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THE EFFECTS OF OUTSIDE READING AND OUTSIDE READING DISCUSSION OF EXAMPLES AND NONEXAMPLES ON COLLEGE STUDENT PERFORMANCE ON QUIZ ITEMS RELATED TO CONCEPTS OF APPLIED BEHAVIOR ANALYSIS

The Ohio State University
Ph.D. 1983

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DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Walter Henry Kimball, B.A., M.S.

******

The Ohio State University

1983

Reading Committee:
Dr. Timothy E. Heron
Dr. John O. Cooper
Dr. Daryl L. Siedentop

Approved By

[Signature]

Adviser
Department of Human Services Education
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It did not take me long to learn that although I may have been the principal investigator for the study, it could not have been completed without the efforts of many people. Dr. John Cooper, Dr. Nancy Cooke, Adele Weiss, and Vikki Howard shared their expertise in evaluating the instructional materials and collecting agreement data. I am also grateful to my dissertation committee members, Dr. Timothy Heron, Dr. John Cooper, and Dr. Daryl Siedentop, for guiding the research and enriching my background in applied behavior analysis.

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Finally, to my wife, Judy, goes my deep gratitude for her unflagging support and understanding in continuing to function on an extremely thin schedule of reinforcers delivered by her spouse over the past two years.
VITA

February 11, 1953.... Born, Pittsburgh, Pennsylvania
1975................. B.A., Centre College of Kentucky
1978................. M.S., University of Kentucky
1978-1981........... Special Education Teacher
Learning Disabilities Resource
Room
Woodford County Schools, Kentucky
1981-1983........... Graduate Research Associate
The Ohio State University

FIELDS OF STUDY

Major Field: Special Education- Mildly Handicapped
  Studies in Applied Behavior Analysis. Dr. John O.
  Cooper, Dr. Daryl L. Siedentop
  Studies in Educational Administration. Dr. Fred Staub
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Chapter I
INTRODUCTION

Background
Lecture, discussion, independent study, use of instructional media, and, more recently, computer instruction have been investigated as college instruction methods. The consensus of researchers over the last 20 years is that although some teaching procedures may be more effective than others for certain content or student characteristics, very few have been shown to consistently result in increased student learning (Dubin & Taveggia, 1968; Kulik & Kulik, 1979; McKeachie, 1963; & Trent & Cohen, 1973).

In much of the comparative research among teaching techniques, the most common dependent variable is student performance on a final examination (Dubin & Taveggia, 1968); a measure insensitive to continually changing student performance. Dressel stated as early as 1953 that the primary focus of educators in evaluation should be on the behaviors or learning to be measured. The use of a posttest after a college course would not appear to adequately monitor continually changing student behavior.
On the other hand, Keller's Personalized System of Instruction (PSI), a behavioral approach to college teaching, is experimentally validated and provides the occasion to measure continuous and relevant dependent variables in higher education research. The Personalized System of Instruction focuses on frequent student performance measures and has consistently been shown to be superior to other teaching strategies (Hursh, 1976; Robin, 1976). It uses frequent measures of student performance and provides for repeated feedback to students to reinforce correct performance and allow for improvements in acquisition of the skill being taught. For example, in a PSI business personnel course, the behaviors that were measured included student performance on tests of multiple and short answer items based on objectives for each unit. Cards showing cumulative data for each student indicated the units that had been completed, units still to be mastered, and the number of weeks remaining in the course. (Hammer, 1975).

Another area of behavioral instruction in higher education is the use of examples and nonexamples, or instances and noninstances for presenting course content, i.e., presenting a concept or skill by demonstrating what it is and what it is not. For example, showing a computer student how and how not to insert a disk into a disk drive.
Although instances and noninstances have previously been used for teaching (Anderson & Kulheuy, 1972; Johnson & Stratton, 1966; Markle & Tieman, 1970; Tenneyson, Woolley, & Merrill, 1972), Miller (1975) systematically arranged conditions for developing, presenting, and reinforcing student discrimination of examples and nonexamples of concepts being taught. In addition, consistent with Stokes & Baer's (1977) assertion that generalization must be programmed, discrimination of examples and nonexamples in the classroom can be considered the first step toward generalization of student responses to situations in which the student will be operating during field placements, internships, and, eventually, the student's own employment situation.

**Statement of Problem**

This dissertation is an attempt to empirically determine the relationship between the use of examples and nonexamples illustrating behavioral concepts and college student performance evaluating situations on a similar measure. Any teaching method should be tested periodically by experimental evaluation. Much of the previous college teaching research on student performance, including the PSI investigations, has centered on the comparison of an experimental and control group on some measure of learning, usually a final examination. The determination of the
The degree to which the difference between the groups was due to chance serves as the basis of statements concerning the effectiveness of the technique being studied. Statistical analysis of sample differences is adequate for comparing the performance of groups. It cannot be used to make statements about the behavior of individuals, however, which is the level at which performance should be described for the results to have any relevance to an individual's behavior. Robin (1976) identified the need for more behavior analysis of college teaching. By examining the differential effects of a treatment on repeated measures of an individual's performance, more appropriate statements about the behavior of that individual can be made. The technique used in this study is a more scientific approach to conducting research in any college classroom.

The study attempted to address the following questions:

1. What are the effects of two college teaching procedures (reading course material and reading course material plus discussing examples and nonexamples) on the level of written student responses to examples and nonexamples of behavior analysis principles and techniques?

2. Will there be a functional relationship between either of two college teaching techniques and student responses to written examples and
nonexamples of behavior analysis principles and techniques?

3. What is a useful measurement technique for evaluating student behaviors in the classroom component of a teacher training program?

4. What are student preferences for two methods of presenting behavior analysis principles and techniques?

5. How can a scientific behavioral research methodology be applied in a college classroom?
Chapter II
REVIEW OF THE LITERATURE

There has been substantial research on college teaching, witness the reviews published by McKeachie (1963), Dubin and Taveggia (1968), Trent and Cohen (1973), and Kulik and Kulik (1979), among others. Among the predominant methods discussed in the literature are lecture, discussion, microteaching, use of media, independent study, and the Personalized System of Instruction (PSI). This section of the review will be limited to lecture, discussion, microteaching, and PSI because of their common use in the college classroom, wide applicability, or interest they have generated. Also, the following examination of these college teaching techniques is intended only as an overview to provide the reader with a context by which to understand the purpose of the study. A comprehensive description of the methods can be found in other sources (cf., Davis, 1976; Jensen, 1974; Johnston, 1975).

Lecture

A lecture is defined as a single instructor teaching a group of students primarily by verbal exposition (Osterman & Coffey, 1980). The learning situation usually involves an
active instructor and passive student, meaning that the teacher is engaged in making a presentation while the student primarily listens (Verner & Dickinson, 1967).

Among the suggestions for effective lecturing, Weaver (1980) indicates that Attention, Interest, Desire, and Action, the A.I.D.A. system, are important ingredients. According to Weaver, it is necessary to get the students' attention at the beginning of the class by telling a story, presenting a startling fact, or by some other means. The beginning of the lecture should be the time for acclimating the students to the situation and reviewing the components of the lecture. Weaver also warns that even though the instructor may get the initial attention of the students, it is very easy to lose. The second component, Interest, is composed of adapting the material to the students' level of expertise and areas of interest. While presenting material, interest can be maintained by moving around the room, using visual aids, and covering a specific in-depth topic instead of presenting superficial information on a broad area. Desire, the third factor, is communicated to students by enthusiasm, the use of good public speaking skills, and talking about personal experiences pertaining to the topic. Fourth, helpful Actions by the lecturer include maintaining eye contact with the students, coming to class with organized material, keeping good posture, and appearing at
Lawson-Smith (1978) interviewed six professors at McGill University for their keys to successful lecturing. Common elements among all the faculty members included a deep love of teaching, genuine liking for the students, changing pace and style of lecturing, and remaining sensitive to the mood of the class. Other components cited by at least one member of the group were using objectives, maintaining clarity, using examples, being prepared with content, and not appearing to read notes directly. With respect to the sequence of the lecture, some preferred the self-contained lecture with an identifiable beginning, middle, and end, while others were less structured and lectured spontaneously. Most of the professors outlined the lecture for the class orally or by distributing guided notes. Several of the lecturers liked to use visual aids and some discouraged note taking so the students could think about the material.

A survey conducted by Brown & Daines (1981) yielded factors considered valuable and those considered unimportant to a group of lecturers. The most important variables of a good lecture included clarity, interest, organization, presenting appropriate content, eliciting student responses, focusing on important points, using examples, and maintaining enthusiasm. The least valuable characteristics
of lectures include using metaphors and analogies, loose structure, maintaining a highly structured presentation, and explaining links between ideas. Among the most learnable variables were incorporating diagrams and illustrations into lectures, selecting appropriate material, focusing attention on important points, using an appropriate vocabulary, and repeating the main points. The least learnable characteristics included style, enthusiasm, flexibility, and verbal fluency.

Taylor, Gibbs, and Morgan (1980) take a different perspective in describing effective lecturing. Their focus is on the questions that lecturers should consider about their students. In developing lectures, teachers should find out why the students are taking the class. It may make a difference if the majority of students are attending because the class is required or if it is an elective. Instructors also need an indication of what the students think they are to do, such as look for correct information in the textbook or interpret the lecture material. Finally, the instructor should consider the level of processing used by the students, as in seeing the relationships between the lecture content or, on the other hand, not thinking about what is read or said. With this information about the students, an instructor can correct student misconceptions about lectures and tailor the presentation of material to
their needs.

**Lecture Variations and Research Findings**

In addition to the straightforward presentation of material, two specific variations to the lecture have been developed, the feedback lecture and the spaced lecture.

**Feedback Lecture.** Osterman & Coffey (1980) describe the feedback lecture as an opportunity for student involvement. The students are given study guides to supplement lectures, which include objectives, terminology, and a pre-test to prime students for the lecture content. Approximately midway through the lecture, the students break into dyads to answer written questions, responses to which are submitted to the instructor. Subsequently, the students receive feedback sheets containing the correct responses to the questions. After the second half of the lecture, a posttest is given.

**Spaced Lecture.** The spaced lecture was developed to avoid the interference of notetaking with attending to the lecture (Bentley & Blount, 1980). The content is broken into segments which indicate to the lecturer when to pause during the presentation. During the pauses, students write notes. Bentley and Blount cited a 1975 research study by Aiken, Thomas, and Shennum which demonstrated that spaced lecturing resulted in superior learning and faster presentations than continual lectures. The authors
conducted their own study of spaced lecturing and note-taking by measuring immediate and delayed retention of material of high and low importance as judged by students. The results indicated no significant differences between spaced and continuous lectures. Students with notes or an outline, however, did significantly better than the control group.

A related investigation examined the effect of student study of lecture material at different times during the course. The data indicated that review of material after a lecture and before the test several weeks later resulted in better test scores than either: (a) reviewing after the lecture and not prior the test, or (b) not reviewing the material at all (Yu & Berliner, 1981). The findings were also consistent with Bentley and Blount's conclusions as to the effectiveness of taking notes or students having access to an outline.

Costin's (1972) review of research focused on student achievement measures. Looking at studies not included in McKeachie's (1963) or Dubin and Taveggia's (1968) reports, Costin found only seven studies which contained significant differences between students receiving instruction by lecture and students receiving instruction by other techniques. However, the studies in which lecture was shown to be more effective primarily used factual knowledge
measures as the dependent variable. Costin concluded that the lecture may be a more efficient method for presenting content to groups of students.

**Advantages of Lecture**

McKeachie (1969) cites several advantages of the lecture technique as the instructor being able to respond immediately to feedback from the students and being able to present information to large groups of students. A lecture is also described as being a way to communicate information to students with differences in background, interests, and abilities.

Osterman and Coffey (1980) reiterate the economy of lecturing in working with many students and add a few advantages of their own. Lectures are easily prepared and easily recorded. A lecture can also be a systematic method of presenting a large quantity of information. A final advantage pertains to familiarity; lecturing is a technique which is widely used.

**Discussion**

Whereas the lecture has often been called instructor-centered, discussion has been identified as student-centered. McKeachie (1969) and Dahlke and Morash (1982) indicate that instructors use discussion when they want to capitalize on the resources of all the members of a group, provide immediate feedback for student input, provide
practice for students in evaluating positions on issues, and help students formulate and examine problems related to textual or lecture information.

Stanton (1980) cites Delbecq and Van de Ven's outline of a procedure for conducting discussion sessions based on brainstorming. The first step in the procedure is generating group ideas, none of which are rejected. Second, all the ideas are recorded in the full view of all the group members. Each idea is then discussed and synthesized, clarified, or expanded. Next, the ideas are prioritized, and those with the highest ranking selected as topics for discussion.

Another procedure presented by Stanton involves discussion in a three meeting sequence. The first session is composed of a brief presentation of information followed by an unstructured and spontaneous discussion. Ideas are written down and reviewed at the beginning of the second meeting. The review is followed by a period of consensus building during which the group attempts to reach agreement on the ideas. At the final meeting in the sequence, the minutes of the two previous sessions are read to the group. The minutes contain the original statements, the issues which were agreed upon, and any disagreements with items on the list. After the minutes are read, the cycle is completed and presentation of information on another topic
In addition, a variety of authors have provided suggestions for conducting effective discussion groups, including:

1. creating smaller discussion groups (Frederick, 1981; Stanton, 1982).
2. using discussion to supplement and complement the background information from a text, study guide, or lecture (Dahlke & Morash, 1982; McKnight, 1978).
3. encouraging participation by having students prepare questions and communicating that responses don't have to be correct to enter the discussion (Dahlke & Morash, 1982; Frederick, 1981).
4. starting the discussion at the knowledge or skill level of the students (McKnight, 1978).
5. setting the occasion for discussion by explaining the role of discussion in the course, using circular seating, calling students by name, and using effective interaction skills such as rephrasing (McKeachie, 1969, McKnight, 1978).

Research Findings on Discussion

When achievement scores have been compared using discussion and lecture conditions, some studies have reported lectures to be more effective, others, reported there was no difference between the groups, and some
indicated discussion was more effective (Goswick, Brown, Covey, Ferrara, & Williams, 1981; McKeachie, 1969). Hence, the data are mixed. In trying to integrate and interpret the mixed results, McKeachie (1963, 1969) indicated that different techniques may work for different outcomes, for example, lecture may result in better acquisition of factual knowledge, while the discussion method may be more effective for developing higher level cognitive skills such as problem analysis.

Other reviewers, such as Dubin & Taveggia (1968), are more emphatic in stating that "We have found no shred of evidence to indicate any basis for preferring one teaching method over another as measured by the performance on student examinations." (p. 45).

**Microteaching**

Microteaching began at Stanford University in the early 1960's (Allen & Ryan, 1969). It is a college level teaching technique directed toward skill acquisition rather than content learning and involves practicing skills in a "realistic" setting. An important component of microteaching is that students receive immediate feedback. The five core components of microteaching are using an actual teaching situation, decreasing the class size, content, and time requirements to reduce the complexity of the situation, identifying specific teaching tasks,
controlling practice by using a structured setting, and increasing feedback. While Allen (1980) noted that microteaching has been used as a system to hire teachers, to generate instances and noninstances of teaching skills, and to develop modeling tapes, its reputation has been earned as a method to train teachers to work more effectively in the classroom.

Planning a microteaching lesson incorporates several elements. First, the goals and objectives and instructional procedures need to be established. The second step, defining the structure of the lesson, involves arranging the teaching schedule and identifying the supervisor to be working with the student. Establishing the pattern of training is another component of planning. Microteaching can entail a micro-lesson, a micro-class, or research clinical sessions. A micro-lesson involves a single skill. A micro-class, or minicourse, is a longer lesson. A research clinical session is a self-contained training session with the purpose of evaluating training.

Gregory (1972) discusses several ways for incorporating microteaching into the curriculum. The clinic model is separate from classes; the teacher works independently with the supervisor. The intra-course model involves using class days for microteaching sessions; the extra-course model entails adding a mini-course to a present course as an
elective experience. In the extra-course model, students from several existing classes could be grouped together.

McKnight (1980) presents a six-step sequence in a microteaching lesson. The teachers are first exposed to a description of the skill by a videotaped example or modeling by a master teacher. Next comes a brief teaching session which is videotaped. Third, performance is reviewed by the student and possibly the supervisor and feedback given. The student then revises the lesson. After re-teaching the lesson to another group of students, the teacher's performance is again critiqued. McKnight states that microteaching provides a way to focus on technical skills in a simplified teaching situation.

Jensen (1974) identifies several options for the different components of microteaching. Reteaching does not have to be included or can be based on a trials to criterion system where the teacher repeats the lesson until the skill is mastered. The critique of the teacher's performance can be external, such as through discussions with a supervisor, or self-evaluative, such as the teacher viewing the videotape alone. Feedback options include videotape, audiotape, peer feedback, or interaction with a designated supervisor.
Advantages of Microteaching

Borg (1975) states that microteaching provides a method of training teachers using focused practice with specific feedback. Borg cites the emphasis on specific skills instead of generalities as one of the major benefits. A second advantage to microteaching is that the teacher works in an actual instructional situation but in a less complex setting than the school classroom. Thus, there is control over the variables to which the teacher is exposed. A third advantage also identified by other researchers is the incorporation of modeling as an integral part of the procedures (Gregory, 1972; McKnight, 1980).

Research Findings on Microteaching

The research on microteaching has demonstrated its general effectiveness in teaching specific skills to teachers. Allen & Ryan (1969) noted that research at Stanford University during the first stages of the program found that independent ratings of teachers' performance indicated that at the end of the instructional quarter teachers who received microteaching exhibited more appropriate teaching skills than those who did not. Leith and Britton's (1977) study compared groups of students completing a microteaching sequence to a control group on performance of teaching skills observed by supervisors using a rating scale based on well-established norms. The results
indicated that the microteaching groups performed better in setting objectives, establishing lesson structure, and focusing and guiding pupil participation. A secondary finding indicated that teachers taught through microteaching performed better than counterparts taught using a "minicourse" approach which emphasized teacher-student interactions.

In another study examining minicourses and microteaching, Borg, Kallenback, Morris, and Friebel (1969) examined the performance of teachers who completed a minicourse, a minicourse plus practice of skills, a minicourse plus practice plus videotaped feedback, and a control group. Raters evaluated student performance on two fifteen minute videotapes, one before the treatment and one after instruction. The results indicated significant differences between the control group and groups getting microteaching or minicourse training on skills such as reducing the repetition of student statements. The investigators also found large, but not statistically significant, differences in other skills with microteaching and minicourses being more effective.

Yeany's (1978) study examined the effect of different levels of microteaching on the directness of teacher interactions with students as measured by raters using an observational system. The three levels of the independent
variable were (a) teachers viewing a videotape of performance with no instruction in the Observational System; (b) teachers receiving instruction in the Observational System and coding their own performance; (c) and teachers receiving instruction, and coding their own performance in a session with a supervisor. The ANCOVA analysis indicated differences between the groups and a subsequent post hoc analysis showed that teachers receiving instruction in coding and receiving instruction and viewing the videotapes with a supervisor were more effective in producing exploratory teaching skills than no instruction in the Observational System.

Other research has examined the effects of microteaching on teacher opinions toward teaching (Peters, 1980; Peters & Moore, 1980). Scales measuring teacher perceptions of themselves as teachers and their attitudes toward teaching were administered to students completing microteaching and reflective teaching experiences. Reflective teaching is a method where teachers teach lessons to a small group and then evaluate their performance with the students in a group process. A technique similar, but not identical, to microteaching, it is teaching with immediate feedback. The teacher survey results indicated no significant differences between teachers completing microteaching and reflective teaching experiences on
measures of their opinions of themselves as teachers and on their attitudes towards teaching.

Currently, microteaching is an accepted college-level teaching procedure used by a wide variety of institutions (Gage, 1978). Allen (1980) stated, however, that its acceptance is based more on a "de facto face validity" than research evidence. He indicated the need to evaluate microteaching by collecting data and to decrease acceptance of microteaching on the basis of satisfaction with the procedures.

**Personalized System of Instruction**

In addition to the prevalence of lecture, discussion, and microteaching, another, more behavioral direction for college teaching is represented by Keller's Personalized System of Instruction (PSI). PSI represents a radical departure from traditional college teaching because of the dramatic change in the roles of the students and the instructor. It is composed of five characteristics which distinguish it from previous procedures (Keller, 1968). These characteristics include:

1. students progressing at their own pace of mastery.
2. passage through the material based on mastery of units as demonstrated by meeting criteria of performance.
3. lecture used as a motivational device instead of for the delivery of content.

4. the use of proctors to assist students and supervise the study area. Ferster (1968) has provided a detailed explanation of using proctors for interviews to increase the opportunities for student responses and allow the student to describe the material in-depth as part of the evaluation process.

5. emphasis on written communication between teacher and student.

An example of a PSI course in teaching a class in behavior modification has been described by Cole, Martin, and Vincent (1975). The class met three days a week for one hour sessions. Students had interviews with proctors at the first class of the week to discuss the course content based on the reading material, answer oral questions pertaining to the content, and after mastery had been demonstrated, listen to another student. The second class of the week was reserved for lectures, speakers, and demonstrations. Attendance was optional. The final class of the week was used for small discussion groups to review the material in more detail. The course content was divided into four levels. A grade was assigned based on the student's completion of levels. A grade of "A" required completion of
all four levels, a B three levels, and so on. Deadlines were used for completion of levels; after certain dates, students were ineligible to complete specified levels of the course.

**Research Findings on PSI**

The experimental research evaluating PSI comes from two sources, group research and applied behavior analysis. Both have demonstrated the superiority of PSI over other teaching techniques.

**Group research.** Born, Gledhill, and Davis (1972) looked at the midterm and final examination performance for two groups in a psychology of learning course; one receiving lectures and the other using PSI. The results indicated a significant difference in favor of PSI methods over lecture. In an introductory psychology course, Cooper and Greiner (1971) compared a lecture method with monthly exams to weekly quizzes with criterion levels and instructional feedback and found significant differences on exam scores between the groups at the end of the course. McMichael and Corey (1969) compared group exam performance of a control group taking several exams throughout an introductory psychology course and an experimental group using a PSI procedure with units, proctors, immediate feedback, self-pacing, and unit mastery. Data analysis indicated there were significant differences between experimental
group and control group performance. Sheppard and MacDermot (1970) compared final exam performance of students completing a PSI sequence to a group with small group discussion and optional lectures in an introductory psychology course. The results indicated a significant difference in final exam performance between the groups.

In reviews of PSI research, Hursh (1976) and Robin (1976) reached the same conclusions as to the effectiveness of PSI in improving student performance in group comparisons with other techniques. Although Hursh (1976) identified several methodological problems with the research such as the scarcity of reliable measurements of dependent and independent variables, he conceded that the amount of research indicating positive results is so great that until research with more controls can be completed, the strategy can tentatively be considered effective in improving student performance.

Behavior analysis research. Several of the studies investigating PSI have used applied behavior analysis techniques. Miller, Weaver, & Semb (1974) used a reversal design in demonstrating a functional relationship between the use of target dates for unit completion and student progress in completing unit assignments. Semb (1974) used a counterbalanced reversal design to study the effect of mastery criteria and assignment length on exam performance.
Semb found that high criteria resulted in better exam performance than low criteria. This finding is similar to that of Johnston & O'Neill (1973) who used rate criteria for grades and found that students responded to high criteria.

**Pacing**

Data pertaining to the best ways to implement PSI have also been collected. For example, self-pacing has been investigated by a variety of researchers. In addition to the previously discussed findings of Miller, Weaver, and Semb (1974) regarding the effectiveness of target dates, Lloyd and Knutzen (1969) examined the relationship between when students started submitting assignments and their course grade. They found that the earlier students began completing course requirements, the higher their grades. The results led Lloyd and Knutzen to conclude that some type of contingency to maintain consistent student progress through a course is necessary.

Sutterer and Holloway (1975) measured the number of units students completed by weeks in a PSI course containing deadlines. They found that students earning an "A" had completed a high number of the units in the beginning of the course while the students getting lower grades had completed fewer units. Therefore, they instituted a series of deadlines to encourage students to begin completing units early in the semester. In another study of the
effectiveness of instituting a pacing contingency, Burt (1975) found students required to complete units within a
certain period of time completed more units than students
working solely at their own pace. In another type of pacing
contingency, Malott and Svinicki (1969) developed the Doom's
Day Contingency. If a student did not earn 100% mastery on
a particular quiz before the time limit expired, he either
withdrew from the course or received a failing grade,
depending on the time in the semester.

Semb, Conyers, Spencer, and Sosa (1975) compared four
different pacing contingencies: (a) no contingency; (b)
points lost for progress below the minimum rate line; (c)
points earned for progress above the minimum rate line; and
(d) points earned for exams no matter whether progress above
or below the minimum rate line but bonus points awarded if
above the rate line at the time of the exam. Their results
indicated no significant differences on performance on the
hourly or final examinations between the pacing
contingencies. In implementing PSI, the results of the
studies indicate pacing may be useful for courses based on
unit completion, but that pacing does not have as much of an
effect on exam performance.

Behavioral Techniques Different from PSI

The previous descriptions have primarily focused on
techniques which involve teaching strategies similar to
those introduced by Keller. There have been other facets of behavior analysis in higher education. Johnston and Pennypacker (1971) developed a technology in which student managers hold periodic meetings, called performance sessions, with the students. Although there are various components of a performance session, the major portion of time is consumed by the presentation of 3X5 flash cards containing fill-in-the-blank items. The student orally reads the items and completes the statement. He then looks at the correct answer on the back and reads it aloud. The rate of correct and incorrect responses are calculated and plotted on a cumulative record. The grade criteria are based on the rates of previous students. Alba and Pennypacker (1972) compared gain scores of students completing performance sessions to a control group given one opportunity to answer questions about the text in a human growth and development course. They found the students participating in performance sessions had significantly different scores on the post-test as compared to the pre-test.

Rate is also the basic measure applied to the Consulting Teacher Program at the University of Vermont. The task requirements are defined and plotted on a graph according to the expected completion date. Each student's actual progress is then plotted on the same graph and the
comparison of the slopes of the two lines used to monitor progress and diagnose problems. The data generated from the rate comparison are one component of the feedback mechanism of the Consulting Teacher Program (Knight, Christie, Egner, Paolucci, and Lates, 1976).

Another application of behavioral principles in higher education began with the work of Miller and Weaver (1972) in developing a multiple baseline achievement test. The test covers the entire content of a course and is composed of fill-in-the-blank items. The same test is given after each unit of the course. By plotting performance on the items pertaining to units as tiers on a multiple baseline graph, the instructor can get an indication of student performance on taught and untaught content. This framework also provides an analysis of the functional relationship between instruction and performance on the test items. Miller's work continued with the publication of the text *Principles of Everyday Behavior Analysis* in 1975 and the development of a teaching technique called "concept programming" (Miller & Weaver, 1975). Concept programming is the presentation of examples and nonexamples in training students to recognize members of a class of stimuli, all of which share some common property (Whaley and Malott, 1971). For example, the infinite examples of reinforcement represent a class of stimuli, or concept, about the presentation of a consequence
which results in an increase in the future likelihood of the occurrence of a response under similar conditions. Whaley and Malott define "conceptual behavior" (p. 174) as responding in the same way to stimuli which are members of a stimulus class and not responding to stimuli outside the class. Through the presentation of related but untaught examples and nonexamples, Miller measures the degree to which the student is under control of the appropriate stimuli related to a particular "concept". Semb and Spencer (1976) discuss two types of complex tasks involving novel examples. For a problem solving task, the student responds to a novel situation and the answer is compared to a list of scoring criteria. An example request task has the student provide an illustration of a concept with the response examined to see how closely it approximates the scoring criteria.

Research using a multiple baseline design demonstrated that concept programming was effective in training students in research methods, reinforcement control, stimulus control, and aversive control (Miller & Weaver, 1976). Miller (1974) completed another investigation comparing a behavior analysis textbook based on concept programming with two other textbooks. The study used a multiple baseline design across subjects during which the students completed items pertaining to examples of behavior analysis.
principles. The results indicated large gain scores for each group after reading the concept programming text.

Incorporating Behavior Analysis in Higher Education Instruction

Despite the success of behavioral techniques in college teaching as exemplified by the previously described research, the use of behavior analysis in higher education and a focus on a technology of teaching remains limited (Keller, 1980).

Fraley (1980a) identified one reason for the limited exposure as the fact that most of the reported research consists of single studies which are not reported as part of a program of research. Johnston (1974) illustrated the same problem by pointing out that research activities become splintered because of the development of numerous teaching techniques defined as unique from other procedures that have been presented. Examination of the procedures reveals, however, similarities between the procedures. For example, Programmed Instruction, Contingency-Managed Instruction, and the Personalized System of Instruction each have common elements. By separating them, however, the research efforts become splintered. Johnston indicated a more functional approach would be to recognize the similarities between approaches, coordinate research among and within teaching techniques, and ignore the artificial separation of
different procedures based on their particular definitions.

Measurement

One solution to the problem of incorporating behavioral teaching into higher education presented by Fraley (1980d) is to encourage a focus on measurement in instruction. An integral part of measurement is arranging conditions in the college environment which occasion and reinforce the observer's behavior. Fraley described a series of measures which when incorporated into the instructional process would help evaluate student performance, the impact of instruction on the institutional environment, and serve as the basis for contingencies on the instructor's behaviors. The simplest measure is that of test scores, followed by gain scores, setting performance criteria and comparing student scores to desired levels, and so on. More complex measures described by Fraley include dividing gain scores by the cost for instruction as a measure of cost-efficiency, dividing changes in student behavior by time for a measure of instructional efficiency, and dividing student performance by a function of time and money. As the measures incorporate more variables, the contingencies on the instructor's performance become more stringent and the measures become more integrated into instruction and its evaluation. Vargas (1980) also indicated the need for more integration of budgeting, cost-analysis procedures, and
institutions evaluation with instruction and student products and usage of services.

Another unit of measurement is called the teacher-learner-task (TLT) triad and is based on precision measurement with components such as rate as the basic datum, continuous measurement, and systematic recording of independent conditions (Wolking & Hodgeson 1976). The TLT triad also includes indices of productivity (percent of change in speed or accuracy of performance during instruction), efficiency (productivity divided by time spent planning and teaching), and celeration (productivity divided by time taken for the triad). The TLT measures can be used for student and program evaluation.

Elkins (1974) described a systems approach to implementing instructional changes such as new measurement procedures beginning with examining present goals and objectives, methods of evaluation, and learning experiences. The analysis is followed by planning and implementing sequential improvements. A time schedule allowing for small increments of change is necessary and communication should contain understandable language.

Modifying the College Environment

To facilitate increased use of behavior analysis in college teaching, changes will need to be made in the administrative and general higher education environment.
Fraley (1980c) stated that behaviors interfering with effective instruction are consequated by dysfunctional social and political consequences. A systematic examination of the environment using behavior analysis is necessary to identify the inappropriate contingencies, define appropriate contingencies, and establish procedures to put them into place. Skinner (1974) and Wood (1976) indicated that effective higher education requires analysis and delivery of appropriate educational experiences consistent with the function of education as transmitting the culture, or enabling new members of a group to benefit from what others have learned (Skinner, p. 196). A systematic approach to arranging contingencies is necessary to increase the probability that appropriate and inappropriate behaviors will results in the proper consequences.

Several authors identified resistances to implementing such institutional changes. Lipson (1976) stated that organizations are inherently conservative and change their mode of operation only as the situation dictates that it is a necessity. A relative lack of system accountability and a weak relationship between the budget and accountability make it difficult to use instructional data as the basis of establishing procedures. Also, the departmental organization of universities makes it difficult to take a problem-solving perspective that extends beyond the needs of
the department. Fraley (1980b) also stated that grant money and federal support often go to projects with conflicting purposes.

**Implementing Behavior Analysis Procedures**

To overcome the resistances to change and establish systematic, data-based higher education, Lipson (1976) suggests getting the political support of administrators and influential persons for basic budgeting needs. In addition, the persons desiring to institute change must develop a consensus on how to implement the technology. There should also be an attempt to demonstrate the utility and effectiveness of the technology. The persons leading the effort at change should be "charismatic" (p. 226), or able to improve the quality of the system through other people.

A final consideration for institutional change is developing a management structure designed to support the new system. Silber (1976) suggested analyzing and planning management variables such as hiring, training, faculty evaluation, institutional reinforcers, institutional priorities, availability of resources, physical facilities, and instructional variables such as materials and the parameters of courses.

**Summary**

Reviews of research by a variety of educators indicate that popular techniques such as lecture and discussion are,
at best, effective only for certain types of content (McKeachie, 1963; Dubin & Taveggia, 1968). Although other procedures such as microteaching have been demonstrated to be effective (Gage, 1978), they are primarily intended to train teaching skills. A technology for teaching both college content and skills, however, does exist, namely, behavioral procedures such as the Personalized System of Instruction (Hursch, 1976; Keller, 1968). Among other techniques, Johnston and Pennypacker (1971) developed performance sessions using frequent responding and rate as the data measure. Miller and Weaver (1975) developed concept programming, an instructional procedure based on the presentation of written examples and nonexamples. Despite their success, however, with the exception of PSI these methods are not commonly used on college campuses (Keller, 1980).

