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Teaching Self-Control to Increase On-Task Behavior

University — Université

University of Alberta

Degree for which thesis was presented — Grade pour lequel cette thèse fut présentée

M. Ed.

Year this degree conferred — Année d'obtention de ce grade	Name of Supervisor — Nom du directeur de thèse
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THE UNIVERSITY OF ALBERTA

TEACHING SELF-CONTROL TO INCREASE ON-TASK BEHAVIOR

by

JEFF RUBIN

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF EDUCATION

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

EDMONTON, ALBERTA

SPRING, 1980

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled "Teaching Self-Control to Increase On-Task Behavior", submitted by Jeffrey Guy Rubin in partial fulfilment of the requirements for the degree of Master of Education.

R. McKay
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Gary Holdgrafer

DATE November 30, 1979

ABSTRACT

The present study evaluated the efficacy of a behavioral self-control training program. This program was composed of 3 components — self-monitoring, self-evaluation, and self-reinforcement -- and was designed to increase the on-task behavior of students and promote generalization of the behavior change across settings and over time.

In the present study a multiple-baseline-across-subjects design was used to assess the effects of the self-control training program. The subjects were six learning disabled children between the ages of eleven to sixteen years. Four of the children served as the experimental (self-control) subjects while the other two children served as the control (no-treatment) subjects. Continuous behavioral observations were conducted from 10:15 a.m. until noon every morning of the school week. This time interval was divided into a 60-minute reading session and a 45-minute math session. Data was only collected when the subjects were supposed to be in their desks doing individual seat-work.

During the reading period the four experimental subjects were successively trained in behavioral self-control, while the math period served as the control period. The control subjects received no training in self-control throughout the study.

Improvements in on-task behavior were observed following self-control training. The greatest increase occurred during the reading period for all four of the experimental subjects although one subject exhibited an almost equal increase in on-task behavior during the math session. However, the high levels of on-task behavior were not

consistently maintained for all subjects. The on-task behaviors of the control subjects remained stable throughout the study.

The results indicated that behavioral self-control procedures may be employed successfully by students in order to improve their attending skills without prior training under externally administered reinforcement conditions. However, if the behavior changes are to be maintained over time and across settings, future research must program for generalization.

ACKNOWLEDGEMENTS

I would like to express my thanks and appreciation to the following people:

Dr. Robert Mulcahy, for his supervision and encouragement throughout the course of this research.

Dr. David Baine, who provided the original idea and direction for my thesis and who supervised me during the early stages of my research. As my supervisor, teacher and friend, I am deeply appreciative.

Dr. Al Scott, for his willingness to be a member of my thesis committee and for his advice, support and friendship during the past five years.

Dr. Gary Holdgraffer, for his interest and willingness to be a member of my thesis committee.

Mrs. Bev Dekker and Mr. Alex Pieterse, the two teachers in the classroom, for their patience and assistance throughout my study. A special note of acknowledgement is extended to Mrs. Dekker for her excellence in teaching which constantly amazed me and made the classroom a pleasant and facilitative environment for learning.

Mrs. Evelyn Unger for her cooperative spirit and courtesy in allowing me to carry-out my study in her school.

Kevin, Laura Lee, Michael, Kevin, Peter and Grant who were wonderful subjects and whose assistance made this study possible.

To my parents, Abner and Hilda Rubin, for their emotional and financial support during my training in Graduate studies.

And especially to my wife, Janice, whose assistance, patience, encouragement and love was forever present.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Since the 1960's behavior modification has dramatically influenced the direction and effectiveness of services for exceptional children. An impressive array of studies has clearly demonstrated that operant principles can be used successfully to modify a wide spectrum of behaviors (Ashem & Poser, 1973; Krasner & Ullman, 1965, Thoresen, 1973; Ulrich, Stachnik & Mabry, 1970). In the field of education, disruptive classroom behavior has often been the target of behavior modification strategies. Many studies have shown that rates of disruptive behavior can be substantially reduced by the systematic application of externally managed contingencies, in which an external change agent is the locus of control (e.g. Allen, Hart, Buell, Harris & Wolf, 1964; O'Leary, Kaufman, Kass & Drabman, 1970; Patterson, 1965; Schmidt & Ulrich, 1969). The agent assumes responsibility for determining target behaviors, environmental structure, and delivery of consequences. However, in many cases it is neither desirable nor necessary for the change agent to assume all responsibility (Sulzer-Azaroff & Mayer, 1977). In contrast, the utility of self-managed contingencies in affecting desirable behavior changes in the classroom setting is relatively unexplored (Kurtz & Neisworth, 1976).

Bandura (1971) suggests that the emphasis on external control is extrapolated from much infrahuman research. For example, since rats and chimpanzees do not typically reward or punish themselves, applications from this research have tended to ignore self-management techniques. Kurtz and Neisworth (1976) suggest that another factor

which has contributed to the emphasis on external control is the behaviorists' aversion to the use of mentalistic variables often used in discussions of "self". Yet Skinner (1953) stated more than twenty-five years ago: "An individual controls himself precisely as he would control the behavior of anyone else -- through the manipulation of variables of which behavior is a function" (p. 228).

Since a primary goal of the socialization process is to teach children to control their own behaviors, rather than to rely solely on external agents for control, it is important to program for self-management or self-control. This requires a shift in the control of behavior from peers, parents or teachers, who usually operate as contingency managers, to the child himself. Moreover, a major problem associated with the variety of behavior modification strategies used with children, such as token reinforcement procedures whereby changes in the child's behavior are brought about by externally administered contingencies, has been the rapid deterioration of the desired behavior change following the removal of the contingencies (Jones & Kazdin, 1975). Kazdin (1975) attributes this lack of response maintenance to a number of factors. First, external change agents frequently fail to reinforce the occurrence of many behaviors. Monitoring several persons in a group situation makes it very difficult to consistently reinforce all target responses. Secondly, agents who administer the contingencies may cue performance of the target behavior because of their association with reinforcement and punishment. Behavior may be performed only in the presence of those who administer reinforcers. Thirdly, and related to the above, behaviors may not be performed as readily in situations in which

external agents are not administering reinforcement, because individuals can easily discriminate different contingencies across situations.

Self control has been proposed by a number of authors as an alternative approach in effectively promoting behavior generalization and maintenance (Bolstad & Johnson, 1972; Drabman, Spitalnik & O'Leary, 1973; Turkewitz, O'Leary & Ironsmith, 1975). Aside from the possible limitations of externally administered contingencies, there are certain advantages for teaching a person control over his own behavior. First, self-control training may strengthen and maintain the gains derived from some other treatment. For example, classroom research has demonstrated the maintenance value of self-control training once a desired behavior change has been established by externally administered reinforcement procedures (e.g. Glynn, Thomas & Shee, 1973). Secondly, individuals sometimes perform better when they are allowed to contribute to the planning of the program or choose the behaviors they are to perform, rather than having contingencies imposed upon them (e.g. Lovitt & Curtis, 1969). Third, the goal of any behavior modification program is to train an individual to control his or her own behavior and achieve self-selected goals. According to Kazdin (1975), "continuous control over a client by an external agent is not an end in itself. Whenever possible, external control is a means to achieve self-control" (pp. 190-191). External control in some form is usually essential to initiate most behavior modification programs, including self-control training. However, children must eventually learn to regulate and control their own behavior, without constant monitoring

by external agents. This socialization process extends from the control of simple bodily functions, such as defecation, to the control of social and educational behaviors in more complex situations.

In view of the potential benefits of teaching self-control strategies to children, this study investigated a means of training children in the use of behavioral self-control procedures and the effects of the procedures on their attending behaviors. To provide a context for this investigation, it is necessary first to review the relevant literature in the area of self-control, including the defining characteristics of self-control, and the models and components of the self-control process.

CHAPTER II

REVIEW OF RELEVANT LITERATURE

Definitions of Self-Control

The area of self-control has long been beset by a host of terminological confusions and misconceptions (Thoresen & Mahoney, 1974). Traditionally, self-control has been viewed as a function of internal variables such as "will power", "determination", and "restraint" (Kurtz & Neisworth, 1976). By contrast, Skinner (1953) has stressed external variables as being primarily and ultimately responsible for self-control. Bandura (as cited in Kurtz & Neisworth, 1976) has attempted to resolve this dichotomy by describing the individual-environment relationship as a continuous reciprocal influence process. The individual alters the environment, and is, in turn, altered by the environment. According to Thoresen and Mahoney (1974): "Self-control represents a dynamic continuum wherein the person alters the external environment as well as his own internal environment to promote meaningful change" (p. 129).

The terms, "self-management", "self-regulation", and "self-control" are currently the most frequently used terms and are used synonomously with one another. However, individual variation in the use of these terms has caused some degree of confusion (Mahoney, 1972). Therefore, for purposes of clarity, the term "self-control" will herein be employed as a summary label for all cases of self-regulated behavior change. It is also necessary to functionally define the concept, self-control, because as Jeffrey (1974) stated, since "there is no common agreement at this time, it seems essential

that all self-control investigations should include clear, explicit, operational definitions of self-control and other self-hyphenated terms (such as self-reinforcement and self-monitoring)" (p. 175). Therefore, following is the definition of self-control which was adhered to in the present study and which is a synthesis of a number of other definitions (Kanfer, 1975; Skinner, 1963; Thoresen & Mahoney, 1974): Self-control is displayed when an individual, in the relative absence of immediate external constraints or controls, responds or engages in behavior whose previous probability has been less than that of alternatively available behaviors. This new response pattern is usually influenced by delayed environmental consequences.

This definition of self-control has three major features implied within it: (1) Self-control always involves two or more alternative behaviors, the consequences of which are usually incompatible, (2) the behavior to be managed or controlled (i.e. controlled response) is influenced (i.e. made either more or less probable) by the individual himself altering the environmental variables (i.e. controlling response) of which the behavior is a function, such as the antecedent or initiating stimuli, and/or the response consequences, and (3) self-control behaviors are usually prompted and/or maintained by external factors such as environmental cues and long-term consequences.

For example, the individual who chooses to quit smoking has the options of smoking, not smoking, chewing gum, sucking candy, etc. The consequences of smoking are immediately pleasant, but ultimately aversive, while the consequences of not smoking are just the opposite, immediately aversive but ultimately pleasant. The probability of the

response to be controlled (smoking) may be modified by various self-controlling responses, such as the individual rewarding himself for not smoking. As well, self-control may have been prompted, and being maintained, by more extensive environmental modification of antecedents and consequences, the least of which may be a doctor informing the individual that he will live longer if he quits smoking.

It should be noted, that as the individual becomes more successful with the self-control procedures, the previous probability of the response to be controlled changes, so that a relatively lesser degree of self-control is exhibited. Once the new habit or behavior pattern is firmly established, self-control is no longer exhibited.

For the purpose of the present study, each of the defining characteristics of self-control was examined in terms of improving on-task classroom behaviors. These behaviors may be viewed as being incompatible since being off-task may be consequented by opposing outcomes, such as peer reinforcement and teacher punishment. As well, a self-controlling strategy, such as self-reinforcement, may be applied to alter the probability of off-task behavior. It is reasoned that if, in a situation relatively absent of immediate constraints or controls and in which the probability of off-task behaviors has previously been high, the child's frequency of on-task behaviors increases (the probability of which had previously been low), while a concomitant decrease in his off-task behaviors also occurs, then, consistent with the definition, the child can be said to have exhibited self-control.

In the case of self-control training with children, the

objective is to teach them how they may apply some self-controlling strategy in order to produce the desired response in the absence of any external support, or in the event of opposing reinforcement contingencies. The basis for this contention will be reviewed from the models of self-control which have served as theoretical frameworks for the process of self-control, and as paradigms for directly programming self-control with children.

Models of Self-Control

In the literature, self-control is described as ranging from the self-application of an operant paradigm to modify some instrumental behavior (Bolstad & Johnson, 1972; Johnson, 1970) to more cognitive techniques aimed at some variant of cognitive restructuring (Bornstein & Quevillon, 1976; Meichenbaum & Goodman, 1971).

