A "Systems Analysis" of an Applied Behavior Analysis Laboratory Course and an Experimental Analysis of Attendance and Prompt Assignment Completion

Ansley Bacon
Western Michigan University

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A "SYSTEMS ANALYSIS" OF AN APPLIED BEHAVIOR ANALYSIS LABORATORY COURSE AND
AN EXPERIMENTAL ANALYSIS OF ATTENDANCE AND PROMPT ASSIGNMENT COMPLETION

by

Ansley Bacon

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
Degree of Master of Arts

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August 1974
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Ansley Bacon
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>SECTION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>ANALYSIS OF THE CURRENT SYSTEM</td>
<td>5</td>
</tr>
<tr>
<td>STATING THE BEHAVIORAL OBJECTIVES</td>
<td>8</td>
</tr>
<tr>
<td>DESIGNING THE SYSTEM</td>
<td>12</td>
</tr>
<tr>
<td>Specification</td>
<td>13</td>
</tr>
<tr>
<td>Observation and Consequation</td>
<td>16</td>
</tr>
<tr>
<td>Course Description</td>
<td>18</td>
</tr>
<tr>
<td>Summary</td>
<td>34</td>
</tr>
<tr>
<td>EVALUATION AND RECYCLING</td>
<td>35</td>
</tr>
<tr>
<td>Fall 1973</td>
<td>35</td>
</tr>
<tr>
<td>Settings</td>
<td>36</td>
</tr>
<tr>
<td>Monitoring System Hierarchy</td>
<td>36</td>
</tr>
<tr>
<td>Daily Laboratory Activities</td>
<td>37</td>
</tr>
<tr>
<td>Behavior Inventory Sheets</td>
<td>38</td>
</tr>
<tr>
<td>Progress Reports</td>
<td>38</td>
</tr>
<tr>
<td>Procedure Sheets</td>
<td>38</td>
</tr>
<tr>
<td>Laboratory Reports</td>
<td>39</td>
</tr>
<tr>
<td>Orientation</td>
<td>41</td>
</tr>
<tr>
<td>SUMMARY</td>
<td>42</td>
</tr>
<tr>
<td>II. INTRODUCTION</td>
<td>43</td>
</tr>
<tr>
<td>Attendance</td>
<td>44</td>
</tr>
<tr>
<td>Deadlines</td>
<td>45</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>METHOD</td>
<td>51</td>
</tr>
<tr>
<td>Procedure</td>
<td>51</td>
</tr>
<tr>
<td>RESULTS AND DISCUSSION</td>
<td>57</td>
</tr>
<tr>
<td>Attendance Results</td>
<td>57</td>
</tr>
<tr>
<td>Deadline Results</td>
<td>66</td>
</tr>
<tr>
<td>Attendance Discussion</td>
<td>70</td>
</tr>
<tr>
<td>Deadline Discussion</td>
<td>74</td>
</tr>
<tr>
<td>SUMMARY</td>
<td>77</td>
</tr>
<tr>
<td>APPENDIX</td>
<td>79</td>
</tr>
<tr>
<td>Specification, Observation and Consequation</td>
<td>80</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>82</td>
</tr>
</tbody>
</table>
SECTION I

INTRODUCTION

One of the major goals of education is to teach the students specific stimulus-response repertoires that will help them deal more effectively with their environment. There appear to have been few empirically validated methods of teaching developed to assist educators in higher education in meeting that goal.

Recently, a teaching technology based on the laws of behavior has been developed. There have been many studies demonstrating the lawful relationships between the student's academic performance and the educational environment. Therefore, the task of the educator is to design learning environments that will maximize student performance.

This approach to higher-education is called the behavioral approach. It is characterized by a clear specification of responses to be learned, which are defined in terms of observable and measurable student behavior; the monitoring or observation of student performance by more advanced students; and immediate and frequent feedback and consequation of student performance. When compared to traditional lecture methods of teaching, the behavioral approach has resulted in students receiving higher scores on final exams (McMichael and Corey, 1969; Sheppard and MacDermot, 1970; Born, Gledhill and Davis, 1972; Stalling, 1971; and Cooper and Greiner, 1971; Hesse, 1971; Hubbard, 1971; Janczarek, 1970) and having better
long-term retention of the material (Cooper and Greiner, 1971). Also the students report that they work harder and learn more with this type of approach (Born et al., 1972; Cooper and Greiner, 1971; and McMichael and Corey, 1969), and rate their enjoyment of the course high (Stalling, 1971; Sheppard and MacDermot, 1970; Born, Gledhill, and Davis, 1972; McMichael and Corey, 1969; and Cooper and Greiner, 1971).

In designing the program of instruction, the educator should consider the available data when specifying the criterion for advancement. Johnston and O'Neill (1973) varied minimum criteria for advancement and found that the students' performance varied to just meet the specified criteria. Furthermore, when the criteria were more specific, they controlled behavior to a larger extent. These results are consistent with those obtained by Johnston and Penny-packer (1971) in which students stayed just above a specified minimal rate for correct responding and just below the specified maximal rate for incorrect responding, irrespective of how the criteria were defined.

In order to motivate the student to participate in the academic activity, and to participate correctly, an incentive system must be developed. Points toward a grade have been shown to be effective reinforcers for maintaining correct responding (Semb, Hopkins, and Hursh, 1973). However, it has been argued that it is unethical to give points toward a grade for behaviors that are not directly related to the student's skill or knowledge, such as points for attendance or the removal of points for late assignments. It has been
said that the meaning of the grade is distorted (Ray, 1973). Nevertheless, if these behaviors are desirable in terms of helping the student meet the academic goals of the course, a small percentage of the total points can be presented (or removed) to control these behaviors without greatly changing the meaning of the grade.

Most of the literature related to the behavioral approach to teaching college students deals with teaching verbal skills and emphasizes studying and test-taking behavior in a variety of subject matters. This method has been very effective in teaching the principles of behavior modification, but what about teaching the skills of behavior modification? Gardner (1972) found that institutional attendants learned the principles of behavior modification better in a class with a lecture-type format, but behavior modification skills were taught more effectively when role-playing was used. In teaching behavior modification skills to attendants and volunteers for an institution, Watson, Gardner, and Sanders (1971) used a training program which consisted of three weeks of classroom training with textbooks, lectures and discussions, followed by a four month ward internship. During the last portion of the classroom training, attendants and volunteers practiced role-playing with each other, followed by actually working with one retarded child. During the ward internship, the attendants and volunteers worked with four or five children simultaneously.

In general, when designing educational systems, short range objectives must be set that will aid in the accomplishment of long range educational goals, and all of the objectives must be specified

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in terms of observable behavior. To reach the objectives and goals, the system must be designed so that desirable behavior is reinforced and maintained and undesirable behavior is extinguished or punished. Such an educational system can be designed using grades as one of the most effective reinforcers available to educators.

There are several phases in the design of any effective system, including educational systems. These phases comprise a systems analysis and the format of this paper will closely follow them. They are: a behavioral analysis of the system, a statement of the behavioral objectives of the system, the design of a new system based on the laws of behavior, the implementation of the new system, a careful evaluation of the new system based on empirical data, and a recycling through each of the previous phases until the system accomplishes its objectives (Malott, 1972).
In general, the psychology department at Western Michigan University emphasizes behavioral psychology. The majority of the faculty in the department are primarily concerned with behavior analysis; and therefore, the content and structure of many of the courses are based on the basic principles of behavior analysis. The structure is characterized by small units of material, study objectives, frequent quizzes, and immediate feedback.

Until fairly recently, it was the case that the required courses in the undergraduate curriculum gave undergraduate psychology majors a thorough background in experimental psychology. Almost all of the required readings consisted of theoretical analyses supported by data from the animal laboratory, and all of the required laboratories were animal laboratories. The majority of undergraduate psychology students had no laboratory experience working with human beings until they were in graduate school or working in the "real" world, where most of the jobs available in the field of operant psychology are in human services institutions (i.e., schools, mental hospitals, etc.). During the applied laboratory work in the "real" world, there was usually no systematic specification, observation, or consequation of their behavior. The student was expected to immediately generalize the principles of behavior learned from the readings and the animal laboratory to complex human behavior in the natural environment. Since generalization of the principles to the human situation is not an easy task, the student's learning is
erratic and not always reliable.

Clearly, this was not a desirable or efficient situation. Since the undergraduate psychology students were quite familiar with the basic principles of behavior and had an adequate theoretical background by the beginning of their junior year, there was no reason why the students could not begin working with humans under supervision in an applied laboratory.

There seemed to be many advantages to offering an applied laboratory option as part of the undergraduate psychology curriculum. The students could be specifically taught to generalize the principles learned on a theoretical level to applications involving complex human behavior. They could actually apply the principles of behavior in an applied situation rather than simply reading about them. The laboratory could be sufficiently structured and supervised so that behavior modification skills could be systematically acquired. The applied laboratory work would probably be more reinforcing for most students than the experimental laboratory because the relevance to their everyday life and future would be more obvious.

Our first attempt to systematically develop a rigorous undergraduate applied laboratory course began with the development of a separate applied section of Psychology 350: Experimental Analysis of Behavior I, a junior level psychology course at Western Michigan University. Originally in this course, the readings consisted of experimental analyses of behavior and the only laboratory was an experimental pigeon laboratory. The students completed four introductory experiments and one advanced experiment using either a
manual apparatus, a Wisconsin General Testing Apparatus (modified for pigeons), or an automated Skinner box. A laboratory report was written for each experiment. The course had been revised many times over many semesters, and as a result, the laboratory experience and writing skills that the students attained were of high quality. But the option of an applied laboratory for this course or any other course required for psychology majors or minors was not offered. A student could receive independent study credit for doing applied work, but frequently the work was not well supervised and the student received very little instruction or feedback. The first step in the development of the applied laboratory was to find the best way to teach undergraduate students to generalize basic behavior principles and apply them to human behavior. Or more specifically, the problem could have been stated as, "What was the best way to design an applied laboratory option for Psychology 350."
STATING THE BEHAVIORAL OBJECTIVES

One of the general goals of any learning system is to develop new behavioral repertoires. In stating the behavior objectives of an applied laboratory, the stimulus-response chains to be learned must be specified. For example, when a student has completed the applied laboratory course, he should be able to a) design an effective procedure when presented with a class of behavior problems within a class of stimulus situations; b) implement the procedure; c) make any necessary changes in the procedure; and d) write a technical laboratory report on the project that was conducted.