Behavioral technology can be used to analyze the reasons for reluctance to implement an instructional technology. Reasons for resistance include the conservative nature of organizations and the dysfunctional contingencies under which college teachers and administrators operate (Fraley, 1980c; Lipson, 1976). One possible approach to integrating the efforts of each member of the college setting is to incorporate measurement procedures into instructional and program evaluation by combining student
gains, cost analysis, and time factors (Fraley, 1980d; Wolking & Hodgsen, 1976). Developing effective teaching techniques, such as the use of examples and nonexamples for discrimination training and functional measurement, however, does not appear to be enough. It is necessary to arrange the environment to occasion and reinforce their use (Fraley, 1980d).
Chapter III
METHODS AND PROCEDURES

**Subjects**

The participants in the study were undergraduate (N=36), graduate (N=46), and Continuing Education (N=6) students taking a class in applied behavior analysis through the Department of Human Services Education. The students had a wide range of teaching experience from enrollment in the Ohio State preservice program to veteran teachers returning for an advanced degree or additional certification. The students were also enrolled in a variety of programs, including special education, elementary education, and physical education.

Data were collected during two quarters using two classes of students. Class, or group, data were based on those students in attendance every session a dependent variable measure was given. Thus, the group data represented a sample smaller than the original class. The data for each student completing all eight of the dependent variable measures were graphed and the configurations of each student's data used as the criteria for selection for use as individual data in the results and discussion. The
graphs of individual students were categorized into two groups; those with overlapping data points and those with no intersection. Individuals were then randomly selected from each of the two groups for each quarter the study was conducted. During the second quarter, all the students with no intersection were included in the individual data.

The instructor for the course was an associate professor teaching in the Mildly Handicapped Program at the Columbus campus of The Ohio State University. He had had previous experience in teaching the course for seven years and was completing a book on applied behavior analysis in education. The same instructor taught both quarters of data collection.

**Setting**

The study took place in a college classroom. The classroom used during one quarter of data collection had an aisle down the center of the room. The students sat at tables with chairs for four students and at desk-chairs in the rear of the room. The instructor generally stood in the front or at the side of the room because of restricted movement. The classroom used during the other quarter of data collection had moveable desk-chairs and chalkboards in the front of the room. The desk-chairs were dispersed around the room, although the instructor primarily stood in the front of the room.
Materials

The materials used in the study included:


2. a pre-test composed of definitions and graphing tasks (see Appendix A for pre-test and scoring criteria).

3. a list of 13 key elements, or rules, for each unit which were the basis of the weekly dependent variable (see Appendix B for rules distributed during the first class session each quarter).

4. sets of written examples and nonexamples representing the 13 rules of units used for instruction in the condition including examples and nonexamples (see Appendix C for the examples and nonexamples used during the two quarters of the study). The first set of examples/nonexamples during Quarter One contained two examples and two nonexamples. Revised sets for the following units
contained one example and one nonexample for each rule.

5. an audio-tape recorder to record the instructor's implementation of the independent variable and the students' questions and comments.

6. a recording sheet for marking the instructor's implementation of the independent variable. Included were sections for the duration of discussion of examples and nonexamples and the dependent variable measure, the correspondence of student questions to the examples and nonexamples, and the correspondence of instructor responses to the examples and nonexamples (see Appendix D for samples of the independent variable observation sheets for each condition).

7. an electronic spreadsheet software program for storing student scores for the dependent variable and calculating class averages during each quarter.

8. digital Cronus stopwatches (Model LC-AJ) for recording the total amount of time students took for each dependent variable measure and the instructor took for the independent variable.

9. sets of 15 two sentence examples and nonexamples for each unit as the dependent variable (see Appendix E for the dependent variable for each
session of the course).

10. graphs for recording the percentages and frequencies of individual students for each unit and the combined average rates, percentages, and frequencies of the students who completed each administration of the dependent variable.

Behavior Definition and Recording

The dependent variable was performance on written, short-answer examples and nonexamples representing behavioral principles and techniques described in the course texts. The quizzes for each unit pertained to the following content:

1. Unit 1: reinforcement and extinction
2. Unit 2: measurement techniques—frequency, percentage, rate (permanent products) and event, duration, interval, and momentary time sampling (observational), interobserver agreement
3. Unit 3: graphing techniques, AB design, reversal design, multiple baseline design
4. Unit 4: stimulus control, discriminative stimuli, instructions, modeling, physical guidance, fading
5. Unit 5: shaping and chaining
6. Unit 6: positive behavior reduction techniques, response cost, timeout, overcorrection, punishment
7. Unit 7: generalization training and intermittent reinforcement
8. Unit 8: group contingency packages and token economies

The first and tenth sessions of the first quarter were used for an introduction to the course and review of the material, respectively. The first half of Session Ten was devoted to completion of a maintenance measure composed of example and nonexample items from each unit and the second half used for review and make-up quizzes. During the second quarter, one class was not held because of the Fourth of July holiday. Therefore, the review of the material was dropped from the schedule. The maintenance measure during the second quarter of the study was administered prior to the final examination.

The examples and nonexamples serving as the dependent variable were each two sentences long. Sentence one provided general background information for the example or nonexample such as the name of the person involved, the setting, the behavior being changed, and so forth. For example, the first sentence of an item from Unit Two stated "Mrs. Kiel calculates a percentage of the number of days during the month her students hang up their coats in the morning." Sentence two described the behavior required to complete the item, such as naming the reinforcers,
explaining what the principal character should do differently, providing the next step to follow those described in the item, and other tasks. For example, to continue the previous illustration, "What two pieces of information in the above situation does Mrs. Kiel need to calculate a percentage?"

Scoring

Correct responses to the items corresponded to the 13 key elements, or rules, per unit which were provided to the students at the beginning of each quarter and served as the foundation of the development of the dependent variable. Each of the student's responses was compared to the answer key which contained the rule pertaining to the item and a series of response alternatives scored as correct (see Appendix F for answer keys for each dependent variable measure). Generic criteria for scoring a response as correct included the requirement that the response specified in sentence two of the item must have been present in the answer. For example, if the second sentence stipulated writing a behavior and a consequence, those two items had to be present for credit for the item. If only one aspect of the correct answer was present, the response was scored as incorrect. One item in the dependent variable measure for
Unit Six asked:

Mrs. Courtney's son keeps going through her purse even though he is punished with spankings. Being sure to describe any pertinent behavior(s) and consequence(s), why isn't punishment occurring in this situation?

A student response which stated that the behavior did not decrease despite the spankings would be scored as incorrect because there is no identification of the relevant behavior.

If the response included the correct answer and superfluous information which was either correct or not a gross misrepresentation of the principle or technique being discussed, the item was scored as correct. One item in the dependent variable measure for Unit Eight asked:

Bruce is considering using the Grab Bag to reinforce his junior basketball team's completion of exercises during the conditioning portion of practice. In terms of the criteria for selecting the appropriate system, why might Bruce want to try Contingent Recreation first?

A student response which stated that Contingent Recreation is less intrusive and also that basketball is a recreational activity and would be appropriate for basketball practice would be scored as correct because the rule is present. A response without an indication that Contingent Recreation is
less intrusive would be scored as incorrect.

If additional information contained an error, such as stating a discriminative stimulus elicits a behavior, the response was scored as incorrect regardless of the presence of the correct response. One item in the dependent variable measure for Unit Four asked:

Sam says "Time to go!" when he and his wife need to leave for the theatre. If his wife stays in her room, what can Sam conclude about the effectiveness of the request and its influence on his wife's behavior of coming downstairs to leave?

A student response that stimulus control was not present, and the discriminative stimulus did not cause the behavior, would be scored as incorrect. Even though the correct response was made, i.e., stimulus control is not present, the statement pertaining to discriminative stimuli having a causal effect on behavior is clearly incorrect.

Recording

Each item to which the students had an opportunity to respond was worth one point. A plus (+) or minus (-) was placed beside each item on the left side of the quiz paper to indicate if the student did or did not earn credit for the item. The total number of points earned for the quiz was written on the top of each student's quiz. The total number of points earned for the quiz was translated into a
rate correct score by dividing the number of correct responses by the amount of time taken for the quiz. Percentage correct was also calculated by dividing the number of correct responses by 15, which was the number of responses available.

Each student's tally score and rate correct were entered on the Visi-Calc (TM) software program, an electronic spreadsheet, which kept a record of the students' scores in a matrix format. Each student was assigned a two-digit control number based on the row of their scores on the spreadsheet. The control number was written by the students at the top of their quizzes and served as the identification number. The spreadsheet was employed because it had the capability to automatically re-calculate the averages of the class if scores were added or changed after the other data had been entered, an occasional necessity with some students. It was also possible to print the cumulative student data in tabular form and to post these data for inspection after each class period.

Because the students' dependent variable performance had no influence on their grades— a separate quiz was used for this purpose— a contingency was necessary to increase the probability of maintained student effort on the quizzes. If a student scored 12 or better correct out of 15 on the dependent variable for a particular unit, then items
pertaining to that unit were deleted from that student's final. For example, if a student scored 10, 12, 13, 12, 14, 11, 12, and 6 on the eight dependent variable measures respectively, then questions from Units One, Six, and Eight were included on that student's final.

**Dependent Variable Rating**

The key elements for each unit and the examples and nonexamples for the dependent variable were validated by two faculty members and one graduate student. Three factors were examined: (a) how completely the key elements represented the concepts of each unit; (b) the degree to which the items were accurate discriminators of the key elements they represented; and (c) the difficulty of the items coded as easy (1), average (2), or hard (3).

The key elements determined to be relevant by a majority of the raters were retained. Key elements suggested for addition or deletion were considered by the principal investigator and if necessary, adjustments made; always keeping the number of key elements at 13. Suggestions to improve the correspondence between dependent variable items and the key elements they represented were considered, and if necessary, used to modify items. Items coded as average in difficulty by a majority of raters were retained and given priority in selection for the quizzes. Items rated as difficult or easy by a majority of raters
were revised as needed.

The review process for all the key elements, or rules, was completed prior to the first class session of Quarter One so a copy of the rules for every Unit could be distributed with the syllabus. The first three dependent variable measures were evaluated prior to the first session of Quarter One; the remaining five dependent variable measures were rated throughout the first quarter prior to their use in class.

Design

The multi-element design was used to arrange the conditions of the study (Ulman & Sulzer-Azaroff, 1975). This design allowed the opportunity to examine treatments without an extended baseline and provided a clear graphic representation of the differential effects of the treatments on student performance on discrimination of examples and nonexamples. The conditions were arranged so as not to repeat a condition in a sequence until the other condition had been used. The conditions included in the design were: (a) reading the text, completing study guide items, and reading the rules for the Unit; and (b) reading the text, completing study guide items, reading the rules for the Unit, and instructor review of the key elements and examining written examples and nonexamples.
Design Conditions

Book- Study Guide- Rules (Condition Number One)

Condition Number One was Book- Study Guide- Rules, during which the students only had access to reading the text, answering the study guide questions, and reading the rules for the Unit before taking the dependent variable measure.

Before class, the observers synchronized the stopwatches by starting them simultaneously outside of the classroom. Also, announcements were sometimes made to the students. The first component of the class was an introduction. The introduction officially started with the words "The topic for this week was...". The introduction officially ended with the words "Part A of the quiz reflects these procedures".

The second component of the Book- Study Guide- Rules condition was the dependent variable measure, Part A of the quiz. Part A of the quiz officially commenced with the word "Begin" and officially ended with the word "Stop" or when all the students were finished, whichever came first. If Part A concluded before 45 minutes, the end was signalled by the words opening the next component, "Are there any questions about this week's material?"

The third component of the Book- Study Guide- Rules condition was the opportunity to ask questions about the
material in the unit. The opportunity officially started with the words "Are there any questions about this week's material?" and officially ended with the words "Now that we have finished with the questions, let's move on".

The fourth component of the Book-Study Guide-Rules condition was the quiz for the grade, Part B of the quiz. Part B of the quiz officially commenced with the words "When you are done this portion of the quiz..." After Part B of the quiz was completed and handed to the instructor, students were free to leave (see Appendix G for a sample of the script for the Book-Study Guide-Rules condition). Book-Study Guide-Rules-Examples/Nonexamples (Condition Number Two)

Condition Number Two was presentation of written examples and nonexamples in addition to reading the text, completing study guide items, and reading the rules for the Unit. During Condition Number Two, the students had access to written examples and nonexamples in class before taking the dependent variable measure.

Before class, the observers synchronized the stopwatches by starting them simultaneously outside the door of the classroom. Also, announcements were sometimes made to the students. The first component of the class was an introduction. The introduction officially started with the words "The topic for this week was...". The introduction
officially ended with the beginning of the next component, review of the rules.

The second component of the Book- Study Guide- Rules- Examples/Nonexamples condition was review of the rules and written examples and nonexamples for the unit. The first time Condition Number Two was used in the first quarter, it consisted of the instructor orally reading the 13 rules and the students silently reading two examples and two nonexamples representing each rule. After the reading, the students were provided the opportunity to ask questions related to the examples and nonexamples. For the second and each following occurrence of condition number two across both quarters, the instructor read each rule, one example, one nonexample, and then answered related questions. The review officially started with the words "Let's look at the rules for this week...". The review officially ended with the words "Now that we have finished with the questions, let's move on."

The third component of the Book- Study Guide- Rules- Examples/Nonexamples condition was the dependent variable measure, Part A of the quiz. Part A of the quiz officially commenced with the word "Begin" and officially ended with the word "Stop" after 45 minutes or when all the students were finished, whichever came first. If Part A concluded before 45 minutes, the end was signalled by the words
opening the next component, "Are there any questions about this week's material?"

The fourth component of the Book- Study Guide- Rules- Examples/Nonexamples condition was the opportunity to ask questions about the material in the unit. The opportunity officially started with the words "Are there any questions about this week's material?" and officially ended with the words "Now that we have finished with the questions, let's move on."

The fifth component of the Book- Study Guide- Rules- Examples/Nonexamples condition was the measure for the grade, Part B of the quiz. After Part B of the quiz was completed and handed to the instructor, students were free to leave (see Appendix G for a sample of the script for the Book- Study Guide- Rules- Examples/Nonexamples condition).

Training of Experimenters

Instructor

The instructor was trained to conduct the study by first silently reading the script prepared by the principal investigator and making notations of additional comments. The principal investigator then modeled the respective segments of the class by reading the script with emphasized key words the instructor was required to say to cue two observers to record the time. Following the reading and modeling, the instructor practiced each component in the
presence of the principal investigator. The principal investigator listened to the instructor's presentation and noted any necessary modifications. This procedure was repeated until the instructor accurately completed each component.

**Independent Variable Observers**

Two other observers, in addition to the principal investigator, were trained to record the implementation of the independent variable by first listening to an explanation of the study and the two conditions. During training activities, the principal investigator acted as the instructor and read the scripts for each condition. The observers used the independent variable recording sheets to mark the time on the stopwatches at the time the key words were spoken by the principal investigator. The times of the two observers were compared to verify that both observers were attending to the correct word and operating the stopwatches correctly. This procedure was completed when both observers accurately wrote down the appropriate times.

**Interobserver Agreement Measures**

**Dependent Variable**

Agreement measures on the evaluation of student performance on example and nonexample items were obtained by the
following procedure:

1. One evaluator in addition to the principal investigator was trained to score the students' responses to examples and nonexamples. Practice and feedback for the scoring procedure were provided at the evaluator's discretion on quizzes not selected for agreement scoring.

2. The agreement observer was provided with a list of the rules to which each item on a particular quiz applied, a list of sample correct and incorrect responses to the items taken from completed quizzes, a dependent variable scoring sheet, and copies of the students' quizzes. The quizzes of 14 or 15 students were randomly chosen from each unit for agreement scoring the first quarter, seven or eight randomly chosen from each unit the second quarter.

3. The agreement observer scored the quizzes by marking on the dependent variable scoring sheet whether each item was correct or incorrect.

4. Agreement was recorded by comparing the principal investigator's and observer's scoring and marking the number of agreements on the data sheet. The data sheet also contained space for the social security number or two-digit control number of the
student whose paper was being scored and the title of the quiz (see Appendix H for a sample of the agreement data sheet).

5. Agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by one hundred.

An arbitrary agreement coefficient of 85 percent was used as the criteria for adequate agreement. If agreement was consistently lower than 85 percent, then additional illustrations of correct and incorrect responses were provided to the evaluator and principal investigator and the examples and nonexamples on the dependent variable examined for clarity as to the response required of the student.

Agreement on the duration of the time allotted for the dependent variable measure was calculated by subtracting the start and finish times of the two observers recording the times during the class and dividing the resulting durations.

**Independent Variable**

Agreement on the implementation of components one and two of Condition Number One and components one, two, and three of Condition Number Two was based on the observations recorded on the independent variable agreement form (Appendix D). An agreement was defined as both observers recording or not recording a time for the occurrence of a component. A disagreement was defined as only one observer
recording a time for the occurrence of a component. Inter-observer agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements for the implementation of the condition assigned to each class session.

Agreement on the duration of the review of written examples and nonexamples during Condition Number Two was calculated by subtracting the start and finish times of the two observers and dividing the resulting durations.

**Data Analysis**

The basis of data analysis was examination of the vertical distance between the conditions in the multi-element design. A functional relationship between review of textual materials and presentation of written examples and nonexamples and the dependent variable was determined to be present if Condition Number Two demonstrated control over the level of responses on the dependent variable. A functional relationship between review of course materials alone and the dependent variable was determined to be present if Condition Number One demonstrated control over the level of responses on the dependent variable. The analysis was based on the stability and level of student performance during each condition and the separation of the data.
In addition to the functional relationship, the educational significance of the results was examined. It is possible for an experimental functional relationship to be established without the level of the behavior being great enough to be of importance in the educational setting. For example, a functional relationship could be established between the combination of access to textual materials and use of examples and nonexamples and student performance on examples and nonexamples with the student's performance still not being high enough to warrant concluding the student had acquired the skills specified in the goals of the course. Social significance was determined by comparison of student performance to an arbitrarily established criterion level of 90 percent correct completion on the dependent variable.

To strengthen the analysis, the multi-element design was counterbalanced by reversing the order of presentation of conditions during the second quarter of the study. For example, if Unit One, Reinforcement and Extinction, was presented under Condition Number One in the first quarter, it was presented under Condition Number Two in the second quarter. As a result each unit of the course was taught under both conditions.

Descriptive data analysis included examination of the average group rate correct on the dependent variable and
comparison of individual and group percentage correct on Part A of the quiz, the dependent variable, and Part B of the quiz, the items for the grade. Descriptive social validity measures were completed at the end of the course each quarter, data described as necessary in analyzing student behavior by Wolf (1978). A questionnaire was completed by students with items pertaining to study time, which condition the students thought taught them the most pertaining to the course objectives, and possible improvements in the written examples and nonexamples (see Appendix I for a sample of the evaluation questionnaire). The data were analyzed according to the frequency of the responses to particular items, for example, what percentage of students liked each condition, the number of hours studied per week, and ratings as to the usefulness of the rules, book, and study guide.
The study examined the effects of two treatments on college student responses to written examples and nonexamples representing the principles of behavior analysis. The principles were separated into eight units of study related to the organization of the text for the course, *Applying Behavior-Analysis Procedures with Children and Youth* (Sulzer-Azaroff & Mayer, 1977). Baseline data on student knowledge of applied behavior analysis were collected by means of a pretest on written definitions of behavioral terms, such as reinforcement, Sd, and punishment. No student in either quarter the study was conducted scored over 50 percent. The results of the study will be divided into four sections: (a) interobserver agreement; (b) descriptive data; (c) experimental data; and (d) performance on the maintenance measure.

**Interobserver Agreement**

Interobserver agreement measures were made for the implementation of both conditions of the study and for the duration and scoring of the written examples and nonexamples measure. The formula used to calculate a percentage of
agreement was:

\[
\text{Agreements} \quad \frac{\text{Agreements}}{\text{Agreements plus Disagreements}} \times 100
\]

**Independent Variable**

The two components of the class structure for which agreement data were collected during the Book-Study Guide-Rules condition, or Condition Number One, were the introduction to the material covered in the unit's reading and completion of the dependent variable. The three components of the class structure for which agreement data were collected during the Book-Study Guide-Rules-Examples/Nonexamples condition, or Condition Number Two, were the introduction to the material covered in the unit's reading, review of examples and nonexamples, and completion of the dependent variable. Two observers recorded the occurrence of the pertinent components during the sessions to which each condition was assigned. Agreement for each session was calculated by comparing the data of each observer and dividing the agreements of the occurrence of each component by the total number of components. Agreement scores were 100 percent for each session and are presented in Table One.
<table>
<thead>
<tr>
<th>Quarter</th>
<th>Session</th>
<th>Condition</th>
<th>Components Implemented</th>
<th>Percentage Agreement for Implementation of all Condition Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Observer 1</td>
<td>Observer 2</td>
<td>of all Condition Components</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>100%</td>
<td>100%</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>100%</td>
<td>100%</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>100%</td>
<td>100%</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>100%</td>
<td>100%</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>100%</td>
<td>100%</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>100%</td>
<td>100%</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>100%</td>
<td>100%</td>
<td>100</td>
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<td></td>
<td>2</td>
<td>100%</td>
<td>100%</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>100%</td>
<td>100%</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>100%</td>
<td>100%</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>100%</td>
<td>100%</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>100%</td>
<td>100%</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
<td>100%</td>
<td>100%</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>100%</td>
<td>100%</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>100%</td>
<td>100%</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>100%</td>
<td>100%</td>
<td>100</td>
</tr>
</tbody>
</table>
The same two observers also recorded the beginning and finishing times of the discussion of examples and nonexamples during Condition Number Two. The duration of the discussions was calculated by subtracting the starting time from the ending time. Agreement was calculated by dividing the durations recorded by each observer. There were four sessions of Book-Study Guide-Rules-Examples/Nonexamples in Quarter One and four in Quarter Two.

The durations and agreement coefficients for the discussion of examples and nonexamples are presented in Table Two. Based on the data of Observer One, none of the durations exceeded forty-five minutes. The longest session during Quarter One was 42.95 minutes, the shortest 20.21 minutes. During Quarter Two, the longest session was approximately 21.40 minutes, the shortest 16.68 minutes. The agreement coefficients exceeded 99 percent for the duration of the Book-Study Guide-Rules-Examples/Nonexamples sessions in both quarters.

**Dependent Variable**

Agreement data calculated for the dependent variable were the duration of the written examples and nonexample measure and the scoring of the students' responses as correct or incorrect.

**Duration.** Two observers recorded the beginning and finishing times of the dependent variable for each unit.
Table 2
Duration and Agreement Percentages for the Discussion of Written Examples and Nonexamples for Quarter One and Quarter Two

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Unit</th>
<th>Topic</th>
<th>Duration (min.)</th>
<th>Duration (min.)</th>
<th>Agreement Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Observer 1</td>
<td>Observer 2</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>Measurement</td>
<td>33.67</td>
<td>33.65</td>
<td>99.9</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>Graphing</td>
<td>42.95</td>
<td>42.94</td>
<td>99.9</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>Shaping and Chaining</td>
<td>27.89</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
<td>Maintaining Behavior</td>
<td>20.21</td>
<td>20.23</td>
<td>99.9</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Reinforcement and Extinction</td>
<td>19.21</td>
<td>19.25</td>
<td>99.8</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>Stimulus Control</td>
<td>16.68</td>
<td>16.67</td>
<td>99.9</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>Comparison of Behavior Change Programs</td>
<td>17.61</td>
<td>17.62</td>
<td>99.9</td>
</tr>
</tbody>
</table>
The ending time was indicated when the instructor said "Stop" after 45 minutes had elapsed. If 45 minutes had not been used, the ending time was determined by the first word of the next component of the class. The duration of the examples and nonexamples as measured by each observer was calculated by subtracting the starting time from the ending time. Agreement was calculated by dividing the smaller duration by the larger.

The durations and agreement coefficients for the completion of the written examples and nonexamples are presented in Table Three. During Quarter One, the data recorded by Observer One show the longest period of time needed to complete the dependent variable was 46.33 minutes, the shortest 41.05 minutes. The agreement coefficients for the duration allowed for the dependent variable exceeded 98 percent for each unit. During Quarter Two, the longest duration was 45.58 minutes, the shortest 45.02 minutes. The agreement coefficients for the time allowed for the dependent variable exceeded 99 percent for each session.

**Student performance.** Agreement on the principal investigator's scoring of the dependent variable was completed for randomly selected students for each unit from each quarter. The agreement observer scored each item as correct or incorrect according to the rule the item represented and sample correct and incorrect responses.
<table>
<thead>
<tr>
<th>Quarter</th>
<th>Unit</th>
<th>Topic</th>
<th>Duration (min.)</th>
<th>Duration (min.)</th>
<th>Agreement Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Observer 1</td>
<td>Observer 2</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Reinforcement and Extinction</td>
<td>46.33</td>
<td>46.40</td>
<td>99.8</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td></td>
<td>45.25</td>
<td>45.29</td>
<td>99.9</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>Measurement</td>
<td>41.63</td>
<td>41.63</td>
<td>100.0</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
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<td>45.40</td>
<td>45.43</td>
<td>99.9</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>Graphing</td>
<td>41.05</td>
<td>41.05</td>
<td>100.0</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td></td>
<td>45.40</td>
<td>45.43</td>
<td>99.9</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>Stimulus Control</td>
<td>45.62</td>
<td>45.02</td>
<td>98.7</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
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<td>45.38</td>
<td>45.60</td>
<td>99.9</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>Shaping and Chaining</td>
<td>44.65</td>
<td>44.70</td>
<td>99.9</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td></td>
<td>45.02</td>
<td>45.04</td>
<td>99.9</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>Reducing Behavior</td>
<td>44.73</td>
<td>44.70</td>
<td>99.9</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td></td>
<td>45.03</td>
<td>45.03</td>
<td>100.0</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
<td>Maintaining Behavior</td>
<td>43.00</td>
<td>43.00</td>
<td>100.0</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td></td>
<td>45.02</td>
<td>45.04</td>
<td>99.9</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>Comparison of Behavior Change Programs</td>
<td>45.09</td>
<td>45.04</td>
<td>99.9</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td></td>
<td>45.05</td>
<td>45.02</td>
<td>99.9</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Maintenance Measure</td>
<td>44.95</td>
<td>44.94</td>
<td>99.9</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>45.03</td>
<td>45.03</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Agreement was then calculated by counting the number of items on which the scorers agreed, the number on which they disagreed, and dividing the number of agreements by the number of agreements plus disagreements. The agreement data for the scoring of the dependent variable are presented in Table Four.

Quarter one. During Quarter One approximately 53 students completed the dependent variable for each unit. Fourteen of the quizzes from each unit were randomly selected for agreement scoring with the exception of Unit Four, which had 15 quizzes scored for agreement. The highest agreement for each unit was 100 percent. The lowest agreement for any unit was 80 percent. The mean agreement percentage for each unit exceeded 96 percent.

Quarter two. During Quarter Two, approximately 32 students completed the dependent variable for each unit. Seven of the quizzes from each unit were randomly selected for agreement scoring with the exception of Unit Five, which had eight quizzes scored for agreement. The highest agreement for each unit was 100 percent. The lowest agreement for any unit was 86.7 percent. The mean agreement percentage for each unit exceeded 96 percent.

Descriptive Data

The rate of student completion of written example and nonexamples was collected during both quarters of the study.
### Table 4
Mean Range and Percentage Agreement for the Examples and Nonexamples Measure for Quarter One and Quarter Two

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Unit</th>
<th>Topic</th>
<th>Number of Samples Scored</th>
<th>Highest Agreement</th>
<th>Lowest Agreement</th>
<th>Mean Percentage of Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Reinforcement and Extinction</td>
<td>14</td>
<td>100</td>
<td>80</td>
<td>98.1</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td>93.3</td>
<td>97.1</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>Measurement</td>
<td>14</td>
<td>100</td>
<td>86.7</td>
<td>98.1</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td>96.7</td>
<td>98.1</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>Graphing</td>
<td>14</td>
<td>100</td>
<td>93.3</td>
<td>98.1</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td>93.3</td>
<td>98.1</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>Stimulus Control</td>
<td>15</td>
<td>100</td>
<td>93.3</td>
<td>98.2</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td>93.3</td>
<td>98.1</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>Shaping and Chaining</td>
<td>14</td>
<td>100</td>
<td>86.7</td>
<td>97.1</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td>86.7</td>
<td>97.1</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>Reducing Behavior</td>
<td>14</td>
<td>100</td>
<td>86.7</td>
<td>97.6</td>
</tr>
<tr>
<td>2</td>
<td></td>
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<td></td>
<td>100</td>
<td>86.7</td>
<td>97.6</td>
</tr>
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<td>7</td>
<td>Maintaining Behavior</td>
<td>14</td>
<td>100</td>
<td>93.3</td>
<td>99.0</td>
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<td></td>
<td></td>
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<td>Comparison of Behavior</td>
<td>14</td>
<td>100</td>
<td>80.7</td>
<td>96.7</td>
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<td></td>
<td>Change Programs</td>
<td></td>
<td>100</td>
<td>100</td>
<td>100.0</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>100</td>
<td>100</td>
<td>100.0</td>
</tr>
</tbody>
</table>
To obtain rate data, the number of correct responses was divided by the number of minutes taken by the student to complete the quiz. A second set of descriptive data was collected by calculating the students' percentages of correct responses during both quizzes given for each unit; the dependent variable and the items given to determine the grade. The final set of descriptive data was collected by soliciting student responses to a series of questions at the end of each quarter. The questions dealt with which of the teaching techniques were preferred by the students, the number of hours studied, their opinion of the usefulness of the materials such as the text, study guide, and rules, and comments about the course.

**Rate**

During the first quarter of the study, rate data were collected from the 32 students completing all the dependent variable measures. The average rate for each unit of material is presented in Figure One. The highest mean rate of .51 correct responses per minute occurred during the quiz for Unit Seven, Maintaining Behavior. The lowest mean rate, .27 responses per minute, occurred during Unit One, Reinforcement and Extinction.

During the second quarter of the study, rate data were collected from the 25 students completing all the dependent variable measures. The average rate for each unit of
material is presented in Figure Two. The highest mean rate of .39 correct responses per minute occurred during the quiz for Unit Six, Reducing Behavior. The lowest mean rate, .27 correct responses per minute, occurred during the quiz for Unit One, Reinforcement and Extinction.

**Book–study guide–rules.** The Book–Study Guide–Rules condition consisted of students having the opportunity to read the text and rules and complete the study guide for the material for the unit. Data were collected for four sessions during each quarter.

For the first quarter, the highest mean rate was .42 correct responses per minute for Unit Six, Reducing Behavior. The lowest mean rate during this condition was .27 correct responses per minute for Unit One, Reinforcement.

For the second quarter, the highest mean rate was .36 correct responses per minute for Unit Seven, Maintaining Behavior. The lowest mean rate during this condition was .29 correct responses per minute for Unit Two, Measurement, and Unit Five, Shaping and Chaining.

**Book–study guide–rules–examples/nonexamples.** The Book–Study Guide–Rules–Examples/Nonexamples condition consisted of students having the opportunity to read the text and rules, complete the study guide, and discuss written examples and nonexamples illustrating the material
for the unit. Data were collected for four sessions during each quarter.

For the first quarter, the highest mean rate was .51 correct responses per minute for Unit Seven, Maintaining Behavior. The lowest mean rate during this condition was .41 correct responses per minute for Unit Two, Measurement.

For the second quarter, the highest mean rate was .39 correct responses per minute for Unit Six, Reducing Behavior. The lowest mean rate during this condition was .27 correct responses per minute for Unit One, Reinforcement and Extinction.

**Percentage**

The percentage of student correct completion of written examples and nonexamples and the items determining the grade were calculated during both quarters of the study. Group data and individual data are reported for each quarter. The individuals are the same students chosen for the analysis of the experimental data. The selection procedure is explained more fully in the Experimental Data section of the Results.

**Group data.** During the first quarter of the study, percentage data were collected from 32 students. The average group percentage for the written examples and nonexamples pertaining to each unit of material is presented in Figure Three. The highest percentage of correct responses, 87.5 percent, occurred during Unit Three,
Figure 1. Group Rate Performance on Written Examples and Nonexamples During Quarter One for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 2. Group Rate Performance on Written Examples and Nonexamples During Quarter Two for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Graphing. The lowest percentage of correct responses, 66.4 percent, occurred during Unit One, Reinforcement and Extinction. The range of percentages for the Book--Study Guide--Rules condition was 66.4 percent to 74.8 percent. The range of percentages for the Book--Study Guide--Rules--Examples/Nonexamples condition was 78.8 percent to 87.5 percent.

The average group percentage for the measures for each unit used to calculate the grade is presented in Figure Three. The highest percentage of correct responses, 98.8 percent, occurred during Unit Eight, Comparison of Behavior Change Programs. The lowest percentage of correct responses, 86.8 percent, occurred during Unit Three, Graphing.