Kanfer (1971) has proposed a multistage model for organizing the critical variables determining effective self-control. The three primary components of this model include: (1) self-monitoring, (2) self-evaluation, and (3) self-reinforcement. Kanfer proposed that if an individual can be taught to monitor, evaluate and reinforce his own behavior, much in the same way as an external agent might do, then self-control can be achieved.

Self-monitoring, or self-observation, involves the monitoring of one's own behaviors. In context of the research literature, this usually involves recording instances of a response or response class. Self-evaluation refers to a discrimination process, whereby the individual compares his performance to some criterion or performance standard. It may involve making a subjective judgment

or an objective comparison of the self-monitoring observations to some standard. And finally, self-reinforcement refers to a consequence being self-administered depending upon the judgment made in the self-evaluation phase. According to Spates and Kanfer (1977), because of the practical difficulty in separating the self-evaluative and the self-reinforcement stages of the model, these components should be considered as occurring together simultaneously, with the latter dependent upon the former. Kanfer (1973) notes that in most self-control programs, all three components are best considered together.

Bandura and Perloff (1967) and Glynn, Thomas and Shee (1973) have put forward a model for the analysis of behavioral self-control which is very similar to Kanfer's model. As well, other strategies of self-control have been proposed, including Goldfried and Merbaum (1973), Kazdin (1975), Skinner (1953), and Thoresen and Mahoney (1974). In each of these models, three basic elements in self-control have been identified, at least one of which has been present in every successful self-control program (Mahoney & Thoresen, 1974). These elements include: (1) self-observation, requires the individual not only to attend to his own actions, record their occurrence for purposes of feedback and on; (2) environmental planning, which involves changing ment so the cues that precede a behavior are c behav l programming, which involves altering f a avior.

977 offered a cognitive-behavioral model of se whi so similar to Kanfer's model, but which

is conceptualized in terms of the verbal control of behavior. Each stage focuses on the control of thoughts which may precede some behavior. The three stages of his model include: (1) self-statements prompting awareness of one's thoughts and behaviors; (2) the emission of alternative self-statements to promote a behavior change; and, (3) self-statements which either reinforce or extinguish the new thoughts and behaviors.

Like Kanfer's model, it may be seen that these three stages incorporate the processes of self-monitoring, self-evaluation, and self-reinforcement, but with a greater emphasis upon the cognitions which preceed a behavioral action.

The importance of these models of self-control is the implication that if individuals are trained in the components of self-control, then behavior changes will be maintained. Indeed, as Bandura (1969) emphasized, "the establishment of self-monitoring reinforcement systems is essential if induced behavioral changes are to generalize and endure, particularly where social environments provide either weak support for new modes of behavior or conflicting patterns of reinforcement" (p. 624).

In the following section, evidence for the assumption that lasting behavior changes can be promoted by self-control will be examined in an analysis of the self-control procedures used in classroom settings. These clinical applications are evaluated primarily in terms of the degree of behavior maintenance attributable to self, as opposed to environmental control.

Components of the Self-Control Process

In this section, evidence for the assumption that the teaching

of self-control will promote maintenance and transfer of behavior change, will be reviewed. The emphasis will be upon studies applying self-control procedures in classroom settings, with particular attention paid to self-control programs derived from the theoretical model of Kanfer (1971). Consequently, the programs are broadly reviewed in terms of the self-control components trained, including self-monitoring, self-evaluation, and self-reinforcement.

The procedure most often used in the classroom self-control programs involves training components of the self-control process following the establishment of the desired behavior change via externally controlled reinforcement contingencies (e.g. Drabman, Spitalnik & O'Leary, 1973). Thereafter, the participants are instructed to assume the responsibility of some facet of the externally controlled program. This responsibility might involve recording their own behavior, determining if they have met some objective and/or deciding what rewards they should receive for their efforts.

Self-Monitoring. Self-monitoring or self-observation procedures are primarily intended as an assessment technique in self-control studies. However, the mere act of observing oneself may, in fact, be a highly reactive procedure, that is, it may influence the observed behavior (Kazdin, 1974).

Self-monitoring has been observed to modify the frequency of study behavior (Broden, Hall & Mitts, 1971; Johnson & White, 1971), class participation (Gottman & McFall, 1972), and a variety of other behaviors (Kazdin, 1974). However, this effect does not always

reliably occur(e.g. Spates & Kanfer, 1977), and when it does, the effects are usually found to be short-lived (Kazdin, 1974).

For example, Broden et al., (1971) investigated the effects of self-recording on the classroom behavior of two junior high school students. In the first experiment, a grade eight student recorded the frequency of her in-class study behavior, which resulted in increased study time. This improvement was maintained over a three-week follow-up period even though self-recording had been discontinued. In the second experiment, the number of talk-outs emitted by an eighth-grade boy were recorded during math period. Following base-line, the student was requested to record the frequency of inappropriate talk-outs during the first half of the period, for the second half, and then for the entire period. Talk-outs decreased when self-recording was in effect and increased again when self-recording was discontinued. When self-recording w reinstituted in the final phase there was a slight, though no significant decrease in talking-out when compared to the baseline condition.

Exemplified by the study of Broden et al., (1971) is the finding that behavior change and behavior maintenance following self-monitoring practices are highly variable. Though a maintained behavio nge occurred for one student, this effect was not observed with another. I should be noted, however, that in the first experiment, counselor feedback and praise for improved study behavior were concurrent procedures. These environmental conditions may have facilitated the observed behavior maintenance. The results of the foregoing studies suggest that self-monitoring by itself,

though a necessary component of self-control, is probably insufficient to ensure a maintained behavior change.

An important variable related to self-monitoring is the accuracy of the observations and recording. The usefulness of a measurement in any scientific application is largely influenced by its accuracy (Mahoney & Thoresen, 1974). In general, the accuracy of measurements is determined by their reliability and their validity. Jeffrey (1974) and Kazdin (1974) discuss some of the possible problems in obtaining accurate self-monitored data. Generally, it can be said that people are not naturally accurate observers -- either of their own behavior or that of others. The importance of self-monitoring reliability varies with the purpose for which self-monitoring is employed. When it is used as an assessment technique, reliability is very important; when it is used as a behavior-change technique, the consistency and accuracy of measurement are much less crucial and perhaps irrelevant (Kazdin, 1974). Thoresen and Mahoney (1974) suggest several measures which may be taken to increase the likelihood of accurate self-monitoring. These include: (1) providing reinforcement contingencies for accurate self-reporting; (2) informing the observer that his/her accuracy is being checked; (3) initially, arranging for an independent observer to collect the data and then gradually having the subject assume this task by himself/herself. By repeated comparison of his/her personal data with that collected by the observer, the individual may be shaped into more accurate self-recording. Thoresen and Mahoney also suggested two additional procedures. Provision of a simple and painless recording system; and, having the individual practice or train in

the discrimination and recording of the behaviors to be monitored. This training procedure could incorporate most of the previous suggestions, i.e., gradually transferring recording responsibilities to the individual, providing immediate accuracy feedback, and providing systematic reinforcement.

Self-Evaluation and Self-Reinforcement. Research on the effects of self-evaluation and self-reinforcement is considered jointly because of the practical difficulty in separating the two processes. Self-evaluation may involve self-reinforcement (Bandura, 1971), and conversely, whether or not a person reinforces himself/herself is dependent upon some prior judgment or evaluation of the performance to be reinforced. It should be noted that self-monitoring is also often very difficult to separate from these two processes. Consequently, all three components -- self-monitoring, self-evaluation, and self-reinforcement -- may at times be best referred to as an entire package, i.e., behavioral self-control. The important distinctions between various studies are the procedures used.

One of the most consistent findings in self-determined reinforcement studies is that contingent reinforcement based on self-imposed standards is as effective as that based on teacher-imposed standards in modifying academic behavior or rates of disruptive behavior (Felixbrod & O'Leary, 1973; Lovitt & Curtiss, 1969).

Lovitt and Curtiss (1969) demonstrated that higher academic rates occurred when a 12 year old pupil arranged his own academic contingency requirements than when the teacher specified the contingency. The student had participated in a teacher administered

experimenters then allowed the child to specify his own work/reinforcement ratio in the token program using the curriculum guidelines set by the teacher. Although the student set more lenient reinforcement standards, he showed a small gain in academic performance which could not be accounted for by reinforcement magnitude. This study demonstrated that academic performance could be maintained when the student exercised some control over the reinforcement contingencies. However, the durability of the student's academic performance was not assessed following the removal of contingent reinforcement.

Felixbrod and O'Leary (1973) compared the effects of self-determined, externally-determined and no-reinforcement contingencies upon the academic performance of Grade two students. As in the Lovitt and Curtiss study, the children in the self-determined group decided for themselves the work/reinforcement ratio. The same performance standards were externally imposed upon children in the second contingent reinforcement condition. Children in the no-reinforcement control condition performed in the absence of external reward. The results indicated that the behavioral productivity of the self-determined group was greater than that of the no-reinforcement group but equivalent to that of the externally-determined group. However, the children in the self-determined group also tended to reduce the performance requirements for reinforcement.

The functional equivalence of external and self-determined reinforcement has also been shown by Glynn (1970). In this study, Glynn compared the academic performance rates of four classes of grade nine students in which the amount of reinforcement received

was determined either by the students themselves, by the experimenter, by chance, or where the group received no reinforcement. Unlike the previous studies, however, the self-determined reinforcement group decided how much they earned after and not before the work was completed. The results indicated that self-determined reinforcement is as equally effective as experimenter-determined reinforcement, in terms of improving academic performance. The self-determined group and the external control group were also clearly superior to the chance and no-reinforcement groups.

In the context of a token economy system, test performance improved whether the students or the teacher controlled the amount of reinforcement received. This result, congruent with the findings of Lovitt and Curtiss (1969) and Felixbrod and O'Leary (1973), supports the hypothesis that an individual can affect the same behavioral changes as expected from an externally-administered reinforcement system. However, when the reinforcement system was withdrawn, the desired behavior changes returned to baseline levels.

These findings suggest that the self-determination procedures, as used here, do not facilitate behavior maintenance to any greater degree than teacher-determined reinforcement procedures. Similar results have been obtained in other classroom studies where the students were simply asked whether or not they should receive a token for appropriate classroom behaviors (Frederiksen & Frederiksen, 1975; Kaufman & O'Leary, 1972; Santogrossi, O'Leary, Romanczyk & Kaufman, 1973).

For example, in the Frederiksen and Frederiksen (1975) classroom study, students in special education classes were given control

of the token economy following a 14-week teacher-administered token program. When the students decided for themselves whether or not they earned a token for appropriate behavior, disruptive classroom behaviors remained at a low level. However, when the tokens were withdrawn, a dramatic increase in disruptiveness occurred.

The lack of response maintenance in each of these studies may have been a function of insufficient self-control training. In each study, the students were simply requested to take responsibility for "evaluating" their own behavior without explicit guidelines. Close examination of the procedures and results revealed no evidence that the students either monitored or evaluated their behavior in comparison to some standard. In fact, the students self-ratings were always near maximum regardless of variations in their behaviors. In each study, the students gave themselves near maximal ratings to gain near maximal reinforcement.

Recognizing some of the problems in the above studies, more elaborate self-control training programs have been devised (Bolstad & Johnson, 1972; Drabman, Spitalnik & O'Leary, 1973; Glynn, Thomas & Shee, 1973; Turkewitz, O'Leary & Ironsmith, 1975).

In the Bolstad and Johnson (1972) classroom study, four of the most disruptive students in each of 10 first- and second-grade classrooms were observed. Following the baseline period, disruptive behavior was reduced by a teacher-controlled token economy. One half of the children were then trained to self-monitor their own disruptive behavior, while the remaining children continued under teacher control. In the next phase, the self-monitoring students were allowed to take full-responsibility for their own ratings, and consequently,

the amount of reinforcement they received. In the final phase, reinforcement was abruptly withdrawn.