Each of the four skills listed above can easily be broken into smaller units of behavior. In order to design an effective procedure, the student must be able to generalize some of the concepts learned from readings in applied psychology and apply them to classes of behavior problems. The behavior must be defined, and a measurement technique specified. All aspects of the procedure should be based on behavioral principles and follow the rules of contingency management (see the Design section).

In correctly implementing the resulting behavioral procedure, it is important that the student emit many "therapist" behaviors. Examples of these behaviors are: being consistent in the consequence (presentation of an event immediately following the behavior) of patient, student, or client behaviors, delivering reinforcers for appropriate behavior, and extinguishing or punishing inappropriate behaviors correctly and immediately following the behavior,
presenting prompts at appropriate times and frequencies, and recording data accurately.

There are many prerequisite behaviors necessary in learning to revise a procedure. If the procedure is being implemented correctly and there is no change in the behavior in the desired direction after the procedure has been implemented for a few weeks (depending on the subject and the type of behavior), then some aspect of the procedure should be altered.

Determining how the procedure should be changed is a very difficult skill to acquire. In fact, the procedure may be altered many times before the behavior changes in the desired direction. Many variables may prevent the procedure from being effective. For example, the reinforcer used may not be effective, it may not be presented contingent upon small enough behavior units, the client may not have the prerequisite skills necessary to emit the behavior, the $S^D$s (discriminative stimuli) for the behavior may be insufficient, etc.

Typically a technical laboratory report must meet the requirements specified by the American Psychological Association. It is broken into sections which include the abstract, introduction, method (subject, setting, procedure), results and discussion. The abstract is a short summary of the method, results, and discussion sections. To write the introduction and discussion sections, the student must refer to some published articles that relate to his project. This involves scanning the relevant journals, critiquing the relevant articles, and relating the articles to his research. In writing the method section of a laboratory report, the student must precisely
and accurately describe the subject, setting, and procedure so that the study could easily be replicated. In the results section the data obtained from the study must be presented in graphic for- mat and explained; these data are discussed in the discussion sec- tion.

These behavioral objectives specified for the student are very functional. In many cases the behaviors learned in the applied laboratory are similar to those that the student will be emitting in future job settings. For example, it is highly probable that the student will be in a position in which he is responsible for designing behavioral procedures. After the procedures are designed, the student may implement the procedures himself, or may train other people to implement the procedure. Then if the procedure is being implemented correctly but the desired behavior change is not occur- ring, the student may be responsible for revising the procedure. The laboratory report writing skills may be extremely functional for many students; the student may be in a position to write a pro- posal for a grant or submit a study for publication.

It may be worthwhile at this point to analyze the way in which the objectives for this system were determined. Brethower (1972) presents the concept of a "total performance system." There are two main components of a total performance system: a processing system and a receiving system. A processing system changes its inputs into outputs and the receiving system receives these outputs. In this case the processing system is the Psychology Department at Western Michigan University and receiving system is the future.
teachers in graduate schools and employers of the students that graduate from the university. One of the inputs and outputs of the processing system is students. Their behavior is changed in the processing system, and after they complete the program, they enter the receiving system (graduate schools, clinics, institutions, etc.) Ideally the processing system is designed based on feedback from the receiving system. This feedback informs the processing system as to how well they are preparing the students for their future. The Psychology Department has not yet conducted any systematic analysis of the receiving system of their students. However, the objectives for this applied laboratory were based on some unsystematic feedback from the receiving system. The more feedback that is obtained from the receiving system, the more we can determine exactly what behaviors to teach. If we teach behaviors that are functional in the receiving system, we increase the probability that they will be maintained after the student leaves the educational setting.
DESIGNING THE SYSTEM

One of the first steps in designing an applied laboratory system is to locate a setting. There are several aspects that must be present in order for it to be acceptable. First, it must be a setting from which the student can gain some practical experience in consistent application of the basic principles of behavior to human behavior. It is clearly desirable that the students design their own procedures. It is also advantageous if the setting has experienced behavior modifiers with whom the students can interact and obtain advice. However, if the setting cannot provide experienced behavior modifiers, perhaps the instructor can.

Another aspect of an acceptable setting is that the administrators of the setting must see a need for the additional staffpower that is provided by the students. Also, the administrators must be cooperative and put forth a minimal amount of time and effort to help the instructor organize the laboratory and maintain the behavior of the students at the setting. In a sense, the relationship between the administrator and instructor is a reciprocal one. The administrators are providing the instructor with an applied setting in which to train the students, and the instructor is providing the administrators with a free source of staff.

But the most important aspect of any human services setting is the people serviced by it. The main function of any setting is to serve a specified population. The extent that the student can increase the value of that service influences the extent to which they
are acceptable to the setting.

The above three points discuss some factors that determine the acceptability of a setting, but how does one establish contact with one? In the first place, it is very important to establish and maintain good rapport with the administrators of the applied settings. There should always be close contact between the administrators and the instructor, perhaps in the form of weekly meetings. Also, any major decisions affecting the laboratory should be discussed with and endorsed by the administrators before they are implemented. The cooperation of the administrators is essential in improving and expanding the laboratory.

It is also important for the instructor to have good communication with other instructors who have students completing a laboratory at the same community setting. In this way, resources and some organizational behavior can be shared between the instructors. It would also be much less confusing to students and setting administrators.

Specification

This instructor is responsible for the specification of the behaviors to be learned (or the objectives of the course), the consequences to be applied to those behaviors and the contingency or relationship between the behaviors and the consequences. In specifying the behavioral objectives for the course, the instructor should follow some of the rules of contingency management. That is, he should specify only those objectives that are feasibly attained.
within the limits of the physical and personnel resources available. Instead of specifying a large number of unattainable objectives and accomplishing little, he should specify a small number of attainable objectives and have an effective system.

Also, the instructor should specify "functional behaviors to be established." The behaviors learned in the system should be "relevant" and help the students deal more effectively with their environment. In other words, the behaviors should be maintained by reinforcement outside of the laboratory (Malott, 1972).

It is important that the instructor set the objectives to correspond to the current level of behavior so that the students can accomplish the objectives. The prerequisite skills of the students determine the objectives that should be specified. If the laboratory experience is the first time for the majority of the students to conduct behavior modification studies, then the objectives will be much different than if most of the students had an extensive history of conducting such studies.

The specific behaviors to be taught should be divided into small units. Then in establishing the contingencies and consequences of the desired behaviors, "each unit should be reinforced." This will increase the frequency of reinforcement and therefore effectively maintain the behavior (Malott, 1972).

Once the course is designed, the next step is to get the information to the students. The best way to get the most accurate information across to the largest number of students is to put it in writing. The instructor or course staff may have to write their
own laboratory manual because it is difficult to find an existing manual that is specific enough to a particular human service setting. (If a manual is written, it is useful to bind it in a three-ring notebook so that new information can be added throughout the semester.) A weekly newsletter is a very helpful device that can be used to supplement or clarify the manual.

In a laboratory manual many things should be specified and explained such as the course policies, basis on which final grade is given, daily laboratory activities (such as signing in and out and graphing data), assignments, laboratory reports, due dates for assignments and laboratory reports, objective criteria by which daily activities, assignments and laboratory reports are graded, etc. Also, it may be appropriate to include a section in the manual on designing a research project. In all cases the responses of the student should be specified as clearly as possible, perhaps by providing samples of completed assignments and laboratory reports.

At the end of each semester the manual should be updated and revised according to student performance and feedback.

If a fairly complex chain of daily laboratory activities is required of the student, it is helpful to provide daily check sheets that specify each activity that the student will complete. These may be appropriate either the first two weeks of the semester or for the entire term. In general, the number of discriminative stimuli for desired behavior can never be too high.
Observation and Consequation

Even with a fairly small course it would be impossible for one instructor to effectively observe and consequate the students' behavior on a daily basis. However, if the students are to learn some complex skills, it is clearly desirable that their behavior be frequently observed and consequated.

One solution to this problem of a large student-faculty ratio is the use of more advanced students as teaching apprentices (Malott and Svinicki, 1969). In this way the students' behavior can be observed and immediately consequated. Immediate feedback can be given by the teaching apprentices for all assignments, laboratory reports and daily laboratory activities.

In designing any observation and consequation system one rule that should be followed is "be consistent." In other words, once a contingency is established, it should be consistently enforced with essentially no exceptions. If one exception is justified, then more and more exceptions can be justified and the system tends to drift farther and farther from its goals (Malott, 1972).

It is necessary to recognize that a system of observation and consequation is needed for everyone's behavior, including the teaching apprentices. This may take many forms such as a monitoring system by advanced teaching apprentices or weekly meetings or seminars with the instructor in which the teaching apprentice presents data on his own behavior.

A very efficient, worthwhile and complex monitoring (observation and consequation) system can be developed over a few semesters. In
such a system all of the students in the class and all of the staff (students in the hierarchy) can receive frequent feedback and very complex skills can be taught with relatively little instructor time. The staff of such a system will learn valuable skills in the area of educational technology and systems analysis.

Depending on the size of the class the hierarchy can progress as follows. After being a student in the class, a person can become a teaching apprentice and after that, an advanced teaching apprentice, both for college credit. The next step is an undergraduate assistant and then a graduate assistant, both for pay. In developing and maintaining such a system the instructor's role depends, to a large extent, on the experience of the staff in terms of maintaining and designing behavioral systems. Other variables affecting the instructor's role are the extent to which the setting is already behaviorally oriented and whether other students had previously worked as therapists in that setting. It is feasible that eventually the instructor would simply specify the behaviors of the students and staff and give feedback at all levels of the hierarchy, but more frequently to the graduate and undergraduate assistants.

