaviors during the post-treatment extinction period (E) will be significantly different in the desired direction over the pre-treatment baseline period.

Design

The design chosen for this study was a multiple baseline time-series design as applied to a single subject. The reader is referred to Chapter 2 for the rationale for this choice. To review, however, the N=1 approach was chosen in order to more carefully assess the specific effects of the treatment on the individual behaviors. The multiple baseline time series was chosen in that it adequately controls for potential confounding variables. Figure 3-1 shows the format of the experimental study as it was applied with each subject. In this figure, B refers to a no-treatment baseline, SM refers to Self-Monitoring, SR--Self-Reinforcement, and E refers to a post treatment extinction phase.

Figure 3-1

Multiple baseline design applied to 3 behaviors for each patient

Calendar Days	9	18	27	36	45	54
Behavior 1	B	SM	SR	E	E	E
Behavior 2	B	B	SM	SR	E	E
Behavior 3	B	B	B	SM	SR	E

Figure 3-2 shows the actual research time line as it occurred over the three patients. Patient B is shown to begin the study on the 17th calendar day while Patient C began the study on day 25 of the study. The total time used for the study was 79 calendar days. One should readily see from Figure 3-2 that there is a multiple baseline effect both within one patient's experiment study as well as across

Figure 3-2

Multiple Baseline Design as applied to the selected behaviors of 3 patients

Patient	Behaviors													
Calendar	Days	9	18	27	36	45	54							
Sue	1&1a	B	SM	SR	E	E	E							
	2	B	B	SM	SR	E	E							
	3	B	B	B	SM	SR	E							
Calendar	Days	17	26	35	44	53	62	71						
Bob	1 →	B	SM	SR	E	E	E							
	2 →	B	B	SM	SR	E	E							
	3 →	B	B	B	SM	SR	E							
Calendar	Days	25	34	43	52	61	70	79						
Doug	1 →	B	SM	SR	E	E	E							
	2&2a →	B	B	SM	SR	E	E							
	3 →	B	B	B	SM	SR	E							

the three patients, adequately controlling for any potential confounding due to external factors.

Sample

Since this study intended to test the effect of a self-controlled reinforcement program on medical rehabilitation inpatients, the population from which the sample was taken was in a medical rehabilitation center. Further, because the study concentrated on the individual effects of an experimental treatment on selected behaviors of an N of 1 design, only a small segment of the medical rehabilitation inpatient population was used.

The population from which three persons were selected for this study was the adult and young adult inpatient population at Mary Free Bed Rehabilitation Center in Grand Rapids, Michigan. The facility is a comprehensive medical rehabilitation center offering total rehabilitation services to the entire Western Michigan area. The types of rehabilitation services offered include medical and nursing care, occupational, physical, and speech therapies, psychological and social services. Mary Free Bed is a fully accredited 78-bed medical center open to all ages and disability types. Children, which comprise about 25-30 percent of the total population, are admitted with developmental disabilities such as cerebral palsy or brain damage, severe asthma, congenital and traumatic amputations. The facility serves young adults with similar diagnoses or other long-term medically complicated cases, and it admits adults who have a variety of disabilities resulting from

closed head injuries, spinal cord injuries, strokes, arthritis, amputations arising from injury or illness, among other diagnoses. The overall length of stay in this center averages about 43 days, with adults staying slightly longer than the population in general.

For the purpose of this study, three patients were selected from these two older groups. This number was chosen in order to provide ample opportunity to test the effect of the principle of self-reinforcement on inpatient behavior and to formulate the basis for future work in the area. Since this study was designed to test the application of the theory in a different setting than what had been previously used, the number chosen was small. This intense study permitted a greater in-depth analysis of what transpired rather than to prove that self-control makes a significant change in all medical rehabilitation patients.

The three persons selected for the study were chosen because they met certain standards. These standards included the need in the patient's treatment program for both occupational and physical therapy and a minimum anticipated stay of 60 calender days. In addition, the selected patients were required to have little or no mental impairment which would affect their comprehension of the anticipated activities in the study. The ultimate acceptance of the patient into the study rested with the researcher and was based on the medical reports, a subjective assessment of the patient's mental status, as well as on the patient's overall physical

functioning level. Hence, variables such as age, sex, disability type, length of previous limitations, work status, and educational levels were not considered specifically in the selection of the patients.

The three patients selected for the study are described as follows:

Patient A: Sue

Demographic:	40-year-old female, married, mother of two teenage sons, registered nurse, socially active
Disability & Limitations:	Hemiplegia and Heminopsia due to Cardio-vascular accident and/or right temporal lobe hematoma; partial paralysis of left side, vision loss on left side, weakness of right hand, secondary to pre-existing condition
Time Since Onset of Disability:	Approximately 9 weeks
Nature of Condition:	Confined to wheelchair with functional use of right side only. Wore a short leg brace on left leg and used a mobile arm support on wheelchair for mobility of left arm and shoulder and prevention of drooping shoulder.

Patient A: Sue (cont.)

Patient's Goals for Treatment:	Learn to walk, or at least stand with support, to cope with restricted visual field, to strengthen dominant hand and use affected arm for support activity, to function as mother and wife under restricted limitations.

Patient B: Bob

Demographic:	27-year-old male, divorced, father of two children, used car salesman, previously physically strong and socially active person living with mother.
Disability & Limitations:	Spinal cord injury at C5-6 (Cervical vertebrae #5, 6) causing partial paralysis of hands, fingers, and total paralysis from upper chest down, but with some sensory retention.
Time Since Onset of Disability	Approximately 7 weeks
Nature of Condition:	Confined to wheelchair, totally dependent for transer, bowel, bladder, hygiene, eating, and mobility at onset of study.

Patient B: Bob (cont.)

Wore a neck movement restricting Halo Brace until day 42 of the study to assist in healing of spinal fusion.

Patient's Goals for Treatment: To walk, and use of hands, to regain independence.

Patient C: Doug

Demographic: 11-year-old male, foster child living with grandparents in small rural community, previously enjoyed scientific and athletic activity.

Disability & Limitation: Extreme total body muscle weakness due to Guillam-Barre Syndrome, a deteriorating, but reversible condition affecting all muscle groups, following a severe appendicitis.

Time Since Onset of Disability: Approximately 11 weeks

Nature of Condition: Confined to wheelchair, nearly totally dependent for assistance in feeding, toileting, transfers. Doug was very weak and frail looking, had supposedly lost

Patient C: Doug (cont.)

about 30-35 pounds since his illness and moved about very slowly in wheelchair. Began to stand in a tilt table 30 minutes/day just as study was started.

Patient's Goals for Treatment: To walk, run, use arms and hands, and go home.

Procedures

Pre-Study Sequence

Prior to the onset of the study, having obtained the consent of the Executive Director of the Center, the physical therapy (PT) and occupational therapy (OT) departments, nursing units, psychology and social service departments were told of the study in general terms. Their respective roles in the study were described as they related to the planned patient selection and patient conferences. Subsequently, a one-week pilot study was introduced with one patient to refine specific systems, procedures, and forms. In addition to staff training, paid observers for the study were given an overview of the study in terms of the research design and hypotheses being tested. Specific considerations for observer behaviors were described as outlined in Appendix B-1. Each of these observers participated in at least one joint observation(with the researcher) of the chosen behaviors of each patient prior to the beginning of any data collection on the patient.

The typical admission procedure to the center remained in effect throughout the study. This procedure included admission office assignment to nursing unit and room. Within one or two days, the patient's medical record was reviewed by each department with assignment to appropriate therapists determined either by who the physician was, the nursing unit the patient was on, or the primary limitations of the patient. Subsequent to this determination, the physical therapist and occupational therapist scheduled the patient into a treatment routine usually consisting of two 30-minute sessions per day, or more, depending on the patient's physical tolerance. The other staff members scheduled their less frequent appointments as fit best with the patient's daily schedule.

Patient Selection

As new patients were admitted to the center, or as existing inpatients made sufficient progress, the head of the physical therapy department informed the researcher of prospective candidates for the study. The researcher then met with the occupational therapist (OTR) and physical therapist (RPT) assigned to the patient to obtain their subjective evaluations of the patient's capacity to participate in the study. At this point the researcher casually observed the patients in their treatment programs and became briefly acquainted with them. If, after this brief exposure to the patients, the researcher considered the patients to be good candidates for the study, the patients were informed of the study. Each was told they were part of a research project but that it would not hamper their treatment. They were told that there would be some

recordkeeping and paper work. The patients were also told they would be included in a special team conference to discuss their personal goals for their treatment and objectives for their own discharge. Each was informed that "as a result of that conference, three behaviors would be selected" which would form the basis of the study. If the patient consented to be part of the study, the patient's immediate family was contacted and briefly advised of the study. If they concurred with the patient's consent, a patient conference was arranged. Of the first four patients selected for the study, three were interested and became the participants for the study.

Patient Conference

Sue's initial conference was held in the patient lounge on the nursing unit. It was attended by the entire team (physical therapy, occupational therapy, social service, psychology, nursing) and included the patient's husband as well. Sue was informed that this was a research project.

The conference enabled Sue to verbalize her goals and feelings about her treatment, allowed the staff to give their perceptions of the goals, and concluded with a general discussion about the total program. The specific goals of the patient, and the related behaviors and recommended time for completing behaviors as determined by the researcher and staff (without the patient's knowledge) are shown in Figure 3-3. After one day of additional instruction for selected behaviors, the baseline period was initiated.

The conference for Bob was held at his bedside with RPT, OTR and nursing in attendance. Bob's goals and feelings about

Figure 3-3

Summary of Sue's Goals, Monitored Behaviors, and Self-Reward Contract

Patient	Patient's Goals	Researched Behaviors	Time	Means of Monitoring	Self-Reward Contract
Sue	1. Walk 2. Perform activities of Housewife 3. Drive car	1&1a Travel time from ward to OT & including number of times Sue accidently hit things (1a)	to p.m. therapy	Count accidents with counter & timed trip with stop watch	Have afternoon snack for improvement in linear fashion from 3:45/trip to 3:15/trip for the 9 days with 1 or fewer accidents/trip
		2 Time spent between pm OT and PT in OT prescribed eye-hand coordination activity	2-3p.m. (30-min. maximum)	Actual clock time	Doing mind puzzles or games for 20 minutes of OT activity
		3 Number of prescribed passive range of motion exercises	12-1p.m.	Counting	50ROM exercises before Sue could have dessert at lunch

Figure 3-4

Summary of Bob's Goals, Monitored Behaviors, and Self-Reward Contract

Patient	Patient's Goals	Researched Behaviors	Time	Means of Monitoring	Self-Reward Contract
Bob	1. Walk 2. Use Hands again	1 Resistance exercises of right arm	4-5p.m.	Counting	No cigarettes after supper unless Bob did 50 resistance exercises prior to supper
		2 Range of Motion exercises of left arm	4-5p.m.	Counting	While smoking cigarettes do range of motion exercises
		3 Time spent in a.m. OT actively working	11-11:30 a.m.	Electric "stop-clock"	20 minutes activity earns cigarette break

Figure 3-5

Summary of Doug's Goals, Monitored Behaviors, and Self Reward-Contract

Patient	Patient's Goals	Researched Behaviors	Time	Means of Monitoring	Self-Reward Contract
Doug	1. Walk 2. Make arms strong 3. get out of center	1 Range of motion exercises of arms	3:30-4:00	Counting	No recreational therapy unless 45 exercises
		2&2a Time from OT to elevator and # of pushes of wheelchair (2a)	after p.m. therapy	Stop watch & counting	A can of pop if Doug stayed below his standards for established time and pushes
		3 Time spent in p.m. OT activity	3:00-3:30	Electric "stop-clock"	Choice of OT activity after 35 minutes of therapy

his program were solicited. The attending staff were encouraged to respond to the patient's concerns. Again, specific important related behaviors were singled out by the staff and the researcher for inclusion in the study. These are shown in Figure 3-4. The subsequent day was used by the staff to give instructions to the patient on the routine therapeutic activities demanded "for his rehabilitation" and to write ward orders, a description for the nursing units to follow in implementing therapy-related behaviors during off-therapy hours.

The patient conference with Doug, because of scheduling problems, was less efficient. It was anticipated that the conference would take place during a routine medical conference at which all involved staff and attending physician were in attendence. Due to an unavoidable problem, the entire conference (including RPT, OTR, social service, nursing, physician and medical students) moved to Doug's bedside where his condition was briefly checked by the physician. The group then reconvened for a reporting session without Doug to discuss treatment plans, problems, and progress. The researcher subsequently interviewed the patient alone to obtain his goals for treatment. Once again, a one day lag time was established to allow for appropriate therapy training and encouragement to occur and to establish observer schedules. Doug's specific goals and the behaviors selected for his treatment are shown in Figure 3-5.

Once each of the behaviors had been identified and the best time established for observing the behaviors had been cleared with all team members, the baseline period for each person was begun. In each case where observers were to be trained, a one-day practice observation was completed with an observer to make sure he/she understood the specific behavior to be observed, the best way of monitoring the behavior, and the proper method of recording the behavior. Appendix B-2 shows the log sheets used for recording the daily occurrence of the behavior by the observers. Appendix B-3 shows the research journal sheet that was kept on the logs to use in recording unusual observations or comments which were pertinent to the day's observations.

Elaboration of the Behaviors Chosen and Monitoring Techniques

Based on Sue's overall desire to regain lost skills needed for homemaking and for her potential return to her job as a nurse, several behaviors were noted for inclusion in the study. Of particular importance to these goals was her definite vision loss. Loss of the vision in one eye was uncompensated for at the onset of the study. Typical of most persons with this type of loss, Sue would forget she couldn't see out of one eye and would frequently hit things with her wheelchair such as doors, other persons, protruding objects, or would not be able to locate things even though they were in front of her but off-centered in her vision field. She also missed turns in hallways and became quickly disoriented in location. The first major behavior unit selected was the process of going from her room to the OT area. This behavior

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was broken into two separate functions--physical strength as measured by time, and visual accuracy as measured by lack of accidents. Thus, behavior 1 and 1a were related to the length of time it took Sue to get to therapy from her room and the number of objects she hit which impeded her progress to her destination. These skills were related to her desire to regain homemaking skills. Another benefit of behavior 1 was that it put additional pressure on her right hand in that she wheeled her wheelchair with this hand and was therefore a strengthening exercise. Since the therapy area is on a different floor than the nursing units, Sue was timed with a stopwatch as she began her trip to therapy from her room. The watch was stopped when Sue pressed the elevator button and started again as she got off the elevator on the treatment floor and proceeded to the OT area. It was stopped while she waited in the OT room to get directions to her final therapy station, and was reactivated until she got herself to the area. All "accidents" were counted during both timed or untimed periods.

Behavior 2 was also developed to assist Sue in her objective of homemaking. The OTR agreed to make a list of recommended activities and place some materials in Sue's room to help her to develop her eye-hand coordination. These exercises were necessary both for strengthening the weak but dominant hand and learning to cope with her restricted visual field. The activities prescribed included any writing, playing cards, games, doing leather work. Sue did not have

therapy between 2 and 3 p.m. so this was considered an ideal time to engage in these activities. Initially, both the number of specific goal directed movements of the right hand and the amount of actual time Sue spent in a continuous 30-minute time period were monitored. Because of the variety of activities and difficulty in assessing goal-directed activity, as the study progressed, only the actual number of minutes spent in an activity as measured by a stopwatch was recorded. Once Sue began an activity, a 30-minute continuous time period was observed. That is, if Sue began playing cards at 2:10 the observation period would end at 2:40. Any major interruption in Sue's activity where her attention was diverted from working with her eyes and hands led to a termination of the timing. But as Sue resumed her activity, the timing resumed until the end of the 30-minute observation time or until Sue terminated the OT prescribed activity. None of Sue's goal directed behavior beyond the 30-minute continuous time period was recorded.

The third behavior observed included a series of exercises Sue was trained to perform on her paralyzed fingers, hand, arm, and shoulder. Called passive range of motion exercises, these required taking the affected part of the body with the functional hand and moving the affected part through its total range of motion. The need for this activity was to prevent tightening of the affected muscles with possible pain and deformity the result. The activity was designed also to help firm up the muscle groups and build whatever residual strength might be left. Each complete passive flexion of the

muscle group was counted separately. The muscle groups affected included the thumb, the fingers as a group, the wrist, the elbow, the shoulder muscles up and down and across the body and out to the side, a total of six separate exercises.

Bob's three behaviors were derived primarily from his goals of desiring to walk again and to be functionally independent. Behavior 1, called resistance exercises, were necessary for building strength in his upper extremities. In this activity, Bob had weighted cuffs (beginning with 5 pounds, slowly increasing) placed around the wrists. He was required to flex the muscles of his arm in order to lift the weights and to swing the arm inward and outward. The goal was to develop gross muscle strength in the biceps and triceps. In this behavior, Bob was given RPT instruction to use the cuff weights daily between 4 and 5 p.m. when on the nursing unit. Ward orders were sent to the nursing unit "encouraging Bob to use the cuff weights and exercise both arms" between 4 and 5 p.m. For the study, the specific number of contraction and relaxation cycles of his right arm were counted. This arm was chosen since his right hand was his dominant hand and this arm needed the most strengthening for subsequent independent activity. The anticipated length of time for this exercise was about 15 minutes before Bob would be expected to tire. The cuff weights were left in Bob's room during the study so that he could make a request of the orderly or other nursing staff to put them on.

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Behavior 2, range of motion exercises of left upper extremity, was related to Bob's overall goal of mobility and strength. Through disuse and the presence of the large head and neck controlling Halo Brace, his left arm was restricted in its movement at the shoulder. It was increasingly painful to him to have it moved beyond a certain point. Because this restriction could easily lead to reduced functional ability in terms of dressing or hygiene, he was encouraged to consciously move his left arm as much as possible between the hours of 4 and 5 p.m. Bob was given specific instructions on how to do the ranging activities. Ward orders were sent to the nursing unit to "encourage Bob to do his range of motion" at the selected time. A simple count of the number of complete upper left arm range exercises was the observational requirement. Since this activity generally takes no more than 5 minutes, it was felt that the performance of this behavior would not interfere with the performance of Behavior 1.

