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ABSTRACT

The report is the third in a six part research report. The construction and evaluation of a treatment model using short term placement in a token economy to modify deviant behavior is described. Between 1968 and 1970 the treatment model was replicated on a total of 44 subjects ranging in age from 8 to 12 years. Eight groups of six subjects each were rotated through the experimental classroom for a 2 month period of treatment. Three components of the treatment model - token reinforcement, social reinforcement, and aversive controls, were evaluated in terms of their efficiency in accounting for behavior change. Results were felt to indicate that social reinforcement had the greatest control over the subjects' behavior. Application of the treatment model over a 2 year period was felt to produce measurable changes in classroom behavior and in measured achievement in math and reading. Other aspects of the project are included in: section one (EC 032 208) overview; section two (EC 032 209) assessment; section four (EC 032211) generalization and maintenance; section five (EC 032 212) teacher behavior; and section six (EC 032 213) single subject experiments. (CL)

Final Report

Section Three: Construction and Evaluation of a Treatment Model for Modifying Deviant Behavior in Children

Assessment and Treatment of
Deviant Behavior in Children

U.S.O.E. Contract OEG 4-6-061308-0571

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FINAL REPORT

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Modification of Deviant Behavior Through Short-term Placement in A Token Economy

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Modification of Deviant Behavior Through Short-term Placement in A Token Economy.[1]

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In the decade of the sixties educators became increasingly aware of the population of children in the elementary schools who were variously labeled as emotionally disturbed, acting-out, hyperactive, socially maladjusted or exhibiting deviant behaviors. For the above group of labels, the most frequently used global description is currently "a child who exhibits behavior deviations." Kirk (1962) defines a behavior deviation as "that behavior of a child which (1) has a detrimental effect on his development and adjustment and/or (2) interferes with the lives of other people [p. 330]." Determining what is and is not "detrimental" and does or does not "interfere" is the function of the setting in which the child finds himself. In the case of the school setting the teachers, peers and miscellaneous school staff as well as the physical setting itself, determine the boundaries for acceptable behavior.

An early investigation by Ullmann (1952) found that eight per cent of the regular classroom children were rated as maladjusted by their teachers. The Special Education Department of the co-operating school district conducted a study (1961) to determine the number of maladjusted children. This was accomplished by

having each regular classroom teacher list the maladjusted children in her classroom, according to her own definition of maladjustment. An average of 7.3 percent of all children in grades one through six were reported as maladjusted. The lowest percentage (5.84) occurred in grade one and the highest in grade six (8.15).

In previous studies (Walker, Mattson, and Buckley, 1969; Mattos, Walker, Mattson, and Buckley, 1969), the authors found that children identified as exhibiting deviant behaviors (N=12) spent on the average only 36 percent of the available time in task related activities. Thus, it is not surprising that the authors found the group of twelve behaviorally deviant children (1967-68) to be, on the average, behind grade level 2.2 years in reading (-.1 to -5.1; Gray's Oral) and behind grade level -.4 years in math (-3.6 to 2.2; Wide Range Achievement Test). Stennett (1966) looked at children in grades four through six and found that in general "EHC [emotionally handicapped children] tend to get farther and farther behind their classmates in achievement as they move over the elementary school years. [p.448]."

Early attempts to treat the "acting-out" child in special classes within the school setting met with little demonstrable success. Kounin, Friesen, and Norton (1966), Rabinovich (1959), and Shannon (1961), suggest that the inability of the schools to deal effectively with these children stems primarily from the lack of established procedures and techniques that might be effectively employed within the context of the regular school setting.

The experimental analysis of behavior undertaken by Skinner in 1938 revealed many principles from which valuable behavior modification techniques have been derived. The success of these techniques in changing behavior has been widely demonstrated in laboratory settings. Extensions of these same principles to the behavior or deviant children in applied settings also met with considerable success (Patterson, 1965a, b; Straughan, 1964; Zimmerman and Zimmerman, 1962). Staats, Finley, Minke, Wolf and Brooks (1964) used a token reinforcement system to maintain reading behavior of three, four-year-old children. These studies reflect, for the most part, behavior modification with individuals or small groups in highly controlled settings. Because of the success achieved when using tokens with individuals in laboratory and applied settings, investigators began to apply the token economy to large groups of children (Girarduau & Spradlin, 1964; Birnbrauer & Lawler, 1964; Hewett, 1966).

A token economy is one in which desirable responses are followed by administration of a stimulus (marks, chips, stars, etc.) to be traded in for certain special items or activities. Thus, the child learns the contingent relationship between behaving appropriately and the reinforcing consequences. The token reinforcers used in these systems may be tangible (Hewett, 1966) or symbolic (Valett, 1967). Their value is derived from the various kinds of "back-up" reinforcers (candy, trinkets, free time, etc.) for which they are exchanged. Once the desired

behaviors come under reinforcer control, more contrived back-up reinforcers are gradually eliminated and replaced by reinforcing stimuli more readily available in the classroom environment. This process is facilitated by pairing the presentation of the tangible or token reinforcers with social reinforcers and gradually fading out the presentation of the contrived reinforcers (tokens and toys). Quay and associates (Quay, Werry, McQueen, & Sprague, 1966; Quay, Sprague, Werry, McQueen, 1967) increased attending behavior in a classroom for "conduct problem children" by flashing a small desk unit light for attending behavior followed by candy and/or social reinforcement at the end of the period.

In 1966 the authors began to identify and treat children with behavior problems in an experimental class setting (Mattson and Walker, 1966). The rationale for the treatment model was based on the token economy. Since that time, variations of the token economy have been implemented in at least 100 separate programs in this country (Krasner & Attowe in O'Leary & Drabman, 1970). O'Leary and Becker (1967) successfully used a token program to control the behavior of a large class (N=17) of emotionally disturbed children. In addition, token reinforcement programs have been extended to junior high age children (Broden, Hall, Dunlap & Clark, 1970); and regular elementary school classrooms (O'Leary, Becker, Evans and Saudargas, 1969). O'Leary, et. al. (1969) investigated seven children with disruptive behaviors in a regular second grade classroom. Systematic introductions of "Rules," "Educational

Structure," "Praising Appropriate Behavior," and "Ignoring Disruptive Behavior" did not consistently reduce disruptive behavior. Only when the token system with back-up reinforcers was added to the previous variables did disruptive behavior decline for six of the seven subjects.

This paper describes the development and evaluation of a treatment model which is designed to provide efficient modification of one class of deviant behavior: hyperactive, disruptive, acting-out behavior in the classroom. The data were gathered during 1968-1970 in a special class setting, the Engineered Learning Project (ELP). The data presented here were generated by an inter-subject replication of the design, procedures, and results of the treatment model and by an evaluation of the components of this model. Special attention was given to the persistence of treatment effects across time and across settings. The goal of this research was the development of a workable treatment model, adapted to the school setting, which can be implemented by regular school personnel.

Method

Subjects

Forty-four subjects were included in the treatment classroom from 1968-1970. The subjects (39 males; 5 females) were enrolled in eight groups of six children each.[2] The children ranged in age from 8.1 years to 12.6 years. In the regular classroom the children were in grades three through six (grade 3: N = 12; grade 4: N = 12; grade 5: N = 10; grade 6: N = 10).

The children were selected from 24 elementary schools in the local school district. Selection criteria used average or above average intellectual ability, inadequate academic performance, and socially deviant behavior occurring within the regular classroom setting. All subjects possessed a number of behaviors which made them poor candidates for learning. Teacher defiance, distractibility, hyperactivity, and tantrum behavior were attributed to the group as a whole. Individual behaviors exhibited were physical and verbal abuse of peers, pre-delinquent behaviors (stealing, smoking, glue-sniffing), rejection of peer interaction, and excessive verbal outbursts (swearing, loud noises, smart talk). These behaviors were identified as most annoying to the regular classroom teacher; yet the subjects exhibited many additional behaviors illustrative of inadequate social and academic adjustment. All candidates for the experimental classroom were screened by the Walker Problem Behavior Identification Checklist (Walker, 1970), a behavior rating scale (Walker, 1969) and baseline observations of attending behavior taken within the regular classroom. All subjects scored average or above on standardized intelligence tests (WISC: Stanford-Binet), but had educational deficits in reading of from two months to 3.9 years (Gates-McKillip Reading Diagnostic Test) and from one month to 3.5 years in math skills (Stanford Diagnostic Arithmetic Test).

All of the children received standard auditory, visual and general health tests either prior to, or during, enrollment in the classroom. No major deficits were displayed and minor deficits

were corrected by prosthetic devices and seating arrangements. Six of the 44 subjects had been on various drugs prior to enrollment to reduce hyperactivity but requests were made for all six parents to terminate drugs during treatment and follow-up. At follow-up conferences the parents reaffirmed that each child was still off medication.

Setting

The classroom facilities were adjoining and affiliated with a public elementary school in the Eugene School District. The primary area for academic activities contained six double desks (approximately 20" x 45" work surface), the teacher's desk, and shelves and tables for the display of high interest materials for science and art projects, a carpentry room with a variety of tools and wood, and the necessary observation facilities. Adjoining rooms provided sink and table facilities. Space was also available for individual testing, tutoring, and remedial instruction. A small isolation room (time-out), containing a chair and desk, adjoining the classroom (Figure 1). The children used the same playground and lunch facilities as the regularly enrolled students in the school.

Insert Figure 1 About Here

The children were in the special class daily for approximately three hours and forty minutes. Of that time, approximately two hours and fifty minutes were devoted to academic assignments, forty-five minutes to p. e. and recess and ten to point counting and trading for prizes at the end of the day.

The class ended at 1:45 and the children were, in most cases,[3] bussed back to their regular classes for one hour of continued academic work.

Each morning the teacher and teacher aide were both present in the classroom to answer questions, correct papers and listen to reading. Following lunch break, and for the last forty-five minutes of the day, the teacher operated the classroom by herself.

Apparatus and Materials

Display board. An electronic displayed board designed by the project staff (Walker, Mattson, and Buckley, 1969) was used for recording reinforcing events and providing subjects with discriminative stimuli for appropriate and inappropriate behaviors. The device was also designed to provide a more systematic presentation and removal of points than can be provided by teacher marks on point sheets.

The display board contained a unit for each subject with name, stimulus light, three-digit plus and three-digit minus counters. A similar unit set apart from the rest and containing a larger light was used for recording and regulating the group reinforcing climate. A control panel at the side of the room allowed immediate and visible reinforcement. Each subject was required to be in his seat ready to begin the assignment before his light came on. When the stimulus light was on, it signified that the child was behaving appropriately and that he had gained access to a schedule of reinforcement. When a child received a point, his light flashed,

there was an audible click, and the cumulative counter recorded the event. If the child was behaving inappropriately, his light was extinguished and a buzzer sounded which signalled the occurrence of deviant behavior. The subject had ten seconds in which to modify his behavior. If he did not modify his behavior within this time period, one point was subtracted for every sixty seconds that the deviant behavior persisted. No subject's points were ever taken below zero. Thus, if a subject failed to modify his behavior and lost all his points for that day he was placed in time-out. At any time that it became necessary for a child to be placed in the time-out room or to be suspended from the experimental classroom, his stimulus light remained off, as did the group light, until he returned to the classroom.

At the end of the day, plus and minus points as well as total accumulated points for each child were announced to the entire class by the teacher. At the same time she transferred the points to a cumulative point sheet. Thus each day the subjects began with zero points on the display board. In this way each child was able to easily identify his daily achievement.

The display board proved to be very successful in operation for the three year period in a number of ways. (1) The unit proved highly reliable and required no repairs; (2) the teachers found it to be a much more efficient way to administer points; (3) it made enforcing negative sanctions much less aversive to the teacher;[4] and (4) it was also effective in social consequation since all lights are visible to all subjects. Thus the children may compete

among themselves to be high-point person for the day, to beat a friend in total points, or to earn a toy before another individual. Also, during group reinforcement, all children cooperate to receive group points. The children can quickly see the child's light which is out and thus responsible for their failure to earn a point. Thus it combines an aversive stimulus (peer pressure) with positive reinforcement (points).

Individual Work Box. The individual work box was originally developed by Patterson (1965a) for use with individuals in the regular classroom. The work boxes in the ELP Classroom were 3" x 3" x 5" boxes powered by a six volt battery. The front of the box contained a green light and a red light and corresponding plus and minus counters. The teacher or experimenter controlled the box from a hand-sized control box at the end of a 25 foot cord. The length of the cord allowed the controller to stand in the observation room and manipulate the lights and counters on the box without being visible to the child. The boxes were found to be extremely effective when used for: (a) attending behavior; (b) ideosyncratic behaviors; and (c) a follow-up strategy in the regular classroom. The boxes were effective since they allowed for immediate consequation of behavior, served as an S^D for appropriate behavior, and removed the social element from the punishment process.

During the first weeks that the subjects were in the classroom, the work boxes were placed on their desks. Each child was told that the box would help him to work and earn points. As

long as the green light stayed on he could earn points. The green light meant he was behaving and working appropriately. However, if the red light came on he was doing something wrong and if the red light stayed on for any time he would lose points. The red light might come on for any number of things which are considered not attending: looking around the room, watching someone or something, playing with an object, doodling, laying head on desk, etc.

After a verbal explanation of how the box worked, it was demonstrated for the child. The teacher or experimenter then moved to her observation station. The child was given one point immediately if his behavior was appropriate. Following the initial point, points were awarded on a variable interval schedule (see Behavioral Program).