During the second quarter of the study, percentage data were collected from 25 students. The average group percentage for the written examples and nonexamples pertaining to each unit of material is presented in Figure Four. The highest percentage of correct responses, 83.5 percent, occurred during Unit 6, Reducing Behavior. The lowest percentage of correct responses, 70.4 percent, occurred during Unit One, Reinforcement and Extinction. The range of percentages for the Book--Study Guide--Rules condition was 75.5 percent to 81.3 percent. The range of percentages for the Book--Study Guide--Rules--
Figure 3. Group Percentage Correct of Written Examples and Nonexamples and Quiz items Used for the Grade During Quarter One for Alternating Conditions. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Examples/Nonexamples condition was 70.4 percent to 83.5 percent.

The average group percentage for the measures for each unit used to calculate the grade is presented in Figure Four. The highest percentage of correct responses, 96.2 percent, occurred during Unit Eight, Comparison of Behavior Change Programs. The lowest percentage of correct responses, 88.6 percent, occurred during Unit Three, Graphing.

**Individual data.** The individual descriptive data are being presented in summary form. Individual data were collected on 12 students during the first quarter of the study and nine students during the second quarter. The data for the twelve students selected for the first quarter are presented in Figures Five through Sixteen. The greatest difference in percentage correct for the written examples and nonexamples occurred for Student Two. The highest percentage was 100 percent, the lowest 40 percent, yielding a range of 60 percent. The smallest difference in percentage correct for the written examples and nonexamples occurred for Student One. The highest percentage was 100 percent, the lowest percentage 73.3 percent, the range 26.7 percent. The mean range for the 12 students on the written examples and nonexamples was 43.3 percentage points.
Figure 4. Group Percentage Correct of Written Examples and Nonexamples and Quiz items Used for the Grade During Quarter Two for Alternating Conditions. The Alternating Conditions were Book-Study Guide-Rules and Book-Study Guide-Rules-Examples/Nonexamples.
The greatest difference in percentage correct for the quizzes counting toward the grade occurred for Student 12. The highest percentage was 100 percent, the lowest 32.1 percent, and the range 67.9 percent. The smallest difference in percentage correct for the quizzes counting toward the grade occurred for Student 10. The highest percentage was 100 percent, the lowest percentage 92.1 percent, the range 7.9 percent. The mean range for the 12 students on the quizzes counting for the grade was 23.9 percentage points.

The data for the nine students selected for the second quarter are presented in Figures 17 through 25. The greatest difference in percentage correct for the written examples and nonexamples occurred for Student Five. The highest percentage was 93.3 percent, the lowest 53.3 percent, and the range 40 percentage points. The smallest difference in percentage correct for the written examples and nonexamples occurred for Students One, Three, Eight, and Nine with ranges of 20 percentage points. The mean range for the nine students on the written examples and nonexamples was 24.3 percentage points.

The percentages for the quizzes whose scores counted for the grade of the nine students are presented in Figures 17 through 25. The greatest difference in percentage correct for the quizzes counting toward the grade occurred
Figure 5. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter One for Student 1 for Alternating Conditions. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 6. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter One for Student 2 for Alternating Conditions. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 7. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter One for Student 3 for Alternating Conditions. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 8. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter One for Student 4 for Alternating Conditions. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 9. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter One for Student 5 for Alternating Conditions. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 10. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter One for Student 6 for Alternating Conditions. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 11. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter One for Student 7 for Alternating Conditions. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 12. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter One for Student 8 for Alternating Conditions. The Alternating Conditions were Book—Study Guide—Rules and Book—Study Guide—Rules—Examples/Nonexamples.
Figure 13. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter One for Student 9 for Alternating Conditions. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 14. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter One for Student 10 for Alternating Conditions. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 15. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter One for Student 11 for Alternating Conditions. The Alternating Conditions were Book—Study Guide—Rules and Book—Study Guide—Rules—Examples/Nonexamples.
Figure 16. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter One for Student 12 for Alternating Conditions. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
for Student Five. The highest percentage was 100 percent, the lowest 58.3 percent, and the range 41.7 percent. The smallest difference in percentage correct for the quizzes counting toward the grade occurred for Students One, Three, and Nine. The highest percentage was 100 percent, the lowest percentage 91.7 percent, and the range 8.3 percentage points. The mean range for the nine students on the quizzes counting for the grade was 22 percentage points.

Social Validity

Social validity data were collected both quarters by a questionnaire answered on the day the class completed the maintenance measure. Questions addressed topics such as: (a) student preference for either condition of the study; (b) the procedure which helped the student learn more about the principles of behavior analysis, (c) the number of hours studied each week; (d) the usefulness of the book, study guide, and rules in preparing for the written examples and nonexamples measure; and (e) suggestions about improving the use of examples and nonexamples or any other topic about which the student had a comment.

Data pertaining to student responses during Quarter One are presented in Table Five. Forty-eight students responded to the questionnaire. The Book-Study Guide-Rules condition was preferred by 8.3 percent of the students; the Book-Study Guide-Rules-Examples/Nonexamples condition was
Figure 17. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter Two for Student 1 for Alternating Conditions. The Alternating Conditions were Book–Study Guide–Rules and Book–Study Guide–Rules–Examples/Nonexamples.
Figure 18. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter Two for Student 2 for Alternating Conditions. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 19. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter Two for Student 3 for Alternating Conditions. The Alternating Conditions were Book - Study Guide - Rules and Book - Study Guide - Rules - Examples and Nonexamples.
Figure 20. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter Two for Student 4 for Alternating Conditions. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 21. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter Two for Student 5 for Alternating Conditions. The Alternating Conditions were Book-Study Guide-Rules and Book-Study Guide-Rules-Examples/Nonexamples.
Figure 22. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter Two for Student 6 for Alternating Conditions. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 23. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter Two for Student 7 for Alternating Conditions. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 24. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter Two for Student 8 for Alternating Conditions. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 25. Individual Percentage Correct of Written Examples and Nonexamples and Quiz Items Used for the Grade During Quarter Two for Student 9 for Alternating Conditions. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Table 5
Results of Course Evaluation Questionnaire

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Preferred Method</th>
<th>Effective Method</th>
<th>Hours Studied Per Week (mean)</th>
<th>Usefulness for Studying</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Condition 1</td>
<td>Condition 2</td>
<td></td>
<td>rules book study guide</td>
</tr>
<tr>
<td>1</td>
<td>8.3%</td>
<td>91.7%</td>
<td>6.2%</td>
<td>93.8%</td>
</tr>
<tr>
<td>2</td>
<td>6.2%</td>
<td>93.8%</td>
<td>3.1%</td>
<td>96.9%</td>
</tr>
</tbody>
</table>
preferred by 91.7 percent of the students. Most of the students, 93.8 percent, also indicated that the Book-Study Guide-Rules-Examples/Nonexamples condition resulted in more learning. Forty-seven students reported the number of hours they studied each week, the mean was 5.8. To quantify student responses regarding the usefulness of the course materials, the students marked on a scale of one (useful) to five (not useful) their opinion of the text, study guide, and rules that were distributed at the beginning of the quarter. The mean ranking of the rules was 1.6, the mean ranking of the book 1.9, and the mean ranking of the study guide 2.7. Student responses to the questions asking for suggestions are found in Tables Six and Seven. For improving the use of examples and nonexamples, some of the more common suggestions were to distribute them ahead of time and to write them more clearly. Other comments about the course in general included spending more time in discussion and improving feedback.

Data representing student responses during Quarter Two are presented in Table Five. Thirty-two students responded to the questionnaire. The Book-Study Guide-Rules condition was preferred by 6.2 percent of the students; the Book-Study Guide-Rules-Examples/Nonexamples condition preferred by 93.8 percent of the students. Most of the students, 96.9 percent, also indicated that the Book-Study
Table 6

Suggestions of Quarter One Students for Improving the Use of Examples and Nonexamples in Teaching the Principles and Techniques of Applied Behavior Analysis

1. distribute examples ahead of time- 8 students
2. allow for more discussion- 4 students
3. explain parts more thoroughly
4. break into groups
5. were helpful as they were- 5 students
6. review examples after Part A (dependent variable) taken
7. write more clearly- 6 students
8. use for every class- 4 students
9. more examples- 4 students
10. don't write "example" or "nonexample" at the end, let student figure it out
11. additional time to read
12. don't do things differently- 3 students
13. have demonstration
14. use before Part A of quiz
15. apply them to study guide
16. use real examples, as on closed circuit television
17. have test question asking whether item is example or nonexample
18. go slower
19. liked it when every item read aloud
Table 6 (con't.)

20. include them in study guide and use class time for clarification and extension activities

21. lot of discussion for only a few questions

22. resist being read to
Table 7

Comments of Quarter One Students on Part A of the Quiz, the 15 Examples and Nonexamples

1. complete Part B (items for the grade) first, then Part A—2 students
2. Part A made test anxiety for Part B higher—2 students
3. was memorization that forgot after class
4. Part A aided understanding
5. wouldn’t prefer Part A type test
6. Part A unfair during class time
7. preferred lecture
8. Part A helped in taking Part B
9. allow more time for discussion
10. need less structured situation
11. spend 45 minutes (used for Part A) in teaching or discussion—5 students
12. not fun being someone else’s doctoral study
13. confusing with technical terms
14. amazing same material scored high on B and not A
15. go over tests as soon as taken—2 students
16. burden to take two quizzes—three students
17. how will it be known if it was examples and nonexamples that improved Part A
18. great job preparing and representing materials
19. if not graded, why take Part A
Table 7 (con't.)

20. lot of pressure to do well
21. don't know how to improve them
22. frustrating course
23. didn't significantly increase knowledge of behavioral principles
24. grading of Part A picky
25. make Part A similar to Part B (multiple choice and short answer)
26. feedback poor- 4 students
27. whole evaluation procedure directed toward how well text written
28. felt limited to ask only related questions (to examples and nonexamples)
29. liked classes where discussed the material
30. review and study guide more helpful for Part B because no feedback on Part A
31. liked how course set up- use examples and nonexamples every time
32. Part B quiz was fair
33. Part A quiz too technical
34. rules added to studying as did examples and nonexamples
35. study guide questions vague
36. learned a lot of useful information
37. Part A gave chance for application- 2 students
38. resentment about having a particular example represent an impossible situation
39. excellent feedback
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>40.</td>
<td>ambiguous questions- 2 students</td>
</tr>
<tr>
<td>41.</td>
<td>test protocol time-consuming</td>
</tr>
<tr>
<td>42.</td>
<td>studied for quizzes and not learning</td>
</tr>
<tr>
<td>43.</td>
<td>use more displayed information, as on chalkboard</td>
</tr>
<tr>
<td>44.</td>
<td>except for stress of two quizzes, class taught well</td>
</tr>
</tbody>
</table>
Guide- Rules- Examples/Nonexamples condition resulted in more learning. Thirty students reported the number of hours they studied each week, the mean was 8.1 hours per week for two sessions. To quantify student responses regarding the usefulness of the course materials, the students marked on a scale of one (useful) to five (not useful) their opinion of the text, study guide, and rules that were distributed at the beginning of the quarter. The mean ranking of the rules was 1.4, the mean ranking of the book 1.7, and the mean ranking of the study guide 2.9. Student responses to the questions asking for suggestions are found in Tables Eight and Nine. For improving the use of examples and nonexamples, some of the more common suggestions were to use them each session and distribute them before the class during which they were to be discussed. Other comments about the course in general included having more formal lecture and allowing time for reviewing student responses on the dependent variable, or written examples and nonexamples.

Summary

The descriptive data included rate of completion of correct responses of written examples and nonexamples, percentage correct on written examples and nonexamples and the section of the quiz pertaining to the grade, and responses to course evaluation questions about study time and the preference for and effectiveness of examples and
Table 8
Suggestions of Quarter Two Students for Improving the Use of Examples and Nonexamples in Teaching the Principles and Techniques of Applied Behavior Analysis

1. less wordy and more realistic
2. go over more slowly—2 students
3. use (examples and nonexamples) each class—6 students
4. give lecture with them (examples and nonexamples)
5. distribute (examples and nonexamples) session before (Part A of quiz)—4 students
6. nothing—2 students
7. more information in examples and nonexamples, were confusing
8. were help, maybe have variety of examples and nonexamples for each rule
9. students determine which items are examples or nonexamples and given immediate feedback on correctness
10. more helpful to have material discussed first
11. allow questions on topics without limiting to rule or particular example or nonexample
12. more discussion
Table 9

Comments of Quarter Two Students on Part A of the Quiz, the 15 Examples and Nonexamples

1. no feedback—go over Part A and Part B of quiz
2. describe what collection of data used for
3. too much emphasis on Part A
4. course poor example of education process—2 students
5. Part A confusing and unclear
6. more discussion before Part A—3 students
7. more formal lecture—8 students
8. (instructor) did exactly what said would do on first day—2 students
9. Part A hard
10. liked being able to competency out of final—2 students
11. wanted partial credit for some items on Part A
12. goal seemed to be collecting data and not so much helping (students) become familiar with material—2 students
13. don’t see reason for Part A, everyone should have to take final
14. frustrated by not knowing what questions missed or what made answers acceptable or unacceptable
15. opportunity to review (Part A) and discuss missed items in class—5 students
16. tired of reading and taking tests
17. instructor prevented by bounds of study from explaining material
18. course well-organized
19. had problems at beginning of course about what was behavior and consequence
Table 9 (con't.)

20. large quantity of material

21. knowledge from course gained from my (student) hard work—2 students

22. feedback excellent and class format good

23. would like to have asked more questions

24. now have useable information regarding effective strategies—2 students

25. taking Part A helped identify misunderstandings before Part B

26. access to Part A grades at beginning of next class instead of end

27. examples and situations were realistic
nonexamples and the course materials.

During the first quarter, the rate of correct completion was generally higher during the Book-Study Guide-Rules-Examples/Nonexamples condition. During the second quarter, there was very little difference between the rate of completion for the two conditions of the study.

For percent correct completion of items on the examples and nonexamples and graded portions of the quiz, the group data generally indicated the students the first quarter scored higher on items pertaining to the grade the entire quarter than the dependent variable during the Book-Study Guide- Rules- Examples/Nonexamples condition. Percentages on the units presented during the Book-Study Guide- Rules condition were generally lower than either of the other two sets of percentages. Individual data demonstrated responding on the items for the grade and on the written examples and nonexamples during Condition Two were generally similar with responding on the written examples and nonexamples during Condition One lower.

During the second quarter, the group data generally indicated students scored higher on the items for the grade with lower scores for the written examples and nonexamples during both Condition One and Condition Two. The individual data indicated three students demonstrated similar responding on the written examples and nonexamples during
both conditions, three students scored higher during Condition One, and two students scored higher during Condition Two. For many units, scores on the items used to determine the grade were higher than or equal to the percentage on the examples and nonexamples. In neither quarter did any student consistently score lower on the items counting for the grade than the written examples and nonexamples.

Student preferences during the first quarter were heavily weighted toward use of examples and nonexamples for instruction instead of using the textbook and study guide only. Study time averaged approximately six hours per week. The most useful material to which the students had access during the course were the lists of rules for each unit. During the second quarter, a similar pattern emerged with examples and nonexamples preferred overwhelmingly by students and also seen as more useful. The number of hours studied was approximately eight hours per week for two sessions. The rules were seen as most useful in preparing for the examples and nonexamples quiz.

**Experimental Data**

A multi-element design was used to explore the relationship between student responses to written examples and nonexamples and two treatments. The first condition was reading the book and rules describing the concepts and
completing the study guide. The second condition was reading the book and rules describing the concepts, completing the study guide, and reviewing examples and nonexamples in class. Data were collected across two quarters as the number of correct responses to 15 short answer examples and nonexamples for each of the eight units in an applied behavior analysis course.

During the first quarter, data were collected on 53 students. At the end of the quarter, this number was reduced to 32 to include only those students who completed all the short answer measures corresponding to the eight units in the course. After graphing the number of correct responses for the two conditions, two groups of students were formed. The first group was comprised of students whose data for the two conditions did not overlap; there were no intersections of the lines connecting the data points for each of the two conditions. The second group was comprised of students whose data did overlap; there was intersection in the lines. Six students were randomly selected from each group as the individual data for the study. The group data represented the results of the 32 students who completed each of the eight example and nonexample measures.

During the second quarter, data were collected on 32 students in the class in which the study was conducted. The
group data for the study represent 25 students who completed all eight of the dependent variable measures. As in Quarter One, two groups were formed for presentation of the individual data. The data for three of the students did not overlap, there were no intersections in the graphs. Each of these students is represented in the individual data. The data for 22 of the students did intersect at some point in the graph. Six of these students were randomly selected to represent the individuals with overlapping data points.

**Group Data**

During the first quarter of the study, the data of 32 students were analyzed and the average results are presented in Figure 26. The highest average number correct, 13.1 responses, occurred during the quiz for Unit Three, Graphing. The lowest average number correct, 10 responses, occurred during the quiz for Unit One, Reinforcement and Extinction. The mean number of correct responses during Quarter One was 12.4 items per student.

**Book-study guide-rules.** During the first quarter of the study, the mean number of correct responses during Condition Number One of the study was 10.5 items. The highest average number correct, 11.2 items, occurred during Unit Six, Reducing Behavior. The lowest average number correct, 10 items, occurred during Unit One, Reinforcement and Extinction.
During the first quarter of the study, the mean number of correct responses during Condition Number Two of the study was 12.5 items. The highest average number correct, 13.1 items, occurred during Unit Three, Graphing. The lowest average number correct, 11.8 items, occurred during Unit Two, Measurement.

During the second quarter of the study, the data of 25 students were analyzed and the average results are presented in Figure 27. The highest average number correct, 12.5 responses, occurred during the quiz for Unit Six, Reducing Behavior. The lowest number correct, 10.6 responses, occurred during the quiz for Unit One, Reinforcement and Extinction. The mean number of correct responses during Quarter Two was 11.6 items per student.

During the second quarter of the study, the mean number of correct responses during Condition Number One of the study was 11.8 items. The highest average number correct, 12.2 items, occurred during Unit Three, Graphing, and Unit Seven, Maintaining Behavior. The lowest average number correct, 11.3 items, occurred during Unit Two, Measurement.

During the second quarter of the study, the mean number of correct responses during Condition Number Two of the study was 11.4
Figure 26. Group Number Correct of Written Examples and Nonexamples During Quarter One for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book-Study Guide-Rules and Book-Study Guide-Rules-Examples/Nonexamples.
items. The highest average number correct, 12.5 items, occurred during Unit Six, Reducing Behavior. The lowest average number correct, 10.6 items, occurred during Unit One, Reinforcement and Extinction.

**Summary of Group Data**

During the first quarter, the range of the average number of correct responses during the Book- Study Guide- Rules condition was 1.2 items correct. The range of the data for the Book- Study Guide- Rules- Examples/Nonexamples condition was 1.3 items correct. In addition to the slight variability of the data, there was no intersection of any of the data points; there was clear fractionation among the data for the two conditions with higher student performance on the days when Book- Study Guide- Rules- Examples/Nonexamples was used for instruction.

During the second quarter of the study, the range of the number of correct responses during the Book- Study Guide- Rules condition was .9 items correct. The range of the data for the Book- Study Guide- Rules- Examples/Nonexamples condition was 1.9 items correct. There was intersection of the data points; there was no clear fractionation among the data for the two conditions.

**Individual Data**

Data for the individual students completing each dependent variable measure were graphed and categorized
Figure 27. Group Number Correct of Written Examples and Nonexamples During Quarter Two for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book—Study Guide—Rules and Book—Study Guide—Rules—Examples/Nonexamples.
according to whether any of the data points for the two conditions intersected or didn't intersect. The categorization system to select individuals was used because of the large number of students in the class each quarter. During Quarter One, 17 students had data that intersected at some point in the graph for the eight units of the course, the data of 15 students did not intersect. Six students were randomly selected from each of these groups. During Quarter Two, 22 students had data that intersected, three students had data that did not intersect. All the second quarter students whose data did not intersect are represented in the data analysis, six randomly selected students whose data did intersect are represented in the individual data analysis.

**Graphs with intersecting data.** During the first quarter, the data for six of the students whose graphs contain intersection are presented in Figures 28-33. The data for Student 4 showed little fractionation with intersection at two points. The mean number correct for Condition Number One was 8.5 with a range of six items. Student 4's high score of 11 correct was for Unit Four, Stimulus Control. The low score of five correct was for Unit One, Reinforcement and Extinction. The mean number correct for Condition Number Two was 10.5 with a range of two items. Student 4's high score of 12 correct was for
Unit Seven, Maintaining Behavior. The low score of 10 correct was for Unit Two, Measurement, Unit Three Graphing, and Unit Five, Shaping and Chaining.

The data for Student 5 were variable with more fractionation; the data only intersected at one point with clear differences for the remainder of the data. The mean number correct for Condition Number One was 9.2 with a range of five items. Student 5's high score of 12 correct was for Unit Four, Stimulus Control. The low score of seven correct was for Unit One, Reinforcement and Extinction. The mean number correct for Condition Number Two was 12 with a range of four items. Student 5's high score of 14 correct was for Unit Seven, Maintaining Behavior. The low score of 10 correct was for Unit Two, Measurement.

The data for Student 6 also had only one point of intersection with clear fractionation at the beginning of the course. The data became much more even, however, with the final three data points all being 14 correct despite the change in treatment. The mean number correct for Condition Number One was 12 with a range of four items. Student 6's high score of 14 correct was for Unit Six, Reducing Behavior, and Unit Eight, Comparison of Behavior Change Programs. The low score of 10 correct was for Unit One, Reinforcement and Extinction, and Unit Four, Stimulus Control. The mean number correct for Condition Number Two
was 14.5 with a range of one item. Student 6's high score of 15 correct was for Unit Three, Graphing, and Unit Five, Shaping and Chaining. The low score of 14 correct was for Unit Two, Measurement, and Unit Seven Maintaining Behavior.

Student 8 had no clear fractionation; the data appeared intertwined. The mean number correct for Condition Number One was 9 with a range of six items. Student 8's high score of 12 correct was for Unit Four, Stimulus Control. The low score of six correct was for Unit Eight, Comparison of Behavior Change Programs. The mean number correct for Condition Number Two was 10.8 with a range of three items. Student 8's high score of 13 correct was for Unit Three, Graphing. The low score of 10 correct was for Unit Five, Shaping and Chaining.

The data for Student 10 only intersected early in the course, the rest of the data showed clear fractionation. The mean number correct for Condition Number One was 12.2 with a range of four items. Student 10's high score of 14 correct was for Unit One, Reinforcement and Extinction, and Unit Four, Stimulus Control. The low score of 10 correct was for Unit Eight, Comparison of Behavior Change Programs. The mean number correct for Condition Number Two was 14.5 with a range of one item. Student 10's high score of 15 correct was for Unit Three, Graphing, and Unit Five, Shaping and Chaining. The low score of 14 correct was for Unit Two,
The data for Student 12 were variable and intertwined with no clear fractionation. The mean number correct for Condition Number One was 6.5 with a range of six items. Student 12's high score of 10 correct was for Unit Six, Reducing Behavior. The low score of four correct was for Unit Eight, Comparison of Behavior Change Programs. The mean number correct for Condition Number Two was 7.8 with a range of three items. Student 12's high score of 10 correct was for Unit Two, Measurement. The low score of 7 correct was for Unit Three, Graphing, Unit Five, Shaping and Chaining, and Unit Seven, Maintaining Behavior.

During the second quarter, the data for 6 of the 22 of the students whose graphs contain intersection are presented in Figures 34-39. The data for Students 1, 3, 5, 6, and 9 intersect at one point on the graph. Student 1 has clear fractionation at the beginning of the quarter with higher scores during the Book-Study Guide-Rules condition. The mean number correct for Condition Number One was 14.5 with a range of one item. Student 1's high score of 15 correct was for Unit Two, Measurement, and Unit Three, Graphing. The low score of 14 correct was for Unit Five, Shaping and Chaining, and Unit Seven, Maintaining Behavior. The mean number correct for Condition Number Two was 13 with a range of three items. Student 1's high score of 15 correct was
Figure 28. Individual Number Correct of Written Examples and Nonexamples During Quarter One for Student 4 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 29. Individual Number Correct of Written Examples and Nonexamples During Quarter One for Student 5 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 30. Individual Number Correct of Written Examples and Nonexamples During Quarter One for Student 6 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 31. Individual Number Correct of Written Examples and Nonexamples During Quarter One for Student 8 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book-Study Guide-Rules and Book-Study Guide-Rules-Examples/Nonexamples.
Figure 32. Individual Number Correct of Written Examples and Nonexamples During Quarter One for Student 10 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 33. Individual Number Correct of Written Examples and Nonexamples During Quarter One for Student 12 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book-Study Guide-Rules and Book-Study Guide-Rules-Examples/Nonexamples.
for Unit Eight, Comparison of Behavior Change Programs. The low score of 12 correct was for Unit One, Reinforcement and Extinction, and Unit Four, Stimulus Control.

Student 9 also had clear fractionation at the beginning of the quarter with higher scores during the Book-Study Guide-Rules condition. The mean number correct for Condition Number One was 13.5 with a range of one item. Student 9's high score of 14 correct was for Unit Three, Graphing, and Unit Five, Shaping and Chaining. The low score of 13 correct was for Unit Two, Measurement, and Unit Seven, Maintaining Behavior. The mean number correct for Condition Number Two was 12.5 with a range of three items. Student 9's high score of 14 correct was for Unit Six, Reducing Behavior. The low score of 11 correct was for Unit One, Reinforcement and Extinction.

Student 6 had higher scores during the Book-Study Guide-Rules-Examples/Nonexamples condition for every session but one. The mean number correct for Condition Number One was 8.8 with a range of four items. Student 6's high score of 11 correct was for Unit Seven, Maintaining Behavior. The low score of seven correct was for Unit Five, Shaping and Chaining. The mean number correct for Condition Number Two was 9.8 with a range of one item. Student 6's high score of 10 correct was for Unit Four, Stimulus Control, Unit Six, Reducing Behavior, and Unit Eight,
Comparison of Behavior Change Programs. The low score of 9 correct was for Unit One, Reinforcement and Extinction.

Although Student 3's data only intersect at one point, there is little fractionation. The mean number correct for Condition Number One was 13.5 with a range of three items. Student 3's high score of 15 correct was for Unit Three, Graphing. The low score of 12 correct was for Unit Five, Shaping and Chaining. The mean number correct for Condition Number Two was 13.2 with a range of one item. Student 3's high score of 14 correct was for Unit Eight, Comparison of Behavior Change Programs. The low score of 13 correct was for Unit One, Reinforcement and Extinction, Unit Four, Stimulus Control, and Unit Six, Reducing Behavior.

The data for Student 4 show variability with little fractionation. The mean number correct for Condition Number One was 10.5 with a range of three items. Student 4's high score of 12 correct was for Unit Seven, Maintaining Behavior. The low score of nine correct was for Unit Two, Measurement. The mean number correct for Condition Number Two was 10 with a range of five items. Student 4's high score of 13 correct was for Unit Six, Reducing Behavior. The low score of 8 correct was for Unit Eight, Comparison of Behavior Change Programs.

The data for Student 5 show little fractionation and high variability. The mean number correct for Condition
Number One was 11.2 with a range of five items. Student 5's high score of 13 correct was for Unit Two, Measurement, and Unit Three, Graphing. The low score of eight correct was for Unit Five, Shaping and Chaining. The mean number correct for Condition Number Two was 11 with a range of five items. Student 5's high score of 14 correct was for Unit Six, Reducing Behavior. The low score of 9 correct was for Unit Four, Stimulus Control.

Graphs with no intersecting data. During the first quarter, the data for six of the students whose data lines do not intersect are presented in Figures 40-45. There is clear fractionation for Student 1, however, there are increasing and decreasing trends in the data which could have led to intersection at a later time if the course had continued. For student 1, the mean number correct for Condition Number One was 12 with a range of two items. Student 1's high score of 13 correct was for Unit Eight, Comparison of Behavior Change Programs. The low score of 11 correct was for Unit Four, Stimulus Control. The mean number correct for Condition Number Two was 14.2 with a range of two items. Student 1's high score of 15 correct was for Unit Three, Graphing, and Unit Five, Shaping and Chaining. The low score of 13 correct was for Unit Seven, Maintaining Behavior.
Figure 34. Individual Number Correct of Written Examples and Nonexamples During Quarter Two for Student 1 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples and Nonexamples.
Figure 35. Individual Number Correct of Written Examples and Nonexamples During Quarter Two for Student 3 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book - Study Guide - Rules and Book - Study Guide - Rules - Examples/Nonexamples.
Figure 36. Individual Number Correct of Written Examples and Nonexamples During Quarter Two for Student 4 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 37. Individual Number Correct of Written Examples and Nonexamples During Quarter Two for Student 5 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book-Study Guide-Rules and Book-Study Guide-Rules-Examples/Nonexamples.
Figure 36. Individual Number Correct of Written Examples and Nonexamples During Quarter Two for Student 6 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 39. Individual Number Correct of Written Examples and Nonexamples During Quarter Two for Student 9 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book-Study Guide-Rules and Book-Study Guide-Rules-Examples/Nonexamples.
There is clear fractionation for Student 2, however, like Student 1, there are increasing and decreasing trends which could have led to intersection if the course had continued. The mean number correct for Condition Number One was 9 with a range of six items. Student 2's high score of 12 correct was for Unit Eight, Comparison of Behavior Change Programs. The low score of six correct was for Unit One, Reinforcement and Extinction. The mean number correct for Condition Number Two was 13 with a range of two items. Student 2's high score of 15 correct was for Unit Five, Shaping and Chaining. The low score of 13 correct was for Unit Seven, Maintaining Behavior.

The data for the remaining four students with no intersection show no trends which would indicate future overlap. For Student 3, the mean number correct for Condition Number One was 9.8 with a range of three items. Student 3's high score of 11 correct was for Unit Six, Reducing Behavior. The low score of eight correct was for Unit Four, Stimulus Control. The mean number correct for Condition Number Two was 14 with a range of two items. Student 3's high score of 15 correct was for Unit Three, Graphing. The low score of 13 correct was for Unit Five, Shaping and Chaining.

For Student 7, the mean number correct for Condition Number One was 9.8 with a range of three items. Student 7's
high score of 11 correct was for Unit Six, Reducing Behavior, and Unit Eight, Comparison of Behavior Change Programs. The low score of eight correct was for Unit One, Reinforcement and Extinction. The mean number correct for Condition Number Two was 12.5 with a range of three items. Student 7's high score of 14 correct was for Unit Seven, Maintaining Behavior. The low score of 11 correct was for Unit Five, Shaping and Chaining.

For Student 9, the mean number correct for Condition Number One was 9 with a range of five items. Student 9's high score of 12 correct was for Unit Six, Reducing Behavior. The low score of seven correct was for Unit Eight, Comparison of Behavior Change Programs. The mean number correct for Condition Number Two was 12.8 with a range of five items. Student 9's high score of 15 correct was for Unit Three, Graphing. The low score of 10 correct was for Unit Two, Measurement.

For Student 11, the mean number correct for Condition Number One was 9.2 with a range of six items. Student 11's high score of 13 correct was for Unit One, Reinforcement and Extinction. The low score of seven correct was for Unit Four, Stimulus Control. The mean number correct for Condition Number Two was 13.5 with a range of one item. Student 11's high score of 14 correct was for Unit Three, Graphing, and Unit Five, Shaping and Chaining. The low
score of 13 correct was for Unit Two, Measurement, and Unit Seven, Maintaining Behavior.

During the second quarter, the data for the three students whose data lines do not intersect are presented in Figures 46-48. The data for Students 7 and 8 show clear fractionation with higher scores during the Book-Study Guide-Rules condition. For Student 7, the mean number correct for Condition Number One was 13.2 with a range of two items. Student 7's high score of 14 correct was for Unit Three, Graphing, and for Unit Seven, Maintaining Behavior. The low score of 12 correct was for Unit Two, Measurement. The mean number correct for Condition Number Two was 10.8 with a range of two items. Student 7's high score of 12 correct was for Unit Four, Stimulus Control. The low score of 10 correct was for Unit One, Reinforcement and Extinction, and Unit Eight, Comparison of Behavior Change Programs.

For Student 8, the mean number correct for Condition Number One was 12.5 with a range of one item. Student 8's high score of 13 correct was for Unit Two, Measurement, and Unit Five, Shaping and Chaining. The low score of 12 correct was for Unit Three, Graphing, and Unit Seven, Maintaining Behavior. The mean number correct for Condition Number Two was 10.8 with a range of two items. Student 9's high score of 12 correct was for Unit Six, Reducing
Figure 40. Individual Number Correct of Written Examples and Nonexamples During Quarter One for Student 1 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 41. Individual Number Correct of Written Examples and Nonexamples During Quarter One for Student 2 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 42. Individual Number Correct of Written Examples and Nonexamples During Quarter One for Student 3 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 43. Individual Number Correct of Written Examples and Nonexamples During Quarter One for Student 7 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 44. Individual Number Correct of Written Examples and Nonexamples During Quarter One for Student 9 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples and Nonexamples.
Figure 45. Individual Number Correct of Written Examples and Nonexamples During Quarter One for Student 11 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Behavior. The low score of 10 correct was for Unit One, Reinforcement and Extinction, and Unit Eight, Comparison of Behavior Change Programs.