These authors demonstrated that the self-regulation procedures were slightly more effective in reducing disruptive behavior than was the external regulation procedure. However, this effect was only maintained during the initial stage of a one week extinction phase. Overall, there was a dramatic increase of disruptive behavior for all experimental groups which probably eventually would have reached the baseline rate.

Drabman, et al., (1973) designed program contingencies to promote honest and accurate self-evaluation skills and to permit a gradual transference of evaluation responsibility. Following baseline, a teacher-administered token program was implemented in an after-school remedial reading class of eight 9- to 10-year old boys. This one hour class was divided into four, fifteen minute segments. Experimental contingencies were put into effect for three randomly selected periods, while the other fifteen minute segment served as a control period. The students were then instructed to rate themselves on a five point scale for both academic and social behavior. Only those children who successfully matched the teacher's rating within one point were given a bonus point which could be exchanged for backup reinforcers. Following ten days of this matching phase, the experimenters began to gradually fade out the contingencies for accurate ratings. Over a 20 day period, the number of children in the group who were allowed to match their ratings with the teacher were gradually decreased. Those children not required to match received the number of tokens they gave themselves from their own ratings. In

the final 12 days, checking was discontinued and the children now had full responsibility for self-evaluation.

The matching and fading out procedures used in this program were very effective in promoting relatively accurate self-evaluation skills. Throughout the program, disruptive behaviors remained at low levels and there was also some transfer of these results during the 15 minute control period when the experimental contingencies were not in effect.

Utilizing essentially the same procedural outline as Drabman et al., Turkewitz et al., (1975) systematically attempted to produce generalization and maintenance of appropriate classroom behavior with eight disruptive elementary school children. In addition to fading out the matching phase, they also faded out the back-up reinforcers, and observations of these children were made in another non-experimental classroom setting.

Like the results of Drabman et al., the response changes were maintained during the 15 minute control period but there was no transfer of appropriate social behavior to the regular classroom setting. Also, during a one week extinction phase when the reinforcers had been completely faded out, the disruptive behaviors remained below baseline but were beginning to increase.

Glynn, et al., (1973) demonstrated that grade-two children could successfully use behavioral self-control procedures in a regular classroom setting to maintain high rates of on-task behavior that had previously been established by externally administered reinforcement procedures. Following a baseline period, on-task behavior was increased by a teacher-controlled token economy. Then,

with the use of a tape-recorded signalling procedure, the children were instructed by the teacher that they would now be able to decide for themselves whether or not they had earned a point. Whenever a "beep" occurred they were instructed to place a check on their recording sheets only if they were "on-task" at that moment. The points were later exchanged for back-up reinforcers.

Results indicated that the self-control techniques maintained on-task behavior at its high level both immediately following the externally administered reinforcement program and during the follow-up treatments five and seven weeks later. However, the back-up reinforcers were never faded out prior to the termination of the experiment.

Though a limited degree of behavior maintenance was shown in the Drabman and Turkewitz studies, there is some question as to whether the behaviors, in fact, were maintained by self-control behaviors. The behavioral maintenance may have been due to such environmental factors as the demand characteristics of the class setting, and reactivity to being observed. Without appropriate controls, these "non-specific" factors may alternatively account for the results (Jeffrey, 1974).

Though maintenance of behavior changes has been limited almost entirely to brief periods during and following self-control training, transfer of behavior changes across classroom settings has also been observed. In a study by Anderson, Fodor and Alpert (1976) self-control training resulted in a marked decrease in disruptive behavior which was maintained in both the training classroom and a regular classroom setting during the period in which the training program was

in effect. During a follow-up study, disruptive behavior remained at low levels in the training classroom, although a sharp increase in disruptiveness was observed in the regular classroom setting.

A critical difference between this study, which finds some degree of generalization outside the classroom, and the Turkewitz's study which does not, may be in the nature of the group experience. Whereas students in the Turkewitz's study returned to different classrooms from the experimental classroom, students in the Anderson study travelled from class to class as one group. Therefore peer support would more likely occur, and other non-experimental students would not be present to influence the disruptiveness of the self-control students.

The implication of this difference is that the behaviors may have been maintained largely by positive attributes of the environment. The degree to which the students controlled their own behavior is uncertain in this situation. Thus, it remains to be demonstrated that self-control training will facilitate the maintenance and generalization of behavior where weak or opposing reinforcement contingencies are present.

Conclusions

The classroom research reviewed has provided some encouraging, though limited, evidence for the behavior maintenance value of teaching self-control to children. The major result of the self-control procedures has been the maintenance of the behavior changes in context of the environment in which the behaviors were taught. Though it has been demonstrated repeatedly that students can manage

their own behavior within the token economy, the target behaviors tend to return to baseline levels when the token system is removed (Frederiksen & Frederiksen, 1975; Glynn, 1970; Kaufman & O'Leary, 1972).

Very few self-control programs have been found that produce response maintenance following removal of the reinforcement system (Anderson, et al., 1976; Bolstad & Johnson, 1972; Drabman et al., 1973; Turkewitz et al., 1975), and only one study reviewed observed a transfer of the behavior changes to another setting (Anderson et al., 1976).

The failure of many studies to demonstrate maintenance and generalization with self-control programs may be due to several aspects of the training programs. Most of the training programs have focused on only one aspect of the proposed self-control process: self-monitoring (Broden, Hall & Mitts, 1971), self-evaluation (Frederiksen & Frederiksen, 1975), or self-reinforcement (Glynn, 1970). Of those studies which have used more than one component (e.g. Drabman et al., 1973; Glynn et al., 1973, Turkewitz et al., 1975) few have ensured that the students could demonstrate mastery of the skills before assessing behavior maintenance. As well, many of the studies have failed to provide adequate controls for the non-specific effects associated with the self-control training procedures.

It remains to be demonstrated, therefore, that self-control training will facilitate behavior maintenance in environments where there are weak or opposing reinforcement contingencies. Based upon some theoretical speculations (Bandura, 1971; Kanfer, 1971) and some

promising, albeit limited, evidence (Anderson et al., 1976) it is proposed that if children who exhibit a lack of self-control can learn self-control skills, then they should be effectively able to control their own behavior during times when environmental consequences are delayed.

The present study sought to investigate a means of training children in the use of behavioral self-control procedures. Additionally, an attempt was made to assess the degree of maintenance and generalization of children's behavior change as a function of self-control training in the classroom.

CHAPTER III

RATIONALE, DEFINITIONS, AND HYPOTHESES

Rationale

A review of the relevant literature reveals that the procedure most often used in classroom self-control programs, involves training in the components of the self-control process following the establishment of the desired behavior change via externally controlled reinforcement contingencies. Previous studies have demonstrated the effectiveness of self-control procedures in classroom settings when introduced after a period of external reinforcement (Drabman et al., 1973; Glynn et al., 1973; Kaufman & O'Leary, 1972). However, what is the effectiveness of self-control procedures in modifying behavior without the prior application of externally managed contingencies? An important question which remains, therefore, is whether a behavioral self-control training procedure introduced into a classroom setting without prior external reinforcement will modify behavior effectively.

Furthermore, many of the studies examined have failed to demonstrate the behavior maintenance value of self-control training. This failure can probably be attributed to aspects of the training program employed. In order to facilitate behavioral maintenance, it is important to provide each child with a complete self-control program which incorporates all components of the self-control process, and then to train each component until the child demonstrates mastery of the skills. In addition, as was illustrated by the study of Broden et al., (1971), some environmental modification of antecedents and/or

consequences may be necessary to promote maintenance and transfer of behavior changes.

Consequently, the specific objectives of the present study were to:

1) assess the effectiveness of a self-control training program, based on Kanfer's 3-stage model of self-control, which was introduced into a classroom setting without prior implementation of teacher-administered token program.
2) assess the degree of maintenance of children's behavior change as a function of self-control training in the classroom.
3) evaluate transfer of children's behavior change as a function of self-control training in the classroom.

Definitions

On-Task Behavior -- Behavior that is compatible with good classroom learning conditions. During teacher instruction it includes: remaining in one's seat, remaining silent when not being spoken to, looking at the teacher or blackboard, and taking part in oral discussion with the teacher. During work periods it includes: remaining in one's seat, remaining silent, and looking at and working on the assignment prescribed by the teacher.

Off-Task Behavior — Behavior that is incompatible with good classroom learning conditions. It includes: not attending or working on assigned material, movement of the child from his/her

chair when not permitted or requested by the teacher, movement of the child while he/she is in his/her chair such that he/she does not look at the blackboard or the teacher when he/she is talking, playing with toys and writing implements, talking to other children, and failure to initiate the appropriate response required by the teacher within a period of 5 seconds.

Hypotheses

Based on the relevant literature in the area of self-control training with children, the following hypotheses were made:

Hypothesis 1: During the self-control training program, the subjects who are receiving training will exhibit an increase of on-task behaviors during times when the training program is in effect and also during the control period, as compared to the baseline level and as measured by observer ratings.

Hypothesis 2: Following the termination of the self-control training program, the increase of on-task behaviors will be maintained over time and across both the treatment and control settings, as measured by observer ratings.

Hypothesis 3: Transfer of the self-control subjects' behavior change will be facilitated by teacher praise.

Hypothesis 4: The percentage of on-task behaviors exhibited by the (no-treatment) control subjects will remain stable throughout the study.

Hypothesis 5: The self-control training program employed in the study will produce accurate self-monitoring and self-evaluation skills by the subjects.

CHAPTER IV

METHOD

Subjects

Six children, five males and one female, aged eleven to sixteen years who were enrolled in the same class of a remedial school for the language and learning disabled served as subjects. Each of the children were attending the school because of auditory and/or visual difficulties in learning which made it difficult for them to cope with regular school programs. The children's overall level of intellectual functioning were all considered by their teachers to be within the educable range of mental ability.

The six students were preselected for their high rates of off-task behaviors based upon their teachers' subjective evaluations. These behaviors were interfering with their classroom learning and were much more frequent during individual seat-work as opposed to when the children were in small groups or when one of the teachers was giving instructions or talking to the whole class. When engaged in individual seat-work, the six students were described by the teachers as continually not attending to their work, frequently moving about in their desks or around the room without the teacher's permission, constantly talking to the other students, and a tendency to play with materials other than their assigned work. Both of the classroom teachers were anxious to see improvements in the children's on-task behaviors.

The pre-selected children were then observed in the classroom to establish a baserate of on-task behaviors. Based on this data, the

four children who displayed the lowest percentage of on-task behaviors, and therefore were considered priority, were selected as the experimental (self-control) subjects. The other two children served as the (no-treatment) control subjects. Subjects #1, #2, #3 and #4 were labelled the self-control subjects, and their ages respectively were 16 years, 11 years, 12 years and 12 years. Subject #1 was enrolled in the remedial school in May, 1976; Subject #2 on September 3, 1975; Subject #3 on September 23, 1974; and Subject #4 on September 3, 1975. Subjects #5 and #6 were called the control subjects and both their ages were 11 years. Subject #5 was enrolled in the school on February 19, 1977 whereas Subject #6, the only female subject in the study, was enrolled in January, 1973. Intellectual testing which was carried out with the Wechsler Intelligence Scale for Children-Revised prior to the beginning of the study yielded the following results:

Subject #1 - Verbal Scale I.Q., 57; Performance Scale I.Q., 57; Full Scale I.Q., 52.

Subject #2 - Verbal Scale I.Q., 90; Performance Scale I.Q., 93; Full Scale I.Q., 91.

Subject #3 - Verbal Scale I.Q., 87; Performance Scale I.Q., 80; Full Scale I.Q., 82.

Subject #4 - Verbal Scale I.Q., 77; Performance Scale I.Q., 68; Full Scale I.Q., 70.