In shaping attending behaviors the rules were always verbally specified. Once attending was under good control, the boxes were used for any ideosyncratic behaviors recorded for a child. For these behaviors the rules may be verbally specified or the behavior may simply be shaped in through successive approximations. The choice would depend on the type of behavior and the length of time available. Some of the behaviors modified using the box were: head tic, excessive movement in chair, finger tapping and babbling or talking to self. The work box was also used in the regular classroom with a peer reprogramming maintanence strategy (see Section 4).

Timers. Individual sixty-minute timers, place on each child's desk, were used in a variety of ways to meet the specific behavioral needs of each child. The timers were particularly effective in controlling high rate distractibility. All the children were placed on timers (or work box) when they entered the classroom.

The instructions to the S were that he was not to look up from his task during that interval in order to receive points (reinforcers). The schedule was increased gradually (see Behavioral Program) from a time interval the subject could originally accommodate to a time-interval compatible with regular classroom requirements. This technique was based on the assumption that introducing a stimulus incompatible with distractions, which functions as an S^D for a reinforcing event, will lead to the response of academic production. As soon as each child's attending behavior reached criterion the attending timer was removed from his desk and he could earn his points on the display board at the front of the room. To increase the potency of "getting on the display board," the teacher made an announcement to the entire class when each child met the criterion.

Once the attending timers were removed from the child's desk they were used for attending only intermittently as a behavior check. However, for any subjects needing to increase their academic production rate, timers were placed on the desk and labeled "academic" timers. Thus the teacher would set the timer and require a certain amount of work to be completed before the time expired and the

buzzer sounded. Because of the multiple uses made of the timers, the children were not to set their own timers. Thus if the child in any way touched the timer it was considered inappropriate behavior.

Group timer. An electric, Gra-lab Universal interval timer with an eight-inch diameter face was used to record and control group attending behavior. (see Group Strategy) The dial numbers represent from one to sixty minutes. By setting both the minutes and seconds hands it could be determined exactly how much time had expired. An audible click signalled when the specified time interval was complete.

Outdoor timers. The children could normally earn or lose one point for an entire physical education period. With some of the groups, it became necessary to more closely monitor p.e. and recess periods. If the group engaged in large amounts of arguing they had to earn p.e. period by not arguing.

The experimenters obtained small two hour pocket timers for playground use. They could easily be held in the hand, pinned on a shirt or attached to a subject's belt loop on his pants. The timer was set for five minutes. If all subjects cooperated during the five minutes they could stay out an additional five minutes. This procedure continued through the 30 minute p.e. period.

It was discovered that getting to wear the timer was very reinforcing to all the children. Thus the person with the highest number of daily points by p.e. period was chosen to wear the timer.

Recording Sheets. Heavy emphasis was placed on recording both teacher and pupil behaviors in the classroom setting. This recording was not only necessary for research purposes but it also gave constant feedback to the teachers regarding effectiveness of intervention. Listed here are the sheets used by the teacher and teacher aide to record and monitor behaviors.

1. Time-out and suspension sheet (See Appendix A). Record was kept of the time and reason each child was placed in time-out or sent home for the day. In addition, behavior of the child following the consequence was recorded by the teacher. Thus if a behavior continued to be repeated or the behavior did not improve following the consequence it was assumed the consequence was not effective and was altered.

2. Point sheets. (See Appendix A). These sheets were placed on each child's desk to record points. The point sheets were used only until the child had earned the right to be on the display board.

3. Weekly point record. (See Appendix A). These sheets were records of number of points earned and lost daily, total number of points accumulated, and number of points traded for prizes.

4. Record of individual behaviors (See Appendix A.). During the first week of class the teacher and teacher aide identified behaviors for each child, apart from the behaviors common to the whole group, which were either incompatible with classroom work or had been identified by the classroom teacher or peers as annoying. The behaviors were recorded to determine the frequency. If the frequency was high attempts were made to alter the behavior.

Usually a first step was making the child aware of the behavior by having him actively involved in the counting process (or counting an incompatible behavior) or keeping a teacher-recorded tally on his desk. If this did not effectively reduce the frequency additional variables were manipulated.

5. Point record form. (See Appendix A). In preparation for returning the subjects to their regular classes, during weeks six through eight, points were not given following each appropriate behavior. During weeks six and seven they were given three times a day and during week eight they were given once a day. The teacher used the point record form to record daily points earned so they could be put on the display board at the appropriate time.

6. Record of teacher behaviors. (See Appendix B) On the corner of each child's desk was a small 3 x 5 index card with the heading P (praise), TI (teacher initiation) and PI (pupil initiation). Each time the teacher or her aide would praise or in some way interact with the pupils, a mark would be made on the card in the appropriate column. Each adult involved used a different colored pen to be able to distinguish her marks. From this the teachers could determine the amount of praise given, the number of times attention was initiated to students and to which students it was given most frequently as well as the number of times individual students initiated. As a result of this the teachers were able to distribute their attention equally among students, increase praise to some students, and perhaps put a question limit on those who demanded too much time.

The children were not told the codes on the card. They were simply told the teachers were counting their own behaviors.[5]

Academic Program

Each group of six subjects was phased into the classroom in pairs during a one-week period; two on Monday, two on Wednesday and two on Friday. Each pair replaced two subjects from the previous group. This method of staging the entry of the new subjects made it possible for "old" subjects to orient the "newcomers" to classroom rules and routine and to serve as models for appropriate behavior. It also allowed the teacher time for close individual attention to both appropriate and inappropriate behaviors.

Three major tasks were performed on each new student's first day in the classroom: (a) orientation to the physical aspects of the classroom; (b) orientation to classroom rules and procedures; and (c) diagnostic testing of reading and arithmetic skills. Orientation to the classroom consisted of taking the child on a tour of the facility, including the observation room (discussing the one-way window), the time-out room and the store. Orientation to classroom rules and procedures consisted of a teacher led group discussion of how points were earned and what behaviors resulted in loss of points, time-out or suspension. Also discussed was the classroom time schedule for activities including recess, p.e., lunch, etc. and functional details concerning the use of red tags and daily assignment sheets and special materials (to be discussed later). The rules were repeated a total of three times,

once at the addition of each new pair of subjects. From that point, the rules were never formally repeated, but applied to the subject's behavior.

Diagnostic assessment of reading and arithmetic skill strengths and weaknesses were obtained through the administering of two tests: (1) Gates-McKillop Reading Diagnostic Tests, form I and II, and (2) Stanford Diagnostic Arithmetic Test, form X and W, level I or II. The Gates-McKillop Tests were chosen because they offered a functional assessment for instruction purposes due to the range of skills tested as well as including standardized indices of functioning in terms of grade level. The tests were not used in their entirety, but rather, the most crucial elements pertinent to the modes and materials of instruction were extracted for measure. The test parts used were (a) Oral Reading, (b) Knowledge of Word Parts (Giving Letter Sounds only), (c) Recognizing the Visual Form of Sounds (Vowel part only), and (d) Supplementary Spelling Test. The form of the test, I or II, used for the first testing situation was arbitrary as long as the alternate test was administered at the end of the eight-week treatment period. The standardized indices of functioning made it possible to measure gains produced by the treatment model.

The Stanford Diagnostic Arithmetic Test was chosen for much the same reasons as the Gates-McKillop; to channel instruction and determine level of functioning. The blending of modern math and more traditional problem types in the Stanford Diagnostic Test also made it more appropriate since the experimental class subjects

came from varied backgrounds and the ELP instruction more closely resembled traditional math instruction in the basic skills areas. The computational part of the test was given on the first day with each child working at his own desk with a timer set by the teacher for the specified time interval. The concept portion of the test, testing counting, operations, and place value was given orally to the whole group as soon as the new group was complete and all other preliminary testing was completed. Level I of this test was used most often, primarily because the subjects tended to be functioning well below grade level and to have begun with level II would not have sampled the subjects' range of performance. In those cases where level II was warranted, it was given after level I and by necessity on an individual basis. The complementary test to the one given the first week of the program was administered at the end of treatment, making it possible for measurement in terms of grade level gains.

The function of testing was to determine where the subjects stood academically, and how the materials could best be used to concentrate and maximize instruction to challenge strengths and develop needed skills. Each child, in the beginning, was given work that he could perform fairly independently; well below frustration level in most subject areas. The purposes for the gradual beginning were: (a) the point system, accompanied by teacher praise, could be maximized resulting in students experiencing success and the classroom setting becoming reinforcing; (b) attending behaviors could be established;and (c) students could become accustomed to

classroom routines such as moving from one task to the next without waiting for teacher directives. After these essential elements were well formed the content of instruction became more challenging.

Typical Day. When the students arrived at the classroom at approximately 9:20 a.m., they would quickly and quietly put their lunches and coats away, sharpen their pencils, sit down at their desks and begin work immediately after examining their daily assignment sheets. Each child's assignment sheet (see Appendix C) was prepared for the next day in the afternoon after class was dismissed. The assignments were made on an individual basis according to the quality and kinds of work that had been completed to that point. The current days work and assignment sheet were used as a reference for filling out the new assignment sheet. The assignment sheet told the students in step-by-step order the exact pieces of work they were to complete on that day. All the books and materials needed (except for extra credit options) were likewise placed in order on the right-hand corner of the desk with the assignment sheet on top. As each assignment was completed the student placed it on the right-hand side of the desk for marking and continued to the next piece of work. Papers were marked and returned as promptly as possible. Papers had to be completed neatly and correctly before points were given. Students were not punished or admonished for mistakes but shown methods and given encouragement.

Insert Figure 2 About Here

For purposes of illustrating how the assignment sheet was used, Figure 2 is a copy of a typical sheet for a fourth grade pupil. The first major heading on the sheet is math, below that are sub-headings: flashcards, worksheets and mathbook. The child, upon looking at his sheet, would see that his first task for that day was flashcards, addition and multiplication. He would take his cards, practice them to himself until he felt confident, then place them on the left-hand corner of his desk to signify to the teacher that he was ready to be timed. All completed work was to be placed on the left side of the desk ready for teacher attention. If a teacher was free, she would go over to the student and time him for one-half minute on each set of cards. The results were then graphed on a bar graph on the student's desk. If a teacher had not been available the student would have gone directly to the next task, worksheets. The flashcards and any other completed work had to await the teacher's availabliity. However, the more immediate the correction, providing feedback and reinforcement, the more effective the instruction. The five worksheets consist of four basic fact sheets; one addition, one subtraction, one multiplication and one division and one extra worksheet, in this case perhaps working with place value. The basic fact sheets were used to increase rate and accuracy. The student was asked to fill in his name, date, his starting time and his ending time. An estimated time was placed in the upper left-hand corner. The student's goal was to beat that time. Originally a child could get a bonus point for completion within the time period. As points were reduced he had to complete

the assignment within the time period to get the point for completion.

When worksheets were completed the student usually had an assignment from a math book. This allowed for practice in copying and writing both problems and answers. Placement cues on the answer sheet were gradually faded out by the teacher. After completing math this student would begin his reading assignments. He would go through his Hegge, Kirk and Kirk drill, read his Palo Alto book and then go on to his Sullivan workbook, writing answers on a separate piece of paper. The drill and the reader were always read silently first, then orally with a teacher to work on word attack skills and check comprehension. Sullivan assignments were completed independently and corrected by a teacher. The student was usually given a one or two page optional assignment that could earn the child an extra point.

Each child was given a new spelling list each day. Sometimes they were from a regular spelling book and sometimes they were teacher prepared lists. This particular child had a list of ten phonically regular spelling words next in his stack. He was to look at the words, write each twice and study them for a test. The test could be teacher administered or students could take turns giving each other their tests. Points in this case were given for both taking and giving the test.

In language, the child was to complete the specified pages in his Dr. Spello book and a ditto, perhaps, working on homonyms.

The penmanship assignment was from a formalized series and was to be completed on special paper which was provided.

Once a child had gotten to this point on his sheet, he had completed all of his regular daily assignments, including all corrections. He could then go to the extra credit column and choose from the activities available to him. These options varied with each pupil and may have included any activities which proved rewarding for students. Group work was introduced after the subjects were all attending well individually, usually in the third week. Group work was introduced primarily because much of the work in a regular classroom involves sitting and listening rather than the active responding of programmed instruction. Also our data from the regular classroom indicate that seldom do children get reinforced except during recitation periods. Thus by reinforcing active recitation in ELP with points, it was possible, to increase the probability of recitation in the regular class and thus of reinforcement from the regular classroom teacher. Because of a limiting time factor, such subjects as Science, Social Studies, Health and Art were limited to extra credit (optional) categories.

In the event that the student did not finish all his assignments during the class period he was required to complete the work on his own time at home. The student's admittance to the classroom the following day was contingent upon completion of the assignment.

In order to get a teacher's attention in a regular classroom the usual procedure is for the student to raise his hand and

wait, hand waving in the air, talking to peers or gazing out the window until the teacher responds. In the ELP classroom in order to avoid this time wasting procedure a different signalling system was instituted. The student placed a red tag on the left side of his desk when he needed help. The value of this procedure was that even though the student's red tag was out he was expected to keep working until a teacher was free to help him. This meant that if a student was stuck on one assignment, he was to go on to the next and come back to the trouble spot when the teacher stopped. Another important factor was the manner in which the student placed his tag on the desk. If slammed down, put on the wrong side, waved in the air or otherwise used incorrectly; no teacher response would follow until the student himself corrected the situation. Hand raising was used only in group discussion.

The very structured, basically formal mode of instruction used in the classroom seemed to develop as a natural outgrowth of the treatment model. Both students and teachers reported being comfortable with it. There was never a question of what to do next.

