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WAYS BY WHICH OVERLY-ACTIVE STUDENTS CAN BE TAUGHT TO CONCENTRATE ON STUDY ACTIVITY.

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THE EFFECTS OF SPECIFIC OPERANT AND MODELING PRINCIPLES ON INCREASING ATTENTIVE (TASK-ORIENTED) CLASSROOM BEHAVIOR OF HYPERACTIVE CHILDREN WERE STUDIED. THE METHODS OF BEHAVIORAL MODIFICATION USED IN THE STUDY WERE DISCRIMINATION-MODELING AND OPERANT CONDITIONING. SUBJECTS WERE 24 STUDENTS FROM GRADES 1 THROUGH 4 WHO WERE JUDGED HYPERACTIVE BY TEACHERS AND BY OBSERVERS. DISCRIMINATION-MODELING WAS AN OUT-OF-CLASSROOM PROCEDURE IN WHICH SUBJECTS, WHILE VIEWING A MOTION PICTURE, WERE ASKED TO DISCRIMINATE BETWEEN HYPERACTIVE AND TASK-ORIENTED BEHAVIOR. APPROPRIATE IDENTIFICATIONS OF TASK-ORIENTED BEHAVIOR WERE MATERIALLY AND VERBALLY REINFORCED, WHILE IDENTIFICATIONS OF HYPERACTIVE BEHAVIOR WERE MERELY VERBALLY AFFIRMED. OPERANT CONDITIONING WAS REINFORCEMENT IN THE CLASSROOM AFTER A GIVEN BEHAVIOR HAD OCCURRED. THE SUBJECTS WERE PRETESTED AND RANDOMLY DIVIDED IN FOUR TREATMENT GROUPS--(1) EXPOSURE TO DISCRIMINATION-MODELING SESSIONS, AND OPERANT CONDITIONING WITH TASK-ORIENTED BEHAVIOR, (2) EXPOSURE TO DISCRIMINATION-MODELING SESSIONS, AND OPERANT CONDITIONING WITH NONTASK-ORIENTED BEHAVIOR, (3) EXPOSURE ONLY TO OPERANT CONDITIONING WITH TASK-ORIENTED BEHAVIOR, AND (4) NO EXPOSURE TO TREATMENT PROCEDURES. AFTER TREATMENTS WERE COMPLETED, ALL SUBJECTS WERE POST-TESTED. THE RESULTS INDICATED THAT NEITHER THE USE OF OPERANT CONDITIONING ALONE NOR ITS USE WITH DISCRIMINATION-MODELING PRODUCED STATISTICALLY SIGNIFICANT CHANGES IN THE DIRECTION OF HIGHER TASK-ORIENTATION. POSSIBLE EXPLANATIONS FOR THIS LACK OF SIGNIFICANCE WERE GIVEN. (JH)
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CHAPTER I

DESCRIPTION AND BACKGROUND OF THE STUDY

Youngsters who exhibit short attention spans pose a difficult problem to teachers as well as other educational specialists. The problem is further complicated in that "low attenders" frequently manifest distractible and inappropriate classroom behavior. It would appear that these youngsters cannot control their inappropriate behavior, which includes: excessive squirming, looking around, hitting, talking, tapping, playing with various objects, and walking about the room. These responses, in and of themselves, can be observed in many children and during certain times of the day would fit within the classroom norms. The distracting and aversive character of the behavior just listed would appear to be a function of both its high rate of manifestation and the distraction from a given task.

School personnel have tried various means to modify this non-attending behavior. At the first sign of such distractive movements, the teacher may simply ask the student to stop. The non-attentiveness may or may not be attenuated by such requests or comments. Generally, with

the type of student under consideration, the behavior continues. Eventually, the teacher may lose her temper and a time-consuming and disruptive scene ensues.

Another means of dealing with this distractibility is to remove the child from the room. He may be sent to stand in the hall or talk with the principal. Sending the child from the room may be of value to the teacher in removing an objectionable and disturbing stimulus but does little toward the reduction of the aversive responses. In cases where the principal proves ineffective in reducing the frequency of this behavior, parents are consulted for their cooperation. When all procedures fail, the child may be excluded from school or put on a limited day schedule (James, 1964). From the description above, it can be seen that much time and energy are focused on the undesirable behavior. A pattern may develop in which a teacher and/or other school personnel pay attention to the child only when he is displaying non-attentive behavior. For a variety of reasons the appropriate attending behavior is rarely praised or rewarded. Since the maladaptive responses persist in such a tenacious manner, it seems plausible to hypothesize that procedures used by school personnel may be of an augmenting and reinforcing nature, thus assuring a continuation of the problem of non-attention. From learning paradigms of Skinner (1958) and Guthrie (1935)

it is possible to illustrate how the teacher or parent is not only reinforcing the undesirable behavior, but allowing any vague successive approximations of desirable responses to be extinguished.

In the last five years, various programs and surveys have been started to help these youngsters who do not seem to function adequately in the regular classroom. Special classes have been established, using many specific procedures: removing as much extraneous stimulation as possible (Strauss and Lehtinen, 1950); administering drugs, e.g., amphetamines, tranquilizers (Richanback, 1963); directing education toward self-control and reduction of sensory input (Haring and Phillips, 1962).

Two medical-clinical categories that have a very high percentage of hyperactive non-attentive youngsters are the emotionally and neurologically handicapped. Even though a noticeably higher incidence of the behavior under question is present within these two categories, it is still difficult to state definitely what causes the hyperactivity. Likewise, there are many individuals who are brain-damaged and/or emotionally handicapped who are not excessively inattentive. In their search for a method of alleviating this disturbing behavior, medical and social scientists have, in a traditional manner, set forth to discover its etiology. This approach is worthy of continued

endeavor. However, the primary aim of the present research will be to focus upon the behavior itself.

Central thesis of the study

The primary concern of this study is that, regardless of the etiology, attending behavior can be increased by use of operant and modeling principles formulated by Skinner (1958) and Bandura (1964) respectively. From these learning theories it is possible to posit that both environmental and internal stimuli have become conditioned elicitors of hyperactive-distractible behavior. It seems worthy of experimental endeavor to ascertain the possibility of conditioning a set of acceptable and appropriate responses to these same external and internal stimuli which would then measurably interfere with the undesirable behavior. This interference of distractible behavior could occur within the classroom by reinforcing or giving greater emphasis to appropriate attending responses. Examples of the latter behavior would be: looking at a book, performing written assignments, and listening to the teacher.

Rationale of the study

The efficiency of machines is measured by ratio of energy input to output, but it is not so simple to measure human efficiency, since human input is an unknown quantity,

and only the direction of energy expenditure can be observed. This energy can then be distinguished as task-focused behavior or diffuse behavior (Wishner, 1955). Wishner (1953) gives evidence that individuals with psychopathology are characterized by a preponderance of this diffuse behavior. Luria (1932), Duffy (1930), and Arnold (1942) found that some form of motor disorganization and verbal blocking accompanied psychological disturbance. Malmo et al. (1951), using Luria's technique of electronic measurement, found that the degree of motor disorganization was most severe with chronic schizophrenics, next with acute psychotics, and then with psychoneurotics. The control group was significantly different from all groups. At the same time, there were no such significant differences in productivity, except that the chronic schizophrenics were considerably less productive, possibly due to their inattention.

Background of the Study

Research on the neurological syndrome

It is assumed that a pupil's ability to focus upon a task, without excessive distraction, is essential to the regular school learning process. The distraction may be of an internal and/or external nature. Lorenz (Strauss

and Kephart, 1955) speaks of internal stimuli as endogenous movements which are primarily spontaneous and independent of the particular stimulus situation in which an organism finds itself:

> Normally, such endogenous movements are set off by a definite pattern of stimuli. However, if their occurrence is prevented they come to be set off by simpler and simpler patterns of stimuli until finally only one element of the previous pattern will serve to set off the movement series. It is even probable that if the obstacles to normal occurrences of the innate pattern are extreme and insurmountable, the pattern will be set off eventually without any outside stimulation at all (pp. 128-129).

Strauss and Kephart postulate that the brain-damaged individual does not undergo the series of sublimations which occurs in normal humans, for in normal individuals there is not always a single response to a stimulus situation. These authors see responses coordinated through a number of synchronized patterns of perceived stimuli. Hence the normal individual can release energy as it builds up, in small increments, in coordination with the vast repertoire of responses he has learned. The neurologically handicapped child does not have a highly coordinated series of perceptions. His release, according to the latter authors, will stand out as quite different from the normal individual. There appear to be times of great paucity of activity and other times of extreme hyperactivity. Mixed with this syndrome, the brain-injured youngster frequently

has explosive outbursts that will occur from apparently no eliciting stimulus. Anderson (1964) speaks of the hyperkinetic behavior of the brain-injured child in the following manner:

> It would seem that hyperkinetic behavior disorders are the result of a lack of adequate integration of visual, auditory, and tactile stimuli at higher cerebral levels of function. The stimulus-bound behavior of the hyperkinetic child is a reflection of the inability to synthesize incoming sensory stimuli, which continually bombard a disorganized and immature perceptual apparatus. As a result the child tends to react to every stimulus. The learning problems undoubtedly have a similar origin since he lacks the capacity to distinguish between those sensory inputs that are important from those that are not (p. 5).

Research by Richanback (1963) showed certain characteristics which were associated with the neurologically handicapped youngsters who were school failures. He states that the most frequently associated factors are: 1) hyperactivity; 2) being a boy; and 3) a disturbed home environment or one not suited to this particular child. Richanback emphasizes the point of environment. He feels it plays a major role in determining the degree and perhaps the kind of symptomatology any given child will manifest.

The emotionally handicapped syndrome

Regardless of the etiology, it seems apparent that certain behavior of the neurologically handicapped and emotionally disturbed interferes with learning. This

behavior has been shown to be distractive to both peers and teachers (Cruickshank et al., 1961). Although there are many assumptions, no body of research evidence has been found which would precisely differentiate methods of attenuating the hyperactivity of either the emotionally disturbed or the brain-injured child. Various protagonists of each construct may favor very different and separate treatment for youngsters in each of these categories, yet research evidence which will substantiate their views is difficult to obtain. Haring and Phillips (1962) suggest that if stimulus-reduction and an orderly environment are helpful for the education of brain-injured children, would this not apply equally well to emotionally handicapped youngsters? "Are not the hyperactivity, the restlessness, the easy distractibility of the emotionally disturbed child related, at least at an educational level, to the 'same' behavior in the brain-injured child?" (p. 63) They further contend that organic etiology is not the important issue in the educational setting.

Richanback (1964), Anderson (1963), and Keuffer (1963) note that children who are often medically and psychologically diagnosed as brain injured still can benefit from the normal classroom routine. Hence it would appear that cause or causes of hyperactivity and distractibility have by no means been isolated. Further, regardless

of the causative elements, behavior which prevents a child and his peers from learning must be unlearned and new, more adaptive responses developed. Eysenck (1959) notes that these are learned patterns of behavior which for various reasons are unadaptive. He sees no neurosis underlying the symptom, and therefore stresses the necessity of dealing with the symptom itself. In this same regard, Bandura (1964) states that, "according to social learning theory, so-called symptomatic behaviors are viewed not as emotional disease manifestations, but as learned reactions which can be modified directly by the application of appropriate social learning procedures. Once the maladaptive behavior is altered, it is unnecessary to modify or remove an underlying pathology" (p. 10). On this same topic Ferster (1958) notes:

> The behavior of the patient is treated directly as the subject matter of therapy rather than as a symptom of inner cause. Just as the current behavior of an individual developed as a result of the past exposure to environment, the current repertoire should be amenable to a similar process in the current environment. To the extent that behavioral processes are reversible, it should be possible to change any performance by manipulating the relevant factors within the context of the same process on which it was originally generated (p. 118).

Background of Research Procedure

It is quite probable that there are many techniques which might promote the increase or decrease of a

particular behavior. Due in part to the paucity of research data regarding the effectiveness of various procedures, school personnel operate on a very eclectic basis to bring about some consistency in behavior. One avenue of approach has been research in learning theory.