Subject #5 - Verbal Scale I.Q., 75; Performance Scale I.Q., 72; Full Scale I.Q., 72.

Subject #6 - Verbal Scale I.Q., 75; Performance Scale I.Q., 95; Full Scale I.Q., 84.

Setting and Apparatus

The experimental classroom was a large, well-lighted room. There were a total of twelve children and two teachers in the classroom. Classes ran Monday, Tuesday, Wednesday, Thursday and Friday from 9:30 a.m. until noon, and from 1:00 p.m. until 3:30 p.m. The children's desks were arranged in three rows, with each row containing four desks. Audiovisual recording equipment consisting of a VTR, a monitor, a microphone, and a camera with a wide-angle lens were all located in a portable wooden box measuring 3 feet by 5 feet by 3 feet. The box was placed in a corner of the classroom and remained there throughout the study. The camera was situated within the box such that each of the six subjects could be video taped simultaneously. The video equipment was electronically equipped to automatically turn-on at 9:30 a.m. and to automatically shut-off at noon. The video equipment was also electronically equipped to run on a specified, repetitive cycle, i.e., 10-minute "on" interval followed by a 20-minute "off" interval.

Throughout the study, the experimenter sat at the teacher's desk which was situated in an adjacent corner from the VTR equipment. The sound of a bell delivered through an earphone by means of a tape recorder cued the end of each 10-second observation interval.

In addition to the audiovisual recording equipment located in the wooden box, another set of video recording equipment was utilized but only during the first week of the study. This set of equipment was located behind the teacher's desk and was operated by the experimenter throughout the morning in order to obtain samples of the subjects' typical classroom behaviors.

Every morning of the school week from 9:30 a.m. until 9:45 a.m. the teacher conducted a class question-and-answer session based on the weather, date, and current news. For the next 15-minutes the children were divided into two groups for a phonics lesson. A physical education lesson typically took place from 10:00 a.m. until 10:15 a.m. For the last hour and 45-minutes of the morning, the children had a reading period followed by a math period.

Measurement and Reliability

The on-task behavior of each subject was defined as the percentage of 10-second observation intervals in which a subject's behavior could be classified as being "on-task". It was calculated by dividing the total number of intervals the subject was on-task by the total number of intervals observed.

Observations were taken from 10:15 a.m. until noon every morning of the school week. This time interval was divided into two sessions -- a 60-minute session and a 45-minute session. The former session typically consisted of a reading period which ran from 10:15 a.m. until 11:15 a.m. During this period the six subjects were divided into two groups. Each group was observed for 30 minutes. For the first half-hour of the reading period, one group, consisting of two children both of whom were self-control subjects, were observed in their desks doing individual seat-work. The four children in the other group, two of whom were self-control subjects and the other two were the (no-treatment) control subjects, met with one of the teachers behind a portable room divider for a reading group. For the second-half hour of the reading period the two groups rotated. The one group

of two children now met with the teacher behind the portable room divider while the four children in the second group were now observed in their desks doing individual seat-work. The other children in the class met as a reading group with the other teacher for 60 minutes behind another portable room divider.

The latter session of the morning consisted of a math period which ran from 11:15 a.m. until noon. During this period all six subjects were observed together. This period typically consisted of 15 minutes during which the teacher presented information and conducted a question-and-answer session. The remaining 30 minutes were spent in individual seat-work.

Data was only collected when the subjects were supposed to be in their desks doing individual seat-work. Only the experimenter collected the observational data. A momentary time-sampling technique was utilized whereby the subjects' behavior were recorded as being "on-task" if, at the moment each 10-second observation interval terminated, the subjects were observed to be on-task.

Reliability measures over both the reading and math sessions were obtained for all six of the subjects during the experimental conditions. An attempt was made to gain regular samples of reliability on each child's behaviors as the experimental phases changed. Reliability was assessed by viewing the audiovisual recordings. At the end of each day, the video tapes were replayed and observed by the experimenter and a second observer who had previously been trained to a criterion of 95% agreement over each session for on-task behaviors. The observer was a teacher who had volunteered to be a reliability assessor and was naive as to the design of the study.

Reliability was obtained by utilizing the momentary time-sampling technique. Each of the two observers recorded the on-task behaviors of the subjects so that simultaneous records were obtained for each subject throughout a session. The two records were then compared and the degree of reliability calculated.

Experimental Conditions

The children were observed in the context of a reading and math period across all experimental conditions. During the reading period the four experimental subjects were successively trained in behavioral self-control, while the math period served as the control or generalization period. The two control subjects received no training in self-control throughout the study.

Pre-Baseline. An initial pre-baseline condition served as a training phase for the observers, a period of adaptation for the subjects to the presence of the experimenter and the audiovisual equipment, and to collect video recordings of the subjects' classroom behavior.

Baseline. During this condition baseline rates of on-task behavior were established for the six children. During baseline, the teachers were instructed to use any form of disciplinary control they thought was appropriate except removal of a child from the classroom. This discipline primarily involved the use of praise and ignore techniques, although reprimands were used on occasion.

Self-Control Training -- Phase 1. This condition marked the beginning of the self-control training program. Thoresen and Mahoney (1974) have suggested that an intensive individual training procedure,

incorporating immediate feedback and systematic reinforcement, can lead to the reliable discrimination and recording of behaviors to be monitored. The prime purpose of this condition, therefore, was to train the self-control subjects in all three components of the self-control process, and to increase the likelihood of accurate self-monitoring and self-evaluation.

During each day of this phase, instead of attending the Physical Education class from 10:00 a.m. to 10:15 a.m., one of the self-control subjects stayed with the experimenter in the classroom. Initially, it was explained to the subject that during the next few weeks, the experimenter would be working with him in order to teach him self-control and thus improve his "on-task" behavior in class. At the beginning of each session, the experimenter demonstrated to the subject what behaviors constituted being "on-task" and what behaviors constituted being "off-task". The subject was also asked to act-out being on-task and off-task.

A video-tape of the subject, taped during the pre-baseline condition, was then played. Concurrently with the playing of the video tape, a series of intermittent "beeps" sounded. The "beeps" were produced by a small electronic timer which was worn by the subject in his shirt pocket. The "beeps" occurred at regular 0.5 minute intervals. On the average, 20 signals occurred during each 15 minute training session.

The subject was provided with recording sheets (see Appendix A) which were 2 in. x 10 in. pieces of paper attached to opposite sides of a piece of wood. The recording sheets consisted of 10 rows of 2 squares, with a "happy face" stamp in each of the squares. The

"happy face" stamp was selected because of its assumed reinforcing value to the subjects. In addition, as was suggested by Thoresen and Mahoney (1974), the simple recording system would increase the likelihood of accurate self-monitoring.

Whenever a "beep" from the timer sounded, the experimenter immediately stopped the video tape and asked the subject if he had been "on-task" or "off-task" at the moment of the signal. If the subject correctly identified his behavior in the video tape, he was praised for "good watching" and given a point for being honest. Additionally, if he had been "on-task" in the video tape at the moment of the "beep" he was instructed to cross-out one of the "happy faces" on the recording sheet. Each crossed-out "happy face" constituted a point. The points were exchanged at the end of the session for back-up reinforcers which were different kinds of candies from which the subjects could choose. These back-up reinforcers were considered to be effective as the subjects were highly motivated to earn them. The criterion for the back-up reinforcers was gradually increased during this condition from one point to five points, and the points could be carried over from one day to the next. If, however, the subject was "off-task" in the video tape at the moment a signal occurred, he was told that he was unable to cross-out a "happy face", although if he had correctly identified himself as being "off task" he was awarded a point for being honest. Whenever the subject incorrectly identified his behavior in the video tape he did not receive a point and it was explained to him why he was wrong.

Self-Control Training -- Phase 2. In this condition the self-control procedures of self-monitoring, self-evaluation and self-

reinforcement taught to the experimental subjects during the previous condition were now transfered into the reading period. The self-control subjects no longer stayed with the experimenter during the Physical Education lesson.

The self-control subjects were provided with two recording sheets, as in the previous condition, which they had with them during the reading period. The self-control subjects also wore the electronic timer with an earphone attached to it, when doing individual seat-work during the reading period. The self-control subjects had neither the recording sheets nor the electronic timer during the math period. The "beeps" from the electronic timer were on a fixed interval schedule, although the intervals were gradually increased during this condition from one minute to ten minutes so that the external cue could be gradually faded out.

The self-control subjects were instructed by the experimenter at the beginning of this condition that they would now be able to decide for themselves whether or not they had earned a "happy face" for being on-task during the reading period. Whenever a "beep" occurred and the subject was "on-task", he was instructed to cross-out one of the "happy faces". However, if the signal occurred and the subject was "off-task" he was told not to cross-out a "happy face". Each crossed-out "happy face" was worth one point. At the end of the reading period, the subjects were allowed to exchange their points for an educational magazine or book. The number of points necessary to obtain any given reinforcer varied depending upon the real value of the reinforcer. The more expensive the reinforcer the greater the number of points required in order to earn the reinforcer. Points were carried over from one day to the next, and the

subjects were allowed to save their points if they desired.

In order to encourage accurate recording and evaluation of behavior during this condition, the self-control subjects were informed that if their ratings were within 2 points of the experimenter's ratings, they would receive the number of points they had given themselves plus bonus points for being honest. The bonus points were gradually increased from 4 to 10 as the length of the fixed interval of the electronic timer was also increased. However, if there was more than a 2-point discrepancy between the ratings, half the subjects points were taken away.

The experimenter used a stopwatch to time the intervals of the electronic timer, so that he would know when a "beep" was signaled to the subject. At the end of the interval, the experimenter would immediately look up and see if the subject was "on-task". If the subject was on-task at that precise moment, the experimenter crossed-out a "happy face" on a recording sheet similar to the self-control subject's. This sheet was later compared to the subject's recording sheet in order to determine the subject's honesty.

Although the self-control subjects had neither the recording sheets nor the electronic timer during the math period, the teachers were instructed during this period to verbally praise subjects #2 and #4 whenever they were observed to be on-task, i.e., "you sure are using good self-control and staying on task".

Maintenance. During this last condition, the recording sheets, the electronic signals, teacher praise, and all checking was discontinued. The self-control subjects continued to be observed during both the reading and math periods in order to note whether or not whatever behavioral changes had occurred during the previous

conditions were being maintained over time.

General Design

A multiple-baseline-across subjects design was used to evaluate the effects of self-control training on the on-task classroom behavior of children. Self-control was taught to one subject at a time.

The effects of self-control training on the percentage of on-task behavior was evaluated by variations on an A-B design for each subject with multiple baseline comparisons being made on on-task behaviors between and among subjects.

The following experimental phases were used:

1. Baseline: Five sessions for Subject #1, ten sessions for Subject #2, fourteen sessions for Subject #3, and nineteen sessions for Subject #4. (Subject #4 was absent from the first session to the seventh session because of illness.) Subjects #5 and #6 continued on the baseline phase throughout the study. This phase consisted of thirty sessions for Subject #5 and thirty-four sessions for Subject #6.

2. Self-Control Training — Phase 1 for Subject #1, beginning in session six and lasting for five sessions.

3. Self-Control Training — Phase 2 for Subject #1, beginning in session eleven and lasting for thirteen sessions.

4. Self-Control Training — Phase 1 for Subject #2, beginning in session eleven and lasting for four sessions.

5. Self-Control Training — Phase 2 for Subject #2, beginning in session fifteen and lasting for thirteen sessions.

6. Self-Control Training — Phase 1 for Subject #3, beginning

in session fifteen and lasting for five sessions.

7. Self-Control Training — Phase 2 for Subject #3, beginning in session twenty and lasting for thirteen sessions.

8. Self-Control Training -- Phase 1 for Subject #4, beginning session twenty and lasting for five sessions.

9. Self-Control Training -- Phase 2 for Subject #4, beginning in session twenty-five and lasting for nine sessions.

10. Maintenance: eleven sessions for Subject #1, seven sessions for Subject #2, two sessions for Subject #3 and one session for Subject #4.

