ELIMINATION OF STEREOTYPED BEHAVIOR, EMPLOYING
CONTINGENT WITHDRAWAL AND REPRESENTATION
OF A POSITIVELY REINFORCING STIMULUS

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An attempt was made in this study to eliminate the body rocking behavior of a twenty-three-year-old totally blind male individual, presently classified as moderately retarded. Consequences were placed upon rocking behavior in seven experimental phases, employing time-out from a positively reinforcing stimulus as a punisher. More specifically, apparatus were designed in such a manner that rocking would result in elimination of the auditory and visual portion of a television, and in a later phase, the auditory portion of a transistor radio. In general, the results indicated that each treatment was extremely effective in reducing rate of rocking to a near-zero level, but probe phases revealed that little generalization had occurred. It was concluded that a schedule involving differential reinforcement of other behavior (Whaley and Malott, 1970) should have been implemented to maintain non-rocking behavior, and that perhaps a new, more appropriate behavior should have been reinforced concurrently.
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Introduction

The word "retarded," as it is most commonly used, brings to mind such thoughts as "incurable," "hopeless," and "unable to learn." This seems to be largely due to classificatory systems which attribute the bulk of what is considered "retarded" learning to internal conditions about which one can only speculate. There are, of course, exceptions to this when directly measurable physiological conditions are used as basis for the classification. Concerning the etiology of mental retardation, Love (1965) lists eleven of the most familiar "known or suspected causes" of mental retardation, none of which is even remotely concerned with learning or learning deficits. One might conclude from this that behavior manifested by retarded individuals is directly related to some internal state, and would not be greatly affected by external stimuli. In recent years, a large amount of research has been done in the field of mental retardation which presents evidence to
support the hypothesis that many of the behaviors which lead to the label of "retarded" are not only affected by the introduction of new stimuli, but are learned, and, therefore, entirely controlled by external conditions (Bijou, 1963). Most of this research would come under the heading of "behavior modification," a title given to studies which attempt to apply a functional analysis in their approach to behavior problems.

There are two types of learning included in a behavior modification paradigm, namely, respondent and operant conditioning (Ullmann and Krasner, 1969). Respondent conditioning occurs when an unconditioned stimulus elicits an unconditioned response and is paired with a previously neutral stimulus. This stimulus then elicits the initially unconditioned response and is then referred to as a conditioned stimulus, and the response is referred to as a conditioned response. Operant conditioning, which is the type of learning to be dealt with here, requires that a response be emitted and followed by a positively reinforcing consequence in order to be a learned response. Many researchers have found operant conditioning techniques to be quite effective in working with the retarded population (Wright, Clayton and Edgar, 1970; Cowart and Whaley, 1968; Whaley and Tough, 1968; Peterson and Peterson, 1968; Hamilton
and Stephens, 1967). One study in particular by Roos and Oliver (1969) was performed with the specific purpose of assessing the value of operant conditioning with institutionalized retarded children, and found operant techniques to be superior to a more traditional approach in achieving the desired behavioral results.

There have also been numerous attempts to eliminate inappropriate behavior through techniques other than those involving respondent or operant conditioning. Davis, Sprague, and Werry (1969) performed an analysis of variance on "body rocking" data before and after administration of a particular drug, in order to assess its effectiveness in reducing the rate of occurrence of this and other repetitive behaviors. Although the drug was effective with a portion of the maladaptive behavior under study, it was found to produce no significant change in rate in the particular behavior of "body rocking." In an attempt to determine an effective treatment for "tics," Rafi (1962) hypothesized that this specific repetitive behavior had originally developed in order to satisfy an inner need, and would be best treated through a procedure involving massed practice. A group sensory motor activity program was employed by Painter (1968) for remediation of
maladaptive behavior, with the explanation that such a group would be geared toward the "major deficiency areas" of the particular individuals involved. It was observed in reading the above studies that either no data were presented at all or those data which were presented indicated the ineffectiveness of the treatment applied.