The final evaluation of the academic program for each pupil was based mainly upon post-tests in reading and arithmetic. A fairly extensive final report, complete with academic and behavioral recommendations was prepared for a final conference with the child's parents, regular teacher and other school personnel from his own school.

Evaluation of Materials. Below are listed the programmed and non-programmed materials used in the classroom setting, included also, is a brief description and evaluation of each.

1. Sullivan Associates Programmed Reading Series, McGraw-Hill This program is divided into four sections, Programmed Pre-reading and Programmed Reading Series I, II and III. The total program ranges from pre-reading symbol sound cards and workbook to selections from classical myths at a sixth grade reading level. Basically the program is such that students read the materials, respond to them and immediately check their responses. Supplementary activities and materials are suggested in the teacher's guide for maximum development. The program has several advantages: it is programmed (it progresses slowly, repeats, calls for instant recall and reinforces correct responses), it contains a very humorous, high-interest story line and it makes independent seat work possible. The pace is perhaps too slow and the variety of content is somewhat limited. This series would not be recommended for use as a total classroom reading program.

2. S. R. A. Reading Laboratory, Elementary Edition. This is a program designed to gradually increase reading comprehension, skills and speed. The set is divided into three parts, power builders, rate builders and listening. Each of the first two segments are color coded according to ability levels ranging from fourth to seventh grade. The basic procedure is for the child to read a passage or short story, answer questions by writing in a special booklet and check responses by comparing his answers with those on

a special answer card. Only the power builder segment of this program was used in the ELP classroom, and only by the most capable students. In most cases the students' skills had not developed to the level required by this program; or else, they had been previously over-exposed, leading to lack of interest.

3. The Palo Alto Reading Program, Sequential Steps In Reading, Harcourt, Brace and World, Inc., 1968. This is a very effective phonetically developed reading series containing individual reading books and corresponding workbooks. The books for this program are small 50-60 page paper bound booklets sequentially numbered from one to 20. In a very careful, systematic way, this program introduces vowel sounds, consonant sounds and rules governing both. The program can be individually paced and is applicable to first through sixth grade reading abilities. The stress on phonetically regular words is very useful in developing word-attack skills.

4. Checkered Flag Series, Henry Bamman and Robert Whitehead Field Educational Publications, 1968. This is a reading series composed of six hard bound books, each about racing and race cars. The minimum reading level requirement is at least fifth grade. Each book, besides the story, contains chapter comprehension check questions. This series, with its high interest stories, functions very effectively as a remedial tool.

5. Remedial Reading Drills, Hegge, Kirk and Kirk, George Wahr Publishing Co., 1969. This spiral-bound paper back drill book contains sounding-out, word-attack skill development exercises. The progression from drill to drill is a very gradual one, emphasizing

one sound at a time. This is a very phonetically regular material which would be effective in initial instruction as well as in remediation. It also provides a good source for spelling words.

6. Webster Company's Classroom Reading Clinic, Webster Division, McGraw-Hill Book Co., 1963. This set contains story and comprehension cards such as that in S.R.A. reading series, Dolch word cards, Conquests in Reading, The Magic World of Dr. Spello, and a set of eight paper-back novels. Of these Dr. Spello and the paper back book editions lended themselves most successfully to the program. Dr. Spello is most appropriate for grades three to five, and could be used for language development as well as spelling. The paper-backs required a minimum reading level of fourth grade, they were used mostly for supplementary extra credit reading and frequently were chosen instead of library books.

7. Lessons for Self Instruction in Basic Skills, California Test Bureau. These materials are branching programmed booklets on subjects ranging from basic math processes to "Following Directions". Each booklet is programmed so that a correct response meets with a smiling face and new problem, and an incorrect response meets with a frowning face and a rediscussion of the process involved to clear up misconceptions. The programs work most effectively as reviews on supplementary activities. They are fun for students. However, they do not effectively teach new skills.

In addition to the materials listed above, several other materials were employed and modified according to the various needs of students. Among these were basic fourth and fifth grade math

books, SRA math workbooks, basic fact rate sheets (Haughton), mimeographed math and language arts materials, and Webster basic spelling books for grades four, five and six.

Behavioral Program

Attending Behavior. Enrollment data (Behavior Checklist and baseline observations) indicate that the majority of the candidates had very low levels of attention (attention span) to appropriate academic stimuli (see Results Section).

Martin and Powers (1967) report that the most frequent definition of attention span is "the length of time a person can attend to one thing." According to this definition attention span is both manipulable and improvable. "...task perseverence, or a long attention span, is primarily a function of presenting reinforcement contingent upon attending behavior, and allowing incompatible behavior to go unreinforced (Martin and Powers, 1967, p. 567)."

Moyer and von Haller Gilmer (1955) measured attention spans for normal children ages 18 months to seven years and found them to range from seconds to forty-five minutes. They defined attention span as the length of time the child played with a toy, chosen from six take-apart toys.

Attention spans have been increased with retarded children (Birnbrauer, Bijou and Wolf, 1963), brain injured children (Kerr, 1962; Patterson, 1965) and normal children (Kennedy and Thompson, 1967; Allen, Henke, Harris, Baer & Reynolds 1967; Walker and Buckley, 1968). Attention spans in young hyperactive children not

only can but should be increased. Attwell, Orpet and Meyers (1967) report that "attention" was of particular importance in predicting reading ability. Since much of a child's academic day is spent "sitting and listening" or working with possibly non-challenging materials, it is extremely important that he be taught the basic requirement for any assignment--to attend.

The response measure in this study was established in accordance with Martin and Powers (1967) operant conditioning analysis of attention span. Attending behaviors for the subject involved looking at the assigned page, working problems, and recording responses. Non-attending behaviors were defined as those behaviors which were incompatible with task-oriented (attending) behavior. The following observable behaviors were classified as non-attending events (Walker & Buckley, 1968): "(a) looking away from the text and answer sheet by eye movements or head turning; (b) bringing an object into his field of vision with head and eyes directed toward paper (other than pencil, book and answer sheet necessary for the task); and (c) making marks other than those necessary for the task (e.g., doodling)." Using this criterion, most of the ELP subjects had baseline attention spans of under three minutes.

All children were placed on a variable interval schedule for attending. To facilitate teacher implementation of the variable interval schedule, random time assignments were made on 3 x 5 cards. A random sampling without replacement design was implemented by drawing numbers from a pool of predetermined numbers.

Thus a variable interval (VI) of three minutes ranged from one minute to six minutes; a VI 4 ranged from one to eight minutes; a VI 5 from two to nine minutes, etc. Table I amalgamates the separate lists.

Insert Table I About Here

In practice a child's timer (or teacher controlled work box) was set for a schedule the child could function within, based on previous observations of the child. For most of the subjects this was VI 3. Even if a child was attending extremely well, the teacher was to begin with no higher than a VI 7. (None of the 44 subjects were attending at high enough levels to begin above a VI 5). Six subjects could not successfully complete a one-minute interval of attending so were set up on schedules ranging from 20 to 60 seconds at the onset.

Once the child successfully completed a given time interval he was awarded a point. The teacher crossed th interval off her list and set the timer for the next time interval. However, if he non-attended during the interval, his timer was reset. Tallies were kept of the number of times the timer was reset for non-attending. If it was reset more than three or four times for any one interval, it was assumed the interval was too large and the child was placed on a lower schedule.

Theoretically a child could progress in orderly fashion through the eight schedules to criterion. However, flexibility was built

in so that a child progressing slowly would repeat the schedule. (If the timer was reset on several occasions but not enough for the child to be placed on a lower schedule.) On the other hand a child who did extremely well on the schedule could be skipped from one to three schedules ahead.

After the child successfully completed the VI 10 schedule in one day, he was placed on the display board. Some children achieved criterion in as little as three days. All children must have reached criterion by the end of week two or their points were cut in half. With close teacher attention to attending behavior this goal can be achieved by all children. Thus it becomes as much a function of teacher behavior as child behavior whether criterion is met.

Points and social praise were adjusted to insure a child would continually try for higher levels of attending. The prestige of getting on the display board was also an important factor in shaping attending. Once on the display board, the subjects were given points for attending on a VI 10 schedule. For weeks three through five this was raised to FI 20[6] and for weeks six through eight to FI 30.

Reinforcer System. The academic and social behaviors of children who function productively in a regular classroom setting are ordinarily under the control of a wide variety of generalized reinforcers appropriate to that setting. Solving problems, completing assignments, and achieving success at academic endeavors generally function as powerful reinforcing events which maintain

academic behavior. Such behaviors are further strengthened as a result of the parental and teacher administered praise that often accompanies appropriate academic behavior (Hall, Lund, & Jackson, 1968). It is not surprising, then, that the behavior of most school children is responsive to traditional educational procedures and methods even when no systematic efforts are directed toward gaining behavioral control.

The "acting-out" child, however, complete with accompanying academic disabilities, often misses out on these avenues of positive reinforcement common to the educational setting. Reinforcements for appropriate academic behavior are rarely available for him. The low probability of success and/or praise being associated with his academic behavior decreases the frequency of academic behavior in a spiraling process, e.g., the fewer the reinforcements, the less academic work attempted, the fewer the reinforcements. In addition, many of the social behaviors demonstrated by such children are aversive and thereby preclude or severely limit the probablity of the child being positively reinforced by teachers or peers.

In order to reverse this process, it is necessary to use additional incentives to make appropriate classroom behaviors more reinforcing to the subject and at the same time reduce the reinforcing value of deviant behaviors. Tangible reinforcement for appropriate behavior has been shown to increase resistance to forgetting (Jones, Edmonds, and Mueller, 1966) and to facilitate

discrimination learning among older children (Cross and Vaughter, 1966) as well as alter behavioral variables previously mentioned. The total token economy is designed to increase these positive classroom behaviors and reduce the probability of occurrence of deviant behavior.

Individual Reinforcer System. In the Engineered Learning Project, individual points could be earned for appropriate academic behavior (task completion, correct answers on tasks, completion of specified units of academic work in relation to time) [illegible] ppropriate student behavior (raising hand, not talking, [illegible] ork without talking, task attending). During the initial [illegible] of treatment, subjects were reinforced for minor approx[illegible] to these appropriate behaviors on a nearly continuous b[illegible] ee Appendix D)

During the first six weeks of treatment subjects [illegible] points for each piece of work they completed. They c[illegible] point per page and an additional point if done with l[illegible] uracy. (Individualized assignments allowed for the criterion of [illegible] racy).

They also received points for attending, walki[illegible] s appropriately to out-of-classroom activities, p.e. an[illegible] nto the classroom quietly and beginning work. Their maxi[illegible] score each day was 25. They received points immedi[illegible] the completion of a task throughout the day.

Points could be exchanged at 1:00 p.m. each day f[illegible] vidual stimulus items. There were six levels of point valu[illegible] he items, ranging from 25 points to 200 points with occasional special items

for 500 points. The values for these reinforcers were selected to approximate their purchase price e.g., 25 points would be needed for toys costing 20¢ to 39¢; 50 points for toys costing 40¢ to 65¢; etc. The advantage of using a large number of back-up reinforcers is that it increased the probability that at least one of the stimuli would be relevant to the deprivation conditions of the various subjects (Ferster & DeMeyer, 1962). The minimum interval of time necessary to earn the minimum stimulus (lowest point value) was approximately one day during the first five weeks assuming the child was completely task-oriented during this period. The subjects were free to exchange their points for an inexpensive item or to accumulate them for a more expensive one. There was no evidence of an inability to delay gratification and save for higher prizes. Their academic production remained relatively constant whether receiving immediate exchange for toys or saving them.

Points were awarded on the basis of concurrent schedules (Morse, 1966). Subjects could receive points on both a variable interval schedule of reinforcement for task-attending behavior and a fixed ratio (FR 1) for completion of assignments.

Group Reinforcer Strategy. Deviant behavior in the classroom setting is sometimes reinforced by approval and recognition from peers (e.g., giggles, comments, gestures). A group reinforcing climate controls this source of reinforcement by making it more desirable to encourage peers to behave appropriately than inappropriately. Group contingencies have been used by a number

of investigators in the classroom setting (e.g., Barrish, Saunders, Wolf, 1969; Schmidt and Ullrich, 1969; Bushell, Wrobel and Michaelis, 1968). Mithaug and Burgess (1967) compared individual reinforcement to group reinforcement for a complex cooperative act. They found that group reinforcement alone was not effective. However, the highest rate of responding was achieved with a combination of individual and group reinforcement.

Once all the children in the ELP classroom were on the display board they could begin earning group points. Group points operated for two 30 minute periods daily during academic assignments. During this time the teacher aide sat at the side of the room controlling the timer and observing all children closely. Initially the entire group had to attend well for five minute periods for each point. This was increased to ten minutes after the children were performing well at the five-minute level.[7]

If the entire group was task-oriented (using the same criteria as for individuals) during the time specified they received a group point and the timer was reset for another interval. If at any time during the interval, one or more of the children were not task-oriented; the timer hands were placed back on the starting point and not restarted until the deviant behavior was terminated. Group points were recorded on the display board as they were earned. When the criterion number of points was reached the group was taken on a trip to an activity of their choice. The total number of points necessary varied among the groups, subject to the time that all children were on the display board. The number was

fixed so that each group, if working well, had the opportunity to earn at least one trip.

The institution of group points was effective in making a highly desirable reinforcer (trips) available while simultaneously providing aversive control in the form of peer group pressure against individual deviant behavior. (Patterson & Anderson, 1964)

While the use of tangible reinforcers can greatly facilitate learning and appropriate classroom behaviors it is not the only variable necessary for an effective token economy program. Kuypers, Becker and O'Leary (1968) instituted a token program only in an adjustment class of six third and fourth grade children. They concluded,

> "A token system is not a magical set of tools available to the teacher concerned with improving the behavior of children. The full set of equipment is needed to do the job right (p. 108)."

