

THE UNIVERSITY OF MANITOBA

AN EXPERIMENTAL ANALYSIS OF THE EFFECTS  
OF A SELF-CONTROL TRAINING PACKAGE  
ON THE BEHAVIOR OF MODERATELY RETARDED  
STUDENTS

by

Diana H. Simpson

A Thesis

Submitted to the Faculty of Graduate Studies  
In Partial Fulfillment of the Requirements for the Degree  
of Master of Arts

Department of Psychology

Winnipeg, Manitoba

August, 1978

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## ABSTRACT

The use of self-control procedures to program response maintenance and generalization has often been recommended in the recent literature as a potentially promising approach to the problem of developing a clear technology for long-term behavior change. Although previous studies have investigated the effects of some self-control procedures, more information documenting these effects with specific reference to the maintenance and generalization of treatment gains is clearly needed. As well, there is a need for information regarding the impact of self-control with varying subject populations and behavior problems.

During this study, two moderately retarded subjects were exposed to self-control training at different points in time and observations in the classroom and in two generalization areas were carried out. The research design involved four phases, a baseline phase plus two phases where the introduction of self-control training with one subject was staggered over time for two different behaviors, and one phase where self-control training was introduced for one behavior with a new subject. The first, second and third target behaviors were monitored through a follow-up of 4, 3 and 2 weeks respectively.

The findings of this study suggest that the self-control training package was effective in producing marked decreases in all target behaviors for both subjects, with the second and third behaviors showing a downward trend throughout two and three weeks of follow-up, while the first behavior showed an upward trend through four weeks of follow-up. The treatment gains generalized to a new setting for only one behavior.

Furthermore, this study demonstrated that mentally retarded students can acquire self-control responses and that considerable gains in treatment outcomes can occur in spite of low levels of accuracy.

## ACKNOWLEDGEMENTS

I wish to express my thanks to the members of my committee, Dr. Terry Hogan, Dr. Garry Martin, and Dr. Derek Jehu, for their assistance throughout the course of this study.

Special thanks are due as well, to the St. Vital School Board for allowing me to do my research in one of their schools, and to Mr. A. Boyes, Assistant Superintendent and Mrs. Brenda Yost, Deputy Assistant Superintendent. To Mrs. Lydia Giesbrecht, Principal of the St. Amant School, and all the staff there who welcomed me so warmly, I give special tribute and thanks for the privilege of being a part of the daily life of their school. In particular, I would like to acknowledge the very enriching and rewarding experiences I enjoyed in working with a fine teacher, Mrs. Nancy Cullen. Finally, to the students I met and worked with at the St. Amant School, I extend my thanks and appreciation, for I have learned much about you as persons and also learned something about myself.

I would like to take this opportunity to give special tribute to Dr. Don McCarthy and Dr. Garry Martin, who by their support and the strength of their example, have had a lasting impact on my learnings as a student.

Finally, I wish to express my gratitude to all those people who gave so much support throughout the duration of this study. Here I include my family and my friends, especially Lou, who have been outstanding in their encouragement, interest and help. To my husband, Joël, and my two young boys, Michael and Stephen, I reserve my largest thanks and boundless appreciation for their patience, strength, laughter and sunshine that never wavered throughout the time consuming

and sometimes trying course of this work.

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## INTRODUCTION

A central concern in the application of behavior modification principles to increase adaptive behaviors or decrease maladaptive behaviors is to obtain the subsequent generalization of demonstrated behavior changes. According to Baer, Wolf and Risley (1968), one important dimension of an applied behavior analysis is that the behavioral change display some generality in terms of durability over time, transfer across settings and to various related behaviors. All too often, however, reports documenting such subsequent generalization of treatment gains are the exception rather than the rule; and those few studies that have done so have yielded inconsistent results. For example, Wahler (1969) reported little generalization between home and school in the elimination of disruptive behaviors through child behavior therapy, while Schwarz and Hawkins (1970) reported a high degree of generalization of delayed reinforcement from one class to another for a sixth grade child. The need for increased attention and more systematic research in this area is clearly emphasized by Kazdin and Bootzin (1972) who pointed out that transfer of treatment gains to extra-therapy settings is not something that can be reliably counted on and that transfer should be planned rather than depended upon as an inadvertent consequence of the program used. There is no doubt that post hoc explanations for the durability and transfer of treatment gains must give way to experimental manipulations which can demonstrate procedures of choice to achieve this goal (Kazdin, 1973; Koegel & Rincover, 1977; Stokes & Baer, 1977). It would appear, however, that clinically applied operant research to date has generally not addressed itself to this task. For example, Keeley, Shemberg and Carbonell (1976), in their review of