Behavior 3, OT attending behavior, was selected not so much from Bob's goal statement as from the researcher's observations of his activity level in both PT and OT. With the OTR's agreement, it was decided to attempt to influence Bob's attending behavior in OT. To measure this behavior once Bob reached his assigned station in the OT area, a stopwatch was activated whenever he was not actively doing some goal directed activity with his upper extremities. He was not timed while the upper extremity muscles were actively

exercised. When he stopped, the watch was activated after a count of 5. When he began to work again, the watch was deactivated after a count of 5. This count was necessary since Bob made considerable random movements, and a count of 5 seemed to provide the necessary time to determine if the behavior was to continue in goal directed action. In this setting a 30-minute continuous observation time was maximal. Since a number of observation periods fell short of this maximum, the observed data were converted to percentages of time not engaged in activity. For presentation in the graph in the Appendix (A-8), the percentages were reversed to show percentage of activity time.

Doug's behaviors were related to the very obvious need of strengthening. Behavior 1, range of motion exercises, was related to Doug's arm strength. He was advised by both his RPT and OTR to continually and actively move his shoulder, upper arm, and wrist muscles to strengthen them and to keep them from becoming restricted in movement. A ward order was sent to the nursing unit to "encourage Doug to do his upper extremity range of motion exercises between 3:30 and 4:00 p.m.". For observation, the number of complete cycles of exercises were counted and recorded as described for both Sue and Bob.

Behavior 2 and 2a, travel time and number of pushes, were also related to upper extremity strengthening. Since Doug was very weak, wheeling himself around in a wheelchair was difficult and tiring for him. In an attempt to get him to become more vigorous in wheeling his own wheelchair, he was timed in his trip from a specific area in OT to the elevator.

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At the same time the number of distinct and separate pushes of the wheels of his wheelchair were counted. Any simultaneous push with both arms was counted as a single push while any single arm push also counted as one push. The timing was done by a stopwatch while the number of pushes was simply counted as Doug wheeled down the hall, an estimated 80 feet to the elevator.

Behavior 3, amount of time spent in OT activity, was related to Doug's overall desire to get out of the rehabilitation center. It was the observation of the researcher that Doug seemed to spend a great deal of time in OT therapy sessions observing others while accomplishing little himself. Hence, as in Bob's situation, the OTR agreed to try to improve Doug's OT activity time. Observation for a 30-minute maximum time period in his afternoon OT session was initiated. Because of the observer schedule, the start of the period was somewhat contingent upon when Sue got to the OT area in the afternoon. As soon as the observer and Sue arrived from her timed trip to OT, timing began on Doug's activity. Any time Doug was active with his arms and/or hands in therapeutic activities the stopwatch was activated. When Doug's attention was diverted and he stopped working, the watch was stopped.

Self-Monitoring Technique

On the last day of the pre-treatment baseline period for each behavior, each of the patients was informed of the specifics of the behaviors being observed. They were told that on the next day they were to begin keeping a record of that behavior themselves. In some cases this recordkeeping only required counting. In some cases the patient was given

a stopwatch with which to keep a record. In Doug's case with behavior 2, travel time, since he lacked the strength to quickly start and stop a stopwatch, a wooden holder was made into which the stopwatch fit snugly. He could then start and stop the watch by hitting the control button rather than squeezing it since the watch was firmly placed in his lap or on his wheelchair seat. He could carry the watch with him relatively simply as he "ran his race". In the behaviors where self-monitoring of OT activity levels was required (Bob and Doug), an electric alarm clock was wired to a very wide, easily engaged electrical switch. Since both Doug and Bob lacked the finger strength to manipulate even an ordinary toggle light switch, the larger switch, which was controlled by the entire hand, allowed easy self-timing of their activity in the therapy hours. Throughout the entire study, the external observers kept a record of observations with the use of a stopwatch and hand-operated digital counters like those used to keep track of expenditures in grocery shopping. The researcher was present at the beginning of each self-monitoring phase to assist in counting and recording of the target behaviors.

In all behaviors, Sue used the same type of log used by the external observers to daily record her observations. She generally kept the log book at her bedside throughout the SM and SR periods of her study. Similarly, Doug was given the same type of log which was placed in a folder by his bedside. He did not wish to keep the records on the wall near his bed

or in any other visible place. Because Doug was unable to do anything requiring fine hand coordination, the researcher wrote Doug's verbal report into the chart for him. The OTR kept a daily log with him for behavior 3, OT activity time. Bob, being nearly completely paralyzed, could not use his hands for any recording. In his case, a log sheet was posted at his bedside and the orderly was taught to fill in the chart when Bob reported on his target behavior performance. Once again, the OTR filled in the daily performance log for Bob on his activity time in OT. She would verbally check the accumulated clock time with Bob prior to recording the accumulated time on her sheet. These sheets were kept in the OTR's file.

Self-Reinforcement Period

At the conclusion of each SM period, the researcher had a conference with Sue about her perception of the activity level of the period. The concept of reinforcement for performing the target behaviors was discussed. Sue readily grasped the concepts of reinforcement planning. A discussion was held about what kind of things would be rewarding for her when she successfully completed the target behavior. In addition, a standard of behavior was established by Sue based on her performance level during the SM period. Once this standard was set, the reward was related to it in a contract which was written onto her recording log. Since Sue was attempting to gain weight, eating snacks was a high frequency and pleasant activity for her. It should be noted in Figure 3-3 that for behaviors 1, 1a, and 3 the reinforcer Sue chose to use was related to eating. The mind games and

puzzles which Sue chose to reinforce behavior 2 were activities which she indicated she always had enjoyed, but which the researcher noted were not common occurrences. In lieu of a better alternative at the time, however, her choice remained. Per the theory of self-controlled reinforcement, the reinforcers were all under Sue's direct control pending the accomplishment of what Sue felt was acceptable minimal performance. She continued to monitor the daily results of her behavior in her bedside log book.

Bob's self-reward contract was developed in the same way as Sue's for behavior 1 (resistance exercises of left arm). The researcher attempted to explain the concept of reinforcement to Bob. He realized the basic values of the concept and suggested some potential reinforcers which evidenced his knowledge of reinforcement. The researcher helped Bob choose a high probability and pleasant activity which was under his direct control. Based on his SM performance levels, a standard of behavior was established by Bob as noted in Figure 3-4, and for meeting this standard for behavior 1, Bob chose to allow himself cigarettes after his supper. A slightly modified approach was attempted for behavior 2 in light of the poor results during the SR period of behavior 1. Since Bob did not really wish to give up a reward for lack of performance, for behavior 2, Bob agreed that during the 3-4 minutes he was smoking a cigarette (a high frequency behavior after his afternoon therapy) he would do the range of motion exercises of his left arm. In this case no specified standard was set, simply that he would perform a less pleasant activity while

simultaneously performing a pleasant activity, a direct application of the concept called contingency management. Since Bob's 3rd behavior was occuring in the OT area, the researcher was interested in whether the self-control system could be taught to and implemented through a staff person. In this case the therapist was given instruction in the process of allowing the patient to dictate a standard of behavior, a suitable high probability reinforcement and also a method of recordkeeping. The therapist was encouraged to help the patient select a reasonable standard based on the SM period level of activity and assist in selecting a meaningful reinforcer. Figure 3-4 summarizes Bob's Self-Reward Contract as it was developed for this behavior.

Doug's SR phase was handled very similarly to the others. For behaviors 1, 2, and 2a, at the end of the SM periods, a conference was held with Doug to talk about the concept of giving rewards to himself as a way of increasing or maintaining appropriate behaviors. Doug also readily grasped the basic idea of the meaning of rewarding behavior with nice things or pleasant activities. At the appropriate times, his SM period performances were reviewed with the researcher for behavior 1 and 2 and he was asked to pick something enjoyable which he often did at about the same time of the day as the target behavior which could be related to the research behavior. He was then encouraged to choose a goal for his behavior which would be acceptable to him and for which he could have his self-controlled reward. Since Doug wanted to gain weight, and

since his friends often had a snack, he often had pop and candy from the cafeteria after his afternoon therapy. He also thoroughly enjoyed associating with his peers in recreational and social activities late in the day. These were logical choices totally under his control and were very reinforcing to him, and as shown in Figure 3-5, became the basis for his self-reward contracts for behavior 1 and 2. As with Bob, Doug's third behavior was monitored in the OT area. Once again, the OTR was encouraged to help Doug establish a reasonable standard of behavior based on his SM period performance level and to choose a suitable reward for accomplishing his behavior. In this situation, Doug chose to work on a model, or other activities he preferred to do over some OTR prescribed activities. The chance to work on an activity he particularly enjoyed became the reinforcer for appropriate activity levels for Doug in OT.

Additional Data Collected

In addition to the daily behavior data of the individuals, the test data previously described were also collected. At the onset of the study, each participant was given the previously described Rehabilitation Attitude Survey, the locus of control instrument. Throughout the study, the state trait anxiety inventory was repeatedly given to assess potential change in the A-State. These were administered as often as conveniently possible, given the patients' cooperation and schedule. In addition, the STAI was administered to a variety of other patients in the center to establish a generalized

norm against which to compare the results of the research patients. At the conclusion of each patient's study sequence, he or she was given the selected subscales of the EPPS as previously outlined, an Incomplete Sentences Test (Appendix C-3) designed to assess the general attitude to the study itself, and a Research Questionnaire (Appendix C-4), a study related true false test designed to test the level of knowledge and interest the patient had in the study.

Analysis

The analysis of this study was done with the application of median slope analysis described by White (1971 and 1972a,b). This technique utilizes data collected over time for the purpose of predicting future behavior patterns. Although originally intended for use in assessing the effectiveness of educational programs in a child's learning, the technique is useful as a post hoc test for the effects of an experimental procedure on any single subject study. The accuracy of this predictive technique depends on the number of original data points from which the original trend line is derived. More data points improve the accuracy and increase the length of time into the future which the slope can predict. If a slightly greater deviation about the projected slope is allowed, a still higher chance of accuracy of prediction is possible. White notes that a 25 percent increase in allowable deviation increases the accuracy noticeably. White described four types of significance testing which can be done through the process of median slope calculation. The first includes

the test of whether the trend of the data is different than a flat or no trend distribution. A second test is whether the slope for a particular phase of the study is significantly different than for a slope in the subsequent phases. This latter test is a test of treatment effects. If the slopes vary significantly between phases, the differences in a single subject study must imply some treatment effect. This test of trend line differences can be further broken down into two more analyses. The third analysis, then, is a test of the immediate effect of the treatment by testing the step changes between two phases of a study. The fourth test is of the longer range effect of the intervention which is again done by testing the differences of slopes between phases but in a slightly different manner than the second test.

The step change is noted by simply comparing the behavior level at the completion of one phase and the level of the same behavior immediately after the initiation of a different treatment. In this study, if behaviors show a large difference from one phase to the next phase immediately after the change in process, the deduction would be that the treatment itself caused an immediate change in motivation or facility to perform. If, on the other hand, we notice that the immediate change in levels of performance takes place over the entire period and the distribution of data points shows a different slope than previously, then we can describe the longer term effect of the treatment itself by noting the direction of the slope.

In this study, the analysis of the overall significant differences between phases utilizing the binomial distribution as

described by Siegel (1956). In this analysis the significance test derives from whether the actual number of data points falling above and below the projected trend line could be due to chance occurrence and the comparison of phases was done in terms of significant step and significant trends. The results of this analysis are described in the following chapter.

As was mentioned previously, the value of the intensive case study is that it permits both a statistical and non-statistical analytical approach. The analysis of this study is carried out at both levels. The statistical approach has been described. The non-statistical approach includes consideration of the subjective climate during the study, the individual influences affecting patient behaviors, and the changes in daily procedures which might explain the variety of behavioral observations. Chapter 5 addresses this analytical process.

Chapter IV

Statistical Analysis of the Data

The N of 1 Intensive Case Study Approach to research produces a considerable amount of useful data. The statistical analysis technique recommended by White (1971, 1972 a,b) provides a statistical assessment of the immediate and longer term effects of an experimental intervention. However, a statistical analysis of this type does not utilize the nominal data and subjective observations gained over the period of observation. Since the researcher was interested in the effects of SM and SR on patient behaviors, a statistical analysis is important. At the same time, a considerable amount of other observational data were collected which cannot be statistically analyzed but which may have meaning for the practitioner interested in the problem. For this type of data a separate analysis is very important. Hence, the analysis of this research will be two-fold--statistical and descriptive. This chapter will deal with the question of what were the effects of SM and SR treatment on the behaviors statistically. The subsequent chapter, which could be considered an assessment of the meaningfulness of the study, will attempt to isolate factors which might be of benefit to the rehabilitation or medical profession.

To assist in the statistical analysis of the data, the reader is referred to Figures 1-11 in Appendix A. These figures show the data point distributions for each of the 11 specific behaviors. The figures also show the median slope trend line

for each phase of each behavior. Each of the stated hypotheses will be reviewed and summarized in terms of the overall outcomes. Once again, the point is to be made that in White's median slope analysis there is the possibility of four separate analyses: (1) The testing of difference from a no-trend distribution, which will not be addressed; (2) the testing of differences in slopes between phases, which will be tested; (3) the testing of differences due to step changes or the immediate effect of the treatment, which will be addressed; (4) the differences in trends between phases or the longer range effect of the treatment, which will be assessed. In the following description, the test of overall statistical differences is the test of overall differences between phases. The Step Differences addressed immediate change effects and Slope Differences addressed the longer range effects.

In each of the tables a range of accurate prediction is also presented. The figures in this range show the highest possible accurate prediction from one phase to another and from one end of the projected phase to the other. The more data points which originally exist upon which to plot a trend line, the higher the predictability. On the other hand, the farther ahead into the future one wishes to predict a trend, the less accurate is the probable prediction. The figures were computed by White from the actual data analysis of 166 analyzed studies and reflects a deviation error of .25 in the data distribution.

Figure 4-1

Statistical probability of SM > B for each behavior using all B period data points

PATIENT		BEHAVIOR	RANGE OF ACCURATE PREDICTION +.25 (p>)	STAT. DIFF. (p<)	STEP DIFF. (p<)	SLOPE DIFF. (p<)
Sue	1	Travel Time	.80-.78	N.S.	N.S.	N.S.
	1a	Accidents	.80-.78	.055	N.S.	.055
	2	Eye-hand OT	.99	N.S.	--	--
	3	Range of Motion	.99	.020	.020	N.S.
Bob	1	Resistive Exer.	.96	N.S.	--	--
	2	Range of Motion	.96	N.S.	--	--
	3	OT % Activity	.93-.90	.062	N.S.	N.S.
Doug	1	Range of Motion	.96	N.S.	--	--
	2	Travel Time	.71-.67	N.S.	--	--
	2a	Pushes	.71-.67	.004	N.S.	.008
	3	OT % Activity	.90-.84	N.S.	N.S.	N.S.

General Findings

Hypothesis 1:

The implementation of a self-monitoring (SM) technique for selected patient behaviors will significantly change the occurrence pattern of the behavior in the desired direction over a pre-treatment baseline period.

This hypothesis was rejected.

In this analysis, the trend line obtained in the total baseline period was extended into the SM period. The binomial test was used to calculate the probability of the differences between the projected trend and the actual trend of the SM data. The same procedure was used to calculate the significant findings of the step and slope changes.

It is noted initially that for Sue (Behavior 1) and Doug (Behavior 2), although the actual travel time was not significantly altered, the corresponding behaviors (accidents and pushes) were both significantly different because of self-monitoring. Both showed that the statistical difference was due mostly to a change across phases of the slope of the data and not a large step difference. This result might be expected in behaviors of this nature where practice is essential for improvement. A slow improvement would undoubtedly occur rather than an immediate change simply because of the learning required to become more effective. We further note that Sue's ROM exercises show a significant change this time due primarily to a step change. One might speculate that self-recording of her behavior in this case changed the fact that the behavior occured at all. However, upon further analysis, we note that Sue's ROM trend line is steeply declining during the SM period but the scatter of data in that period

was enough to make the overall decision regarding significance. We also note that the mean of the SM phase is progressively in line with the changes in the period means from B to SR. Further analysis shows that neither Bob's nor Doug's ROM exercises were significantly altered when they were asked to self-monitor their behavior, however. Finally we note that Bob's percentage of OT activity significantly improved as a result of the self-monitoring. In this case, step and slope differences apparently combined to cause the change although neither the step nor slope differences were significant in themselves.

One must conclude from the data that although SM seems to have some effect on some behaviors, it does not routinely effect all behaviors. We can further speculate that the effects, if any, of self-monitoring vary from an immediate effect to a longer term effect depending on the type of behavior being measured where practice or motivation is the basis for activity.

Hypothesis 2:

> The implementation of a self-reinforcement (SR) program (Which includes self-monitoring (SM)) will significantly change the occurrence pattern of behaviors in the desired direction over a pre-treatment baseline (B) period.

This hypothesis was rejected.

For this analysis, the total number of B data points were used to develop the trend line. This line was projected across the SM period and into the SR period. Of particular note, 4-2 shows that in Sue's case the probability ranges for successful prediction are very low and little reliability can be placed on the statistical outcome for behavior 1 and 1a. This is due to the fact that very few baseline data points were available upon which to base a prediction from 9 to 18 days into the future.

Figure 4-2

Statistical probability of differences of SR > B for each behavior using all B period data points

PATIENT		BEHAVIOR	RANGE OF ACCURATE PREDICTION +.25 (p >)	STAT. SIGN. (p <)	STEP SIGN. (p <)	SLOPE SIGN. (p <)
Sue	1	Travel Time	.69-.63	N.S.	--	--
	1a	Accidents	.69-.63	.004	.004	N.S.
	2	Eye-Hand OT	.96-.94	N.S.	--	--
	3	Range of Motion	.94	.002	.002	N.S.
Bob	1	Resistance Exer.	.96-.97	N.S.	--	--
	2	Range of Motion	.97-.97	N.S.	--	--
	3	OT % Activity	.97-	N.S.	--	--
Doug	1	Range of Motion	.96-.97	.002	.002	N.S.
	2	Travel Time	.96-.94	N.S.	--	--
	2a	Pushes	.96-.94	.035	N.S.	.035
	3	OT % Activity	.94-	N.S.	--	--

Figure 4-2 shows that statistical significance again occurred not in actual travel time for Sue and Doug but in the related activity associated with accidents and pushing behavior. It would appear from this data that recording and reinforcing appropriate behavior levels does little to affect the speed of an activity but it does help to influence the energy exerted (pushes) and awareness of body position (accidents). The other significant results were found in Sue's and Doug's range of motion exercise behavior. In this case considerable significance can be attributed to the immediate effect of the SR program as indicated by the fact that significant differences were due to step changes which implies that this activity may be motivated rather than learned. Bob had no behaviors affected by the SR program, which detracts from the value of the other findings. Based on these outcomes, it would appear that SR has a limited effect on behaviors. There seems to be a tendency to produce changes in those behaviors which ordinarily do not occur in daily behaviors and for which additional awareness and motivation is required.