Operant conditioning

A great wealth of research has been done with subhuman animals using the paradigm of operant conditioning. In more recent years an increasing number of studies has involved human subjects. Although there may be controversy regarding various aspects of this process, it is difficult to ignore the consistent and positive research findings that have accrued. MacDonald (1964) comments about operant conditioning by saying ". . . what seems to be called for (in education) are systems that lead to procedures with predictable effects. The present Skinnerian concepts, in part, satisfy this need" (p. 25).

What is meant by operants and operant conditioning? Skinner (1953), who originated the term, discusses the process as follows:

> The unit of a predictive science is, therefore, not a response, but a class of responses. The word operant will be used to describe this class. The term emphasizes the fact that the behavior operates upon the environment to generate consequences. . . .
>
> A single instance in which a pigeon raises its head is a response. It is a bit of history which

> may be reported in any frame of reference we wish to use. The behavior called "raising the head," regardless of when the specific instances occur, is an operant (p. 65).

Distinguishing between classical and operant conditioning, Skinner further states that

> In the Pavlovian experiment, however, a reinforcer is paired with a stimulus; whereas in operant behavior it (the reinforcer) is contingent upon a response. Operant reinforcement is therefore a separate process and requires a separate analysis. In both cases, the strengthening of behavior which results from reinforcement is appropriately called "conditioning." In operant conditioning we 'strengthen' an operant in the sense of making a response more probable or, in actual fact, more frequent. In Pavlovian or "respondent" conditioning we simply increase the magnitude of the response elicited by the conditioned stimulus and shorten the time which elapses between stimulus and response (p. 65).

Skinner's description presents several other terms, namely reinforcement and reinforcer, knowledge of which is essential to understanding the operant process. Various authors have slightly different definitions for these terms. Krasner (1961) says that reinforcers are basically cues controlled by a therapist or other influencer to reward specific responses of a given person. Examples of reinforcers are: head-nodding or "mm-hmm," and such material reinforcers as tokens, candy, or cigarettes. In a more general manner, Skinner (1953) speaks of reinforcement as presenting certain stimuli or adding something, such as food, water, or sexual contact to a given situation. "These we call positive reinforcers. Others consist of

removing something--for example, a loud noise, a very bright light, extreme cold or heat, or electric shock--from the situation. These we call negative reinforcers. In both cases the effect of reinforcement is the same--the probability of responses is increased."

In many of the studies which follow the operant conditioning paradigm, the dependent variable is the individual's verbal behavior, and the independent variable the generalized conditioned reinforcers which are used to influence the verbalization. Skinner has suggested in various publications (1953, 1956, 1957) that operant conditioning might be more successful if generalized reinforcers were used. Examples would be "good," "right," "that's fine." Specific reinforcers are more relevant to the subject's specific state of deprivation.

Krasner (1958) concluded from a review of the literature and from his own research that the use of generalized conditioned verbal and non-verbal reinforcers can produce change in verbalization. One of the early experiments in this area was done by Greenspoon in 1955. Subjects were instructed to recite words in any order, and then all plural nouns were positively reinforced. The generalized reinforcer "mm-hmm" was found to increase the frequency of plural nouns, but "huh-uh" resulted in a decreased frequency of these responses.

More rare in the literature on operant conditioning is evidence of reinforced responses, persisting over time. Sarason (1957) reported two experiments in which responses that were altered by verbal conditioning differed over a period of time from non-reinforced responses.

Studies that have investigated the use and effectiveness of operant procedures in counseling and therapeutic endeavors are of relatively recent origin. Verplank (1955) showed that certain responses could be reinforced in a conversation even though the subject was unaware of the fact that he was involved in an experiment. His findings showed that all subjects increased their use of specific statements of opinion when the experimenter paraphrased or agreed with such statements. Within a diagnostic interview, Salzinger and Pisoni (1958) reported the results of verbal reinforcement on specific responses. Their findings indicated that reinforcing self-reference statements made by schizophrenic patients could measurably increase such responses. Work done by Rogers (1960) is relevant to the latter study. He showed that self-reference comments of a subject could be significantly changed by verbal operant conditioning procedures.

Bandura, Lipsher and Miller (1960) presented data regarding various therapists' approach reactions to a patient in therapy. They showed that the approach could

act as a positive social reinforcer for the expression of feelings of hostility.

All of the studies thus far cited have been done within experimental or semi-clinical settings. These experiments presented data which would indicate that, within the confines of the experimental milieu, operant reinforcement can significantly modify specific responses. As has been indicated, it is more difficult to locate experiments in which reinforcement procedures have been used within the classroom setting. Within the school counseling setting, studies by Krumboltz and Schroeder (in press) and Krumboltz and Thoresen (1964) indicated quite conclusively that counselors can influence the amount of self-initiated occupational information-seeking behavior a high school student will engage in. The first experiment used a variety of reinforcement and modeling techniques. Modeling procedures were particularly effective for males, but not for females. Following exposure to a male model, boys engaged in more independent information-seeking activity than did girls.

Still within the school environment, Johnson (1964) found that low-participating pupils increased in classroom verbal behavior when they were reinforced verbally. Ryan (1964) showed that counselors can significantly influence the client's tendency to make either decision or deliberation

responses by reinforcing systematically selected client statements. She further demonstrated that behavior which has been modified in planned reinforcement counseling will generalize to a non-counseling environment.

Mech, Hurst, Auble, and Fattu (1953) reported on an experiment designed to test differential verbal reinforcement in the classroom situation. This design gave two groups of fourth graders massed and spaced training respectively. Verbal approval and praise were the reinforcers. The experimenters found no significant difference in level of performance on the acquisition trials under conditions of 100 per cent, 50 per cent, and 0 per cent reinforcement. Yet it should be brought out that the classroom teachers administered the reinforcement, hence the non-reinforced subjects were in the presence of those receiving the treatment. There was a significant difference in performance between those students receiving the massed and spaced training. Subjects receiving massed training made higher performance records. After massed training, those receiving the 100 per cent reinforcement treatment were significantly more resistant to extinction than those who received 50 per cent reinforcement. Further, Mech (in press) found that by massing trials, 50 per cent reinforcement was as efficient as 100 per cent reinforcement in producing acquisition to a given criterion.

Two experiments carried out by Kapos, Mech, and Fox (1957) were designed to ascertain how elementary pupils react to positive verbal stimuli from their regular classroom teachers. There was a conclusion by the authors that certain quantities of verbal reinforcement did produce significant differential effects upon performance of routine arithmetical tasks. Further, it was found that pupil performance increased under both spaced and massed practice.

Modeling procedures

Bandura (1964) showed quite clearly how operant conditioning alone is impractical for acquiring certain specific skills, especially when no previous knowledge of these skills exists.

> It is highly doubtful, for example, that an experimenter could get a mynah bird to sing a chorus of "Sweet Adeline" during his lifetime by differential reinforcement of the bird's squeaks and squawks. Nevertheless, a recent appearance of a gifted mynah bird on television demonstrated how a young housewife who had employed modeling procedures succeeded, not only in training her feathered friend to sing this sentimental ballad with considerable fidelity, but also developed in the bird a verbal repertoire containing 180 words (p. 1).

Further, Bandura noted that few persons would survive the process of socialization if the operant procedures or trial-and-error learning were used. He notes how models are used in learning to swim, learning to drive a car, or

learning certain vocational skills.

Hence the reliance upon any specific procedure in the process of changing human behavior is hardly warranted. The fact that operant procedures are effective in changing the frequency of given behavior has been previously shown. Both Wolpe (1958) and Lazarus (1963) have presented evidence for the effectiveness of classical conditioning in behavioral change. Bandura has shown through a series of experiments (e.g., Bandura and MacDonald, 1963; Bandura, 1964) that under certain circumstances modeling procedures produce greater change than operant or other forms of reinforcement. Since these methods of changing behavior have been demonstrated to be effective in a wide variety of circumstances, it would seem unrealistic to use but one, when the objective is to obtain the greatest behavioral change.

Operant conditioning procedures

Patterson (1963) reported that he was able markedly to reduce the level of hyperactivity in a neurologically handicapped child. The case study was so designed that the youngster in question was given material reinforcers, praise, and peer reinforcement when appropriate attending behavior was manifested. A marked diminution of hyperactivity occurred after eight operant conditioning sessions.

James (1964) reported work of a similar nature.

He used neither material nor peer reinforcement. Since it took twenty months for a discernible change to take place in this experiment, one may well question the policy of not including positive material reinforcement (e.g., candy, money, etc.). The use of such reinforcement seems particularly essential in light of research by Levine and Simmons (1962), who reported that emotionally disturbed boys are less responsive to social reinforcement than a group of "normal" boys. In keeping with this, Patterson, Littman, and Kinsey (1963) showed that in the early part of treatment, youngsters with various psychological problems were less responsive to social reinforcers given by the therapist than were a hundred other children who had been reinforced by a variety of social agents.

Diffuse states and anxiety make up one category of behavior that the non-attender often manifests. Wishner (1955) cited evidence (Taylor, 1951; Taylor and Spence, 1953) which would further show the possibilities of conditioning a person who demonstrates these symptoms: "The assumption that in such a state, an individual is more prone to make arbitrary associations between events contiguous in time and space is tenable on the basis of the experimental data available." In both brainwashing and psychotherapy, it has been shown (Sargent, 1957) that there is a deliberate attempt at disorganization of the cognitive and affective

thought process. Once this type of disorganization has taken place, there appears to be a greater susceptibility to learning new patterns of behavior.

The majority of studies in modification of behavior have not been performed in the classroom. More often they are performed in an experimental or clinical milieu. If the experiment is carried out within an institutional setting, such as a school, subjects are most frequently removed from classes to special areas for treatment procedures. "The major problem in all applications of conditioning procedures is to insure generalization from the conditioning periods to behavior occurring outside of the conditioning sessions" (Patterson, 1963, p. 9). One value of the present study lies in the fact that it took place in the classroom, specifically in situations where distraction and non-task oriented behavior were most detrimental to the learning process. A major concern of researchers and practitioners is the degree to which there is generalization of treatment from one setting to another.

Prior approaches to the problem

One desirable objective of education is to assist each youngster in developing his power of attending and concentrating. Observation of a classroom interaction

during a time when a task has been assigned generally reveals a wide range of ability to attend and concentrate. The non-attender is often involved in activity that has no bearing on the academic work which has been assigned. Further, he is not only limiting the amount and chances of his learning, but frequently he is a serious distraction to the teacher and other youngsters. The primary objective of the present study was to examine means of increasing the pupil's ability to concentrate and manifest more task-oriented behavior.

Current educational practice involves several alternative avenues of coping with the problem posed by the distractible youngster. First, he may be segregated from the regular classroom setting, either being assigned to a special class or given tutorial help. Second, the discovery and removal of the cause of hyperactivity and non-attending behavior may be initiated. Thirdly, various forms and intensities of punishment may be administered. In many instances a combination of all of these approaches is used.

The first approach is relevant and topical to recent legislation affecting California schools. Assembly Bill 464 states that any youngster who qualifies as either neurologically or emotionally handicapped may be placed in a small class consisting of eight to ten pupils. One of

the primary criteria for pupils' qualifying under this bill is hyperactivity and non-attending behavior. There are several important advantages that might accrue from the homogeneous grouping of youngsters in these small classes. The teacher has more time per pupil for individual instruction and assistance. Various specific techniques which might not be applicable in the regular, larger classroom can more readily be carried out in this setting. The teacher has more opportunity to observe each student's cognitive process as manifested in the classroom activities. Chief disadvantages would seem to be in the youngster's isolation from peer and social groups. Pertinent to this are the comments of teachers conducting these classes. They note that only a minority of the youngsters improved in their attending and task-oriented behavior. The majority of those who had previously been hyperactive remained so. Many school districts (e.g., Palo Alto) inaugurated during the academic year (1964-65) a tutorial system for some of the educationally handicapped. Under this plan, youngsters selected for the program will remain in their regular classes for most of the day. They will only be removed for several hours per week for individual assistance. The youngsters' teachers will also receive consultant help.