Although use of aversive stimuli in elimination of inappropriate behavior may cause disruption of social relationships (Azrin and Holz, 1966), such a procedure has been found quite effective in dealing with certain repetitive or stereotyped behaviors, and no harmful effects of the procedure were reported (Cowart and Whaley, 1968; Whaley and Tough, 1968). One such study (Flanagan, Goldiamond and Azrin, 1958) involved punishment of a stuttering response by an aversive sound brought on by depression of a micro-switch. Lovaas, Schaeffer, and Simmons (1965) paired the word "no" with electric shock in order to facilitate elimination of body rocking and other self-stimulatory behavior in autistic children. The success of these studies indicates that there is perhaps a particular variable or set of variables in some aversive consequence paradigms which have the direct effect of disrupting social relationships. If so, that variable was not present in the successful studies cited above.
Some of the various operant techniques to eliminate stereotyped, repetitive behavior (other than the use of aversive stimuli) are differential reinforcement of behavior other than that to be eliminated, "time-out" from positive reinforcement in conjunction with such a differential reinforcement procedure, and a procedure in which the unwanted behavior is controlled through contingent presentation and withdrawal of a positively reinforcing stimulus. There have recently been several successful attempts to eliminate inappropriate behavior through manipulation of positive reinforcers, with no utilization of punishment procedures (as defined by Whaley and Malott, 1971) at all (Peterson, 1968; Allen and Harris, 1966). In attempting to eliminate such self-stimulatory behaviors as "spinning" in an autistic child, Means and Merrens (1969) merely reinforced all socially acceptable behaviors and found that the rates of the maladaptive behaviors decreased. There is actually implied in every DRO (differential reinforcement of behaviors other than that to be eliminated) procedure a time-out from positive reinforcement procedure; that is, by positively reinforcing all behavior other than that to be eliminated, the investigator is actually withdrawing a positive reinforcer when the unwanted behavior occurs. Several
recent studies have described use of DRO and concurrent use of a time-out procedure as distinct from the DRO procedure. An example of such a study was performed by Rickard and Mundy (1966), in which behavior other than that to be eliminated was reinforced with promise of an extrinsic reward and the inappropriate behavior (in this instance, stuttering) was followed by not only removal of the promise of reward but total withdrawal of any form of attention. A time-out procedure can also be seen as distinct from DRO when it involves physically removing the individual from his normal environment and isolating him in an area designated specifically for that purpose, as in studies by Wolf, Risley, and Mees (1964), as well as Hamilton, Stephens and Allen (1967).

There has been some controversy about whether a time-out procedure used alone is effective in eliminating unwanted behavior without any harmful effects occurring concurrently. Spradlin and Girardeau (1966) state that removal of positive reinforcement seems to be the most effective way to eliminate unwanted behavior. They further state that a more socially adaptive behavior should be introduced to replace the eliminated behavior, particularly if the latter was found to occur at a high rate relative to other behaviors. Gardner (1969)
cites as one of the most significant drawbacks of what he calls an extinction procedure the possible increase in rate or resistance to extinction, which in the case of self-destructive behavior can be particularly harmful. Although withdrawal of a positive reinforcer has been defined as a punishing event (Whaley and Malott, 1971), there seems to be some question as to whether or not it is an aversive event. Leitenberg (1965), following a review of the appropriate literature, concluded that the most convincing evidence that withdrawal of positive reinforcement is an aversive event comes from those studies demonstrating escape from stimuli which had previously set the occasion for non-reinforcement.

It would seem that use of a DRO procedure in conjunction with the time-out procedure would solve some of the above-mentioned problems, since the behavior other than that to be eliminated would increase in rate and eventually replace the unwanted behavior. Wright, Clayton, and Edgar (1970) employed such a procedure, where the contingencies are such that emitting the unwanted behavior interrupts a positively reinforcing stimulus and emitting any other behavior is reinforced with recurrence of this stimulus. Such a procedure was also employed by Baer (1962), when he controlled a child's
thumb-sucking behavior by reinforcing non-thumb-sucking behavior with the opportunity to view cartoons and punishing thumb-sucking by removal of the cartoons. Barrett (1962) eliminated multiple tics in one of her patients by a similar method. She designed an apparatus which would stop the playing of music through a set of headphones each time the patient emitted a tic. An aversive stimulus, white noise, and a "self-control" procedure were also used in attempting to solve the same problem, but the contingent playing and cessation of the music proved most effective. The latter two studies seem to have arrived at a procedure which is relatively free from any of the difficulties pointed out above as occurring in studies using a time-out procedure.