Hypothesis 3:

> The implementation of a SR program will significantly change the occurrence pattern of selected behaviors in the desired direction over a SM only period.

This hypothesis was rejected.

To study the effects of a SR program wherein the individual not only kept records but also reinforced the behavior, the SM median slope was extended into the SR period data.

Table 4-3

Statistical probability of SR > SM for each behavior

PATIENT		BEHAVIOR	PREDICTION ACCURACY +.25 (p >)	STAT. SIGN. (p <)	STEP SIGN. (p <)	SLOPE SIGN. (p <)
Sue	1	Travel Time	.80-.75	N.S.	--	--
	1a	Accidents	.93-.90	N.S.	--	--
	2	Eye-Hand OT	.93-.90	N.S.	--	--
	3	Range of Motion	.93-.90	.002	.002	N.S.
Bob	1	Resistance Exer.	.96	N.S.	--	--
	2	Range of Motion	.96	N.S.	--	--
	3	OT % Activity	.90-.85	N.S.	--	--
Doug	1	Range of Motion	.96	.002	.002	--
	2	Travel Time	.90-.85	N.S.	--	--
	2a	Pushes	.90-.85	N.S.	--	--
	3	OT % Activity	.93-.90	N.S.	--	--

With the application of the binomial test, tests of significance were calculated for total difference between phases, differences between steps only and differences of slopes. Table 4-3 provides a summary of the statistically significant differences due to the effect of SR.

Only one type of behavior was shown to be significantly different because of the administration of a self-controlled reward. That behavior in Sue and Doug was range of motion exercise. In looking further at Bob's behavior 2 (also ROM), the only change from a 0 level occured during the SR phase; however, the change was not great enough to create statistical significance. Hence, it appears that the introduction of a SR program may have some benefit for encouraging patients to exercise outside of the therapy hour, but the introduction of a self-reward system seems to do little to influence the other behaviors over and above whatever reactive effects self-monitoring may produce in itself.

Hypothesis 4:

> As a result of the SM and SR intervention, the occurrence pattern of selected behaviors during the post-treatment extinction period (E) will be significantly different in the desired direction over the pretreatment baseline period.

This hypothesis was rejected.

The question of concern here is whether there is any benefit to the patient because of the combined treatments over a period of time. To assess this statistical question, the median slope of the total B period was projected into the E period. Once again, with the application of the binomial test, levels of significance for the probability of the E period were

computed and are shown in Table 4-4. A careful evaluation of the table shows that two behaviors showed a significant difference in the E period over the B period. Sue's post-treatment accident-avoidance behavior and Bob's OT activity levels were both significantly different from their pre-treatment baseline levels. One must wonder naturally why these particular behaviors reflect the improvement. Is it a function of the treatment, the behavior, of some other factor? Itmight reflect a simple adjustment factor of the individual.

Table 4-4

Statistical probability of E > B for each behavior using all the data points for E and B periods

PATIENT		BEHAVIOR	PREDICTION ACCURACY (p>)	STAT. SIGN. (p<)
Sue	1	Travel Time	.69-.60	N.S.
	1a	Accidents	.69-.60	.002
	2	Eye-Hand OT	.96-.94	N.S.
	3	Range of Motion	.96-.94	N.S.
Bob	1	Resistance Exercises	.97-.98	
	2	Range of Motion	.96-	N.S.
	3	OT Activity	.96-.94	.016
Doug	1	Range of Motion	.97	N.S.
	2	Travel Time	.96-.94	N.S.
	2a	Pushes	.96-.94	N.S.
	3	OT Activity	.96-.94	N.S.

Care must be exercised, however, not to be overly critical of the treatment because of the statistical results. It is true for all patients, range of motion activities dropped to zero or near-zero levels during the E phase. However, looking at Sue's Behavior 1 and Doug's Behaviors 2, 2a, and 3, it is clear that the general E levels are not much different from either the SM or SR phases. In each of these cases, however, the initial baseline slope had such a dramatic decent level that it would be nearly impossible for the patients to perform at the predicted level in the E phase. In other words, a "leveling off" process in "travel times" and "pushes" seemed to occur beyond which the patient was unable to improve. Also, in some cases prediction from baseline into the E phase was at a level impossible to attain physically and hence impossible to assess statistically. Nevertheless, it must be stated that, with the exception of two behaviors mentioned, there was a general slippage in almost all other behavior categories once the treatment had ended, in contraindication to previous research which indicated a continuing level of performance.

Consideration of the Summary of Mean Values (Table 4-5) provides information about the number of behaviors in which the E period levels are better than the B periods. In Sue's case, Behavior 1 and 1a both show a substantial improvement over B while Behaviors 2 and 3 show a performance at or below the B period. In Bob's case, Behavior 3 has already been noted. In Doug's case, the OT activity level shows a higher mean

Table 4-5

Summary of Mean Values Obtained Across Phases

PHASES

	1	2	3	4	5	6
SUE						
Behavior 1 (Travel)	4:19	3:34	2:28	2:40	2:21	1:44
Behavior 1a (Accidents)	3.33	1.67	.38	1.33	.88	.50
Behavior 2 (OT)	8:36	11:46	9:32	7:40	2:20	0
Behavior 3 (ROM)	109.7	8.1	25.5	37.1	54.4	12.2
BOB						
Behavior 1 (Resistance	19.33	0	20.8(1)	0	0	0
Behavior 2 (ROM)	0	0	0	1.75(1)	0	0
Behavior 3 (OT % Act.)	.22	.12	.19	.32	.37	.50
DOUG						
Behavior 1 (ROM)	0	5.6	52.2(1)	.4	0	0
Behavior 2 (Travel)	2:02	1:35	1:03	:57	1:00	:58
Behavior 2a (Push)	74	60	38	33	31	29
Behavior 3 (OT % Act.)	.49	.47	.64	.73	.69	.74

Self-Monitoring Self-Reinforcement

performance than the baseline and a lower travel time and push average than during the B period, while the ROM was only slightly better than the B.

Comparison of Self-Monitoring and External Monitoring

One of the elements of self-control theory which has been noted to need further explanation is the process and accuracy of self-monitoring techniques (Mahoney and Thoreson, 1974; Kazdin, 1974). Of concern is whether the individual will manipulate the self-observation to "prove" a change in behavior. A comparison of the obtained results for each subject for both SM and SR periods are presented in Table 4-6. A range from no correlation (Bob, 2 SR) to perfect correlation (Sue, 1a SM: Bob 2, SR; Doug 1, SM and SR) was obtained. The method used to obtain these results was to compare the recorded self-observations and external observations for each of the data points. Those days on which the patient did not record any data were eliminated from the comparisons.

Table 4-6

Correlation of Self-Observation and External Observation

PATIENT		BEHAVIOR	SM PERIOD	SR PERIOD
Sue	1	Travel Time	.93	.91
	1a	Accidents	1.00	.46
	2	Eye-Hand OT	.70	.92
	3	Range of Motion	.91	.93
Bob	1	Resistance Exer.	N.A.	0
	2	Range of Motion	N.A.	1.00
	3	OT Activity	.72	.90
Doug	1	Range of Motion	1.00	1.00
	2	Travel Time	.97	.99
	2a	Pushes	.80	.76
	3	OT Activity	.91	.26

Of greatest concern are those correlations which fell below .90. Sue's accident report shows a dramatic change from a perfect (1.00) correlation in SM to a .46 in the SR period. This was due to a difference between SM and SR self- and external observation for two days. In these days a difference in interpretation of one accident--a 100% difference--occured. It should be noted that out of 18 days there was a total difference of only two accidents, a reasonably accurate evaluation. In the evaluation of Sue's self-report of her OT in-room activity (Behavior 2) the difference was caused by one observation day where Sue recorded a 20 minute performance while the observer noted no such time. It is felt that Sue probably recorded her activity for a period outside of the 2:00p.m.-3:00p.m. time period.

Since Bob recorded no performances during the SM period of either Behavior 1 or 2, no correlations were possible. As for the low correlations for the SM period of Behavior 3, most of the difference is due to the inaccurate timing process Bob used. Bob often allowed the clock to run while he was to have turned if off and vice versa. As for the SR phase, Bob reported his performance in general terms. On one occasion, for example, Bob was observed to have completed 82 resistance exercises. Subsequently he was asked how many he did, his response was "at least 50", indicating that Bob apparently did not keep an accurate record. The perfect correlation (1.00) obtained for Behavior 2 was based only on one reported response which agreed with the external observation of 10 range of motion exercises.

Evaluation of Doug's self-monitoring process shows a relatively high correlation overall. Behavior 2 (SM and SR) both show a difference. This was undoubtedly due to the fact that there was a different interpretation of the definition "pushes". Doug would often count a simultaneous push of both arms as "2" while the explanation given to him was to count it as "1". Another potentially confounding activity occurred when Doug's wheelchair on a few occasions rolled on a depressed area of the floor and the wheel would spin freely. On a few occasions it took several pushes of the wheel to get over the floor depression. On these occasions, differences in interpretation of whether the pushes were counted was a possibility. Since the actual number of pushes counted for this nonproductive activity could not be isolated after the experience, no change in counted pushes was possible. The final major discrepency occurred in the OT SR period. In this case the noted differences probably occurred due to the self-reward contract Doug established. The external observer was asked to observe for a 30-minute continuous period once the timing began while Doug continued to time his activity in the anticipation of completing the 35 minutes. Doug often stayed longer in OT during this period in order to achieve his goal than during the SM period. A modification in the process should have been to subtly note Doug's accumulated time at the end of the 30 minute external observation period. Undoubtedly this would have led to a much higher correlation.

Overall, this would seem to indicate that, in most cases, the patient's self-reports were not distorted in order to obtain any self-controlled reinforcement. Furthermore, it should be noted that the self-reinforcement contracts were formulated on the basis of the patient's obtained behavior pattern in the SM period. Any changes in behavior pattern, then, can be related to the introduction of self-controlled reinforcement and not to a change in monitoring process.

One final observation should be made, however. Mahoney and Thoreson (1974) advocated training people to monitor their own behaviors over a series of observations. Such training would seem to be a reasonable suggestion. Further training time for each of these patients would undoubtedly have improved the overall reliability and validity of the patient's observations.

Summary of Statistical Findings

In general we can say that none of the hypotheses were totally supported statistically. There is reason to believe that the application of self-monitoring has a positive benefit when applied to those behaviors which the patient engages in out of necessity rather than as a result of some special training. Therefore, activities like eating and walking, behaviors which are repetitive and produce an immediate reward, may be representative of the kind of behavior which one might consider for the implementation of a self-monitoring approach in the production of change.

Self-reinforcement, on the other hand, seemed to be more effective, at least for two of the three patients, for accomplishing unusual behaviors not within the current repertoire of behaviors. For example, active and passive range of motion activities are not typical behaviors of most healthy adults or adolescents. All normally functioning adults daily engage in range of motion because of the constant movement of arms, wrists, hands, and legs, but, when one becomes disabled and the limbs are suddenly paralyzed or weakened, the movement is grossly reduced. Hence, in healthy individuals the ranging activities are usually related to a function such as writing, climbing, bending, or reaching, for which there is an observable and definable outcome. On the other hand, range of motion when practiced in rehabilitation therapy is often used only as an activity for the movement of the affected body part with no other personally beneficial goal. In this case, some meaningful external reinforcement may be necessary to create a desire to perform the behavior.

Further analysis reveals that, although the effect of the treatments found by comparing the pre-treatment and post treatment trends of behavior seems non-significant, comparison of the pre- post treatment means of behavior gives a slightly different picture. It must be emphasized that having dramatically increasing or decreasing slopes produces considerable difficulty in establishing statistical significance. At the same time comparison of the grouped data provides a much

different perspective on occasion than the trend of the data. Hence, the argument regarding static versus dynamic analysis of N=1 data seems to be legitimate. The question ultimately is which type of analysis is the most meaningful for the research hypotheses.

Chapter V

Descriptive Analysis of the Study

The statistical testing of the Intensive Case Study has been discussed earlier. At that time, it was noted that the N=1 design gives the interested observer the opportunity for a descriptive assessment of the day-by-day events which may add insight to the statistical analysis. This type of information is often more meaningful to those who are directly involved in the area with which the study is concerned. To assist the practitioner in the analysis of this study, three additional components are addressed. The first analysis for each participant is a within-behavior analysis; the second is an across-behavior data analysis; the final section of this chapter deals with the personality-related components of the study.

Within-Behavior Analysis

Sue: Behavior 1 (Travel time and Accident)

It was noted in the statistical analysis of this behavior that there was no significant effect due to treatment in Sue's travel time to OT, but there was a significant effect in the accident prevention in both the SM and SR phase. An analysis of the successive trend lines shows a period-by-period leveling off of the slopes to approximately a no-slope trend. It is interesting to note, however, as Sue began to monitor Behavior 1 for the first time, the slopes of both the time and accidents behaviors proceeded in the expected direction implying an increased awareness of the behavior unit. It is also interesting

to note that the travel time in B and SM periods represent nearly identical shapes. This phoenomenon is difficult to explain, especially in light of the unobtrusive B observation. It was noticed at the onset of the SM period that Sue had some difficulty coordinating the stopwatch and the counter and manipulating her wheelchair at the same time. However, by the third day she was doing well. It should be noted further that during the early phase of the research, Sue did not have therapy on Saturday or Sunday, thereby leaving a number of days uncounted. This situation changed when the Rehabilitation Center began Saturday a.m. therapy after the study began. Sue's husband did attempt to report the number of accidents Sue had at home on one trip from living room to kitchen, although this reporting did not occur with any regularity over the duration of the study. Furthermore, considering the total change in the environment, one might wonder about the value of these data points to the overall study.

As for Sue's self-monitoring period, behavior 1 was the most closely and accurately monitored of all behaviors. At the completion of her "run" to OT, Sue's first activity was to fill out her own behavioral log kept in the OT area during this period only. It was surmised that the physical presence of a stopwatch and counter and the concurrent presence of the observer provided an observable reminder of the need to record the results of her trip. A record was kept for each of the possible days in the study.

Sue's self-reward contract, eating some fruit or snack she was keeping on the unit, seemed to provide a suitable reward for this behavior. She was unable to have the reinforcement immediately after the behavior since she was in OT, however observation validated that she claimed the reward later in the afternoon when she returned to her room. Sue met her pre-established objective each day of the SR period, thereby seemingly confirming the value of goal setting, monitoring and reinforcement system.

Sue: Behavior 2 (OT Activity)

This behavior was the most difficult to monitor and one of the least effective behaviors included in the entire study. For one thing, only five of the first six days in which there was any noticeable time spent in OT activity on the ward, Sue spent that time on written work directly associated with the study. Sue had been asked by the researcher to keep a daily log of her activity for the hypothetical purpose of obtaining data for establishing the later reinforcement program. She usually chose to fill in this log during the prescribed time period for OT activity. This recording continued for 10 days, so much of the early data are biased by this activity. In addition, Sue used this time to fill in the STAI instrument and other test-like materials, all worthwhile activities but completely externally imposed. The greater part of the other days in which Sue was noted to be engaged in OT activity, she mostly spent her time playing solitaire, an activity she seemed to enjoy on occasion but not very reinforcing for a person who

enjoyed socializing as much as Sue did. During the later phases (SR and E), Sue was making considerable physical progress and was spending a longer time in her afternoon appointment. In addition, she became responsible for more independent activity including washing some of her own clothes and making her bed, both of which were important, of course, for her goal of returning to housekeeping activities. These two activities however, took up much of the observation time between 2 and 3 p.m. and her small eye-hand activity became secondary for her. Furthermore, the OTR prescribed activity seemed to provide little intrinsic reward and seemed to lose its effectiveness over time. Sue's self-monitoring and self-reinforcement did not seem as effective during this period either. Sue made no record in her log for 12 of the 18 days. The researcher, with little success, attempted to change this pattern by periodically inquiring whether she had recorded her OT time. It was felt that the lack of a specific monitoring technique, other than "keep track of the time you spend", the relative value of her OT-prescribed activity when compared to the other physical progress being made, the lack of intrinsic reinforcment for the activity, and the weakness of the self-reward contract all contributed to the apparent lack of motivation Sue had for this activity. It seems obvious by looking at Table 4-5 that Sue reached her performance peak during the B period and simply lost interest in that activity as the study progressed.

Sue: Behavior 3 (Range of Motion)

This behavior represents what seems to be exemplary of the kinds of behaviors to include in a study of this nature. Consideration of the slopes across all periods show an interesting pattern. It is to be noted at the outset a strong determination to exercise probably more out of duty than anything else. It is surmised that after this initial rush of activity there was a lack of reinforcement and hence a drastic drop to a flat trend at the 0 level with only occasional spurts of activity during the final B days. At the outset of the SM phase it appeared that the instructions about self-monitoring again reminded Sue of the potential value of the activity; however, by the last day of the SM period she had reverted to an off-again, on-again behavior. The SR period shows a substantial increase in performance although the trend is relatively flat. This would confirm the value of reinforcement in this behavior. During the SM and SR periods, Sue recorded her range of motion 16 out of a maximum of 18 possible times with the researcher recording the first day amount with Sue. The accuracy of her recording is somewhat in question; the external observers reported that their location, the position of the patient at times, and the nature of the exercises (ranging of the fingers can be done relatively subtly and is hard to discern if the patient is not facing the observer directly) may have made this reporting inaccurate. In addition, it is possible that the patient on some occasions included ranges completed prior to or after the actual observation period. This discrepancy

was particularly noticeable during the SM period when the external observers consistently rated Sue's performance lower than she rated herself. During the SR period however, probably because of the slight change in observer pattern to accommodate Sue's reward selection (do 50 ROM to earn luncheon dessert), the observers began to watch Sue a little earlier with a higher correlation noticeable. Sue rewarded herself each day, since according to her records she maintained an acceptable level of behavior. It is finally to be noted that the only substantial activity occurring in the E period was done at home and reported by Sue's husband.