Social Reinforcement. Contingent use of social reinforcement has been shown to increase achievement (Stein, 1969); study behavior (Hall, Lund & Jackson, 1968); and appropriate classroom behaviors (Madsen, Becker & Thomas, 1968; Thomas, Becker & Armstrong, 1968) among normal elementary school children.

When social reinforcement is available, there is some evidence which suggests that adult praise is aversive for "acting-out" children (Levin and Simmons, 1962). Such research shows social approval or praise often has little desired effect on these children while negative consequences such as social disapproval and verbal sanctions, applied to disruptive behavior by teachers

and peers, serve to maintain these behaviors in the education setting. However, research evidence is accumulating which suggests that the contingent use of teacher attention and praise can reduce deviant behavior (Becker, Madsen, Arnold, & Thomas, 1967; Ward & Baker, 1968). Social approval and attention, while not initially desirable for some children can take on reinforcing properties by the systematic pairing of approval and praise with token reinforcers.

In the ELP classroom, social reinforcement in the form of attention, approval, praise, interest, and affection was paired with token reinforcement in order to transfer stimulus control from contrived reinforcers to those reinforcers more often available in the regular classroom and to build up responsiveness to social reinforcement through the process of generalization.

O'Leary (1969) reports that his research indicates children in grades one through four can make the transition from token to social reinforcers within three or four months without a loss of appropriate behavior. The data presented here indicate that this can occur even earlier.

Aversive Consequences.

The reinforcement procedures used in the treatment setting were supplemented by aversive consequences which were applied to certain classes of deviant behavior. (See Appendix D)

Response Cost. Response cost is simply the removal of a reinforcer which has already been presented to the subject as a

consequence of the subject's behavior. As such it functions as a mildly aversive stimulus in controlling behavior. As a punishment procedure response cost has proved extremely effective in reducing responding in adult subjects (Weiner, 1962, 1963, 1964a, 1964b, 1965; Siegel, Lennke, & Broen, 1969). The results indicate an immediate and nearly complete reduction in responding following response cost. Response cost has also been shown to be effective in reducing disruptive behaviors in a "pre-delinquent" rehabilitation center (Phillips, 1968) and the classroom (McIntire, Jensen, & Davis, 1968).

The authors previously found when response cost was introduced following an inappropriate response there was immediate suppression of the response. However, this attenuation was accompanied by a sharp rise in other inappropriate responses which could be described as emotional behaviors (Walker, Mattson, Mattos, Walken & Buckley, 1967). It was mentioned at that time that these results may have been due to the human agent involved.

> "...social aggression appears to result when an individual is punished by another individual but not when the administration of the punishment is directly mechanical p. 17"

Results from the use of the electronic display board in the ELP classroom for administering response cost would substantiate this point. Subtracting points proved extremely effective and eliminated the need for verbal comments by the teacher. Non-attending and talking without raising hand and securing permission resulted in point loss.

Time-out. Time-out refers to "an arrangement in which the occurrence of a response is followed by a brief period of time in which a variety of reinforcers are no longer available [Patterson & White, 1969, p. 1]." Extensive use has been made of time-out in animal research (Leitenberg, 1965) and single subject designs (e.g., Wolf, Birnbrawr, Williams & Lawler, 1965; Risley, 1968; Burchard & Tyler, 1965; Wahler, 1969; McReynolds, 1969; Bostow, 1969). Most successful procedures for implementation of time-out with young children involve isolating the child in a small non-reinforcing room for a short period of time.

In the present study, time-out from a reinforcing climate was used to consequate such behaviors as talking out, throwing objects, out-of-seat and inappropriate verbal behavior. When one of these behaviors occurred, the child was required to go to the time-out room adjoining the classroom. During the time a subject was placed in the isolation room, he was unable to receive points, attend to the class, or work on an assignment. The group reinforcing climate was immediately terminated when a subject was placed in time-out and remained suspended until he re-entered the class. When the child had spent ten minutes in the time-out room, his timer rang and he was allowed back into the reinforcing climate prevailing in the classroom.

The average number of times the time-out room was used per subject in each treatment group was seven. That represents .88 times per week per child. Results from the ELP classroom substantiate those of Tyler and Brown (1967) indicating that time-out

is especially effective in terminating deviant behaviors before they become disruptive.

Suspension. For highly disruptive behaviors such as fighting, leaving the building without permission, foul language and gestures, disobedience and/or defying the teacher, creating a disturbance during time-out, or accumulating three time-outs in one day, the child was suspended from school for the remainder of that day or the following one, depending on the time in which the incident occurred. Readmission to the classroom was made contingent upon the subject's successful completion of all regularly assigned academic tasks at home. In addition, all individual points were lost for the same period, the group reinforcing climate could not operate during this time, and parents were instructed to prohibit recreational activity and television viewing while the subject was absent from school. Suspension was normally used one or two times per group during the first few weeks of treatment and then rarely, if ever, used for the remainder of treatment. The technique appeared to be quite effective in suppressing such behaviors as teacher defiance, verbal abuse, fighting, and tantrum behavior. Brown and Shields (1967) have found the same technique to be successful with grades K-eight.

Classroom Schedule. During the eight-week treatment period, there were a few significant changes in the overall academi gram. These changes were (a) increasing output demands; (b) integration into a regular fourth or fifth grade class for physical education and noon recess; and (c) gradual reduction of number of points and time of consequation.

As the eight weeks progressed, increasing demands in terms of quantity and difficulty of tasks were placed on students, basically due to their increased academic and behavioral skills. (See Appendix E)

The integration procedure usually began during the fifth week of treatment. This sometimes varied, however, depending upon the development of the particular group. Up to this point, all p.e. and recess activities were limited to the six pupil group, in isolation from other classes. The purpose of integration was to further work on the skills developed in the small group setting by applying them to a total class situation. Since the students in their regular classrooms were forced to interact within large group settings this integration was deemed necessary.

As treatment progressed and these behaviors came under control of the response-reinforcement conditions operating in the treatment setting, the frequency of reinforcement was reduced and the ratio between amount of academic production and amount of reinforcement was gradually changed until the subjects were producing large amounts of work for small amounts of tangible reinforcement. Reducing the amount and frequency of reinforcement and shifting to a variable interval schedule near the end of treatment was designed to facilitate the generalization and persistence of treatment effects into the regular classroom setting. During the sixth week, in preparation for return to regular classrooms, the maximum point total was dropped to 20, and points were

awarded only three times a day. The children no longer received points for each piece of work completed but rather received points for completing a whole category of assignments e.g., math, reading, etc. By the eighth week, their maximum total was reduced to 15 points. These were tabulated and put on the display board only at the end of the day. A staging technique was again used to phase the subjects back into the regular classroom and to introduce untreated subjects into the special class.

Observation and Recording

Graduate students in education, interested in working with exceptional children, served as observers throughout the various special and regular class phases. Before beginning to collect data, each new observer was given a copy of the observation form and manual to read and master. Once the categories were memorized to the satisfaction of the observer, he was brought into the observation facilities to practice taking observations. The new observer worked with the experimenter or observer trainer during a trial period. The authors also made a video-tape of a previous group of subjects which was used in the training process. When each observer felt comfortable with his coding, the trainer took simultaneous recordings to check reliability.

Reliability was calculated by scoring each interval in terms of whether the two observers agreed or disagreed. By the percent agreement method, the number of agreements was divided by the total

number of observation intervals to obtain the reliability coefficient. For an agreement to be scored in any one interval, observers were required to agree on the behavior code (15 categories) as well as the type of agent response (8 categories) that consequented the behavior.

In measuring reliability of an observer's recordings, no six-minute observation form was counted in which only one behavior occurred. For example, if the child sat reading for six full minutes each row would simply have one code--attention to individual work with no response by agent. Since many one-category intervals occur in the special class, and they are easy to record, it was felt their inclusion would inflate the reliability coefficient.

Criterion for an observer was .90 or above agreement with the trainer for a one hour period (ten observations). In general the training process required one week (one hour sessions per day). Generally the new observers spent two days practicing and three checking reliability with the trainer. The average for the group of observers was 21 practice observations prior to meeting criterion.

It was found that weekly spot checks on reliability were necessary to maintain inter-observer agreement. This was necessary because the behavior of the children changed over time and with it the requirements of the observer changed.

Behaviors were recorded every 15 seconds for a six-minute period. To determine the passage of time, interval timers were

mounted in clipboards. At the end of each 15-second period a "bleep" was heard in the earphone and a light mounted in the clipboard flashed. This was the signal for the observer to record the behaviors and move to the next interval on the observation form.

The recording form for the two year period was revised from a form originally devleoped and tested by Ray, Shaw and Patterson (1968). Each coding sheet provides the following information for a six-minute period: behavior of the subject, social consequence, agent supplying consequence, and description of the classroom situation.

The rating form has 15 columns for classroom behaviors. Twenty-four corresponding rows represent 15-second intervals. The observer records and then moves down a row each time a 15-second interval is complete. During each 15-second interval the observer records both the behavior of the subject and the social consequences of his behavior. The observer may code more than one subject behavior and more than one consequence during each 15-second interval.

The description of classroom behaviors and agent responses are presented in Figure 3. The complete manual and form are presented in Appendix F.

Insert Figure 3 About Here

The observers were instructed to make continuous recordings for the six-minute sheet. Thus if the child left the room or the

observer was interrupted during a six-minute period, the recording sheet was discarded.

Observations of the subjects were taken in the regular classroom prior to enrollment in ELP, during treatment, and for a two-month follow-up period. Patterson, Shaw and Ebner (1969) report that obtaining between 40 and 150 minutes of observation yields reliable data with the current form. Baseline data for each subject consisted of a minimum of 60 minutes in the regular classroom over a two week period.

During treatment three observers, recording one hour each, obtained daily observations for all academic periods. Each observer, recording behaviors for one child at a time, was instructed to begin recording with any child on a random basis. Once a six-minute observation was complete they were to move to the next child in seating order. This sequence was to continue for their entire hour. Among the three observers between 21 and 30 observations were collected daily. Thus each child was observed for approximately three to five six-minute periods daily for a total of 18 to 30 minutes. Changes in classroom scheduling, and illness of observers and subjects reduced the total number of observations for the eight week period to an average total of 64 observations, or 6.4 hours per subject.

Follow-up observations in the regular classroom were obtained bi-weekly at random times during academic portions of the day. A minimum of 32 observations (192 minutes) were obtained for each child during post treatment data collection in the regular classroom.

Results and Discussion

Treatment Effects

An analysis of variance for a repeated measures design (Winer, 1962) was used to analyze the baseline and treatment data for all 44 experimental subjects. Scores for each subject were the mean percentage of appropriate behavior produced during baseline and treatment. Each data point in baseline was based on an average of 10, six-minute observations taken in the regular classroom. Treatment scores were based on an average of 64, six-minute observations taken in the experimental classroom.

Insert Table 2 About Here

The F ratio of 406.24 in Table 2 indicates the intervention procedures in the experimental classroom produced a very powerful treatment effect. The mean percentage of appropriate behavior for all 44 subjects in baseline was 44.59. During treatment, the mean percentage of appropriate behavior for the same subjects was 90.20.

The treatment program also affected variability in behavioral rates across subjects. For example, during baseline the mean percentage of appropriate behavior varied from 20 to 67. During treatment, it varied from 79 to 99. The standard deviations for experimental subjects in baseline and treatment were respectively 10.71 and 4.69.

During the first week in the experimental classroom each subject was given the Stanford Diagnostic Arithmetic Test and the Gates-McKillop Reading Diagnostic Test. During the last week in the experimental classroom, after two months of treatment, each subject was given an alternate

form of the same test.

Insert Table 3 About Here

The F ratio in Table 3 indicates that treatment in the experimental classroom substantially altered the subjects' measured achievement in math. The mean grade equivalent score for all 44 subjects on the pre-test was 3.5. The mean grade equivalent score for the same subjects on the post-test was 4.5. Achievement ranged from grade level 1.5 to 5.2 on the pre-test and from 1.5 to 6.5 on the post-test.

Insert Table 4 About Here

Inspection of Table 4 reveals that the subjects' measured achievement in reading was also substantially changed. While the effect was not as powerful as that produced in math achievement, it was statistically significant beyond .001. The mean grade level score in reading on the pre-test was 3.6. On the post-test it was 4.5. Mean achievement scores ranged from 1.3 to 7.5 on the pre-test and from 1.8 to 8.6 on the post-test.

Inter-Subject Replications of the Treatment Model

The treatment model, consisting of the primary treatment variables of token reinforcement, social reinforcement, and aversive control procedures, was applied to eight groups of deviant subjects in grades three, four, five, and six over a two-year period. Each of the eight groups provided an independent, inter-subject replication of the treatment model.