To generate and maintain a high quality of staff over a period of semesters, the instructor and staff members should hire new staff members that will work in the system for a relatively long period of time. That is, if a sophomore and junior had the same qualifications for the job, it would be more advantageous to the system to hire the sophomore. Other strategies to maintain high quality staff are to have the staff members at one level train the staff at the
previous level to fill their positions and to have the more advanced staff write a manual that specifies all of the duties for all aspects of the course. The manual can be revised each semester by the advanced assistants.

In order for the student's (and staff's) behavior to be effectively consequated, a reinforcement system must be developed. One of the most objective and effective systems is a point system where the final course grade is based on the per cent of total points earned. Each assignment, laboratory report section, and daily laboratory activity is given a total possible point value, and the student's papers are scored according to pre-specified criteria.

The number of points earned by each student should be kept up to date and made available to the student. As a result, the student will always know exactly where he stands in terms of his course grade.

Course Description

A description of Psychology 350, an applied laboratory course based on the principles and rules described above, follows. The course began in the fall of 1973 and this description is based on the course as it was in the winter semester of 1974. Many improvements were made. There are still many to be made. Some specific improvements for the next semester, fall 1974, are discussed.

Laboratory settings

The students did their laboratory work in one of two programs
at Grand Prairie School. This school housed only these two pro-
grams. Both programs ran from approximately 8:30 a.m. to 2:30 p.m.,
Monday through Friday, and were funded through the local interme-
diate school district. Most of the people in the administration
at both centers consisted of former psychology students at Western
Michigan University. They all had a background in behavioral psy-
chology and both programs were based on behavioral principles. A
description of each of the programs follows.

The Day Training Center (DTC) served 36 severely retarded chil-
dren. When the children were not participating in a one-to-one
therapy situation, they were in a classroom situation with a teacher
working on group skills. The children were placed in specific
classrooms according to their behavioral skills. The DTC had 240
hours of paid staff per week (teachers and therapists).

In the other setting, Kalamazoo Valley Multihandicap Center
(KVMC), 47 multiply handicapped children attended. They were di-
vided into components based on their behavioral skills. Each com-
ponent had a supervisor responsible for each child in the component.
When not engaged in one-to-one therapy, the children worked in small
groups with other children with similar problems. KVMC had 520
hours of paid staff per week (therapists and supervisors).

In each setting, each child's time was divided into twelve half-
hour periods. For the majority of the periods the client was in a
one-to-one therapy situation with a therapist. The behavior(s) to
be worked on was specified for each period. Both programs had a
token economy system.
Classes

There were 74 students enrolled in the applied laboratory for the applied Psychology 350 laboratory at Western Michigan University. Fifty-two of them were completing the course in the Student Centered Education Project (SCEP). In this curriculum the students complete a "package" of two or three psychology courses in one semester (six to twelve credit hours). They study in class and take two or three quizzes daily. At the end of each course, a final examination over the readings is offered. The classes run from 1:00 p.m. to 4:30 p.m. four days per week. In addition to this, the students who sign up for the junior-level psychology course as part of the "package," are required to do two laboratory projects at the community settings (DTC or KVMC), or as teaching apprentices in the introductory psychology class or in SCEP; or four laboratory projects in the experimental laboratory. Twenty-eight students from SCEP enrolled for the laboratory sections at the community settings which ran one hour per day, five days per week. Only the laboratories at the community settings will be discussed, although the contingencies for all of the laboratories are similar.

The other 25 students enrolled for the course in the regular curriculum. They had weekly quizzes over reading assignments that were studied outside of class. A midterm and final examination over the readings were offered. In addition to this, they were also required to complete two laboratory projects at the community setting (DTC or KVMC) and their laboratory sections also ran one hour per day, five days per week.
Of those who signed up to do their laboratory projects at the community settings, approximately half of the students from each class worked at each setting. For both settings, each student was assigned to work with two children for one-half hour each.

**Monitoring system hierarchy**

A monitoring system hierarchy was developed to effectively observe and consequate the behavior of a large group of students. If a student received an "A" grade in the course, he was eligible to become a teaching apprentice or, in this case, research apprentice (RA) for course credit. The duties of an RA consisted of being at the laboratory setting and available to the student for questions at a specified one hour block, five days per week. The RA was also responsible for the students in that specific laboratory time; the RA graded all of the laboratory quizzes, assignments and laboratory reports for those students; monitored and consequated the students' daily activities; and recorded, on an RA sheet, the points earned for each activity and assignment.

There was one part-time (ten hours per week) undergraduate assistant (UGA) and one part-time graduate assistant (GA) at the laboratory setting. Their duties consisted of recording the data from the RA sheets (which contained daily data on each student) into the gradebook, posting the points in the hallway from the RA sheets, handling any student problems that could not be solved by the RA on duty, and monitoring the RA's duties, and grading of laboratory reports. However, they were not on duty for any specific laboratory...
hours.

A full-time (twenty hours per week) graduate assistant was responsible for coordinating all aspects of the laboratory. The duties consisted of monitoring the UGA and GA at the laboratory, attempting to resolve any problems that could not be solved by the UGA or GA at the laboratory, and having frequent contact with the instructor of the course and the administrators of the setting.

History of the assistants. Many of the staff members had experience working in the Experimental Psychology 350 class (mentioned earlier), which is a highly structured, contingency managed, experimental laboratory course. One of the RAs and the part-time undergraduate and graduate assistants had been RAs in the experimental course for one semester. The part-time undergraduate assistant had previously worked for one semester as an assistant for the experimental psychology course, and was also working for the experimental course during the current semester. The full-time graduate assistant had previously worked in the experimental class for six semesters. In general, the staff had quite extensive experience in the maintenance and design of behavior systems. Even so, the instructor played a major role in the design and maintenance of the system.

Meetings. The full-time graduate assistant had one-hour weekly meetings with the instructor. Every third week the part-time GA and UGA were required to attend this meeting and the administrators at the setting were invited to attend. The GA and UGA from the laboratory also had one-hour weekly meetings with the full-time graduate assistant.
Seminars. Weekly seminars were held to increase the probability of having staff members knowledgeable in the area of the laboratory and to increase the academic-social interaction between the staff. One of the RAs who had previously taken part in a similar seminar conducted the two and one-half hour weekly seminar. All of the RAs took the seminar for course credit and the part-time GA from the laboratory attended the seminar but did not enroll for credit. The administrators from each setting attended on alternate weeks and helped lead the discussion. The instructor intermittently attended for short periods of time.

The content of the seminar consisted of three parts. One part was a detailed discussion of a journal article or other readings related to the field of the laboratory, followed by a short quiz over the reading. One of the RAs presented the procedure and results of a project of one of the students during his laboratory hour. This resulted in the RA being quite familiar with the projects of most or all of his students. The third part of the seminar consisted of a discussion of laboratory problems and suggestions for their improvement.

Assignments

A laboratory manual, specifying the course assignments and contingencies, was written by the assistants.

Daily laboratory activities. Five points per day were available contingent upon the correct completion of laboratory activities. The daily laboratory activities consisted of signing in, signing out,
and initialing any new notices on the bulletin board (1 point); conducting both therapy sessions for the full twenty-five minutes (2 points); cleaning the therapy area after each session (1 point); and accurately recording and plotting data for each subject (1 point).

The research apprentices monitored the activities and posted the number of points earned daily on a grade sheet in the hall at the setting. If points were lost, the student's name and the reason for the point loss were written on a point loss sheet that was posted next to the grade sheet.

Laboratory quizzes. At the beginning of the semester, the students took several quizzes during the laboratory hour. The quizzes covered the laboratory manual, a description of the setting and its rules, and information about the children with whom the student was assigned to work.

Behavior inventory sheets. The students were required to complete a Behavior Inventory sheet for each of his assigned children. The sheet specified four behavior problems of the child, the reinforcers for the child, and the method by which undesirable behavior was consequated.

Progress reports. At the end of each month a report on the progress of each child was due to keep the staff at the setting up to date.

Procedure sheets. The students were required to design a procedure for each child. The measurement guide in the manual described research designs, behavior definitions, recording techniques, reliability checks, and graphing procedures. The staff at the setting
also helped the student design the experimental procedure. The students handed in a completed procedure sheet which was graded by the regular graders and the staff at the setting and returned to the student. Any errors pointed out by the graders were corrected by the students and the sheets were posted next to their graphs in the hall at the setting. There was no chance for the students to remediate points lost on the procedure sheet.

Laboratory reports. Two laboratory reports were required. Each report was written in three sections: (a) introduction, (b) method, and (c) abstract, results and discussion. The appropriate format and content for each section along with the objective criteria according to which the reports were graded was specified in detail in the laboratory manual. A sample laboratory report completed by one of the former students was also included in the manual.

For each section of the report, the student was required to turn in a rough draft worth five grade points. It was to be written to meet all of the specifications for a final report, except that it could be written in longhand instead of typed. The rough draft was graded and returned to the student. There was no opportunity for making up grade points lost on rough drafts. The student then rewrote the report section making all of the corrections on the rough draft specified by the grader. It was then typed in the format specified in the manual, attached to the rough draft and handed in. This new section was called the original and was worth twenty grade points. It was graded and returned to the student. If the report section was acceptable, 0-3 error points (as specified in
the laboratory manual) lost, the student received the full twenty
grade points and was finished with the section. If 4–8 error points
were lost, the student received only five grade points for the sec­tion and an opportunity to rewrite it to earn the other fifteen
grade points. If more than 8 error points were lost, the student
earned no grade points for the original, but an opportunity to earn
fifteen grade points on a rewrite. In both cases, the errors on
the original that were specified by the grader were corrected and
the report section was retyped. It was then attached to the ori­
ginal and rough draft and handed in. The final number of grade
points for a report section was the sum of scores on the rough
draft, original and rewrite for a total possible of twenty-five
points. To avoid confusion, each writing section (i.e., rough draft,
original and rewrite) of each report section (i.e., introduction,
method and abstract, results and discussion) had a cover sheet at­
tached to it which specified the student's name, grader's name, date,
writing section, and report section.