Sue: Across-Behavior Assessment

In looking at all three of Sue's behaviors, the following things are of interest. It seems apparent that meaningful behaviors were the most motivating in Sue's case. That is, it was meaningful that she learned to avoid hitting things despite her restricted vision because in the role of housekeeping inefficiency would be harmful or dangerous. It is also noteworthy that housekeeping related activities soon replaced the small motor coordination activity. It was also most important to note that reinforcement with food was successful in that it generally promoted a more stable and acceptable standard of behavior than either in the B or SM period. Throughout the study, visits home were important for Sue. These visits meant many missing data points and an unfortunate variability within the "own control" aspect of the N of 1 design, since the environment changed for Sue 2 days out of every 14 or less.

Overall it seems, that with the exception of the apparent non-rewarding OT activity, the technique of SM and SR seemed to promote behavior change in the desired direction for Sue. Due to the unstable baseline periods the statistical significance issue was clouded and the overall results do not seem as positive as the total data might suggest. Nevertheless, there seems to be sufficient data in Sue's case to support the application of SM and SR in a medical rehabilitation center if meaningful tasks are developed and suitable rewards chosen.

Bob: Behavior 1 (Resistance Exercise)

There is relatively little that need be said with respect to this behavior pattern. It seems probable, as it was in some of Sue's behaviors, that the duty and the knowledge that exercising outside of scheduled therapy was important and therefore done. At the outset it is noted that Bob used the cuff weights to perform his resistance exercises. It is highly possible, since Bob needed assistance to put cuff weights on and since the ward order was new, that the staff influenced Bob's decision to exercise by encouraging him to wear the weights on the first few days. However, as time progressed, the ward order was forgotten (not an unusual occurrence), the reinforcement obtained did not stimulate the continuation of activity, and Bob did not pursue the issue. The SM period was met with little enthusiasm by Bob. Although he agreed to have the orderly record his exercise rate, he never had any data recorded, obviously because he didn't do any. The SR period continued to show Bob's less than whole hearted support of the research idea. Although he made some attempt to exercise, it

was only when this researcher was in his room that Bob attempted his exercises. On the first day of the SR period, Bob manipulated the staff somewhat to make them think he had done his required activity. He kept the weights on his wrists purportedly to do his exercises while visiting in the cafeteria. Upon arrival there, however, he was soon able to shrug the weights off his arms. He subsequently told the staff he wore the weights "for an hour". He, in fact, did no exercises. Bob remarked later in the study that "he rarely smoked cigarettes after supper anyway" implying that his self-reward contract for this behavior was meaningless and indicating somewhat the attitude he had toward the study.

Bob: Behavior 2 (Range of Motion)

Of some importance regarding this behavior pattern is Bob's short-lived attempt at ranging his left arm at the outset of the SR period. But again, Bob did not follow through on having someone record his activity on the chart posted on the wall at his bedside. Most of Bob's "no performance" times were spent either sleeping or visiting with his family. It is interesting to note that during this phase of the experiment, Bob described to the researcher his antics designed to fool the observer assigned to monitor his behavior. Bob also suggested that the researcher should get "the spy off his back". It was obvious that Bob knew he was being observed and this seemed to irritate him. However, the situation at the Center was such that unobtrusive observation of Bob between 4 and 5p.m. was very difficult. As noted, he spent a great deal of time in

in his room during this time and the only way to observe him necessitated going in his room. Of course, this destroyed some of the unobtrusiveness, but probably had little to do with Bob's cooperation.

Bob: Behavior 3 (OT Inactivity Time)

In one of the more interesting segments of the study, Bob was asked to time himself during his therapy period in his morning OT. He was given a wooden box, approximately 4x4x10 inches, in which an electric clock was placed with an electric switch mounted next to the face of the clock. Whenever Bob was stationed in OT, the OTR placed the clock within his reach and he was instructed by the OTR to "punch in" or "punch out" as he worked or rested. The system had its drawbacks, however, for Bob was not an accurate or compulsive time keeper. He would occasionally "forget" to activate or deactivate the clock despite the OTR's reminder. In addition, the self-reward contract was not clearly worked out. In this case, since the entire SM-SR program was under direct supervision of his OTR, Bob was not really given an opportunity to set his own reinforcement or standard for behavior 3. The therapist, an active antismoking campaigner, suggested to Bob that if he worked 20 minutes (of a 30-minute period) he could have a cigarette break in the hallway (Bob often suggested he wanted to smoke in the therapy area). This "contract", of course, violated a basic assumption of self-reinforcement, establishing the standard and the reward himself. It proved to be quite ineffective; Bob often did not arrive at 11:00a.m.,

and would often not get positioned at his OT station for another few minutes. Therefore, the likelihood of his attaining the 20 minute goal was practically non-existant. Furthermore, since Bob ate lunch in the same room immediately after his OT session, he usually had no time to accomplish the reward even when he earned it. When these factors were pointed out, the therapist agreed to a change and told (again a violation) Bob that if he worked for 20 minutes he could terminate his p.m. therapy early. This new reward was also an externally imposed reinforcement, since Bob was not part of the decision-making process, but the reinforcement seemed appropriate in that Bob had been leaving his afternoon therapy sessions prematurely. Observations in the SR period show the highest amount of dispersion among these scores. This would seem to indicate that the SR treatment had some effect on Bob's behavior, although the specific effect is not clear. His constant negative reference made about the timing task was perhaps indicative of his interest (or lack thereof) in the project as well, although Bob was supposedly unaware of the fact that this was part of the ongoing research. The daily presence of the "unobtrusive observer" in Bob's therapy hour and the contract was perhaps a tip-off to the relationship to the study, however.

It is interesting to note that the E period activity level was higher than any of the previous periods. Although no definite conclusions can be reached, we can speculate whether doing away with the clock and the self-reward contracts, or possibly the removal of Bob's Halo brace on day 41 and the subsequent increase in physical movement potential, influenced

his overall activity level. The change in OT performance might also reflect Bob's slow adjustment to his limitations with a corresponding realization for the need to change his pattern.

It is finally of interest to point out that Bob's primary activity in OT during the study included sanding a board (biceps, triceps strengthening), assembling and disassembling activities (finger strengthening) and performing active and passive range of motion exercises. Of particular interest is that Bob's average activity percentage when sanding was only .265. At the same time, when Bob was forced, because of a one-to-one situation, to produce in exercising, his activity level rose to an average of .515. This would seem to indicate that social interaction and personal contact seemed to increase the activity level for Bob and might provide a clue to a major reinforcer overlooked in Bob's situation. Although some of the variability within this behavior is due to the specific activity occuring each day, it seems that the range of activities was dispersed throughout the study and hence can not explain a total performance profile for a period. The only activity which seemed to increase over time was the hand and finger activities which were directly related to the return of that function with Bob's stay at the center. The use of the hands and fingers, of course, was very reinforcing for Bob, and their increasing mobility was important for Bob's long-range recovery. He seemed to work more intensely to improve his skills in this area, particularly toward the end of the study period.

Bob: Across-Behavior Summary

From studying Bob's three behaviors, it seems evident that his behaviors were obviously not effected to any great extent by the treatment. Although there was an effect noted during the SR period for behavior 2 (ROM), the effect was short-lived, while the 3rd behavior (OT) resulted in a greater dispersion in scores during the SR period. The results do not seem conclusive in favor of the implementation of SM or SR in Bob's case. Although there was a significant improvement in behavior 3 over the time of the study, the improvement might have been a function of either greater physical strength and mobility or the removal of what might have been perceived as an aversive experience--the threat of contracts. At any rate, several potential confounding factors are evident in this last behavior.

Doug: Behavior 1 (Range of Motion)

The within-behavior analysis of Doug's range of motion activities shows a decisive change in behavior at the outset of the SR period. It is noteworthy that on only one occasion in the SM period Doug did perform his ranging exercises. This was undoubtedly a reaction to the observer's periodic checking with Doug on whether the data was being recorded and Doug's antagonism at having to defend his behavior. Part of the lack of performance in Doug's case might have been related to some peer group pressure he seemed to feel. For example, his observer noted that when Doug chose to do his exercises he would do them in a secluded spot out of sight of his room-mates or he would do them in a hasty manner when no one was around.

The realization that the ranging activity was an activity none of his early adolescent room-mates had to perform may have made Doug feel embarrassed or less than adequate. His SM period comments that he did them "later" and that the scheduled time (3:30-4:00) was a "busy time" were indicators of his reluctance to engage in such an activity.

As far as the SM period was concerned, Doug was unwilling to initiate the self-recording. The researcher often made the daily record after Doug had become involved in an alternative activity. As for the SR period, Doug was most cooperative in setting an acceptable minimal standard (45 exercises). One suggested alternative reinforcement suggested by the researcher was quickly accepted by Doug. He established that he would do 45 exercises before going to arts and crafts, music or game time scheduled daily at 4:00 p.m. Doug always "cashed in" on his reinforcements. The value of the range of motion exercises to Doug however, seemed to diminish as soon as the reinforcement period was finished thereby implying the value of the reinforcement, but a lack of carryover of the principle when it was no longer required. The intrinsic reinforcement of range of motion exercises apparently did not outweigh the potential aversive effects which might derive from his peers as Doug chose not to continue the existing reinforcement contract.

Doug: Behavior 2 and 2a (Travel Time and Pushes)

This phase of the study was interesting in that Doug, who until the time of the study seemed to be quite clumsy and apathetic as he wheeled his chair down the hall, made great

improvement in his strength and dexterity. Although Doug's timed performance steadily improved from the B through the SM period, one noticeable effect of the SM phase was the decrease in variation about the slope and the joint descent of slope for both the pushing behavior and the timed behavior, implying a greater concentration on the task behavior, similar to Sue's situation. Because of the continual decline during the SM phase for each behavior and the subsequent levelling off of both the number of pushes, and time during the SR period, significance was not achieved. As was pointed out, however, Doug may have reached his ultimate physical potential at the end of the SM period and further improvement might have been impossible.

As for the SM period Doug was very excited and motivated to make the run in "one minute". After he had accomplished that goal he noted that he wished to reduce the number of pushes. His enthusiasm was carried over into the SR phase where Doug projected a continued improvement both in the time and number of pushes. All went very well with the exception of day 35 when Doug was given a different wheelchair. The change produced an immediate decrease both in his rate of speed and dexterity. However, immediately thereafter Doug regained his skill and speed and reached the lowest score for the study. The self-monitoring and graph was attended to each day by both the observer and Doug since Doug was aware of the joint monitoring. As for the reinforcement--a can of pop--Doug usually got one. He passed it up on a few occasions saying that "it was too cold for a cold pop". No other reward was substituted;

however, the intrinsic reward of "winning the race against time" was undoubtedly sufficient to keep Doug intent on the activity and he needed no further reinforcement. In fact, on a few occasions, Doug made a second "run" to try to improve his performance level.

Doug: Behavior 3 (OT Activity Time)

As was noted in Chapter 3, this behavior was chosen by the researcher because Doug seemed to spend a great deal of time daydreaming or watching others around him in the busy OT area. The data show that Doug's overall baseline performance improved over time due primarily to the 3rd phase of the B period. We note that in the SM period the slope was reversed, although the mean activity level of the SM period was higher than in the previous 3 baseline periods. Doug was relatively hard on himself in the self-timing program, the very observation made by Bandura and Perloff (1967). He would often turn the clock off even if he was actively performing in therapy. These untimed activities were not as goal directed as playing a game, building block towers or exercising with the therapist, and there did not seem to be a carryover of the concept that OT can also mean sitting unsupported on a mat for several minutes or for picking up parts of a game which is a means to muscle strengthening.

As we consider the specific activities occuring within Doug's OT sessions, it was noted, as in Bob's behavior 3, that Doug's activity level dropped during the relatively direction-less sanding days (average percent of activity .35) while OT time

spent playing games resulted in an average active percentage time of .64. The final major time block of OT was spent in independent goal directed hand activities with an average percentage of activity being .78.

This observation of activity re-emphasizes the point made earlier that apparently patients do work harder at those activities in which there is an immediate reinforcement, such as putting a plastic model together, or making a tower of styrofoam or wooden blocks. It also seems to indicate that although selected activities may be necessary for increasing strength or range of motion, patients may need an alternative experience immediately thereafter, particularly a very reinforcing event such as a social time with the therapist or other enjoyable activity. As in Bob's case, the SM for Doug's behavior was done by the OT with the patient's knowledge. A sheet was kept, but in an inconspicuous place, on which was recorded Doug's time recorded by the electric clock. Although Doug daily reported his time verbally, he was only reminded of his overall performance between the SM and SR phase when he was given his average recorded time for the SM period. He then set his own standard for the SR phase. His olympic-like goal was to "work" for 35 minutes at therapist-assigned activities, after which he could choose to do an activity he enjoyed in the OT area. This goal was reached four out of eight days, with two other days falling just two minutes shy. This fact does not appear on the actual data, since the maximum observation time was 30 minutes. In this case, as in Doug's other behaviors,

it appears that auto-recording was not particularly reliable. Furthermore, it was not evident to the observers that Doug proceeded to his preferential OT task after reaching his goal in the assigned task, implying that the self-reward contract and feedback might not have been too effective in this situation probably due to the time element.

Doug: Across Behavior Summary

From the data collected on Doug's three behaviors, it seems that there are certain findings to be emphasized. First, although the actual number of significant results due to treatment is low, there a r e some effects due to treatment. It is obvious that SM did stabilize behaviors 2, 2a, and 3 somewhat. Had the SM results been more accessible to Doug, one might speculate on how much more behavior 3 might have changed. The SR technique had a noticeable effect on behavior 1, and in both 2 and 2a it at least seemed to keep the behavior at a plateau. With better devised reinforcers for the third behavior, it is felt that this behavior might have showed continued improvement. Overall, it would appear that with some slight changes, the SM and SR programs would be a good possibility for promoting behavior changes in Doug.

Personal Data Analysis

The personality differences among the three subjects and their participation in the program will be considered in this section. In reviewing all the statistical tests, Sue had six, Bob two, and Doug four significant differences across treatments. Despite the fact that this is not a large number for any patient, it

should be determined whether there are some readily apparent differences between the personality characteristics of the patients which might explain the differences in performance. Tables 5-1 and 5-2 provide some points for consideration.

We note in Table 5-1 that the scores obtained on the locus of control instrument differ only by 3 points. These scores are very close to the average scores of 22 patients who had previously taken the test. Based on the correlation of the RAS to Rotter's Opinion Survey, the average locus of control tended toward the external direction. This set of scores seems to correspond to the observation found by Wendland (1972) regarding the tendency of recently disabled patients to be more externally controlled. This also seems to fit the idea that those persons confined to institutions feel they lose a certain amount of personal freedom. It is a little surprising, given Seeman and Evan's (1962) findings, that Sue's scores were in the external direction since she was very knowledgable and interested in her condition.

The Self-Evaluation Questionnaire, the state-trait anxiety inventory, results (Table 5-1) shows that Bob claims the least amount of state anxiety while Sue had the least amount of general or trait anxiety but the highest variability within state scores. This corresponds very well with observed behaviors that Bob was low keyed and Sue was highly emotional. Doug scored the highest on both subscales, as might be expected considering his youthful age and his physical condition. He also scored slightly higher on both subscales than did 15 other persons in the Center tested on the same measure. Again,

Table 5-1

Comparative scores of the 3 patients on each of 3 tests administered

		Sue	Bob	Doug	Avg.Pt. Data
REHAB. ATT. Survey (Locus of Control)		17	16	14	14.5(22)
STAI Average Scores (S/T)		32.6/ 23.50 (6)	30.0/ 31.25 (4)	34.5/ 39.75 (4)	33.93/ 38.26 (15)
STAI Range	S	20-48	31-43	30-43	20-61
	T	23-25	25-44	37-46	21-54
EPPS: (percentile)					
Ach		88	29	37	
Def		27	52	25	
Aut		4	70	77	
Suc		46	50	63	
End		32	1	3	
Agg		46	76	96	

( ) Refers to number of completed protocols

Table 5-2

Average Staff Rating of Patient Activity Level

	Sue	Bob	Doug	Avg.Pt. Data
BEHAVIOR RATING				
Scale Score	32.25	21.25	28.50	22.54
Total Rank	2/13	8/13	4/13	(19)

( ) Refers to number of completed protocols

considering his age, his physical status, and uncertain prognosis, this higher level of anxiety may be quite understandable. It is interesting to note that these scores in general reflect a lower average than the norms presented for the STAI. This seems a little unusual, but may in fact reflect the attitude of the Center, the nature of the Center, or a very unique relaxed group of people.

The Edwards Personal Preference profiles provide probably the most helpful information. The data are interesting, particularly as one looks at Bob's and Doug's scores on the Endurance, Autonomy, and Achievement subscales where we see very low scores on Endurance, but high on Autonomy and Achievement. In the same test, Sue's Endurance and Achievement scores are much higher than Bob's and Doug's. It would be expected, and was noted, a greater involvement and participation in her treatment program which may help to explain her overall interest in her program.

The results on the Incomplete Sentence and Research Questionnaire seem to parallel the researcher's subjective feelings about the patients in the study. Sue and Doug both responded with comments which reflected a high level of understanding and feeling of interest with the experiment. Bob's Incomplete Sentence test showed a great deal of disenchantment with some of the concepts of the study like having "observers" or "self-reward contracts" and an overall feeling that the study was not particularly beneficial to him. His Research Questionnaire results supported this attitude.

Finally, on the Patient Behavior Rating Scale (Table 5-2) we find a total of 13 distinct ranks. It is noted that Sue was rated by the staff as more active than all but one other patient in the center. Doug ranks 4th out of 13 and Bob ranks 8th. This would seem to confirm that Sue was a very motivated patient and a hard worker. Doug was somewhat less motivated and Bob ranks in the lower half in terms of his activity level. This again corresponds with the subjective rating of the participants in the study. Sue, by far was most cooperative and interested, with Doug less committed, but still considered interested. Bob, on the other hand, seemed to pass the research tasks and concepts off as meaningless.