Some particular considerations should be made, according to some authors, when eliminating inappropriate behavior in a blind individual. Nersworth and Smith (1965), for example, state that the human "cortex requires a certain amount of stimulation for consciousness and reality contact" and that rocking and other "auto-erotichisms" represent an attempt on the part of a blind person to generate his own stimulation. Implied in such a statement is the idea that self-stimulatory behavior is internally reinforcing, particularly for the blind.
One might further conclude that control of such behavior with extrinsic reinforcers would prove difficult; however, there is evidence to the contrary in the literature (Means and Merrens, 1969; Lovaas, Schaeffer, and Simmons, 1965). In Tate and Baroff's (1966) study, control of self-injurious behavior of a child who was almost totally blind was established through contingent withdrawal and presentation of physical contact, and no particular difficulty was encountered.

The purpose of the present study was to test the effectiveness of a new procedure in demonstrating a familiar method of treatment, punishment through removal of a positive reinforcer. The specific characteristics of the procedure involve withdrawal and reinstatement of a positively reinforcing stimulus, contingent upon the behavior of a blind retarded individual.

Method

Subject

Jimmy is a totally blind twenty-two-year-old who is currently classified as moderately retarded. He has been a resident in an institution for the retarded for the past twenty years, and has been totally blind since birth. The contrast between the stereotyped, repetitive nature of his gross motor behavior and the articulate, coherent nature of his verbal
behavior is particularly noticeable and distinguishes Jimmy from other individuals of his diagnostic level. This could perhaps be attributed to a "specific superiority" which sometimes occurs in retarded individuals as a result of sensory deprivation—in this case, blindness (Lindsley, 1964). Jimmy possesses adequate self-help skills and is able to move around, alone, when he has had an opportunity to familiarize himself with his environment. Among the relatively few maladaptive or inappropriate behaviors in Jimmy's repertoire, the most prominent is the behavior sometimes referred to as "body rocking" (Davis, Sprague and Werry, 1969).

Apparatus

The apparatus in Phase II includes a straight-back chair, cushioned, without arm rests. A standard micro-switch is installed in the top of the back cushion in such a manner that a particular amount of pressure on the cushion depresses and activates the switch. The switch is connected by standard low-voltage wire to the circuitry in a portable black and white television so that release of pressure on the switch causes the video and sound portion of the operation to be eliminated entirely. This arrangement does not cut the power to the television and the picture and sound are eliminated
and returned without any delay due to the warming up of the picture tube. In Phases II and IV there is also a push-button hand switch connected to the television in such a manner that depression of the button eliminates the sound and picture, and release of the button returns the television to normal operation. Phase VI involves a Willson Jet-Cap similar to that used by workers in a building construction project. Also employed in this phase is a miniature mercury switch which is wired to the power controls of a seven-transistor radio in such a manner that when the circuit within the switch is broken, the radio will not operate. The radio is attached inside the top of the hat under the webbing with the mercury switch on the back side of the radio facing toward the bottom of the hat. Elmer's epoxy glue was used to attach the radio at all four corners to the hat, leaving the tuning and volume controls easily accessible from the bottom of the hat. When the apparatus is assembled in this manner, the radio will not operate when the hat is tilted forward, as would be involved in a body rocking or head nodding movement, but will operate correctly in any other position.
Procedure

The procedure took place in seven distinct phases. They were Baseline Phase I, Treatment Phases II, IV, and VI, and Probe Phases III, V, and VII.