Regarding the second approach, research directed

toward the diagnosis and discovery of the cause of hyperactive non-attentive behavior has been a favored approach of many medical and psychological specialists. Yet, within the school setting, determining the cause of the particular syndrome under consideration usually requires specialized skills not readily available. In very few educational settings are the discovered "causes" within the control of the school staff. As has been pointed out by various authorities (Bandura, 1961; Skinner, 1953; Wolpe, 1958), even when "causes" are discovered and susceptible to change through action of the school staff, there is considerable doubt as to whether this process of cause-removal will subsequently result in the significant reduction of the hyperactive-distractive symptoms.

Punishment in one form or another is probably used more frequently than other approaches in the hope of changing a child's non-attending behavior. Unfortunately, there is very little research using humans as subjects which would give us a firm reason to accept or reject this method of approach. What research has been done (Solomon, 1964; Church, 1963) would tend to indicate the unreliability of this procedure. As Church says, "Considerable uncertainty remains today regarding the effect of punishment and there does not appear to be any single reliable effect" (1963, p. 369). Sears, Macoby and Levin (1957), Solomon (1964),

Church (1963), and Skinner (1953) seem unanimous in their opinion that punishment is most effective when it is combined with reward for some alternative responses. By itself, these authors conclude, the use of punishment does not produce reliable or consistent results. In most instances there is a temporary effect from punishment, but it suppresses the behavior only as long as the aversive condition continues. Very often when the punishment ceases, the behavior returns to the same level as the pre-punished state (Church, 1963). Studies by Sears, Macoby and Levine (1957) and Bandura and Walters (1959) point out the unfortunate side effects of punishment. The parent who uses considerable punishment gives the youngster a model for aggressive behavior. The latter authors go on to say that they found that children who had been so punished had more behavioral problems, particularly of an aggressive nature, than children from parents who used less physical punishment. Such correlational studies can lead to various interpretations. Does the punishment cause the aggressive behavioral problem or do children receive more punishment who have this antisocial problem? Faced with the problem of differentiating between cause and effect, researchers have relied heavily upon animal experimentation. It is hoped by such experimenters as Church (1963) that understanding of effects of punishment on animals will aid our

understanding of punishment with regard to humans.

Skinner (1953) speaks more strongly against the use of punishment: "In the long run, punishment, unlike reinforcement, works to the disadvantage of both the punished organism and the punishing agency. . . . Punishment, as we have seen, does not create a negative probability that a response will be made but rather a positive probability that incompatible behavior will occur" (p. 222). Some educators may be attracted to punishment by its ability to achieve very rapid, though in most cases temporary, results. The fact that the teacher may use the same punishment each day, with no lasting behavioral change does not seem to make her question the method. To this point, Skinner (1961) notes "thus, although we boast that the birch rod has been abandoned, most school children are still under aversive control--not because punishment is more effective in the long run, but because it yields immediate results. It is easier for the teacher to control students by threatening punishment than by using positive reinforcement with its deferred, though more powerful, effects" (36.08).

Certain disadvantages have been enumerated for several approaches that are being used in current educational practice. It would seem important to stress the particular inefficiency of the punishment approach. Hence, what is needed is more research regarding procedures which

will assist youngsters in developing greater frequency and longer duration of attention to a given task.

Relevant research would indicate that a pupil personnel worker could operate from a learning theory framework of behavioral change. The use of reinforcement has been cited to change behavior of patients in hospitals, clinical settings, and in psychotherapy as well as the classroom. It seems appropriate to investigate the usefulness of these approaches to a very difficult educational problem.

CHAPTER II

PROCEDURE

Subjects

The subjects for this study were made available through the cooperation of the Ravenswood Elementary School District. The first through fourth grades of seven different elementary schools were involved in the project. All subjects were male and Negro with the exception of one Mexican-American boy.

Preliminary procedures

Before the selection of subjects began, the two school psychologists of the district were contacted to ascertain their interest in the study. They were not only interested in the project, but extended their help and co-operation in many ways, including some office facilities and secretarial assistance.

The superintendent of the district was contacted and expressed interest in the study. He wished to have an outline of the investigation and, one month after receiving it, he sent a letter formally giving his permission to do the study.

One of the psychologists took the experimenter to

all the schools and introduced the administrative staff. There was a subjective impression by the author and the school psychologist that two of the principals were not in sympathy with the study. Although these two principals allowed the form letter (Appendix C) to be distributed to teachers in their respective schools, few teachers from these schools returned the forms. One principal noted that they did not have the kind of youngsters that we wished to study and the other principal expressed concern regarding how the parents and teachers might react to such a study.

Selection Process

The procedure of selecting subjects for the study began by giving teachers of the first through fourth grades of seven different elementary schools a form letter (Appendix C). The form very briefly described the investigation and asked each teacher's cooperation in listing one or several children who might fit the categories of being excessively hyperactive and non-task-oriented. Teachers could avoid participation in the study in various ways. The letter suggested that if they did not have such youngsters in their rooms, they should mark this at the bottom of the form letter. Although not stated in the letter, a teacher could merely fail to return the letter or note that she did not wish to be in the study. Out of the 64 teachers

(all of whom were female) receiving letters, 32 returned them. Of those returning the form, five noted that they did not have such youngsters in their classrooms. After several pre-rating sessions (see p. 29) in each of the remaining 27 classrooms, two teachers stated they did not wish to be involved in the investigation. During these preliminary phases of the study, teachers were not encouraged to continue if they gave any indications of not wishing to participate.

Teachers who returned the forms were asked to state the best time to observe the youngsters they had listed (Appendix A). They were told that, for the purpose of the study, the "best time" was that period of the day when the youngster would be most non-task-oriented. Most teachers agreed that the youngsters under consideration were most inattentive during individual seat-work assignments.

At the time of the first meeting with the teacher, the study was briefly explained. She was assured that the project would not involve any additional teacher time, but it would require a willingness to allow raters and experimenters in her classroom. The teacher was told that, for the purpose of the research, it would be preferable to continue the usual classroom schedule. She was particularly asked not to warn the youngsters to be "good" because

visitors were in the room. During the early pre-rating (see p. 29) a few teachers did encourage their classes to be on their best behavior when the raters were present. Each of these teachers was again reminded that the basic concept of the study involved observation of the youngster during his typical hyperactive periods.

Preliminary selection procedure

The author and two other trained raters (see p. 42) did the preliminary selection as well as the pre-ratings for the subjects. (The post-ratings were done entirely by the trained raters.) Candidates listed by the teacher were observed for a ten to fifteen minute interval on several different days, but without their behavior being rated. If a youngster who was not on the teacher's list appeared particularly inattentive, his name was subsequently added as a possible subject. After the three most inattentive youngsters had been selected from each room, the more formal and objective pre-rating was started.

Pre- and Post-Rating Procedures

Two to four youngsters in each of the thirty-two classrooms were given the following type of pre-rating. Through a portable tape-recorder, the rater received signals. Between each signal, there was a five-second interval during which she evaluated the subject's behavior. At the

end of each interval, she marked her observation on the rating form (Appendix B).[1] The behavior rating instrument was divided into a five-point scale. If the subject was manifesting behavior associated with the completion of a task such as writing in his workbook, using reference material, or doing board work, he was given a 1. If a subject received a 2, it meant that he was involved in preparatory or monitoring behavior, e.g., passing out books, collecting papers, or assembling study materials for a task. Behavior category 3 was defined as neutral behavior. Such activity as staring out the window, playing with objects on the desk, or other behavior which did not offer sufficient cues to permit identification in another category would be given a rating of 3. A subject given a 4 might be involved in the following non-task-oriented behaviors: visiting with classmates, disturbing one or two other children nearby, behaving in a manner incompatible with task completion or having some disruptive, disturbing quality to it. The most extreme category of low task-orientation (high hyperactivity) was 5. A youngster so rated would be causing a disturbance that would be audible

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[1] As can be seen from the rating scale (Appendix B) there is provision for rating teacher behavior simultaneous to each rating of the subject. This form was developed jointly for two separate studies. The teacher ratings were not used in the present investigation.

and visible in most parts of the room. He would be behaving in an extremely deviant manner, e.g., running around the room or yelling loudly across the room.

The rater was to identify the behavior most characteristic of the youngster during the five-second intervals and place the corresponding number on the rating form. When the rater had finished one four-minute interval for a child, she would rate another youngster chosen in the preliminary selection procedure. The duration for each pre-rating was four minutes. Ratings that made up the final average of the youngsters were made on four separate days, making the total pre-rating time for each subject sixteen minutes. Those youngsters with the highest average hyperactivity score in each classroom as assessed on the behavior pre-rating scale were selected for the study. Subjects scoring 2.00 or above on the behavior rating scale were arbitrarily defined as sufficiently hyperactive to be included in the project. In the event several youngsters in one class had equally high hyperactivity scores, the rater's and teacher's subjective evaluation became the final criteria for selection. From the final population of 25 classrooms, 24 subjects were randomly assigned to four different groups with six per group. After two weeks of treatment, two youngsters were lost (because of illness and moving) from Groups I and II respectively. This left a

total population of 22 youngsters in the experiment.

Generalizability study

As the pre-ratings progressed, the question arose as to the amount of observation time necessary to obtain an accurate picture of a subject's behavior. Previous studies using various methods to rate behavior gave little data to answer this question. The closest data relating to this problem were found in a study by Cronbach, et al. (in press). He notes that common measures of reliability of an instrument by per cent agreement or intercorrelation of ratings are not broad enough in scope to indicate the nature of error variance. Cronbach suggested that a "G" or generalizability study would show the extent to which certain important variables were contributing to the error variance. Hence a "G" study was undertaken with another investigator, concurrent with the pre-rating procedures, and full details of the study were reported in his dissertation (Goodwin, 1965). Since the variables that were considered important to the total error variance of the present study were pupils, raters, days, and half-hours, these were the factors subjected to analysis in the generalizability study. The rating method utilized in the "G" study was the same as that of the pre-ratings for the major investigation, with the exception that, in pre-tests, one rater

observed a child at a given time. In the "G" study, two observers rated the youngster simultaneously. The raters in this case were the author and another doctoral candidate. From the population of hyperactive youngsters initially selected by the teachers, six children were chosen for the generalizability study.

The sequence of the "G" study was as follows: The two raters went to a third grade class where two subjects were to be rated. One child was observed by both raters simultaneously for a four-minute time interval. Forty-eight five-second observations were made within this four-minute period. The experimenters then followed the same procedure on the second subject in the same room. The four other subjects used in the study were in two other third grade classrooms in the same school. The raters proceeded to the next two classrooms and duplicated the previously described rating method. On a succeeding day, a second simultaneous rating was done in the same manner on each of the six children. The total number of observation scores by both experimenters on all children totaled 192, each observation score being the mean of the forty-eight observations during a four-minute interval. In the BMD02V Computer Program for analysis of variance, these forty-eight mean observations were listed as replicates[1] (see

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[1]Data was taken from observation sheets and put on IBM cards, making 48 replicates of observation on a subject.

Table 1). This BMD02V program computed a four-way analysis of variance. The results (Table 1) showed how much each variable (pupils, raters, days, half-hours) and combination thereof contributed to the total error variance.