The personal data collected provides some information about the types of persons involved. All tended to think others had some control of their reinforcers. Sue appeared far more goal oriented and willing to stick to tasks than did the two males in the study. In addition, it appeared that although Sue was more excitable, she showed a consistently low trait anxiety profile throughout the study. The variability in scores presents interesting and thought provoking questions. Because of the small sample, further analysis would not be useful, although these basic observations can only provide the basics for further investigation.

Chapter VI

Summary, Discussion, and Implications

This dissertation attempted to extend the theory regarding self-directed reinforcement programs to the medical rehabilitation setting. Applying the intensive case study approach to a multiple baseline design, four hypotheses were tested. The first question asked was whether the utilization of auto-recording (SM) of selected patient behaviors affected the occurrence pattern of the behavior over a pre-treatment baseline. The next questions tested whether the utilization of self-directed reinforcement program (SR) for the same behaviors caused a change in the behavior pattern over a pre-treatment baseline period and the self-monitoring period. Finally, the question was addressed whether the SM and SR treatment effects produced any long-term effects on the behavior as measured by comparing the pre-treatment baseline period with the post-treatment extinction phase.

Three patients were selected for the study from the total adult and young adult inpatient population of Mary Free Bed Rehabilitation Center, a comprehensive medical rehabilitation center in Grand Rapids, Michigan. Each patient was asked to define his/her goals for treatment with the rehabilitation staff. Based on these goals and other behaviors noted, three behaviors were selected by the researcher which could be measured and observed during the study. In two individuals, a single behavior was divided into two component parts resulting in a total of 11 observed behaviors.

The multiple baseline procedure began with external monitoring of the three behaviors of the three patients for a 9-calender-day period without informing the patient of the behaviors being observed. The patients were then told about one behavior which was being observed. They were instructed in the process of auto-recording and asked to monitor this behavior themselves for 9 calender days. Once this 9-day SM period was completed a second conference was held with the patient to establish a standard for that behavior for the third 9-day segment. The patients were asked to decide on some reinforcement directly under their own control and which they were willing to administer pending their accomplishment of the established standard of behavior. At the same conference the patients were introduced to Behavior 2 and the self-monitoring technique for that behavior.

After the third 9-day period, the patient was placed on an extinction program with no standard required and no reinforcement related to performance of the first behavior. At the same time the patients were informed of the 3rd behavior being observed and asked to monitor their performance on that behavior. A standard and a reinforcement for successful completion of behavior 2 was also established at this time.

Again, after 9 days, a conference was held with the patient and researcher. At this conference behavior 2 was placed on the extinction program and standard of acceptable performance and suitable self-controlled reinforcement selected for behavior 3. Finally after 9 additional days (or 45 cumulative study days) the patient was told there was no

further need for monitoring or rewarding performance of any behavior, although external observations continued 9 days more. Fifty-four calendar days were used by each subject and the entire study took 79 days to run.

The statistical analysis applied to the behavioral data utilized a trend analysis of the median slopes of each separate period. This technique projects the trend line of the accumulated data points into each succeeding time period with the binomial test applied to each set of data. By comparing the actual dispersion of the data with the projected data, a test of the significant differences was calculated across treatments within each behavior. By comparing results across behaviors some implications were derived.

Summary of Results

The statistical analysis of the results showed no particular consistency in terms of the four tested hypotheses. There seemed to be a trend in that those behaviors which traditionally occured in the participant's life, things such as timed activities, were more influenced by the self-monitoring process. Those activities which traditionally did not need to occur in the person's life, such as specific exercise programs, were more positively affected by the self-reinforcement. Those activities for which there was an immediate reinforcement precluded the need for self-reinforcement. The overall effect of the total treatment from a dynamic analysis standpoint showed that the treatment was significant for one behavior of one individual. Further analysis of the dynamic trends however,

seemed to provide some explanation for the lack of significant differences post-treatment when compared to pre-treatment baselines. The lack of significance seems to be attributed to the lack of baseline stability and the physical plateau effect, wherein the individual physically reached the maximal performance level.

Tne assessment of the descriptive data that was collected showed that the patients tended toward the external locus of control, with major differences on the personality measures. The outcomes on the external measures seemed to correspond to the researcher's subjective opinion. The participant's selection of reinforcers also seemed to be closely related to the performance on the corresponding behaviors. Those reinforcers which were regularly utilized prior to the study seemed to provide the greatest incentive during the SR phases in the study as well. Those reinforcers that were casually suggested or not meaningful produced little behavior change.

Discussion

In reviewing the procedures and results of this study, there are several issues which need further exploration. These issues relate to the theory as applied in the study, the method of conducting the study and the overall results of the study. It is anticipated that a review of these issues will aid in the interpretation of the study results.

At the outset, a major issue relative to the premise under which the study was conducted needs clarification. All of the patients in the study were told they were part of a research project. Although the behaviors selected were for the most

part directly related to the patient's rehabilitation treatment program, the entire process was seen by the patients more as a research project than a method of patient treatment. As the patients moved from one phase to the next in the study they were informed of the change in that manner. The instructions for each new phase were generally couched in a stage-like manner as opposed to being related to changes occurring within a monitored or rewarded behavior.

Given this type of orientation a slightly different evaluation of the overall results might seem possible. In particular, one might question the liklihood of the direction of Hypothesis 4 as it was stated. This hypothesis anticipated an extinction (E) period performance at a better level than the pre-treatment baseline (B) performance. Since the patients were told they no longer needed to record or reinforce the behavior during the (E) period, one would speculate that this might serve as a cue for them to drop the technique employed. In this case, then, the results which showed a drop in performance level after the SR period would confirm a treatment effect as much as an increase after a no-treatment baseline (B) period. This seemed to occur with some regularity as previously noted, and adds credibility to the effectiveness of the treatment.

Along the same line of the procedures used in the study, a review of the system employed during the study shows that, in fact, there was a diversion from a true self-control process. At the outset, although the patients were asked to state their respective goals for treatment, they had no choice in the specific behaviors chosen related to the goals. Although the

rationale for not allowing this choice is somewhat defensible in terms of the questions addressed and the control desired in the study, further research is needed wherein the patients have options on behaviors they might wish to improve upon or change. Furthermore, if the self-control process is to be most effective, it would seem reasonable in a study of this nature to give the patients free rein in decision-making about when they might be ready to move from one phase to another. At some arbitrary point later in the study, the researcher might indicate that although the data collected to that time was sufficient for the research project, the patients could continue to monitor the behaviors or reinforce appropriate levels of the behavior as long as they wished. An external monitoring system could continue to monitor the behaviors into this extinction phase. It would seem in this case that a control behavior might be selected and externally monitored throughout the study or one might consider concentrating on one behavior at a time through all phases before initiating another behavior into the study. This, of course, is the multiple baseline approach as used in this study but extended over a longer period of time.

Related to this issue of self-control, another interesting and intriguing question is the value of the behavior to the person and the continuation of that behavior over time. In a rehabilitation setting, this becomes a crucial question in that patients are daily learning the extent of the limitations imposed by their disability and are gradually adjusting themselves to these limitations. Therefore, a goal or behavior chosen early in the rehabilitation process may become meaningless

as the patient realizes the extent of the limitations or as the behavioral goal is accomplished. In this study there were some goals stated by the patients which became valueless as the project continued simply because the physical re-development did not occur as wished. In this case, behaviors related to the accomplishment of the goal became valueless and interest was soon lost in performance of the behavior. In other cases, the patients accommodated themselves well to the goals and the related behaviors became meaningless when the goals were accomplished. This might have been more of a problem had the patient selected specific behaviors at the outset of the study as opposed to goals. Since the behaviors chosen were related to the stated goals, but also related to other implied goals, realization of the goal or the inability to reach the stated goal did not entirely diminish the value of the related behavior. Nevertheless, future studies must contend with this issue of the meaningfulness of the behavior chosen for self-control when assessing the effect of self-control techniques.

Still another issue to consider in the development of this type of study is tied in to reinforcements. It has been stated earlier that reinforcement is considered in two separate contexts in this study. The first, self-reinforcement, is directly related to the act of controlling specific reinforcements obtained as a result of maintaining an acceptable standard of behavior. The second, locus of control, is related to the individual's perception of whether such control actually exists. In implementing a self-control program it seems imperative that the entire staff must be made aware of the self-control process

from self-suggestion through self-reinforcement. Incorporated into this training is the need to train the staff in reinforcement theory. If the patients are to be given responsibility for their own behavior, it becomes imperative that the environment become reinforcing for these individuals. If, in fact, self-control is seen as an effective means of promoting rehabilitation behaviors, the staff must understand their role in reinforcing the patient's behaviors related to self-control including identification, monitoring, standard setting and reinforcement. This becomes especially important for consideration for those individuals who perceive the locus of control as being external, or not under their own control. These individuals usually expect reinforcements from the external environment and their behavior patterns are such that they solicit these reinforcements from significant others in the environment. The staff must be made aware of this potential behavior pattern of the patients and must be taught that reinforcement of appropriate attempts at self-control is an important adjunct to the development of an internal locus of control and self-directed behavior change.

Finally, a comment is in order with respect to this study in relation to the comments by Friedlander (1974) and Wright (1972) discussed earlier. One of the qualifying reasons for conducting a study in self-control in rehabilitation was based on tne practicality for patient care and applicability for existing staff to use. It is felt that applying the principles of self control in a medical rehabilitation center is both prac-

tical and applicable. The advantages provided to the patient include the prospect for more time actively spent in therapeutic activity outside of the regularly scheduled therapy sessions, the potential for a shorter stay and reduction in treatment cost. For the staff, the practical applications of the self-control ideology seem obvious. The staff can spend more time on actual instruction in therapeutic procedures rather than a much more time consuming treatment observing. By teaching many of the patients the skills of self-control, the staff hypothetically should have more time to spend in the establishment of self-reinforcement contract contingencies with the patients, and should then have more time to spend with the more severely disabled in the treatment setting. In this way the staff can become coordinators of patient activity as opposed to the primary care specialist they function as now for every individual patient. This would seem to promote effective time and energy utilization in the medical rehabilitation setting especially when time is limited and funds equally limited.

Limitations of the Study

Despite all the careful planning for a study such as this, several unplanned for problems occurred. There were some difficulties which need comment for the benefit of those who might wish to replicate the study.

A problem which was described on several occasions is that associated with the trend of the baselines of several of the behaviors. White (1972, a) described a baseline period as ideally that "condition in which data collected during a specified period of time reflect stability and or predictability to a degree which allows . . . changes to be discriminated" (p. 11).

In this study the baseline periods often reflected a trend which precluded the likelihood that any significant differences would occur. That is, had the researcher extended the baseline in some cases until the behavior stabilized, the test for effects due to treatment might have been more meaningful. As White notes, however, extending the baseline does add time to the study which often is not permitted within a particular study.

A second potential difficulty encountered in the study has to do with observer anonymity and unobtrusiveness. Because of the physical structure of the rehabilitation center, it was often impossible for observers to remain out of the line of sight of the patients. This was particularly a problem with Bob. His reaction to having someone tag along to watch whether he performed his behavior was that it was a relatively juvenile experience. The use of fellow patients on the nursing ward to observe did not work either, since so many patients had varying schedules and their skills of external monitoring were questionable. The use of staff for monitoring or counting was found, by direct experience, to be unpredictable. In addition, with the daily presence of observers in a relatively stable hospital-like environment, the patients soon became aware of the relation of the observers to the study.

A third problem in this study has to do with the method of including the staff in the study. Only three staff members were directly involved to any degree, two orderlies who usually cared for Bob and were informed of Bob's exercises and recording needs and one OTR who worked with Bob and Doug

especially on their OT behaviors. It was unfortunate that the staff in general were unable to follow through on some of the specific observations or recording of behaviors. Having this option might make the observation process a little less noticeable and perhaps make the staff slightly more aware of the benefits of this type of program and behavior level of the patient. In addition to the monitoring issue, additional training of the OTR in the principles of self-reinforcement and standard setting would be an example of a necessary improvement in the study.

Another basic improvement in this study would have to do with establishing a better self-monitoring program, particularly with the more physically involved patients. Not only does the method of staff presentation of non-intrinsically reinforcing behavior requirements (range of motion exercises, for example) need improvement, but so does the method of recording the activity. Perhaps some sort of stamp or other method for recording which involves gross hand functioning rather than fine finger dexterity would increase the patient's interest in the behavior being observed and might influence the accomplishment of the behavior. Furthermore, having the chart readily visible to the patient also provides a subtle but effective reminder to patient (and staff) for specific behavior cues.

Finally, as we noted in the procedure section, this study was designed to test the effects of SM and SR on selected patient behaviors. Because of the small number of patients used, the results can not be generalized to the patient population as a whole. Hence, the results of this study can be

used only to stimulate further questions and research. They can in no way be used to describe the effects the treatment had on the total medical rehabilitation population.

Implications for Future Studies

The kinds of data obtained in this study raise several questions which could form the basis for future studies in the field of rehabilitation. The data gathered in terms of the day-to-day patient observations, the personality characteristics of the patients and the effects of the treatment, the characteristics of the patients and their rehabilitation activity expectations, the differential effects of the SM and SR treatments for specific behaviors all seem to be worthy of further study.

For example, one could hypothesize that an internally controlled patient might perform very differently under a self-directed reinforcement program than would the externally controlled individual. Although it is questionable how many inpatients in a medical rehabilitation setting feel they have control over any reinforcers, the different outcome anticipated from an internal and externally controlled patient might well be worth exploring, however, as Bellack (1975) also noted.

Another interesting phoenomenon in this study was the extremely low scores obtained for both male patients on the endurance subscale of the Edwards Personal Preference Survey. One might speculate on the overall profile of the EPPS for an inpatient medical rehabilitation population and the differences that might occur between medical rehabilitation patient norms and the general population norms and what effect this might have on the treatment program of the patients.

A third question which might be addressed in future studies has to do with the issue of observable goal attainment and therapeutic activity. That is, if patients seldom, if ever, see any increase in strength, endurance, or overall ability because of their specific treatment regimens, one must question the likelihood that the related behaviors will continue to be produced. On the other hand, if the patients were filling in a chart daily showing their progress in the ability to perform some activity which in and of itself seems to have no value, immediate reinforcement of seeing that they can exert 14 pounds of pressure instead of 12, that they can place 16 pegs in small holes in 19 minutes when a week before they could only do 8 in the same length of time might seem important. The need for immediate concrete feedback to the patient in all phases of medical rehabilitation seems absolutely essential if the patient's motivation is to be raised. Considerable more work needs to be done in this area.

As the study results showed, the use of self-monitoring techniques seemed to be a sufficient incentive for the patient to improve those behaviors for which there is an in-built reinforcement. At the same time SR was shown to be more effective in changing those behavior patterns for which there was no immediate specific or measurable result as an outcome of the activity. This seems to be perhaps the most meaningful outcome of the study. Further study might show that for those behaviors for which there is a reinforcement obtained as a direct result of performing the behavior, self-monitoring may be the only necessary tool to change the likelihood

of that behavior. On the other hand, those behaviors for which there is no direct reinforcement may need a self-administered reinforcement program to maintain the behavior. This would be an extremely worthwhile study and would add substantially to the work being done in the field of self-controlled behavior.

Finally, in the light of these study results, it seems as though carefully designed SM and SR treatment programs do seem to influence patient activity levels. It is quite clear that the SM activity could promote more independent activity for the patient. A SR program should be the result of a combination of the review of previous performance levels and the application of the contingency management concept for rehabilitation activity planning. With the results and recommendations of this study in the field of medical rehabilitation, it would seem that if patients could internalize and practice the art of self-controlled behavior the nature of the work of each rehabilitation staff member would change dramatically. The patients would seemingly demand less attention from the staff thus allowing the staff the opportunity to more selectively reinforce appropriate behaviors while assisting the patients in establishing self-reward contracts and teaching new, related behaviors.

It seems that the potential for the application of the technique of self-controlled behavior modification has potential benefits for the population of medical rehabilitation patients. Undoubtedly it will not be an easy system to

inaugurate in any treatment center, since the concepts of "patient" and "medical staff responsibility" and "patient independence" are often antithetical in nature. The staff's needs for patient dependence and the traditional dependency roles of the patient will be the major hurdles to overcome in establishing what could be a very innovative and invigorating approach to rehabilitation medicine. It is hoped that this research will form the basis for further work in the application of self-directed behavioral principles in rehabilitation and the increased level of understanding of behavioral science principles on the part of staff and patient alike.

In Retrospect

Having completed this research it is imperative that some general feelings be shared. The process from idea germination through design considerations into the actual study was a long and frustrating one. Conducting the actual research was undoubtedly the most rewarding in that the participants and staff provided a considerable amount of positive reinforcement in terms of their overall interest in the study and cooperation in the daily details. The analysis of the data although challenging was somewhat frustrating in that the problems as they have been noted began to influence the results and made the outcome appear less satisfactory than when first conceived. Nevertheless a sense of pride exists now that it is all over and the product is complete.

The initial feelings about the potential for self-controlled behavior have been solidified through this experimental program.

It appears that by the development of appropriate self-monitoring techniques and the careful application of appropriate and meaningful reinforcers a wide variety of medical rehabilitation inpatient behaviors can be brought under the direct control of the patients themselves. The skill of the individual staff in encouragement of independent activities rather than the reinforcement of dependent patterns of behavior will make this kind of program most appropriate in a medical setting. For many it will mean a massive change in perception of health care roles; for some it will mean a welcome relief from the frustrations of dependent patient patterns. Most importantly it will mean a personal challenge for the individuals with a disability to begin to apply again the principle of being in control of their own destiny as they carry out the daily activities of their rehabilitation.