Baseline Phase I—Data collected during the first part of this phase consisted of number of body rocking responses per ten-minute period in the 'T. V. room' of Jimmy's dormitory. Times of day were chosen at random from those times during which Jimmy had been observed listening to the television or the radio. This same selection procedure was also used in the Probe Phases and Treatment Phases II and IV. There was no change in the normal dormitory environment during this period, since the investigator wanted an initial pre-treatment measure of rocking responses to compare with later measures. One complete rocking response is defined as the forward and backward movement of the head, ranging from a full body rock involving the trunk, shoulders and head to a slight nodding movement involving only the head and neck. The investigator attempted during this phase, as well as the Probe Phases, to keep his presence unknown to Jimmy in order to avoid introducing new variables into the situation. This was possible
due to the fact that Jimmy is totally blind and the behavior to be observed is gross enough that it can be counted from a distance of up to thirty feet.

The second part of this phase involves a procedure identical to that of the first part, with the exception that rocking responses were counted in settings other than those in which Jimmy was watching television. The most prevalent of these settings is outside the dormitory, with Jimmy sitting on one of the benches against the building. In each of these settings, Jimmy listens to the transistor radios which belong to the other residents of his dormitory.

Treatment Phase II--The first effort to eliminate Jimmy’s rocking was made by merely asking him to sit in a "special chair" while he watched television. He soon discovered that this chair is of such a nature that one has to lean back in it in order for the television to operate properly. This means that any forward moving of the trunk will cause the television to stop working. It also means that one must remain seated in the chair for the television to function at all. The investigator had merely to observe Jimmy during this phase and record the number of rocking responses in each ten-minute period. Meanwhile, Jimmy did a little experimenting
of his own with the apparatus and found that he could rock freely with his head and neck without releasing pressure on the switch and turning off the television. The investigator, therefore, connected the push-button hand switch and thereby placed consequences upon the head and neck rocking manually. After he had put this procedure into effect, it occurred to the investigator that the chair was no longer serving any purpose in the experimental setting. Any movement which would operate the micro-switch in the chair would also be detected effectively by the person operating the hand switch. It was further hypothesized that the chair was serving as a discriminative stimulus for non-rocking behavior and that a more effective procedure would be to establish any position in the "T. V. room" as such a stimulus. Therefore, the chair was removed from the room and a new approach was formulated for the next phase of the experiment.

Probe Phase III--After discarding the chair as a part of the experimental apparatus, it was decided that its effectiveness in eliminating Jimmy's rocking behavior should be assessed. This was accomplished by use of what is referred to as a "probe" technique (Sidman, 1960). The procedure involved merely counting and recording Jimmy's rocking behavior just
as was done in Phase I. Data were collected both in the presence of the television and of a radio in order to determine the degree of generalization taking place. The length of this phase as well as the other Probe phases was determined by the amount of time required to establish a fairly stable rate of rocking responses (one to three ten-minute periods per day for at least eight days).

Treatment Phase IV (A and B)--Based upon the conclusions drawn from the first treatment phase, the investigator decided to put into effect a procedure which could place consequences upon rocking behavior anywhere in the "T. V. room," regardless of postural position. The investigator had merely to enter the room, get the hand switch from behind the television, and sit in a position from which he could see Jimmy and the television (this did not usually present any difficulty, since Jimmy's favorite place for listening is on the floor under the television). This phase was begun with the investigator spending thirty minutes to an hour each day in the "T. V. room" consequating Jimmy's rocking behavior. Upon consideration of the fact that Jimmy spends approximately nine hours each day listening to the television, the investigator decided that in order to effect any generalization of treatment, he must
place consequences upon a larger portion of Jimmy's total rocking responses each day. To accomplish this, volunteer assistants were recruited and soon a schedule of five hours a day was filled for six consecutive days. To distinguish the intermittent from continuous schedule, the former will be entitled Treatment Phase IVA and the latter Treatment Phase IVB. Each assistant was instructed concerning the topography of one rocking response and the specific method of collecting data to be employed. The investigator conducted tests for reliability during this phase by collecting data concurrently with several of the assistants. The Pearson Product-Moment Correlation Coefficient was calculated and used as a reliability measure of the work of the various assistants and the investigator.