operant studies, reported that very few extended beyond short-term behavioral management and that evidence relating to long-term and/or generalizable changes is conspicuous by its absence.

Attempts to program response maintenance and transfer of behaviors to new settings have focused on a number of approaches. First, "natural" contingencies of reinforcement, as opposed to other "more artificial" reinforcers can be utilized in training to maintain behavior. This has been described by Baer and Wolf (1970) as "behavioral trapping". Second, relatives or "significant others" in the natural environment can be trained to carry out or continue the training contingencies in the home or other important setting (e.g., Hall, Axelrod, Tyler, Grief, Jones & Robertson, 1972; Herbert & Baer, 1972; Stokes, Baer & Jackson, 1974). Third, variations in schedules of reinforcement can affect resistance to extinction and hence response durability, though it is unclear at this time just how long and to what limits intermittent reinforcement might effectively maintain behavior. Kazdin and Polster (1973) demonstrated that intermittent token reinforcement maintained social behaviors of a retarded male through five weeks of follow-up, whereas another subject reinforced continuously did not show such maintenance. Fourth, maximizing the similarity between the training setting and significant outside situations where the desired behavior is to occur, as well as reinforcing the desired behavior in a variety of situations and stimulus conditions can enhance generalization (Lowther, Martin & Nicholson, 1978). Finally, it has been suggested that developing self-management or self-control behaviors in clients may enhance response durability and transfer of new behaviors to other settings.

While it is not yet clear precisely what self-control procedure or combination of procedures can reliably produce what specific consequences, this is an approach that holds promise and deserves careful consideration. For example, there is some evidence that children who are trained to self-reinforce maintain behaviors slightly longer than children who are externally-reinforced (Johnson & Martin, 1972). Many references in the literature point to this new area in a suggestive way as a possibly important facet to the generalization problem (O'Leary & Drabman, 1971; Kazdin & Bootzin, 1972; Kaufman & O'Leary 1972; Thoresen & Mahoney, 1974; Jeffrey, 1974; Turkewitz, O'Leary & Ironsmith, 1975). In particular, self control may be of critical value in planning programs for the mentally retarded, where the durability and transfer of treatment gains to a variety of social settings seems especially crucial to increasing public acceptance of these individuals. However, this is an area that remains, as yet, relatively unexplored.

#### THEORETICAL AND RESEARCH BACKGROUND

The idea of applying behavior modification principles to problems associated with self-control is certainly not new. Skinner (1953) provided a rudimentary conceptual analysis; other writers since then have followed and made significant inroads (e.g., Goldiamond, 1965; Homme, 1965; Watson & Tharp, 1972; Thoresen & Mahoney, 1974).

In place of the traditional concept of self-control as "willpower" or some inner psychic force, the behavioral model of self-control or self-management emphasizes the reciprocal relationship between a person's behaviors and his environment. By arranging specific environmental

conditions, one can predictably control the occurrence of a specific behavior (Goldiamond, 1965). However, the manipulation of environmental conditions can be performed either by some external agent or by the person himself. In the latter case, the act of arranging one's own environment in order to facilitate behavior change is referred to as self-control. Because of the complexity of interacting variables in self-control situations however, Thoresen and Mahoney (1974) emphasize the appropriateness of a continuum classification; one can distinguish degrees of self-control with regard to the relative frequency, form, timing, and magnitude of external versus self-control components.