Insert Table 5 About Here

Table 5 presents the mean percentage of appropriate classroom behavior in baseline and treatment conditions for each of the eight replication groups. The mean percentage of appropriate behavior, in the baseline condition, varied from 35.00 to 51.83 across the eight groups. During treatment, means for the same subject groups varied from 85.33 to 93.50. The effect of the treatment model was to increase the amount of appropriate classroom behavior produced across all eight replication groups. Exposure to the intervention procedures also substantially reduced the amount of inter-group variability in appropriate behavior over the baseline condition. During baseline, the mean difference between the lowest and highest group was 16.83 percentage points; whereas during treatment, the largest mean difference was 8.17 percentage points between groups five and eight. Ranges for individual subjects within each group were also reduced during treatment. For example, the greatest range during baseline was 50 percentage points for subjects in group number five. Subject three in this group averaged 25 percent appropriate behavior during baseline. Subject six in this same group averaged 75 percent appropriate behavior for the same period. One reason for the large range among subjects in the mean percentage of appropriate behavior produced in baseline can be attributed to the topography of the behavior for which different subjects were referred. For example, some children produced relatively high rates of appropriate behavior in their classrooms. However they were referred primarily because of acting-out behaviors that occurred at a low frequency. These behaviors included temper

tantrums, teacher defiance, fighting, noncompliance, and disrupting the classroom. Other children referred to the project rarely engaged in the high intensity behaviors listed above. However, they produced high rates of non-study behavior such as noisy, movement around the room, not-attending and peer initiation.

The largest range for subjects during treatment was 12 percentage points in group number one. Thus, an additional effect of treatment was to increase the within group's homogeneity in amount of appropriate classroom behavior produced.

The means for groups number one and five reflect the process of training the experimental classroom teacher in behavior modification and classroom management techniques. Group number one is the first of four groups rotated through the experimental classroom for a two month period during the 1968-69 academic school year. Similarly group number five is the first of four groups rotated through the experimental classroom during the 1969-70 school year. Two different teachers were used during the two school years. Neither teacher had applied experience in behavior modification techniques. Thus, both teachers were trained on the first group of subjects, groups one and five, that were rotated through the experimental classroom during each academic year. In Table 5 the lowest means are for groups one and five. However the difference between these means and the combined treatment means of 90.29 for all eight groups is negligible. Thus, the "cost" of training each teacher in effective application of the treatment model was very small.

Insert Table 6 About Here

Table 6 presents the mean pre-test and post-test grade equivalent scores on the Stanford Diagnostic Arithmetic Test for each treatment group. The effectiveness of the treatment model in increasing measured achievement in math is replicated across the eight groups. The largest mean gain of one year and eight months was produced with experimental group number six. The smallest mean gains of approximately six-months were produced for experimental groups two and five.

Unlike appropriate classroom behavior, application of the treatment model did not reduce the amount of inter-group variability in measured achievement in math. There was an actual increase in this variability during treatment. During baseline, the difference between the means for the highest and lowest groups was 8.3 months. During treatment, the difference was one year and 4.4 months. Although the treatment model produced substantial increases in achievement across the eight groups, the effect was much less reliable than for appropriate behavior. This result suggests a less than perfect correlation between appropriate behavior and measured achievement.

This result also suggests that academic achievement, as measured by standardized tests, is much less sensitive to the application of treatment variables than is appropriate classroom behavior. In a study by Walker, Mattson, and Buckley (1969), in which attending behavior was the dependent variable, the systematic withdrawal and reintroduction of token reinforcement, social reinforcement, and aversive control procedures produced differential effects in amount of appropriate behavior recorded

during experimental and control phases. This dependent measure thus proved very sensitive to manipulation of independent treatment variables. In addition repeated measures of carefully defined classroom behaviors, such as attending, by trained observers provide a much more reliable and stable estimate of performance than standardized achievement tests that sample one unit of behavior at fixed points in time.

Another factor that could account for the increased variability in achievement is the complexity of the behavior involved. A number of specific skills are subsumed under the term "academic achievement". Proficiency in these skills would tend to vary greatly across individual subjects. It is possible the treatment model had a substantial impact upon certain classes of these skills and only minimal impact upon other classes. Thus the distribution of a subject's proficiency on these skills, upon entering treatment, could mediate the impact of the treatment model in improving his measured academic achievement. Inspection of Table 5 reveals some overlapping of the lower end of the pre-test and post-test ranges. For groups four and five, the lower end of the ranges are exactly the same. This indicates that the treatment model had absolutely no effect upon the measured, math achievement of one subject in each of these groups. Since the treatment model was applied uniformly across subjects, it is possible the treatment model's effect upon these subjects' achievement was mediated by their initial skill levels. Some subjects referred to the project for treatment were so deficient in basic skills areas that they could not tell time, did not know the alphabet, could not do simple addition or subtraction, and did not know the multiplication tables.

Many of these subjects improved in these areas during treatment. However, the changes were not powerful enough to be reflected on a standardized achievement test.

Insert Table 7 About Here

Table 7 presents the mean pre-test and post-test grade equivalent scores on the Gates-McKillop Reading Diagnostic Test. In contrast to math achievement, the inter-group variability in reading achievement was slightly greater on the pre-test than the post-test. The largest mean difference between the eight groups on the pre-test was one year and 9.3-months on the post-test, it was one year and 8.7-months.

The smallest mean gain in reading achievement was 2.4-months for experimental group eight. The largest mean gain was one year and 6.3-months for experimental group one. This compares to six months for groups two and five and one year and eight months for group six in math achievement.

Changes in Academic Rates

Rate per minute was used to monitor and record subjects' performance on such academic activities as oral reading rate, rate correct on multiplication flash cards, and rate correct on basic math facts.

Daily records showed substantial changes in rates of these behaviors during the treatment period. Because of the sheer amount of data involved, the difficulties associated with summarizing such data and the costs of reproduction, these data are not included in the final report. However, copies will be furnished to the reader upon request.

Rate Changes Across Individual Classroom Behaviors

In addition to changes that treatment produced in the proportion of time subjects engaged in appropriate classroom behavior, the experimenters were interested in the effect of the treatment model upon individual classes of behavior between baseline and treatment conditions. O'Leary and Drabman (1970) discuss this issue in relation to studies reported in the literature. They argue that changes in individual behaviors in token systems are of experimental interest and that simply reporting an overall percentage of time spent in appropriate behavior masks these changes. "The frequencies of individual classes or subcategories of behavior have usually not been reported..." They further state that "...in the token studies, such data does not exist, and one can only speculate about such behavior changes (p. 15)."

Insert Table 8 About Here

Table 8 presents the average rate per minute of the 44 subjects on seven individual behaviors during baseline and treatment. The seven behaviors are listed as: noisy, aggressive, non-attending, peer initiation, initiation to peer, movement, and inappropriate task. With the exception of non-attending, these behaviors had very low baseline rates. However, the treatment model was very effective in decelerating these low base rate behaviors. For example, peer initiation and initiation to peer were decelerated from rates of approximately five and six responses every ten minutes to rates of four responses every thousand minutes. Although changes in these two behaviors were the most dramatic, noisy, aggressive, non-attending, movement, and inappropriate task showed similar decreases in rate per minute.

Non-attending had the highest baseline rate of any of the seven inappropriate behaviors. In baseline, its average rate across 44 subjects was approximately one and a half responses per minute. During treatment, the rate was reduced to approximately one non-attending event per two-minute time period. As defined in the observation schedule, all these behaviors are incompatible with study behavior. Thus, reducing the rates of these behaviors provides the necessary setting events for building in and reinforcing behaviors that are compatible with learning and successful academic performance. The treatment model was designed to weaken behaviors that actively compete with learning and performance and to simultaneously strengthen behaviors that facilitate these processes. Results of the study indicate that this effect was produced in the experimental class setting.

Experimental Analysis of Treatment Model Components

Results of the initial application of the treatment model indicated that the intervention procedures were very effective in producing behavior change and in modifying deviant classroom behavior. These data, however, do not provide information about which components of the treatment model were instrumental in producing the behavior change. It is possible, for example, that only one or two variables account for the major portion of variance in the treatment outcome(s). It is also conceivable that the behavior change depends upon the interaction of a series of these variables or that the change is due to other than treatment variables such as stimuli specific to the treatment setting. (Teacher-student ratios, individual attention, teacher skill, special materials, novel stimulation,

or change in settings). The specification, control, and evaluation of all variables that could possibly affect treatment outcome(s) in an applied setting would be practically impossible. However, it is possible to specify those variables that have been manipulated in the treatment process and which can logically be assumed to have a causal relationship to treatment outcome. A probe technique was used to evaluate the effects of three treatment model components upon the academic and social behavior of a group of five subjects. This experiment was conducted during the 1967-68 academic school year and was designed to provide data on the influence or weight of a series of independent treatment variables upon the dependent variable of attending behavior. The specific question to be investigated was the extent to which these variables controlled or accounted for variance in behavioral rates. The results of this experiment are only summarized here. Complete details of the experiment are contained in the interim report: U. S. O. E. Grant #OEG 4-6-061308-0571 Assessment and Treatment of Deviant Behavior, Bureau of Education for the Handicapped, 1968.

Insert Figure 4 About Here

Figure 4 contains the results of an experiment which evaluated the components of token reinforcement, social reinforcement, and aversive controls in the control of behavior in a special class setting. The data in Phase I record the performance of the subjects with all controls operating. This phase lasted until the behavior of all subjects stabilized at high rates. During Phase II all token reinforcement dispensed through both individual and group reinforcing climates, was withdrawn. This procedure had very little effect upon attending behavior of subjects one, three, and four. It had an

initially substantial impact on subject two's behavior and a very dramatic impact on the behavior of subject five. However, the behavior of both subjects returned to its original level after several days and remained there until Phase II was terminated. Token reinforcement was reintroduced during an intervening reinstatement phase designed to return the behavior to its original, preintervention level of stability.

During Phase III, all social reinforcement was controlled within the classroom environment. The effects of the withdrawal of this component were not immediately reflected within the data; perhaps because it took the subjects some time to discover that the social reinforcement had, in fact, been withdrawn. The withdrawal produced a marked increase in the variability of the behavior of all subjects, indicating that this variable exercised powerful control over the subjects' attending behavior. This phase was terminated at the end of two weeks when it became obvious that the subjects' behavior was not going to return to its original level or stability (as in Phase I) with this variable withdrawn. When social reinforcement was reinstated, the attending behavior of all subjects immediately returned to its original level of stability and remained there until the beginning of Phase IV where all aversive controls were withdrawn. The removal of time-out and suspension, as aversive controls, had differential effects upon the subjects' behavior. Subject three's attending behavior was apparently not under the control of these aversive stimuli. In fact, his behavior during this period was slightly more stable than at any other time during the experiment. Though slightly less pronounced than the effect of removing

social reinforcement, the withdrawal of all aversive controls indicated that these components accounted for large amounts of variance in behavioral rates and were very effective in controlling the behavior of subjects in this experiment. The aversive controls were reinstated after a two-week period and the experiment was terminated at this point. The remainder of the treatment period consisted of preparing the subjects for full-time entry into the regular classroom.

Insert Table 9 About Here

Table 9 contains the mean scores and standard deviations for the group of subjects during each experimental phase. Although slightly more variable following experimental intervention, the behavior of all subjects was very stable during Phases I and V. The group's attending behavior was most variable during Phase IV and lowest, in terms of mean score, during Phase III. This inter-subject variability, however, is very misleading when used to evaluate the effects of experimental intervention. The inter-subject variability in Phases II, III and IV is approximately the same; yet Figure 4 indicates that very differential effects were produced in the subjects' inter-subject variability following withdrawal of the respective components. The withdrawal of token reinforcement had very little effect upon the subjects' behavior. The variance in the data was attributable to the behavior of only two subjects. The data in Phase III show the same inter-subject variability as those in Phase II; yet inspection of Figure 4 indicates that the inter-subject variability of these same data clearly establishes social reinforcement as the most potent component of the treatment model in controlling attending behavior.

The effects of withdrawing token reinforcement were rather unexpected. Token reinforcement was apparently exercising much weaker control over the social and academic behaviors of the subjects, at this point in the experiment, than the authors had estimated. If all token reinforcement had been withdrawn during the initial stages of treatment, the authors suspect its effect upon the subjects' behavior would have been much more marked. The subjects' appropriate behavior was apparently under the control of such intrinsic reinforcers as academic success, social approval, individual attention, task mastery, and positive feedback by the time token reinforcement was removed.

The data appear to be in direct contrast to the evidence provided by Levin and Simmons (1962a) which suggests that adult praise did not exercise control over the behavior of fifteen emotionally disturbed males between the ages of 7.2 and 11.9. A second study, Levin and Simmons (1962b), which alternated food reinforcement and social reinforcement on successive trials, indicated that praise served as an aversive stimulus rather than as a positive reinforcer for these subjects. Praise as well as expressions of positive and negative feedback, approval, attention, affection, and interest by the teacher were controlled in Phase III of the present study. These stimuli not only appeared to be non-aversive for these subjects, they were, in fact, highly reinforcing and functioned as very powerful controls of their appropriate social and academic behaviors. This result is consistent with the findings of other experimenters in the field who have used social reinforcement effectively in controlling both the social and academic behaviors of children, in the classroom, laboratory, and clinic setting (Allen,

Hart, Buell, Harris, Wolf, 1964; Harris, Johnston, Kelley, Wolf, 1964; Harris, Wolf, Baer, 1964; Becker, Madsen, Arnold, Thomas, 1967; Hall and Broden, 1967; Hall, Lund, Jackson, 1968; Thomas, Becker, Armstrong, 1968).

Withdrawal from a reinforcing climate contingent upon the occurrence of deviant or inappropriate behavior is a form of punishment which was most effective in controlling and modifying this class of behavior in the experiment. This technique not only decreases the probability that these deviant behaviors will occur (its withdrawal increased this probability during the experiment), it terminates disruptive, deviant behaviors very rapidly. As a result, the systematic application of time-out can function as a very powerful learning and control device in classroom settings provided that the climate of these classrooms is reinforcing.