As the present study occurred near the end of the school term (May and June), time restrictions did not allow sufficient follow-up procedures for Subjects #3 and #4.

CHAPTER V

RESULTS

Observer Reliability

Table 1 presents reliability data in terms of percentage agreement of occurrences of on-task behaviors recorded by the two observers for both the reading and math periods and across experimental conditions. The formula which was used was:

$$R = \frac{A}{A + B} \times 100$$

where "R" is the index of reliability expressed in terms of a percentage; "A" is the number of intervals where both observers agreed as to whether or not the subject was on-task at the moment each observation interval terminated; and "B" is the number of intervals where the two observers disagreed.

Throughout the study, inter-observer agreement ranged from 87% to 100% for all six subjects, with better than 90% agreement on 29 of the 34 days of the study. Reliabilities averaged across the subjects for the various phases were as follows: baseline, 96%; self-control training -- Phase 1, 97%; self-control training -- Phase 2, 97%; and maintenance, 97%.

On-Task Behavior

Table 2 presents, for each subject, the mean percentage of on-task behavior in both the reading and math periods during each phase of the study.

Table 1

Percentage Reliability Between Observers

for the Occurrences of On-Task Behaviors

		Experimental Conditions			
Subject	Period	Baseline	Self-Control Training - 1	Self-Control Training - 2	Maintenance
1	Reading	95	95	96	95
	Math	94	96	95	95
2	Reading	96	98	99	98
	Math	95	96	97	96
3	Reading	96	98	97	98
	Math	[illegible]	95	97	98
4	Reading	98	98	98	98
	Math	96	97	97	97
5	Reading	98	-	-	-
	Math	97	-	-	-
6	Reading	99	-	-	-
	Math	96	-	-	-

Table 2

Mean Percentage of On-Task Behavior Across Situations and Over All Phases

		Experimental Conditions			
Subject	Situation	Baseline	Self-Control Training - 1	Self-Control Training - 2	Maintenance
1	Reading	48	56	85	69
	Math	41	42	58	53
2	Reading	46	75	98	91
	Math	44	59	85	84
3	Reading	53	57	88	82
	Math	47	53	64	74
4	Reading	50	55	86	85
	Math	55	59	79	75
5	Reading	68	-	-	-
	Math	63	-	-	-
6	Reading	70	-	-	-
	Math	66	-	-	-

It can be seen from the table that with the implementation of the self-control training program, the percentage of on-task behavior increased for all four of the experimental (self-control) subjects; however, it was not until the second phase of the program that a much stronger increase in on-task behavior resulted. This improvement in on-task behavior, which was unrelated to the ages of the subjects, occurred during both the reading and math periods. However, whereas there was a 35% to 52% increase in on-task behavior for all four experimental subjects during the reading period from baseline to the second phase of the self-control training program, there was only a 17% to 24% increase in on-task behavior for three of the experimental subjects during the math period. Only Subject #2 had large increases in on-task behavior during both the reading and math periods. From baseline to Self-Control Training -- Phase 2, Subject #2's on-task behavior increased 52% during the reading period and 41% during the math period. For Subjects #1 and #3, the increases in their on-task behavior from baseline to Self-Control Training -- Phase 2 during the reading period was double that of the increases in on-task behavior during the math period. During the second self-control training phase, Subject #4 showed an increase in on-task behavior over baseline level of 36% during the reading period and 24% during the math period. Thus, it appears that Subject #2 and, to a lesser extent, Subject #4 exhibited an increase in on-task behavior in both the reading and math periods which was stronger and more consistently together than were the increases for the other two experimental subjects. This information is corroborated by visually inspecting Figures 1 through 4 which presents individual graphs of the percentage of on-task

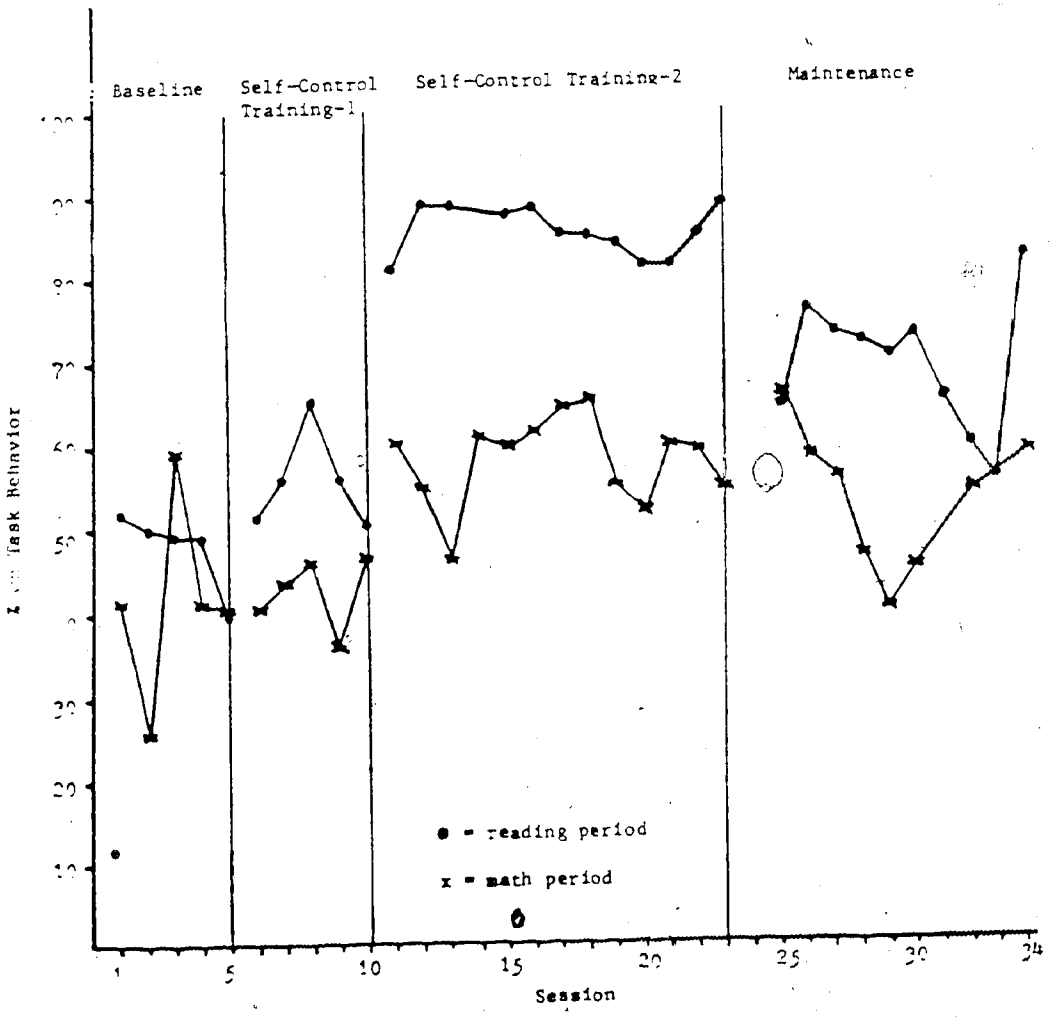

Figure 1. Percent on-task behavior for Subject #1 during reading period and math period, and across experimental conditions.

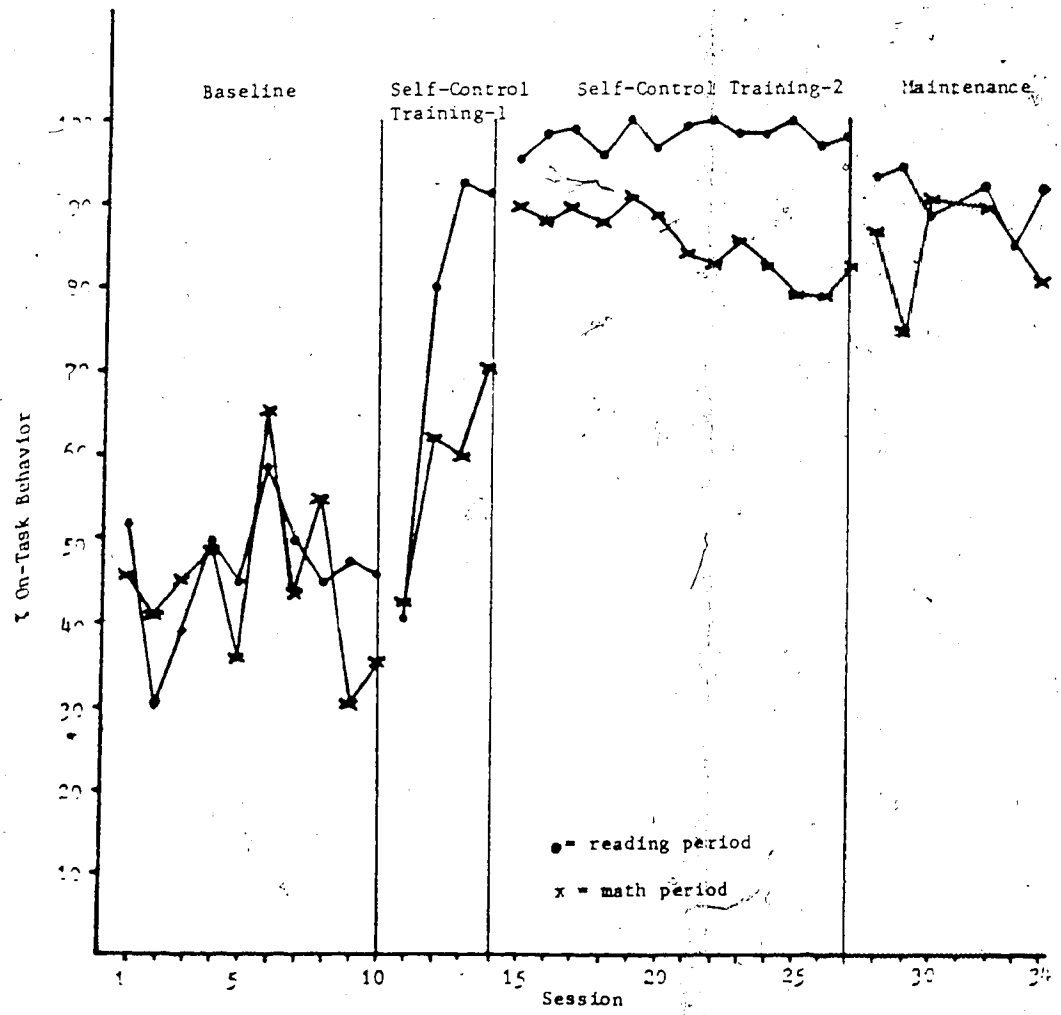

Figure 2. Percent on-task behavior for Subject #2 during reading period and math period, and across experimental conditions.