Probe Phase V--The procedure for this phase of the experiment was identical to that followed in Phase III.

Treatment Phase VI--In order to facilitate generalization of treatment effects, the investigator used this phase of the experiment to consequate rocking in settings other than the "T. V. room." To accomplish this, the hat with the transistor radio controlled by the mercury switch was introduced as part
of the experimental apparatus. The investigator chose to put this treatment into effect during periods of time during which Jimmy had indicated a lack of interest in the television program by leaving the "T. V. room," at which time he often listened to his fellow residents' transistor radios. Instructions to Jimmy consisted of nothing more than an explanation that he was being presented with a hat with a radio in it, and that it does not work unless the wearer holds his head straight when he wears it. Data were collected by merely observing Jimmy while he wore the hat and counting the number of times he rocked per ten-minute period.

Probe Phase VII--The procedure for this phase of the experiment was identical to that followed in Phases III and V.

Results

The data in Table I follow a consistent pattern throughout the successive phases. The Baseline and Probe phases reveal a mean rate of rocking behavior higher than that which occurred during any of the treatment phases. There is also a consistent reduction in mean rate of rocking occurring in each successive treatment phase (II, IVA, IVB, and VI). One might conclude from this that each treatment was more effective than the former in reducing rate of body rocking.
TABLE I

MEAN NUMBER OF ROCKING RESPONSES PER TEN-MINUTE PERIOD IN SUCCESSIVE PHASES

<table>
<thead>
<tr>
<th>Activity</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IVA</th>
<th>IVB</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listening to television</td>
<td>318</td>
<td>60</td>
<td>323</td>
<td>11</td>
<td>1.3</td>
<td>178</td>
<td>. .</td>
<td>242</td>
</tr>
<tr>
<td>Listening to radio</td>
<td>288</td>
<td>. .</td>
<td>304</td>
<td>. .</td>
<td>. .</td>
<td>329</td>
<td>.13</td>
<td>99</td>
</tr>
</tbody>
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It should be noted that each data point in Figures 1 through 5 represents the arithmetic mean of three ten-minute data periods. The arithmetic means of rate of rocking responses in each phase, however, were calculated from the original data as collected by the investigator.

Figure 1 contains data for the first four phases of the study. In the first part of Phase I, a mean number of 318 rocking responses occurred per 10-minute period, which rate did not differ significantly from that in the second part, 288 responses per data period. The entire baseline period lasted 12 days, and data were recorded in 1 or 2 10-minute periods per day.

When Phase II was initiated, there was a brief period during which the former rate of rocking was maintained; then
Fig. 1--Phases I through IVA. Baseline, Treatment, Probe, and Treatment.
"full rocking" dropped to zero, and "half rocking" began occurring at a relatively high rate (158 per data period). When the push-button hand switch was introduced as part of the experimental apparatus in the ninth data period, "full rocking" remained at a zero level and "half rocking" occurred at a significantly reduced level. (After this phase, there was no further necessity for differentiating "half" from "full" rocking responses.) The mean number of rocking responses for Phase II was 60 per ten-minute period. This phase lasted four days, after which a probe was conducted in order to determine the effectiveness of the procedure. Phase III indicated, with a mean rate of 314 rocking responses per data period, that no generalization of effects from the treatment had occurred.

By observing Figures 2 and 3, it can be seen that there were two "peaks" in the data of this phase, which could possibly have pulled the mean away from a more representative number. These high numbers referred to as "peaks" are so labeled because they are 25 to 50 rocking responses higher than any other rate which occurred while the hand switch was in operation. Nevertheless, when comparing the means of the two phases, 11 and 1.3, Phase IVA appears to have been clearly less effective. Phase IVA lasted for thirteen days, with an average of
In the presence of the television

Fig. 2--Phase IVB. Treatment.
Fig. 3--Phase IVB, continued. Treatment.
three ten-minute periods of treatment being applied per day. Phase IVB, however, lasted for six days, with treatment actually being applied an average of thirty ten-minute periods per day. Figure 4 contains data collected throughout Phases V and VI. Comparison of the two arithmetic means in Phase V, 178 in the presence of the television and 329 in the presence of the radio, leads one to some tentative conclusions concerning the effectiveness of the preceding treatment. During this phase, a reliability check was conducted and the correlation coefficient was calculated and found to be .92.