As can be seen in Table 1, the largest source of variance was half-hours. The mean of behavioral ratings taken during one half-hour time of the morning was considerably different from the mean of ratings taken during another half-hour time period. For example, a youngster rated at 9:30 might be more or less attentive by 10:00. However, the results of the "G" study were available only after pre-ratings were completed and the treatment was in process. Therefore, it was decided to utilize the information obtained from the "G" study in the post-rating procedure. The generalizability study did not answer the question of how much time was sufficient to obtain a consistent picture of the subject's behavior. The study only gave strong indication that more rating time was necessary. Due to the variability of a subject's behavior over time, a continuous rating throughout the morning would probably have given the most accurate portrayal of behavior. Funds and time for such extensive rating were not available, hence a compromise was reached in which there would be four 20-minute rating periods before recess (labeled "early") and four 20-minute rating sessions after recess (labeled

TABLE 1

ANALYSIS OF VARIANCE OF ATTENDING BEHAVIOR DURING GENERALIZATION STUDY

Source of Variation	Mean Square	Degrees of Freedom	F
1. Pupils	12.818	5	40.900
2. Raters	.444	1	1.323
3. Days	22.563	1	72.086
4. Half-Hours	39.585	1	126.469
5. Pupils x Raters	.668	5	2.134
6. Pupils x Days	18.851	5	60.227
7. Pupils x Half-Hours	54.970	5	175.651
8. Raters x Days	.001	1	.003
9. Raters x Half-Hours	.250	1	.799
10. Days x Half-Hours	29.340	1	93.738
11. Pupils x Rater x Days	.717	5	22.907
12. Pupils x Raters x Half-Hours	.189	5	6.038
13. Pupils x Days x Half-Hours	30.555	5	91.620
14. Raters x Days x Half-Hours	.002	1	.006
15. Pupils x Raters x Days x Half-Hours	.313	5	1.000
Within Replicates	.318	2256	
Total		2303	

"late"). Each twenty-minute observation was made on a different day. Generally, one early and one late rating were made on each subject during every week of the post-ratings. The original time-schedule called for a four-week period to make post-ratings. Illness of one rater and absences of subjects increased the total post-rating time to five weeks.

In addition to increasing the total time in post-ratings, the point system of rating was initiated. In the point system, the observer made a rating the instant the signal came from the tape recorder. In the pre-ratings, the observer had a five-second interval in which to determine into which category the youngster's behavior fell.

Inter-rater reliability study

Fifteen pairs of ratings were made to estimate inter-rater agreement for the post-test type of observation. In this series of special ratings, two raters were present in the same classroom. They simultaneously rated the behavior of a specific youngster over the twenty-minute period of time. Except for having two raters in the room, the procedure in this inter-rater reliability study was the same as other post-ratings. The resulting series of observations yielded fifteen pairs of scores which correlated .57. It should be kept in mind, however,

that this estimate of inter-rater agreement was only one observation of fifteen youngsters. In the actual post-ratings, twenty-two youngsters were each observed eight times. Taking the Product-Moment Correlation Coefficient obtained in the inter-rater reliability study of r = .57 and applying the Spearman-Brown Prediction Formula, we might be able to extrapolate that an inter-rater reliability study done on each child eight times would produce an r of .91. But, in order to accept the estimated correlation of .91, it must be assumed that the factors present in the rating of the fifteen youngsters on one occasion were similar to the variables present on rating 22 subjects eight times.

Table 2 shows pre-scores of each subject as well as eight different post-ratings for every subject. Each pre-score represents the mean of each subject's four-minute observation period. Post-rating scores represent the mean for every subject's twenty-minute behavior rating sample. With the exception of two cases, all post-ratings were started the day after treatment had terminated. (These two cases, marked with an asterisk before their names, had their first post-treatment ratings on the last day of the treatment procedure.)

TABLE 2

MEANS OF PRE- AND POST-BEHAVIOR RATINGS FOR EACH SUBJECT

Subject	Pre-ratings 1	2	3	4	Average
Group I, Consistent					
Gordon G.	2.54	2.23	3.28	2.54	2.65
Thomas S.	2.56	2.02	2.88	2.08	2.39
*Don M.	2.19	2.65	2.42	2.31	2.39
Nathanial S.	2.25	2.17	2.85	2.00	2.32
Thaddeus F.	2.69	2.88	3.04	3.00	2.90
Group II, Inconsistent					
*Anthony L.	2.71	3.58	1.96	2.83	2.77
Gary C.	3.02	2.52	2.85	2.98	2.84
Daryl J. S.	2.29	2.98	3.15	2.62	2.76
Cedrick S.	2.73	2.89	2.94	3.90	3.12
Don B.	1.84	2.63	2.89	3.48	2.71
Group III, Operant Conditioning Only					
Ron D.	2.43	1.88	2.80	2.13	2.31
Mike L.	3.44	2.69	1.54	1.17	2.21
Anthony H.	3.04	2.96	1.98	2.95	2.73
Michael S.	2.92	2.00	1.90	3.58	2.60
Marshmont T.	2.07	2.21	2.19	2.58	2.26
Leonard D.	3.08	2.54	2.31	2.23	2.54
Group IV, Control					
Wayne R.	2.88	2.89	2.89	3.25	2.98
George M.	2.77	2.58	1.92	2.77	2.51
Larry P.	2.69	2.92	2.38	1.85	2.46
Lonnie Q.	2.13	2.33	2.88	2.44	2.45
John H.	1.77	2.32	2.52	2.33	2.24
Darwin G.	3.69	2.77	3.39	1.87	2.93

*These subjects had post-ratings taken the same day treatment terminated.

TABLE 2--Continued

Subject	Post-ratings							
	Early	Late	Early	Late	Early	Late	Early	Late
Group I, Consistent								
Gordon G.	1.23	1.95	2.50	1.90	1.32	1.80	2.38	2.05
Thomas S.	2.18	2.87	1.92	2.93	2.73	2.82	2.48	2.55
*Don M.	1.43	1.87	1.22	1.63	1.58	1.97	2.83	1.53
Nathanial S.	1.33	3.05	2.30	2.83[a]				
Thaddeus F.	2.13	1.47	1.87	1.48	1.33	1.17	2.57	1.85
Group II, Inconsistent								
*Anthony L.	1.47	1.70	2.03	2.40	2.65	1.87	1.75	1.65
Gary C.	2.03	3.10	2.47	1.85	2.15	2.42	1.87	2.75
Daryl J. S.	2.62	1.95	3.02	2.23	1.97	1.95	2.73	2.70
Cedrick S.	3.13	2.33	2.63	3.20	2.57	3.00	2.17	2.52
Don B.	1.78	1.40	2.12	2.37	2.10	3.70	1.80	2.73
Group III, Operant Conditioning Only								
Ron D.	1.70	1.73	2.35	1.85	1.67	1.98	2.00	2.17
Mike L.	2.04	2.25	1.63	1.54	1.78	1.20	1.87	1.38
Anthony H.	2.03	1.72	2.07	2.32	1.92	2.03	1.97	2.20
Michael S.	1.92	1.95	2.53	2.07	2.52	2.27	1.75	2.50
Marshmont T.	1.41	3.52	2.48	2.26	1.98	1.92	1.60	2.70
Leonard D.	2.12	2.08	1.50	1.38	2.05	2.33	1.92	2.82
Group IV, Control								
Wayne R.	1.29	2.78	1.85	2.13	1.82	2.00	1.97	2.42
George M.	2.03	2.55	2.12	2.53	1.12	1.68	1.83	1.83
Larry P.	2.57	3.07	1.15	2.17	1.71	2.18	2.55	2.10
Lonnie Q.	1.82	1.88	2.30	1.88	1.23	1.72	1.97	1.78
John H.	1.10	1.70	1.40	1.85	1.70	1.68	2.70	1.68
Darwin G.	2.37	2.52	2.53	2.43	2.18	2.42	1.60	2.32

*These subjects had post-ratings taken the same day treatment terminated.

[a]Subject moved after 4 post-ratings.

TABLE 2--Continued

Means of Post Ratings

Subject	Mean All Early	Group Mean All Early	Mean All Late	Group Mean All Late	Mean All Post	Group Mean All Post
Group I, Consistent						
Gordon G.	1.86		1.93		1.89	
Thomas S.	2.32		2.79		2.44	
*Don M.	1.77	1.95	1.75	2.18	1.76	2.24
Nathanial S.	1.82		2.94		2.37	
Thaddeus F.	1.98		1.49		2.73	
Group II, Inconsistent						
*Anthony L.	1.98		1.91		1.94	
Gary C.	2.13		2.53		2.33	
Daryl J. S.	2.59	2.26	2.21	2.39	2.40	2.32
Cedrick S.	2.63		2.76		2.69	
Don B.	1.95		2.55		2.25	
Group III, Operant Conditioning Only						
Ron D.	1.93		1.93		1.93	
Mike L.	1.83		1.59		1.71	
Anthony H.	2.00	1.93	2.07	2.09	2.08	2.03
Michael S.	2.18		2.20		2.19	
Marshmont T.	1.87		2.60		2.23	
Leonard D.	1.90		2.15		2.03	
Group IV, Control						
Wayne R.	1.73		2.33		2.03	
George M.	1.78		2.15		1.96	
Larry P.	2.00	1.87	2.38	2.14	2.18	2.00
Lonnie Q.	1.83		1.82		1.82	
John H.	1.73		1.73		1.72	
Darwin G.	2.17		2.42		2.30	

*These subjects had post-ratings taken the same day treatment terminated.

Research Design

Twenty-four subjects were randomly assigned to four different groups (see Diagram 1) which are more fully described on pp. 26-27. Each subject was in a different classroom and was judged to be hyperactive by teachers and later by rater evaluation.

Group I (Consistent Treatment Group) was exposed twice to modeling discrimination movies and received six operant conditioning sessions within the classroom (see p. 47).

Group II (Inconsistent Treatment Group) was shown the modeling discrimination movie in the same manner as Group I, but received reinforcement within the classroom for non-task-oriented behavior (see p. 49).

Group III received only operant reinforcement for task-oriented behavior. Two pre-conditioning sessions were held outside the classroom for this group and six reinforcement periods occurred within the classroom (see p. 49).

Group IV served as the control and received only pre- and post-measures (see p. 51).

Initially, the design called for eight subjects per group. As the pre-ratings phase of the project progressed and some teachers were dropped for lack of non-task-oriented subjects, it became apparent that a total of 30 subjects with high distractible scores would be

available. Since it was felt necessary to have several subjects per class in reserve in the event of experimental mortality, the size was decreased to six per group. A subject might be substituted from the same class if the subject originally selected dropped out prior to treatment. This did not occur in the treatment groups but did take place in the control group. In the control group, one youngster moved and another subject from the same class with a comparable score was substituted. There was a certain amount of experimental mortality in two of the experimental groups after the experiment had commenced. Groups I and II both lost one youngster due to illness or moving. Likewise, Group I lost another subject after only four post-ratings had been completed (see Table 2).

See Diagram I for a summary of the research procedure.

Raters

Two raters were selected, both of whom had teaching experience and elementary credentials. They were given initial training by means of movies of youngsters' behavior. Specific scenes of classroom behavior were shown. During the first showing, these scenes were identified by the experimenter. During two other presentations of the same movie, the raters identified the different categories

All classes, first through fourth, in the Ravenswood Elementary School District

Classes in which teachers showed cooperation and listed youngsters who might fit the criteria of the study

Pre-Ratings
Four 4-min. intervals of a child's behavior. 24 high hyperactive-distractible subjects selected. Experimental mortality resulted in 22 for the study. Three wks. pre-rating.

Random Assignment

Group I--Exper. N = 5	Group II--Exper. N = 5	Group III--Exper. N = 6	Group IV--Control N = 6
1) Two exposures to modeling discrimination movie. 2) Six operant conditioning sessions of 10 to 15 min. ea. within the classroom. Reinforcement after task-oriented behavior.	1) Two exposures to modeling discrimination movie. 2) Six operant conditioning sessions of 10 to 15 min. within the classroom. Reinforcement after non-task-oriented behav.	1) Two exposures to pre-training in operant conditioning. 2) Six operant conditioning sessions of 10 to 15 min. within the classroom. Reinforcement after task-oriented behavior.	1) Pre- and post-measures only.

Post-Rating
Eight 20 min. intervals of subjects' behavior. Five wks. post-rating.

Diagram I. Summary of Research Procedure.

of behavior (see discussion under Pre- and Post-Ratings pp. 29-36) until there was agreement with the experimenter as to which category a given behavior belonged. Then they rated with the author in the classroom. Raters were considered ready for independent observation when a high rate of agreement with the author was attained. This took approximately three days of joint rating. A generalizability study (see p. 32) completed prior to pre-ratings showed raters to be a low source of variance. A post-rating inter-rater reliability study resulted in an r of .57.