An important distinction is usually made between the "controlled" and "controlling" responses (Skinner, 1953). The controlled response is the behavior to be changed by altering environmental variables such as response consequences or environmental cues. The act of carrying out those environmental manipulations is referred to as the controlling response. If all behaviors are influenced by their consequences, then this applies not only to the controlled behavior in the distinction made above, but also to the controlling behaviors. They too, like any other behavior, are ultimately maintained by external variables. This interdependence of behavior and environment cannot be overemphasized in self-control.

Self-control strategies generally involve two basic approaches. The first focuses on stimulus control procedures which alter the stimuli that influence the occurrence of a behavior prior to its execution; this would include not only the physical stimuli in the external environment, such as controlling overeating by restricting eating to a few relatively

infrequent, nonentertaining situations (Ferster, Nurnberger & Levitt, 1962), but also "internal" stimulus control such as, for example, self-instructions whereby institutionalized schizophrenics modify what they say to themselves and how they perform by averting maladaptive internal monologues and substituting relevant coping cues (Meichenbaum & Cameron, 1973). The second approach focuses on self-presented consequences following a behavior, and usually involves some combination of self-observation and self-reinforcement or self-punishment. Here too, consequences may involve symbolic or covert activities that play a role in the maintenance of behavior as well as tangible, concrete consequences after a response occurs. Bolstad and Johnson (1972), for example, found that self-reward with points exchangeable for prizes produced considerable reductions in the disruptive behaviors of first and second-grade children. Children who rewarded themselves were slightly more successful in this respect than were children who received only external reinforcement. Though these two approaches are distinguished for purposes of clarity and simplification, most programs and clinical applications of self-control in fact involve complex combinations of the two strategies. Thoresen and Mahoney (1974) provide a detailed and comprehensive review of theory and research findings in this area.

One facet of self-control research in particular seems to suggest potentially promising theoretical and research implications for the problem of generalization. The role of verbal self-instructions and "covert speech" in complex performance has increasingly become a topic of experimental interest. Much of the early thrust in this area came from the Soviet psychologists Luria (1961; 1963) and Vygotsky (1962). They suggested that early in normal development, the verbal instructions

and reactions of external agents, usually parents, control and direct a child's behavior. Later, the child's own overt speech and self-talk become a regulator of his actions, and finally, these self-statements become covert or inner speech and assume a regulatory role.

From this hypothetical sequence, and their own observations and study of the literature, Meichenbaum and his colleagues developed a training paradigm for the development of self-control in impulsive children which paralleled some of the above elements in children's internalization of speech (Meichenbaum & Goodman, 1971). The training sequence proceeded as follows:

1. first E performed a task while talking to himself out loud while S observed (modeling);
2. then S performed the same task while E instructed S out loud (overt external direction);
3. next, S performed the task while repeating the instructions to himself aloud (overt self-direction);
4. next, S performed the task while whispering the instructions to himself (faded overt self-direction);
5. S performed the task while guiding his performance via private speech (covert self-instruction).

The verbalizations which E modelled included: (a) questions about the nature of the task (e.g., "What is it I have to do?"), and answers to these questions in the form of cognitive rehearsal; (b) focused attention plus response guidance (e.g., "Be careful ... draw the line down."); (c) self-evaluative coping skills (e.g., "That's okay ... even if I make an error I can go on slowly."); and (d) self-reinforcement (e.g., "Good, I'm doing fine ...").

The training procedure resulted in significantly improved performance on various dependent measures such as Porteus Maze scores,

performance IQ on the WISC, and cognitive reflectivity as identified by scores on the Matching Familiar Figures Test. These improvements were significantly greater than those obtained in no-treatment and attentional control groups and were evident in a one-month follow-up.

Further controlled laboratory studies explored the contribution of several of the above training components. For example, it was found that cognitive modeling alone was not as effective as cognitive modeling plus self-instructional training in the actual rehearsal and personal use of private speech (cf. Meichenbaum, 1971b). Another study on snake avoidance (Meichenbaum, 1971a) indicated that exposure to coping behavior plus coping self-verbalization models (e.g., snake approach with marked hesitancy and occasional physical withdrawal plus description of initial fears, self-instructions to take deep breaths and relax) was more effective in reducing avoidance behavior than exposure to nonverbal coping performances alone or exposure to mastery models (e.g., fearless and unhesitating snake approach and mastery self-verbalizations). Previous research on vicarious learning (Bandura, 1969; 1971) had suggested the importance of the coping versus mastery distinction and the possibility that subjects would more likely imitate the behaviors of coping models due to their greater similarity to the observer.