This experiment provided only a gross evaluation of the treatment model's components. It should be carefully replicated before its results are generalized and applied to the response class of acting-out, disruptive behavior in children. In addition, such dichotomies as individual versus group reinforcing climates and time-out versus suspension may produce differential effects in the control and modification of behavior. The interaction between various combinations of these variables may also be a crucial factor in producing behavior change. Additional experiments will have to evaluate these interactions before the functional relationships which exist between behavioral and treatment variables are clearly established and precisely described.

Summary

Application of the treatment model to the behavior of 44 subjects over a two year period produced measurable changes in appropriate classroom behavior, math achievement, and reading achievement. These effects were replicated on eight groups of subjects rotated through the experimental class setting during a two month period. Three components of the treatment model, token reinforcement, social reinforcement, and aversive controls were evaluated in terms of their efficiency or potency in accounting for variance in social and academic behavior. Results indicated that social reinforcement exercised the greatest control over the subjects' behavior while aversive controls were slightly less effective in controlling the same behavior. After five weeks of treatment, each [illegible] of these treatment variables were in operation and the behavior of all subjects had come under control, the withdrawal of token reinforcement produced only a minimal interruption of the subjects' appropriate behaviors.

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Footnotes

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2. Four subjects moved from the school district either during or immediately following treatment and thus were not included in data analyses.

3. In a small number of cases the child's behavior had been so aversive to the regular classroom teacher that he or she refused to allow the child back into the classroom at the end of the day. In addition, the third graders normally were dismissed earlier at their elementary schools so there was not enough time for them to return to their classes following the special class.

4. The authors have found that not only do consequences for positive behavior occur at a low rate but consequences for inappropriate behaviors occur very infrequently as well in most classrooms. Even among teachers who are doing a good job in the classroom, there is a reluctance to do any more than "warn" or reprimand the child despite the data indicating the ineffectiveness of verbal reprimands (e.g., O'Leary, 1970). A possible suggestion for this is that the teacher is often punished by the child for applying sanctions. The child may shout comments, stick his tongue out, etc., leaving the teacher little recourse but to ignore the behavior. In our classroom any of these behaviors resulted in additional point loss. Thus the children quickly learned to inhibit the behavior. It is important, however, that the teacher remain neutral in her facial expression. The children quickly pick up when the teacher is angry and are reinforced for "bugging the teacher."

5. From subject comments it can be assumed that none of the children learned the code categories. Subject comments also indicated they "liked" the idea of teachers having their behaviors counted too, and would report whether the teacher had a "good" or "bad" day (often incorrectly) on the basis of the number of tally marks.

6. The schedule was changed from a variable interval to a fixed interval during week three since it was easier to allot time periods for the teacher. In actual practice it becomes a VI schedule because the teacher fits the schedule to her academic work and thus randomly over- and under-shoots the exact time.

7. The small time interval required for earning a point was because of the rigid definition applied to attending behavior by the authors. If any child looked up from his paper or stopped working it was considered non-attending.

TABLE I

Variable Interval Schedules for Levels of Attending in the ELP Classroom

VI 3	VI 4	VI 5	VI 6	VI 7	VI 8	VI 9	VI 10
5	7	8	9	7	11	7	11
2	8	9	8	9	12	6	8
1	1	6	6	5	10	8	7
4	6	7	4	6	7	13	10
3	4	5	3	4	5	10	14
6	2	4	7	10	8	11	13
	3	3	10	11	6	12	9
	5	2	5	8	9	9	12

Table 2

Summary of the Repeated Measures Analysis of Variance of Baseline, and Treatment Scores

Source	SS	df	MS	F	p
Total	54,522	87			
Subjects	4,520	43			
Treatments	45,955	1	45,955	488.21	$<.001$
Error	4,047	43	94.13		

Table 3

Summary of the Repeated Measures Analysis of Variance of Pre-Treatment and Post-Treatment Achievement Scores in Math

Source	SS	df	MS	F	p
Total	10,824	87			
Subjects	7,156	43			
Treatments	2,384	1	2,384	79.73	<.001
Error	1,284	43	29.86		

Table 4

Summary of the Repeated Measures Analysis of Variance of Pre-Treatment and Post-Treatment Achievement Scores in Reading

Source	SS	df	MS	F	p
Total	27,946	87			
Subjects	22,286	43			
Treatments	1,746	1	1,746	19.18	$<.001$
Error	3,914	43	91		

Table 5

Inter-Subject Replication of the Treatment Model
on the Variable of Appropriate Classroom Behavior

Experimental Group		#1(N=6)	#2(N=6)	#3(N=5)	#4(N=5)	#5(N=6)	#6(N=5)	#7(N=5)	#8(N=6)
Baseline Mean $\bar{x}$		40.00	47.50	51.83	48.00	39.83	35.00	48.80	44.00
Treatment Mean $\bar{x}$		86.16	87.83	89.80	93.40	85.33	95.60	92.40	93.50
Range	Baseline	34-43	36-66	43-67	25-75	25-66	20-61	25-65	32-54
	Treatment	79-91	85-93	86-92	88-97	80-88	92-97	89-93	89-99

Table 6

Inter-Subject Replication of the Treatment Model on the Variable of Achievement in Math

Experimental Group		#1(N=6)	#2(N=6)	#3(N=5)	#4(N=5)	#5(N=6)	#6(N=5)	#7(N=5)	#8(N=6)
Pre-Test Mean $\bar{x}$		3.40	3.41	3.74	3.52	2.91	3.76	3.38	3.26
Post-Test Mean $\bar{x}$		4.78	4.06	4.48	4.40	3.46	5.50	4.54	4.26
Range	Pre-Test	1.6-5.2	1.9-4.5	2.2-4.7	3.1-4.3	1.5-4.8	3.0-4.8	2.4-4.2	2.0-4.6
	Post-Test	3.8-6.5	2.5-4.7	3.0-5.9	3.1-5.4	1.5-4.7	4.8-6.1	4.0-6.2	3.1-5.4

Table 7

Inter-Subject Replication of the Treatment
Model on the Variable of Achievement in Reading

Experimental Group	#1(N=6)	#2(N=6)	#3(N=5)	#4(N=5)	#5(N=6)	#6(N=5)	#7(N=5)	#8(N=6)
Pre-Test Mean $\bar{x}$	4.15	4.23	3.46	3.98	2.40	3.70	3.68	3.16
Post-Test Mean $\bar{x}$	5.78	5.76	4.00	4.98	3.18	4.12	3.92	3.91
Range Pre-Test	1.7-7.4	1.9-7.5	2.1-5.6	1.8-6.3	1.6-3.3	3.)-4.6	3.0-4.3	1.6-4.4
Post-Test	2.6-7.8	3.4-8.6	2.0-5.8	2.5-6.5	2.2-4.5	3.3-4.7	3.3-4.7	1.8-6.0

Table 8

Rate Changes in Individual Behaviors
Between Baseline and Treatment
Conditions for All 44 Subjects

Individual Behavior	Ny	Ag	Na	Pi	Ip	Mo	Tw
Baseline Rate	.15	.02	1.39	.57	.63	.79	.13
Treatment Rate	.003	001	.49	.004	.004	.06	.01

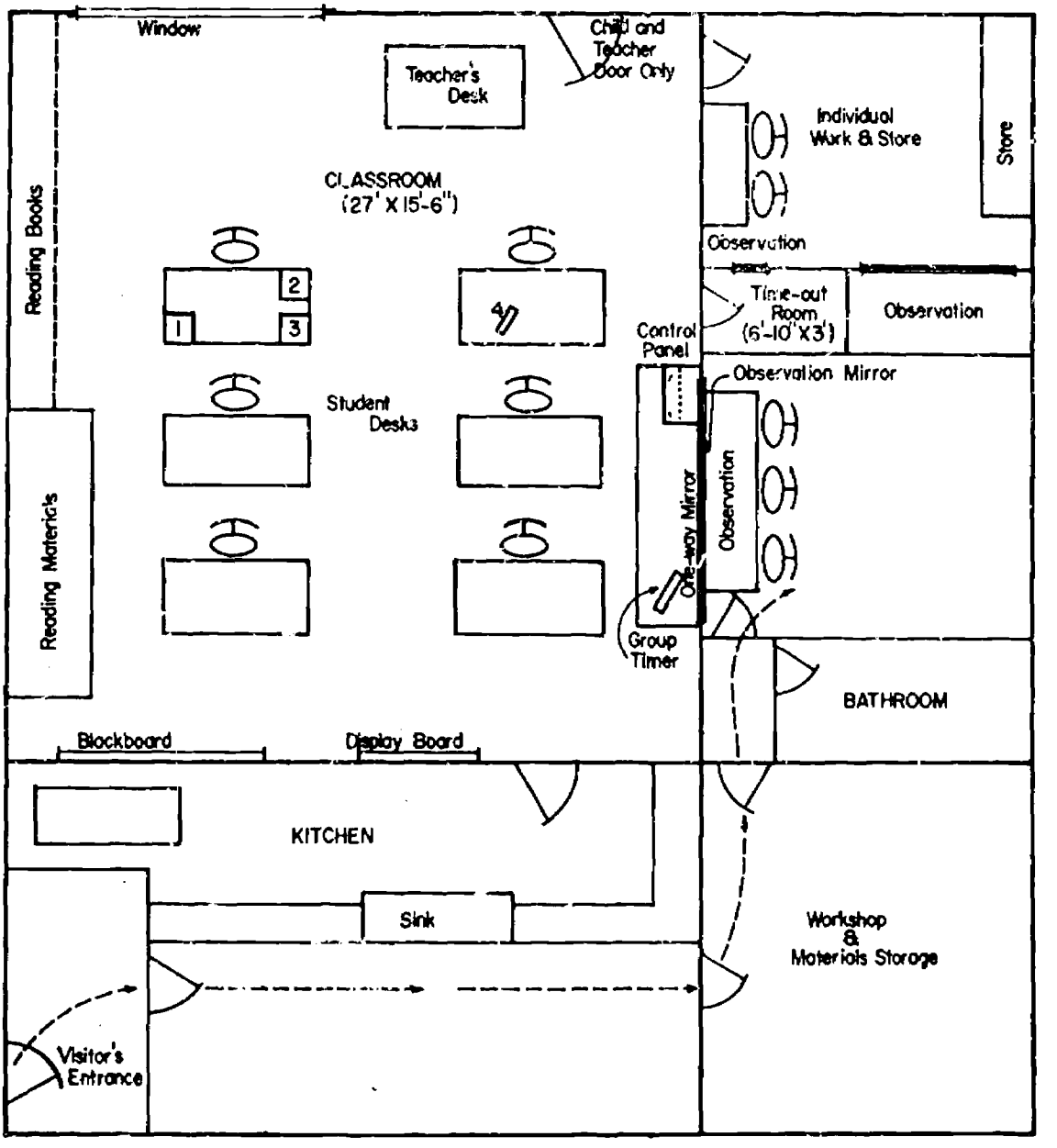
Figure Captions

Fig. 1 Schematic Diagram of Treatment setting including outline of of child's desk for work to be completed (1); completed work to be corrected (2); corrected work - points assigned (3); and individual timers (4).

Fig. 2. Sample Copy of Daily Assignment Sheet for ELP Subjects

Fig. 3 Descriptions of Codes Used for Observation in All Phases of the Engineered Learning Project.

Fig. 4 Experimental Analysis of the Effects of Three Treatment Variables Upon the Task-Oriented Behavior of Deviant Subjects in Grades 4, 5, & 6.


Window
Child and Teacher Door Only
Teacher's Desk
Individual Work & Store
Store
CLASSROOM (27' X 15'-6")
Reading Books
Observation
Time-out Room (6'-10" X 3')
Observation
Control Panel
Observation Mirror
Student Desks
Reading Materials
One-way Mirror
Observation
Group Timer
BATHROOM
Blackboard
Display Board
KITCHEN
Sink
Workshop & Materials Storage
Visitor's Entrance

Name Jack Date April 23

Math
1. Flashcards: add, xply
2. Worksheets: #: 2,3,4,5
3. Mathbook: p. 69 row 5
p. 308 row 10

Reading
Hegge, Kirk & Kirk Drill
#: 13
Palo Alto: #10 pgs. 5-10
Sullivan: #11 pgs. 35-43 p. 44 E.C.
~~Conquests in Reading~~
~~S.R.A.~~
~~Lippincott~~
~~Checkered Flag~~
~~Webster~~

Spelling
Study Words: write them twice
Test

Language
Dr. Spello: pgs. 29, 30, 31 (top)
Ditto: #1

Penmanship
Pages: 2,3

Extra Credit
finish all other work first
p. 21 1-5

1. Library book
2. S.R.A. (Brown Power Builder)
3. Following Directions A-B
4. Write a story about your favorite kind of animal

Put five of your words in sentences.

p. 31 (bottom) #2 E.C.

p. 4 E.C.

Classroom Behaviors

NY (noisy): Coded whenever the subject is talking loudly, yelling, or making other deliberate, inappropriate noise (such as banging books or scraping chair back and forth) which is actually or potentially disruptive to others.

AG (aggression): Actual or attempted physical abuse of another, e.g., John hits Bill or John starts to hit Bill and is stopped by the teacher. This included pushing, shoving, threatening, bossy.

NA (not attending): Subject is not attending to his work or to a lesson being taught, etc.: may be looking out the window watching the observer or other children, drawing when he is supposed to be watching teacher demonstrate arithmetic, leaning down to tie his shoe, turning in his chair.

PI (peer initiation): Peer talks to, pokes or in some way tries for attention of S.

IP (initiation to peer): S talks to, or in some way tries for attention of peer.

MO (movement around room): Coded whenever subject is moving around room (other than times when entire group is moving, as in transition periods): observer need not try to decide whether each movement is appropriate or inappropriate: that question is better decided by comparing rate of movement across subjects.