Report sections were due on dates specified on a calendar in
the laboratory manual. The graders were given two days from the
time a report section was turned in to grade it and return it to
the students. The students were given two days from the time they
received a graded rough draft or original to turn in an original
or a rewrite, if necessary. Any late laboratory report writing
sections resulted in the loss of one point from the final score of
the late section, except in the case of an excused absence. (See
the description of the absence policy in this section.)
**Introduction reference critiques.** Since writing an introduction section of a laboratory report was such a difficulty task, it was broken into smaller units. For each study the student was required to find three relevant published articles and summarize them on the introduction reference critique forms. These forms asked for brief descriptions of the subject, procedure, results, conclusions and significance of the study, differences between studies, and other possibly valuable references listed. These forms were graded and returned to the student to use in writing his introductions. This procedure seemed to make the task a little easier and resulted in introduction sections of higher quality.

Copies of many articles relevant to the studies being conducted were held on reserve at the university library. This made it easier for the students to locate the articles and very little time was needed in library search. The setting is also in the process of constructing a reference library of its own that will be available to the students.

All of the previously mentioned assignments were an attempt to specify, observe and consequate the students' behavior.

**Orientation**

On the first night of the semester a general orientation meeting was held at the university. All students who planned to do an applied laboratory for credit were required to attend. People from each setting presented their program and then the students chose a program. The students filled out a form indicating their name,
telephone number, the class for which they were enrolled, the program they desired to work in, and the time that they would work there. They also indicated whether they had a car and if so, whether they would be willing to drive other students to the center each day.

From this information a sheet was posted with a list of the names, telephone numbers, and therapy time of the students who would drive. The students without cars then arranged their own transportation. In general, the car pools worked well; however, one car broke down halfway through the semester so the university provided a state car for that laboratory hour for the remainder of the semester.

The staff from the settings then took the sheets filled out by the students and scheduled them to work with specific children. The students began working in the laboratory setting the next day.

During the first week of the semester, the students are expected to make many novel responses. In an attempt to reduce the amount of confusion, for the first two weeks the students were provided with daily check sheets that listed activities to be completed for the day. This was done to provide as many discriminative stimuli as were feasible for the desired behavior. For the first two weeks the students were required to complete the duties on the checklist, sign it, and hand it in to earn the five daily-activity points. The checklists seemed to reduce the amount of confusion as compared to the previous semester, and they also reduced student aggression resulting from point loss.
Absence and tardiness policy

A distinction was made between excused and unexcused absences. Excused absences included such cases as illness, death in the immediate family, official university academic or sporting events in which the student was a participant, professional meetings and court appearances. If the students thought their absence should be excused, they completed and submitted a petition for an excused absence on the day of their return to the laboratory. To be excused it was necessary that the absence petition be accompanied by some legitimate verification, such as a doctor's excuse, funeral notice from the newspaper, or a note from someone who was involved (university administrator, coach, etc.). If the students were sure that their absence was unexcused (i.e., they slept in or were drinking coffee in the union), there was no reason to complete a petition.

The student was allowed four unexcused absences with no penalty. On the fifth unexcused absence the final grade was lowered one letter grade as shown in the table below. Fifteen excused absences

<table>
<thead>
<tr>
<th>NUMBER OF EXCUSED OR EXCUSED AND UNEXCUSED COMBINED</th>
<th>NUMBER OF UNEXCUSED</th>
<th>CONSEQUENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-15</td>
<td>1-4</td>
<td>No penalty</td>
</tr>
<tr>
<td></td>
<td>5-8</td>
<td>Drop 1 letter grade</td>
</tr>
<tr>
<td></td>
<td>9-12</td>
<td>Drop 2 letter grades</td>
</tr>
<tr>
<td></td>
<td>13-15</td>
<td>Drop 3 letter grades</td>
</tr>
<tr>
<td>over 15</td>
<td>over 15</td>
<td>Drop the course</td>
</tr>
</tbody>
</table>

or excused and unexcused absences combined were allowed with no penalty. If a student missed more than fifteen classes (excused or excused and unexcused combined), he had missed too many classes and
was required to drop the course.

While no single absence is very harmful, continuous absences can hamper a student in the completion of the laboratory assignments. As a result, the final grade may be affected. Also, unlike other courses even those with an animal laboratory, an absence from this course affects the children with whom the student is working. This may not have only serious academic, but serious social implications. Although this absence policy sounds fairly strict, a very small percentage of the students had enough absences to affect their final grade. Since each therapy session was conducted for only one-half hour, it was important that no time be wasted. A student was counted tardy if he was not working with his assigned child by three minutes after the assigned time. Tardiness was consequated according to the following table.

<table>
<thead>
<tr>
<th>NUMBER OF TARDINESSES</th>
<th>CONSEQUENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>No penalty</td>
</tr>
<tr>
<td>5-8</td>
<td>Constitutes 1 unexcused absence</td>
</tr>
<tr>
<td>9-12</td>
<td>Constitutes 2 unexcused absences</td>
</tr>
<tr>
<td>13-16</td>
<td>Constitutes 3 unexcused absences</td>
</tr>
</tbody>
</table>

If the student felt that a tardiness was justified, an absence petition was turned in.

Earning points lost due to absences. Since time was needed to reschedule the children if a student was absent, no absence was excused if the student did not notify the setting of his absence at least one-half hour before his schedule time to work. If this were done, the student was given two of the five daily activity points
for the day.

To make up the other three daily activity points (whether the absence was excused or unexcused) the student worked at the setting for an additional one and one-half hours within one week of the absence. During this time the student worked with a child whose therapist was absent or helped in setting up the reference library at the setting.

Any quizzes missed as a result of absences (excused or unexcused) could be made up within one week of the absence. Also, there was no penalty for assignments that were late as a result of excused absences. However, if assignments were late as a result of unexcused absences, the penalty was the loss of one point for each day late.

Course grade

The course grade was based on the percentage of the total possible points earned for daily laboratory activities and assignments, and quizzes over assigned readings; and the percentage scores from the midterm and final combined or the final alone (whichever was the highest), for regular Psychology 350 and the percentage score from the final for SCEP 350. The exams covered the assigned readings. They were optional and could not lower the student's grade. However, the highest grade a student could earn without taking them was a "B." The exams served as a quality control check to demonstrate that the students had mastered the material on a cumulative basis as well as a daily (SCEP) or weekly (regular) basis.

The criteria for an "A" grade in the course were at least 90%
of the total possible points and 90% or above on the midterm and final combined or on the final alone. The midterm and final grades affected the course grade in the following manner:

<table>
<thead>
<tr>
<th>PERCENTAGE OF TOTAL POSSIBLE POINTS</th>
<th>AVERAGE % OF MIDTERM &amp; FINAL OR % OF FINAL ALONE</th>
<th>COURSE GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>90%-100% (B)</td>
<td>90% or above (A)</td>
<td>A</td>
</tr>
<tr>
<td>80%-89% (C)</td>
<td>80% or above (B)</td>
<td>B</td>
</tr>
<tr>
<td>70%-79% (D)</td>
<td>70% or above (C)</td>
<td>C</td>
</tr>
<tr>
<td>60%-69% (E)</td>
<td>60% or above (D)</td>
<td>D</td>
</tr>
<tr>
<td>59% or below (D)</td>
<td>59% or below (E)</td>
<td>E</td>
</tr>
</tbody>
</table>

The exams could not lower a student's grade, but they could raise the grade by one letter grade.

Therapy evaluation

Each student's work with each child was evaluated once a week by experienced therapists (monitors) provided by the setting. An evaluation sheet listed fourteen desirable "therapist" behaviors, such as delivering reinforcers immediately and recording data accurately. This scale was partially based on the Training Proficiency Scale described by Gardner, Brust and Watson (1970), in which behavior modification skills were broken down into components. Each behavior was assigned a point value from one to five with the higher point values for the behaviors considered most important. The monitor marked one of three categories for each behavior: the "yes" category, if the student was consistently emitting the behavior; the "no" category, if the student was not consistently emitting
the behavior; or the "not applicable" category. The monitor made comments on the back of the evaluation sheet for each behavior marked "no," and also on any exceptionally good therapist behaviors. The total points for each behavior marked "yes" were added and the sum was divided by the sum of the total points for each behavior marked "yes" and the total points for each behavior marked "no." The quotient was then multiplied by 100 as follows:

\[
\frac{\text{Total "yes" points}}{\text{Total "yes" points & Total "no" points}} \times 100 = \%.
\]

The percentage was then converted to grade points as follows:
90-100% = 5 points; 80-89% = 4 points; 70-79% = 3 points; 60-69% = 2 points; 50-59% = 1 point; and 0-49% = 0 points.

The students were given a form, along with the completed evaluation, on which they could rate the quality of the evaluation and give feedback to the monitors. Since the students were evaluated with each child each week, the total possible points per week for evaluations was ten.

Reliability checks

The student was required to have at least one reliability check for each phase of each study. Reliability is the degree to which two independent observers agree on the data being collected on the same subject during the same time period. Frequently a monitor that evaluated the student's therapy conducted a reliability check simultaneously. This consisted of the monitor reading a definition...
of the behavior being recorded and independently recording the behavior at the same time as the student. A percentage of agreement was then calculated.

Summary

This was a description of an education-behavioral system designed to meet specified objectives. The complexity of this system was possible because it was developed from a highly structured, contingency managed, experimental psychology course. If such a course were to be developed independent of other systems, it must be done gradually. That is, it would be desirable to begin with very few students and relatively few assignments. As the course is recycled each semester, and an effective monitoring system hierarchy developed, the student performance criteria can be raised and the quality of the course increased.