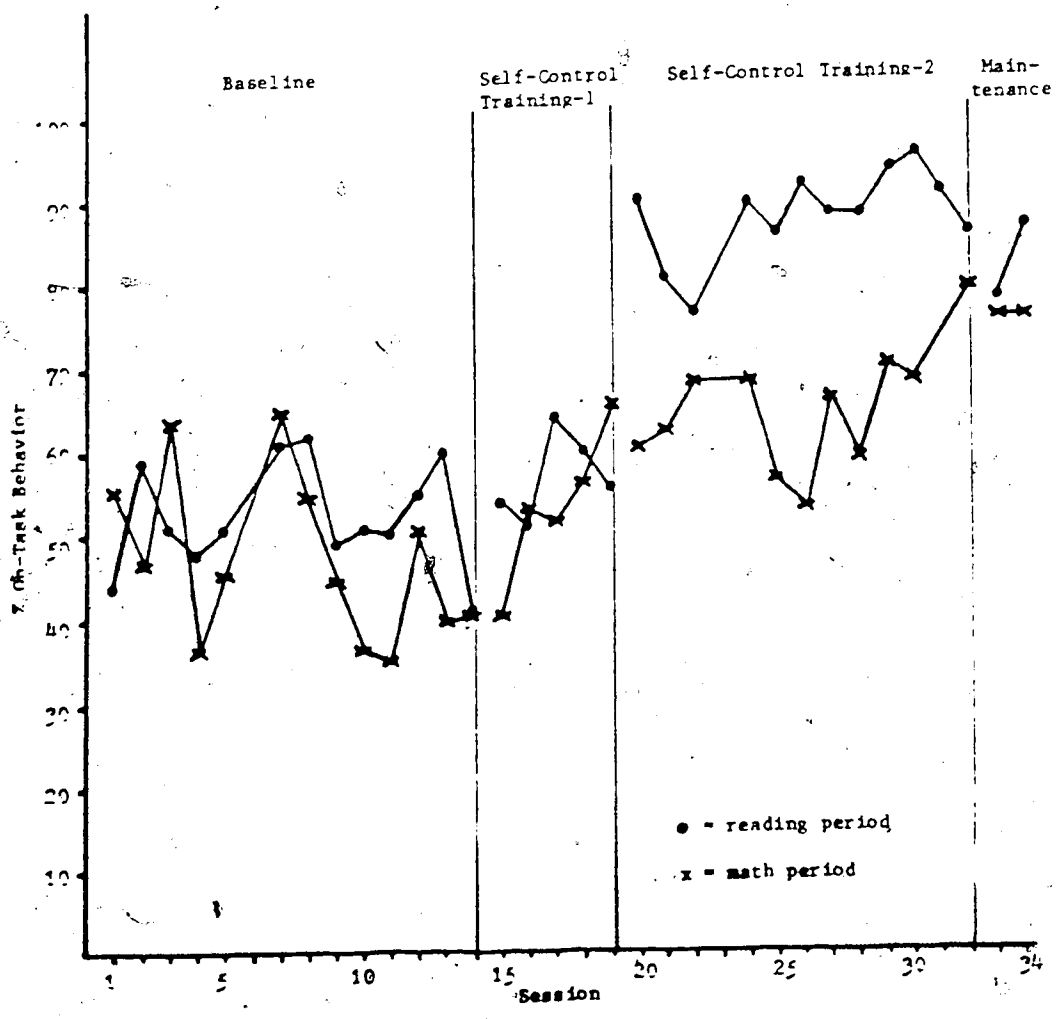

Figure 3. Percent on-task behavior for Subject #3 during reading period and math period, and across experimental conditions.

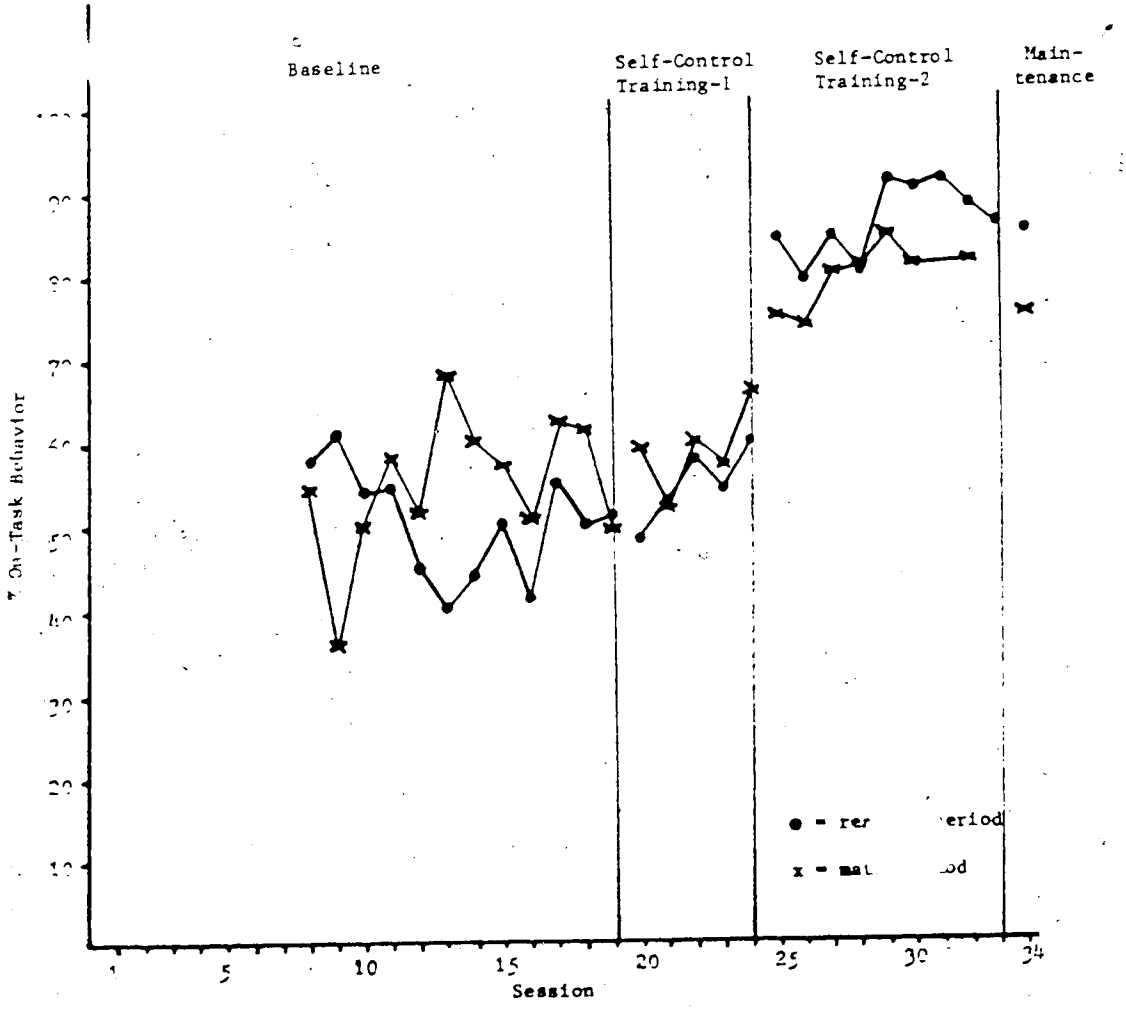

Figure 4. Percent on-task behavior for Subject #4 during reading period and math period, and across experimental conditions.

behavior for the four experimental subjects. As will be discussed later, it was also Subjects #2 and #4 who received verbal praise from the teacher for being "on-task" during the math period.

The data in Table 2 and Figures 1 through 4 also provides clear evidence that the behavioral self-control procedures were more effective for some subjects in maintaining the high levels of on-task behavior than for other subjects. Unfortunately, there is not sufficient follow-up data for Subjects #3 and #4 to evaluate the effectiveness of the self-control training program in maintaining their high levels of on-task behavior. However, it appears that the self-control procedures were more effective in maintaining the level of on-task behavior for Subject #2 than for Subject #1. Once the self-control procedures were withdrawn, there was an immediate and significant decrease in the on-task behavior of Subject #1, especially during the reading period, which may have eventually reached baseline level. Although there was a slight downward trend in the on-task behavior of Subject #2, it was neither as great nor as immediate as the decrease in on-task behavior of Subject #1.

Figures 5 and 6 reveal that the on-task behaviors of the (no-treatment) control subjects remained stable throughout the duration of the study.

Figures 7 and 8 presents the percent on-task behavior across subjects and across experimental conditions during the reading and math periods. It is evident from these figures that only when the self-control training procedures were successively implemented for each experimental subject did the subject's on-task behavior improve over baseline level. Additionally, the control subjects' on-task

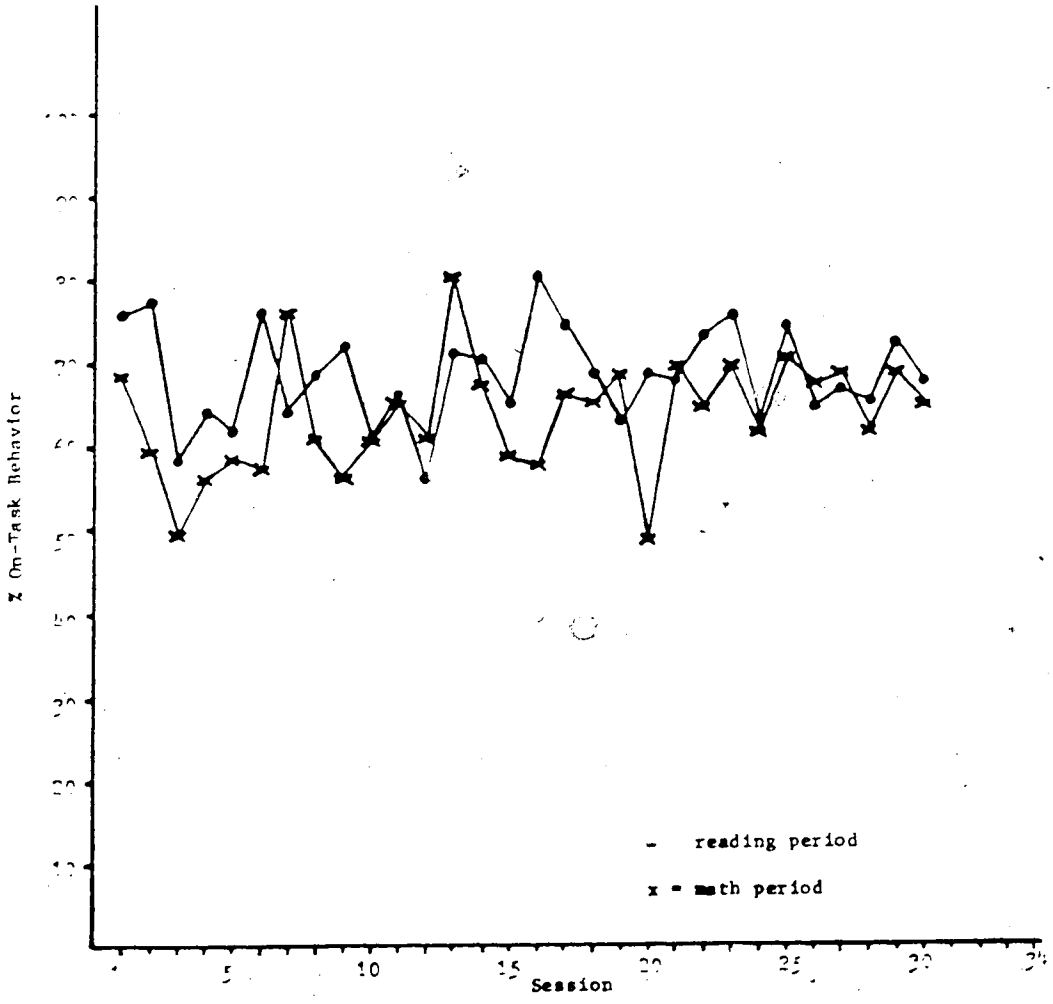

Figure 5. Percent on-task behavior for Subject #5 during reading period and math period throughout baseline condition.