IW (inappropriate task): Work on task not assigned or specified by teacher for that time.

NO (appropriate group behavior or normative behavior): Coded whenever the subject's behavior is task-directed activity which is appropriate for that time and situation. Included would be listening to the teacher explain a lesson, painting during an art class, singing with others during music, lining up with the rest of the class to go out for recess, etc. The observer should take care not to include any behavior which might be more appropriately characterized as recitation.

WK (work): A child may be engaged in appropriate group activity but not working e.g., observe a movie. Work means at desk on academic projects. Must work on teacher assigned task. Record when engaged in reading, writing, arithmetic, basic skills.

RE (recites): Coded whenever subject recites, answers a teacher's questions, reads out loud, gives a speech, or performs before the class.

VO (volunteers): Coded whenever subject raises his hand or in some other manner indicates a desire to recite or do whatever else the teacher may have asked for, e.g., someone to pick up papers: may be either in a class discussion or in a small group.

TI (teacher initiation): Coded when the teacher "calls on" the subject or comes to his desk or activity area to speak to him; this interaction must be initiated by the teacher and not be a response to an initiation by the subject.

IT (initiation to teacher): Coded when the subject indicates that he wants some attention from the teacher; he may raise his hand, speak or go to her: this behavior is differentiated from "volunteer" in that the subject's initiation to the teacher is not in conjunction with class discussion, group study, or reciting.

Agent Responses

O (no response): Coded when no response from teacher, peers, or observer follows a behavior. There may be no response because the behavior does not demand one or because the subject is being ignored, the observer should note this at the side rather than attempt to code the response any differently).

A (attention): Coded whenever the agent listens to or looks at the behaving subject: this is a neutral kind of response with no obvious approval or disapproval in the attending response.

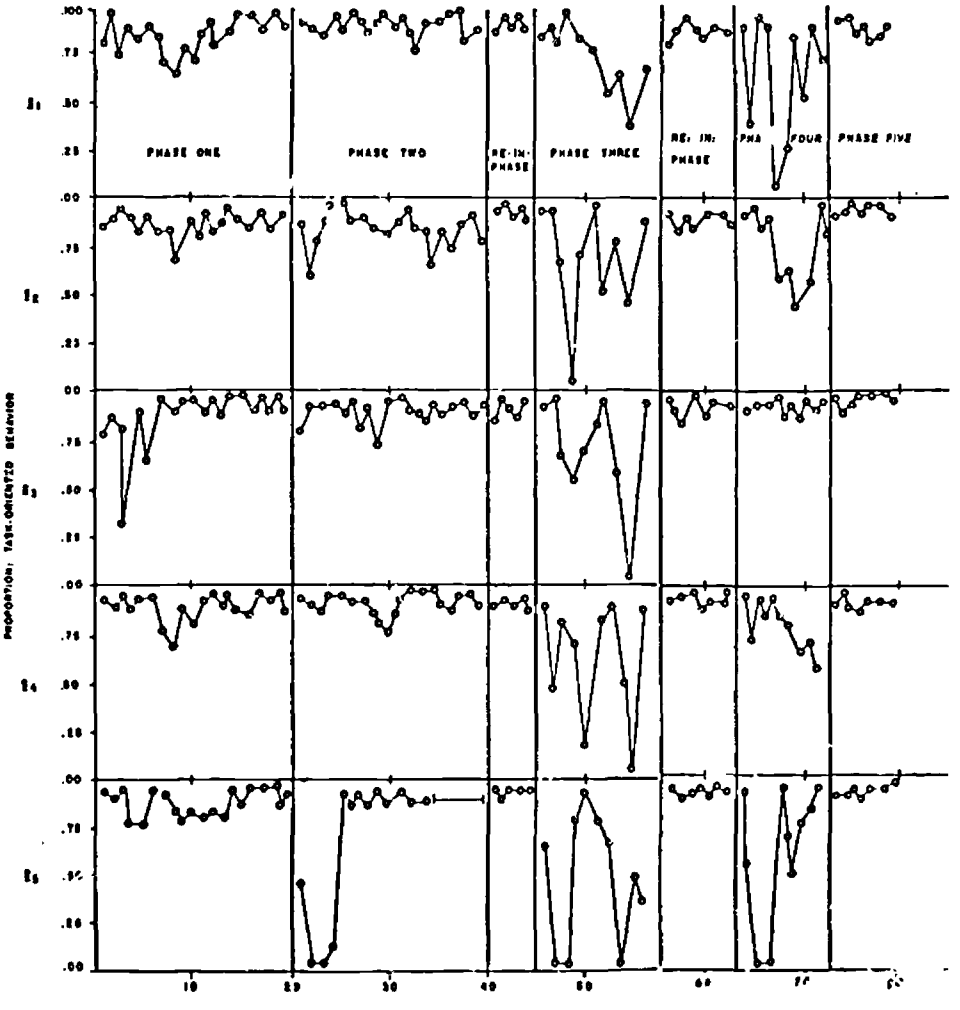
P (praise): Coded when the subject receives praise or approval from an agent: may be verbal behavior or consist of gestures, e.g., smiles, head nods, applause.

C (compliance): Coded when subject complies with a command from another.

NC (non-compliance): Coded when subject does not comply with a command from another. Neither C or NC will probably be used very often: if they are, they will probably be responses of the subject to TI.

PH + or - (physical contact positive or negative): Positive physical contact would include such behaviors as hugs, pats on the back: negative physical contact would include aggressive behaviors from an agent such as hitting, spanking, etc.

D (disapproval): Coded when a subject behavior is followed by verbal or gestural disapproval from an agent: examples might be frowning, negative head nods, "you shouldn't have done that," etc.


PHASE ONE
PHASE TWO
RE-IN-PHASE
PHASE THREE
RE: IN: PHASE
PHA
FOUR
PHASE FIVE
PROPORTION; TASK-ORIENTED BEHAVIOR
No. of 10 Min. Observations

Appendices

A. Recording Sheets for Subject Behavior

B. Recording Sheets for Teacher Behavior

C. Academic Assignment Sheet

D. Behavioral Program

E. Classroom Schedule

F. Observation Manual and Form

Date	Time	Behavior of Child	Teacher Responses	Time	Behavior of child Following Consequence	Total # of Points (+ & -)	Comments

Appendix A

Deviant Response
Record Form

Behavior of Child

1. Not attending to task (failure to begin work when light extinguished)
2. Talking
3. Unauthorized walking or standing
4. Throwing objects
5. Disobedience and/or defying teacher
6. Fighting
7. Leaving building without permission
8. Foul language, lewd gestures
9. Creating disturbance in T.O. or refusing to enter
10. Other

Teacher Response

C - Cost

T.O. - Time Out

S - Suspension

Behavior of Child Following Consequence

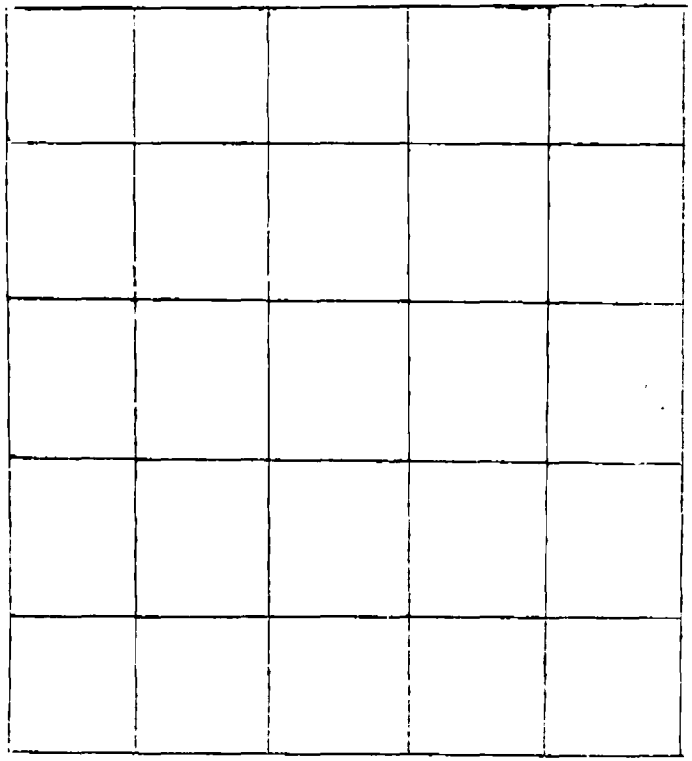
1 - 10. (Same as above)

11. Appropriate behavior
12. Pouting or crying

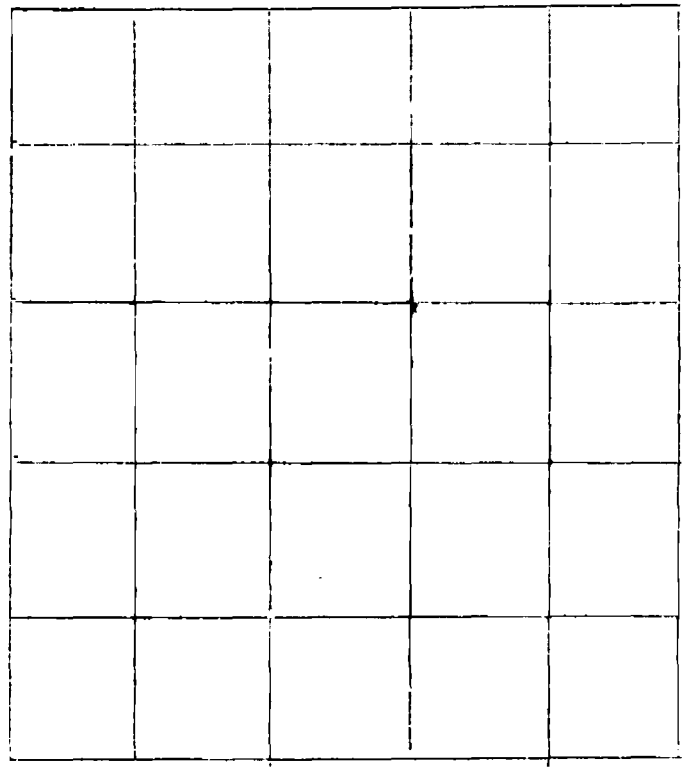
POINT RECORD FORM

Name_____ Date_____

Good Academic Production



Good Student Behavior



Week # ____________________ WEEKLY POINT RECORD

	/	/	/	/	/	/
#transferred						
date:						
#earned	+	+	+	+	+	+
#lost	-	-	-	-	-	-
Total Day						
Grand Total						
- trade	-	-	-	-	-	-
remainder						
date:						
#earned	+	+	+	+	+	+
#lost	-	-	-	-	-	-
Total Day						
Grand Total						
- trade	-	-	-	-	-	-
remainder						
date:						
#earned	+	+	+	+	+	+
#lost	-	-	-	-	-	-
Total Day						
Grand Total						
- trade	-	-	-	-	-	-
remainder						
date:						
#earned	+	+	+	+	+	+
#lost	-	-	-	-	-	-
Total Day						
Grand Total						
- trade	-	-	-	-	-	-
remainder						
date:						
#earned	+	+	+	+	+	+
#lost	-	-	-	-	-	-
Total Day						
Grand Total						
- trade	-	-	-	-	-	-
remainder						

BEHAVIOR RECORD

Name	Mon. Time	Tues. Time	Wed. Time	Thur. Time	Fri. Time
1.					
2.					
3.					
4.					
5.					
6.					
Name					
1.					
2.					
3.					
4.					
5.					
6.					
Name					
1.					
2.					
3.					
4.					
5.					
6.					
Name					
1.					
2.					
3.					
4.					
5.					
6.					
Name					
1.					
2.					
3.					
4.					
5.					
6.					
Name					
1.					
2.					
3.					
4.					
5.					
6.					

POINT RECORD FORM

(Weeks 6-8)

Name of Child_____ _____Date_____

Weeks 6-7: (20 pts. maximum) Give 3 times daily - 9:20-10:30 red marks;
10:30-12:10 blue marks; 12:10-1:40 green marks.
Week 8: (15 pts. maximum) - Give once daily.

POSITIVE

1. Completed Assignment (wk 6-7 +1 if 100%)
   _____(2) Math
   _____(+1) Reading
   _____(+1) Language
   _____(+1) Writing
   _____(+1) Other _____sub-total

2. Attended to task
   _____(+1) 9:20 - 9:55
   _____(+1) 10:30 - 11:00
   _____(+1) 11:00 - 11:35
   _____(+1) 11:35 - 12:10
   _____(+1) 1:00 - 1:40 _____sub-total

3. Entered classroom appropriately
   _____(+1) 8:20
   _____(+1) After P.E.
   _____(+1) 12:30 _____sub-total

4. Exhibited socially appropriate behavior. (Can apply to specific programs and other)
   _____(+1)_____
   _____(+1)_____
   _____(+1)_____
   _____(+1)_____
   _____(+1)_____ _____sub-total

_____TOTAL POINTS EARNED

NEGATIVE

1. Not attending
   _____(-1) 9:20-9:55
   _____(-1) 9:55-10:30
   _____(-1) 10:30-11:00
   _____(-1) 11:00-11:35
   _____(-1) 1:00-1:45 _____sub-total

2. Other inappropriate behaviors (specify)
   _____(-) _____ _____
   _____(-) _____ _____sub-total

_____TOTAL POINTS LOST

Appendix B

Record of Teacher Behaviors

Name	T. P.	T. I.	P. I.
Date:			

3 x 5 card on child's desk.