The treatment employed in Phase VI kept Jimmy's rocking almost entirely at the zero level, as indicated by the mean of .13 rocking responses per data period. Phase VII, for which the data is depicted in Figure 5, is the probe following the final treatment. This probe revealed a rate of rocking behavior the mean of which was 99 in the presence of a radio, and 242 in the presence of the television. Observation of this data might lead one to the conclusion that some generalization was occurring from the treatment in Phases IV and VI.

Discussion

The results of this particular experimental approach are typical of those of punishment studies in general. When
Fig. 4.-Phases V and VI. Probe and Treatment.
Fig. 5--Phase VII. Final Probe.
not followed by a positive reinforcer to maintain substitute behavior, a punishment procedure will frequently be followed by recurrence of the punished behavior (Whaley and Malott, 1971). This would seem to be true particularly when aspects of the experimental setting make it easy for the subject to discriminate stimuli indicating the onset of a positive reinforcer (Sᵅ's) from stimuli indicating the onset of a punishing or non-reinforcing stimulus (Sᴬ's). The above-mentioned concepts, Sᵅ and Sᴬ, are explained in detail by Whaley and Malott (1971). The fact that there were no positive reinforcers for maintaining substitute behavior and many salient discriminative stimuli sufficiently explains the results of this particular study.

Upon consideration of the fact that the nature of the consequence being placed on Jimmy's rocking behavior would mean removal of the sound and picture from the television for all of the residents on the dormitory, the investigator hypothesized that some social controls might possibly be placed on Jimmy's behavior. Throughout the investigator's observations, however, this only occurred once or twice, possibly due to the fact that the television was never off for more than a few seconds at a time. When it did occur, Jimmy immediately stopped rocking, without any hesitation whatsoever.
The immediate return of rate of rocking behavior to baseline level following Phase II may be interpreted in a number of ways. The most obvious explanation would be that the chair connected to the television served as an easily discriminated $S^A$ for rocking behavior and $S^D$ for non-rocking behavior. There was also a great deal of commotion involved in setting up the experimental apparatus before each data session, and this was invariably followed by aversive consequences being placed on rocking behavior. Another possible explanation of the rate which occurred in Phase III could be the short duration of Phase II, which was entirely due to the investigator's recognition of the limitations of such an approach.

The increased effectiveness of Phase IV over Phase II could have been due to the longer duration of treatment or perhaps to the fact that consequences were placed on rocking in a wider variety of locations and postural positions. The fluctuation which occurred in Phase IVA can perhaps be explained by referring to the schedule of treatment that was in operation. The investigator placed consequences upon Jimmy's rocking behavior approximately one hour each day out of the nine hours that Jimmy spent listening to the television. This meant that Jimmy was getting approximately eight hours of reinforced (non-punished) rocking behavior, and only one
hour of punished rocking. The lower mean rate of rocking in Phase IVB was perhaps the result of more concentrated treatment and, thus, fewer reinforced rocking responses. Since it was sometimes difficult for Jimmy to tell when an experimenter was leaving and, thus, when he could begin rocking again, there were additional periods of non-reinforcement of rocking during which there were actually no experimenters applying treatment. Jimmy was often observed "testing" to determine whether there was an experimenter present by rocking once or twice and waiting to see if the television remained in operation. This, of course, involves a great deal of speculation concerning Jimmy's covert behavior, but it is the basis of the hypothesis that Jimmy was learning to discriminate between treatment and non-treatment periods. This hypothetical ability to discriminate could perhaps explain the steady decline in mean rate of rocking responses with each treatment phase.