The data for Student 2 show fractionation with higher scores during the Book-Study Guide-Rules-Examples/Nonexamples condition. The data for Student 2 also indicate increasing and decreasing trends which could have led to intersection if the course had continued. The mean number correct for Condition Number One was 11.2 with a range of four items. Student 2's high score of 13 correct was for Unit Seven, Maintaining Behavior. The low score of nine correct was for Unit Two, Measurement. The mean number correct for Condition Number Two was 12.8 with a range of two items. Student 2's high score of 14 correct was for Unit Six, Reducing Behavior. The low score of 12 correct was for Unit One, Reinforcement and Extinction, and Unit Four, Stimulus Control.

Summary of Individual Data

The students in Quarter One and Quarter Two were divided into groups according to those whose data for the two conditions did intersect and those students whose data did not intersect. For Quarter One, the set of students with no intersection between the graph lines for the two treatments was composed of 15 of the 32 students who completed all the dependent variable measures. Of the six
Figure 46. Individual Number Correct of Written Examples and Nonexamples During Quarter Two for Student 2 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book–Study Guide–Rules and Book–Study Guide–Rules–Examples/Nonexamples.
Figure 47. Individual Number Correct of Written Examples and Nonexamples During Quarter Two for Student 7 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
Figure 48. Individual Number Correct of Written Examples and Nonexamples During Quarter Two for Student 8 for Alternating Conditions and a Maintenance Measure. The Alternating Conditions were Book- Study Guide- Rules and Book- Study Guide- Rules- Examples/Nonexamples.
students chosen for individual analysis, two had increasing and decreasing trends which could have led to intersection if the course had continued.

Seventeen of the students had intersection between the data points for the two conditions, six of whom were randomly chosen for analysis. Three of the six individual graphs reported in the study with intersection only crossed at one point with fractionation for the rest of the units. The remaining three graphs intersected at two or more points.

During Quarter Two, one of the students completing the dependent variable for all eight units had no intersection among the data points with Condition Number Two leading to higher performance. Of the 25 students completing each dependent variable measure, 22 had some intersection in the data. Two of the graphs had fractionation with the Book-Study Guide-Rules condition leading to higher performance on all the quizzes.

**Maintenance Measure**

A maintenance measure was administered on the last class session during Quarter One and the day of the final examination during Quarter Two. Twenty-seven of the Quarter One students completing the examples and nonexamples quiz for every unit also completed the maintenance measure. The maintenance measure scores are presented in Table Ten. The
average number of correct responses was 8.3 items. The students' scores on the maintenance measure were generally below their scores on the examples and nonexamples scores for the units.

Twenty-five of the Quarter Two students completing the examples and nonexamples quiz for every unit also completed the maintenance measure. The maintenance measure scores are presented in Table Ten. The average number of correct responses was 9.4 items.
Table 10
Average Number Correct, Rate Correct, and Percentage Correct on the Maintenance Measure for Quarter One and Quarter Two

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Number Correct</th>
<th>Rate Correct</th>
<th>Percentage Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8.3</td>
<td>.33</td>
<td>55.6</td>
</tr>
<tr>
<td>2</td>
<td>9.4</td>
<td>.29</td>
<td>62.7</td>
</tr>
</tbody>
</table>
Chapter V
DISCUSSION

The purpose of the study was to examine the use of examples and nonexamples as an instructional technique and measurement device for teaching concepts and principles presented in an applied behavior analysis class. Specifically, the study attempted to: (a) identify the effects of two instructional methods on student performance on examples and nonexamples; and (b) determine the existence of any functional relationships between the two treatments and student performance. One method was composed of students reading the text and course materials and completing the study guide. The other method was composed of students reading the text and course materials, completing the study guide, and reviewing examples and nonexamples in class. The study also attempted to determine student preference and opinion as to the effectiveness of the two procedures. The last two foci of the study were to develop a measurement technique designed to ascertain relevant behaviors in the classroom portion of a teacher training program and a scientific methodology for evaluating student performance and instruction.
The educational significance of the data is represented by the levels of the students' percentage and number correct scores on the dependent variable, or measure of examples and nonexamples, and the students' percentages on items used to calculate the grade.

**Quarter One**

During Quarter One, the range of percentages for the Book- Study Guide- Rules condition was lower than the range for the Book- Study Guide- Rules- Examples/Nonexamples. The range of percentages on items used for the grade was higher than student performance during either of the two conditions of the study. These data are represented in Figure Three.

The individual data for Students 1, 2, 3, 5, 6, 7, 9, 10, and 11 contained approximately equal percentages for Condition Number Two and the quiz items for the grade with lower percentages for Condition Number One. The data for these individuals are represented in Figures 5, 6, 7, 9, 10, 11, 13, 14, and 15. The level of responding on the items for the grade showed no consistent pattern, while performance on the written examples and nonexamples generally varied according to the condition being implemented with Condition Number Two leading to higher performance. There are several possible explanations for the differences in performance on the two measures. First, the question and answer period between completion of the
dependent variable and the quiz for the grade may have addressed any areas of confusion. Thus, on days when the students had no examples and nonexamples to examine before the dependent variable, the discussion before the quiz for the grade may have provided the information the students needed to correctly answer the items.

A second explanation could be the difference in the items on the two measures. The dependent variable required application of the concepts in the text, while the quiz for the grade was composed primarily of recognition questions. In addition, there were no agreement observations on the scoring of the quiz for the grade.

**Quarter Two**

During Quarter Two, performance on the examples and nonexamples during the Book- Study Guide- Rules condition and the Book- Study Guide- Rules- Examples/Nonexamples condition overlapped to a great extent. The group data indicate student performance on items used for the grade was generally greater than for either of the two conditions used in the study. These data are presented in Figure Four. The individual data are presented in Figures 17-25. Student 5 had variable data with approximately the same levels of performance, thus indicating few differences in student performance across the two types of measures. Students 1 and 7 had approximately the same level of
responding on the dependent variable of examples and nonexamples during the Book- Study Guide- Rules condition and the items for the grade. Performance on examples and nonexamples during the Book- Study Guide- Rules- Examples/Nonexamples condition was consistently lower for these two subjects. Students 3 and 4 had few differences in performance during either condition, however, percentages on items used to calculate the grade were usually higher. The remaining students demonstrated other levels of responding. Due to the different patterns in scores between sessions involving each condition, it appears that for Quarter Two, performance on examples and nonexamples was no different from the quiz for the grade as an indicator of acquisition of the concepts of applied behavior analysis.

The educational significance of the percentages for both quarters indicated that students rarely scored above 90 percent for more than half the dependent variable measures. Calculating percentages from a measure with only 15 items is partially responsible for this situation. Two missed items resulted in a score of 87 percent. In addition, the students may not have had adequate skills in completing application items, thus they had difficulty with the dependent variable. Also, the items on the dependent variable may not have matched the material provided by the text, study guide, and rules for the units. It may have
been too difficult for the students to answer application questions without more preparation in addition to the discussion of examples and nonexamples on certain occasions.

Although the antecedent conditions should be analyzed in terms of their failure to occasion appropriate student responses, it is also necessary to examine the consequences provided the students in completing the items. Assuming the students had the prerequisite skills and the test items were adequate discriminative stimuli, it is possible the reinforcer of being able to delete items from the final by demonstrating mastery of the concepts during the course was not strong enough to increase the probability of the occurrence of the appropriate responses.

**Rate.** The rate of student performance is an indicator of how proficiently written examples and nonexamples are completed. The Quarter One data are presented in Figure One. There was fractionation of the rate of completion between the two conditions with a higher rate being associated with the Book- Study Guide- Rules- Examples/Nonexamples condition. The rate during both conditions increased as the quarter progressed. The Quarter Two data are presented in Figure Two. There was intersection between the rate of completion associated with each condition with an increase in the rate as the quarter progressed.
The rate data are descriptive because there were no contingencies placed on the combined speed and accuracy of completion of written examples and nonexamples; therefore, there were no arranged controlling consequences for the students' performance. As a result, other contingencies and the students' past test-taking history were controlling the students' behavior. For example, a possible contingency was allowing time for studying for the quiz for the grade occurring later in the class. The control of previous test-taking behavior is exemplified in Quarter Two, when it appeared that some of the students were very deliberate in their completion of the responses, either checking their answers or dividing the time allotted for the dependent variable by the number of items to establish the maximum average interval that could be allowed for each question. In addition, the students were given a limited number of items to complete in the time limit. Therefore, they had the opportunity to work as long as they wished on some items.

The data show that the students taking the course in Quarter One generally correctly completed items faster during the Book-Study Guide-Rules-Examples/Nonexamples condition. The rate for students in Quarter Two increased or stayed the same for most of the sessions, thus possibly indicating the benefits of practicing completing examples
and nonexamples. The general range of the rate of correct completion was similar for both quarters, thus indicating that students under the conditions of this course can be expected to work at a pace of .25 to .50 correct responses per minute. The rate information might be useful in determining how many items to present students during future classes, given a certain amount of time allotted for the evaluation measure.

**Experimental Analysis**

The data collected for the experimental analysis of the relationship between the two instructional techniques and student performance on written examples and nonexamples was based on the number of items correct on the dependent variable. The group data for Quarter One and Quarter Two indicated the range of number correct for either condition did not exceed two items out of 15 possible responses. For the individual data, approximately one-half of the Quarter One students had complete fractionation of the data, while the other half had at least one point of intersection. The majority of Quarter Two students had intersection among the data.

A functional relationship between discussing examples and nonexamples, opportunity to read the book and rules, and opportunity to complete the study guide and student performance on written examples and nonexamples was
demonstrated by the Quarter One data. The range of the
group data indicated stability and there was no
intersection. The configurations of the individuals graphs' corresponded to the group data. Students One, Two, Three, Seven, Nine, and Eleven represented in Figures 40 through 45 show that Book–Study Guide–Rules–Examples/Nonexamples led to higher performance during the entire quarter. Of the individuals randomly selected from those students with intersecting data represented in Figures 28 through 33, Students Five, Six, and Ten only intersected at one point.

The data did not replicate during Quarter Two. Although the group data were stable, they intersected at two points. The data of 22 of the students intersected at some point during the course, which reflects the inconclusive configuration of the group graph. One functional relationship among the individuals was demonstrated for Student Two on Figure 46 between Condition Number Two and performance on written examples and nonexamples. Two functional relationships for Students Seven and Eight on Figures 47 and 48 were demonstrated between Condition Number One and performance on written examples and nonexamples.

Although the pre-test scores from both quarters were under 50 percent, it is possible that completing the course in five weeks had an influence on the students. There was not as much time available to examine the course materials
or to get acclimated to the materials and written examples and nonexamples. It is also possible that during the first quarter, the students had a more complete understanding of the requirements of the course. During the second session of Quarter One, there was a lengthy discussion of the plausability and relevance of the data that was being collected and the fact that "instructional" time was being taken to complete data collection. Although several of the students complained vociferously, it is possible that in the process the students had a more complete understanding of what the class would entail. Although a functional relationship was demonstrated the first quarter, the results were weakened by the nonreplicability of the data during the second quarter of the study.

Measurement of Student Performance

The study used two measurement devices which fit easily into the curriculum for this class and can be useful for the measurement of student performance: rate and examples and nonexamples. Although rate was collected primarily as descriptive data in this study, other instructors have used rate as the major measurement device in their instruction. Johnston and Pennypacker (1971) demonstrated that rate can be used to provide the students with many opportunities to respond and make an increase in the rate part of the evaluation criteria. Knight, Christie, Egner, Paolucci, &
Lates (1976) demonstrated that rate can be useful in determining the criteria by which to measure student progress. They established the rate of task completion based on the number of requirements to be fulfilled by the end of the training. In this way, the pace of accurate completion of the tasks not only determined the rate at which tasks were currently being completed, but also the future rate necessary to finish training. The current study employed a system whereby the instructor indicated the beginning time for the quiz and independent observers in the classroom gave the finishing times to the students as they came to the front of the room. This insured that the students would be writing down the correct time. In addition to the absence of a planned contingency discussed earlier, one problem with the system was that the finishing times may have been inaccurate due to the fact that the amount of time taken to walk to the front of the room was not separated from the time spent working on the dependent variable. One observer attempted to monitor when students left their seats, but this could not be done for every student and did not account for the time they may have spent just sitting at their seats after completing the quiz before coming to the front of the room. If rate were going to be the major datum in the course, then stricter controls should be maintained and the course structure would need to be
changed to reflect the emphasis on time and enough response opportunities to make rate a functional measure. For example, it would be necessary to make sure the students have control over responding so that their rate is not dependent on the instructor's presentation of the items. If the instructor presents the flash cards, or whatever item format is used, then the speed of the student's response is partially dependent on the instructor.

The other functional measurement format is the use of examples and nonexamples for instruction and evaluation. Teacher training and many other disciplines are concerned with student application of the skills they acquire. Examples and nonexamples can be individualized to fit any situation related to the training or educational program. Second, it is possible to teach by gradually reducing the number of cues which are presented to the student. For example, in teaching reinforcer selection, the instructor could begin by using examples such as:

Howard asked Kyle what he liked to do after school and used those activities as reinforcers for helping him clean the halls after the students had left. Howard also kept track of the number of days Kyle stayed after school and the amount of time spent helping in order to evaluate the effectiveness of the activities. What appropriate
steps are included in Howard's reinforcer selection and evaluation procedure?

Later in instruction, the teacher could use examples with much fewer cues, such as:

Howard wants to select and evaluate effective reinforcers for Kyle's assistance in helping clean the halls after the students leave. What procedures could Howard use to establish such a program?

By using examples and nonexamples as testing materials, the instructor can also get a valid indication of how well the students can apply the concepts and skills being presented in class.

Course Evaluation

The students' evaluation of the course indicated over 90 percent of the students in Quarter One and Quarter Two preferred the Book–Study Guide–Rules–Examples/Nonexamples condition. Over 90 percent of the students both quarters also thought the Book–Study Guide–Rules–Examples/Nonexamples condition taught them more than not having access to examples and nonexamples. These results found in Table Five stand in contrast to the written comments about the course written by the students. The student comments from Quarter One are found in Tables Six and Seven. In responding to an open-ended question on how
to improve the use of examples and nonexamples, eight of the Quarter One students stated that it would help to have the examples and nonexamples ahead of time, six said they should be written more clearly, and five students thought they were helpful as they were presented. In responding to an open-ended question about the written examples and nonexamples measure, five students from Quarter One indicated the time taken for the dependent variable could have better been used for instruction. Four students indicated the feedback was poor. Other comments from Quarter One noted that being part of someone's dissertation study was not appreciated and that taking the dependent variable measure increased test anxiety for the quiz items for the grade. Among the minority of comments that could be termed positive were indications that Part A of the quiz aided understanding and that the material was well represented by the examples and nonexamples.

The responses of the Quarter Two students to the open-ended questions are presented in Tables Eight and Nine. In responding to an open-ended question on how to improve the use of examples and nonexamples, four of the students suggested distributing them before the class and six students would liked to have used them each session. In responding to an open-ended question about the the written examples and nonexamples measure, eight students wanted more
formal lecture and six students would have liked to discuss Part A of the quiz, or the dependent variable, after it had been completed. Other comments noted a desire for more discussion before the examples and nonexamples measure and an appreciation for being able to delete items from the final exam based on quiz performance during the quarter.

The high percentages of students who liked the examples and nonexamples condition when given the choice between it and the Book-Study Guide-Rules condition apparently did not indicate that preference when responding to an open-ended question. The preponderance of negative comments written during Quarter One could have been the result of the disturbance the second session. A more likely explanation, however, is that the class structure and use of examples and nonexamples added another unfamiliar dimension to a class which is already taught in a way probably unlike any procedure to which they had been exposed previously. The responses of the students the second quarter can help answer the question of the effect of the Quarter One second session disturbance. The comments were primarily negative both quarters, so the incident probably had little effect on how students viewed the course.

The arrangement of the experimental conditions probably had an influence on the students in completing generally negative evaluations. In order to control access to other
information as much as possible, it was necessary to examine the written examples and nonexamples in class so that all students had the same exposure to the material. As some of the students appropriately pointed out, it would have been better to distribute them the week before; however, this would have confounded the data. In addition, it was not natural to use two quizzes, but this was required to control student access to information. During the Book- Study Guide- Rules condition, the students needed to take the quiz as soon as they came to class; yet it was necessary to give them access to instruction before administering the items for the grade. If the study had been comparing two treatments containing instruction, then taking one quiz with embedded items for the dependent variable would have been more feasible. The steps many of the students didn't like were taken to maintain experimental control while having the course remain as much like a typical course as possible in terms of access to study materials.

Developing an Evaluation Procedure

The multi-element design was chosen in an attempt to develop a scientific measurement procedure which would be useful in a college classroom. Ulman and Sulzer-Azaroff (1975) indicated two of the advantages of the multi-element design are the absence of a lengthy baseline and the capability of evaluating a number of treatments. These two
benefits are particularly suited to evaluating college instruction. Many college courses are offered once or twice a week for 10, 12, or 16 weeks. If some in-class measure is chosen as the dependent variable, then it is very difficult to establish the predictive and verifying baselines necessary for experimental evaluation. In addition, the data must be stable, or at least predictable, in any condition to be interpreted with any degree of assurance. By emphasizing the vertical distance between treatments that have been randomly arranged or ordered so that no condition is repeated until all the others have been used not only facilitates shorter data collection, it allows the experimenter to make decisions of ineffectiveness much more quickly so that other instructional procedures can be attempted before the students complete the coursework. The multi-element design also allows the instructor to evaluate a series of procedures at one time; instead of only being able to examine one treatment and compare it to a baseline.

The advantages of the multi-element design were demonstrated by this study. The class only met once a week for ten weeks or twice a week for five weeks. Subtracting the introductory session and a review session resulted in only eight classes available for data collection. The multi-element design allowed two instructional techniques to be compared in this time frame. Although a "no instruction"
condition was included in the study, it would have been possible to compare Book- Study Guide- Rules- Examples/Nonexamples with another condition, such as lecture or discussion. Such a comparison would have been virtually impossible using another of the standard designs. Eliminating the "baseline" condition to allow more instruction and consolidating the quizzes would probably have facilitated more student satisfaction while still allowing experimental evaluation.

The study also demonstrated the feasibility of adhering to criteria of scientific evaluation while maintaining a functional instructional environment. Johnston & Pennypacker (1980) state the criteria are:

1. basing measurement on objective descriptions of behaviors.
2. using absolute units of measurement not related to the measurement device.
3. arranging conditions to examine the relationship between the behavior and the environment.

This study fulfilled the behavioral criteria by using a dependent variable composed of written student responses to application situations. No assumptions were made about the students' thought processes; the measure was just an indication of the students' skills in responding to written stimuli representing the principles and procedures of
behavior analysis.

The absolute units used were number correct and rate correct. The units are based on algebraic counting and time and are not determined by mathematical manipulation of the performance of a group of students. Rate and number correct could be applied in any situation with any student and facilitate a direct comparison of the measurement units.

The multi-element design was used to arrange the conditions to allow conclusions about the control of the treatments over the dependent variable. The first phase of the application of the two conditions was pre-arranged so that the students would complete the Book-Study Guide-Rules condition in the absence of the instructor, who was out of town on the first day content was presented in class. The second phase of the two conditions was randomly established by a flip of a coin; the Book-Study Guide-Rules-Examples/Nonexamples condition was used first followed by the Book-Study Guide-Rules condition. For the remainder of the course, the Book-Study Guide-Rules-Examples/Nonexamples condition was always used first in each phase of completion of the two conditions. Random selection was not seen as vital because of the limited number of data points and it was determined that the critical rule was to use each of the conditions before either was repeated in any phase of two conditions. During Quarter Two, the conditions
assigned to each session were reversed from Quarter One. The experimental arrangement of the environment helped set the occasion for scientific analysis of the conditions.

**Limitations**

There are several factors which need to be considered when interpreting the results of the study. The dependent variable and treatments were based on different sections of material as presented in the text used for the course. Therefore, the lengths of the reading assignments were variable and the possibility existed that the content for each of the units was of differing levels of difficulty, which in turn may have influenced student performance on the dependent variable. Several steps were taken to control and monitor these possibilities. First, 13 rules were defined for each unit of material. Thus, although the reading assignments may have been of different lengths, the content within those assignments for which the students were responsible for the dependent variable was approximately equal. To control for the level of difficulty, two steps were taken. The 13 rules and the dependent variable items were rated by two faculty members and one graduate student with extensive expertise in applied behavior analysis. They rated how completely the rules represented the important principles of applied behavior analysis being discussed by the text. The raters also indicated the difficulty level of
the items on a scale of one (easy) to three (hard) and how well the items represented the rules to which they pertained with a plus (+) or a minus (-). Only items with a rating of plus 2 were used in the dependent variable. If it was necessary to use items with a different rating, they were modified according to rater comments. A second control for difficulty was the use of a counterbalanced design in which each unit was taught under both conditions across quarters. Semb (1976) identifies the counterbalanced design as one way to evaluate the difficulty of the items on a quiz. Because the data did not reverse during the second quarter as compared to the first quarter, the material may have been of differing levels of difficulty.

Pertaining to the implementation of the dependent and independent variables, the time allowed for the dependent variable exceeded 45 minutes for several sessions. It was determined by discussion with the instructor that the extensions were due to the fact that he was saying "Begin" to start the first part of the quiz while standing among the students immediately after distribution of the quizzes but delayed starting his stopwatch until he reached the front of the room. The misunderstanding regarding the instructor's role in time management was corrected during Quarter Two by using a simple verbal reminder before class to the instructor to start timing immediately after saying the word
Another limitation was that the students probably had limited training for the dependent variable. Considering many of the students probably had little experience systematically identifying behaviors and consequences or working with the three term contingency (Antecedent-Behavior-Consequence), they may not have been used to answering short answer examples and nonexamples asking for specific descriptions or dealing with recognizing stimuli in situations. Before instruction began, it may have been helpful to illustrate the meaning of a contingency and provide examples of appropriately described antecedents, behaviors, and consequences. During Quarter One, such a demonstration did take place briefly after several sessions but it would have been better to include it as part of the introduction to the class.

Another limitation pertaining to implementation was the fact that the examples and nonexamples were not developed jointly by the instructor and the principal investigator. Hence, students would sometimes ask questions about specific items on the examples and nonexamples, and, the instructor, in an attempt to clarify the students' questions, would provide additional responses not related directly to the rule corresponding to the students' questions. For example, in the examples and nonexamples of negative reinforcement,
one of the rules stated that negative reinforcement can result in avoidance behavior. The nonexample of the rule was "Mr. Watts nags his wife about forgetting to thaw meat for dinner. In a few weeks she is taking meat out of the freezer every morning." The key point in this nonexample not discussed between the student and the instructor was that avoidance behavior did not occur. The situation was resolved by the instructor and writer reviewing every example and nonexample during their regular meetings before class.

Another set of limitations dealt with the unavoidable lack of control over several of the variables and events in the study. The most obvious is that the course during Quarter One met once a week for ten weeks, while the course during Quarter Two met twice a week for five weeks. Therefore, the amount of study time available to the students varied. In addition, the measurement of the number of hours studied was limited to self-report data of the students' recollection of how much they worked outside of class. The only way to completely control for study time would be to limit student access to course materials to measureable opportunities in a central location. This was not possible for this class and would have been very different from the existing teaching situation, thus disturbing the attempt to maintain as typical a setting as
possible.

**Implications**

Generalizations are limited to the group of students completing the applied behavior analysis class in this investigation due to the subject selection procedures and absence of replications. The results of this study suggest, however, instructional strategies and future research that will systematically help to improve the use and evaluation of examples and nonexamples in college teaching. For instruction, it appears that more preparation for the students in the fundamentals of the course content could have led to increased understanding of the dependent variable and made the use of written examples and nonexamples in class more valuable. As stated previously, more instruction in the definition of a behavior, the three-term contingency, and the relationship between the principles being discussed may have been helpful. Such preparation could also have involved the use of examples and nonexamples, but on a more basic level. It is not known to what degree just having the examples and nonexamples a week ahead of time could have helped improve performance. Other activities could also have increased the students' opportunity to respond using examples and nonexamples, for instance, students creating their own situations.
The future use of examples and nonexamples for this population was supported by the data indicating that the percentages on the quizzes for the grade did not differ between conditions while student performance on examples and nonexamples during Quarter One did demonstrate fractionation depending on the condition being used. Therefore, it appears the multiple choice and short answer items on the items used for the grade do not discriminate between different methods of instruction and may indeed contain cues and prompts which occasion the students' responses without necessarily having the prerequisite knowledge to answer the question completely. Thus, the quizzes for the grade for this group of students may not have been an entirely accurate indicator of the students' knowledge of applied behavior analysis following the course. It may be appropriate to consider the examples and nonexamples format for future devices designed to measure student performance on the principles of applied behavior analysis.

In addition to being an application measurement device for college classwork, examples and nonexamples can be used in a longitudinal program of training and evaluation by changing their format to match the students' level of training. The written examples and nonexamples can be used to present content best suited to the classroom, such as introductory or background information. As the students
prepare to enter practicum situations or field experiences, simulations and videotapes could be used to present examples and nonexamples. The students could then begin practicing situations on a limited basis and begin relating their experiences to examples and nonexamples previously studied. The students' skills in identifying behaviors and examining situations could also be helpful in their analysis of situations in which they work. Performance feedback could also be based on the same format as the examples and nonexamples that had previously been evaluated.

In increasing the use of examples and nonexamples, some factors must be considered. First is the existing instructional environment. For examples and nonexamples to be used in a longitudinal training effort for systematic generalization across instructors and settings, cooperation among faculty will be required. The contingencies controlling the instructors' teaching activities must be arranged to encourage the use of examples and nonexamples. A portion of this research demonstrated the effectiveness of using examples and nonexamples in tandem with access to course material for a group of students at The Ohio State University. The research of Miller (1974) demonstrated the effectiveness of using examples and nonexamples in teaching other college students. Placing emphasis on using verified techniques and evaluating the teaching that is being done
could lead to more coordination of teaching activities throughout a training program.

Embedding the use of examples and nonexamples into an instructional program could also help to avoid the student dissatisfaction with the course evident in the evaluations. One of the most frequent comments of the students completing the course during Quarter One was that the time taken for the dependent variable could have been better used for instruction. By increasing the use of examples and nonexamples for instruction, this problem could be addressed, although the class structure for the study was determined by the attempt to compare a procedure containing an in-class component with one not containing any interaction with the instructor. As stated previously, student dissatisfaction may have been decreased if the study had compared two techniques containing student-teacher interaction.

Possibly the most important factor to consider in basing instruction on examples and nonexamples is maintaining the effort to evaluate their effectiveness. Although the data for half the individuals during Quarter One demonstrated the effectiveness of the Book- Study Guide- Rules- Examples/Nonexamples condition, the data were not replicated. The absence of a replication of results not only limits the generalization of the procedure, it
indicates the need for future research to obtain more data with which to make firmer conclusions.

Evaluation is also necessary to separate the variables influencing student performance. The conditions used in this study contained several components in addition to the use of examples and nonexamples. Because the only data on the use of those variables, such as student access to course materials, were self-report, research is necessary which isolates each of the variables and examines their effect on student performance on examples and nonexamples. The following questions are offered as topics of future research and investigation:

1. What are the effects of examples and nonexamples alone on student performance on a measure of examples and nonexamples?

2. In addition to examining antecedents and instruction, how can strong consequences be developed which will reinforce students' performance on course material?

3. What are the effects of examples and nonexamples compared to other college teaching techniques?

4. How can examples and nonexamples be used in a longitudinal teacher training, or skill training, program?
5. How can rate be incorporated into a college course as the measurement system used for student and course evaluation?

These questions can be used as the basis for research designed to investigate the effects of examples and nonexamples under more controlled conditions for more conclusive experimental evaluation.
Summary

College instructional techniques such as lecture and discussion have been the subject of evaluative research for decades. As late as the 1960's, however, that research did not result in consistent evidence as to the effectiveness of any one method (Dubin & Taveggia, 1968). The Personalized System of Instruction, a behavioral approach developed by Keller (1968) in the late 1960's, has been demonstrated to be an effective technique (Hursh, 1976; Robin, 1976). Other behavior techniques have also been developed, such as the use of examples and nonexamples to teach concepts, behaviorally defined as a collection of stimuli with similar characteristics. Miller (1974) and Miller and Weaver (1975) developed a system called "concept programming" in which students are presented with situations which depict either instances or noninstances of concepts, such as reinforcement. The current investigation is similar to Miller's concept programming and is a study to evaluate the effects of examples and nonexamples on college student performance in an applied behavior analysis class presenting the concepts of reinforcement and extinction, behavior measurement, graphing and research designs, stimulus control, shaping and chaining, behavior reductive techniques, schedules of reinforcement and generalization, and group behavior change programs.
The study measured student performance as number correct on a set of 15 examples and nonexamples pertaining to the unit being studied each session. One of two conditions was assigned to each session according to a multi-element design (Ulman & Sulzer-Azaroff, 1975). During Condition Number One, the students had access to the text assignment, the study guide, and written rules pertaining to the critical information from each unit. The dependent variable was completed immediately following an introduction by the instructor. During Condition Number Two, the students had access to the text assignment, the study guide, and written rules pertaining to the critical information from each unit. Before completing the dependent variable, however, the students discussed written examples and nonexamples illustrating each of the rules. Following the dependent variable in each session, there was discussion pertaining to the text material and study guide and the quiz for the grade was completed. Descriptive data collected included the percentage and rate correct on the 15 items on the dependent variable, percentage correct on the items that counted toward the students' grades, and social validity data in the form of a questionnaire asking for the students' opinion on the condition they preferred, the number of hours they studied, and the usefulness of the course materials. The study was conducted across two consecutive quarters.
Interobserver agreement data were 100% for the instructor's implementation of all the components of the independent variable condition being used for any particular session. The average agreement percentage on the dependent variable across the two quarters was above 90 percent for each unit. Data were collected each quarter from the students completing all of the dependent variable measures: 32 students from Quarter One and 25 students from Quarter Two. Descriptive data indicated that during Quarter One, the students' mean rate of correct completion for each condition never intersected, with the higher rate being associated with Condition Number Two, Book- Study Guide- Rules- Examples/Nonexamples. The range was .27 to .51 correct responses per minute. During Quarter Two, the mean rate showed little fractionation between the two conditions. The range was .27 to .39 correct responses per minute.

The mean percentage of correct dependent variable items ranged from 66.4 percent to 87.5 percent during Quarter One. The range of the items on the quiz for the grade was from 86.8 percent to 98.8 percent. Of the twelve students during Quarter One selected for individual data presentation, nine had approximately equal percentages for the dependent variable during Condition Number Two sessions and the quiz items for the grade with lower percentages for Condition Number One. During Quarter Two, the mean percentage of
correct dependent variable items ranged from 70.4 percent to 83.5 percent correct. The range of items on the quiz for the grade was from 88.6 percent to 96.2 percent correct. The data for the nine students during Quarter Two selected for individual presentation indicated three students demonstrated similar responding on the written examples during both conditions, three students scored higher during Condition Number One, and two students scored higher during Condition Number Two. For many of the units, scores on the items used to determine the grade were higher than or equal to the percentage on the dependent variable. In neither quarter did any student consistently score lower on the items counting for the grade than the written examples and nonexamples.

The social validity data demonstrated that the students during both quarters overwhelmingly preferred the Book-Study Guide- Rules- Examples/Nonexamples condition over the Book-Study Guide- Rules condition and felt it taught them more about the principles and procedures of applied behavior analysis. The copies of the rules for each unit included with the syllabus were the most useful outside studying material in preparing the students for the dependent variable. Comments about the course included wanting the examples and nonexamples distributed the class before they were to be discussed instead of the day of the dependent
variable measure and having more instructor-student interaction, such as through lecture.

The experimental data were the number of correct items on the dependent variable. During Quarter One, the group data indicated complete fractionation between the two conditions, with Condition Number Two leading to higher scores. The range during Condition Number One was 10 correct to 11.2 correct with a mean of 10.5 correct. The range during Condition Number Two was 11.8 correct to 13.1 correct with a mean of 12.5 correct. Seventeen of the 32 individuals completing all of the dependent variable measures had intersection between the two conditions by at least one data point, 15 had no intersection with Condition Number Two associated with higher scores.