Raters were paid on an hourly basis for their services. They were not informed to which of the treatment groups a subject was assigned.

Experimenters

Besides the author, several doctoral students participated in this research project. Two were trained to assist in the operant conditioning procedures, and four others in the modeling-discrimination treatment. Specific directions for the latter treatment were given to those involved (Appendix F), and several practice sessions with the principal investigator were held to insure uniformity of administration. (See Appendix G for a schedule of treatment by the seven experimenters in the study.)

Methods of Behavioral Modification Utilized

Discrimination-modeling treatment

This treatment was performed in the following manner. The subject was taken from his classroom and told he would see a movie. If the subject was Negro, the film he saw was of Negro children. If the subject was Caucasian,[1] the film showed Caucasian children. This decision was based on the assumption that a youngster is more likely to imitate a person most like himself. A film was used consisting of ten scenes of youngsters in task-oriented situations and five scenes of distractible hyperactive behavior. The hyperactive sequences were interspersed between the task-oriented scenes.

The movie was shown by using a 8 mm. projector flashed into a ground-glass screen so that total darkness was not required. When a given task-oriented scene was on the screen, the projector was stopped and the subject was asked, "What is this boy doing?" When the subject had identified the youngster in the movie as writing, studying or otherwise involved in a task-oriented behavior, the experimenter would, as simultaneously as possible, do the

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[1]The one Mexican-American subject saw the Caucasian film.

following things: activate a small light by the screen, give the subject an M & M or penny alternately, and comment further on the many good things that happened to the youngster in the movie because he was studying so hard, e.g., "I'll bet other youngsters really wanted to play ball with him because he was working so hard"; "his parents were very pleased and happy because he was paying attention"; "he probably got lots of prizes for doing what the teacher asked him to." When a non-task-oriented sequence was shown, there was only a comment to signify that the subject had correctly identified the scene. No praise, enthusiasm, or material reinforcers were given for describing non-task-oriented scenes. The contingencies of the experiment were not explained during this first session outside the classroom. The experimenter did point out that the light went on when the subject identified the task-oriented scenes in the movie. The subject was further told that from time to time a person would place on his desk a box similar to the one next to the screen, with a counter and light. Subjects did not question the experimenter regarding the process.

The movie was shown twice during the experimental procedures. Two groups (I and II) were exposed to this modeling-discrimination (movie) treatment. All three experimental groups (I, II, and III) were exposed to the operant conditioning within the classroom. Since there was

variation in operant conditioning procedure for each group, the prccess for the various groups will be described separately.

Operant conditioning treatment

Certain similarities existed in the operant conditioning procedure used in the three treatment groups. Reinforcement came only after a desired response was emitted by the subject. All youngsters in the treatment groups were reminded of the number of reinforcements they had earned during a session. Further, they were shown an envelope with M & Ms and pennies which they were told would be given to them by the teacher at the next outdoor break in the day's activity.

Group I, Consistent Treatment Group.--After the modeling-discrimination treatment (movie), an experimenter went into the classroom and placed the conditioning apparatus housing a counter and light on the subject's desk. This apparatus operated on a remote-control basis, similar to a one way "walkie-talkie." Specifically, the device consisted of a receiver (9" x 6-1/4" x 2") containing batteries and electronic parts to operate the light and counter. The transmitting mechanism (4" x 6-1/4" x 2") was small enough to be strapped to one's belt or fit in a woman's handbag. A small push-button switch was connected to the

transmitter. This switch could easily fit into one's pocket. Hence, the entire transmitting mechanism was not visible. By pushing the button on the switch, the light and the counter in the receiver were activated.

For ten- to fifteen-minute intervals, the experimenter would sit in the back of the room, in good view of the subject, and reinforce the youngster approximately every minute if he was engaged in task-oriented activity. Activation of the light and counter constituted the initial reinforcement. The average number of reinforcements during operant conditioning for all three groups was 11.27. At the end of the session, the experimenter would go to the subject and praise him for having earned the number of M & Ms and pennies that the counter tallied. (Half of the total would be M & Ms and the other half pennies.) The envelope containing these reinforcers was shown to the subject, and he was told that at recess or noon (whichever came next in the day's schedule) the teacher would give him the envelope. After the first two operant conditioning sessions in the classroom, it was decided to tell the youngster the contingencies of the experiment, i.e., that the light and counter would go on when he was attentive and doing what the teacher had assigned. Likewise, the subject was told that he should continue working hard, even when the machine was not on his desk. After the third or

fourth conditioning session in the classroom, the subject was exposed to the model-discrimination movie treatment for the second time. As can be seen from Diagram I, the subjects in this group received a total of six operant conditioning sessions in the classroom and a total of two modeling-discrimination exposures.

For all treatment groups, post ratings were started when all eight treatments had been completed.

Group II, Inconsistent Treatment Group.-- A subject in this group received the same two exposures to the modeling-discrimination movie as did subjects in Group I. During the first phase of treatment, he was reinforced for identifying task-oriented scenes in the movie. However, in the later classroom phase of the treatment, the light and counter on his desk would be activated after he was involved in inattentive behavior. The duration of treatment per individual classroom session was on the average the same length of time per session as the other experimental groups. The administration of the material reinforcers was done in the same manner as in Groups I and III. The contingencies of the experiment were never explained to the subjects.

Group III, Operant Conditioning of Task-Oriented Behavior Group.--This group experienced the same operant conditioning sessions within the classroom as was described

for Group I. The differing conditions were the following: no modeling-discrimination movies were shown, and subjects in this group were exposed to two pre-training operant conditioning sessions outside the classroom. These pre-training sessions lasted from five to seven minutes. During this time, the youngster would be taken to an available empty room, generally with the assignment he had been doing in class. When the experimenter and subject arrived at the room, the conditioning box was set up on a regular student desk, and the subject was instructed to continue working on his assignment. After ten to fifteen seconds of sustained task-oriented behavior, the conditioning machine was activated, the subject received an M & M or penny and was praised for his behavior. The experimenter tried to perform these activities as simultaneously as possible. It was brought to the attention of the subject that each time the light went on he had been studying and had also received an M & M or penny. In the early phases of pre-conditioning, the series of reinforcements occurred much more frequently, on an average of every ten to twenty seconds. After several minutes of this schedule, the duration between reinforcements was lengthened by a minute to a minute and one-half. At the conclusion of the pre-conditioning sessions, the subject was informed that, on certain days, the box would be placed on his desk and activated

when he was studying. To illustrate this, the experimenter went immediately back to the classroom with the child for the first operant conditioning session. These sessions lasted from ten to fifteen minutes. At the end of the period of conditioning, the reinforcements were given to the subject in exactly the same manner as in the other treatment groups, i.e., the youngster was praised for his task-oriented behavior and the number of reinforcements he had earned. He was shown an envelope containing half of the total reinforcements in M & Ms and the other half in pennies. Giving of material reinforcers was performed in the same manner as in Groups I and II. The delay in dispensing the reinforcers seemed advisable for two reasons. It conformed with classroom rules and also introduced the teacher as a reinforcer of task-oriented behavior.

Group IV, Control Group.--The subjects in this group were from the initial population of hyperactive youngsters (see Selection Process, p. 27). In the initial selection process, each teacher suggested at least three or four youngsters for the study. Teachers in the treatment groups were aware of which child was eventually used in the study. Teachers in the control group were not told which child was eventually chosen for the experiment, nor were they told into which group their child was placed. Neither school personnel nor experimenters contacted any subject in this

group. Since there was no direct contact with any of these children, it is not expected that teachers in this group were aware of which child was being used. The group was given only pre- and post-behavioral ratings.

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CHAPTER III

RESULTS AND DISCUSSION

The primary method of testing the stated experimental hypotheses was by using a one way analysis of covariance design which can be found in BMD Computer Programs (Dixon, 1964). The specific BMD Program utilized was BMD04V Analysis of Covariance with multiple covariates and unequal treatment group sizes. It was necessary to use a program that could analyze unequal groups, since experimental mortality occurred in two different treatment groups. The analysis was conducted with the help of the staff of the Stanford Computer Center.

Results of Analysis

The statistical null hypothesis tested by the method of analysis of covariance was as follows:

No difference exists among the mean scores on the various criterion measures of the four experimental groups.

Since the generalizability study indicated that inattentive behavior could vary greatly at different times of the morning, the average early (before recess) and average late (after recess) ratings were analyzed separately with the pre-test as a covariant. The results of the analyses

of covariance for early and late ratings and for the total of both can be seen in Tables 3, 4, and 5 respectively.

TABLE 3

ANALYSIS OF COVARIANCE BASED ON THE FREQUENCY OF TASK-ORIENTED BEHAVIOR USING ONLY "EARLY" (BEFORE-RECESS) RATINGS

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between	.22	3	.07	1.65
Within	.76	17	.04	
Total	.99	20		

TABLE 4

ANALYSIS OF COVARIANCE BASED ON THE FREQUENCY OF TASK-ORIENTED BEHAVIOR USING ONLY "LATE" (AFTER-RECESS) POST RATINGS

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between	.21	3	.07	.40
Within	3.06	17	.18	
Total	3.28	20		

On the basis of these analyses, the statistical null hypothesis was accepted, and it was concluded that the differences existing among the mean scores of treatment

TABLE 5

ANALYSIS OF COVARIANCE BASED ON THE FREQUENCY OF TASK-ORIENTED BEHAVIOR USING ALL 8 POST TEST RATINGS

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between	.22	3	.07	1.22
Within	1.01	17	.06	
Total	1.22	20		

groups were not large enough to reject the hypothesis that they all arose from sampling the same population. Therefore, it was concluded that there were not sufficiently large differences in the mean scores of task-oriented behavior to attribute any effect to the experimental treatment.

Group means and adjusted group means for each treatment group are shown in Table 6.

Intercorrelational matrix of pre- and post-test measures

The correlations between the various pre-test ratings generally showed low reliability compared to post-test ratings (see Table 7). To illustrate this, the range of correlations between the first pre-test and the eight post-tests was from -.38 to .42 with only two being above .22. The range of correlations between the second pre-test and post-

TABLE 6

GROUP MEANS, ADJUSTED GROUP MEANS, AND STANDARD ERROR OF GROUP MEANS FOR PRE-RATINGS AND EARLY, LATE, AND TOTAL POST-RATINGS OF TASK-ORIENTED BEHAVIOR
(Lower score = more task-oriented)

	Consistent Group I	In-consistent Group II	Op. Cond. Only Group III	Control Group IV
Sample Size	5	5	6	6
Mean Pre-Rating	2.54	2.84	2.44	2.59
Mean Early Post-Rating	1.96	2.28	1.95	1.87
Adjusted Mean Early Post-Rating	1.99	2.40	1.98	1.89
St. Error Adj. Mean Early Post-Rating	.24	.27	.26	.19
Mean Late Post-Rating	2.51	2.36	2.09	2.13
Adjusted Mean Late Post-Rating	2.41	2.28	2.06	2.03
St. Error Adj. Mean Late Post-Rating	.29	.33	.32	.23
Mean Total	2.24	2.32	2.02	2.00
Adjusted Mean Total	2.15	2.30	1.97	1.90
St. Error Adjusted Mean Total	.16	.20	.20	.14