In addition to the above-mentioned applications of self-instructional training, the strategy has also been applied to the treatment of test and speech anxiety, with indications of impressive improvements on dependent measures such as self-reports, actual test performances, and changes in grade point average (Meichenbaum, 1972; Sarason, 1973; Norman, 1974).

Finally, one of the most intriguing and clinically impressive



applications of self-instructional training studied its impact on the attention, thought and language behaviors of institutionalized schizophrenics (Meichenbaum & Cameron, 1973). Performances of a self-instructional training group on "sick talk" during a standardized interview, proverb abstraction, digit recall and rated perceptual integration in ink-blot responses were compared to those of an equivalent attentional control group. Assessments were made by an experimenter who was blind to subjects' condition assignments. Measures of rater reliability on dependent measures ranged from 98.2% to 99.1%. Self-instructional training produced significant decreases in "sick talk" and was related to improvements in proverb abstraction, perceptual integration, and digit recall under distraction conditions. Follow-up three weeks later revealed not only that treatment gains were maintained, but that the self-instructional group actually improved relative to the control group. Differences at follow-up on frequency of "sick talk", for example, were statistically significant at the .0005 level.

Although self-instructional training has demonstrated tentative promise, further inquiries and controlled research are sorely needed. Meichenbaum (1974) suggests the possible operation of at least the following components:

1. didactic presentation and guided self-discovery of the role of self-statements in subjective distress and performance inadequacies;
2. training in the fundamentals of problem solving (e.g., problem definition, anticipation of consequences);
3. training in the discrimination and systematic observation of self-statements;
4. graduated performance assignments;

5. explicit suggestions and self-reinforcement for the modification of self-statements along the lines of "coping" adaptation and performance-relevant attentional focusing;
6. structured modeling of both overt and cognitive skills;
7. modeling and encouragement of positive self-evaluation (self-reinforcement) and
8. depending on the treatment package employed, relaxation training combined with the use of coping imagery in a modified desensitization procedure.

Though self-instructional training has demonstrated some tentative promise, there is a scarcity of the controlled inquiry needed to help unravel questions about the component features of self-instructional training, its maintenance and transfer effects, and its possible differential effects with regard to varying behavior problem categories and varying subject populations. Margolis and Shemberg (1976) reiterate this last point in attempting to account for their failure to replicate the Meichenbaum and Cameron (1973) study.

From a theoretical viewpoint, a basic premise underlying self-instructional training is that internal phenomena such as thoughts, images and physiological reactions can be viewed as responses similar to external behavior, and as such may serve similar important functions as antecedents that cue the occurrence of other behaviors in a response chain or as consequences of other actions. This presumed correspondence between the principles governing overt and covert behavior has been termed the continuity or homogeneity assumption and is tentatively supported by several lines of evidence (e.g., Miller, 1959; Barber & Hahn, 1964; Bandura, 1969; Mahoney, Thoresen & Danaher, 1972). In this context,

the problem of generalization of treatment gains can be viewed in part as a problem of stimulus control. If self-statements such as thoughts and images represent early elements in a lengthy response chain that gradually becomes overt, then can this critical mediating or cueing function of internal events be taken advantage of to program internal adaptive versus maladaptive coping cues, such as described earlier, that might enhance the maintenance and transfer of desired overt behaviors?

In summary, the preliminary self-control research reviewed thus far suggests that bringing internal events into the realm of applied science offers a potentially useful and excitingly comprehensive perspective. In fact, Bandura (1969) and others (e.g., Kanfer & Phillips, 1970; Staats, 1972; Thoresen & Mahoney, 1974; Mahoney, 1974) have argued convincingly that covert processes are not only useful but essential in the understanding and control of complex behavior. A comprehensive approach to the problem of generalization may prove to require an emphasis on covert or cognitive determinants of behavior as well as overt or environmental determinants. To ignore either one of these significant dimensions to the exclusion of the other may perhaps prove to be both premature and unjustified. For the present, it first remains necessary to demonstrate an effect in utilizing such a model for programming generalization; future inquiries may then focus on isolating the contributing influences of various components.