During Quarter Two, the group data indicated very little fractionation between the two conditions. The range during Condition Number One was 11.3 correct to 12.2 correct with a mean of 11.8 correct. The range during Condition Number Two was 10.6 correct to 12.5 correct with a mean of 11.4 correct. Twenty-two of the 25 individuals completing all of the dependent variable measures had intersection between the two conditions by at least one data point, two had no intersection with Condition Number One associated with higher scores, and one had no intersection with Condition Number Two leading to higher scores.
The percentages of correct completion of items for the grade and on the dependent variable were compared to determine the degree to which the grade items indicated the students' acquisition of the concepts of behavior analysis as presented in the text. During Quarter One, performance on the examples and nonexamples was differentiated between the two conditions while responding on the items for the grade showed no consistent pattern. During Quarter Two, there was no consistent pattern of responding which differentiated between the conditions on either the dependent variable or the items for the grade. Possible explanations for the variation in performance between the dependent variable and the quiz for the grade during Quarter One include the difference in the item format of the two measures. The quiz for the grade was composed of multiple choice items as compared to the written examples and nonexamples. Also, a discussion period was held every session between the dependent variable and the quiz for the grade, thus possibly clarifying any areas of student confusion. It may also be possible, however, that the quiz for the grade did not effectively measure student acquisition of the principles of behavior analysis. Therefore, there was no consistent pattern of differentiated performance between the conditions on the items for the grade.
The educational significance of the performance on the dependent variable indicated very few students scored over 90 percent on the dependent variable for more than four of the eight measures. Although percentages based on a denominator of 15 can be misleading, the relatively low scores of the students indicate they were not acquiring the principles of behavior analysis as measured by the examples and nonexamples. It is possible that the students were not trained in responding to questions requiring analysis of situations. The students also may not have had sufficient preparation in basic concepts and skills, such as the definition of a contingency and how to describe a behavior and a consequence.

In analyzing the experimental data, a functional relationship between the dependent variable and discussing examples and nonexamples, opportunity to read the book and the rules, and opportunity to complete the study guide was demonstrated during Quarter One. The data, however, did not replicate during Quarter Two. Only three of the students demonstrated clear functional relationships with no intersection among the data. Of the functional relationships demonstrated, one was between Condition Number Two and performance on examples and nonexamples and two between Condition Number One and performance on examples and nonexamples. It is possible that the lack of control of the
independent variable materials had an effect on student performance. Some students may have examined the materials more closely than others. Also, the consequences for completing the dependent variable could have been of different strength for different students. The students were exempt from sections of the final representing content over which they demonstrated mastery during the course. Perhaps a stronger consequence was needed.

The results indicate several areas of future investigation. First, particularly with the lack of replication, more studies are needed examining the use of examples and nonexamples in instruction. Second, it is important to isolate the effects of the different parts of the independent variable used in this study. It is impossible to identify the separate impact of the text and rules, study guide, and discussion of examples and nonexamples on the results. Third, the consequences affecting student performance and study in the college classroom need to be identified and those over which the instructor has control evaluated. By examining the effects of each of these techniques and consequences, a more accurate picture of the effectiveness of examples and nonexamples could be attained.
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APPENDIX A

Pre-test and Scoring Criteria
Define and give an example of how a teacher could apply the following principles in an educational setting. BE SPECIFIC

Positive Reinforcement
Negative Reinforcement
Extinction
Unconditioned Reinforcer
Sd
S
Generalization
Stimulus Control
Duration Recording
Shaping
Backward Chaining
fading
Timeout
Overcorrection
Punishment
Response Cost
DRO
FI
VR
Intermittent Reinforcement
Momentary time sampling
Token economy

Graph hypothetical data in a reversal design format.
Graph hypothetical data in a multiple baseline design format.
Pre-Test Scoring Criteria

Score one point for each of the criteria included in the student's response.

1. Positive Reinforcement
   1.1 a contingent consequence
   1.2 consequence is positive
   1.3 defined by an increase in the level of the behavior

2. Negative Reinforcement
   2.1 contingent removal of a stimulus
   2.2 stimulus is aversive
   2.3 defined by an increase in the level of the behavior

3. Extinction
   3.1 withholding of reinforcement
   3.2 results in a decrease in the level of the behavior

4. Unconditioned Reinforcer
   4.1 reinforcer which does not have to be associated with another conditioned or unconditioned reinforcer to act as reinforcer

5. Conditioned Reinforcer
   5.1 reinforcer which has to be associated with another conditioned or unconditioned reinforcer to act as reinforcer

6. Discriminative Stimulus (Sd)
   6.1 is an antecedent
   6.2 antecedent in whose presence a response is likely to be reinforced

7. S-delta
   7.1 is an antecedent
   7.2 antecedent in whose presence a response is likely not to be reinforced

8. Generalization
   8.1 occurrence of a response across stimulus conditions
   8.2 is present when there is a high probability that a response under stimulus control is likely to occur in the presence of a similar stimulus

9. Stimulus Control
   9.1 antecedent stimulus
9.2 is present when there is a high probability that a response will occur in the presence of a particular stimulus
9.3 established by reinforcement

10. Duration Recording
10.1 measuring the amount of time taken for a defined event to occur

11. Shaping
11.1 reinforcement necessary
11.2 establishment of successive approximations
11.3 involves terminal goal

12. Backward Chaining
12.1 set of defined simple behaviors
12.2 reinforcement necessary
12.3 combination of simple behaviors to form complex behavior
12.4 links serve as Sd's for links to follow
12.5 links serve as reinforcers for preceding links
12.6 backward chaining is starting with final link

13. Fading
13.1 antecedents- Sd's or prompts
13.2 gradual removal

14. Timeout
14.1 removal of opportunity to acquire any additional reinforcers
14.2 results in a decrease in behavior
14.3 timeout periods of as short duration as possible

15. Overcorrection
15.1 results in a decrease in behavior
15.2 first stage is restitution- restoration of environment
15.3 second stage is positive practice- repetition of a behavior related to restitution

16. Punishment
16.1 aversive consequence
16.2 contingent upon a behavior
16.3 results in decrease in behavior

17. Response Cost
17.1 removal of quantity of reinforcers
17.2 results in decrease in behavior
18. Differential Reinforcement of Other Behavior (DRO)
18.1 reinforcement of any other behavior besides the target behavior
18.2 results in decrease in target behavior

19. Fixed Interval Schedule of Reinforcement (FI)
19.1 intervals of time
19.2 reinforcement delivery
19.3 first response after interval
19.4 interval is constant

20. Variable Ratio Schedule of Reinforcement (VR)
20.1 based on numbers of responses
20.2 reinforcement delivery
20.3 first response after variable number of responses
20.4 schedule based on a pre-determined average of number of responses

21. Intermittent Reinforcement
21.1 reinforce some but not all occurrences of behavior
21.2 maintains behavior under extinction

22. Momentary Time Sampling
22.1 behavior measurement technique
22.2 based on time intervals
22.3 behavior recorded as present if occurring immediately following interval

23. Token Economy
23.1 reinforcement delivery system
23.2 tokens used for immediate consequence
23.3 back-up reinforcers used for delayed reinforcement
23.4 results in increase in level of behavior
Reversal Design Graph

1. at least four phases, but three is satisfactory- Baseline, Intervention, Baseline, Intervention
2. appropriate phase labels
3. appropriate axes labels
4. phase lines
5. data points not connected across phases
6. appropriate graph construction

Multiple Baseline Graph

1. at least three tiers, but two satisfactory
2. Baseline and Intervention conditions
3. identification of settings, subjects, or behaviors each tier represents
4. appropriate phase labels
5. appropriate axes labels
6. phase lines
7. data points not connected across phases
8. appropriate graph construction- tiers stacked
9. sequential introduction of intervention
APPENDIX B

Rules for Course Units
Rules: Reinforcement and Extinction
Unit One

1. Reinforcement requires the presence of a consequence.

2. By definition, reinforcement involves an increase in the likelihood of the future occurrence of a behavior.

3. A reinforcing consequence must be contingent upon a behavior to be effective in maintaining or increasing the behavior.

4. Reinforcing consequences delivered immediately following a behavior have a higher probability of resulting in an increase in the future likelihood of a behavior than consequences that are delayed.

5. Negative reinforcement entails the removal of an aversive stimulus contingent upon a behavior which results in an increase in the likelihood of the future occurrence of the behavior.

6. The use of negative reinforcement can result in avoidance behavior.

7. Extinction is the withholding of reinforcers from a previously reinforced behavior.

8. Extinction results in a decrease in the level of a behavior.

9. Effective use of extinction requires identification of all sources of reinforcement.

10. Spontaneous recovery occurs when the level of the behavior under extinction briefly increases after an initial decrease.

11. Types of reinforcers include social, activity, exchangeable, tangible, and edible.

12. The ultimate goal of an appropriate reinforcement program is to use the least intrusive reinforcer possible.

13. Reinforcer selection techniques include reinforcer sampling, forced choice, data collection on reinforcer selection, and surveying preferences.
1. Recording the frequency of behavior requires counting its occurrence.

2. Comparing frequencies across observations requires that the observation periods be of the same length.

3. Comparing frequencies across observations requires that the observation periods contain the same number of opportunities to respond.

4. Recording the rate of a behavior means dividing the number of occurrences by a certain time period.

5. Recording the percentage of occurrence of a behavior means dividing the number of correct responses by the number of possible responses available and multiplying by 100.

6. Recording the percentage of occurrence of behavior can be misleading if the total number of opportunities is less than 20.

7. Rate is a measure of the proficiency, i.e., efficiency, of performance.

8. Interobserver agreement is based on the recording of occurrences of observable behaviors.

9. Interobserver agreement is usually expressed as a percentage agreement between observers and is calculated by dividing the total number of agreements and disagreements for the occurrence of a behavior into the number of agreements and multiplying by 100.

10. Event recording is counting the number of occurrences of a behavior as it occurs.

11. Duration recording is measuring the amount of time which a defined event takes to occur.

12. Partial-interval recording is indicating whether a behavior occurs at any time during a specified time interval.

13. Momentary time sampling indicates whether a behavior occurs immediately after a specified time interval.
Rules: Graphic Presentations and Analytic Teaching
Unit Three

1. The mean is calculated by dividing the sum of the values by the number of measurements.

2. The abscissa of a graph contains the time or number of sessions for the measurements.

3. The ordinate of a graph contains the values for the behavior being measured.

4. Baseline is the condition during which the behavior is measured without the presence of the intervention.

5. The AB design can be used to determine if a change in behavior has occurred, the direction of the change, and the magnitude of the change.

6. The reversal design consists of baseline, intervention, baseline, the same intervention, baseline, the same intervention, and continuing the same sequence.

7. A multiple baseline design across subjects, settings, or behaviors consists of sequential presentation of the intervention in each tier after baseline.

8. The verification phase is the repetition of the baseline condition to be compared to the original baseline to determine if the data returns to that level.

9-13. Components of a graph include:

9. appropriately graphed design

10. appropriately labeled phases

11. appropriately drawn phase lines

12. appropriately labeled axes

13. appropriately connected data points
1. An antecedent stimulus is a stimulus which occurs before a particular response, or behavior.

2. Stimulus control is present when there is a high probability that a response will occur in the presence of a particular antecedent stimulus.

3. Stimulus control is established by the reinforcement of a response in the presence of an antecedent stimulus.

4. A discriminative stimulus (Sd) is an antecedent stimulus in whose presence a response is likely to be reinforced.

5. An S-delta is an antecedent stimulus in whose presence a response is not likely to be reinforced.

6. When a particular response does not occur in the presence of an Sd, the only inferences that can be made are that the Sd did not occasion the response and that other Sd's may occasion the response.

7. Effective stimulus control requires clear identification of relevant stimulus characteristics.

8. Effective instructions require determining that the desired response is in the subject's repertoire.

9. Effective instructions require determining that the response is under stimulus control of the instructions.

10. The effectiveness of modeling is increased if the subject has had previous success experiences with the model.

11. Effective physical guidance requires using the minimal amount of guidance necessary for prompting the behavior.

12. Fading is the gradual removal of an Sd or prompt.

13. Effective fading requires gradually transferring control to the least intrusive prompts.
1. Shaping is the reinforcement of successive approximations to a terminal goal.
2. The approximations in a shaping procedure are not currently in the subject's repertoire.
3. Progress in a shaping procedure should be based on data indicating the subject's successful performance on the approximations.
4. Definition of approximations should be based on the levels of behavior necessary to facilitate progress toward the terminal behavior.
5. Deterioration of performance at an approximation level may be because the requirements have been set too high or because too much time has been spent at that approximation of the terminal behavior.
6. Chaining is the reinforcement of the combination of a set of simple behaviors to form a more complex behavior.
7. The first step in a shaping or chaining procedure is definition of the terminal behavior.
8. In a chaining procedure, the links are in the subject's repertoire.
9. One requirement for effective chaining is a precise analysis of the complete terminal behavior into its component links.
10. In a chaining procedure, a link serves as an Sd for the next response and as a reinforcer for the behavior that precedes it.
11. Backward chaining is the beginning of the chaining sequence with the final link which results in more immediate access to the reinforcer for the terminal behavior.
12. After the terminal behavior is emitted, it should be frequently reinforced.
13. Shaping can be used to develop the links in a chain which are not already part of the subject's repertoire.
1. Alt-R is the reinforcement of a behavior which is not likely to occur at the same time as the behavior targeted for reduction.

2. Differential Reinforcement of Other Behaviors (DRO) is the reinforcement of any other behavior besides the behavior targeted for reduction.

3. Differential Reinforcement of Low Rates (DRL) is the reinforcement of a lower rate of the targeted behavior.

4. Alt-R, DRO, and DRL are positive reductive techniques because they do not involve the introduction of aversive stimuli.

5. Response cost is the removal of a quantity of reinforcers contingent upon the targeted response.

6. Effective use of response cost requires communicating the "rules of the game", or the contingencies to be applied.

7. Timeout is the removal of all opportunity to acquire additional reinforcers.

8. Effective use of timeout requires insuring that the subject is being removed from a reinforcing situation.

9. Use of timeout for short periods is sometimes effective--the duration should be as short as possible based on the previous history of the subject.

10. Implementation of overcorrection has two stages--restitution and positive practice.

11. Punishment requires the presence of a consequence.

12. By definition, punishment involves a decrease in the likelihood of the future occurrence of a behavior.

13. Punishment should only be used in conjunction with a behavior development procedure designed to increase the occurrence of an appropriate behavior.
1. Effective generalization training requires emphasizing common elements across stimulus situations.

2. Effective generalization training requires training the behavior under a variety of stimulus conditions.

3. Intermittent reinforcement is the reinforcement of some, but not all, occurrences of a behavior.

4. Intermittent reinforcement maintains behaviors under extinction more effectively than a continuous schedule of reinforcement.

5. The progress from frequent reinforcement to more intermittent reinforcement should be gradual.

6. An interval schedule of reinforcement is defined as the delivery of reinforcement contingent upon the first occurrence of a behavior following the passage of a pre-determined amount of time (fixed interval) or a variable amount of time based on a pre-determined average (variable interval).

7. Interval schedules of reinforcement usually result in low rates of responding.

8. A limited hold is a time period following the end of an interval during which reinforcement is available for the occurrence of the behavior.

9. A ratio schedule of reinforcement is defined as the delivery of reinforcement contingent upon the first occurrence of a behavior following the occurrence of a pre-determined number of responses (fixed ratio) or a variable number of responses based on a pre-determined average (variable ratio).

10. Ratio schedules of reinforcement usually result in high rates of the occurrence of a behavior.

11. A variable ratio schedule of reinforcement with a high ratio requirement, or many responses required for reinforcement, results in behavior extremely resistant to extinction.

12. Ratio strain occurs when a behavior begins to deteriorate under a ratio schedule of reinforcement instead of becoming more resistant to extinction.

13. A fixed interval scallop is an increase in the rate of the occurrence of a behavior as the interval is ending and the opportunity for reinforcement getting nearer.
1. Delivery of reinforcement in the Good Behavior Game is made to the group exhibiting the best performance of a specified behavior.

2. One adaptation to the Good Behavior Game is having the teams compete against a criterion instead of each other so that any team whose level of behavior falls below a certain criterion will be reinforced.

3. One adaptation to the Good Behavior Game is to form a separate group with individuals whose behaviors consistently deprive the team of the opportunity for reinforcement.

4. The least intrusive intervention should be attempted first and more obtrusive techniques used only if the level of the behavior indicates they are necessary.

5. The selection of reinforcers for any group contingency package should be based on data indicating their effect on the level of the behavior.

6. Contingent recreation is making high frequency activities (games, etc.) contingent upon low frequency activities (schoolwork, completion of chores, etc.).

7. The effectiveness of the treasure box is primarily due to the novelty of a variety of reinforcers.

8. Home reports can serve to coordinate the reinforcement programs in two important settings of the subject's environment: the school and home.

9. Contracts should contain the following specifications: observable behavior definition; reinforcer type, quantity, and schedule of delivery; and sanctions for failure to fulfill the contract.

10. A token economy is based on the delivery of tokens for immediate reinforcement until the more powerful back-up reinforcers become available.

11. Procedures for gradually reducing the use of tokens should be included in the original plans for the program.

12. Tokens should be established as reinforcers by their pairing with existing unconditioned or conditioned reinforcers.

13. Data to be collected during a token economy include the level of the target behavior, the number of tokens delivered, and the back-up reinforcers selected by the subjects.
APPENDIX C

Examples and Nonexamples
Written Examples and Nonexamples: Reinforcement and Extinction
Unit One

1. Reinforcement involves the occurrence of a consequence.
   a. The professor compliments students after they give correct responses to his questions. (Example)
   b. Mrs. Jones pays her nephew Tony to wax the den floor when he arrives to do the job because she has to go to a long meeting. (Nonexample)

2. By definition, reinforcement involves an increase in the likelihood of the future occurrence of a behavior.
   a. Gary gives his dog a small piece of beef after each time he rolls over. Soon the dog is rolling all over the house. (Example)
   b. Mr. Fooster gives Ron two tickets to the ballet for mowing his lawn. Soon he notices Ron hasn't come around asking to mow his lawn since that time. (Nonexample)

3. Reinforcing consequences delivered immediately following the behavior have a higher probability of resulting in an increase in the behavior.
   a. Three weeks after school starts, David's teacher is discouraged that the class is still not following the rules. Therefore, she plans to tell the students all the good things they did that day fifteen minutes before lunch and fifteen minutes before the dismissal bell. (Nonexample)
   b. Nick, who manages a restaurant, always has something nice to say to the busboy as he is clearing a table. (Example)

4. Negative reinforcement entails the contingent removal of an aversive stimulus which results in an increase in the likelihood of the future occurrence of a behavior.
   a. Betty turns on a fan to get rid of the noxious odor in her chemistry lab and is glad when she can breathe clean air again. The next time an odor permeates the lab, Betty quickly turns on the fan. (Example)
   b. Mr. Darnell "pushes" his students to excel academically by giving them stern looks and calling them down whenever they appear distracted. The students, however, doodle and look out the window. (Nonexample)
5. The use of negative reinforcement can result in avoidance behavior.
   a. Whenever Frank passes his boss's office on the way to the elevator, he
      is always called in and asked when the weekly report will be ready.
      Frank starts to use the stairs at the end of the hall more frequently.
      (Example)

   b. Mr. Watts nags his wife about forgetting to thaw meat for dinner. In
      a few weeks she is taking meat out of the freezer every morning.
      (Nonexample)

6. Extinction results in a decrease in the level of a behavior.
   a. Brian's teacher used to continually smile and say how nice it was to
      have him in class when he was a new student. Brian worked his little
      heart out. After a while, however, the amount of teacher attention
      decreases dramatically and Brian starts submitting sloppier work.
      (Example)

   b. Valerie is confused when her boyfriend starts giving her the cold
      shoulder but keeps accompanying him to events around campus.
      (Nonexample)

7. Extinction is the withholding of reinforcement of a previously reinforced
   behavior.
   a. John comments to his son for the 16th time to stop racing the engine
      after starting the car. (Nonexample).

   b. After listening to several jokes, Sean pretends not to be listening
      when his brother-in-law says once again "Did you hear the one
      about...". (Example)

8. Effective use of extinction involves identification of all sources of
   reinforcement.
   a. Ollie has a straight "A" average in math but still counts on his
      fingers. The teacher ignores Ollie's counting behavior during math
      class but continues to write A's on Ollie's math papers. (Nonexample)

   b. In trying to reduce Charlie's horrible behavior at the school dance,
      the chaperone ignores the disruptions and instructs other students who
      appear interested to also pay no attention and listen to the music.
      (Example)

9. Spontaneous recovery occurs when the level of the behavior under
    extinction briefly increases after an initial decrease.
   a. Susi used to cry as she was being dropped off at the day care center,
      to which her mother would reply "What's wrong?" and talk to her. Now
      Susi's mother gives Susi a quick kiss and leaves. Susi was crying
      less for several days, but now has started to cry even harder when
      being dropped off at the center. (Example)
3. **Reinforcement**

   a. **Lenny's habit of popping his double-jointed fingers out of joint quickly decreases and doesn't recur when his friends start looking the other way instead of reacting with "ooh's" and "ahh's"**. (Nonexample)

10. **A reinforcer must be contingent on the response to be effective in maintaining or increasing a behavior.**

   a. **Without looking, Hank tells Mickey what a good job he is doing washing the cars while he is spraying Jocelyn with water from the hose.** (Nonexample)

   b. **Miss Evans pats Albert on the back as he slaps over his English composition.** (Example)

11. **Types of reinforcers include social, activity, exchangeable, tangible, and edible.**

   a. **Lydia hates the Beatles. Her guitar teacher unwittingly gives her a Beatles album when Lydia successfully plays a difficult song.** (Nonexample)

   b. **Sid always has a cheerful word for people who extend their hand for a shake as part of a greeting.** (Example)

12. **The ultimate goal of an appropriate reinforcement program is to use as unobtrusive reinforcers as possible.**

   a. **Mr. Lilly has been complimenting Pam every time she earns access to the toys at the back of the room. Since she has been exhibiting appropriate behaviors, he decides it is time to start reducing the use of toys and eventually uses only compliments.** (Example)

   b. **Randy has been receiving extra activity time for every day he has positive interactions with his fellow campers. After Randy has been showing progress for several days, his counselors start using ice cream cones in the dining hall as reinforcers for variety.** (Nonexample)

13. **Reinforcer selection techniques include reinforcer sampling, forced choice, data collection on selection, and surveying preferences.**

   a. **Colin has chosen listening to the radio as a reinforcer for going to bed quietly for five out of six days.** (Example)

   b. **In selecting a reinforcer, Jan's father says, "I used to like playing Mr. Wiggly, I'll bet Jan will love it."** (Nonexample)
Written Examples and Nonexamples: Measurement
Unit Two

The following list includes examples and nonexamples for each of the 13 rules, or key elements, for this class session. Please take time to look them over and ask any questions about the items requiring clarification.

1. Recording the frequency of behavior requires counting its occurrence.
   a. Bobby wants to know how often his dog scratches at the door to go outside during the evening and so places a mark on a piece of paper every time it happens between 6:00 P.M. and 10:00 P.M. (Example)
   b. Mrs. Loudon is interested in how many books the students in her class check out of the library each week and so on Friday records the number of cards in her class's portion of the card holder for checked books. (Example)
   c. After checking his bank's records, Calvin notices that 14% of the customers made deposits to their savings accounts on Monday. (Nonexample)
   d. Wanda wants to measure her swimming behavior and so counts the number of minutes it takes her to swim a lap. (Nonexample)

2. Comparing frequencies across observations requires that the observation periods be of the same length.
   a. Sandy's boss asks her why she only served 60 customers during her eight hour shift Monday when Vera was able to handle 95 people in her cash register line. Sandy replies that she was asked to help stock the shelves for an hour and a half that day. (Nonexample)
   b. Miss Tinney counts the number of math problems her students complete in a forty-five minute math period. (Example)
   c. Coach Zoltar counts the number of free throws his basketball players make during practice and is upset when the records show Wednesday's total to be way down. Then he remembers, "That's right, they had to run laps that day." (Nonexample)
   d. To determine the need for a traffic light at the intersection of Kelson and Oboe streets, the police department places traffic counters on each street which count the number of cars at the intersection during periodic 60 minute intervals of time. (Example)

3. Comparing frequencies across observations requires that the observation periods contain the same number of opportunities to respond.
   a. Students in Professor Good's class get an average of sixteen out of twenty items per problem set correct while students in Professor Mix's class get an average of twenty-five out of thirty-five correct. Professor Mix good-naturedly teases Professor Good about how much better his students perform. (Nonexample)
b. "My lion jumped through the hoop three times", said Scott the Magnificent to Gordon the Great, "How about yours?" "Mine only made it through twice", Gordon said, "But your lion had twice as many chances." (Nonexample)

c. Mr. Wembley's social studies tests always have 35 questions on them so he can compare the number of questions students get right on different tests. (Example)

d. Abby can only sink 10 out of 15 pool balls in a row, while Rhonda can sink all fifteen. (Example)

4. Recording the rate of a behavior means dividing the number of occurrences by a certain time period.

a. Miss Rollings calculates a rate of reading for her students by dividing the number of words by the number of minutes taken to complete the passage. (Example)

b. Stanley divides the number of seconds his printer takes to print a line by the number of characters on the line to calculate the rate of printing per line. (Nonexample)

c. Jud counts the number of pieces in the puzzle and divides it by the number of pieces he puts together in five hours to calculate the rate of completion of the puzzle. (Nonexample)

d. Phil's star sprinters on his college track team run at a rate of ten yards per second in the hundred yard dash. (Example)

5. Recording the percentage of occurrence of a behavior means dividing the number of correct responses by the number of possible responses available and multiplying by 100.

a. Mr. English divides the eighty questions on the grammar test by Roger's 72 correct responses and multiplies by 100 to calculate the percentage. (Nonexample)

b. Dr. Busher has updated 40 out of 50 of his patient's files, which means he has finished 40/50 X 100, or 80 percent of the files. (Example)

c. The percentage of free tickets given out for the basketball game was five percent, a figure calculated by dividing the number of free tickets by the total number of tickets and multiplying by 100. (Example)

d. Miss Filcher divides the number of students completing the spelling assignment by the 50 minutes taken for the spelling lesson to calculate the percentage of students finishing the assignment. (Nonexample)
6. Recording the percentage of occurrence of behavior can be misleading if the total number of opportunities is less than 20.

a. Derrick is worried about his son's performance on the five problem math quizzes given each week; last week he got 100 percent correct, but this week only 60 percent. (Nonexample)

b. The evaluation supervisor for the Peachbottom School District is sure to include 200 questions on the district's math competency test to be sure the percentage scores won't exaggerate small changes in each student's performance. (Example)

c. The calculus final examination in the honors program contains eight very complex problems. The teacher decides to use percentage correct as the record of student performance. (Nonexample)

d. In comparing percentages on the twenty item test, the teacher notices a ten percent difference between Mike's and Donna's scores, but says to himself, "Actually, that's only a two problem difference between the two students." (Example)

7. Rate is a measure of the proficiency, i.e., efficiency, of performance.

a. Capt. Jackson is pleased with Pvt. Dudley's performance on the firing range; he scores 95 percent bulls-eyes. Capt. Jackson's satisfaction is shattered, however, when he finds out how long it takes Pvt. Dudley to attain that high accuracy. (Nonexample)

b. To measure efficiency, the foreman at the Yummy Cake Plant uses rate of correct and ruined packing to measure his workers' performance in packing cakes into boxes. (Example)

c. Miss Stone, the head secretary, likes to use the rate of typing by her secretaries because she can get an indication of the accuracy and amount of time taken to complete typing assignments of different lengths. (Example)

d. Jacob's correct completion of test items is increasing, which pleases his teacher. She says "Now I know he's making better use of his time." (Nonexample)
8. Interobserver agreement is based on the recording of occurrences of observable behaviors.

a. The resource teacher agrees to observe Lonnie in the regular room and mark down every time he is angry. The resource teacher's record and the regular teacher's record will then be compared for agreement data. (Nonexample)

b. To obtain agreement about Derrick's crafts behavior, the crafts teacher and camp counselor use their watches to measure how long Derrick is off-task during crafts. (Nonexample)

c. The baseball manager needs an indication of how often his shortstop is ready for the play when the pitch is made. Therefore, he and the third base coach mark every play the shortstop is leaning over with the glove nearly touching the ground when the pitcher goes into his motion. (Example)

d. Ricky and his sister mark down every time their parents put the seat belt in the clasp and click it shut when they get in the car. (Example)

9. Interobserver agreement is usually expressed as a percentage agreement between observers and is calculated by dividing the total number of agreements and disagreements for the occurrence of a behavior into the number of agreements and multiplying by 100.

a. Sarah and Tim are both observing the amount of time their turtle has his head outside his shell. To calculate agreement, they divide the smaller amount of time by the larger and multiply by 100. (Example)

b. Agreement scores for the number of times June throws food on the floor during dinner is calculated by dividing the smaller number of times by the larger and multiplying by 100. (Example)

c. After two teachers have graded Fay's history paper, they count the number of problems they agree are either correct or incorrect. After then counting the number of disagreements, the teachers divide the number of agreements by the number of disagreements and multiply by 100. (Nonexample)

d. Mr. Willis records the number of minutes Ellie is late on Monday and Tuesday and then divides the two figures and multiplies by 100 to calculate the agreement. (Nonexample)

10. Event recording is counting the number of occurrences of a behavior as it occurs.

a. Miss Viney counts the number of times Skip raises his hand to get an exact number of occurrences of Skip's behavior. (Example)

b. Mrs. Hooper's aide grades reading workbooks after school by counting the number of correct questions on each page and marking it in Mrs. Hooper's grade book. (Nonexample)
e. To fulfill one portion of his safety merit badge, Pat must record the number of drivers who use their turn signals at the corner of Juniper and Water Streets. (Example)

d. Taking a survey about a new laundry product, the salesman asks different people how often in the last month they have used a fabric softener. (Nonexample)

11. Duration recording is measuring the amount of time which a defined event takes to occur.

a. Manny observes his brother for ten minutes to see how many times he bites his fingernails. (Nonexample)

b. Dinner at the Holcomb household seems to be getting shorter and shorter. Mrs. Holcomb wants to see if her impression is true and so begins to measure the amount of time between when the last person sits down at the table and when the first person asks to be excused. (Example)

c. Sean works hard on his model for ten minutes before throwing it on the floor. Sean's counselor marks "ten minutes" in his data book before dealing with the situation. (Example)

d. For a science experiment, Roger observes his cat licking her paws six times a minute. "She sure licks her paws a long time!" he says to his teacher when presenting the report. (Nonexample)

12. Partial-interval recording is indicating whether a behavior occurs at any time during a specified time interval.

a. Ms. Bonner doesn't have time to be watching her dance students every minute of every lesson, so she divides the class session into minute long intervals and looks up at the end of every minute to see if the students are practicing their dance steps. (Nonexample)

b. To organize the observation system for his doctoral dissertation, Ben plans a system for marking the number of intervals during which Diedre makes any attempt to copy a spelling word off the chalkboard. (Example)

c. Roy is trying to improve Tina's eating behavior at a residential treatment center. To record the occurrence of the behavior, he divides mealtime into one minute intervals and counts the number of bites Tina takes during each interval. (Nonexample)

d. Colin's father is annoyed because his son won't look him in the eye when they are talking. To get an indication of the occurrence of the behavior he places a mark on a small pad for every thirty second interval during which Colin looks him in the eye at least once. (Example)
13. Momentary time sampling indicates whether a behavior occurs immediately after a specified time interval.

a. To ease her schedule by observing more than one child at a time, the school psychologist implements a system whereby she only has to look at each child being observed one time at the end of a one minute interval to see if the behavior is occurring. (Example)

b. Wally measures the lengths of the intervals of time it takes his gardener to weed the vegetable patch behind the house. (Nonexample)

c. Valene records the behavior of her son during two minute intervals to see if he is continuing to do his chores around the house. (Nonexample)

d. Mrs. Whatley is trying to establish a sustained silent reading program in her classroom and needs data indicating the success of the program. At the end of 45 second intervals she looks up from her own book and marks a plus on the data sheet if everyone is still reading. (Example)
Written Examples and Nonexamples: Graphic Presentations and Analytic Teaching
Unit Three

1. The mean is calculated by dividing the sum of the values by the number of measurements.
   a. The manager of the equestrian club wants to know the mean number of penalty points incurred by his riders on the cross country course. The number of penalty points for each rider is: 3, 6, 0, 2, 2, and 5. He calculates the mean as \( \frac{3+6+0+2+2+5}{6} \), which equals 3.0 penalty points per rider. (Example)
   b. Ted wants to know the average number of miles he drives per month and so finds the total number of miles for the past year and divides by 30 (for 30 days in a month). (Nonexample)

2. The abscissa of a graph contains the time or number of sessions for the measurements.
   a. When graphing the number of minutes taken to run the mile each day of the week, the track coach puts the number of minutes across the bottom of the graph and the days of the week down the side of the graph. (Nonexample)
   b. When graphing the number of cigarettes she has smoked each week for the past year, Dawn puts the number of weeks across the bottom of the graph and the number of cigarettes down the side of the graph. (Example)