TABLE 7

INTERCORRELATION MATRIX OF BOTH INDIVIDUAL AND AVERAGE PRE-TEST AND POST-TEST SCORES

Pre-test						Post-test											
1st Pre-test	2nd Pre-test	3rd Pre-test	4th Pre-test	Ave. of Pre-test	Early 1st Post-t	Late 1st Post-t	Early 2nd Post-t	Late 2nd Post-t	Early 3rd Post-t	Late 3rd Post-t	Early 4th Post-t	Late 4th Post-t	Ave. Early Post-t	Ave. Late Post-t	Ave. Total Post-t	Mean	Std. Deviation	
--	.29	-.18	-.17	.38	.42	.17	.04	-.07	.22	-.17	-.38	-.04	.18	-.03	.09	2.62	.47	1st Pre-t
	--	-.12	.18	.57	.30	-.17	-.15	.05	.13	-.14	.06	-.25	.17	-.18	.11	2.57	.40	2nd Pre-t
		--	.12	.43	.11	-.02	.39	.17	-.06	.33	.27	.37	.32	.27	.45	2.59	.50	3rd Pre-t
			--	.66	.12	-.23	.39	.29	.26	.33	-.11	.31	.32	.21	.41	2.59	.63	4th Pre-t
				--	.44	-.13	.38	.25	.28	.23	-.08	.25	.50	.18	.55	2.59	.26	Av. Pre-t
					--	.07	.22	.30	.30	.21	.08	.21	.78	.25	.58	1.90	.50	Early 1 Post
						--	.07	.37	.16	.16	-.26	.41	.04	.66	.23	2.25	.58	Late 1 Post
							--	.41	.22	.22	-.36	.48	.56	.36	.43	2.09	.48	E. 2nd Post
								--	.48	.61	-.19	.39	.49	.76	.48	2.15	.46	L. 2nd Post
									--	.56	-.24	.44	.61	.53	.39	1.90	.44	E. 3rd Post
										--	-.22	.70	.38	.81	.43	2.14	.58	L. 3rd Post
											--	-.29	.15	-.32	.02	2.10	.38	E. 4th Post
												--	.42	.82	.60	2.23	.45	L. 4th Post
													--	.42	.69	2.00	.24	Av. E. Post
														--	.56	2.19	.39	Av. L. Post
															--	2.14	.28	Av. Total Post-t

N = 22

For .05 significance level r .41
For .01 significance level r .53

tests was from -.25 to .30 with no positive significant correlations. Similarly, the third pre-test and the eight post-tests had a range of -.06 to .39. Pre-test 4, when correlated with the post-tests, had a range of -.13 to .44. The fact that there was low correlation among first, second, third, and fourth pre-tests is seen in their range, which was from -.18 to .29. Post-tests correlated with each other to a somewhat higher degree than pre-tests. The range of all eight post-test intercorrelations was from -.36 to .48. The post-tests had a total of four negative intercorrelations and eight correlations above .40, whereas the four pre-tests, when correlated with one another, yielded three negative correlations and only two that were positive. Both of the latter were below .30.

This lack of reliability of pre-test measures as compared to post-test measures might be explained in several different ways. The greater number of post-ratings (eight) in comparison to the number of pre-ratings (four) adds some stability to their average. The pre-ratings were taken at a variety of times, some before and some after recess; after-recess post measures were more consistent than before-recess ratings. Other factors entering into the greater reliability of post-ratings could have been the five-week time interval in making these

observations as compared to a three-week span in making the pre-test measures. The post-ratings were made on a point-rating system, i.e., the instant the signal came through the earphone, a recording of the behavior occurring at that moment in time was made. In the pre-tests, the rater summarized the typical behavior occurring throughout a five-second interval. Still another factor that may have brought about the greater reliability of post-ratings was, the increase of rating time (eight 20-minute intervals were used in post-ratings while pre-ratings consisted of only four 4-minute intervals). Lastly, it must be noted that raters had become considerably more experienced by the time post-tests were in progress, and it is possible that they were able to rate more accurately.

From these correlational data, one might conclude that the behavior observed was very unstable and that only in the case of means (e.g., average of all late ratings) can some reliability be obtained. To illustrate this conclusion, average pre-test and average early post-test showed a correlation of .50, but average pre-test to average late post-test showed an r of only .18. The average pre-test, when correlated with the total average post-test, yielded an r of .55. The correlation of average early post-test to total average post-test was .69 and the average late post-test to the total post-test was .56. Nevertheless,

the average of the pre-test predicts the total post-test average with some degree of reliability (r = .55). The correlation of the covariant with the average early post-rating is .50 and with the average late post-rating is .18. The correlation of all early and all late post-test behavior ratings was .42. This would tend to indicate that the early post-tests and late post-tests are, to some extent, measuring the same behavior.

As seen below, late ratings when correlated with the average late measures are more consistent than early ratings correlated with the average of the early measure.

TABLE 8

POST-RATINGS CORRELATION

Early	Late
.78	.66
.56	.76
.61	.81
.15	.82

The inconsistent and sometimes low correlations among the criterion measures tend to reduce the possibilities for detecting treatment differences. The lowered reliability combined with a small N would require extremely large mean differences to reach statistical significance. Further, the low correlation between pre- and post-measures

does not substantially reduce the error term in the analysis of covariance, and thus does not greatly improve the chances of obtaining a significant F ratio.

Discussion of Results

The explanation a researcher would least like to accept is that the experimental treatment is not effective with the subjects. Other researchers (James, 1964; Patterson, 1963) working with hyperactive-distractible youngsters have obtained observable changes toward more task-orientation. However, neither of these studies involved an experimental design, but were of a case study nature.

In the present study, teachers and other school personnel noted marked changes in the behavior of certain youngsters in each of the treatment groups. These changes were in the predicted direction. Hence, it is possible that the procedure is effective for certain youngsters and not for others. A striking example of behavior change toward more task-orientation was seen in Group I. Movies were taken of Gordon G. before treatment had commenced. The films clearly illustrated this seven-year old's excessive hyperactivity. A typical scene in the movie showed Gordon running up and down the aisles, yelling across the room, making faces and wildly gesticulating at his neighbors.

The teacher noted that this was very typical behavior for this youngster. Five weeks after completion of the treatment prescribed for Group I, films were again taken of Gordon's behavior. Sustained attention spans of ten minutes could be noted. During these periods of task-orientation, Gordon would ignore other children who were talking to him or moving by his desk. One boy stood for a time with his hand on Gordon's desk, then tousled his hair. Another youngster tossed an eraser on Gordon's desk. Gordon appeared to pay no attention to this activity, but continued to copy an assignment from the board. While operant conditioning was taking place in the classroom, another subject in the same treatment group fought off several youngsters who tried to distract him from his task. It is recognized that other factors, unknown to this experimenter, could have contributed to the changes in the behavior of these children.

Critique of results

One of the most probable reasons for the lack of change in treatment groups could be the limited duration of the study. The entire treatment process lasted over a period of one month. Since no treatment could occur during the week of Easter Vacation, the actual treatment time was a total of three weeks. The subjects in the treatment

groups were seen for only eight sessions of ten to fifteen minutes each. Thus the maximum treatment time with any youngster would have been 120 minutes. The experiment was deliberately designed for short-term treatment, since it was felt that a short treatment procedure would be particularly valuable.

An explanation for the change in the direction of task-orientation in the control group might well lie in the small N of each experimental group. With experiments involving an N of five to six per group, there is considerable possibility that chance factors might bring about spurious results independent of the factors being tested in the study. Certain practical necessities dictated the use of a small N. These were the small number of youngsters who rated sufficiently high in non-task-oriented behavior and the extensive amount of time required for rating and treatment of each child. During the early phases of the study, grant money was not available; it was, therefore, not feasible to undertake a more expensive and time-consuming study.

Another factor that might have made the control group become more task-oriented pertains to the rating technique. Only one youngster in the room was rated, and it seems plausible that the subject under observation might have become more task-oriented when he sensed an adult

observing him. Although raters were trained not to fix their attention upon the subject but to glance away from time to time, it seemed apparent that certain subjects in all groups knew that they were being observed. Methods of avoiding this possible difficulty in measuring behavior will be discussed under "suggestions for further study" in the following chapter.

A further explanation for the change in the control group could be the raters' evaluations. Although they did not know the assignment of subjects to the control or treatment groups, they were aware of what the study was attempting to accomplish. It seems possible that, knowingly or unknowingly, they might have rated <u>all</u> subjects in the direction of more task-orientation. The means of all the treatment groups (Table 6) moved in this direction.

Critique of Treatment Procedures

Discrimination-modeling

The purpose of having discrimination-modeling before the operant conditioning for task-oriented behavior training was to alert or sensitize the youngster in the direction of attentive behavior. Since the data reveal no trends which would give an indication of the effectiveness of this combination of treatment procedures, it is difficult to isolate the precise weaknesses of the method.

The very brief exposure of the subjects to this treatment procedure could be one reason for its observed lack of effectiveness. Two sessions during one month are perhaps insufficient to increase the frequency of attending behavior. More frequent use of the discrimination-modeling procedure might increase the probability of behavioral change.

Studies now in progress by Bandura et al. show that scenes done in vivo have been more effective in producing behavioral change than exposure to movies. This is inconsistent with some of Bandura's early imitation and modeling studies but may tend to indicate that Patterson's technique of having the hyperactive subject observe other hyperactive youngsters and mark their behavior on a check-list might be more effective in learning to discriminate behavior than the discrimination-modeling movie used in the present investigation.

An additional control group might have yielded some indication of the extent to which a Hawthorne Effect might produce behavioral change. This could be done by showing an innocuous movie to one group, stopping the movie occasionally and giving M & Ms and pennies.

A further method of strengthening the discrimination-modeling treatment would have been to show youngsters in the movie involved in task-oriented behavior receiving

a very important reinforcement, either from peers or significant adults. During an early phase of making the discrimination-modeling movie used in the present study, visible rewards were included but with little success. Visible rewards seldom came to the task-oriented youngster, and the sequences appeared so stilted when acted out that they were eventually cut from the film.

Operant conditioning

There are various ways in which this procedure might have been made a more effective treatment. As with discrimination modeling, it would seem equally important to increase the total length of time a subject was exposed to this treatment. If this were done, a modification in the reinforcement schedule might also be instituted. It would be interesting to see whether or not a variable interval schedule would decrease the probability of extinction. In the present study, the continuous schedule appeared to have increased task-orientation during the treatment session and shortly thereafter. The school personnel's observations as well as the experimenter's corroborated this. However, had a more intermittent schedule of reinforcement been instigated, it seems more probable that the treatment would have continued to be effective until raters were able to make their observations.

It became apparent to the experimenters doing operant conditioning that pennies were much more important rewards to the youngsters than M & Ms. Hence both treatment procedures might become more powerful by using only money.

Another factor that may have acted to diminish the effect of the operant reinforcement technique was the delay in receiving material reinforcement (pennies and M & Ms). Originally, a machine was contemplated which would not only have a light and counter but also dispense pennies and M & Ms. From the literature in this area of research, immediate reward seems to be critical to increasing the frequency of a given behavior. This seems particularly important in the early phases of reinforcement. The first discrimination-modeling treatment session did allow for immediate dispensing of material reinforcers, as did the first pre-conditioning session prior to operant conditioning within the classroom. It is very possible that to increase the power of this procedure the first reinforcement sessions within the classroom should have included the immediate dispensing of material reinforcers concurrent with an activation of the light and counter. Violation of classroom rules and expense in developing a dispensing machine were the primary reasons for not instigating this procedure.

Another possible problem with the operant conditioning procedure concerned whether or not the subject noted the light signals and counter while he was involved in task-oriented behavior. In certain cases, investigators assisting in the present study reported that subjects, though very task-oriented, seemed to ignore this secondary reinforcement. There is also some possibility of the light having a distracting effect on subjects. Experiments designed with one machine that has only a light and another machine with only a counter might assist in testing this premise.

An active control group, in which the operant conditioning machine was merely placed on each subject's desk, might have given some information regarding the Hawthorne Effect. Originally, it was planned to have Group II receive a random schedule of reinforcement to obtain information regarding this effect. Because of the short treatment sessions, the possibility was strong that some subjects might have been reinforced only for task-oriented behavior if that happened to be the only behavior they emitted during the random reinforcement schedule. This would have made the treatment for such subjects in Group II the same as that for those in Group I.

CHAPTER IV

SUMMARY AND IMPLICATIONS FOR FURTHER STUDY

Youngsters who are hyperactive and inattentive pose a difficult problem to school personnel. This study was designed to test the effect of several procedures that might increase the task orientation of these youngsters and thereby decrease their hyperactivity. The two procedures were: (1) discrimination-modeling and (2) operant conditioning.