A central concern in the present study, therefore, was the question of whether or not any positive changes related to self-control training might occur, and if so, to what extent would these effects generalize

to settings other than the training setting. In addition, information is clearly needed about the impact of self-control skills with varying subject populations and behavior problems. Very little self-control research generally has been carried out in behavior modification programs for the mentally retarded. However, the feasibility of using these techniques with the retarded is suggested by several recent preliminary studies. Frederiksen and Frederiksen (1975) have reported the effectiveness of contingent self-administered token reinforcement in the control of disruptive and on-task behavior of educable mentally retarded children in a junior high school over an eleven-week period. Helland, Paluck and Klein (1976), in a comparison of self and external reinforcement with mildly mentally retarded adults, found self-reinforcement in the form of verbal praise and self-administration of a monetary or candy reward on a fixed ratio schedule to be at least as effective as external reinforcement in improving performance on a collating task. In addition, Nelson, Lipinski and Black (1976) demonstrated that retarded institutionalized adults with IQ's around 50 were capable of self-recording their behavior, given a very structured situation, with a reliability equivalent to that of college students and that such self-recording was related to an increase in the frequency of desirable behaviors (conversation in the dining room, participation in lounge activities and tidiness of bedrooms). Litrownik, Freitas and Franzini (1978) found that trainable mentally retarded children (IQ's from 30 to 50) who were exposed to a brief 1-hour demonstration-training program were able to acquire, retain and transfer self-recording skills involving a discrimination between the type of task completed (e.g., recording the matching of items involving parts of the body while not recording

the matching of items involving shapes) and the consequences of their behavior (e.g., recording a bowling score of 10 while not recording scores of 1 or 5). Finally, Guralnick (1976) has reported the effectiveness of self-instructional training with educable mentally retarded children in facilitating performance on a matching-to-sample task, and a comparison with a control condition indicated that the self-instruction group was the only one in which a significant increase in accuracy from pre - to post - testing occurred. It appears at least plausible that mentally retarded children may well benefit from a training procedure specifically aimed at programming response maintenance and generalization via self-control techniques. An additional concern in the present study, therefore, was to attempt to add to the existing information on self-control, especially with respect to the acquisition of such skills in moderately retarded (i.e., TMR) students (IQ's 30 to 50) in an uncontrived, naturalistic setting.

In brief, the purpose of this study was to examine the behavioral effects and utility of a self-control training package designed for relatively easy use by teachers in a school setting in modifying the behavior of two moderately retarded students. More specifically, the goals were: (1) to apply prompting, modeling and reinforcement procedures to (a) teach subjects to self-record their socially undesirable behavior, (b) train subjects to provide themselves with verbal commands or self-instructions regarding such behavior and to respond to them appropriately, and (c) teach subjects to appropriately self-reinforce their responses; and (2) to investigate the effects of the self-control behaviors so taught, especially with respect to (a) the maintenance and (b) setting

generalization of any desired changes observed in the target behaviors.

## METHOD

### Subjects

Two students enrolled in the school program at the St. Amant Centre,<sup>1</sup> participated in this study. Subjects were selected by asking the teaching staff at the school to refer any individual students with a specific behavior problem whom they felt might benefit from a self-control program. Of five students initially referred, two were finally selected and three rejected on the basis of several criteria. These included the presence of a high frequency versus low frequency behavior problem, the ability to imitate and follow simple directions and at least minimal expressive language involving the use of two or three word combinations. In addition, both subjects finally selected exhibited a level of retardation which did not exceed the moderately retarded range and did not include additional complications such as autistic behaviors or major sensory or motor impairments. Specific information regarding these individuals can be seen in Table 1.

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Insert Table 1 about here

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In addition to this research, both subjects also participated in an ongoing occupational therapy program in the school involving the use of a token reinforcement system in a workshop setting.