3. The ordinate of a graph contains the values for the behavior being measured.
   a. When graphing the rate of math problem completion each morning, Mrs. Hopkins puts the rate of math problem completion down the left side of the graph and the mornings across the bottom of the graph. (Example)
   b. When graphing the percentage of intervals her husband is looking at the paper while she is talking to him at breakfast, Mrs. Forster puts percentages across the bottom of the graph and days down the side of the graph. (Nonexample)
4. Baseline is the condition during which the behavior is measured without
the presence of the intervention.

   a. Dudley is evaluating the effect of immediate feedback on his son's
      reading of sight words presented on flash cards. To begin the study,
      his son reads each card without a response from his father. After
      three days he starts to tell his son whether he got the word correct
      or incorrect immediately after he says the word. In his study, Dudley
      calls the condition where he is telling his son whether he got the
      word correct or incorrect as baseline. (Nonexample)

   b. Teresa is evaluating the effect of Heath Bars on her boyfriend's
      promptness in picking her up for dates. In one condition of the study,
      Teresa's boyfriend gets a Heath Bar when he is on time and in the
      other condition does not get candy. In her study, Teresa labels the
      condition where Heath Bars are not delivered as baseline. (Example)

5. The AB design can be used to determine if a change in behavior has
   occurred, the direction of the change, and the magnitude of the change.

   a. After Dudley has completed one phase of his sight word study with no
      feedback and one phase with feedback, Dudley notices that his son gets
      23 percent more words correct when feedback is provided. (Example)

   b. After Teresa has completed one phase of her promptness study with no
      Heath Bars and one phase with Heath Bars, Teresa notices that her
      boyfriend is on time much more often when Heath Bars are given.
      Teresa concludes that Heath Bars must make her boyfriend more prompt.
      (Nonexample)

6. The reversal design consists of baseline, intervention, baseline, the same
   intervention, baseline, the same intervention, and continuing the same
   sequence.

   a. Susan is studying her brother's neatly dressing for school each
      morning with his shirt tucked in and shoe laces tied. In order, Susan
      tries no comments whatever his appearance, giving him a smile and a
      hug if he dresses neatly, and parental compliments when he looks nice.
      (Nonexample)

   b. Faith is attempting to improve her brother's eating behaviors at the
      dinner table as indicated by an increase in the number of meals for
      which all his food stays on his plate. The treatment is to placing a
      star on the calendar immediately after each meal for which all her
      brother's food stays on his plate. The stars can then be turned in
      for television with popcorn later that evening. The sequence Faith
      follows in the study is no stars, stars, no stars, stars, no stars,
      stars, and continuing the same sequence. (Example)
7. A multiple baseline design across subjects, settings, or behaviors consists of sequential presentation of the intervention in each tier after baseline.

a. Faith wants to try the same mealtime procedure on her other three brothers. Therefore, she starts to measure whether all their food is on their plate without any stars being given. On the third day, she starts stars with Robbie, on the sixth day with Eugene, and on the tenth day with Irving. (Example)

b. In studying the effects of verbal praise on Reggie's math, spelling, and reading assignment completion, Reggie's teacher doesn't use praise for three days and then introduces praise for all three behaviors on the same day. (Nonexample)

8. The verification phase is the repetition of the baseline condition to be compared to the original baseline to determine if the data returns to that level.

a. Dennis completes an ABAB reversal design evaluating the effects of programmed instruction on student performance on identification of parts of speech. He compares student performance during the first and second baselines to determine if student performance was at approximately the same level during the two phases. (Example)

b. Sam compares the data in the first baseline and intervention of his reversal design evaluating the effects of access to video games to completion of chores to see if the data is approximately at the same level. (Nonexample)

9-13. Components of a graph include:

9. appropriately graphed design
10. appropriately labeled phases
11. appropriately drawn phase lines
12. appropriately labeled axes
13. appropriately connected data points

See the graphs at the end of the packet for examples and nonexamples of the components of a graph.
Pointed finger 'No' for bites, pinches.
Written Examples and Nonexamples: Stimulus Control
Unit Four

1. An antecedent stimulus is a stimulus which occurs before a particular response, or behavior.
   a. Jonah leaves a note beside the bathroom mirror to remind him to brush his teeth in the morning. (Example)
   b. Darryl intends to take more pictures after winning a photographic exhibit award for his shots of the ocean sunset. (Nonexample)

2. Stimulus control is present when there is a high probability that a response will occur in the presence of a particular antecedent stimulus.
   a. Sarah has difficulty cooking even with simple and easy to follow recipes. (Nonexample)
   b. Daniel is an excellent police artist who can draw accurate likenesses from just a verbal description. (Example)

3. Stimulus control is established by the reinforcement of a response in the presence of an antecedent stimulus.
   a. Violet's training supervisor in the flight attendant program rarely compliments her for responding to the passenger call light during simulation exercises. (Nonexample)
   b. Whenever his students correctly translate a Spanish phrase in language class, Mr. Cook immediately places an A in his grade book. (Example)

4. A discriminative stimulus (S_d) is an antecedent stimulus in whose presence a response is likely to be reinforced.
   a. Roger knows that following his teacher's directions will result in a big smile and pat on the back. (Example)
   b. Adele is practicing for the school's "College Bowl" by answering questions asked by her parents. After correctly identifying the capital of a small country, all her father can say is "It took you long enough!" (Nonexample)

5. An S-delta is an antecedent stimulus in whose presence a response is not likely to be reinforced.
   a. The railroad engineer pulls down on the choke after seeing the warning light ahead of him. When the train doesn't slow down, he realizes he should have been pulling down on the throttle. (Example)
   b. Rosalynn is upset when she realizes she has inadvertently been letting her students go out for morning recess after they loudly point out that the clock says it's 11:00 A.M. (Nonexample)
6. When a particular response does not occur in the presence of an Sd, the only inferences that can be made are that the Sd did not occasion the response and that other Sd's may occasion the response.

a. "She still doesn't know how to add and subtract." Angela's teacher says after Angela misses her third word problem in a row. (Nonexample)

b. After vocal prompts don't result in an increase in Mavis's feeding the dog, Chauncey, after school, Mrs. O'Connell decides to put a picture of a dog with his dog bowl beside the refrigerator instead of showing her once again how to prepare Chauncey's dinner. (Example)

7. Effective stimulus control requires clear identification of relevant stimulus characteristics.

a. The electronics manual says to turn on the voltage meter as the first step in testing the power of a battery. (Nonexample)

b. The electronics manual of another company shows a picture of the starting switch in the "on" position in addition to the instruction of turning on the voltage meter. (Example)

8. Effective instructions require determining that the desired response is in the subject's repertoire.

a. Don has his son practice whittling before explaining how to carve a hiking stick. (Example)

b. Sonny says "He's a boy, he should know how to run and catch!" before instructing his son in playing wide receiver in a football game. (Nonexample)

9. Effective instructions require determining that the response is under stimulus control of the instructions.

a. The orchestra conductor always includes several quick commands in his auditions such as "Play this piece fortissimo" to test the applicants skills in following accepted musical signals. (Example)

b. Peggy says "Cory will come when I call, I told him to!" (Nonexample)

10. The effectiveness of modeling is increased if the subject has had previous success experiences with the model.

a. Stacey continues to imitate Mr. Hicks methods of completing tax returns even though he is now in jail for income tax evasion. (Nonexample)

b. Mr. and Mrs. Mitchell hire Bud as a tutor because their son has enjoyed working with him at summer camp the last several years. (Example)
11. Effective physical guidance requires using the minimal amount of guidance necessary for prompting the behavior.
   a. During his sister's first billiards lesson, Emory places the pool cue in her hand and moves her fingers into the correct position. (Example)
   b. Steve has been teaching his son how to ride a bike. Steve still walks by the bike and holds his son upright even though the last several days his son has ridden without assistance. (Nonexample)

12. Fading is the gradual removal of an Sd or prompt.
   a. Valerie's teacher has taped numbers to coins of different values in teaching her students how to make change. One day Valerie is surprised to be using coins without numbers. (Nonexample)
   b. Farley lets the air out of his swimming students' water wings a little bit each day in teaching them how to float. (Example)

13. Effective fading requires gradually transferring control to the least intrusive prompts.
   a. During bus training, Miss Topman usually stands right underneath the bus stop sign to show her students where to stand. One day, she hides behind a bush as her students approach the bus stop to determine if they know where to stand without her presence. (Nonexample)
   b. In providing pro-active feedback to her student teacher, Miss Bobbit gradually makes fewer hand signals reminding the student teacher to be looking for children working quietly at their seats. (Example)
Written Examples and Nonexamples: Shaping and Chaining
Unit Five

1. Shaping is the reinforcement of successive approximations to a terminal goal.
   a. Roger's father is usually twenty minutes late in picking him up after school. Roger plans a shaping procedure to increase his father's promptness by first reinforcing him whenever he is late by fifteen minutes or less, then ten minutes or less, then five minutes or less, until he is finally on time. (Example)
   b. Daisy's ceramics class is learning how to mold clay into pitchers. Each student has a picture of a pot to serve as a model. After two attempts, the students' pots have to look exactly like the picture to earn a passing mark. (Nonexample)

2. The approximations in a shaping procedure are not currently in the subject's repertoire.
   a. Ellie can catch grounders and throw the ball but has trouble making a double play on her softball team. Her coach wants to use a shaping procedure to teach this skill. (Nonexample)
   b. Wendy can't lift the 100 pound barbell very high, only about two inches. Her coach plans a shaping procedure to reinforce Wendy for lifting it four inches and then six inches until she can lift it eight inches. (Example)

3. Progress in a shaping procedure should be based on data indicating the subject's successful performance on the approximations.
   a. Diane is trying to shape her autistic-like student's eye contact with her so she can model some daily living skills. After reinforcing the student's head being turned toward her for several days she decides it's about time to move on to the next approximation. (Nonexample)
   b. In trying to shape his client's reading behaviors, Frank graphs the approximations of keeping a book on his desk, opening the book, and reading the book. His decisions to move on to the next approximation are based on the number of times the client successfully demonstrate the previous approximation. (Example)

4. Definition of approximations should be based on the levels of behavior necessary to facilitate progress toward the terminal behavior.
   a. Quinten has never driven a car before in his life. In teaching Quinten to parallel park, his driving instructor places two pylons four feet more than a car length apart as the first approximation in a shaping procedure. (Nonexample)
b. Ursula has played marbles before, so her brother makes the circle very close to regulation size in teaching her some very tricky plays. (Example)

5. Deterioration of performance at an approximation level may be because the requirements have been set too high or because too much time has been spent at that approximation of the terminal behavior.

a. Troy's boss is using shaping to teach him how to wash cars by reinforcing him whenever he finds only six or less dirty spots, then three or less dirty spots, and so forth. The number of dirty spots starts to increase, however, after Troy is on the three dirty spot level for three weeks. (Example)

b. Paul has been teaching his sister to high jump by gradually placing the bar two inches higher every time his sister makes three successful jumps at a certain height. She has been making steady progress for the last three months. (Nonexample)

6. Chaining is the reinforcement of the combination of a set of simple behaviors to form a more complex behavior.

a. Viola can use all the pieces of her Erector Set but has trouble making complicated machines. Her father therefore works with Viola on combining the skills she has to make more complicated machines. (Example)

b. In teaching his recreation group how to play Duck Duck Goose, Chaz reinforces the children if they complete the game successfully and doesn't reinforce them if they make a mistake. (Nonexample)

7. The first step in a shaping or chaining procedure is definition of the terminal behavior.

a. In planning a shaping procedure for teaching her volleyball students how to stay in position, Susan says "The first thing I need to do is figure out what size to make the approximations." (Nonexample)

b. Rutland loves to do the Hokey-Pokey on roller skates. In trying to teach his friends, he first defines the complete dance and then establishes the criteria for success. (Example)

8. In a chaining procedure, the links are in the subject's repertoire.

a. In teaching the chain of using an encyclopedia index, Mr. Hooton makes sure his students know how to turn to page numbers and can read the words in the index, among other behaviors. (Example)

b. Dennis is teaching his sheltered workshop employees to use the time clock and discovers halfway through teaching the chain that the employees don't know how to place the time card into the punch clock. (Nonexample)
9. One requirement for effective chaining is a precise analysis of the complete terminal behavior into its component links.
   a. In the previous example of the time clock training, Dennis divided the chain into the links of taking the card out of the rack, placing it in the clock slot far enough to activate the punch, and placing the card back in the rack next to their name. (Example)
   b. The executives given access to the high security information files need to learn the sequence for disarming all the security equipment. The security consultant defines the chain as turning off the outside alarm, turning off the inside alarm, and pushing on the safe door handle. (Nonexample)

10. In a chaining procedure, a link serves as an Sd for the next response and as a reinforcer for the behavior that precedes it.
   a. The chain for starting a car is comprised of the following steps: closing the car door, buckling the seat belt, putting the car in neutral, placing the key in the ignition, turning the key, and pumping the gas. The Sd for putting the car in neutral is buckling the seat belt and the reinforcer is turning the key. (Nonexample)
   b. The writer of the instructional manual for assembling the S-400 bicycle has developed a series of links including putting the back wheel in the frame slots, putting the chain on the wheel, and placing the nuts on the wheel threads. The Sd for putting the chain on the wheel is putting the wheel in the frame slots and the reinforcer is placing the nuts on the wheel threads. (Example)

11. Backward chaining is the beginning of the chaining sequence with the final link which results in more immediate access to the reinforcer for the terminal behavior.
   a. The first link in the chain of landing the airplane is checking with the tower and the last link is reducing the throttle as the plane pulls up to the terminal. Gordon always has a safe landing bar to add to the jackets of pilots who make a successful landing and uses backward chaining to make access to the bars more frequent. (Example)
   b. In showing his media students how to use a tape recorder, Alex starts with the first link and requires his students to complete the chain before hearing the funny messages and nice music on the tape. (Nonexample)

12. After the terminal behavior is emitted, it should be frequently reinforced.
   a. Soon after her students have combined the links in the chain of operating a camera, Hattie says "Well, they have gone through all the steps, I guess I don't have to reinforce that behavior as much anymore." (Nonexample)
b. After talking to another instructor about the chaining procedure, Hattie institutes more practice in the complete chain, including the reinforcement of immediately developing any pictures the students may take without assistance. (Example)

13. Shaping can be used to develop the links in a chain which are not already part of the subject's repertoire.

a. In teaching students how to put windows into frames, the instructor discovers Oscar does not do a very good job of neatly using plastic wood to fill the holes left by the finishing nails. Therefore, the instructor institutes a shaping procedure to gradually reinforce Oscar's approximations of the fine skill of keeping all the plastic wood confined to the nail hole. (Example)

b. Lyle drops chaining as a procedure for training in giving manicures when he discovers some of the students have difficulty keeping nail polish on the nails and off the clients fingers. (Nonexample)
1. Alt-R is the reinforcement of a behavior which is not likely to occur at the same time as the behavior targeted for reduction.
   a. The employees in Martin's ice cream store just stand around and talk when business is slow. To decrease his workers' inactivity, Martin indicates they will earn some free ice cream or a bonus for every five times he sees them holding a cleaning rag when not waiting on customers. (Nonexample)
   b. Rollie is very distracted whenever Tina looks out the window during conversations in a restaurant. He decides to reinforce her whenever she is looking at him as they are talking. (Example)

2. Differential Reinforcement of Other Behaviors (DRO) is the reinforcement of any other behavior besides the behavior targeted for reduction.
   a. To decrease the number of times his children slide down the stair railing, Mr. Gordon compliments any of his offspring who come down the stairs without sliding. (Example)
   b. Coach Harding doesn't like his tennis players to lean against the fence instead of practicing their shots. Therefore, he deducts one lap from the running at the end of practice for every time any player goes their opponent in practice games. (Nonexample)

3. Differential Reinforcement of Low Rates (DRL) is the reinforcement of a lower rate of the targeted behavior.
   a. Miss Snyder has found that if the principal actors in her play speak at a rate faster than two words per second, their lines are unintelligible. Therefore, she calls out "That's great delivery!" whenever they speak at two words per second or slower and corrects them when they talk faster. (Example)
   b. The navigator of Car Four in a road rally tells the driver to keep up his speed when he is going ten miles over the speed limit at the beginning of the contest. (Nonexample)

4. Alt-R, DRO, and DRL are positive reductive techniques because they do not involve the introduction of aversive stimuli.
   a. Stephanie's teacher wants her to stop bringing her frog to class and so mentions nicely to Stephanie how much the frog is probably enjoying himself at home whenever she comes to school without the frog. (Example)
   b. Laurie is reprimanded every night she gulps down her food too quickly at dinner. (Nonexample)
5. Response cost is the removal of a quantity of reinforcers contingent upon the targeted response.

a. During severe gasoline rationing, drivers convicted of using counterfeit coupons are required to spend time in jail. (Nonexample)

b. Residents of the Village Pines Cottage at the residential treatment center lose points they have earned for field trips if they run away from the cottage. (Example)

6. Effective use of response cost requires communicating the "rules of the game", or the contingencies to be applied.

a. The administrator of the university computer center doesn't make any attempt to publicize the new policy of decreasing minutes of computer time of persons violating existing rules. (Nonexample)

b. Mrs. Wentworth holds a class meeting to explain the behaviors for which points will be lost as part of a system of fines she is going to institute the next day. (Example)

7. Timeout is the removal of all opportunity to acquire additional reinforcers.

a. Patrick is sent to sit on the stairs with no toys for a few minutes whenever he starts to angrily react to his mother's attention to his new baby sister. (Example)

b. Dobbyn cries when she is sent to sit on the side of the family den for contingent observation, so her mother gives Dobbyn her Teddy Bear. (Nonexample)

8. Effective use of timeout requires insuring that the subject is being removed from a reinforcing situation.

a. When Tommy starts whining loudly during English class, the class he hates the most, his teacher sends him to the study hall to complete his work. (Nonexample)

b. The children in Rakeston look forward to story hour at the library every week. When the children begin to push each other during one story, the librarian stops reading, closes the book, and turns her head. (Example)

9. Use of timeout for short periods is sometimes effective; the duration should be as short as possible based on the previous history of the subject.

a. While touring a movie studio, Kate, who has never been in timeout before, is sent back to sit on the bus for a few minutes with an aide standing outside when she persistently wanders away from the group. (Example)
b. Children interfering with the activities at a recreation center picnic are sent to the table serving as the timeout area for the remainder of the afternoon. (Nonexample)

10. Implementation of overcorrection has two stages—restitution and positive practice.
   a. After intentionally spilling the maple syrup on the kitchen table, Holly wipes the mess off the table and cleans the rest of the table and counter areas in the kitchen and practices using maple syrup on her pancakes. (Example)
   b. Sollie throws a bag of beads on the floor while making a necklace. He is sent from the crafts room and required to write the sentence "I will not throw the beads" 100 times. (Nonexample)

11. Punishment requires the presence of a consequence.
   a. Before she goes trick or treating, Denise's parents sternly tell her not to soap any windows. (Nonexample)
   b. Immediately after his third drunk driving arrest, Mr. Bricker has his license confiscated. (Example)

12. By definition, punishment involves a decrease in the likelihood of the future occurrence of a behavior.
   a. After receiving an automatic "F" on a quiz for looking on someone else's paper, Gordon doesn't copy answers again in Mr. Timmerman's class. (Example)
   b. Although he is lectured by the judge and his parents after each shoplifting offense, Andre keeps taking small items from the drugstore. (Nonexample)

13. Punishment should only be used in conjunction with a behavior development procedure designed to increase the occurrence of an appropriate behavior.
   a. During summer vacation, whenever Omar comes home after curfew he has to do one hour of yard work the next morning. On days he comes home on time, Omar's parents say nothing when he walks in the door. (Nonexample)
   b. Cecily is sent to the office by Miss Bryton each time she fights during recess. The principal suggests to Miss Bryton that she also pat Cecily on the back or write a note to her parents on the days she interacts appropriately with the other students. (Example)
Written Examples and Nonexamples: Maintaining Behavior
Unit Seven

1. Effective generalization training requires emphasizing common elements across stimulus situations.
   a. Caleb goes to bed on time when his parents are home but makes a terrible fuss whenever the babysitter tries to put him to bed. As they prepare to leave for their next evening out, his parents tell Caleb that it is still a weeknight, he still has school the next day, and that he still needs to go to bed when the clock on the wall says 8:30 P.M. (Example)
   b. Molly can't get the new spray nozzle on her hose to work. "It's just like the old one!" her husband says as he goes back in the house. (Nonexample)

2. Effective generalization training requires training the behavior under a variety of stimulus conditions.
   a. In teaching her son how to locate groceries in a supermarket, Mrs. Block takes him to several stores in the same chain. After shopping in three stores which have the merchandise arranged in similar locations on the shelves, Mrs. Block says "Now he should be able to shop anywhere". (Nonexample)
   b. Dave is learning how to play golf and his father takes him out to three different courses after he has learned the basic skills. (Example)

3. Intermittent reinforcement is the reinforcement of some, but not all, occurrences of a behavior.
   a. As Willard says goodnight to his parents' party guests, they each tell him what a nice polite boy he is. (Nonexample)
   b. A high school student selling raffle tickets door to door has seven people buy tickets, nine people refuse to buy tickets, and one person slam the door in his face. (Example)

4. Intermittent reinforcement maintains behaviors under extinction more effectively than a continuous schedule of reinforcement.
   a. "I used to get these problems right every time!" Pauline says in a disgusted voice after missing some problems during a math club meeting. When she misses even more exercises at the next meeting, Pauline stays late to practice more problems. (Nonexample)
   b. "I must doing better at this!" Paul says after he improves his score from 75% to 85% correct at the math club meeting. He looks forward to the next meeting and the chance to do more problems. (Example)
5. The progress from frequent reinforcement to more intermittent reinforcement should be gradual.
   a. Mrs. Baird always puts a thank-you note in the mailbox of any teacher who submits weekly lesson plans on time. In the future, Mrs. Baird plans to distribute notes to teachers for every other consecutive week of prompt submission of plans and eventually intends to go to every fourth week. (Example)
   b. The police lieutenant goes on patrol every three days with his new officers to provide support and feedback on their performance. Due to a manpower shortage, the lieutenant will now only be able to go every three weeks. (Nonexample)

6. An interval schedule of reinforcement is defined as the delivery of reinforcement contingent upon the first occurrence of a behavior following the passage of a pre-determined amount of time (fixed interval) or a variable amount of time based on a pre-determined average (variable interval).
   a. Tommy reinforces the apprentice in his magic act after every third trick he completes successfully. (Nonexample)
   b. Frank receives his paycheck as soon as he goes to pick it up after 3:00 P.M. on Friday. (Example)

7. Interval schedules of reinforcement usually result in low rates of responding.
   a. Randy's rate of writing in his English composition class increases dramatically after his instructor institutes a schedule of reinforcing the first writing behavior of students after fifteen minute intervals have passed. (Nonexample)
   b. In the greenhouse for roses, Carla is reinforced by her boss for the first flower she waters after fifteen minute intervals. Although Carla is consistent in her watering behavior, her boss is disappointed at the low rate at which she waters the roses. (Example)

8. A limited hold is a time period following the end of an interval during which reinforcement is available for the occurrence of the behavior.
   a. Students who bring their forms to the school gym the first week of registration can take care of their matriculation in one location. After a week, the students must go to their college office and the university scheduling center to complete registration. (Example)
   b. Gail reinforces her tour guide after twenty minute intervals as soon as he is driving the speed limit through the safari park. (Nonexample)
9. A ratio schedule of reinforcement is defined as the delivery of reinforcement contingent upon the first occurrence of a behavior following the occurrence of a pre-determined number of responses (fixed ratio) or a variable number of responses based on a pre-determined average (variable ratio).

a. Mr. Santini's fifth grade class earns ten dollars toward their service project for every large plastic bag they fill with trash found on the school grounds. (Example)

b. Wendell is complimented by his bandleader as soon as he practices the bongos following ten minute intervals of time. (Nonexample)

10. Ratio schedules of reinforcement usually result in high rates of the occurrence of a behavior.

a. Scott is paid a nickel for every faulty milk carton he picks out of the quality control line. His partner looks up one day to see Scott frantically pulling cartons off the conveyor belt. (Example)

b. In a promotional contest, Dan earns a free game of bowling for every five strikes he bowls during a fifteen minute period of time. One of spectators comments on how slowly Dan gets ready for the shots and how casually he rolls the ball down the alley. (Nonexample)

11. A variable ratio schedule of reinforcement with a high ratio requirement, or many responses required for reinforcement, results in behavior extremely resistant to extinction.

a. Felicia used to get attention every so often for starting to sing off-key but now nobody pays any attention. Felicia stops singing off-key very soon. (Nonexample)

b. Foster's parents used to reinforce him around every fifth time he would make a face but now have decided it is no longer cute behavior. Even though they don't pay attention to his facial contortions anymore, Foster continues to make faces. (Example)
12. Ratio strain occurs when a behavior begins to deteriorate under a ratio schedule of reinforcement instead of becoming more resistant to extinction.

a. Joshua develops excellent handwriting in a program during which he is reinforced for every ten words in his writing assignments which correspond to legibility standards. His teacher is surprised, therefore, when Joshua's handwriting starts to get worse after he is required to complete two pages of a story with acceptable handwriting to earn reinforcement. (Example)

b. Nate's training for bicycle racing has just been increased from 50 to 100 miles to earn the reinforcer of new bike parts. Nate seems to respond well, however, and rides 120 miles at the start of the new program. (Nonexample)

13. A fixed interval scallop is an increase in the rate of the occurrence of a behavior as the interval is ending and the opportunity for reinforcement getting nearer.

a. As the date when his boat will be delivered gets nearer, Mitch gradually works less on patching the holes in his boathouse. (Nonexample)

b. As the date for the final exam approaches, the students in the statistics class noticeably start to study much harder. (Example)
Written Examples and Nonexamples: Combinations and Comparisons of Behavior Change Programs
Unit Eight

1. Delivery of reinforcement in the Good Behavior Game is made to the group exhibiting the best performance of a specified behavior.
   a. As a substitute teacher, Mr. Burdette needs a fast way to prevent very disruptive behaviors from occurring in the classrooms in which he is teaching. Therefore, at the end of the first hour of the morning, Mr. Burdette identifies several of the more disruptive behaviors being exhibited by the students, splits the class into two or three groups, and, after explaining the rules, says that the group with the least number of marks on the chalkboard at the end of the day will get a special prize. (Example)
   b. Amos notices a lot of his students playing games on the computer before finishing their programming assignment. Therefore, Amos institutes a procedure whereby anyone playing games prematurely will get a point stored in the computer's memory and the student with the most points at the end of the day will get a free disk. (Nonexample)

2. One adaptation to the Good Behavior Game is having the teams compete against a criterion instead of each other so that any team whose level of behavior falls below a certain criterion will be reinforced.
   a. In establishing a Good Behavior Game, Jonathon tells his cottage residents that he is going to form several groups and any group with less than five mornings during the month when their beds are not made will earn a special movie and popcorn. (Example)
   b. In implementing a Good Behavior Game, Drake tells the two groups that after the day is over each group will meet, discuss the day's events and decide among themselves if they have earned the reinforcer. (Nonexample)

3. One adaptation to the Good Behavior Game is to form a separate group with individuals whose behaviors consistently deprive the team of the opportunity for reinforcement.
   a. Roscoe continues to disrupt the class after the teacher and students tell him his behavior is the major reason his group is not qualifying for the reinforcer in the Good Behavior Game. Therefore, at the end of the period the teacher declares that even though they are over the criterion level, Roscoe's team has earned the reinforcer. (Nonexample)
   b. Mason and Nora are constantly talking out loud during the time when such behavior earns their team a mark on the board during the Good Behavior Game. Mrs. Ellerby therefore creates another group consisting of Mason and Nora and makes plans for other contingencies in case their behavior still does not improve. (Example)
4. The least intrusive intervention should be attempted first and more obtrusive techniques used only if the level of the behavior indicates they are necessary.

a. Faith has been using Contingent Recreation in an attempt to increase the number of times her young daughters help her with the laundry; after the laundry is done they go to the spa for a swim. Recently, however, Faith's daughters have not been helping very often; so Faith implements a Grab Bag with movie tickets, toys, and coupons for clothes. (Example)

b. Margo really likes the Slot Machine and so decides to use it first in a behavior change program for improving the academic performance of the group of children she is tutoring. (Nonexample)

5. The selection of reinforcers for any group contingency package should be based on data indicating their effect on the level of the behavior.

a. In picking activities to include with a Contingency Bank, Beth first does a survey of what her students like to do and then keeps track of their behaviors while the program is in effect. When the behaviors do not improve, Beth decides to try another set of activities before changing systems. (Example)

b. Mrs. Basin has been using a Compliment Meter with her counseling group to increase their positive social interactions. After a particularly bad day overall, Mrs. Basin decides that "It seems like these kids complain just as much as they used to!" and proceeds to drop the system. (Nonexample)

6. Contingent Recreation is making high frequency activities (games, etc.) contingent upon low frequency activities (schoolwork, completion of chores, etc.).

a. The children in The Little Tyke Kindergarten love the jungle gym and get 15 extra minutes of playing time whenever they put their games and paint away and clean up their desks before time to go home. (Example)

b. Mrs. Bishop tells her six children "You can clean the kitchen as soon as you are finished your homework." (Nonexample)

7. The effectiveness of the Treasure Box is primarily due to the novelty of a variety of reinforcers.

a. Mr. Stanwloh puts little red and blue rubber balls in a Treasure Box for the children for whom he babysits. (Nonexample)

b. Megan puts story books, short phonograph records, crayons, and puppets in the Treasure Box for the primary choir at church. (Example)
8. Home reports can serve to coordinate the reinforcement programs in two important settings of the subject's environment: the school and home.

   a. Mrs. Scofield requires her students to submit their homework assignments on time before earning free time on Friday. One afternoon, Mrs. Scofield overhears Carrie telling some of her classmates how she doesn't care about free time, her parents allow her to listen to records and watch TV whether she does her homework or not. (Nonexample)

   b. Miss Hayden sends the parents of her students a weekly note describing their child's appropriate social behaviors and reinforcers that have been delivered. The system was arranged so the parents could reinforce similar behaviors at home without duplicating reinforcers. (Example)

9. Contracts should contain the following specifications: observable behavior definition; reinforcer type, quantity, and schedule of delivery; and sanctions for failure to fulfill the contract.

   a. Barney's contract says that he is to earn ten points each day for working hard during reading group. (Nonexample)

   b. Amber's contract states that for every section of her report on horses she completes by the deadline, Amber will earn another piece of the ticket for a tour of a local horse farm. For every section Amber does not complete by the deadline, she does not receive a piece of the ticket and must complete the missing section on her own time. (Example)

10. A token economy is based on the delivery of tokens for immediate reinforcement until the more powerful back-up reinforcers become available.

   a. For every fifty envelopes she stuffs, Adele is immediately given a receipt by her supervisor which can be exchanged for two dollars per receipt at the end of the evening. (Example)

   b. Miss Bainbridge secretly records the points her students earn each day on her desk pad. At the end of the day, she tells the students the total earned and gives them a "check" for that number of points before they leave for the bus. (Nonexample)
11. Procedures for gradually reducing the use of tokens should be included in the original plans for the program.

a. As he plans his token economy, Mr. Klingman says "If this works, I'll keep it going all year." (Nonexample)

b. Although the beginning of her token economy calls for Ms. Nisky to deliver tokens for every time her students bring a pencil to speech class, she plans to eventually deliver tokens after every other day, then every third day, and so on. (Example)

12. Tokens should be established as reinforcers by their pairing with existing unconditioned or conditioned reinforcers.

a. As her campers correctly identify trees, Natalie the Nature Girl gives them a small token. The tokens can be turned in at the end of the two week session for some nature crafts. (Nonexample)

b. The Las Vegas showgirls get a small star on their dressing room door and a bouquet of flowers after the performance for every standing ovation they receive. (Example)

13. Data to be collected during a token economy include the level of the target behavior, the number of tokens delivered, and the back-up reinforcers selected by the subjects.

a. After looking at her data for the exchange of tokens for back-up reinforcers, Miss Hale notices that no one has ever exchanged tokens for time working with the principal. (Example)

b. "Zachary never has many points to exchange at the end of the day" Mr. Seeburg says, "I wish I could tell if he is writing down all the points he is awarded." (Nonexample)
APPENDIX D

Independent Variable Observation Sheets
Independent Variable Measurement Form for the Book/Study Guide Only Condition

The stopwatches will be synchronized with the instructor's watch outside of the classroom before 4:30 P.M. The instructor will then start class at exactly 4:30 P.M. with the words "THE topic for this week was..."

The time on the stopwatch at the word THE: ______________ minutes and seconds.

1. The first component for the Book/Study Guide Only condition is an introduction.

The time on the stopwatch at the word PROCEDURES in the sentence "Part A of the quiz reflects these PROCEDURES...": ______________ minutes and seconds. (A)

2. The second component for the Book/Study Guide Only condition is Part A of the quiz.

The time on the stopwatch at the word THE of the sentence "THE required response...": ______________ minutes and seconds. (B)

The time on the stopwatch at the word BEGIN: ______________ minutes and seconds. (C)

The time on the stopwatch at the word STOP: ______________ minutes and seconds.