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APPENDIX A

FIGURES

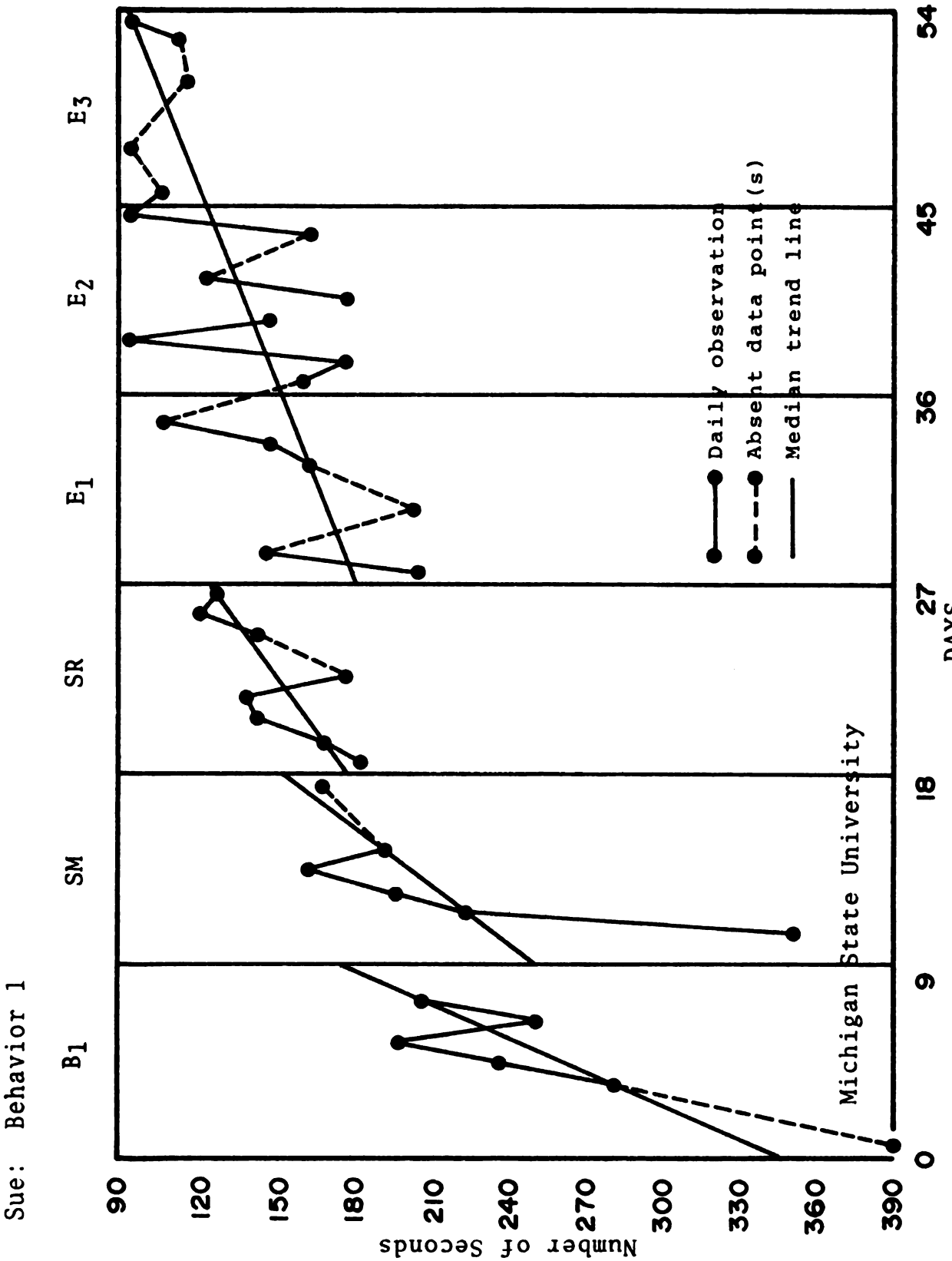

FIGURE A-1.--TRAVEL TIME FROM NURSING UNIT TO OT. Each data point represents one observation period per day. Edward J. DeVries, Investigator; April, 1976.

Sue: Behavior 1a

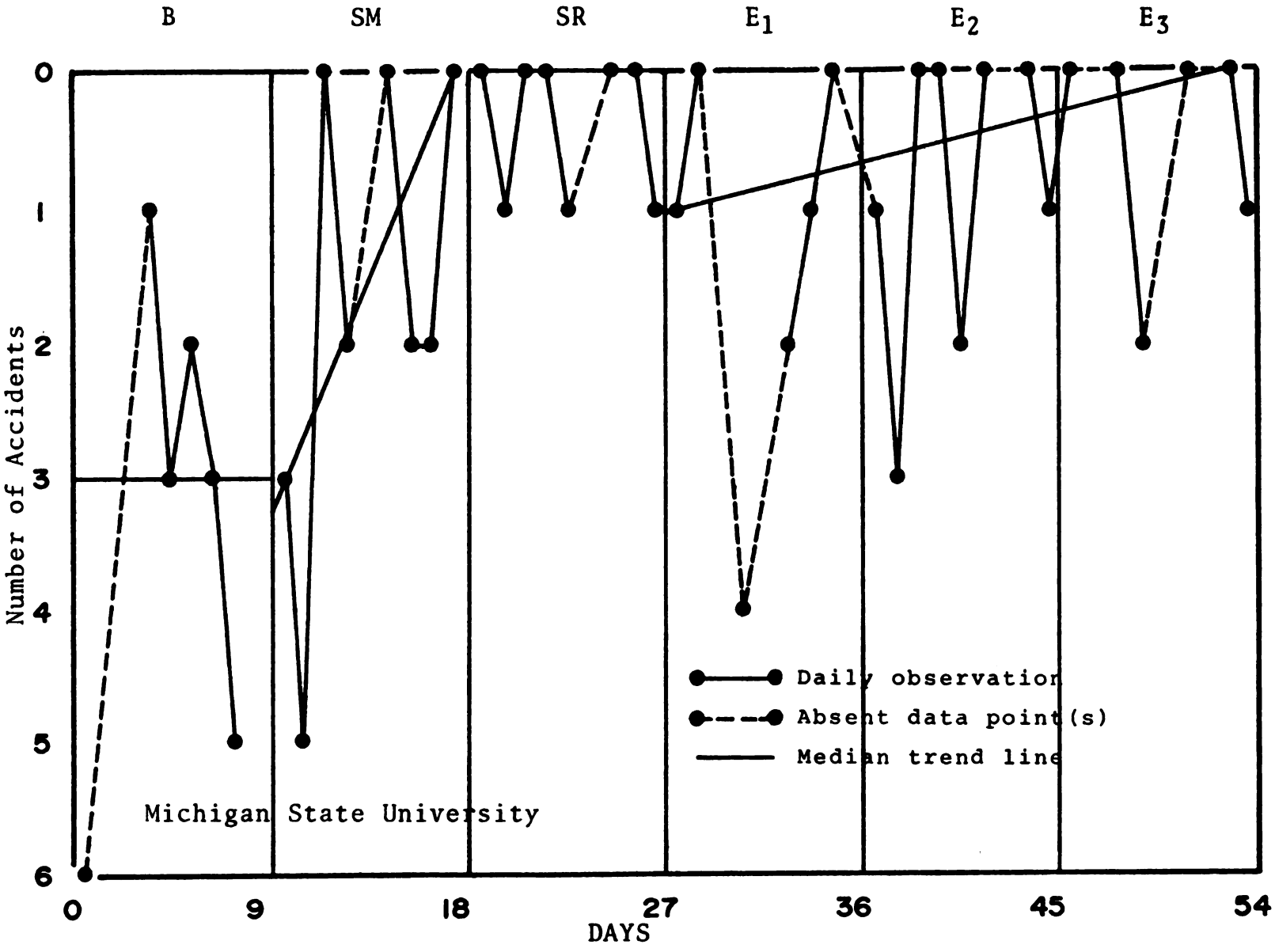

FIGURE A-2.--NUMBER OF OBJECTS STRUCK ENROUTE TO THERAPY. Each data point represents one observation period per day. Edward J. DeVries, Investigator; April, 1976.

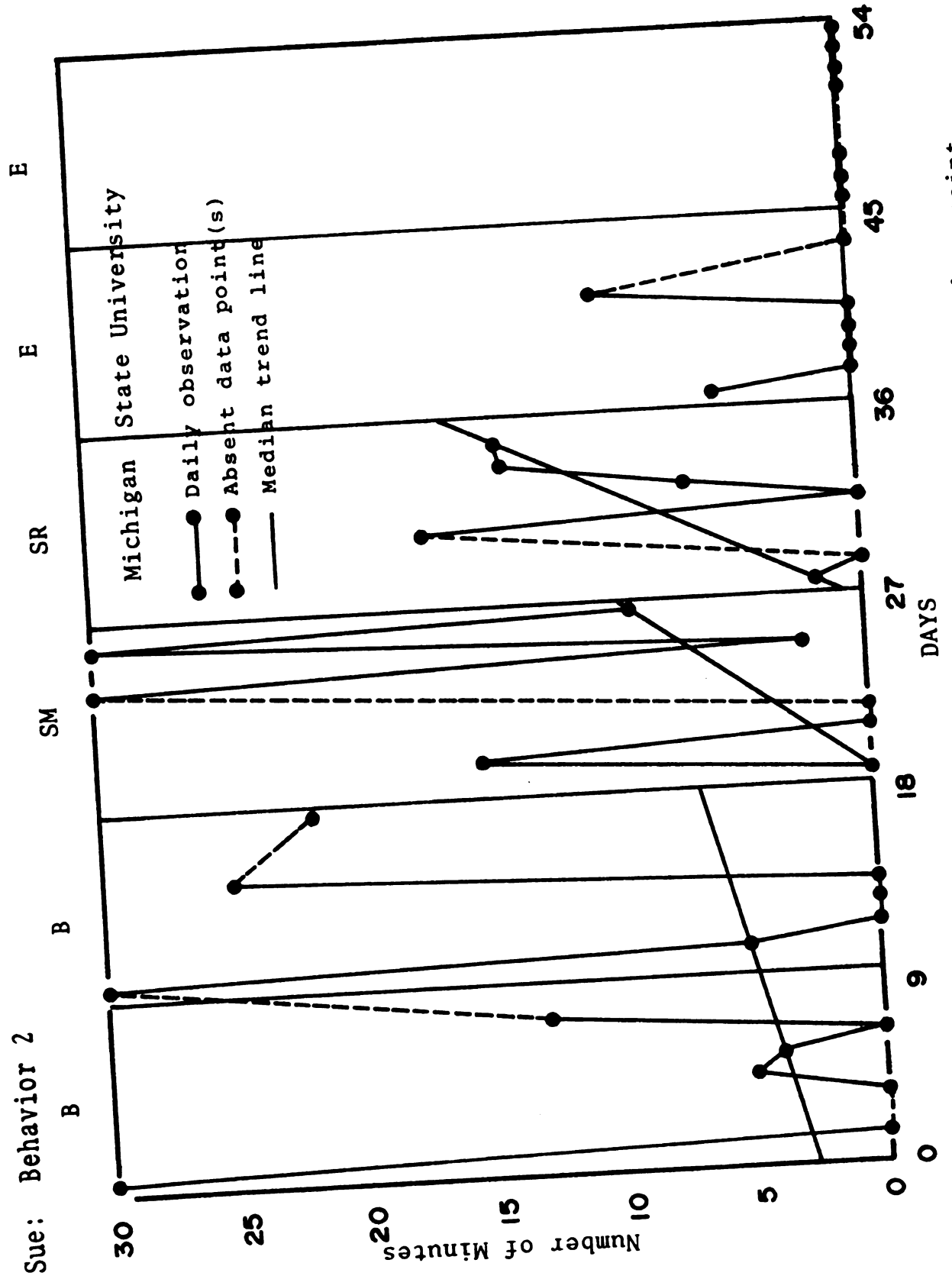

FIGURE A-3.--NUMBER OF MINUTES IN OT ACTIVITY IN ROOM. Each data point represents one observation per day. Edward J. DeVries, Investigator; April, 1976

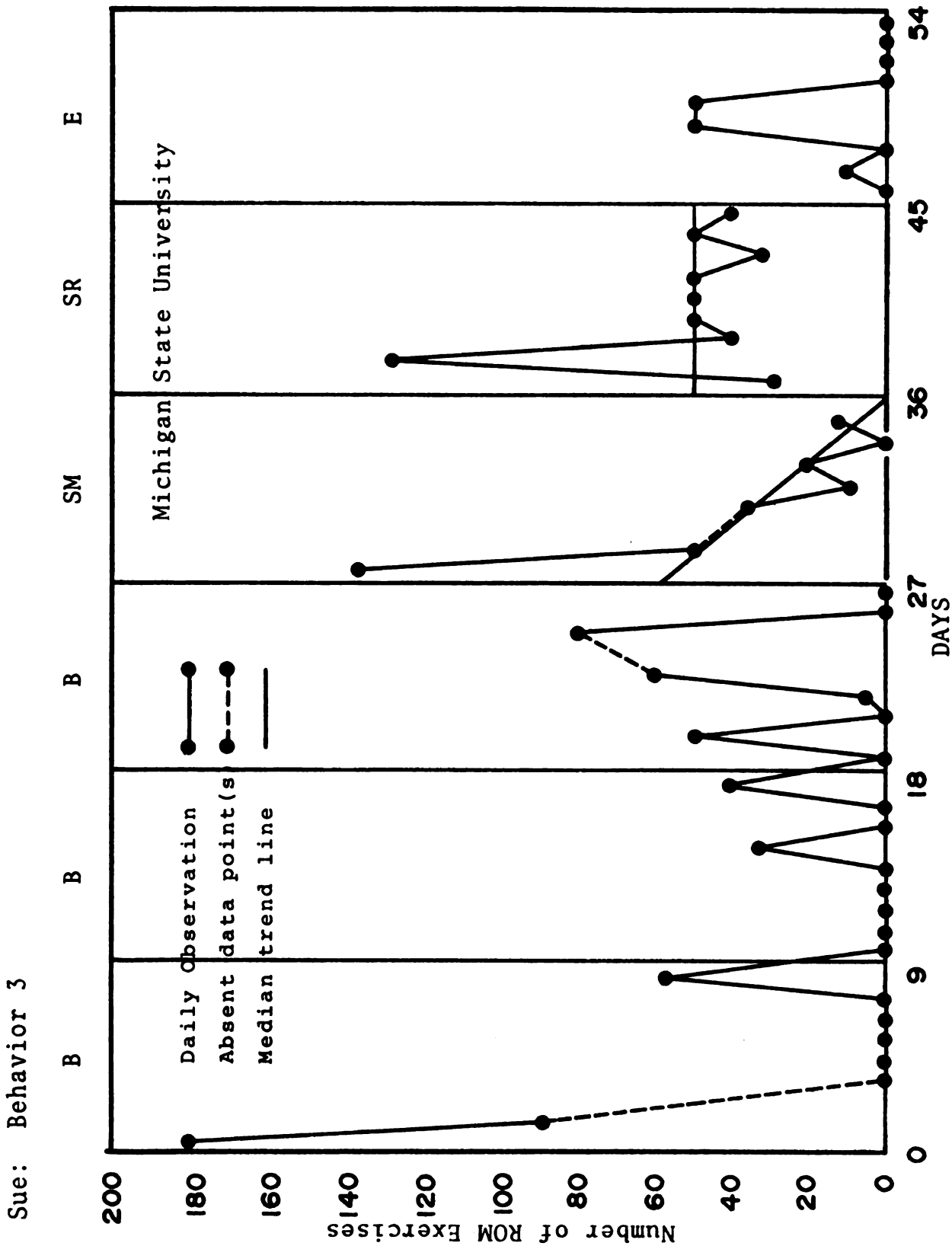

FIGURE A-4.--NUMBER OF RANGE OF MOTION EXERCISES. Each data point represents one observation period per day. Edward J. DeVries, Investigator; April, 1976.

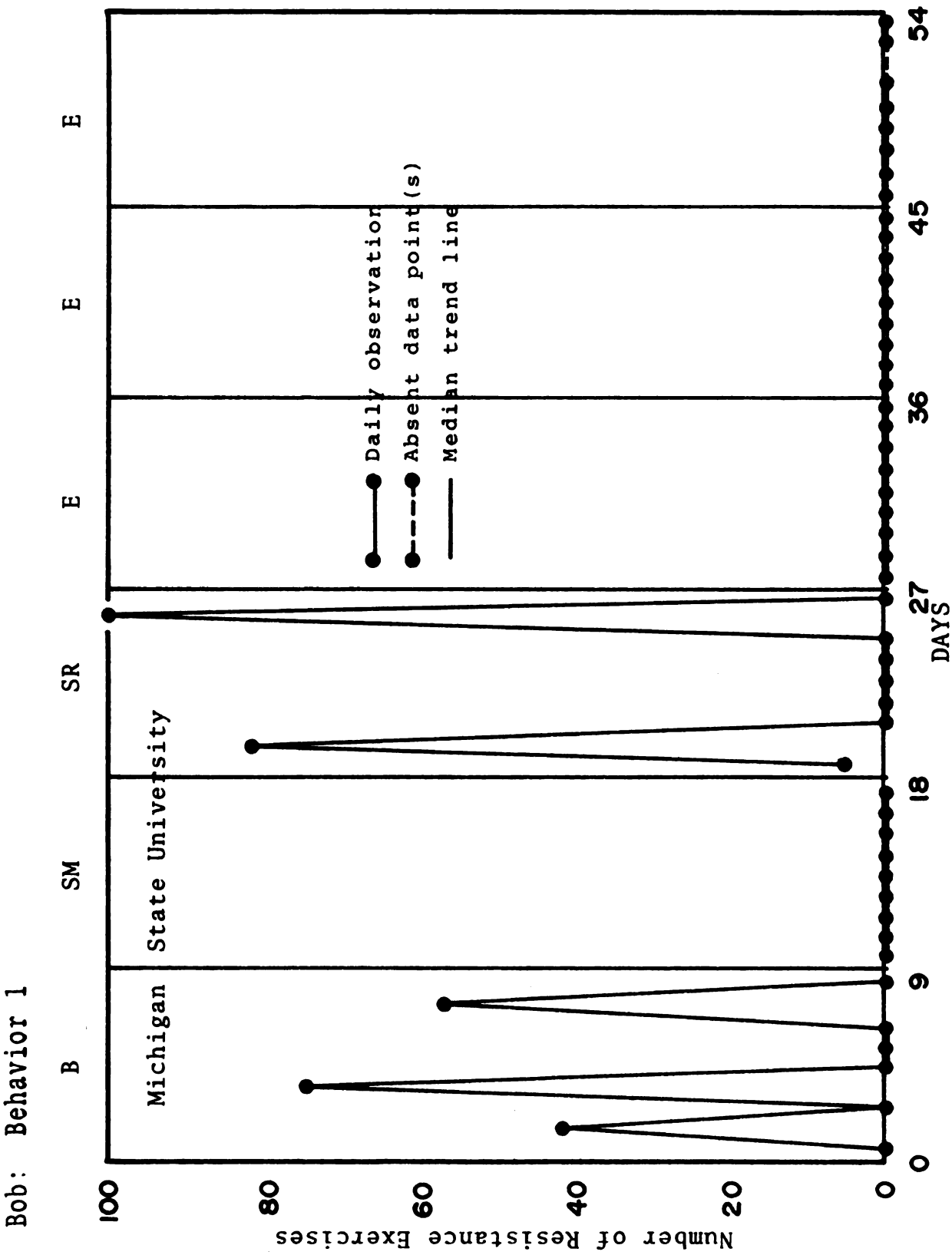

FIGURE A-5.--NUMBER OF RESISTANCE EXERCISES. Each data point represents one observation period per day. Edward J. DeVries, Investigator; April, 1976.