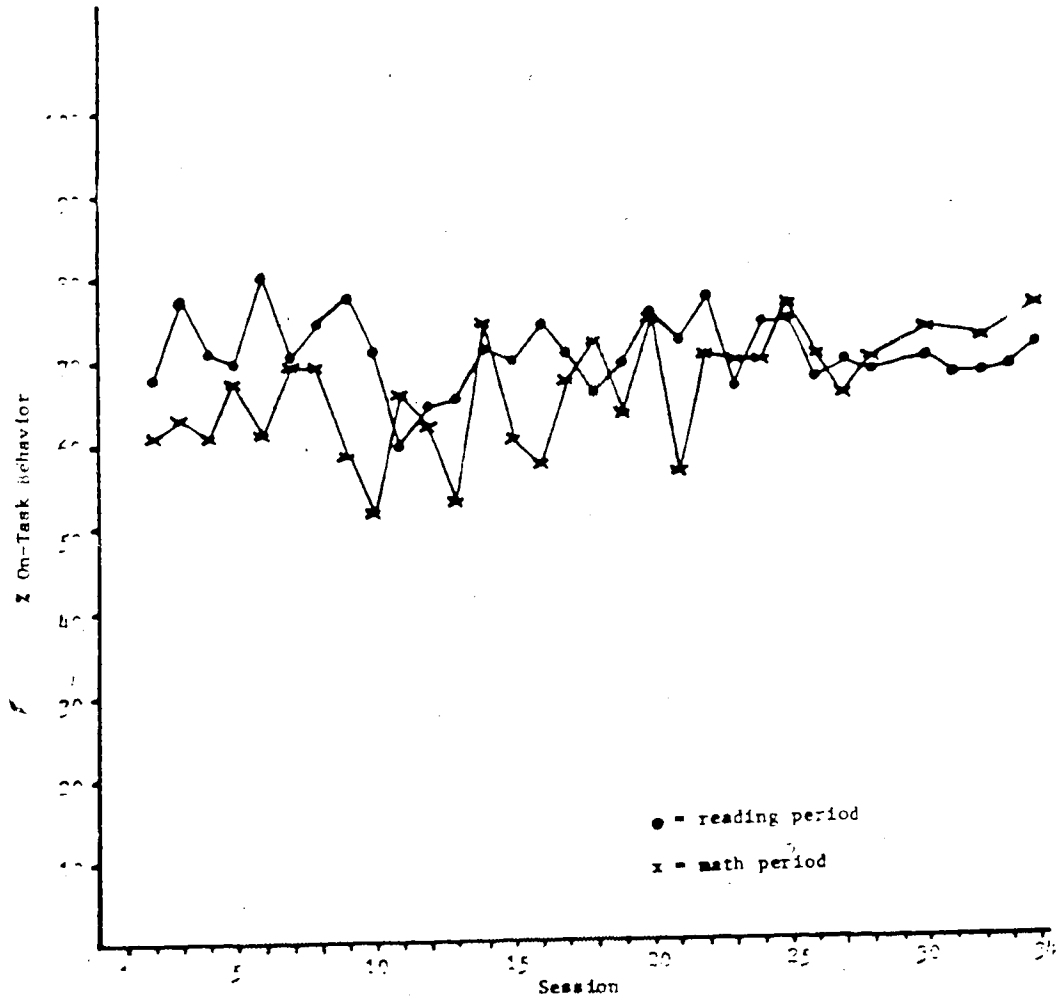

Figure 6. Percent on-task behavior for Subject #6 during reading period and math period throughout baseline condition.

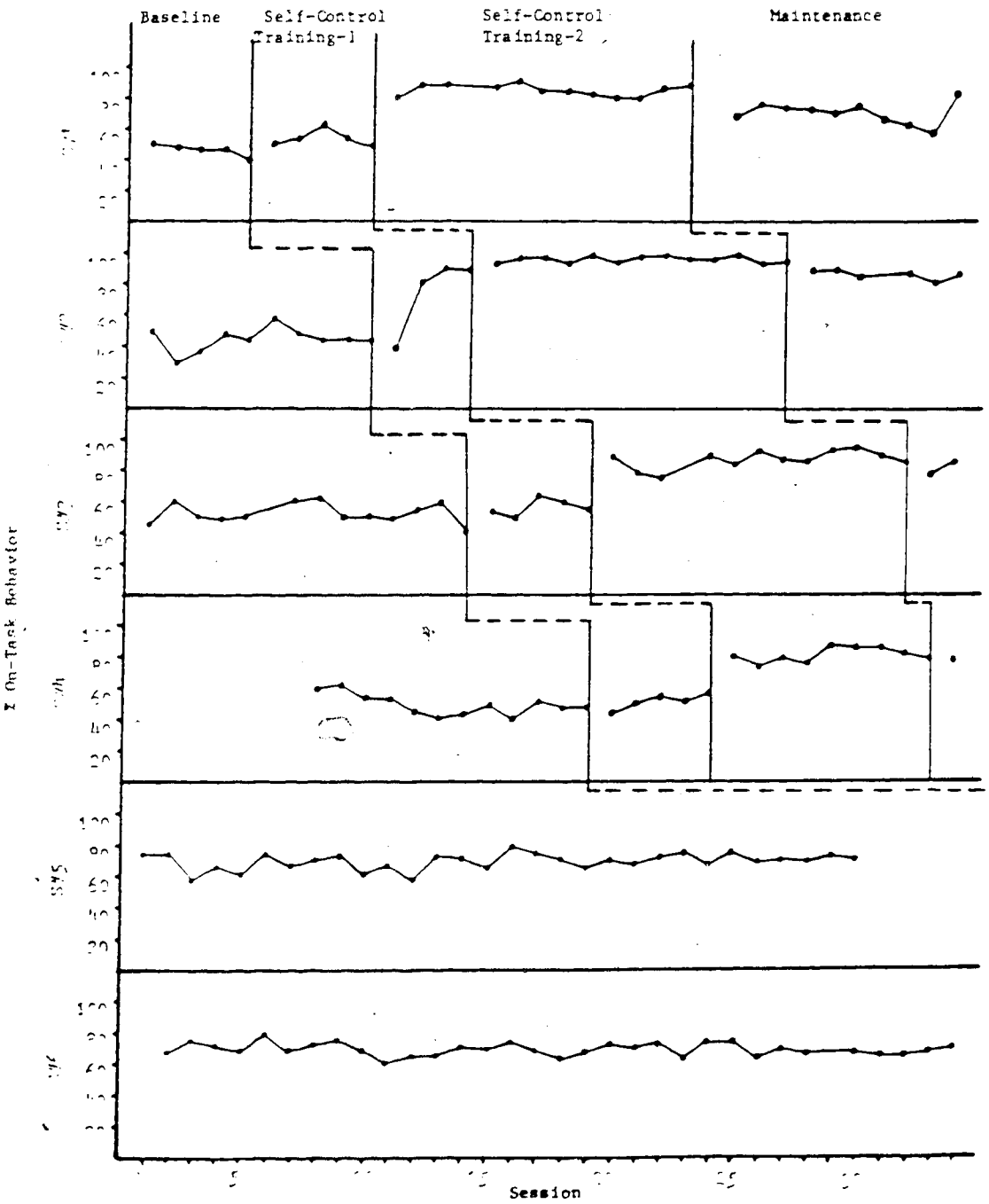

Figure 7. Percent on-task behavior across subjects and across experimental conditions during reading period.

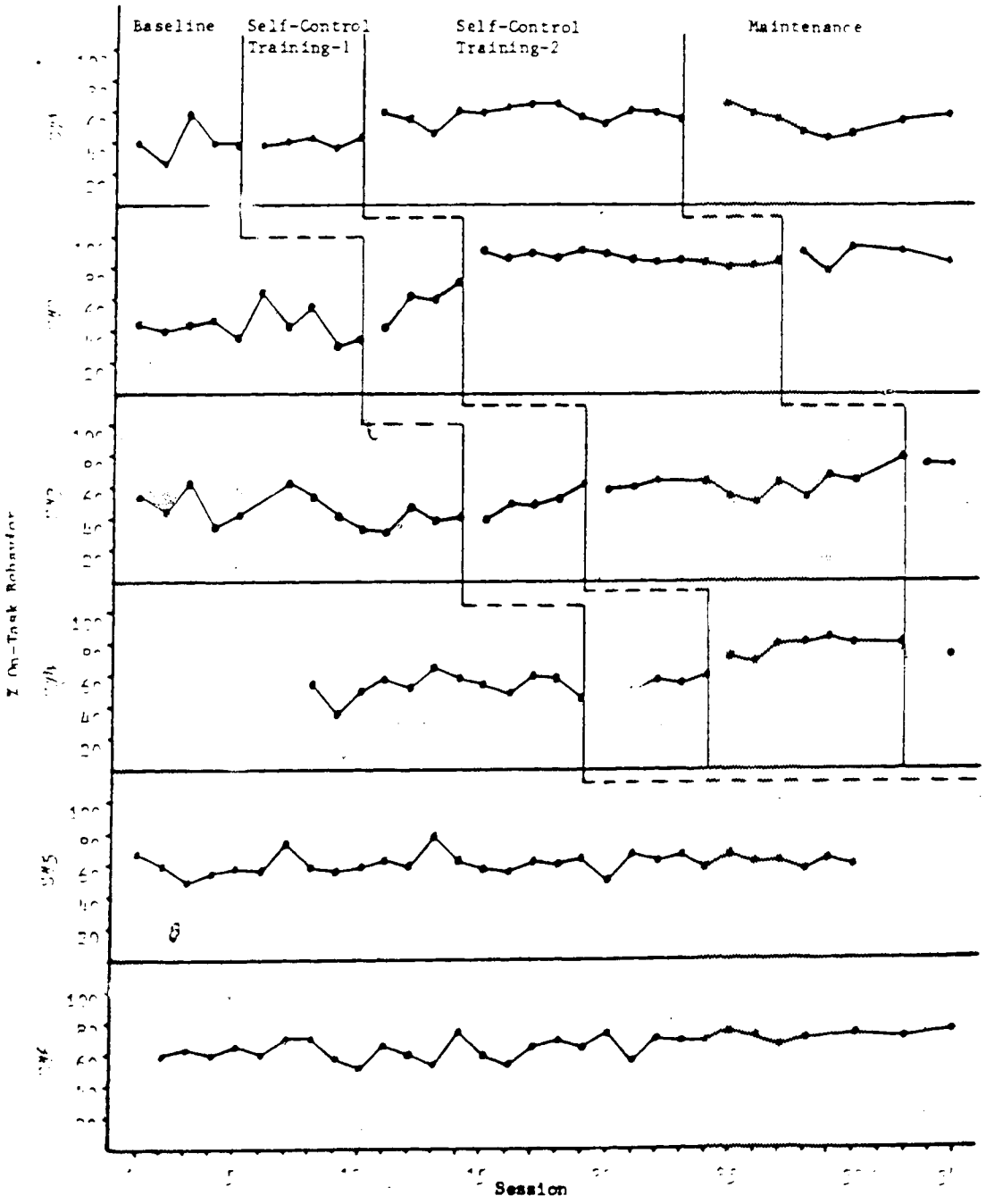

Figure 8. Percent on-task behavior across subjects and across experimental conditions during math period.

behavior remained stable regardless of what conditions were in operation with the experimental subjects.

Accuracy of Self-Evaluation and Self-Recording

During the second phase of the self-control training program, an accuracy check of the subject's self-evaluation and self-recording was made each day by the experimenter. Table 3 presents the accuracy data in terms of mean percentage agreement of occurrences of on-task behaviors recorded by the subject and the experimenter during the reading period. The formula which was used was:

$$A = \frac{C}{C + D} \times 100,$$

where "A" is the index of accuracy expressed in terms of a percentage; "C" is the number of instances where the experimenter and subject agreed as to whether or not the subject should receive a "happy face" for being on-task, and "D" is the number of instances where the experimenter and subject disagreed.

Throughout the Self-Control Training Program — Phase 2, the subject's degree of uracy, or "honesty", ranged from 90% to 100% each day, with almost 100% accuracy for all four of the subjects throughout this experimental condition.

Table 3

Mean Percentage Accuracy of Self-Evaluation and Self-Recording of the Experimental Subjects

Subject	Mean Percentage Accuracy
1	97
2	99
3	98
4	99

CHAPTER VI

DISCUSSION

The present study was designed to assess the effectiveness of a rather complete self-control training program, based on Kanfer's (1975) 3-stage model of self-control, in improving the on-task behaviors of students without the prior implementation of a teacher-administered token program. Additionally, the clinical utility of the self-control program to produce maintained and generalized behavior changes was to be evaluated.