3. The third component for the Book/Study Guide Only condition is the opportunity to ask questions about the material in the unit.

The time on the stopwatch at the word ARE in the sentence "ARE there any questions about this week's material?": ______________ minutes and seconds. (D)

The time on the stopwatch at the word ON in the sentence "Now that we have finished with the questions, let's move ON": ______________ minutes and seconds.

4. The fourth component for the Book/Study Guide Only condition is Part B of the quiz.

The time on the stopwatch at the word WHEN in the sentence "WHEN you are done this portion of the quiz...": ______________ minutes and seconds.
Independent Variable Measurement Form for Examples/Nonexamples Condition

The stopwatches will be synchronized with the instructor’s watch outside of the classroom before 4:30 P.M. The instructor will then start class at exactly 4:30 P.M. with the words “THE” topic for this week was...

The time on the stopwatch at the time of the word “THE”: ____________ minutes and seconds. (A)

1. The first component of the Examples/Nonexamples condition is an introduction.

The time on the stopwatch at the word WEEK in the sentence “Let’s look at the rules for this WEEK...”: ____________ minutes and seconds. (B)

2. The second component of the Examples/Nonexamples condition is review of the rules and examples/nonexamples for the unit.

The time on the stopwatch at the word LOOK in the sentence “LOOK at rule number one...”: ____________ minutes and seconds. (C)

Additional data for review of examples/nonexamples:

Number of student questions related to written examples/nonexamples:

Number of student questions not related to written examples/nonexamples:

Number of instructor responses related to examples/nonexamples:

Number of instructor responses not related to examples/nonexamples:

The time on the stopwatch at the word ON in the sentence “Now that we have finished with the questions, let’s move ON.”: ____________ minutes and seconds. (D)

3. The third component of the Examples/Nonexamples condition is Part A of the quiz.

The time on the stopwatch at the word THE of the sentence “THE required response...”: ____________ minutes and seconds. (E)

The time on the stopwatch at the word BEGIN: ____________ minutes and seconds. (F)

The time on the stopwatch at the word STOP: ____________ minutes and seconds.
4. The fourth component of the Examples/Nonexamples condition is the opportunity to ask questions about the material in the unit.

The time on the stopwatch at the word **ARE** in the sentence "**ARE** there any questions about this week's material?": ______________ minutes and seconds. (G)

The time on the stopwatch at the word **ON** in the sentence "Now that we have finished with the questions, let's move **ON**.": ______________ minutes and seconds. (H)

5. The fifth component of the Examples/Nonexamples condition is Part B of the quiz.

The time on the stopwatch at the word **WHEN** in the sentence "**WHEN** you are done this portion of the quiz...": ______________ minutes and seconds. (I)
APPENDIX E

Dependent Variable Measures
Part A: Reinforcement and Extinction

The second sentence of each item identifies the required response. Mention the behavior(s) and consequence(s) in the situations for which you describe a contingency. As soon as you finish, bring your paper to the front of the room and write the time indicated by the observer in the space at the top of the paper labeled "Finishing Time". There is a maximum of 45 minutes allotted for Part A of the quiz.

1. When Jerome does not comply with his roommate Bob's polite request to clean up his clothes from the living room, Bob says to himself "I guess being polite isn't a very good reinforcer." State what is wrong with Bob's statement about his request.

2. It is a blustery midwinter day as Sal caulks one of his windows which has a crack in the seal letting in a cold draft. In terms of negative reinforcement, describe what behavior(s) and contingent consequence(s) in this situation will be involved in the reinforcement process.

3. Donald used to blush and look flustered when Esther blew kisses at him but now he doesn't pay attention and just keeps on with the task at hand. What other piece(s) of information would be needed to determine if extinction of Esther's behavior has occurred?

4. Paula, a volunteer swim coach, used to do what the demanding head coach said just to get him off her back but she has recently started skipping practice sessions. Explain Paula's absences in terms of negative reinforcement, including any pertinent behavior(s) or consequence(s).
5. Mrs. Wilkens tells her daughter after school one day that her bed looked very nice that morning, but the next day the bed is a mess. What is one thing Mrs. Wilkens can do to improve the probability the same comments will have a stronger effect on Amy's bed-making behavior?

6. An observer in Miss Lott's room notices two things: the children are always quiet and Miss Lott frequently mentions how much easier and pleasant it is to study in a quiet room. In addition to being a consequence, state one reason Miss Lott's comments could be considered reinforcers.

7. Colleen gets a disgusting look every time she tugs at her mother's dress in the store, but it doesn't seem to make any difference; in fact, the behavior seems to be getting worse. If Colleen's mother wanted to employ an extinction procedure, what could she do when Colleen tugs at her dress?

8. Nan presents two reinforcers after her students complete their oral reports from which they can choose one. Name the reinforcer selection system Nan has used.

9. Jane says to herself "Well, I guess that reinforcer didn't work" after she puts a nice message on her answering machine and Roger eventually stops calling her. What is wrong with Jane's statement about the nice message?

10. Oscar has been giving Pamela a smile when she hits the correct note in singing class but she hasn't been earning many smiles. What is the next level of reinforcer Oscar should try in attempting to improve Pamela's singing behavior?
11. Mr. Linwood is disappointed when Minnie's bothersome talking becomes even more intense the day after his ignoring of those behaviors seemed to result in a decrease of the talking behavior. State the name of the phenomenon which is occurring.

12. Tammy never finishes her homework even though Tammy's mother brings her favorite cookies when Tammy goes to her room to do homework without being reminded. What behavior(s) and consequence(s) would be included in a more appropriate contingency for Tammy's homework session.

13. As some of their classmates snicker, Dave won't stop teasing Judy about her haircut even though she ignores him. Explain why Judy's attempt at extinction will probably fail, being sure to include behavior and consequence descriptions.

14. Chuck has been using playing baseball to reinforce his brother's attending to his farm chores but starts to give him points to earn a weekly baseball game instead. Name the class of reinforcers to which Chuck switched.

15. The behavior Iris's father, who knows she loves the "chocolate" dinner plate, wants to increase is the number of times she comes home on time when the dinner bell rings. Explain how these two facts can be arranged contingently to grant Iris's father's wish.
Part A: Measurement

The second sentence of each item identifies the required response. Mention the behavior(s) and consequence(s) in the situations for which you describe a contingency. As soon as you finish, bring your paper to the front of the room and write the time indicated by the observer in the space at the top of the paper labeled "Finishing Time". There is a maximum of 45 minutes allotted for Part A of the quiz.

1. Mr. Booker grades 30 minute English tests having 14-16 questions by counting the number of correct responses and requiring 12 or more correct for an A. State the major problem with the procedure described above as the basis for the students' grades.

2. Mrs. Kiel calculates a percentage of the number of days during the month her students hang up their coats in the morning. What two pieces of information in the above situation does Mrs. Kiel need to calculate a percentage?

3. John takes 10 minutes to complete an assignment for which he gets 5 questions correct and 2 incorrect. Calculate the rate correct and the rate incorrect for the student's performance.

4. Mrs. Madison records performance on 40 single-digit written math problems completed in a 30 minute time period by counting the number of correct responses. What recording method is being used?
5. The time for Ms. Davis's spelling class is always being altered by music, physical education, or a school assembly. State one reason from the above information frequency recording would not be the appropriate recording method for spelling performance.

6. Mr. Goode explains to Miss Seily that all you have to do to calculate rate is count the number of times a behavior occurs and divide by the total number of opportunities. State the necessary correction(s) in Mr. Goode's formula.

7. One observer at the Colby Manufacturing Corporation counts six accidents during an eight hour shift; another observer counts eight mishaps. What is the interobserver agreement between the two observers?

8. Jonathan and Leslie's scores of 80% and 60% respectively on a set of five math problems make Mrs. Cromwell think that Jonathan's skills are well above those of Leslie. From this information, what has Mrs. Cromwell forgotten to consider about the calculation of percentages?

9. Della measures her son's behavior during quiet time by looking up whenever she remembers and recording whether her son is making any sounds. How could the timing of the observations in this approximation of momentary time sampling be improved?
10. Mr. Ungle wants a record of his family's interruptions of each other during dinner. How would Mr. Ungle use event recording to collect the data?

11. Faith's teacher is excited because her efficiency on written spelling assignments has recently increased. What type of measure is Faith's teacher probably looking at?

12. Tom and Mona decide to use duration recording to determine the degree to which a small group of people dominate the meetings of their ecology club. Write a description of how Tom and Mona will be recording the occurrence of talking behavior.

13. Nick and another staff member are recording the occurrence of a behavior defined as children fighting among themselves. Why should Nick not be surprised if he and the other observer don't agree very often?

14. To observe Mason's complaining behavior by partial-interval recording, Mr. Decker divides the reading group time into 30 second intervals and marks whether or not the behavior occurs at the end of each time block. State what Mr. Decker will need to change to make the procedure true partial-interval recording.

15. Hal's interobserver agreement calculation for 50 agreements and 10 disagreements consists of dividing intervals for which he agrees with the other observer by the number of intervals for which they do not agree. Calculate the correct agreement coefficient, whether by Hal's procedure or your own if Hal's formula is inaccurate.
Part A: Graphing

The second sentence of items 1 through 10 identify the required response. Items 11-15 are part of the graphing task included on the last page of Part A. Mention the behavior(a) and consequence(s) in the situations for which you describe a contingency. As soon as you finish, bring your paper to the front of the room and write the time indicated by the observer in the space at the top of the paper labeled "Finishing Time." There is a maximum of 45 minutes allotted for Part A of the quiz.

1. Tony records the daily number of times his calculus professor says "uhh" during a two hour class. What data measure should be used as the scale on the abscissa?

2. During the first three phases of a study, Mrs. Dalby records the level of her students' lining up behavior without any positive comments, the level of the behavior when positive comments are made, and the level when stars are placed beside the names of those students who line up appropriately. Why isn't this an example of an ABA reversal design?

3. In a study of using praise as a potential reinforcer, Mrs. Topal records Roger's rate of correct math behavior when she does not compliment him on his math behavior. What condition of a study does this procedure illustrate?

4. Frank calculates the mean number of hot dogs eaten for the week by adding together the number eaten each day and dividing by 6. State the correction that needs to be made in Frank's calculation of the mean.
5. Billy constructs a graph to show the length of time each morning his brother occupies the bathroom. What data measure should be used as the scale on the ordinate?

6. Ms. Roberts' data from one baseline and intervention indicate that Sally's pencil tapping behavior decreases by 40 percent during intervention in comparison to the baseline. Write one of the three things Ms. Roberts can conclude about the change in the behavior.

7. Willy wants to study homework completion using a reversal design with an intervention of access to television programs. Briefly describe what will occur in the phases of a four part reversal design.

8. Gene's parents want to examine the effect of their comments on Gene's eating habits at home, at Grandma's, and in a restaurant. Identify the most appropriate design for this purpose.

9. Using a reversal design, Vicki has measured the level of her roommate's swimming during baseline and intervention and then stopped the study. What needs to be done for the verification portion of the study?

10. After baseline, the intervention of activity time for correct language performance is introduced at the same time in the resource room, regular classroom, and speech room. From the above description, what correction is necessary to make this a true multiple baseline design?
Using the data described below, draw a graph containing the following elements:

11. appropriately labeled phases
12. appropriately drawn phase lines
13. appropriately labeled axes
14. appropriately connected data points.
15. appropriately graphed design

**Graphing Task for Items 11-15**

Miss Eldie wants to collect data on Jessie's in-seat behavior during math instruction. At the end of every two minutes, Miss Eldie looks to see if Jessie's buttocks are in contact with the seat of the chair, and, if so, records a plus (+) on the data sheet. If Jessie is not in his seat, a minus (-) is recorded. Daily data is summarized as the percentage of intervals Jessie is in his seat for each daily observation period.

Social reinforcers have been ineffective in the past in establishing behavior. Therefore, Miss Eldie develops a home-school communication system with notes to go home for reaching a certain percentage of in-seat intervals. For six days data is collected without home-school communication. On the seventh day, the "happy notes" are introduced. With a deep breath, on Day 14 Miss Eldie removes the "happy notes" and on Day 18 reinstates them. Although Miss Eldie continues the sequence for several more months, you will only be required to graph the first four phases. The data for percentage of intervals are:

- **Days 1-6:** 30, 25, 15, 20, 10, 10
- **Days 7-13:** 35, 50, 50, 70, 80, 80, 80
- **Days 14-17:** 50, 25, 15, 15
- **Days 18-23:** 50, 80, 80, 80, 80, 80
Part A: Stimulus Control

The second sentence of each item identifies the required response. Mention the behavior(s) and consequence(s) in the situations for which you describe a contingency. As soon as you finish, bring your paper to the front of the room and write the time indicated by the observer in the space at the top of the paper labeled "Finishing Time". There is a maximum of 45 minutes allotted for Part A of the quiz.

1. "He doesn't know what a yield sign is", Mr. Kibble said after his son sped right through one during his driving lesson. Identify the Sd(a) and behavior(s) in stating whether Mr. Kibble's conclusion is accurate.

2. When Donna writes the number 7 after her teacher says "5", her teacher pats her on the back and smiles. What should happen to establish the number 5 as an S-delta for writing the number 7?

3. George says "Remember, you only have ten minutes" after his brother starts playing video games on the television. State what George needs to do to make the comment an antecedent stimulus for his brother's behavior of playing video games.

4. Whenever Mrs. Stickley's students quiet down for nap time after she turns off the lights, she quietly says, "It's so nice and quiet in here". State the antecedent stimulus, behavior(s), and reinforcer(s) present in the establishment of stimulus control in this situation.
5. Every time Rusty tells his turtle to roll over, he does it. Stating pertinent antecedent(s) and behavior(s), indicate whether or not the turtle's behavior is under stimulus control and the reason you know this.

6. When office workers exit the building quietly after the fire alarm goes off, they get to take a ten minute break when they re-enter the building. State why the fire alarm can be considered a discriminative stimulus for the behavior of exiting the building quietly.

7. The last time her husband was late, Mrs. Quark kept giving him a stern look while Mr. Quark kept right on dawdling. What would have been a more relevant Sd to prompt Mr. Quark to finish dressing?

8. For her beginning piano students, Mrs. Swift puts the letter names on the key board. Briefly explain how fading might be used as the behavior becomes established, being sure to mention the current prompt and the least intrusive prompt to which the students should be attending.

9. In teaching the tennis serve, Max grasps his pupil's arm and moves it into position while John touches his student's arm and releases contact when they have reached the correct position. Assuming both students are familiar with the tennis serve, which instructor is using physical guidance correctly and why?

10. Sam says "Time to go!" when he and his wife need to leave for the theatre. If his wife stays in her room, what can Sam conclude about the effectiveness of the request and its influence on his wife's behavior of coming downstairs to leave?
11. Mr. Donwell used to go through each part of the long division procedure before his students started their assignments but one day says "I want you to try the problems without any help this time". From the above information, what is the reason fading hasn't been implemented?

12. Dr. Brooks wants to record a videotape of a teacher demonstrating effective teaching skills and is thinking about Mrs. Rosen, a very popular faculty member. From the above information, why would this potentially result in effective modeling?

13. Nick has his new mechanic read the auto repair manual before replacing the carburetor in a customer's car. What behavior(s) should be under stimulus control before the instructions will be effective?

14. Mr. Lincoln wants to eliminate the use of colored letters in teaching letter recognition. What is the least intrusive stimulus to which the students should be attending?

15. It's time for Dr. Loober to provide instructions to his young chemistry students in the finer points of using prefixes to name chemical compounds. What response(s) should already be in the students' repertoires before Dr. Loober starts giving instructions?
Part A: Shaping and Chaining

The second sentence of each item identifies the required response. Mention the behavior(s) and consequence(s) in the situations for which you describe a contingency. As soon as you finish, bring your paper to the front of the room and write the time indicated by the observer in the space at the top of the paper labeled "Finishing Time". There is a maximum of 45 minutes allotted for Part A of the quiz.

1. Millie's shaping procedure for increasing the rate of Opie's handwriting is based on changing the level of approximations every six days. What would be a more appropriate way to determine when to change the level of approximation?

2. Dirty Delbert the mechanic is teaching his assistant to repair a tire. After breaking the task into a discrete set of steps, how would Dirty Delbert use chaining to teach how to change a tire?

3. Although he can print the gross outlines of the letters of the alphabet, Benny has difficulty making legible letters. How could Benny's teacher use a tracing task in shaping the printing of the letter "B"?

4. Jack has been systematically reinforcing approximations of Tim's golf swing to the correct stroke by moving on to the next step when success has been achieved. Why is it unlikely the level of the behavior will deteriorate?
5. Mickey wants to institute a training program in his computer assembly plant based on chaining and task analysis. What is the first thing Mickey needs to do?

6. Todd has never looked his boss in the eye when they are talking. If his boss wanted to shape an increase in that behavior, why would he probably start out with small increments of improvement?

7. Dean can walk and he can chew gum, but he can't do both at the same time. In teaching Dean to walk and chew gum at the same time, why wouldn't it be accurate to say the teacher is using shaping?

8. The reinforcers for the terminal behavior of the chain of students putting books away, getting out the lunch bag, lining up quietly at the door, and walking quietly to the cafeteria are the social interaction and the food available at lunchtime. Name the link with which the teacher would start and the resulting consequence in a backward chaining procedure.

9. Tony has planned a shaping procedure for his orthopedically handicapped daughter's walking behavior from the bedroom to the kitchen but isn't sure when to change to different distances. What should be the basis of his decision?

10. Greg defines the links in the chain of cleaning the dishes to be first washing the dishes and then drying them. What would be a more appropriate description of the links in the chain?
11. In establishing chains of writing words, Mr. King discovers that Joni cannot write the letter "r" very well. Name the procedure Mr. King can use to improve this link in the chain to acceptable standards.

12. Myrna has her ballet partner separately go through each step of the "pas de deux" before starting practice. What prerequisite to chaining is Myrna appropriately verifying?

13. Gary is learning the chain of using word processing which includes the consecutive links of placing the disk in the disk drive, turning on the computer, closing the disk drive door, and taking the disk out of the disk drive when the program is loaded. Identify the links which act as the discriminative stimulus and the reinforcer for the link of turning on the computer.

14. Mrs. Crocker wants to use chaining to teach her daughter to work the washing machine. What should Mrs. Crocker do to formulate the links in the chain?

15. After every fifth time Darden's children successfully complete the newly learned chain of feeding their fish, cleaning the filter, and putting the fish tank tools away, they get 50 cents toward desired aquarium supplies. Why isn't the chain likely to be established very quickly?
1. Lila has planned a response cost program to reduce the profanity of the children on her floor of the residential center. Assuming the children have an adequate supply of reinforcers, what should Lila do with the residents before implementing the program?

2. Mrs. Foster is attempting to use Alt-R to change the amount of time Roger whistles in class by reinforcing him when he is reading a book. What is the primary reason this is not an Alt-R procedure?

3. Every time Mrs. Welman sees her students doing something which is contrary to established rules, she doesn't give them the chips which are part of her token economy. State whether or not response cost is in effect and give a reason for your answer.

4. After placing Stephan in isolation, his teacher sees him reading a picturebook and immediately and quickly removes the book from his possession. In terms of timeout, what is the reason for the teacher's action?
5. Mrs. Lawless wants to implement a DRO procedure for decreasing the amount of time her daughter whispers loudly during church. After dividing church time into even intervals, what behavior(s) should Mrs. Lawless reinforce?

6. Shawn is attempting to decrease her cat's scratching behavior by yelling at the cat whenever she claws at the furniture. Why is this not a positive reductive technique?

7. To reduce but not eliminate her boyfriend's rate of speaking, Martha reinforces him when he does not talk and ignores him when he does talk. Why is this not a DRL procedure?

8. Before he and his students get on the bus for a field trip, Mr. Hocking says that any student who is caught smoking during the trip will receive an official reprimand from the principal. What is the primary reason Mr. Hocking's statement isn't a punisher?

9. Denise is sent to talk to her favorite guidance counselor when she misbehaves during an enjoyable assembly. Why is the teacher's impression that she used timeout from the assembly probably a mistaken one?

10. Although punishment has resulted in a decrease in the number of times Hugh chews gum in class, he now clicks his heels together. What principle could have been used in conjunction with the punishment to avoid the replacement of one undesirable behavior with another?
11. Gordon screams every time his friends show him a snake to punish them for scaring him. What information is necessary before screaming can be considered a punisher?

12. During an overcorrection procedure, Lonnie has just finished sanding and cleaning the desk on which he carved his initials. What should Lonnie be required to do next to implement overcorrection?

13. George used to be kept in isolation for hours whenever he broke the rules during his favorite exercise time in prison. Why will short timeout periods in the halfway house in which he has been placed likely be ineffective?

14. Mrs. Courtney's son keeps going through her purse even though he is punished with spankings. Being sure to describe any pertinent behavior(s) and consequence(s), why isn't punishment occurring in this situation?

15. Rod hates to eat asparagus for dinner and always makes a fuss when it is served; behavior which gets him sent to sit in the living room for a few minutes without any toys or books. What is the primary reason this procedure is not timeout?
Part A: Maintaining Behavior

The second sentence of each item identifies the required response. Mention the behavior(s) and consequence(s) in the situations for which you describe a contingency. As soon as you finish, bring your paper to the front of the room and write the time indicated by the observer in the space at the top of the paper labeled "Finishing Time". There is a maximum of 45 minutes allotted for Part A of the quiz.

1. Ellen is receiving reinforcers for the first button she glues on a doll after fifteen minute time blocks during her shift at the toy factory. State whether Ellen is more likely to be working at a high or low rate of gluing buttons and provide a reason for your response.

2. Yuri’s mother is so pleased when her son cleans up his room that she gives him a hug and a kiss every time he completes the task. What would Yuri’s mother have to do to make this an example of intermittent reinforcement?

3. Mrs. Williams is trying to teach her students to remain just as quiet in Sunday School class as they do in the sanctuary by talking to them about how both activities take place on Sunday in church. What rule of effective generalization training is illustrated by this situation?

4. In establishing a two minute fixed-interval schedule of reinforcement, Mr. Tolliver reinforces the target behavior whenever it occurs during each two minute interval. State the correction that needs to be made in Mr. Tolliver’s procedure to make it an example of interval reinforcement.
5. In language training for the diplomatic corps, the ambassador's staff complete their training in Washington and then are sent overseas to begin their duties. What could be done during the first few months of the staff members' work at the foreign embassy to make the program a more appropriate example of generalization training?

6. Zelda has been getting a gold star whenever she gets 90% or better on her math paper. What could Zelda's teacher do to make sure Zelda's performance will remain high under extinction?

7. In progressing from reinforcing his students whenever they make a correct bridge play to reinforcing every fifth play, Mr. Bidd first reinforces every other correct play, then every third correct play, and finally every fifth correct play. From the above information, state one reason this is an appropriate example of implementing intermittent reinforcement.

8. Calvin's training as a salesman for the region of Illinois, Indiana, and Michigan involves reading training manuals, coursework at the home office, and field experiences in each of the states. What rule of effective generalization training is being illustrated in this example?

9. The deadline for submission of Dr. Small's research grant proposal is approaching. What would be happening to his grant writing behaviors if a fixed interval scallop began to develop?

10. Sharon has been complimenting her husband each evening he takes his dishes to the kitchen which has resulted in an increase in the occurrence of his clearing his place at the table. If Sharon gets tired of complimenting her husband and stops delivering any reinforcers, state whether his behavior will decrease quickly or slowly and provide a reason.
11. Joshua is a writer and gets a bonus if he delivers magazine articles within two days after the preliminary deadline set by the publisher. Name the reinforcement procedure being used by the publisher.

12. Tony is paid twenty dollars for every 5 bushels of apples he picks during harvesting. What schedule of reinforcement is used in this example?

13. Harold notices that his poodle continues to do her tricks even though he has ignored her the last several times she has performed. State whether Harold was previously continuously or intermittently reinforcing his poodle and give one reason you know this.

14. Roy has been responding very well to his proctor's ratio schedule of reinforcement for correctly identifying parts of the body in his tutoring sessions. What is the name of the phenomenon which may occur if the proctor suddenly doubles the number of correctly identified body parts necessary for reinforcement?

15. The shooting contest Frank plans to enter requires that many shots be fired by the participants. State whether Frank's coach would use a ratio or interval schedule of reinforcement in training and state one reason for your choice.
Social Security Number:______________

Finishing Time:______________

Part A: Combinations and Comparisons of Behavior Change Programs

The second sentence of each item identifies the required response. Mention the behavior(s) and consequence(s) in the situations for which you describe a contingency. As soon as you finish, bring your paper to the front of the room and write the time indicated by the observer in the space at the top of the paper labeled "Finishing Time". There is a maximum of 45 minutes allotted for Part A of the quiz.

1. After four weeks of using card games on an Activity Table as potential reinforcers for parent participation in the weekly parent group meetings, Connie says "Now that I think about it, I'm not so sure these card games are working; it's time to try some other activities." What could Connie have been doing during the four weeks to enable her to make a better decision about the effectiveness of the card games?

2. In arranging a Treasure Box reinforcement program for the children in her music class, Andrea puts some of the toy and trinket reinforcers in the closet to be used in several days. What important rule for using the treasure box is Andrea following?

3. Mr. Bustle has divided his swimming class into two groups in implementing a Good Behavior Game to decrease the students' pushing in line while waiting to use the diving board. How should Mr. Bustle determine which group(s) will earn reinforcers each day?

4. Kelvin and Alexis have been sabotaging their group's efforts to earn reinforcers in a Good Behavior Game. How can the teacher eliminate Kelvin and Alexis' disruption of their group and still keep the system intact?
5. Horace makes the unpopular job of cleaning out the stable stalls contingent on a relaxing ride on the family horse. From this information, what should Horace do to correctly implement Contingent Recreation?

6. Mr. Nesbitt is trying to choose between the Contingency Bank and the Slot Machine in maintaining his 4-H group's attention at afternoon meetings. State which technique he should try first and provide a reason for your response.

7. Mrs. Carlton has established a maximum criterion of six talkouts during reading instruction for the two groups which are part of the Good Behavior Game. If Group One talks out five times and Group Two talks out two times, which group(s) will earn reinforcers?

8. In reviewing Mr. Toller's plan for a token economy, the school psychologist says "I really like what you intend to do once the token economy has resulted in a sustained increase in the students' behaviors." What necessary part of Mr. Toller's plan does the school psychologist like so much?

9. Mrs. Kindling is using little chips as tokens in accordance with the new token economy but the students' behaviors haven't changed. Assuming the reinforcement schedule and delayed back-up reinforcers are appropriate, what can Mrs. Kindling do to make the chips more reinforcing?

10. At the end of the week, Eddie's father almost faints with surprise after seeing that Eddie's point sheet indicates he has earned 150 points in a token system geared to handle approximately 50 points a week. What should Eddie's father have been doing concerning token delivery during the week to prevent this problem?
11. Bruce is considering using the Grab Bag to reinforce his junior basketball team's completion of exercises during the conditioning portion of practice. In terms of the criteria for selecting the appropriate system, why might Bruce want to try Contingent Reinforcement first?

12. In designing a token economy, Mr. Jumper is trying to decide when to deliver tokens for his students' accurate spelling of words during the spelling bee. State the best time for Mr. Jumper to deliver the tokens.

13. Lisa is upset when she does not earn the reinforcer specified on her contract and says "But I thought I did exactly what the contract said to do!" What important component of Lisa's contract probably needs clarification?

14. Mr. Dewey wants to communicate with the parents of his fifth graders about a possible reinforcement program for homework completion. How could Mr. Dewey accomplish this task without individually talking to each family?

15. Miss Esting has included the behavior definitions, schedule of reinforcement, back-up reinforcers, and data collection procedures in her proposed token economy but feels like there is one piece missing. What else should Miss Esting include in the plan for her token economy?
Social Security Number:______________

Finishing Time:______________

Part A: Maintenance Measure

The second sentence of each item identifies the required response. Mention the behavior(s) and consequence(s) in the situations for which you describe a contingency. As soon as you finish, bring your paper to the front of the room and write the time indicated by the observer in the space at the top of the paper labeled "Finishing Time". There is a maximum of 45 minutes allotted for the maintenance quiz.

1. Mrs. Drew wants to measure both the speed and accuracy, i.e., efficiency, of her students' completion of their spelling assignments. What one data measure can Mrs. Drew use to examine these facets of student performance?

2. "As soon as the needle on the oil gauge beside the speedometer goes into the red range, stop the car and put some oil in the engine." What has the driving instructor done in this statement to increase the probability the relevant discriminative stimulus will occasion the responses of stopping the car and adding oil?

3. When Miss Bush sees her employees discussing their weekend travel plans instead of working on the overdue report, she becomes angry and impulsively says "You all just lost 5 minutes of your coffee break!" What rule for effective use of response cost has Miss Bush violated?

4. In developing a Good Behavior Game for her Brownie Scouts, Mrs. Willis is trying to make sure each of the groups has an opportunity to earn reinforcers. How can Mrs. Willis arrange the Game so that each group of Brownies has the opportunity to earn reinforcers?
5. After every third successful completion of the cycle of swimming around the obstacles in the pool, Ty's dolphins are fed a piece of fish. State the reason this is an example of intermittent reinforcement of successfully maneuvering a cycle of the obstacle course.

6. In teaching Gary how to be on time for scheduled meetings and events, Miss Porter first reinforces promptness in school, then several days later has Gary's work study employer begin reinforcing promptness, and finally in a week has Gary's parents begin delivering reinforcers for being on time for leaving for school. Assuming data on promptness in each setting has been collected since the beginning of the program, what is the primary reason Miss Porter has correctly implemented a multiple baseline design?

7. Roger begins to analyze the task of starting the mower as the first step in a chaining procedure for teaching his son how to mow the lawn. What did Roger forget to do?

8. After striking a small well, a wildcat oil driller stays in the same general location in Oklahoma and for two weeks continues to search for oil. Specifying any pertinent behavior(s) and consequence(s), state the primary reason striking oil can be considered a reinforcer.

9. During dinner, Mrs. Winters said "Say Please", her daughter immediately complied by saying "please" when asking for some vegetables, and Mrs. Winters mistakenly passed the dish of vegetables her daughter dislikes. In terms of stimulus control, state why Mrs. Winters' verbal prompt may be less effective in the future.

10. Gigi is paying her nephew a penny per weed for cleaning out her garden. State whether weed-pulling is likely to be a high or low rate behavior and give one reason for your choice.
11. Ginger is yelling at her brother to get off the telephone. Describe the consequence that would negatively reinforce Ginger's brother's behavior of handing her the telephone.

12. In using interval recording to measure a violin student's behavior of looking at the sheet music, two observers have 10 intervals where they both marked the behavior as occurring, 4 intervals where they both marked the behavior as not occurring, and 2 intervals where one observer indicated the behavior did occur and the other indicated it did not occur. Calculate the two observers' agreement on the occurrence of the violinist looking at the sheet music.

13. Interns on Dr. Banning's rotation are required to wear an ugly medallion for a misdiagnosis but do receive congratulations from the chief resident for correct identification of symptoms. What two principles have been combined to simultaneously reduce the interns' inappropriate diagnoses and increase appropriate ones?

14. After examining the data in the first and second baselines, Nellie knows the verification portion of her study has been a success. Describe how the configurations of the two baselines compare if Nellie's conclusion is true.

15. Stella is teaching the children in the foster home how to make their beds by linking consecutive steps, some of which include straightening the sheets on the bed, placing the pillow on the bed, and pulling the cover over the bed and the pillow. What function does pulling the cover over the bed and pillow serve in strengthening the behavior of putting the pillow on the bed?
APPENDIX F

Answer Keys for Dependent Variable Measures
Scoring Criteria for Part A: Reinforcement and Extinction:

1. When Jerome does not comply with his roommate Bob’s polite request to clean up his clothes from the living room, Bob says to himself “I guess being polite isn’t a very good reinforcer.” State what is wrong with Bob’s statement about his request.

   a. Reinforcement requires the presence of a consequence.
   b. the request is not a reinforcer; it came before the behavior and is not a consequence
   c. Bob’s request came before the behavior.
   d. Bob’s politeness came in his request before the behavior.
   e. the request was not used as a reinforcer
   f. there is no behavior on which the request is contingent as a consequence

2. It is a blustery midwinter day and Sal caulks one of his windows which has a crack in the seal letting in a cold draft. In terms of negative reinforcement, identify the behavior and the contingent consequence in the situation which results in the behavior’s maintenance or increase.

   a. Negative reinforcement entails the removal of an aversive stimulus contingent upon a behavior which results in an increase in the likelihood of the future occurrence of the behavior.
   b. the behavior was caulking the windows and the consequence was removal of the aversive stimulus of cold air
   c. behavior: caulking the windows, removed stimulus: cold air.
   d. caulking the windows was reinforced by removal of the cold air
   e. Negative reinforcement is the removal of an aversive consequence which in an increase in the future likelihood of the behavior. Removal of the cold draft will reinforce caulking behavior.