Further evidence in support of the above hypothesized relationship is supplied by the extremely fluctuating data in Phase V. In Phase IVB, the investigator came to be a familiar person in Jimmy's dormitory, and each time he entered, three or four of the residents in particular would approach
him and call his name. This could possibly have been heard by Jimmy, and on two or three occasions he was observed by the investigator to stop rocking for as long as two hours after the investigator's name was called. On two occasions, assistant experimenters collected data for Phase V, and Jimmy's rate of rocking was close to baseline level during these data periods. In the portion of the data of this phase, which was recorded with Jimmy in the presence of a radio, his rate of rocking was once again near baseline level. One might hypothesize, therefore, that the television was serving as an $S^A$ for rocking, only if Jimmy was aware of the investigator's presence. No conclusions can be adequately based on this hypothesis, however, since it was impossible to determine without doubt whether Jimmy was aware of the investigator's presence, and also since Jimmy had been observed to say the investigator's name after he had entered and continue rocking.

Throughout the final treatment phase, Phase VI, the recorded rate of rocking behavior remained almost entirely at the zero level. The mean rate of rocking responses for this phase was, therefore, lower than it had been in any preceding phase. This could possibly be attributed to the salience of the stimuli associated with the hat, which was an essential
part of this particular treatment. These stimuli served as S^A's for rocking behavior, and when removed, there was only the investigator's presence or the sound of a radio playing to serve as such a stimulus. In the first part of Phase VII, the final phase of the study, the hat was removed, but the radio and the investigator were present. The fluctuation in rocking rate during this portion of the study can only be attributed to the inconsistency of these stimuli in serving as effective S^A's for rocking behavior.

Some suggestions for possible solutions to some of the problems encountered in this study may be helpful in future studies of this nature. As mentioned above, a DRO schedule could be implemented in order to maintain any more appropriate substitute behavior which may develop during the course of treatment. Totally new behaviors may also be introduced and reinforced concurrently with punishment procedures designed to eliminate inappropriate behavior. To prevent the sort of discriminations made in this study, which prevented adequate generalization, the investigator could construct a booth or room of such a nature that it could be entered and vacated without the knowledge of the subject or any other persons involved in the experimental setting.
Implications for future use of the apparatus designed in this study are numerous, and a few which are particularly relevant for work with the retarded population will be mentioned here. An obvious prerequisite for effective use of any of these techniques is for some sort of auditory or visual stimulus to be strongly reinforcing to the individual being treated. For someone with a fairly extensive repertoire (like the subject of the present study), a cassette tape recorder with recorded educational material may prove useful as part of the apparatus. The recorder could be attached to a belt or harness on the subject, controlled by a mercury switch placed on his shoulders or head, depending upon the particular behavior to be eliminated. This would serve the purpose of providing the necessary substitute behavior while simultaneously eliminating the unnecessary or inappropriate behavior. The chair with the micro-switch could perhaps be used in helping to eliminate hyperactive behavior while facilitating training of new behaviors. Since any application of this apparatus would necessarily be designed to fit the peculiarities of the particular case being dealt with, any further suggestions would be entirely hypothetical. It is hoped that some of the information conveyed in this study
will be of interest or assistance to professionals who find themselves frequently involved in ameliorating the problems of human behavior.

An attempt was made in this study to eliminate the body rocking behavior of a twenty-three-year-old totally blind male individual, presently classified as moderately retarded. Consequences were placed upon rocking behavior in seven experimental phases, employing time-out from a positively reinforcing stimulus as a punisher. More specifically, apparatus was designed in such a manner that rocking would result in elimination of the auditory and visual portion of a television, and in a later phase, the auditory portion of a transistor radio. In general, the results indicated that each treatment was extremely effective in reducing rate of rocking to a near zero level, but probe phases revealed that little generalization had occurred. It was concluded that a schedule involving differential reinforcement of other behavior (Whaley and Malott, 1970) should have been implemented to maintain non-rocking behavior, and that perhaps a new, more appropriate behavior should have been reinforced concurrently.
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