The course described was conducted in the winter of 1974 following one evaluation and recycling of the course after fall of 1973, the first semester that the course was offered. The second evaluation and recycling that is planned for next semester is discussed in the following section.
EVALUATION AND RECYCLING

Fall 1973

This course first began in fall of 1973. During the two weeks before the semester began, one of the graduate assistants prepared a course laboratory manual specifying the behavior of the students. With a staff consisting of one part-time (10 hours per week) undergraduate assistant, one part-time graduate assistant, and one full-time (20 hours per week) graduate assistant, along with approximately 30 students, the specification, observation and consequation of the students' behavior was not maximally effective. But the recycling of the course based on suggestions from instructor, staff, setting administrators, and students resulted in many necessary changes. The major change was the development of a course hierarchy including RAs, students, undergraduate assistants and graduate assistants. With such a hierarchy of students, it is possible to effectively teach complex skills to a large number of students at a very low cost. A change that is planned for next semester is to develop a more systematic training program for the RAs and assistants in the hierarchy. An RA and assistants' manual has been written and checklists may be used by them during the first few weeks of the semester.

In general, the course during winter 1974 was a great improvement over the course during fall 1973, and the next semester, fall 1974, should be still better.

35

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Settings

For next semester (fall 1974) the same settings (DTC and KVMC) will be utilized. The administration of both programs viewed our goals as reasonable and were very cooperative in helping us reach those goals.

Monitoring System Hierarchy

There were many problems with the monitoring system used this semester. Probably the major problem was that the training of the RAs was inadequate. As a result, a frequent complaint listed by the students on the course evaluations was that the RAs were not very helpful, and their report grading was inconsistent. In addition to grading laboratory reports, most of the RA's duties consisted of monitoring the students' behaviors of signing in and out and graphing data, and recording this information on the RA sheets. However, next semester the RA's duties will consist of grading the students' laboratory reports and monitoring the students' therapy. The students' therapy will still be evaluated by the more experienced staff at the center also. Hopefully, these duties will give the RA a more valuable experience. Also, an RA manual that specifies the duties of the RAs has been written. However, the guidelines by which laboratory reports are graded or any other material that is directly relevant to the student is specified in the students' laboratory manual.

There will also be a paid undergraduate assistant (UGA) in
addition to the RA on duty during every laboratory hour. A person would be eligible for consideration for this position if he had received an "A" in the course itself and an "A" in the RA course. The duties of the UGA will be daily monitoring of the students' attendance and graphing of data, keeping the gradebook up to date, monitoring the RA's duties, revising the course, rewriting the students' laboratory manual and the RA manual for the following semester, and answering questions from the RAs and students.

In order to better control the quality of laboratory reports, the GA will hold a grading session for each section of the first report. At this session the RAs will grade the laboratory reports and the GA will be available to clarify the grading guidelines in the manual. For the other laboratory reports the grading will be closely monitored by the UGA and feedback will be given on at least 20 percent of the graded laboratory reports for each RA.

In addition to the grading sessions, the GA will hold weekly meetings with the UGAs. The RAs will be required to attend every third meeting.

Daily Laboratory Activities

The number of points available for daily laboratory activities will be changed from five to four per day and the students will receive one instead of two points for calling in if they are going to be absent. As a result of this change, the percentage of the total possible points for the laboratory made up by the daily laboratory points will be decreased. This will be more appropriate
since, although the daily behaviors are desirable, they are not directly related to the goals of the course (writing, therapy related behaviors, etc.).

Behavior Inventory Sheets

The information required on the Behavior Inventory sheets was given to the student at the beginning of the semester, and the student was quizzed over it. The Behavior Inventory sheet was redundant; therefore it will be eliminated next semester.

Progress Reports

The staff of the programs had fairly close contact with the students and the subjects, and most of the progress reports were not used by the staff of the setting. Therefore, the progress reports turned out to be unnecessary busy work and will be eliminated for next semester.

Procedure Sheets

The students had some difficulty in designing procedures. We finally realized that we had not taught that skill, nor had any previous psychology class in the sequence. The students were concerned that their procedures might not be optimal for the children. Therefore, next semester the students will be given a 5" x 7" index card with a specific procedure on a procedure sheet provided. It will be checked by the staff at the center and the RAs, and then be posted next to the student's graph at the center.
Laboratory Reports

Next semester the student will be required to write four laboratory reports. The first two laboratory reports will be written on the projects carried out with the two children. The next two laboratory reports will be started about halfway through the semester. They will consist of proposals for projects for each of the children to be carried out during the next semester. By doing this, the student will learn how to design a procedure and acquire more experience at writing laboratory reports. At this point in the semester, it will be easier for the student to design a procedure than it was at the beginning of the semester since the student will be familiar with the child's behavior. The students will have had contact with specific procedures by conducting two studies at the setting for about eight weeks and reading at least six published studies to write their introductions. The proposed study would be graded by the regular graders along with the staff at the setting. By having the staff at the setting help in grading the laboratory reports, there will be a high probability that the proposed projects will be conducted by students during the following semesters. In this way we hope to teach the students some useful skills, such as designing research therapy projects, without any detrimental effect to the children.

The format of the laboratory reports will be changed from the standard American Psychological Association format to a systems analysis format (similar to the format of this paper). This new
format will basically follow the six phases of systems analysis as listed in the Introduction section: an analysis of the current system, a statement of the objectives of the system, the design of a new system, and the implementation, evaluation and recycling of the new system. This format includes all of the information in the American Psychological Association format along with other relevant information.

This change in format for laboratory reports resulted from an addition to the specified objectives of the course. In addition to attempting to teach the students behavioral analysis, we wanted to specifically teach system analysis. The students were already learning to design systems for the children they were working with based on behavioral analysis and systems analysis. That is, they designed procedures and if the procedures failed to result in a behavior change, they unsystematically evaluated and recycled the procedure. By writing the laboratory reports in a systems analysis format, the students will be required to systematically analyze, evaluate and recycle their projects (behavioral systems) with the children. A final change related to laboratory reports will be made for next semester. The rough draft writing section will be eliminated. Very few students were required to write a rewrite section for any report section since most students earned all of their grade points on the rough draft and original writing sections. Therefore, it seemed that two writing sections were adequate.
Orientation

The orientation meeting held on the first night of the semester resulted in general confusion and many students failed to attend. Next semester this meeting will be eliminated and the students will fill out forms requiring relevant information during the first laboratory meeting at the university. The students will be assigned to a setting (DTC or KVMC) unless they request a specific setting. The staff at the setting will be given the relevant information from which they will schedule the students to work with specific children.

The laboratory quizzes were previously administered at the laboratory setting. The time and space was limited, and there was much confusion. This resulted in some students failing to complete all of their laboratory quizzes. Next semester the students will complete all of the laboratory quizzes at the university during the first four days of the semester. As a result, they will be familiar with the course policies, the center at which they will be working, and the children with whom they will be working before they begin at the center on the fifth day of the semester.

In addition to completing the laboratory quizzes, during the first four days of the semester the students will view videotapes of previous students conducting therapy and some role-playing will be conducted. Also during this time, car pools will be arranged.

The checklists used during the first two weeks at the center seemed to clear up a lot of confusion and will be continued for next semester.
SUMMARY

Hopefully, the changes planned for next semester will change the environment so that most of the students will earn at least 90% of the total possible points.

The performance criteria are raised, but better specification, observation, and consequation of the students' behavior will increase the probability that most students will master more of the criteria, and as a result, receive higher final grades.
SECTION II

INTRODUCTION

The course just described had many complex contingencies in effect. In evaluating any course as a system, the contribution of each contingency to an effective education system should be considered (Wodarski and Buckholdt, 1972). With empirical data on the effects of each contingency, it is possible to determine which are essential. Certainly it would be a waste of administrative time to maintain certain contingencies or policies if they were not functional in helping the student meet the educational objectives of the system. The following studies represent an evaluation of two contingencies.

The present study investigated the effects of penalties as compared to no penalties for absences and guidelines as compared to deadlines for assignments. The subjects were students enrolled in a junior level psychology class. The students conducted projects with multiply handicapped and severely retarded children at two community settings. The regular course policy was that the final course grade was lowered as a result of excessive absences, and late assignments were consequated by the loss of grade points. For some of the students one or both of these consequences was removed.
Attendance

In an introductory psychology course Malott and Svinicki (1969) suggested a correlation between unexcused absences and grades. Most of the students with fewer than four unexcused absences earned "A's" or "B's" and students with more than four unexcused absences received grades of "C" or lower. This was not necessarily a causal relationship, but it was a reasonable outcome. For each unexcused absence the student lost the opportunity to earn a certain number of points. Although one absence would not be very harmful in this case, a large number of unexcused absences would decrease the number of points earned and therefore, affect the final grade. In some cases (Johnston and Pennypacker, 1971) the criteria for the final grade were adjusted as a result of excused absences (i.e., illness, death in the family, etc.).

If attendance is related to the final grade, then it is desirable that the student attend class. A system must be designed in which attendance is differentially reinforced. That is, attendance must be immediately followed by reinforcing consequences and non-attendance must not be followed by reinforcing consequences or must be immediately followed by punishing consequences (Michael, in press).

In a study by Lloyd and Knutzen (1969) one grade point for each attendance up to thirty was given, with a minimum of eight required. Another incentive system was used in controlling the tardiness of industrial workers. Small daily monetary bonuses, contingent upon
arriving to work on time, decreased the amount of tardinesses to close to 0% (Hermann, De Montes, Dominguez, De Montes and Hopkins, 1973).

Keller (1968) utilized lectures as reinforcers for the completion of certain assignments. However, only about 50% of the eligible students attended these lectures.

Lloyd et al. (1972) suggested that neither the topic nor the lecturer affected attendance at university lectures, even when the lecture was vaguely related to some behavior in the future. However, when points toward a grade or information for a future quiz was given in the lectures, attendance increased.

As a result of the correlation suggested between attendance and grades in an introductory psychology course, an absence policy was designed and implemented. An absence was excused only if it could be verified as legitimate. The result of an unexcused absence was loss of credit for the day, and more than four unexcused absences resulted in a grade of "F" for the course. This policy greatly reduced the number of unexcused absences (Malott and Svinicki, 1969).