Treatment Procedures

Discrimination-modeling was a treatment procedure designed to accomplish two ends--to help the youngsters discriminate between task-oriented and hyperactive behavior and to create a situation in which the subject would imitate task-oriented behavior. To accomplish this, the subject was taken from the classroom and shown a movie consisting of youngsters involved in task-oriented and hyperactive behaviors. The movie projector was stopped from time to time and the subject was asked to identify a given behavior. When he recognized task-oriented

behavior, the light on the receiver mechanism of the remote control device was activated, and the material and verbal reinforcements were given. Three essential stimuli, i.e., the light, task-oriented behavior, and material and verbal reinforcement were to be associated in this phase of the treatment. The purpose of this procedure was to establish the light as the reinforcer of task-oriented behavior since it had originally been associated with material reinforcement and the viewing of youngsters who were task-oriented. When the youngster identified hyperactive behavior, the experimenter merely verified that his answer was correct.

Operant conditioning procedures were designed to increase the frequency of task-oriented behavior in the classroom. The consistent feature of all operant conditioning treatment in this study was the introduction of reinforcement after a given behavior had occurred. This was accomplished by means of a secondary reinforcing device consisting of a remote control transmitter and receiver which operated a light and counter on the subject's desk when the experimenter activated the transmitter.

Since the precise procedure was different in each treatment group, these groups will be described separately.

All treatment within the classroom lasted for a total of ten to fifteen minutes per session for six sessions.

Selection and Rating of Subjects

In choosing subjects, teachers of the first through fourth grades of the Ravenswood Elementary School District were asked to list youngsters in their classes who were excessively hyperactive and inattentive. These children were in turn observed by raters. The raters were trained, both by movies and by classroom observations of children, to rate behavior according to a five-point behavior rating scale. On this scale, a low rating indicated task-orientation and a high score indicated hyperactive and inattentive behavior. To accomplish the ratings, the observer used a tape recorder with an earphone which emitted a prerecorded signal at regular intervals. A rating of the subject's behavior was made at each interval. The ratings were in turn tabulated and a mean computed for a given series of ratings. A generalizability study done concurrently with this study showed extreme variability of youngsters' behavior during different half hours. Therefore, the duration of time was increased when post-measures were done.

From the total number of children suggested by their teachers and rated on the behavior rating scale, twenty-four

subjects were selected for the study. These twenty-four youngsters were in turn randomly assigned to four experimental groups.

Treatment Groups

Group I, consistent.--Subjects in this group were exposed to discrimination-modeling on two different occasions. In addition, operant conditioning was given for task-oriented behavior in the classroom. To accomplish this, a receiver mechanism with a light and counter was placed on the youngster's desk for ten to fifteen minutes on six different days. In the beginning of treatment, if the individual showed sustained attention to his work for fifteen to twenty seconds, the experimenter pressed the button activating the light and counter on the subject's desk. As treatment progressed, the interval between the rewards increased. At the end of each conditioning session, the experimenter would go to the youngster, commend him on the number of reinforcements he had earned, and show him the envelope containing M & Ms and pennies which would be given to him by the teacher at the next outdoor break. Contingencies of the reinforcement process were explained after several operant conditioning sessions within the classroom.

Group II, inconsistent.--Subjects in this group

received two modeling-discrimination treatments in the same manner as subjects in Group I. The same remote control mechanism was used on the child's desk in the classroom. However, the reinforcement came <u>after</u> the subject had been involved in hyperactive and inattentive behavior. Within the classroom the number of operant conditioning sessions totaled six. The process of presenting reinforcers was the same as in Group I. The contingencies of the experiment were never explained to the subject nor was the teacher informed of the reinforcement schedule.

<u>Group III, operant conditioning of task-oriented behavior only</u>.--Each subject in this group received two pre-conditioning sessions outside the classroom. The youngster was taken to an available room with a seat-work assignment such as a workbook or arithmetic lesson. He sat at a regular classroom desk with the remote control mechanism in front of him. After a period of task-orientation, the following three operations occurred as simultaneously as possible: the light and counter were activated, the youngster received an M & M or penny alternately, and he was praised for his task-oriented behavior. The first classroom conditioning session came immediately after the pre-conditioning period. The reinforcement of task-oriented behavior in the classroom was the same as that described for Group I. Group III was

exposed to a total of six operant conditioning sessions in the classroom.

Summary of Results

The results of the study indicate that the treatment variables of discrimination-modeling and operant conditioning did not produce statistically significant changes in the direction of higher task-orientation. Certain youngsters in each treatment group did make behavioral changes in the direction predicted. Possible explanations for the lack of statistical significance are: 1) The treatment time was of short duration. 2) The N per experimental group was small (a fact which could by chance produce spurious results regardless of the power of the treatment variable). 3) There was a possibility of rater bias; observers may have rated all subjects as more task-oriented in the post-test; the change of all treatment and control groups toward more task-oriented scores could have been rater bias or simply the effect of a statistical regression toward the mean. 4) The reliability of the criterion measure was lowered; this would require a large mean difference to reach statistical significance. 5) Subjects became more task-oriented when they were aware of observers rating them.

Suggestions for Further Study

Behavioral rating

Several different procedures might be initiated which would give a more objective evaluation of a subject's behavior.

Raters.--If raters were to be used in subsequent studies, it would seem important, in light of the information from the present investigation, to allow them no knowledge of the behavior change being attempted. This could be done in several ways. Raters could be instructed to observe several different types of behavior. Likewise, it would seem important not to let the subject know he was being rated. A one-way glass would be ideal for this purpose. Since this is rarely available, the possibility of rating several youngsters simultaneously might diffuse the attention formerly given to one subject under observation. By having observers rate several youngsters at the same time, the subject used in the study could remain unknown to the rater. Likewise, with several youngsters under observation, the teacher would not be aware of which youngster was in the experimental study.

Use of photography for behavioral rating.--The use of pictures, either still or motion, would be another possible way to yield more objective measures of behavior.

A camera could be mounted in such fashion that it would not be visible to the class. By using a variable interval timer, pictures could be taken at various times of the day. These pictures could then be evaluated by trained raters. The present study showed the value of noting behavioral change with pre- and post- movies taken in the classroom by an experimenter.

Changes in the experimental design

One important variable that may be crucial to behavioral change is the length of treatment time. An experimental design could be so arranged as to test whether a greater number of treatment periods of the same length would be as effective as fewer treatments of longer duration.

Treatment procedure

Further experimentation might test the effect of having a small signaling device affixed to the youngster's desk in a semi-permanent manner. Since youngsters seemed most attentive when the reinforcing device was on their desk, a variable interval schedule of reinforcement could be instituted whereby the youngster would never know when the reinforcement procedure would be activated.

Other types of secondary reinforcing devices might

be used. A machine with several different colored lights with a counter below each could be made. Each colored light would signify to the subject a certain amount of reinforcement. By using such a device, it would be possible to decrease the frequency of reinforcements as the subject's task-oriented behavior began to increase. Longer intervals could be rewarded with lights signifying a larger reward.

It would seem important to ascertain what reinforcers are most significant to each subject and test the effectiveness of using these throughout the study.

A system of negative reinforcement might produce greater behavioral change. This could be done by subtracting reinforcers when the subject manifested hyperactive behavior. By using coupons or tokens which were kept in the classroom, such a procedure might be quite feasible.

Experimentation should be conducted to test which schedules of reinforcement produce the greatest change in behavior over the longest period of time. The present study worked exclusively with a continuous schedule. From the research literature (Skinner, 1957, and others) behavior reinforced by a variable interval schedule is much less vulnerable to extinction.

Still other possibilities might move in the direction of simply telling the youngster he would receive a given reinforcement for being task-oriented and no reward or mild aversive treatment when he was engaged in distracting behavior.

Further innovations might test the relative effectiveness of having the role of the reinforcing agent played by the experimenter or by the teacher. In the present study the teacher gave the material reinforcers to the subjects at recess or noontime. It would be interesting to compare the effects of teacher's versus experimenter's acting as reinforcing agent.

Conclusion

The fact that operant and modeling procedures are powerful means of changing behavior has been shown by a large number of previous research studies. Fewer studies are available to show the effcct these procedures have upon an increase of the frequency of attentive behavior with youngsters who are hyperactive and inattentive. The present study was an attempt to gain information as to how these methods of changing behavior would bring about modifications in task-oriented behavior. The experiment failed to reveal statistically significant differences in the treatment procedures. Certain limitations of the study

have been enumerated to explain these negative results. More research using different experimental designs and modifications in treatment procedure are necessary before it is possible to start drawing final conclusions. It is hoped that the present investigation will serve as an impetus for further research in this area.

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APPENDIX A

SCHEDULE OF TIME WHEN SUBJECT IS INVOLVED WITH TASK-ORIENTED ACTIVITY

School _____

Teacher _____ Room _____

Schedule of blocks of time in the morning when _____ will be involved with individual seat work activity.

1st time--

_____

Recess-- _____

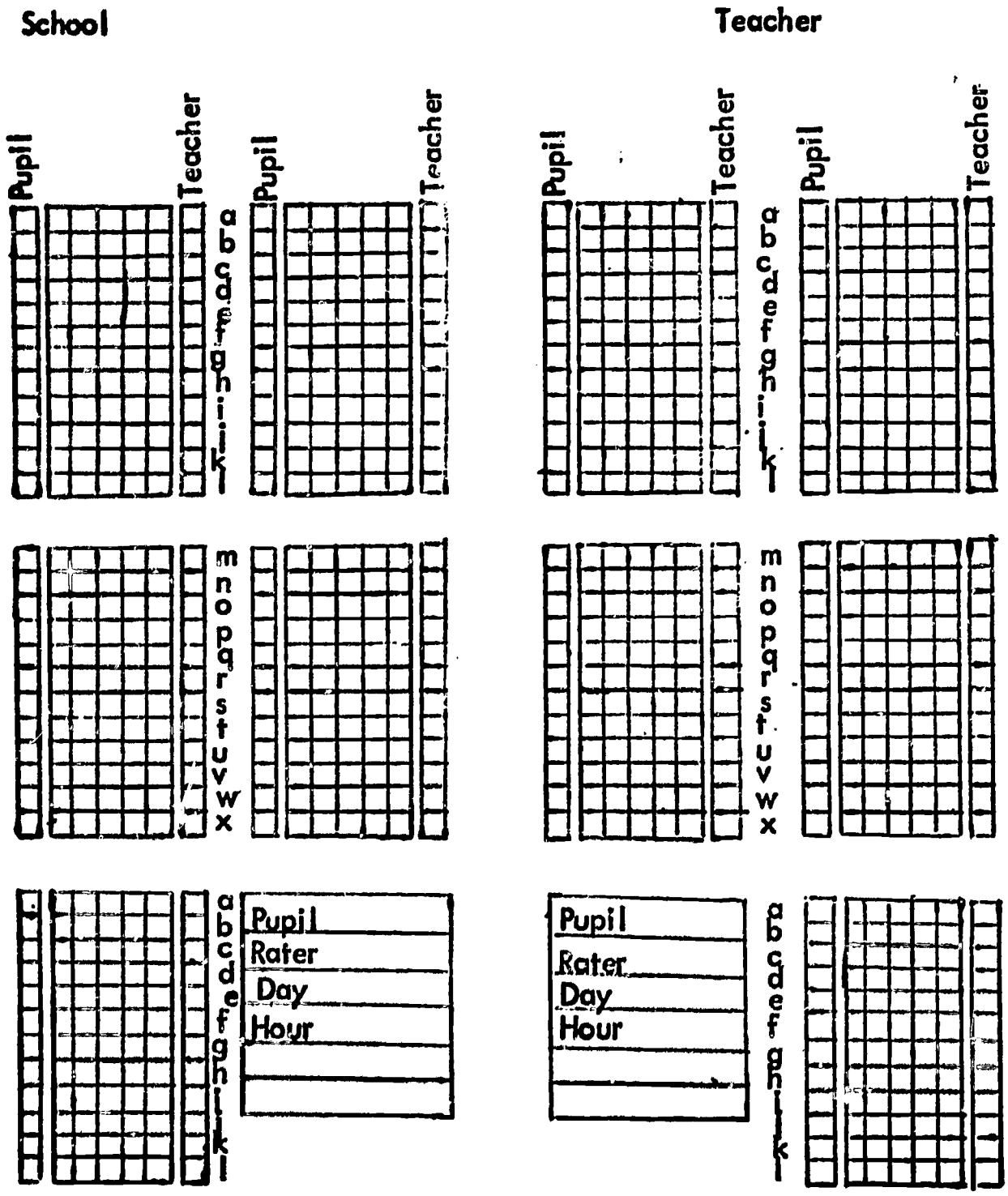
Recess (cross out if only one recess)--

_____

Lunch-- _____

APPENDIX B

BEHAVIOR RATING SCALE



OBSERVER RATING FORM

(Reduced in size by one-half.)