### Setting

This study was conducted in the school section of the St. Amant Centre where three areas were utilized. These included two classrooms,

Table 1. Summary table of Subjects

Subject	Sex	Age (yrs)	Level of retardation	Length of institutionalization	Age at last assessment	Developmental Quotient *(Yale) Development Schedule)
A	Male	13	Low moderate	4 years	10 yrs - 10 mos	30% or 3 to 3½ yr level
B	Male	9	High moderate	1 year	7 yrs - 6 mos	65% or 4½ yr level

\* This was the only psychometric information available from institutional records.

a TV room and a workshop area, which shall be referred to as the training classroom, the home classroom and the generalization areas respectively.

Training Classroom. This area consisted of a standard-sized classroom used by the school as a resource room for storing various equipment and for working one-to-one with individual students. Within this room there were also several school desks and chairs. Two of these were set up to one side of the room to allow for the placing of research equipment close at hand on one desk and to allow the experimenter and one subject to sit diagonally across from one another at the second desk during individual self-control training sessions.

Home Classroom. This area was a standard-sized classroom with a large desk for the teacher situated in one corner, and 8 small school desks and chairs set front to front in two rows of four towards the middle of the room. An additional 8 small school desks and chairs were placed in a half-moon at the back end of the room. These constituted the major work areas for the eight students composing this class, including one student confined to a wheelchair and the two subjects participating in this research. Other basic classroom equipment such as blackboard, books, learning materials, sink and adjoining bathroom completed the layout of the home room. As there were no one-way windows in this particular room, observations were made by observers who sat on chairs in the corner at one end of the room or the other depending on which work area was being utilized by the teacher.

Generalization Areas. The TV room and the school's workshop, situated on a lower level, were used for this area during those times





when films were being shown in the TV room to approximately 40 students and 6 to 8 school staff, or when art or manual work skills were being taught to the eight students seated at several small work tables with anywhere from 5 to 8 staff and volunteers normally assisting. Observations were made by observers who sat in chairs at least 8 feet away but in a variety of locations depending on where subjects were situated or moved.

#### Apparatus

The major equipment used in this study consisted of two audio-tape recorders with attaching earplugs, two pre-recorded audio-tapes used by the observers in the home classroom and generalization areas to indicate observational intervals, and several blank audio-tapes for recording individual treatment sessions in the training classroom. As well, papers, pencils, erasers, and work sheets supplied by the teacher and involving the identification of sets of numbers were on hand in the training classroom. Finally, two 3-feet by 2-feet blue and yellow cardboard behavior charts marked off in half-inch squares and with pictures of Ronald McDonald pasted below a red goal line at the bottom, as well as two peg boards and pegs were available in the training classroom and afterwards in the home classroom.

#### Dependent Variables

The dependent variables in this study were those responses defined by the school staff and experimenter as socially undesirable because of their distracting and unpleasant appearance and/or their unlikely public acceptance as desirable behavior in society at large. These included tongue chewing, tongue protruding, spitting, head jerking and hand clapping. While not necessarily clinically significant, the modification

of these kinds of behaviors seemed crucial to increasing public acceptance of mentally retarded persons. The specific behavioral definitions used for Subject A were:

Head Jerking - quick up and down vertical movement of the head with the head thrown up and back, then moved down with a jerk toward the floor such that the chin moves down to the chest bringing eye level away from the vertical. Do not record instances of nodding the head where the up and down movements of the head are so slight that the face and eye level remain relatively vertical, as for example in nodding affirmatively in answer to a question or instruction or comment from another person. Record any one or more occurrences of head jerking as H for that observation interval, regardless of the number of responses observed.

Tongue Chewing - the tongue protruding beyond the lips so that the tip is clearly visible, either with or without chewing motions and/or chewing motions without the tongue being observable. Do not record instances where the tongue is stuck out and immediately returned in to the mouth within 2 seconds or less. Record any one or more occurrences of the above components as T for the observation interval, regardless of the number of responses observed or whether they occur singly or simultaneously.

Hand Clapping - moving the arms in and out in such a way that the hands come together palm to palm and form a clapping sound. Do not record instances of hand clapping