T. P. = Teacher praise

T. I. = Teacher initiation

P. I. = Pupil initiation to teacher

Appendix C

NAME_____ DATE_____

EXTRA CREDIT
FINISH ALL OTHER
WORK FIRST

MATH

FLASHCARDS

WORKSHEETS

MATHBOOK

READING

HEGGE, KIRK & KIRK DRILL #:

PALO ALTO:

SULLIVAN:

CONQUESTS IN READING

S. R. A.

LIPPINCOTT

CHECKERED FLAG

WEBSTER

SPELLING

STUDY WORDS:

TEST

LANGUAGE

DR. SPELLO:

DITTO:

PENMANSHIP

PAGES:

Appendix D

Program for Altering Classroom Behavior
ELP Experimental Class

I. Reinforcement

A. Individual basis -
1. Appropriate student behavior
-raising hand
-remaining in seat and not talking
-beginning work without talking upon entering classroom
-walking in hall appropriately

2. Academic -
-task-oriented
-completion of task
-correct answers on assignments
-neatness of paper
-(completion within time interval)

B. Group reinforcement
1. Clock timer will be set at preselected time intervals each day provided all S's are present in the classroom area and are engaged in task-oriented behavior. (If any S's are out of the room for individual work, testing or teacher errands, clock may still operate.)

2. A group payoff will be instituted when the group accumulates a pre-selected number of points.

II. Stimulus Consequences of Deviant Operants

A. Loss of points
1. When behavior is inappropriate the S's light on the display board will go out. If the S does not modify his behavior within 10 seconds he will start losing points at the rate of one per minute. If the S has lost all points earned for the day and still has not modified his behavior he should be placed in time-out.

2. Behaviors which result in loss of points:
a. Not attending to task:
-Looking at or manipulating a stimulus object not connected with assignment for more than 60 continuous seconds.
-Laying head on desk so assignment cannot be seen.
-Moving chair away from desk or leaning back so assignment cannot be seen.
For the two preceding behaviors the light should be extinguished immediately.

b. Responding without raising hand and securing permission.

B. Immediate exclusion from the classroom area for 10 minutes (minimum) for the following operants: (S decides when he will return to the classroom area. If he decides to stay in it will count as second time out. The S is not allowed to work on any assignment during time-out but must complete assignments during day.)

1. Talking to peer
2. Unauthorized standing or walking
3. Throwing objects
4. Refusal to work after pts. to zero
5. Inappropriate physical initiations (punching, poking, tripping, etc.)
6. Other, non-tolerated operants falling within this class of behaviors

C. Immediate removal from ELP building for the following behaviors - (If expelled during a.m. the S will stay out for the remainder of the day and return the following morning. If expelled during p.m. will remain home the following day.) Homework required.

1. Disobedience and/or defying teacher
2. Fighting
3. Leaving building without permission
4. Foul language, lewd gestures
5. Creating a disturbance during isolation period (time-out)

III. Behaviors to be ignored-
-asking for help without raising hand
-irrelevant questions
-tapping pencils (unless disturbing class)
-pouting and crying-(see IIA for not working)

Appendix E

ELP CLASSROOM SCHEDULE

Week 1. All students on individual timers or work box. Begin with VI they can operate under based on observations during baseline and Day 1. Maximum should be VI 7 to begin. If interval is too large, cut back. Once a child has reached criterion of VI 10 schedule in one day (not necessarily consecutive) he may begin receiving points on the display board. Prior to that time he uses the pink sheets. This would be continued into week 2 if necessary. Cost held down to make environment reinforcing. Maximum 25 points during weeks 1-5.

Week 2. Use display board on CRF for academic and VI 10 for task attending.

Week 3. All Ss should be on display board. Any Ss whose behavior does not quality him for the display board should receive only one-half points until he is on display board. (12½ pts. maximum.)

Schedule for attending points weeks 3-5.

FI:20	9:20-9:40	11:20-11:40
	9:40-10:00	11:40-12:10
	10:00-10:30	1:00-1:20
	11:00-11:20	1:20-1:40

Start group points as soon as all Ss are on display board.

Week 4 and 5 Continue as in week 3. Behavior should be 3.33 plus on task-oriented (based on "WK" and "NO" categories - periods of over 2 minutes "TI" should not be counted but another observation used).

Week 6 A. If behavior of all children 3.33+ in task attending reduce points to specified time blocks, e.g., 9:20-10:30; 10:30-12:10; 1:00-1:45. Points earned for academic and social behavior given at these 3 times only. Points subtracted at this time also. Maximum 20 points for weeks 5-6.

Schedule for attending points weeks 6-8.

FI:30	9:20-9:55	11:00-11:35
	9:55-10:30	11:35-12:10
	10:30-11:00	1:00-1:45

Week 7 Continue as in week 6.

Week 8 Display board on but no points given or subtracted until end of day. Points at end of day based on checklist during day. Maximum 15 points per day.

Week 9 2 transferred on Monday
2 transferred on Wednesday
2 transferred on Friday

Appendix F

Re-programing Project
Oregon Research Inst.
September, 1968

OBSERVATION IN THE SCHOOL: DESCRIPTION OF A CODING FORM

R.S. Ray, D.A. Shaw, G. R. Patterson

The following is a trial-and-error refinement of a school observation technique used by the project's observers during the past year. It is a method of "characterizing" school situations for a given child in such a way as to facilitate understanding the determinants and consequences of social behaviors as well as the relationship of those behaviors to the classroom setting.

Each coding sheet represents six minutes of behavior for a given subject. The "deviant" child may be compared to his "normal" peer by alternating the two as subjects of observation. (We conventionally observe the "deviant" child for 12 minutes (2 coding sheets) and then select a "normal" peer at random to observe for 6 minutes (1 coding sheet) before returning to the "deviant" child). Each coding sheet provides the following information: behavior of the subject, social consequence, agent supplying consequence, and description of the classroom situation.

The rating form is set up as a grid. Each horizontal line in the grid represents a fifteen-second time interval. The grid is divided into two-minute "chunks" simply for the convenience of the observer in reading the behavior codes. Using the observation clipboard set for fifteen-second intervals, the observer moves down one line each time he receives a signal from the clipboard, i.e., at the end of each fifteen-second time block. (If no clipboard-timer is available, a stopwatch or school clock will generally suffice.) The vertical spaces in the grid correspond to the behaviors listed at the top of the two-minute section. During each fifteen

second interval the observer records both the behavior of the subject and the social consequences of his behavior by placing the appropriate response and agent codes in the space beneath the appropriate behavior code. The response codes and the agent codes are listed at the top of the coding sheet. For example, if the subject is not attending to the teacher's explanation of the lesson and the teacher "calls him down" (i.e., disapproves) the interaction would be coded as follows:

Depending upon the rate at which things are happening in the classroom, the observer may code more than one subject behavior and more than one consequence during each fifteen-second interval. In most cases, however, there will be only one primary behavior or interaction. It is not necessary to make more than one coding entry for behavior which continues unchanged throughout the fifteen-second interval. The subject's behavior during the fifteen-second period should be "characterized" by the coding; it need not be described in sequential detail. The observer should check the situation category at the right side of the coding sheet which best describes the situation during each 2-minute section. The categories are as follows:

Classroom:

Group: To be used whenever the classroom activity is essentially group rather than individual work, e.g., teacher presenting lesson to entire class, subject in a reading group, etc.

Individual: To be checked whenever the subject is involved in individual rather than group work, e.g., sitting at desk doing arithmetic, reading; not listening as a group to teacher or working together in a group.

Transition: This category will generally be checked when the entire group is switching from one kind of activity to another, e.g., lining up to go to assembly, moving chairs to form a reading group. Frequently is movement associated but it would not be considered inappropriate in this situation, e.g., entire class moving from desks to reading groups would be coded NO (appropriate group behavior) rather than MO (movement).

Recess: Checked during any regular recess period whether child is outside or remains in classroom. A short description of the child's activity should be written on the lines provided at the right of each two-minute section (this applies to classroom as well as recess behaviors). Generally during recess periods, the observer will be primarily interested in coding either PL (playing with others) or AL(isolated from others) and possibly AG (aggression); other behavior codes are not so relevant to the usual recess activities.

Description of Codes:

CLASSROOM BEHAVIORS:

NY (noisy): Coded whenever the subject is talking loudly, yelling, or making other deliberate, inappropriate noise (such as banging books or scraping chair back and forth) which is actually or potentially disruptive to others.

AG (aggression): Actual or attempted physical abuse of another, e.g., John hits Bill or John starts to hit Bill and is stopped by the teacher. This includes pushing, shoving, threatening, bossy.

NA (not attending): Subject is not attending to his work or to a lesson being taught, etc.; may be looking out the window, watching the observer or other children, drawing when he is supposed to be watching teacher demonstrate arithmetic, leaning down to tie his shoe, turning in his chair.

PI *(peer initiation): Peer talks to, pokes or in some way trys for attention of S.

IP *(Initiation to peer): S talks to, or in some ways trys for attention of peer.

MO (movement around room): Coded whenever subject is moving around room (other than times when entire group is moving, as in transition periods); observer need not try to decide whether each movement is appropriate or inappropriate; that question is better decided by comparing rate of movement across subjects.

IW *(Inappropriate task): Work on task not assigned or specified by teacher for that time.

NO (appropriate group behavior or normative behavior): Coded whenever the subject's behavior is task-directed activity which is appropriate for that time and situation. Included would be listening to the teacher explain a lesson, painting during an art class, singing with others during music, lining up with the rest of the class to go out for recess, etc. The observer should take care not to include any behavior which might be more appropriately characterized as recitation.

WK (work): A child may be engaged in appropriate group activity but not working e.g., observe a movie. Work means at desk on academic projects. Must work on teacher assigned task. Record when engaged in reading, writing, arithmetic, basic skills.

RE (recites): Coded whenever subject recites, answers a teacher's questions, reads out loud, gives a speech, or performs before the class.

VO (volunteers): Coded whenever subject raises his hand or in some other manner indicates a desire to recite or do whatever else the teacher may have asked for, e.g., someone to pick up papers; may be either in a class discussion or in a small group.

TI (teacher initiation): Coded when the teacher "calls on" the subject or comes to his desk or activitiy area to speak to him; this interaction must be initiated by the teacher and not be a response to an initiation by the subject.

IT (initiation to teacher): Coded when the subject indicates that he wants some attention from the teacher; he may raise his hand, speak or go to her; this behavior is differentiated from "volunteer" in that the subject's initiation to the teacher is not in conjunction with class discussion, group study, or reciting.

RECESS BEHAVIORS ONLY:

PL (play with others): Coded when the subject is clearly in the company of others, whether talking, playing a game or just walking around.

AL (alone, isolated from others): Coded when the subject is engaged in solitary activity, whether playing a game or not.

*These three categories were added or expanded by the present authors (Walker and Buckley) for use at ELP.

RESPONSES:

O (no response): Coded when no response from teacher, peers, or observer follows a behavior. There may be no response because the behavior does not demand one or because the subject is clearly being ignored, the observer should note this at the side rather than attempt to code the response any differently).

A (attention): Coded whenever the agent listens to or looks at the behaving subject; this is a neutral kind of response with no obvious approval or disapproval in the attending response.

P (praise): Coded when the subject receives praise or approval from an agent; may be verbal behavior or consist of gestures, e.g., smiles, head nods, applause.

C (compliance): Coded when subject complies with a command from another.

NC (non-compliance): Coded when subject does not comply with a command from another. Neither C or NC will probably be used very often; if they are, they will probably be responses of the subject to TI.

PH + or - (physical contact positive or negative): Positive physical contact would include such behaviors as hugs, pats on the back; negative physical contact would include aggressive behaviors from an agent such as hitting, spanking, etc.

D (disapproval): Coded when a subject behavior is followed by verbal or gestural disapproval from an agent; examples might be frowning, negative head nods, "you shouldn't have done that," etc.

AGENTS:

Each response should be subscripted with one of the following:

T (teacher), P (peer), ^ (observer)

to indicate the agent of the response. O should rarely have to be used.

NAME ______________________ DATE ______________________

OBSERVER ______________________ SHEET NO. ____________ TIME ____________

BASELINE ______________________ ELP ______________________ FOLLOW-UP ______________________

CLASSROOM BEHAVIORS:

NY Noisy
AG Aggressive
NA Not attending
PI Peer initiation
IP Initiation to peer
MO Movement around room
IW Inappropriate task
NO Appropriate group behavior
WK Individual work

RE Recites
VO Volunteers
TI Teacher initiation
IT Initiation to teacher

RECESS ONLY:

PL Play with others
AL Alone, isolated from others

RESPONSES:

0 No response
A Attention
P Praise
C Compliance
D Disapproval
NC Non compliance
PH Physical (+ or -)

AGENTS:

T Teacher
P Peer
O Observer

	NY	AG	NA	PI	IP	MO	IW	NO	WK	RE	VO	TI	IT	PL	AL	
1.																
2.																
3.																
4.																
5.																
6.																
7.																
8.																

____

____

____

Classroom:
Group ☐
Individual ☐
Transition ☐
Recess ☐

	NY	AG	NA	PI	IP	MO	IW	NO	WK	RE	VO	TI	IT	PL	AL	
1.																
2.																
3.																
4.																
5.																
6.																
7.																
8.																

____

____

____

Classroom:
Group ☐
Individual ☐
Transition ☐
Recess ☐

	NY	AG	NA	PI	IP	MO	IW	NO	WK	RE	VO	TI	IT	PL	AL	
1.																
2.																
3.																
4.																
5.																
6.																
7.																
8.																

____

____

____

Classroom:
Group ☐
Individual ☐
Transition ☐
Recess ☐