In the course described by Malott and Svinicki (1969) the relationship between attendance and the final grade was not explicit and immediate enough to control attendance. Attendance seems to be a function of the immediate contingencies in effect. In some situations an explicit absence policy may be necessary, and in other situations it may not.

In the course discussed in this paper the students were fairly advanced and they were working with children. The consequences for
not attending the laboratory session were of two types, social disapproval and the loss of points toward a grade. If a student was absent, his child did not receive therapy for that session, and the student received social disapproval from the staff at the center when he returned. Also the student lost the daily maintenance points which could be made up by working additional time at the center.

The purpose of this study was to determine whether an explicit absence policy was needed to control attendance.

**Deadlines**

One of the major characteristics of a personalized instruction system is self-pacing (Keller, 1968). In such a system the student can progress at any pace according to his individual rate of mastery of the material and other demands on his time.

Most of the studies relating to personalized instruction are not entirely student-paced. They fall in the middle of the continuum between student-paced (student can progress at his own rate without any contingencies specified by the instructor) and instructor-paced (instructor specifies and consequates the rate at which the students progress). The systems that most closely approximate being student-paced are those that give grades of incomplete (I) to any student who fails to complete all of the assignments (Myers, 1970; Lloyd and Knutzen, 1969). However, there is usually a deadline specified by the university as to when the course must be completed.

In some instances incompletes are given only for special cases
(Keller, 1968), and the end of the semester acts as a final deadline for completing all of the assignments (Sheppard and MacDermot, 1970).

The most common problem with personalized instruction systems is that many students do not begin working early in the semester and maintain a steady rate. As a result, they do not complete the course activities. In a study by Sheppard and MacDermot (1970) it was found that once the students began working, their rates remained quite steady. Also, the students who began working earlier in the semester tended to receive higher final grades than those who began later in the semester. However, only about one-third of the students in the class earned an "A." It was suggested that the number of activities for course completion be decreased or that the duration of the course be lengthened. However, the problem could be easily resolved by the addition of some instructor-paced contingencies.

Lloyd and Knutzen (1969) specified the number of points that a student needed by a date three-quarters of the way through the semester to earn an "A." However, there were no contingencies provided to encourage the student to begin working and maintain a rate high enough to earn these points. As a result, very few students met the criterion, and it was lowered so that more students had a chance to reach it. In this case the imposed deadline was not effective in maintaining the students' behavior. The authors suggested that due dates be specified throughout the semester.

In a study by Born, Gledhill and Davis (1972) the students were required to have completed a certain number of assignments in order
to take the midterm and final exams which were scheduled on specific days. These deadlines were effective in controlling the students' behavior.

Keller (1968) used an effective contingency in helping students begin the course early in the semester. If the students did not pass at least one test within the first two weeks of the semester, they were required to drop the course. This contingency helped students begin the course early but did not provide any consequences for maintaining a high, steady rate of studying behavior.

In a recent analysis of four different self-pacing contingencies, a minimum rate line showing a reasonable rate of progress was used to initiate and maintain a steady rate of responding (Semb, Conyers, Spencer and Sosa, 1973). There were not contingencies for test-taking behavior for students in one group. These students had a low rate of assignment completion at the beginning of the semester and a very high rate at the end of the semester. About one-quarter of these students failed to complete the course. Students in three other groups operated under explicit contingencies. These contingencies were point loss, point gain, and extra points for quizzes taken when the student was either above or below the minimum rate line. The results indicated that the students in groups with explicit point contingencies maintained a fairly steady rate over the semester with very little difference between groups. The students in these groups began taking quizzes early in the semester, and less than ten per cent of them failed to complete the course.
Many courses are designed to insure that students maintain a steady rate of course-related behaviors throughout the semester. Deadlines are specified by the instructor, and consequences for meeting or failing to meet these deadlines are enforced (Malott and Svinicki, 1969; Cooper and Greiner, 1971; Bostow and O'Connor, 1973; Stalling, 1971; Mawhinney, Bostow, Laues, Blumenfeld, and Hopkins, 1971). In these systems the students are required to take the quizzes at a specific time; however, they can study for different lengths of time, depending on their rate of mastery of the material and other demands on their time. So in that sense, most systems are student-paced (Malott and Svinicki, 1969).

The shorter the intervals between quizzes, the more steady the rate of study is. In a study by Mawhinney et al. (1971) the patterns of students' studying behavior were compared on daily, weekly, and three week quizzes. The results indicated that the students studied a small amount each day for daily quizzes, while the studying became more variable with weekly and three week quizzes. The rate of studying was low following a quiz and increased gradually to a high rate just before the next quiz. This effect is called the scalloped effect. In two other studies, Ferster (1968) and Lloyd and Knutzen (1969), the pattern of assignment completion over the entire semester was scallopped also. Probably assignment completion is a direct function of study behavior. In general, it seems that the only way in which class related behaviors can compete with other demands on the student's time is if the behaviors have limited temporal availability (i.e., due dates), and if they are differentially consequated.
(i.e., student is reinforced if behavior occurs and not reinforced or punished if it does not occur), (Michael, in press.)

The purpose of the present study was to determine whether it was necessary, when due dates were specified, to administer late points for late laboratory reports in order to maintain a steady rate of laboratory report writing behavior.
METHOD

Procedure

The students were placed in one of four preliminary categories according to the class they were taking (SCEP or the regular psychology class) and at which setting they worked (DTC or KVMC). Then the students in each category were randomly assigned to one of the four groups so that the number of students from each category were approximately equally divided among the following subgroups: 1) no absence penalty -- laboratory report guideline group, 2) no absence penalty -- laboratory report deadline group, 3) absence penalty -- laboratory report guideline group, 4) absence penalty -- laboratory report deadline group.

Absence penalty and no absence penalty groups

For the absence penalty group (sub-groups 3 and 4), a distinction was made between excused and unexcused absences. Only an absence which could be verified as legitimate was excused. The students were allowed 15 excused absences with no grade lowering penalty. On the fifth unexcused absence the final course grade was lowered one letter grade as shown below. However, if a student had more than 15 total absences, he was required to drop the course. There are some circumstances under which an incomplete will be given. This contingency was not designed as a punishment contingency to prevent students from having a large number of absences, but rather
to prevent students from getting too far behind in the course. No one absence is harmful, but the higher the number of absences, the lower the number of points earned and therefore, the lower the grade.

<table>
<thead>
<tr>
<th>NUMBER EXCUSED OR EXCUSED AND UNEXCUSED</th>
<th>NUMBER UNEXCUSED</th>
<th>CONSEQUENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-15</td>
<td>1-4</td>
<td>No penalty</td>
</tr>
<tr>
<td>5-8</td>
<td>Drop 1 letter grade</td>
<td></td>
</tr>
<tr>
<td>9-12</td>
<td>Drop 2 letter grades</td>
<td></td>
</tr>
<tr>
<td>13-15</td>
<td>Drop 3 letter grades</td>
<td></td>
</tr>
<tr>
<td>over 15</td>
<td>Drop the course</td>
<td></td>
</tr>
</tbody>
</table>

The students in the no absence penalty group (sub-groups 1 and 2) were exempt from this last policy. In other words, the number of absences from the laboratory did not lower their final grade. However, the daily point contingency for absences was still in effect. The absence data were recorded weekly by the experimenter from the sign-in and sign-out book which was completed daily by the students themselves.

Reliability checks

After the end of the semester, reliability checks were made by one of the undergraduate assistants on the sign-in and sign-out data from every other week. He recorded the data from eight specific weeks from the sign-in and sign-out book on a blank data sheet. There were no special marks made by the experimenter to indicate the data previously recorded. This sheet was then compared to the experimenter's data sheet. The number of agreements was divided by
the sum of the number of agreements and disagreements, and the quotient was multiplied by 100 to yield the per cent agreement:

\[
\frac{\text{NUMBER OF AGREEMENTS}}{\text{NUMBER OF AGREEMENTS AND DISAGREEMENTS}} \times 100 = \text{per cent agreement}
\]

Laboratory report guideline and laboratory report deadline groups

Each student was required to complete two laboratory reports. Both laboratory reports were divided into three report sections. For each assignment the student was required to submit a rough draft which was graded and returned two days later. Then a final copy, with all of the errors from the rough draft corrected, was turned in. If the final copy was still not acceptable (determined by an objective point scale), the students still had the option of receiving full points for the laboratory report section if it was rewritten with all of the errors on the final copy corrected (as mentioned in the Design section).

The due dates for handing in each section of the laboratory reports were specified on a calendar in the students' laboratory manual. They were approximately four days apart. This gave the grader two days in which to grade the report section, and the student two days in which to rewrite it. For the laboratory report deadline group (sub-groups 2 and 4) the contingency for late laboratory report sections specified that one point would be subtracted from the total points earned for the section for each day that it was late (unless the student had an excused absence for the due date). The students in the laboratory report guideline group (sub-groups 1 and 3) were

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exempt from the deadlines for handing in laboratory reports. They
lost no late points for handing in late laboratory report sections.
They were, however, told that they should follow the specified due
dates. The only contingency in effect for this group was that the
rough draft of all sections of both laboratory reports was due nine
days before the end of the semester; the final copy was due five
days before the end of the semester. These dates were specified
as the last dates that a report could be turned in and still have
a chance for a rewrite. After these dates one point was subtracted
for each day a section was late. This contingency was in effect to
increase the probability that all sections of each lab report would
be turned in and so the students would have an opportunity to rewrite
the reports if necessary. If lab reports were turned in after the
end of the semester, the students did not earn any points for them.

The research apprentices that supervised the students in the
laboratory setting and graded the laboratory reports were required
to complete a daily data sheet (RA sheet) for the students in their
section. This sheet included information as to which sections of
a laboratory report were handed in by each student. The RAs were
not informed by the experimenter as to which students were in which
groups. This was done to prevent any bias in the data collection
procedures. However, the students may have informed the RAs as to
the group they were in.