APPENDIX C

LETTER TO TEACHERS OF THE RAVENSWOOD ELEMENTARY SCHOOL DISTRICT

January 29, 1965

Dear

I am gathering information for a doctoral dissertation. I wonder if I could enlist your cooperation in listing several male youngsters in your classroom who might manifest the following behavior:

1) Very inattentive, particularly when the rest of the class is engaged in a particular task.

2) Seldom listens to directions.

3) When the rest of the class is involved with a task, this child may be engaged in activities not related to the on-going work of the class. Examples might include: cleaning out his desk, concentrating on involved doodling activity, folding paper to make an airplane, or playing with various objects.

4) Day dreaming and appearing withdrawn.

5) Wandering or watching others without much purpose.

6) Frequent attempts to attract the attention of others in various ways, e.g., grimacing, striking or poking.

7) Generally shows low attention-span.

8) Any of the above activities may be accompanied by fidgeting behavior. This may include rubbing of eyes, tapping fingers or hands, rocking back and forth in his seat, tossing objects in the air and sucking fingers or other objects.

The youngster which I am interested in studying fits many of these categories, though not all at any particular moment. If you do not have any such youngsters (male) in your room, feel free to say so. But, if one, two, or three children come to mind who fit this general description, would you please list them below.

Would you please return this to the office as soon as possible.

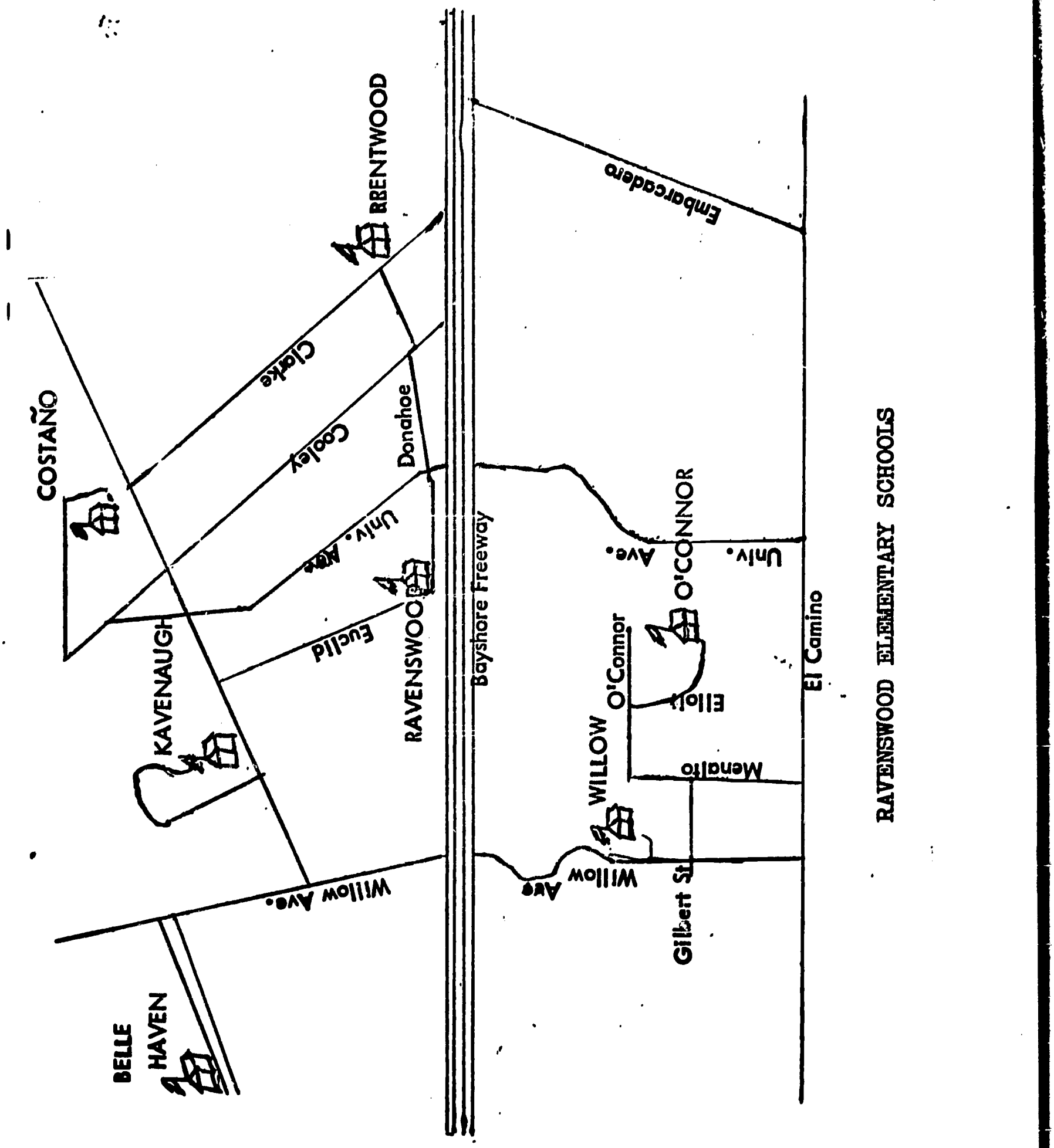
Thank you for your cooperation.

Sincerely,

Stewart B. Nixon
Graduate Student
Stanford University

LOCATION OF SCHOOLS WHICH WERE INVOLVED IN THE STUDY

APPENDIX D



APPENDIX E

INSTRUCTIONS TO TEACHERS PARTICIPATING IN THE STUDY

What to tell the class

In words to this effect you might tell your youngsters that Mr. Nixon, who has been in the room observing with the tape-recorder, is doing an experiment at Stanford to try to help youngsters learn. For a few minutes on certain days, he or his assistant will be in the room with a device on one of the children's desk. The rest of the class can cooperate and help this youngster learn by not paying attention to Mr. Nixon or the youngster he is trying to assist, but by merely going about their own work.

When you give the envolope containing M & Ms and pennies to the youngster in the study, merely say this is what the experimenter left for him.

I wish to thank you again for your willingness to participate in the study.

Sincerely,

Stewart B. Nixon
Stanford University

APPENDIX F

INSTRUCTIONS TO ASSISTANT FOR SHOWING MOVIE AND OPERATING LIGHT

General

Explain: "We're going to be looking at a movie. From time to time, I'll be stopping it and asking you what the people in the movie are doing."

The only contingency to explain is that "every time the light goes on, you will get a prize." If the subject should ask, during the movie, why the light goes on, be "Rogerianly reflective" and ask why he thinks it is going on, but make this as brief as possible.

When you are about ready to leave, mention that--"A box very similar to the one you saw today next to the screen, but with a real counter, will be on your desk on some days. At certain times, the light in the box will go on. This means you will get one candy or penny. The counter will keep score for you, and you will get the number of candies and/or pennies the counter shows at recess or lunch time."

Specifics

1) Check each time at the office as to which room is available for the movie. (It probably will be different each time.)

2) Set up the movie first; then go to the room for the youngster.

3) Since the teacher will know what this is about, merely identify yourself to her (or him) as "someone working on Stew Nixon's research" and ask to take the given subject from the room to see the movie. If he is absent, go to the next youngster on the list, making a note of the absence.

4) As you are walking to the room with the youngster, build rapport in any manner you see fit, but during the

walk ask the child if he would like an M & M. Part of the procedure can be explained as you are walking along. If the youngster should say he does not want an M & M, then offer a penny when you get to the movie room.

5) In talking to the youngster about the movie, you can explain that you want him to tell you what the boy in the movie is doing when you stop the film at certain spots. (Alternate between M & Ms and pennies, starting with an M & M first.)

6) If you are to show the movie to both Caucasians and Negroes, you will have two movies with you, one marked C (Caucasian) the other N (Negro). The N movie will be shown to Negro subjects, the C movie to Caucasian subjects.

7) With both movies, you should stop the movie 8 to 10 different times for identification of task-oriented activities and 5 to 6 stops to have the subject identify non-task-oriented behavior. (Suggested places to stop are listed at the end.) The precise place of stopping is not considered the important variable, but rather the general average of stops listed above.

8) Upon stopping the machine for a given behavior, ask the youngster what the boy is doing in the picture. If he says writing, raising his hand, or any response that signifies task orientation, repeat what the youngster has said, with praise, and add such a phrase as "He really is working, studying or writing hard," and "He got lots of prizes, and people liked him for paying attention and working so hard," or "The teacher was very happy with his paying attention," or "His parents were very pleased that he was doing what he was supposed to," or "The other kids really liked him because he worked so hard," or "He got a good report card because he studied so hard," etc.

If the youngster does not give a task-oriented response for the first or second response, do not give a prize, but go on to the next. (Note this after the youngster's name.)

9) When the S has identified the task-oriented behavior, as simultaneously as possible, give him an M & M, praise, and activate the button for the light. Make sure that the subject gets the M & M in his mouth when the picture of the task-oriented behavior is on the screen (or, in the case of pennies, that he has it in his hand).

At non-task-oriented behavior stops, merely validate the S's response, with no praise or commendation, i.e., more of a matter of fact tone.

10) Each time you are with the S, explain that from time to time, this little box with the light and counter will be on his desk on certain days and that he will get the number of M & Ms and pennies that the counter adds up.

Suggested Stops for C Film

(Approx. running time with stops 8-10")

Task-oriented scenes	No. of suggested stops
Scenes in order of appearance	
1) Boy with red shirt	2
2) Green shirt boy writing	2
4) Stripped shirt boy doing math	2
6) Pink shirt boy (back to camera) between two other boys	2
8) Stripped shirt boy writing	1
10) Boy in red shirt	1
Non-task-oriented scenes	
3) Black shirt boy erasing cover of book	2
5) Boy in white shirt	1
7) Boy laying on top of desk	1
9) Boy and girl talking	1

Suggested Stops for N Film

(Approx. running time with stops 8-12")

Task-oriented scenes	No. of suggested stops
1) Boy raising hand	1
3) Boy writing (front view)	1
5) Boy with red folder on desk	1
7) White shirt boy studying	1
9) Boy studying with 2 books on desk	1
11) Boy with checkered shirt	1
12) Boy with 2 books on desk	1
13) Boy at blackboard	1
14) Boy with ruler on desk	2
Non-task-oriented scenes	
2) Boy in red and white sweater	1
4) Boy in red and white sweater holding eraser to friend	1
6) Boy with red paper in mouth, going around in his seat	1
8) Boy in and out of desk, trying to get neighboring girl's attention	1
10) Boy making faces to others	1

APPENDIX G

NUMBER OF TREATMENT PROCEDURES PERFORMED BY THE SEVEN EXPERIMENTERS

Experimenters	Modeling-discrimination	Operant condition task-orient. behav.	Modeling-discrim. movie	Oper. cond. non-task-orient. behav.	Pre-condit. sessions	Oper. cond. in classroom
1	0	22	0	21	6	25
2	0	8	0	9	5	20
3	3	0	2	3	0	3
4	2	0	5	0	0	0
5	2	0	2	0	0	0
6	3	0	0	0	0	0
7	1	0	3	0	0	0
Total	11	30	12	33	11	48