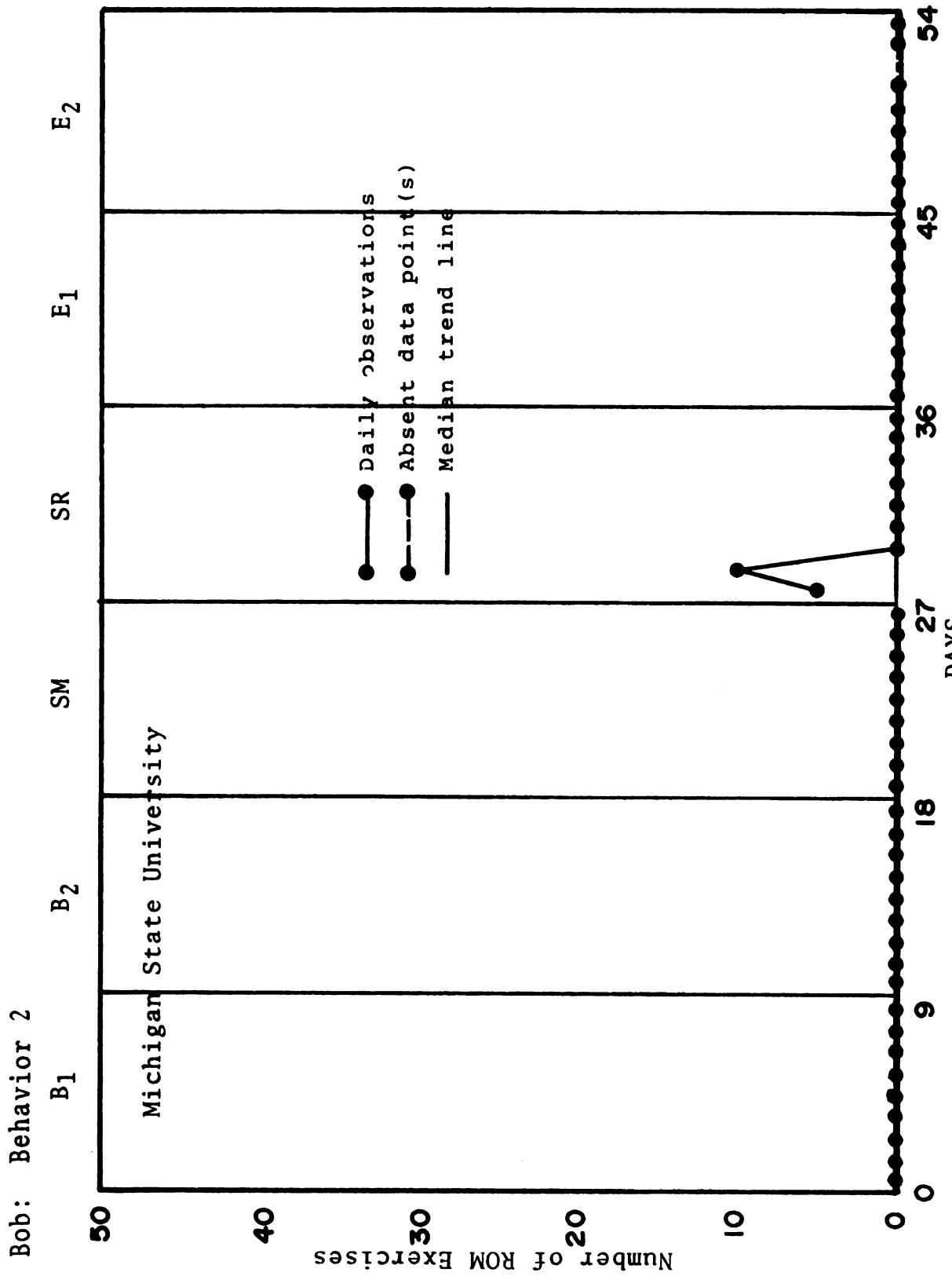

FIGURE A-6.--NUMBER OF RANGE OF MOTION EXERCISES. Each data point represents one observation period per day. Edward J. Devries, Investigator; April, 1976.

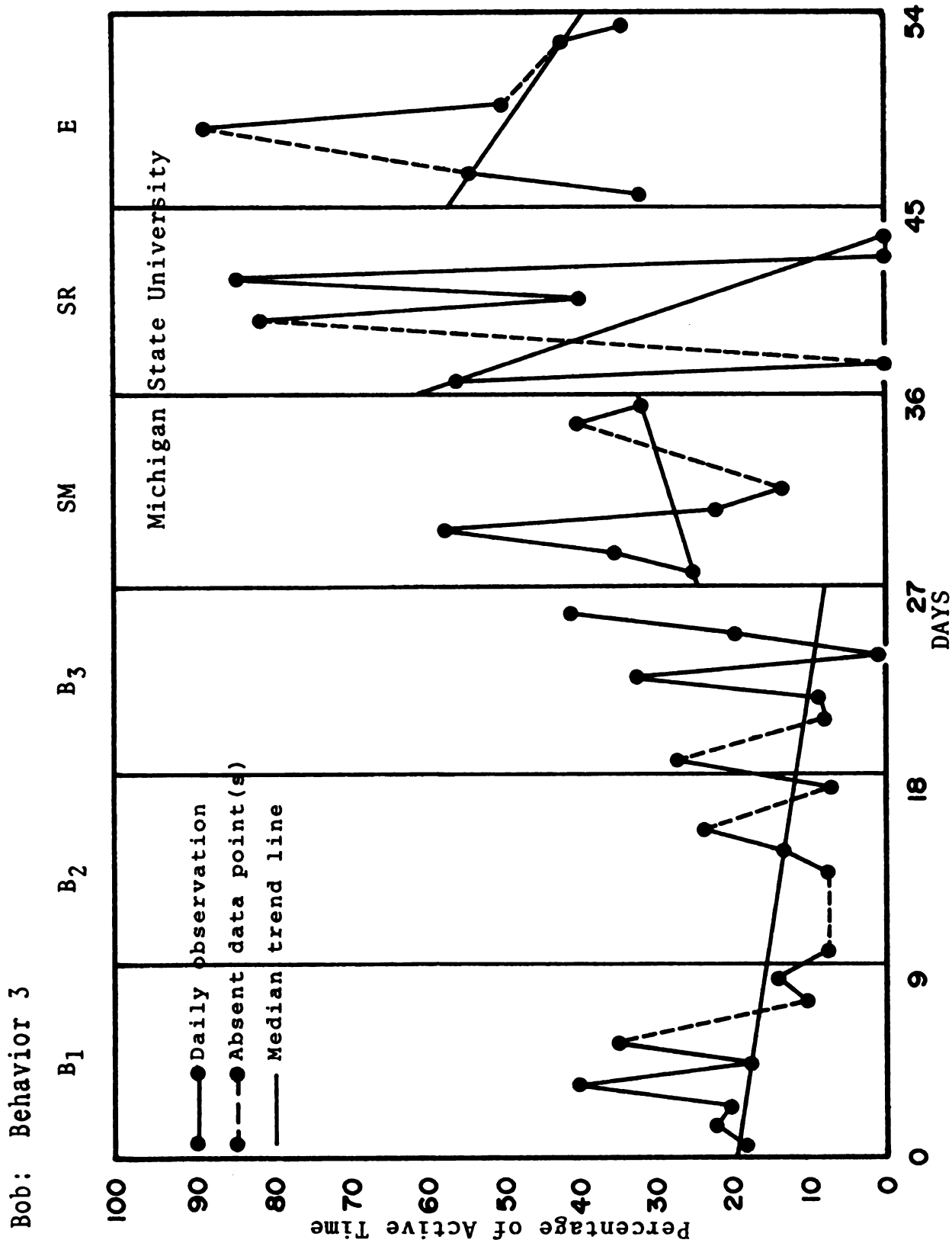

FIGURE A-7.--PERCENTAGE OF TIME ACTIVE IN OT. Each data point represents one observation period per day. Edward J. DeVries, Investigator; April, 1976.

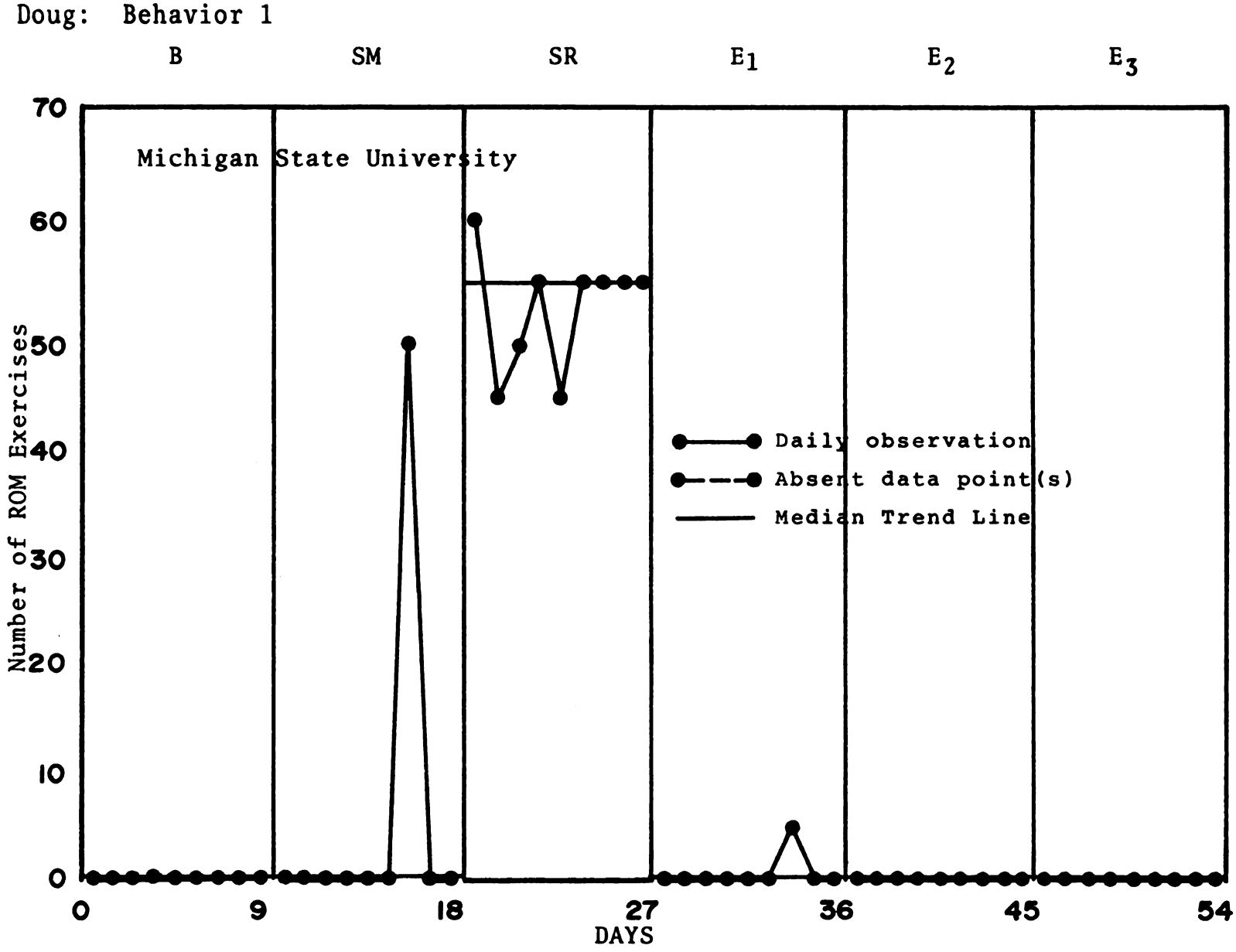

FIGURE A-8.--NUMBER OF RANGE OF MOTION EXERCISES. Each data point represents one observation period per day. Edward J. DeVries, Investigator; April 1976

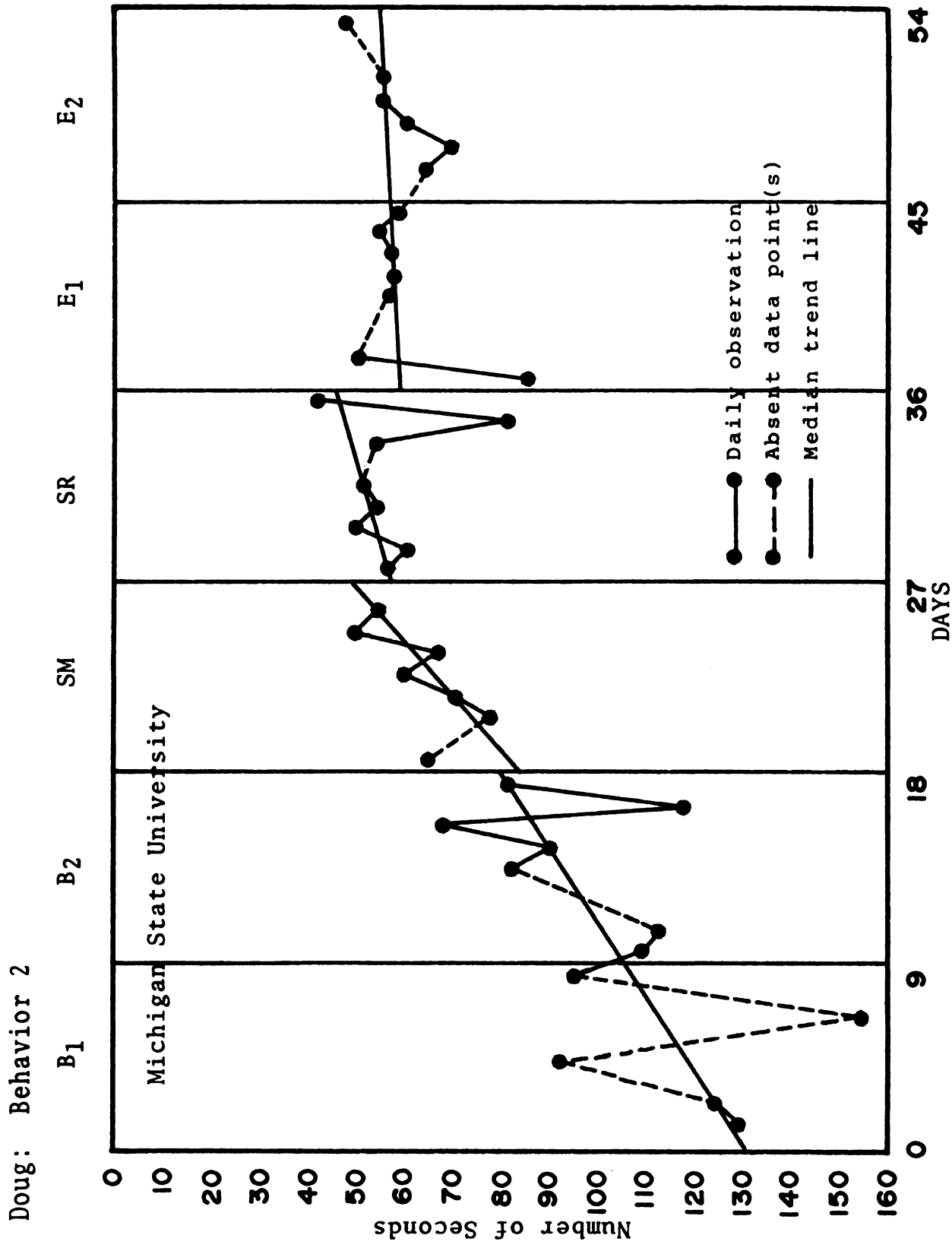

FIGURE A-9.--TRAVEL TIME FROM OT TO ELEVATOR. Each data point represents one observation period per day. Edward J. DeVries, Investigator; April 1976.