The students in sub-groups 1, 2, and 3 were informed as to
what group they had been placed in by a letter describing the new
contingencies for that group. The students in sub-group 4 were
under the normal course contingencies that were described in the course manual.

The experimenter recorded the dates on which specific laboratory report sections were handed in for each student. These data were collected weekly from the RA sheets. The same data were collected from the laboratory reports themselves after the end of the semester.

Reliability checks

Reliability checks were made at three different "levels."

First, an independent observer (one of the undergraduate assistants) recorded the data for specific days from the RA sheets on a blank data sheet. The RA sheets contained no special marks to indicate the data previously recorded by the experimenter. The observer's data sheet was compared to the experimenter's data sheet and an agreement was scored if the same student, report section and writing section were recorded. Otherwise a disagreement was marked. The number of agreements was divided by the sum of the number of agreements and disagreements, and the quotient was multiplied by 100 to obtain a per cent agreement. (See formula 1.) This type of reliability check was made for five different days for each of the six RAs. The per cent agreement was 96%.

The second type of reliability check was conducted ten times during the last three weeks of the semester. Each laboratory hour was checked twice, and a total of 80 laboratory report sections were checked. During a check the experimenter checked the dates
on the laboratory report sections handed in that day during that hour. The total number of laboratory reports with correct dates (defined as having that day's date) was divided by the total number of laboratory reports, and the quotient was multiplied by 100 to yield the per cent agreement.

\[
\text{[2] Total number of sections with correct date} \times 100 = \text{per cent agreement}
\]

The agreement was 100%.

The third type of reliability check occurred after the termination of the semester. A total of 96 laboratory reports were randomly selected, and their dates were recorded on a blank data sheet next to the student's name. These data were compared with the dates recorded on the experimenter's sheet. The number of agreements was divided by the number of agreements plus disagreements and the quotient was multiplied by 100 (see formula 1). The per cent agreement was 96.4%. A comparison of the experimenter's data from the RA sheets to those from the laboratory reports yielded an agreement of 98.3% (see formula 1).

The number of students in each group was: absence penalty group, 27; no absence penalty group, 26; laboratory report guideline group, 27; and laboratory report deadline group, 26.
RESULTS AND DISCUSSION

Attendance Results

A three-way analysis of variance (ANOVA) on the total number of absences for each student was made using absence policies (penalty and no penalty), settings at which the students did their laboratory work (DTC or KVMC), and the class for which they were enrolled (SCEP or regular Psychology 350). There was no significant difference between means for the absence policies ($f = 2.526$, $p \geq .119$) or the classes ($f = .484$, $p \geq .490$). However, the between means difference for settings was almost significant at the .05 level ($f = 3.998$, $p \leq .052$). For students working at DTC and KVMC the mean number of absences was 6.7 and 4.4, respectively. None of the interactions were significant.

Even though the results of the ANOVA were not significant, there seemed to be a fairly large difference between the means for the absence policies. The mean number of absences for the no absence-penalty group and the absence-penalty group was 6.15 and 4.77, respectively. Table 1 shows a breakdown of the mean number of absences. The numbers in parentheses are the number of students on which the mean score was based. Column and row means along with means for each main effect are shown.

The grand mean was 5.47 and the lowest number of absences a student could have was zero. However, the highest number of absences that a student had was 17, and there were nine students who


Table 1
The Mean Number of Absences

<table>
<thead>
<tr>
<th></th>
<th>SCEP</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>No Absence-Penalty Group</td>
<td>Absence-Penalty Group</td>
<td>Overall</td>
</tr>
<tr>
<td>DTC</td>
<td>8.2 (5)</td>
<td>7 (9)</td>
<td>7.43 (14)</td>
</tr>
<tr>
<td>KVMC</td>
<td>5.5 (8)</td>
<td>2.7 (6)</td>
<td>4.29 (14)</td>
</tr>
<tr>
<td>Overall</td>
<td>6.54 (13)</td>
<td>5.27 (15)</td>
<td>5.86 (28)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>APPLIED</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Absence-Penalty Group</td>
<td>Absence-Penalty Group</td>
<td>Overall</td>
</tr>
<tr>
<td>DTC</td>
<td>6.7 (6)</td>
<td>4.6 (5)</td>
<td>5.73 (11)</td>
</tr>
<tr>
<td>KVMC</td>
<td>5.1 (8)</td>
<td>3.7 (6)</td>
<td>4.5 (14)</td>
</tr>
<tr>
<td>Overall</td>
<td>5.79 (14)</td>
<td>4.09 (11)</td>
<td>5.04 (25)</td>
</tr>
</tbody>
</table>

Overall (SCEP + APPLIED) | 6.15 (27) | 4.77 (26)
Overall (DTC) | 7.36 (11) | 6.15 (14) | 6.68 (25)
Overall (KVMC) | 5.31 (16) | 3.16 (12) | 4.39 (28)

GRAND MEAN | 5.47 (53)

had more than 10 absences. The data was therefore positively skewed, and it is possible that an analysis based on ranks would reveal some clear cut differences. A Mann-Whitney U test was made for each of the three factors — absence policy, setting, and classes. These tests, however, were similar in outcome to the ANOVA. The difference between the total number of absences for the absence-
penalty group and the no absence-penalty group had a probability of $\geq .094$; for DTC versus KVMC the probability was $\leq .07$, and for SCEP versus regular Psychology 350 it was $\geq .23$.

To illustrate the pattern of absences over the semester, the mean weekly absences per student is shown in Figure 1 for the no absence-penalty groups and the absence-penalty group. During the final five weeks of the semester, students in the no absence-penalty group had a higher weekly mean for each week than students in the absence-penalty group.

Figure 2 shows the mean weekly absences per student working at DTC and KVMC. Toward the end of the semester, the mean weekly absences for students at DTC decreased while that for students at KVMC increased. Excluding week 15, during which the children from DTC were on vacation, students working at DTC had a higher mean number of absences for each week except weeks 14 and 16.

For the absence-penalty group about 62% of the students had less than five total absences, while approximately 44% of the students in the no absence-penalty group had fewer than five total absences. None of the students in the absence-penalty group had more than 12 total absences and approximately 15% of the students in the no absence-penalty group had more than 12 total absences. Figure 3 shows a frequency distribution of the number of students as a function of the number of absences.
Figure 1. The mean weekly absences per student: absence-duty versus no absence-duty.
Mean Number of Absences

- No Absence-Penalty
- Absence-Penalty

WEEKS

Mean Number of Absences

Spring Vacation
Figure 2. The mean weekly absences per student: DTC versus KVMC.
Figure 3. The number of students as a function of the number of absences.
Deadline Results

The students in the laboratory report guideline group were told that they should follow the due dates for laboratory report sections specified in the laboratory manual, but they did not lose any grade points for late reports. However, students in the laboratory report deadline groups lost one point from the total number of grade points earned on the laboratory report section for each day that the section was late.

A three-way ANOVA was made on the total number of late days for each student in the deadline and guideline group. The three factors used were deadlines (deadlines and guidelines), settings (DTC and KVMC), and classes (SCEP and regular Psychology 350). The mean number of late days was 106.1 for students in the guideline group, and 63.6 for students in the deadline group. An ANOVA showed this difference to be significant ($f = 4.98$, $p \leq .031$). The differences between the means for the settings and classes were non-significant ($DTC \bar{X} = 86.6$, $KVMC \bar{X} = 84$, $f = .009$, $p \geq .926$; $SCEP \bar{X} = 78.9$, regular Psychology 350 $\bar{X} = 92.4$, $f = .605$, $p \geq .441$). There were no significant interactions between any of the factors.

Cumulative records of the number of laboratory report sections turned in as a function of days is shown in Figure 4 for each report section (introductions, methods, and abstracts, results and discussions). Only the rough draft writing sections are shown, except in instances where only an original writing section, but no
Figure 4. The number of laboratory reports turned in as a function of days.
rough draft, was turned in. In that case, the date on which the original writing sections was turned in was plotted. The order in which the report sections were due was as follows: Method I; Method II; Introduction I; Introduction II; Abstract, Results and Discussion I; Abstract, Results and Discussion II.

The students in the deadline group always turned in more laboratory report sections on the due date for that section than the students in the guideline group. The students in the deadline group also had a higher number of writing sections (rough drafts, originals or rewrites) turned in throughout the semester, until the last few days. One exception was the last report section (abstract, results and discussion II) which was due only 12 days before the end of the semester.

If a student did not turn in any section of a report, the section was incomplete. If only a rough draft was turned in, or if a necessary rewrite was not turned in, the section was only partially incomplete. The per cent of incomplete laboratory report sections was very high for both groups -- 22.8 for the guideline group and 26.3 for the deadline group. The per cent of partially incomplete laboratory report sections was lower for both groups -- 9.9 for the guideline group and 6.4 for the deadline group. The deadline group had a slightly high per cent of incomplete laboratory report sections, while the guideline group had a higher per cent of partially incomplete laboratory report sections. An ANOVA showed that the difference between the means of the two groups in terms of incomplete and partially incomplete laboratory report sections was
non-significant ($f = .004$, $p \geq .952$).

The percent of rewrites necessary for the laboratory report sections was 10.7 for the guideline group and 4.3 for the deadline group. This was calculated by determining the number of laboratory report sections for each group in which a rough draft and original were completed, and then determining the number of rewrites necessary in those sections only. The difference between the mean number of rewrites for the guideline group and the deadline group was shown to be non-significant ($f = 2.198$, $p \geq .176$) by an ANOVA.

Attendance Discussion

Although the difference between the overall means for the no absence-penalty group and the absence-penalty group was not statistically significant, there was a difference of about 1.4 absences per student. This suggests that the absence-penalty policy decreased the total number of absences by $26 \times 1.4$, or 36.4. In a class of about 50 students, an absence penalty policy may serve to reduce the number of absences by $50 \times 1.4$, or 71. For an applied laboratory class in which the students work with multiply handicapped and severely retarded children, this may have serious implications. For example, 71 additional absences means that there are 142 therapy sessions (2 per day) in which certain children do not receive therapy.