The results of this study suggests that behavioral self-control procedures may be employed successfully by students without prior training under externally administered reinforcement conditions. Although the present study used adolescent students as subjects, previous studies (i.e. Bolstad & Johnson, 1972; Glynn et al., 1973) have indicated that even younger children of 6 to 7 years of age can also successfully learn to control their own behaviors. In a pilot study, the experimenter, using similar procedures as in the present study, successfully taught a 6 year old child self-control in order to modify his disruptive behavior.

In the present study, the effects of the self-control training program in increasing the percent of on-task behaviors of the experimental (self-control) subjects was an encouraging outcome. Furthermore, the results provide some limited support for Hypothesis 1, since the self-control subjects exhibited an increase in on-task behaviors during times when the training program was in effect (reading period) and also, albeit to a lesser extent, during the

control period. This effect, however, could possibly be explained in a number of alternate ways. First, the increase may simply represent a regression to the mean (Campbell & Stanley, 1963) following an initially low baserate. Second, the effect may be due to measurement reactivity. Simply observing a behavior has often been found to [redacted]ts frequency (Thoresen & Mahoney, 1974). Third, the effect [redacted] tributed to non-specific factors associated with beginning [redacted] program. Introducing the procedures as an effective self-control technique is one example.

In context of the present study, it would be difficult to determine which factors or combinations of factors, produced this marked increase in on-task behaviors. Consequently, the observed results of the study cannot, in all certainty, be attributed to the experimental procedures, i.e. self-control training.

Nevertheless, because of the specific design of the present study, i.e. multiple-baseline-across-subjects design, the effectiveness of the behavioral self-control procedures is considered to have been demonstrated by the increases in each subjects on-task behavior only with the introduction of the procedures at different points in time. Because the response changes occurred when and only when the intervention, i.e. self control procedures, were introduced, a causal relation between the intervention and behavior has, in fact, been demonstrated.

Hypothesis 2, that self-control training would promote response maintenance, was not supported by the results. Even though the acquisition of the proposed self-control skills appeared to result in significant increases in on-task behavior for all four of the

experimental subjects, behavioral improvements were not consistently maintained. In the final phase of the study, where the self-control procedures were withdrawn, on-task behavior decreased significantly for one subject, and slightly for a second subject. Unfortunately, there was not sufficient follow-up data for the other two experimental subjects.

Hypothesis 3, that transfer or generalization of behavior changes across situations would be facilitated by teacher praise, was supported to some degree by the results. During the second phase of the self-control training program, two of the four experimental subjects -- Subjects #2 and #4 -- received verbal praise from the teacher for using "self-control" and for being "on-task" during the control period. It was also these two subjects who exhibited a stronger and more consistent increase in on-task behavior in both the treatment and control periods than did the other two experimental subjects. Therefore, the results of this study suggests that generalization of behavior changes across situations may be facilitated by having an external agent provide random, unpredictable social reinforcement during those times when the behavioral self-control procedures are not in effect.

The results of the present study would also seem to suggest, that transfer of behavior changes across situations could be used as an index of the subjects' dependence on the auditory prompt, i.e. the signals from the electronic timer, and thus be directly related to the maintenance of the behavior changes over time. If transfer of behavior changes is exhibited during the control situation, then one can assume that the behavior changes would also be maintained

over time because of the subject's lack of reliance on the auditory cue. If, on the other hand, transfer is not observed during the control period, then one could not assume that the behavior changes will be maintained over time. The latter result would suggest that the subject is still dependent upon the signals from the timer and thus continues to require the auditory prompt to maintain the behavior changes. As was discussed previously, Subjects #2 and #4, in contrast to the other two experimental subjects, displayed greater generalization of behavior changes across situations. One could assume, therefore, that whereas the behavior changes of Subjects #2 and #4 should be maintained over time as well, they should not for Subjects #1 and #3. Comparing Figure 1 to Figure 2, it is apparent that the behavior changes of Subject #2 are, in fact, maintained over time whereas the behavior changes of Subject #1 are not. Unfortunately, follow-up data was not available for Subjects #3 and #4. Regardless, it appears that the transfer and maintenance of behavior changes are directly related to one another, and that both may be facilitated by having teachers praise students across situations for appropriate behaviors. Additionally, it would seem that maintenance will not occur unless transfer of behavior changes has previously been demonstrated.

Hypothesis 4, that the (no-treatment) control subjects would show no increases in on-task behavior, was supported by the results of the study. Regardless of what conditions were in operation with the experimental subjects, the control subjects' on-task behaviors always remained stable, and much less variable, than the experimental subjects' on-task behaviors. As was attempted in this study, the

effects of an intervention were tested first with one subject while baseline conditions were continued with the other subjects; then later, the intervention was introduced with another subject. The object is to show that, regardless of time, specific subject, and environmental factors, the behavior of each subject changes substantially when -- and only when -- the intervention is introduced. Because of the failure of the control subjects' on-task behaviors to change in response to the successive implementation of the self-control training procedures with the experimental subjects, the increases in on-task behaviors of the self-control subjects can be more parsimoniously accounted for by the experimental conditions than by extraneous events.

Hypothesis 5, that the self-control training program would produce accurate self-monitoring and self-evaluation, was also supported by the results of the present study. All four of the experimental subjects were extremely honest in their monitoring and evaluation of their own behavior, as was indicated by the mean percentage agreement of occurrences of on task behaviors recorded by the subjects and the experimenter during the reading period (see Table 3). The subjects' high degree of honesty can probably be attributed to the intensive individual training procedures used in phase one of the self-control program, as was suggested by Thoresen and Mahoney (1974).

Limitations

In addition to the self-control training program, there may have been other variables that may have affected or confounded the results of the study. Because the experimental subjects were not selected at

random, and because they were compared to one another, there may have been subject confounding variables present in the study, including the subjects' expectations, reinforcement history, age and behavioral repertoire. Additionally, environmental confounding variables may have had some influence on the treatment results. Since the experimenter had no control over the assignments the subjects had to complete during individual seat-work, the different levels of difficulty of the assignments may have had a variable influence on each subjects on-task behavior. Also, the improvement in the experimental (self-control) subjects' on-task behavior, in contrast to the (no-treatment) control subjects' lack of improvement, may be partially attributable to uncontrolled observer influence. Although the experimenter remained in the classroom throughout the study, the experimenter interacted only with the experimental subjects during phase one of the training program. Consequently, the experimenter may have become a discriminative stimulus to the experimental subjects and thus accounting for the increases in their on-task behaviors.

Although there was a noted increase in the percent of on-task behavior for all four of the experimental subjects, there is no data available as to whether or not these same subjects exhibited greater academic improvements. With respect to educational outcomes, greater academic improvements would be predicted for the self-control subjects than for the control subjects. Kaufman and O'Leary (1972) found that academic gains were inversely related to the degree of disruptiveness. Therefore, one could assume that academic gains are directly related to the degree of on-task behavior. Unfortunately, the present study

did not investigate this hypothesis. Consequently, it is quite possible, that although on-task behaviors increased for all four of the experimental subjects, similar academic gains may not have been made. A subject could have appeared to be attending to the tasks at hand yet actually may not have been exerting his complete attention to the assignments.

The relatively short duration of the second phase of the self-control training program represents another potential limitation. Had this phase been extended, the predicted increase in on-task behavior may have occurred more equally for all four of the experimental subjects. It is also possible that a more gradual withdrawal of both the backup reinforcers and the requirement of accurately matching the experimenter's ratings in the second phase of the training program may have facilitated a more durable behavior change across situations and over time.

As a final note, it is recognized that evaluation of the effectiveness of an intervention program is not complete until proper follow-up assessments of behavior change have been conducted to demonstrate its maintenance and generality. The mere occurrence of a behavior change does not mean that the change will persist or generalize to other situations (Sulzer-Azaroff & Mayer, 1977). The environment must be structured to maintain the behavior change or to cause it to generalize. Therefore, in any study it is of utmost importance that follow-up procedures be planned, if the effectiveness of the procedure is to be demonstrated. Unfortunately, because of time and personnel limitations, a detailed follow-up was not possible in the present

study.

Conclusions and Implications for Future Research

The results of the present study offers encouraging results. On the positive side, the study demonstrated that students without prior training under externally administered reinforcement procedures, can successfully use behavioral self-control procedures in a classroom setting to improve their on-task behavior. Additionally, students can be taught to accurately evaluate and record their own behaviors.

The present study does not lend support to the hypothesis that maintenance and transfer of behavior change can be promoted by attempts to directly teach children self-control skills. The present study, using a rather complete self-control program, failed to clearly achieve the desired outcome. Though disappointing from a clinical viewpoint, these results may be seen as consistent with many efforts to achieve behavior maintenance. With rare exception (Anderson et al., 1976) maintenance of behavior change tends to be limited to situations where considerable environmental control is apparent (Drabman et al., 1973; Kaufman & O'Leary, 1972; Turkewitz et al., 1975). It remains to be reliably demonstrated, then, that self-control training will promote behavior maintenance to environments where there is weak or opposing reinforcement for the new behaviors.

This observation suggests that further research in the area of self-control should program for generalization. As Baer, Wolf, and Risley (1968) stated: "Generalization should be programmed rather than expected or lamented" (p. 97). Consequently, Wildman and Wildman

(1975) have advanced a number of rules for obtaining generalization of the effects of behavior modification procedures. It is suggested that these rules be used to make behavior modification more effective, both clinically and practically. The rules which would be applicable to future research in the area of self-control are:

1. Pair attention and social reinforcement with the delivery of tokens and their exchange for back-up reinforcers.

2. Decrease the actual amount of reinforcement awarded for each unit of academic work or appropriate behavior.

3. Attempt to involve the students' parents in the treatment program and in the maintenance of treatment gains.

4. Focus the treatment program on the instruction of skills which will be reinforced and maintained by the environment the child is in.

5. Involve the subjects in the rating of their own behavior and then fade out the external rating.

6. Utilize a number of individuals to implement the experimental contingencies.

7. Enlist the active involvement in the training sessions of someone who will be present in the generalization situation.

With regards to the present study, only a few of the above rules were integrated into the study; perhaps accounting for the lack of generalization and maintenance. In future studies, it may be necessary to implement all of the above rules in order to ensure generalization of behavior changes across situations and over time. O'Leary and Drabman (1971) also suggest that backup reinforcers should be gradually withdrawn and that other "natural" reinforcers

existing within the classroom setting, such as privileges, should be utilized. Additionally, as was supported in the present study, generalization and maintenance of behavior changes may be facilitated by teacher praise.

The current study suggests, therefore, that some external reinforcement control across environments may be necessary to maintain behavior changes which may then be gradually faded out over time. Even in those "successful" studies where transfer of the behavior gains between classrooms was apparent, the social environments have been described as maintaining the change (Anderson et al., 1976). Hopefully, future research will reveal additional methods for making the treatment effects of self-control procedures more long-lasting.

The results of the present study also suggest that under certain environmental conditions and with particular children, therapeutic strategies may be differentially effective. Perhaps it is unreasonable to expect all children to learn self-control skills at the same rate. Additionally, perhaps learning rate influences the maintenance of behavior changes. Although there seems to be some children who are able to learn self-control skills without prior training under externally-administered reinforcement conditions, other children may not. This suggests, perhaps, that the intervention strategy for these children imitate the logical developmental sequence whereby a child gains increasing self-control over previous externally-controlled behaviors. One research direction, then, would be to determine for which children self-control training can be successful without the prior application of externally managed contingencies.

In concluding, it would appear that the behavioral self-control

techniques employed in this study hold promise for the management of classroom behavior. If the goal of having children's classroom behavior become relatively independent of teacher behavior is to be achieved, then further research in the area of self-control training is required. The time has come for investigators to study more effective ways of teaching children to control their own behavior rather than to rely solely on external agents for control. This study was an initial attempt to do this, albeit, limited in scope.

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APPENDIX A

SUBJECT'S RECORDING SHEET