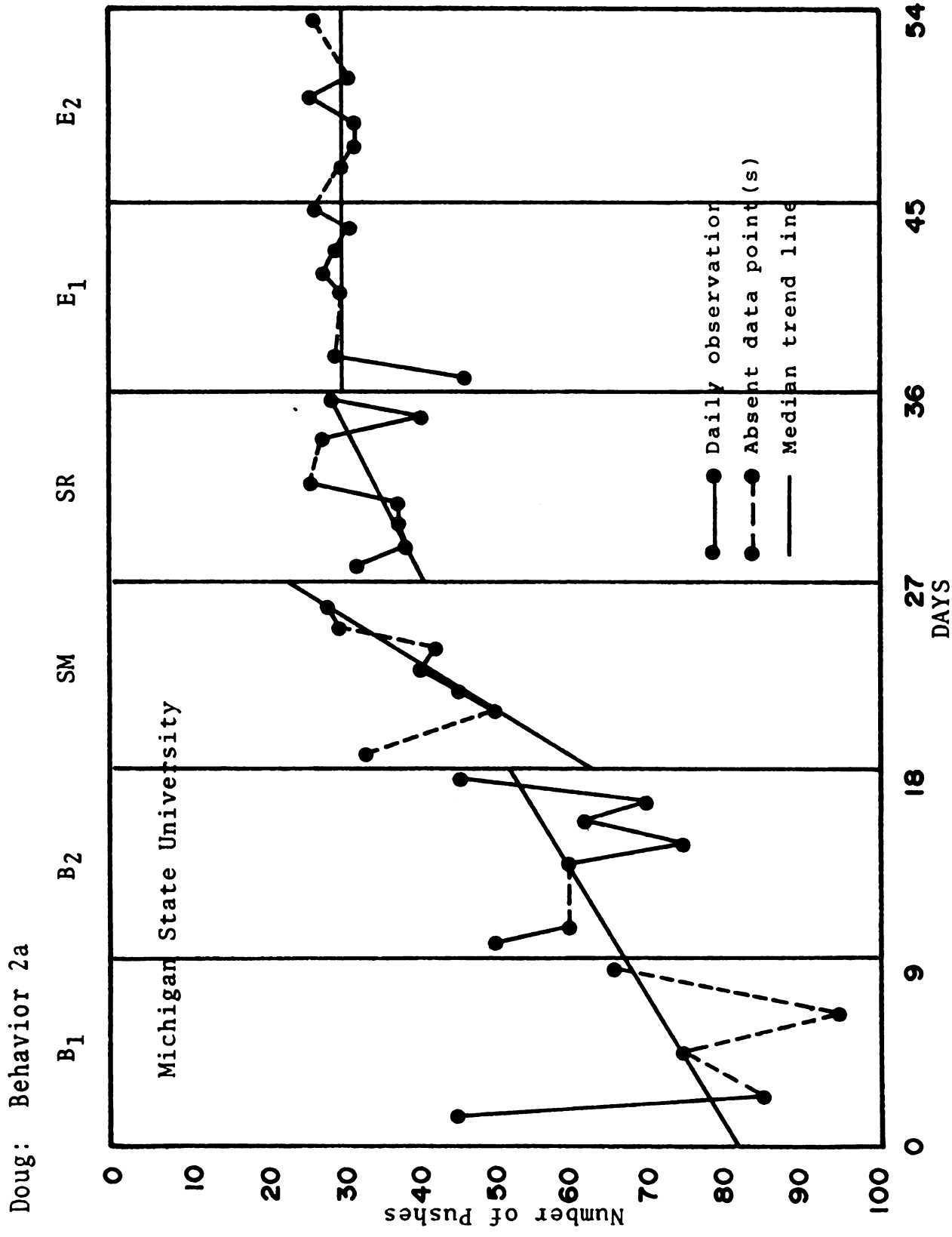

FIGURE A-10.--NUMBER OF PUSHES OF WHEELCHAIR. Each data point represents one observation period per day. Edward J. DeVries, Investigator; April, 1976.

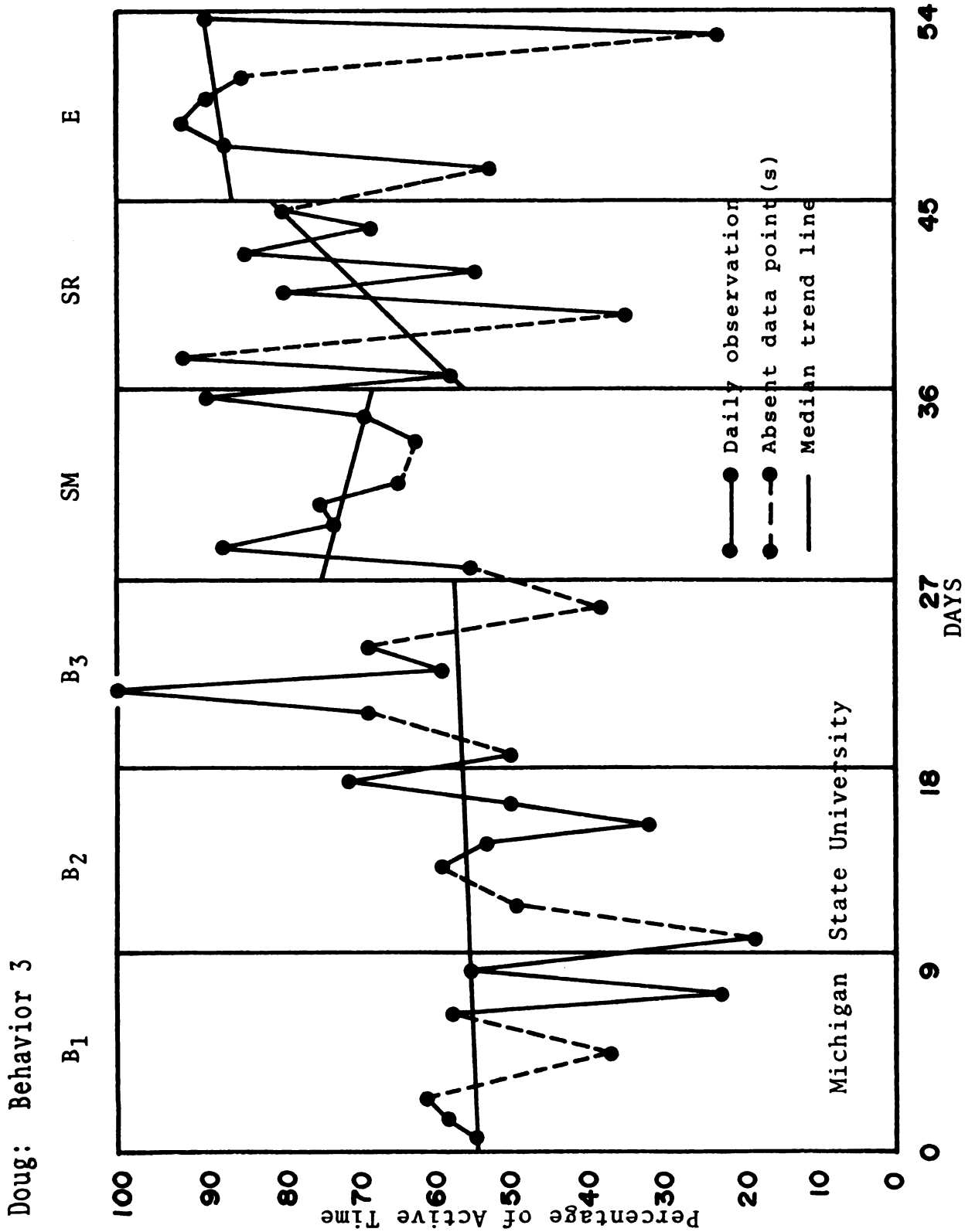

FIGURE A-11.--PERCENTAGE OF TIME ACTIVE IN OT. Each data point represents one observation period per day. Edward J. DeVries, Investigator; April, 1976.

APPENDIX B

FORMS

B-1

SOME THOUGHTS ON BEHAVIORAL OBSERVATION

1. **ATTENDANCE:** It is absolutely essential that records be kept DAILY of patient behaviors. It is imperative that someone be able to observe the behaviors on a scheduled basis. If you are unable to meet your scheduled observation period, notify me as soon as possible!! (office: 459-2837; Home: 949-8957)

2. **ACCURACY:** Accurate reporting is essential for this study. It is very easy to allow your mind to wander as you observe others, especially after the first few times. Concentrate on the assignment at all costs, since inaccurate observations will make the study useless.

3. **INTERACTION:** In many cases it may be very tempting to interact with the persons being observed. Interaction is fine AS LONG AS it doesn't detract from the occurrence of the observed behavior or in any way influence it. The change in observations then is not because of the individual, but because of what you did (and that's a "no-no").

4. **UNOBTRUSIVENESS:** If at all possible, make yourself a 'wallflower' while you are observing. Make the recording instruments as inconspicuous as possible. Using paper and pencil to record tally marks is as legitimate as counting with a counter, and is even better if the sound of the counter is too noticeable. Mingle with other patients if necessary to get a better position to observe.

5. **RECORDING:** Always record your observations BEFORE TURNING YOUR COUNTER OR WATCH back to zero.

6. **OBSERVE THE TIME:** In addition to accuracy, time will usually be a majoy factor to be observed. If the time for observing is from 7:00-7:30, please make sure that you observe that time!

7. **RESEARCH JOURNAL:** Note any particular things which seemed to affect the observed behavior, such as a specific activity which prevented the occurrence of the behavior, or any other unusual activity going on at the time.

8. **TIME KEEPING:** Keep a log of the time you spent for reimbursement purposes.

9. **QUESTIONS:** Don't assume <u>anything</u> in this project. If you have questions about anything, HOLLER RIGHT AWAY! To delay may be costly, either in terms of inaccurate reporting or inaccurate observing. Stay in touch and don't feel embarrased...I'LL be embarrased if the data isn't right when I present it for my doctorate!

Thanks for being the help I know you will be to me. This is an important project for me and your help will be most important!

BEHAVIOR ANALYSIS PROFILE

PATIENT NAME_____ TIME OF OBSERVATION PERIOD_____

BEHAVIOR DEFINED:

METHOD OF OBSERVATION: BEHAVIORAL UNIT:

SELF_REWARD CONTRACT:

Date	Begin Time	End Time	# of Units	Specific Activity	Init	Date	Begin Time	End Time	# of Units	Specific Activity	Init
Example: If Behavior to be observed is amount of time spent in O.T. Hand activity between 1:00 and 3:00											
10/8	1:08	1:25	17 min.	played cards							
10/8	2:10	2:50	40 min.	writing							

page #_____

B-3

RESEARCH JOURNAL

DATE COMMENTS

APPENDIX C

INSTRUMENTS

C-1

REHABILITATION ATTITUDE SURVEY

TO THE PATIENT: The following statements are not a test. There are no right or wrong answers. We are asking that you respond to the statements as you feel about them. Your answers will be anonymous but will help the staff at Mary Free Bed to understand how patients feel about things. To answer, just put an X through the "T" if you agree with the statement or through the "F" if you disagree.

T F 1. American hospitals would be in much worse shape if it not for the trained medical staff they have.

T F 2. I am proud when I do things for myself.

T F 3. Others usually know what is best for me.

T F 4. Knowing what is happening is not important in treatment.

T F 5. There is a direct connection between how hard I work and the progress I make in therapy.

T F 6. A good patient is one who does what the staff tells him.

T F 7. I have often found that what is going to happen will.

T F 8. My return to health is entirely in the hands of others.

T F 9. I feel nervous when asked to make decisions about treatment.

T F 10. Knowing what my problem is helps me to manage my program.

T F 11. I am afraid of doing too much in therapy right now.

T F 12. If given the opportunity to control my life, I would accept.

T F 13. I am totally at ease with my present situation.

T F 14. At this moment I can change the extent to which my disability affects me.

T F 15. I am not sure that the patient care team will do what they are supposed to do.

T F 16. "Eat, drink, and be merry for tomorrow who knows" reflects how I feel right now.

T F 17. I feel that the nurses know what is best for me.

T F 18. Right now I feel there is nothing which can help me to do things any better.

T F 19. I feel that I am able to control my treatment program.

T F 20. I am regretful about what has led me to my present situation.

T F 21. Trying to control what happens to me right now doesn't seem to be paying off--it's hardly worth the effort.

T F 22. Being able to know ahead of time what will happen in therapy doesn't affect how well I do.

T F 23. A good patient is one who makes sure the staff understands his situation even though the staff may find it annoying.

T F 24. Many of the unhappy things in peoples lives are partly due due to bad luck.

C-1

T F 25. Right now I feel that I am in control of my life.

T F 26. It is important for me to know where I am, what is happening and what may happen in any circumstance.

T F 27. I am most pleasant when allowed complete freedom of activity.

T F 28. I feel tense about what is happening in my treatment.

T F 29. Knowing what my problem is cannot help me to manage my program any better.

T F 30. I feel most content when I am permitted to make my own decisions.

T F 31. I feel totally to blame for what has happened to me.

T F 32. No matter how hard I try I cannot improve my condition.

T F 33. Most patients don't realize the extend to which their rehabilitation is influenced by accidental happenings.

T F 34. I prefer to have the staff tell me what to do.

T F 35. Trying to control what happens to me isn't worth the effort, it doesn't pay off.

T F 36. Right now I feel totally helpless.

T F 37. Where I am right now is a function of my own doing--luck or fate has little to do with it.

T F 38. I get jittery feelings when asked to think about my future.

T F 39. Trying to change any part of my program is useless, patients opinions don't really seem to count.

T F 40. In the long run, patients are in control of their program.

AGE_____ SEX_____ DIAGNOSIS_____

C-2

PATIENT BEHAVIOR SCALE

Patient's name_____ Unit_____ Date_____

Rater's name_____ Title_____

Indicate by placing an X before the statement which is most indicative of the above named patient for each of the following comments, based on your observations of the patient.

1._____ The patient follows treatment recommendations.
_____ The patient seldom follows treatment recommendations.

2._____ The patient seldom needs prodding to get activities done.
_____ The patient usually needs prodding to get activities done.

3._____ The patient rarely requests help more often than is necessary.
_____ The patient often requests help more often than is necessary.

4._____ The patient follows directions for treatment.
_____ The patient does not follow directions for treatment.

5._____ The patient works for extended periods of time on tasks.
_____ The patient fails to work on a task for any reasonable period.

6._____ The patient's attitude is usually positive.
_____ The patient's attitude is usually poor.

7._____ The patient abides by hospital rules and regulations.
_____ The patient violates hospital rules and regulations.

8._____ The patient seldom becomes upset by failure or lack of progress.
_____ The patient often becomes upset by failure or lack of progress.

9._____ The patient usually complains about tasks that are given.
_____ The patient seldom complains about tasks that are given.

10._____ The patient works constantly on therapeutic activities.
_____ The patient rarely works on therapeutic activities.

11._____ The patient reports regularly for appointments.
_____ The patient often fails to show up for appointments or is late.

12._____ The patient sometimes says or does things that are self-defeating.
_____ The patient rarely says or does things that are self-defeating.

13._____ The patient is usually friendly and agreeable.
_____ The patient is often unfriendly and disagreeable.

14._____ The patient never comments in an uncomplimentary manner on the work or activity of the staff.
_____ The patient frequently comments in an uncomplimentary manner on the work or activity of the staff.

15._____ The patient often speaks to others.
_____ The patient rarely or never speaks to others.

16._____ The patient takes pride in the progress of therapy; that is, shows progress or talks about progress to others.
_____ The patient takes no pride in the progress of therapy; that is, shows nothing to others nor talks about progress to others.

17._____ The patient pays attention to the therapy and progress of others.
_____ The patient pays no attention to the therapy and progress of others.

18._____ The patient makes no worthwhile suggestions about treatment.
_____ The patient makes some worthwhile suggestions about treatment.

19._____ The patient seldom accepts constructive suggestions from the staff.
_____ The patient usually accepts constructive suggestions from the staff.

20._____ The patient participates in the activities around him.
_____ The patient rarely participates in the activities around him.

21._____ The patient often volunteers information which is helpful.
_____ The patient never volunteers any information which is helpful.

22._____ The patient is usually interacting with one or more patients.
_____ The patient usually spends time alone.

23._____ The patient rquests to follow through on ward orders.
_____ The patient ignores ward order recommendations.

24._____ The patient often plays cards, games, etc. with other patients.
_____ The patient rarely plays cards, games, etc. with other patients.

25._____ The patient initiates activity for themselves.
_____ The patient waits for others to start him on an activity.

26._____ The patient is usually playful and good humored.
_____ The patient is seldom playful and good humored.

27._____ The patient is usually busy with something.
_____ The patient seems to have a lot of inactivity.

28._____ The patient seldom becomes upset if something doesn't suit him/her.
_____ The patient often becomes upset if something doesn't suit him/her.

29._____ The patient takes pride in personal appearance.
_____ The patient takes no pride in personal appearance.

30._____ The patient asks for things to do when not occupied.
_____ The patient never asks for things to do when not occupied.

31._____ The patient does not have to be pressured to get to appointments.
_____ The patient has to be pressured to get to appointments.

32._____ The patient never wants to lie in bed during the daytime more than is required.
_____ The patient usually wants to lie in bed during the daytime more than is required.

33._____ The patient makes positive suggestions when problems arise.
_____ The patient seldom makes positive suggestions when problems arise.

34._____ The patient seems interested in nothing.
_____ The patient seems interested in everything.

35._____ The patient does not need to be directed to an activity.
_____ The patient would sit all day if not directed to an activity.

C-3

INCOMPLETE SENTENCES BLANK

Name_____ Date_____

Complete these sentences to express your real feelings about the study you have been part of while a patient at Mary Free Bed. Be sure to make a complete sentence.

1. The study I was part of
2. Rewarding my own behavior
3. During the study
4. The whole idea
5. Charts and graphs
6. Keeping a daily record of behavior
7. I don't think
8. Making deals about my behavior
9. My greatest desire
10. The thing I would like to do
11. Observers
12. Self-given rewards
13. Observing and counting
14. Three goals I have
15. I feel
16. The thing I liked best about the study
17. Sometimes
18. I am very
19. I do best
20. What pains me
21. The only trouble
22. If I had a chance
23. Now that it's over
24. In the future
25. I want to know

RESEARCH QUESTIONNAIRE

Name_____ Date_____

The following statements are to be answered either True if you agree or False if you disagree. They are related to the study you were part of.

True False 1. Just recording the amount of a certain behavior I do helps to make me do the behavior better or more often.

True False 2. By requiring that I wait to do something I like to do until I do something that is required or suggested will probably help to make the required behavior happen more.

True False 3. Rewards are something which we only get from others, we can't give ourselves rewards.

True False 4. I felt that keeping a record of the number of times or amount of time I spend doing something was not important to me.

True False 5. The idea of rewarding my own behavior meant that I should do a certain thing before I could do something I would rather do.

True False 6. Giving myself a few minutes rest in therapy for every so many minutes I worked in therapy would be an example of rewarding my own behavior.

True False 7. I felt I understood the "Self-Reward Contracts" I made during the study.

True False 8. I felt that the behaviors I watched for the study were related to my goals I had for myself.

True False 9. I don't see how "making a deal with myself" will help me to change how much I do of some behavior.

True False 10. I don't need to "make a deal with myself" to do something I don't particularly want to do, but which is important.

True False 11. Having a snack, smoke, or some other enjoyable thing BEFORE doing some recommended behavior will increase the possibility that I will do that behavior later.

True False 12. I was interested in what the study was all about.

True False 13. I feel the Self-Reward Contract assisted me in doing more of the behaviors than I would have done without any contract.

True False 14. Having observer(s) around was the main influence that made me do the suggested behaviors rather than my own incentive.

True False 15. I might use the idea of a Self-Reward Contract on my own.