The mean number of absences for both the no absence-penalty and absence-penalty groups, and students working at DTC and KVMC...
was relatively high during week 8. This week was the last week before the students had a one week spring vacation. Also, many classes (including regular Psychology 350) offered midterms during this week. The students in the penalty group may have taken one or more of their four unexcused absences that were allowed with no penalty.

The contingencies for students in the penalty group appear to have had their main effect during the last seven weeks of the semester. The large increase in the per cent of absences for students in the no penalty group could have been a result of many variables. In many courses the demand on the student's studying time increases at the end of the semester. For such courses this may be a result of procrastination on the part of the students in completing their work, or on the part of the professor in assigning the work. In SCEP and regular Psychology 350, the work load was evenly distributed throughout the semester and the contingencies were such that student procrastination was punished (except for handing in laboratory reports for the students in the guideline group). However, most of the students from SCEP and all of the students from regular Psychology 350 were enrolled in other courses. Since the students in the no penalty group did not have their final grade lowered as a result of the number of absences, the contingencies for other courses could have been stronger than those controlling attendance to the laboratory classes. However, the contingencies for the students in the penalty group may have effectively competed with the other demands on the student's time.
It is possible that this was also the case with midterms in other classes during week 8.

An ANOVA showed an almost significant difference between the mean number of absences for students working at DTC and students working at KVMC. A discussion of the relevant similarities and differences follows.

All of the students had the same daily maintenance points possible and they lost the same number of points for absences. The students from both settings had the same research apprentices who monitored their behavior and graded their laboratory reports.

Approximately the same percentage of students from both DTC and KVMC were assigned to one of the four groups. However, the structure of the settings was slightly different. In DTC, the children were in one of four classrooms with a teacher when they were not engaged in one-to-one therapy with a therapist. In the classrooms, the teachers worked with groups of children. If a student was absent, the children that the student worked with simply remained in the classroom and worked in a group with the teacher. Furthermore, the teachers at DTC had relatively little contact with the students and probably delivered little social disapproval for absences. The assistants at the DTC (who monitored the student's therapy) did not have consistent enough contact with each student to be aware of most of the absences.

In KVMC the children were assigned to components and each component had a supervisor. The children were scheduled for one-to-one or small group (2-4 children) therapy sessions with
therapists who had behavior modification backgrounds. The supervisors of the components either conducted therapy sessions with the children or monitored the student-therapist's behavior. If the students were absent from KVMC, the children remained in their components and did not receive therapy for that session. Therefore, the consequences for the student being absent from KVMC were depriving the children of therapy time, and social disapproval from the component supervisors.

Another difference between the two settings might be in the overall helpfulness of the teachers and supervisors. Some of the teachers at DTC had a very limited background in behavior modification, so if the students had questions about their children or about the procedures being implemented, they were required to ask one of the assistants who was not always available to every student. However, at KVMC the supervisors of the components were advanced psychology students who were skilled in behavior modification and prepared to answer almost any question that the students might have concerning their children or procedure.

At the end of the semester the mean number of absences for students at DTC tended to decrease while the mean number of absences for students at KVMC tended to increase. A possible explanation for the decrease in the number of absences for students at DTC is that the more subtle consequences for absences, such as the effects on the children as a result of missed therapy sessions, may have become more apparent. Also, the assistants at DTC may have started to give more social disapproval for absences. Another variable
affecting this decrease may have been the one week vacation for the children at DTC. The students working with these children may have wanted to conduct as many therapy sessions as possible before the end of the semester, and in order to do this, their attendance had to be high just before and after the DTC vacation.

In a study by Lloyd, et al. (1972) attendance to lectures was found to be a function of the specific attendance contingencies in effect, and was not controlled by the lecturer or content of the lecture. However, in the present study the variables other than the specific absence contingencies that might control attendance (i.e., variables within the setting) are quite different, and perhaps stronger, than those for a lecture.

Deadline Discussion

There was a significant difference in the mean number of days late between the guideline group and the deadline group. However, for the final laboratory report section turned in, the number of reports turned in for the guideline group was higher than the number of reports turned in for the deadline group, on the fifth day after the due date. This may have been due to the fact that most of the students in the deadline group had already turned in all of the other laboratory report sections and had received the grade points for them. Information as to which percentage category (90-100%, 80-89%, 70-79%, etc.) of the total possible laboratory points that each student's points fell, was posted in the hallways at the university and at the settings. Some of the students could
have lost late points without changing their percentage category. As a result, their rate of turning in the last section was relatively low. Also, since this report section was due only 12 days before the end of the semester, it was necessary for students in the guideline group (if most of them were to complete the section) to have a higher rate of turning in this section than the other sections. In general, the contingencies for turning in this section were similar for both groups.

There were no significant differences between means for the guideline group and the deadline group in terms of the number of incomplete or partially incomplete laboratory report sections. However, one of the major faults reported in self-paced systems is that students do not begin working early enough, and as a result, they do not finish all of the necessary work and receive lower grades (Sheppard and MacDermot, 1970). In the present study the data indicate that the absence of specific aversive consequences for failure to meet due dates, resulted in students failing to begin work on time; however, the total amount of work completed and the grades were not affected. There was no significant difference in the mean number of rewrites required for each group. This may be due to the overall quality and variability of the grading, since the training program for teaching the research apprentices to grade laboratory reports was not maximally effective. To minimize the probability of grader bias, the experimenter did not inform the research apprentices as to which students were in the guideline group and which were in the deadline group.
The number of students that withdrew from the course was 2, 0, 1 and 1 for sub-groups 1, 2, 3 and 4, respectively. One of the students from Group 1 was required to withdraw during week 8 because of cheating on a quiz. The student from Group 4 withdrew during week 7 with four unexcused absences. The other two students withdrew during week 4. It appeared that none of the students withdrew as a result of too many absences or from falling behind in their work. The data from these students are not included.

The students rated many aspects of the course quite positively on an evaluation given at the end of the semester. They reported that they liked the relevant experience of working with the children and that they worked very hard in the course. Many courses using behavioral instruction report positive feedback on several aspects of the course (Sheppard and MacDermot, 1970; and Born et al., 1972).
SUMMARY

Although the absence-penalty policy did not significantly reduce the total number of absences, these data are not conclusive enough to eliminate the absence policy for this course. But since there was a nearly significant difference between the number of absences at the different settings, perhaps the efforts of the staff should be directed more toward social reinforcement for attendance and social disapproval for absences.

The data show that the only function of the negative consequences for failure to meet deadlines was to decrease the number of late days. It is probably the case that the due dates also controlled the behavior of the students in the laboratory report guideline group. With no specified due dates (as is the case in most personalized instruction courses) the number of completed laboratory report sections may have been lower, and as a result, the grades would have been lower. Perhaps it is sufficient to simply specify due dates in order to control behavior enough so that final grades are not affected.

It is clearly desirable that the contingencies of a course be designed to create a high level of student satisfaction, along with a high level of student performance. In the present course many of the students in the laboratory report guideline group complained about the heavy work load at the end of the semester. They were aware of the fact that if they failed to complete the laboratory report sections throughout the semester, they would have
a large amount of work to finish at the end of the semester. Most of the students, however, did not have sufficient self-management skills to control their own behavior over a period of 15 weeks, and they failed to follow the specified due dates. The contingencies provided for students in the deadline group to control their behavior so that they worked fairly steadily during the semester and did not have an unusually heavy work load at the end of the semester. As a result, there were very few complaints related to the size of the work load from these students. Perhaps the negative consequences for late laboratory reports served another function — to increase the overall level of student satisfaction.
APPENDIX

There were 57 days in which the absence data were collected for the laboratory classes at Day Training Center (DTC) and 62 days for Kalamazoo Valley Multihandicap Center (KVMC). The difference was due to an Easter Vacation during week 15 for the children at DTC. There were five days of classes each week except for weeks 3, 14 and 16 in which there were only four days.

The laboratory report guideline group and the laboratory report deadline group had an equal number of possible late days, since during week 15, the students working at DTC turned in their laboratory reports at the university.

The number of late days for laboratory report sections was calculated in the following manner for the purpose of data analysis only. The number of late grade points that a student received was determined according to the method described in the procedure section.

The total number of days that laboratory report sections could be late was 199. That is, if no laboratory report sections were turned in, a student would receive 199 late days. Only school days were counted as late days. These late days were calculated for each section by determining the number of days from the date the rough draft write-up for each section was due, until the last day of the semester. The number of late days for each section were then added for each student.
If a rough draft of a section was handed in late, the student received late points from the day it was due until the day it was handed in. The rough draft was graded and two days later, returned to the student. The original of that section was then due two days after that regardless of the due date specified in the manual. The same rules applied to originals and rewrites. That is, if an original was late, the student received late points from the day it was due until it was turned in. Then if a rewrite was necessary, it was due two days after the student received the graded original. If only a rough draft of a section were handed in, then late points for the original were calculated from the day it was due until the end of the semester. If a rewrite were required, but not turned in, late points were assigned from the day it was due until the end of the semester.

If a student failed to hand in a rough draft but handed in an original, the number of days from the date the rough draft was due until the original was handed in was counted as late days for the original. The rough draft section was not assigned any late points.

Specification, Observation and Consequation

The specification, observation and consequation of behavior is very important. In writing the present master's thesis, the appropriate behavior of the author was specified in a manual that the author's advisor had written for his theses students. Also, the author specified assignments to be turned in to the advisor for editing (observation and consequation) on a weekly basis. Most of
the time the assignments were edited and returned to the author during the following weekly meeting. If the advisor failed to observe and consequence the author's assignments by this time, his behavior was specified, observed and consequated. A date on which the assignment would be edited and a short term "artificial" consequence, such as a five dollar fine, were specified. Some of the long term consequences of the advisor's behavior were provided by other members of the thesis committee and the Dean of the Graduate College.
REFERENCES