3. Donald used to blush and look flustered when Esther blew kisses at him but now he doesn’t pay attention and just keeps on with the task at hand. What other piece of information is necessary to determine if extinction of Esther’s behavior has occurred?

   a. Extinction results in a decrease in the level of a behavior.
   b. whether the behavior increased or maintained
   c. whether Esther kept on blowing kisses
   d. what happened to the level of the behavior

4. Paula, a volunteer swim coach, used to do what the head coach said just to get him off her back but has recently started skipping practice sessions. Explain Paula’s absences in terms of negative reinforcement, mentioning a behavior and a consequence.

   a. The use of negative reinforcement can result in avoidance behavior.
   b. skipping practice is reinforced by the removal of the coach’s criticisms
   c. the coach’s criticisms are aversive and Paula skips practice to avoid them
d. Paula's compliance was reinforced by the removal of the coach's criticisms but now she skips practice to avoid them.

5. Mrs. Wilkens tells her daughter after school one day that her bed looked very nice that morning, but the next day the bed is a mess. What is one thing Mrs. Wilkens can do to improve the probability the same comments will have an effect on Amy's bed-making behavior?

a. Reinforcing consequences delivered immediately following a behavior have a higher probability of resulting in an increase in the future likelihood of a behavior than consequences that are delayed.
b. give them right after Amy makes her bed
c. tell Amy how nice her bed looks before she goes to school
d. make the potential reinforcer more immediate, give compliments right after Amy makes her bed
e. accept pairing the comment with any other previously established reinforcer to strengthen it

6. An observer in Miss Lott's room notices two things: the children are always quiet and Miss Lott frequently mentions how much easier and pleasant it is to study in a quiet room. In addition to being a consequence, state one reason Miss Lott's comments could be considered reinforcers.

a. By definition, reinforcement involves an increase in the likelihood of future occurrences of a behavior.
b. They result in the increase or maintenance of the quiet behavior.
c. The children are quiet.
d. Miss Lott's classroom is quiet when she talks about the ease of studying in a quiet classroom.

7. Colleen gets a disgusting look every time she tugs at her mother's dress in the store, but it doesn't seem to make any difference; in fact, the behavior seems to be getting worse. If Colleen's mother wanted to employ an extinction procedure, what could she do when Colleen tugged at her dress?

a. Extinction is the withholding of reinforcers from a previously reinforced behavior.
b. ignore her
c. stop giving Colleen disgusting looks
d. don't pay attention to Colleen when she tugs on her dress

8. Nan presents two reinforcers after her students complete their oral reports from which they can choose one. Name the reinforcer selection system Nan has used.

a. Reinforcer selection techniques include reinforcer sampling, forced choice, data collection of reinforcer selection, and surveying preferences.
b. forced choice
c. forced selection
9. Jane says to herself "Well, I guess that reinforcer didn't work" after she puts a nice message on her answering machine but Roger eventually stops calling her. What is wrong with Jane's statement about the nice message?

   a. By definition, reinforcement involves an increase in the likelihood of the future occurrence of a behavior.
   b. It's not a reinforcer, the level of Roger's calling behavior decreased.
   c. The message isn't a reinforcer, the behavior didn't maintain or increase.
   d. The message wasn't enough for Roger to keep calling.
   e. Message was not reinforcing for Roger.

10. Oscar has been giving Pamela a smile when she hits the correct note in singing class but she hasn't been earning many smiles. What is the next level of reinforcer Oscar should try in attempting to improve Pamela's singing behavior?

   a. The ultimate goal of an appropriate reinforcement program is to use the least intrusive reinforcer possible.
   b. Activity reinforcers.

11. Mr. Linwood is disappointed when Minnie's bothersome talking becomes even more intense the day after his ignoring of those behaviors seemed to result in a decrease of the talking behavior. State the name of the phenomena which is occurring.

   a. Spontaneous recovery occurs when the level of the behavior under extinction briefly increases after an initial decrease.
   b. Spontaneous recovery.
   c. Spontaneous recurrence.

12. Tammy never finishes her homework even though Tammy's mother brings her favorite cookies when she goes to her room to do homework without being reminded. Identifying behavior(s) and consequence(s), describe a more appropriate contingency for Tammy's homework session.

   a. A reinforcing consequence must be contingent upon a behavior to be effective in maintaining or increasing the behavior.
   b. Bring Tammy cookies when she completes her homework.
   c. Make the behavior finishing homework instead of going up stairs and give Tammy cookies when she finishes her homework.
   e. Bring Tammy ________ (any reinforcer) for finishing her homework.
13. As some of their classmates snicker, Dave won't stop teasing Judy about her haircuts even though she ignores him. Specifying behavior(s) and consequence(s), explain why Judy's attempt at extinction will probably fail.

a. Effective use of extinction requires identification of all sources of reinforcement.

b. All sources of reinforcement haven't been identified— the snickers of the classmates are potential reinforcers for David's teasing.

c. Judy's attention isn't the most powerful reinforcer present; the snickers serve to maintain David's teasing.

d. The classmates snickering behavior will reinforce David's teasing.

14. Chuck has been using playing baseball to reinforce his brother's attending to his farm chores but starts to give him points to earn a weekly baseball game instead. Name the class of reinforcers to which Chuck switched.

a. Types of reinforcers include social, activity, exchangeable, tangible, and edible.

b. exchangeable reinforcers

c. token system

15. The behavior Iris's father, who knows she loves the "chocolate" dinner plate, wants to increase is the number of times she comes home when the dinner bell rings. Explain how these two facts can be arranged contingently to grant Iris's father's wish.

a. A reinforcing consequence must be contingent upon a behavior to be effective in maintaining or increasing the behavior.

b. Let Iris use the chocolate plate on days she comes home when the dinner bell rings.

c. If Iris comes home when the dinner bell rings, let her use the chocolate dinner plate.


e. accept use of chocolate candy as a reinforcer for coming home when the dinner bell rings
Scoring Criteria for Part A: Measurement

1. Mr. Booker grades English papers having 14-16 questions by counting the number of correct responses and requiring 12 or more correct for an A. What is wrong with this frequency procedure as implemented by Mr. Booker?
   
a. Comparing frequencies across observations requires that the observation periods containing the same number of opportunities to respond.
   b. he should have the same number of problems
   c. there are different number of problems on the tests
   d. with 14/16 questions scores will be different

2. Mrs. Kiel calculates a percentage of the number of days during the month her students hang up their coats in the morning. What two pieces of information should Mrs. Kiel use to calculate a percentage?
   
a. Recording the percentage of occurrence of a behavior means dividing the number of correct responses by the number of possible responses available and multiplying by 100.
   b. one: number of days in the month, two: number of days students hang up their coats.
   c. 20 days in a month and the number of mornings the students hang up their coats.
   d. number of occurrences, number of opportunities for occurrence
   e. number of days students hang up coats and number of days hang up coats plus number of days don't hang up coats

3. John takes 10 minutes to complete an assignment for which he gets 5 questions correct and 2 incorrect. Write the two appropriate rates for the student's performance.
   
a. Recording the rate of a behavior means dividing the number of occurrences by a certain time period.
   b. .50 problems per minute correct and .20 problems per minute incorrect
   c. accept formula (5/10, 2/10), don’t grade on computation unless response only includes the rate without the formula

4. Mrs. Madison records the answers to 40 single-digit math problems completed in a 30 minute time period by counting the number of correct responses. What recording method is being used?
   
a. Recording the frequency of behavior requires counting its occurrence.
   b. frequency, event, or tally recording

5. The time for Ms. Davis's spelling class is always being altered by music, physical education, or a school assembly. Why would frequency recording not be the appropriate recording method for spelling performance?
   
a. Comparing frequencies across observations requires that the observation periods be of the same length.
   b. spelling class is always a different length of time
   c. spelling class is always being cut short
6. Mr. Goode explains to Miss Seilly that all you have to do to calculate rate is count the number of times a behavior occurs and divide by the total number of opportunities. State the correction that needs to be made in Mr. Goode's formula.

a. Recording the rate of a behavior means dividing the number of occurrences by a certain time period.
b. the denominator needs to be a time period
c. the number you divide by has to be time
d. don't divide by number of problems, you divide by time
e. provide formula

7. One observer at the Colby Manufacturing Corporation counts six accidents during an eight hour shift; another observer counts eight mishaps. What is the interobserver agreement between the two observers?

a. Interobserver agreement is usually expressed as a percentage agreement between observers and is calculated by dividing the total number of agreements and disagreements for the occurrence of a behavior into the number of agreements and multiplying by 100.
b. .75, 6 over 8, 6/8.

8. Jonathon and Leslie's scores of 80% and 60% respectively on a set of five math problems make Mrs. Cromwell think that Jonathon's skills are well above those of Leslie. What has Mrs. Cromwell forgotten to consider about the calculation of percentages?

a. Recording the percentage of occurrence of behavior can be misleading if the total number of opportunities is less than 20.
b. denominator should be 20 or over
c. scores are misleading if the total number of opportunities is less than 20
d. five problems is too small

9. Della is measuring her son's behavior during quiet time by looking up whenever she remembers and recording whether her son is making any sounds. How could the timing of the observations in this approximation of momentary time sampling be improved?

a. Momentary time sampling indicates whether a behavior occurs immediately after a specified time interval.
b. more systematic than looking up when she thinks of it.
c. base them on a pre-established time interval.
d. use same time interval
e. use timer to remind her to look up
f. state specific time interval
10. Mr. Ungle wants a record of his family's interruptions of each other during dinner. How would Mr. Ungle use event recording to collect the data?
   a. Event recording is counting the number of occurrences of a behavior as it occurs.
   b. Count the number of interruptions.

11. Faith's teacher is excited because her efficiency on written spelling assignments has recently increased. What type of measure is Faith's teacher probably looking at?
   a. Rate is a measure of the proficiency, i.e., efficiency, of performance.
   b. Rate

12. Tom and Mona decide to use duration recording to determine the degree to which a small group of people dominate the meetings of their ecology club. Write a description of how Tom and Mona will be recording the occurrence of talking behavior.
   a. Duration recording is measuring the amount of time which a defined event takes to occur.
   b. Define the behavior, use stopwatch to measure how long behavior takes.
   c. Measure how long each person who is long-winded is talking and write it down.

13. Nick and another staff member are recording the occurrence of a behavior defined as children fighting among themselves. Why should Nick not be surprised if he and the other observer don't agree very often?
   a. Interobserver agreement is based on the recording of occurrences of observable behavior.
   b. The behavior is poorly defined.
   c. The behavior is unclear.
   d. The observers won't know the specifics of the behavior, the definition is too general.
   e. Identity of children and time not specified
14. To observe Mason's complaining behavior by interval recording, Mr. Decker divides the reading group time into 30 second intervals and marks whether or not the behavior occurs at the end of each time block. State what is wrong with Mr. Decker's interval recording procedure.

a. Partial-interval recording is indicating whether a behavior occurs at any time during a specified time interval.
b. Now looking at the end of the interval
c. Should be watching the whole interval instead of at the end
d. Time sampling recording being used, he should be watching the whole interval.

15. Hal's interobserver agreement calculations for 50 agreements and 10 disagreements consist of dividing intervals for which he agrees with the other observer by the number of intervals for which they do not agree. Calculate the agreement coefficient, whether by Hal's procedure or your own if Hal's formula is incorrect.

a. Interobserver agreement is usually expressed as a percentage agreement between observers and is calculated by dividing the total number of agreements and disagreements for the occurrence of a behavior into the number of agreements and multiplying by 100.
b. 83%, 50/60, 50 divided by 60.
Scoring Criteria for Part A: Graphic Presentations and Analytic Teaching

1. Tony records the daily number of times his calculus professor says "uhh" during a two hour class. What data measure should be placed on the abscissa?
   a. The abscissa of a graph contains the time or number of sessions for the measurements.
   b. days
   c. numbers representing days
   d. time in terms of days
   e. daily marks
   f. classes or class sessions
   g. the two hour time block
   h. hours not acceptable

2. During the first three phases of a study, Mrs. Dalby records the level of lining up behavior without any positive comments, the level of the behavior when positive comments are made, and the level when stars are placed beside the names of those students who line up quickly. Why isn’t this an example of an ABA reversal design?
   a. The reversal design consists of baseline, intervention, baseline, the same intervention, and continuing with the same sequence.
   b. the third phase is not a return to baseline
   c. the third phase is a new condition
   d. there is no return to baseline
   e. the third phase is not another A
   f. didn’t go back to beginning
   g. don’t give out stars during baseline

3. In a study of using praise as a potential reinforcer, Mrs. Topal records Roger’s rate of correct math behavior when she does not compliment him on his math behavior. What condition of a study does this procedure illustrate?
   a. Baseline is the condition during which the behavior is measured without the presence of the intervention.
   b. baseline
   c. no intervention condition
   d. go back to no compliments

4. Frank calculates the mean number of hot dogs eaten for the week by adding together the number eaten each day and dividing by 6. State the correction that needs to be made in Frank’s calculation of the mean.
   a. The mean is calculated by dividing the sum of the values by the number of measurements.
   b. divide by 5 or 7
   c. divide by the number of days in the week
   d. divide by five days
e. divide by number of measurements- accept number of measurements in terms of weeks, as in adding number eaten in a month and divide by four
f. provide formula

5. Billy constructs a graph to show the length of time each morning his brother occupies the bathroom. State the data measure that should be placed on the ordinate.

a. The ordinate of a graph contains the values for the behavior being measured.
b. time
c. number of minutes
d. time his brother is in the bathroom
e. scale of minutes
f. duration

6. Ms. Roberts' data from one baseline and intervention indicate that Sally's pencil tapping behavior decreases by 40 percent during intervention in comparison to the baseline. Write one of the three things Ms. Roberts can conclude about the change in the behavior.

a. The AB design can be used to determine if a change in behavior has occurred, the direction of the change, and the magnitude of the change.
b. the behavior (pencil tapping) decreased
c. the behavior decreased by 40 percent
d. the behavior changed
e. magnitude of the change
f. direction of the change

7. Willy wants to study homework completion using a reversal design with an intervention of access to television programs. Briefly describe the phases of a four-part reversal design.

a. The reversal design consists of baseline, intervention, baseline, the same intervention, baseline, the same intervention, and so on.
b. minimum correct response is: Baseline- describe intervention- Baseline- Intervention, describe at least one intervention
c. noncontingent reinforcement acceptable- watch TV as usual during baseline and contingent upon homework completion for intervention

8. Gene's parents want to examine the effect of their comments on Gene's eating habits at home, at Grandma's, and in a restaurant. Identify the most appropriate design for this purpose.

a. A multiple baseline design across subjects, settings, or behaviors consists of sequential presentation of the intervention in each tier after baseline.
b. multiple baseline- must include words "multiple" and "baseline"
9. Using a reversal design, Vicki has measured the level of her roommate's swimming during baseline and intervention and then stopped the study. What needs to be done for the verification portion of the study?

a. The verification phase is the repetition of the baseline condition to be compared to the original baseline to determine if the data returns to that level.
b. do the baseline and intervention again
c. repeat baseline 1
d. add a baseline and intervention
e. go back to baseline
f. repeat the non-treatment condition

10. After baseline, the intervention of activity time for correct language performance is introduced at the same time in the resource room, regular classroom, and speech room. From the above description, what correction is necessary to make this a true multiple baseline design?

a. A multiple baseline design across subjects, settings, or behaviors consists of sequential presentation of the intervention in each tier after baseline.
b. introduce the treatments sequentially
c. don't introduce the treatments at the same time
d. wait a few days between introducing the intervention in each setting
e. activity introduced at different times
f. only change after met criterion for previous setting

Using the data described below, draw a graph containing the following elements:

11. appropriately labeled phases- descriptions of intervention, "baseline" label is acceptable- number subscripts not required-do not accept interventions described under graph
12. appropriately drawn phase lines- between data points and the from the top to the bottom- OK if data points touching phase lines
13. appropriately labeled axes- time on abscissa and dependent variable on ordissa- any mention of in-seat behavior- not acceptable to mention out of seat behavior
14. appropriately connected data points- not connected across phases
15. appropriately graphed design- no treatment, treatment, no treatment, treatment, etc.
Scoring Criteria for Part A: Stimulus Control

1. "He doesn't know what a yield sign is", Mr. Kibble said after his son sped right through one during his driving lesson. Identify the Sd(s) and behavior(s) in stating whether Mr. Kibble's conclusion is accurate.

a. When a particular response does not occur in the presence of an Sd, the only inferences that can be made are that the Sd did not occasion the response and that other Sd's may occasion the response.
b. Conclusion not accurate, can only conclude the sign did not occasion yielding behavior
c. Conclusion not accurate, can only conclude Sd may prompt response in other situations
d. Behavior can be speeding through the sign because may have been attending to other stimuli
e. Must state whether conclusion accurate or inaccurate
f. Conclusion not accurate, can only conclude the sign may occasion other behavior
g. Accept conclusion may or may not be accurate
h. Must state behavior (speeding through sign) and Sd (yield sign)

2. When Donna writes the number 7 after her teacher says "5", her teacher pats her on the back and smiles. What should happen to establish the number 5 as an S-delta for writing the number 7?

a. A S-Delta is an antecedent stimulus in whose presence a response is not likely to be reinforced
b. Teacher ignore Donna's writing 7
c. Don't reinforce behavior
d. Mention no reinforcement for writing number 7
e. Can't say don't reinforce writing 5 because is Sd for that behavior

3. George says "Remember, you only have ten minutes" after his brother starts playing video games on the television. State what George needs to do to make the comment an antecedent stimulus for his brother's behavior of playing video games.

a. An antecedent stimulus is a stimulus which occurs before a particular response, or behavior.
b. Say it before behavior
c. Comment precedes behavior
d. Do not accept reinforcing brother for stopping after ten minutes

4. Whenever Mrs. Stickley's students quiet down for nap time after she turns off the lights, she quietly says, "It's so nice and quiet in here". State the antecedent stimulus, behavior(s), and reinforcer(s) present in the establishment of stimulus control in this situation.

a. Stimulus control is established by the reinforcement of a response in the presence of an antecedent stimulus.
b. Turn out lights, students quiet down, positive comment - need all three
5. Every time Rusty tells his turtle to roll over, he does it. Stating pertinent antecedent(s) and behavior(s), indicate whether or not the turtle's behavior is under stimulus control and the reason you know this.

   a. Stimulus control is present when there is a high probability that a response will occur in the presence of a particular antecedent stimulus.
   b. turtle responding to sound of Rusty's voice
   c. turtle responds every time Rusty's command is given

6. When office workers exit the building quietly and quickly after the fire alarm goes off, they get to take a ten minute break when they re-enter the building. State why the fire alarm can be considered a discriminative stimulus for the behavior of exiting the building quietly.

   a. A discriminative stimulus (Sd) is an antecedent stimulus in whose presence a response is likely to be reinforced.
   b. behavior reinforced by break in presence of fire alarm
   c. Sd is alarm and exiting quietly reinforced by break
   d. mention reinforcement

7. The last time her husband was late, Mrs. Quark kept giving him a stern look while Mr. Quark kept right on dawdling. What would have been a more relevant Sd to prompt Mr. Quark to finish dressing?

   a. Effective stimulus control requires clear identification of relevant stimulus characteristics.
   b. reference to time
   c. comment to hurry up- verbal prompt
   d. promise of desired reinforcer
   e. show him- hand him his clothes
   f. lay his clothes out
   g. setting alarm clock or establishing consistent departure time

8. For her beginning piano students, Mrs. Swift puts the letter names on the keyboard. Briefly explain how fading might be used as the behavior becomes established, being sure to mention the current prompt and the least intrusive prompt to which the students should be attending.

   a. Effective fading requires gradually transferring control to the least intrusive prompts.
   b. gradually remove the letter names to the least intrusive prompt of the keys and their location
   c. gradually fade the letter names so the students are responding to the keys
   d. relative position of keys
   e. arrangement of keys
   f. must provide least intrusive prompt- which is not notes on music sheet, instructor verbal prompt
   g. the keyboard
9. In teaching the tennis serve, Max grasps his pupil's arm and moves it into position while John touches his student's arm and releases contact when they have reached the correct position. Assuming both students are familiar with the tennis serve, which instructor is using physical guidance correctly and why?

a. Effective physical guidance requires using the minimal amount of guidance necessary for prompting the behavior.
b. John, students know serve and don't need as much guidance
c. John, Max using too much guidance and physical contact
d. John using least intrusive prompt—allow student to feel on his own

10. Sam says "Time to go!" when he and his wife need to leave for the theatre. If his wife stays in her room, what can Sam conclude about the effectiveness of the request and its influence on his wife's behavior of coming downstairs to leave?

a. When a particular response does not occur in the presence of an Sd, the only inferences that can be made are that the Sd did not occasion the response and that other Sd's may occasion the response.
b. Does not occasion behavior of leaving
c. Other Sd's may occasion leaving behavior
d. There is no stimulus control
e. Sd not effective—had no effect on behavior
f. Request doesn't have much influence
g. Do not accept responses with words "cause", "because", or "elicit"

11. Mr. Donwell used to go through each part of the long division procedure before his students started their assignments but one day says "I want you to try the problems without any help this time". From the above information, what is the reason fading hasn't been implemented?

a. Effective physical guidance requires using the minimal amount of guidance necessary for prompting the behavior.
b. Too big a jump to doing problems with no example
c. Not gradual reduction of sample
d. Procedure too abrupt

12. Dr. Brooks wants to record a videotape of a teacher demonstrating effective teaching skills and is thinking about Mrs. Rosen, a very popular faculty member. From the above information, why would this potentially result in effective modeling?

a. The effectiveness of modeling is increased if the subject has had previous success experiences with the model.
b. She is prestigious model
c. She is well-respected and popular
d. She is effective teacher is not acceptable—must be mention of prestige, popularity, or respect
13. Nick has his new mechanic read the auto repair manual before replacing the carburetor in a customer's car. What behavior(s) should be under stimulus control before the instructions will be effective?

a. Effective instruction require determining that the response is under stimulus control of the instructions.
b. read manual
c. know how to work on carburetor
d. know what manual is saying to be done
e. follow verbal instructions
f. understand concepts in manual
g. know how to replace carburetor

14. Mr. Lincoln wants to eliminate the use of colored letters in teaching letter recognition. What is the least intrusive stimulus to which the students should be attending?

a. Effective fading requires gradually transferring control to the least intrusive prompts.
b. letter shape
c. letter itself
d. mention shape or form of letter—non-colored or black and white letters not adequate
e. do not accept letters of same color or shape (not necessarily generalizable)

15. It's time for Dr. Loober to provide instructions to his young chemistry students in the finer points of using prefixes to name chemical compounds. What response(s) should already be in the students' repertoires before Dr. Loober starts giving instructions?

a. Effective instructions require determining that the desired response is in the subject's repertoire.
b. the names of the compounds
c. what the prefixes stand for—definitions
d. how to use prefixes
e. know rules for prefixes
Scoring Criteria for Part A: Shaping and Chaining

1. Millie's shaping procedure for increasing the rate of Opie's handwriting is based on changing the level of approximations every six days. What would be a more appropriate way to determine when to change the level of approximation?
   a. Progress in a shaping procedure should be based on data indicating the subject's successful performance on the approximations.
   b. Data on Opie's success
   c. Keep track of Opie's performance and change when masters approximations
   d. When Opie knows level of approximation
   e. Change when Opie is ready- not time
   f. When handwriting is where she can understand it

2. Dirty Delbert the mechanic is teaching his assistant to repair a tire. After breaking the task into a discrete set of steps, how would Dirty Delbert use chaining to teach how to change a tire?
   a. Chaining is the reinforcement of the combination of a set of simple behaviors to form a more complex behavior.
   b. Go through each step until successfully completed- then go on to next one
   c. Gradually link the behaviors together with reinforcement for establishing the behavior
   d. Reinforce correct combination of steps
   e. Response must mention reinforcement or progressive introduction of links

3. Although he can print the gross outlines of the letters of the alphabet, Benny has difficulty making legible letters. How could Benny's teacher use a tracing task in shaping the printing of the letter "B"?
   a. Shaping is the reinforcement of successive approximations to a terminal goal.
   b. Make the outline a big B and gradually make it smaller
   c. Provide a lot of space around the outline of a letter and gradually make the space smaller until the tracing is the letter shape
   d. Reinforce improvement in letters
   e. Provide complete model of letters and then fade out
   f. Mention of approximations
   g. Description of fading procedure acceptable
   h. Description of chaining- putting parts together- not acceptable
   i. Description of approximations

4. Jack has been systematically reinforcing approximations of Tim's golf swing to the correct stroke by moving on to the next step when success has been achieved. Why is it unlikely the level of the behavior will deteriorate?
   a. Deterioration of performance at an approximation level may be because the requirements have been set too high or because too much time has been spent at that approximation of the terminal behavior.
b. because waiting until behavior established to move on

c. not waiting too long after success to move on - time of approximation
not too long

d. not being held back

e. after success, moves on

f. systematic in reinforcement approximations

5. Mickey wants to institute a training program in his computer assembly
plant based on chaining and task analysis. What is the first thing Mickey
needs to do?

a. The first step in a shaping or chaining procedure is definition of the
terminal behavior.

b. define the terminal behavior

c. define what the workers should be doing upon completion of the program

d. classify a terminal behavior

e. decide what he wants people to learn

6. Todd has never looked his boss in the eye when they are talking. If his
boss wanted to shape an increase in that behavior, why would he probably
start out with small increments of improvement?

a. Definition of approximations should be based on the levels of behavior
necessary to facilitate progress toward the terminal behavior.

b. because Todd has never even come close to looking at his boss

c. Todd's current behavior is very different from desired behavior

d. because behavior never been in repertoire

e. so increments not too hard

f. successive approximations begin with small increments

g. small steps lead to confidence

h. decrease chance of frustration or backing off

i. don't accept definition

j. insure behavior won't decrease in future

7. Dean can walk and he can chew gum, but he can't do both at the same time.
In teaching Dean to walk and chew gum at the same time, why wouldn't it be
accurate to say the teacher is using shaping?

a. The approximations in a shaping procedure are not currently in the
subject's repertoire.

b. Dean can do the separate behaviors

c. the steps are in his repertoire

d. he can walk and chew gum

e. behaviors not in need of being taught

8. The reinforcers for the terminal behavior of the chain of students putting
books away, getting out the lunch bag, lining up quietly at the door, and
walking quietly to the cafeteria are the social interaction and the food
available at lunchtime. Name the link with which the teacher would start
and the resulting consequence in a backward chaining procedure.

a. Backward chaining is the beginning of the chaining sequence with the
final link which results in more immediate access to the reinforcer
for the terminal behavior.
b. walking quietly to the cafeteria - social interaction and food

9. Tony has planned a shaping procedure for his orthopedically handicapped daughter's walking behavior from the bedroom to the kitchen but isn't sure when to change to different distances. What should be the basis of his decision?

   a. Progress in a shaping procedure should be based on data indicating the subject's successful performance on the approximations.
   b. daughter's performance on the approximations
   c. after daughter has been successful
   d. observe daughter - see how progression goes
   e. when approximation completed go on to next one
   f. don't accept when successful in walking from bedroom to kitchen
   g. increase when criterion met

10. Greg defines the links in the chain of cleaning the dishes to be first washing the dishes and then drying them. What would be a more appropriate description of the links in the chain?

   a. One requirement for effective chaining is a precise analysis of the complete terminal behavior into its component links.
   b. more specific description of washing dish, rinsing it off, placing it in rack, drying dish
   c. identify at least several links in more specific chain, statement of need for more precise analysis not enough

11. In establishing chains of writing words, Mr. King discovers that Joni cannot write the letter "r" very well. Name the procedure Mr. King can use to improve this link in the chain to acceptable standards.

   a. Shaping can be used to develop the links in a chain which are not already part of the subject's repertoire.
   b. shaping
   c. successive approximations
   d. fading

12. Myrna has her ballet partner separately go through each step of the "pas de deux" before starting practice. What prerequisite to chaining is Myrna appropriately verifying?

   a. In a chaining procedure, the links are in the subject's repertoire.
   b. the links are in the repertoire
   c. the subject can do each of the steps
   d. being aware of the detail contained in each component
13. Gary is learning the chain of using word processing which includes the consecutive links of placing the disk in the disk drive, turning on the computer, closing the disk drive door, and taking the disk out of the disk drive when the program is loaded. Identify the links which act as the discriminative stimulus and the reinforcer for the link of turning on the computer.

a. In a chaining procedure, a link serves as an Sd for the next response and as a reinforcer for the behavior that precedes it.
b. placing the disk in the drive as Sd and closing the drive door as reinforcer
c. can include taking disk out of drive as reinforcer if also indicate closing of disk drive door

14. Mrs. Crocker wants to use chaining to teach her daughter to work the washing machine. What should Mrs. Crocker do to formulate the links in the chain?

a. One requirement for effective chaining is a precise analysis of the complete terminal behavior into its component links.
b. task analyze the tasks for working the washing machine
c. break down the directions for working the washing machine into its parts
d. break task into component parts
e. establish terminal goal and set small goals- acceptable to describe possible chain

15. After every fifth time Derden's children successfully complete the newly learned chain of feeding their fish, cleaning the filter, and putting the fish tank tools away, they get 50 cents toward desired aquarium supplies. Why isn't the chain likely to be established very quickly?

a. After the terminal behavior is emitted, it should be frequently reinforced.
b. not enough reinforcement
c. the terminal behavior isn't being reinforced enough
d. only concerned with every fifth step
e. reinforcement not immediate enough
f. reinforcement not often enough
g. reinforce more frequently
1. Lila has planned a response cost program to reduce the profanity of the children on her floor of the residential center. Assuming the children have an adequate supply of reinforcers, what should Lila do with the residents before implementing the program?
   a. Effective use of response cost requires communicating the "rules of the game", or the contingencies to be applied.
   b. talk to students about program
   c. tell the students the behaviors and reinforcers
   d. accept possible explanation including behaviors and consequences—description of behavior not adequate
   e. be sure students understand contingencies

2. Mrs. Foster is attempting to use Alt-R to change the amount of time Roger whistles in class by reinforcing him when he is reading a book. What is the primary reason this is not an Alt-R procedure?
   a. Alt-R is the reinforcement of a behavior which is not likely to occur at the same time as the behavior targeted for reduction.
   b. Roger can whistle while he reads the book
   c. Roger can easily do both behaviors at the same time
   d. she needs to reinforce an alternative behavior
   e. they are not incompatible
   f. definition of Alt-R not adequate
   g. be sure behaviors are not compatible

3. Every time Mrs. Welman sees her students doing something which is contrary to established rules, she doesn't give them the chips which are part of her token economy. State whether or not response cost is in effect and give a reason for your answer.
   a. Response cost is the removal of a quantity of reinforcers contingent upon the targeted response.
   b. hasn't given them the chips that will be removed
   c. she is not removing chips the students already possess
   d. must state "no" or "yes" for presence of response cost
   e. chips taken away from reinforcer reserve
   f. teacher is not withdrawing tokens when students misbehave
   g. better to take away tokens
   h. withdrawal of reinforcers not adequate

4. After placing Stephan in isolation, his teacher sees him reading a picturebook and immediately removes the book from his possession. In terms of timeout, what is the reason for the teacher's action?
   a. Timeout is the removal of all opportunity to acquire additional reinforcers.
   b. remove a reinforcer
   c. make sure Stephan doesn't have access to reinforcers
   d. should not be participating in anything
   e. removal of all reinforcers
5. Mrs. Lawless wants to implement a DRO procedure for decreasing the amount of time her daughter whispers loudly during church. After dividing church time into even intervals, what behaviors should Mrs. Lawless reinforce?

- a. Differential Reinforcement of Other Behaviors (DRO) is the reinforcement of any behavior besides the behavior targeted for reduction.
- b. any behavior besides whispering loudly
- c. sitting quietly, moving around, reading the hymnal, drawing pictures, or any behavior besides whispering loudly—must say all other or any other behavior
- d. time she is not whispering
- e. reinforce quiet behavior not acceptable

6. Shawn is attempting to decrease her cat's scratching behavior by yelling at the cat whenever she claws at the furniture. Why is this not a positive reductive technique?

- a. Alt-R, DRO, and DRL are positive reductive techniques because they do not involve the introduction of aversive stimuli.
- b. yelling is an aversive stimulus
- c. yelling is usually not pleasant
- d. she is punishing the cat
- e. not using reinforcement
- f. positive reductive allows for reinforcement
- g. aversive stimulus being introduced

7. To reduce but not eliminate her boyfriend's rate of speaking, Martha reinforces him when he does not talk and ignores him when he does talk. Why is this not a DRL procedure?

- a. Differential Reinforcement of Low Rates (DRL) is the reinforcement of a lower rate of the targeted behavior.
- b. doesn't reinforce talking at all
- c. needs to reinforce talking at a lower rate
- d. any mention of DRO unacceptable

8. Before he and his students get on the bus for a field trip, Mr. Hocking says that any student who is caught smoking during the trip will receive an official reprimand from the principal. What is the primary reason Mr. Hocking's statement isn't a punisher?

- a. Punishment requires the presence of a stimulus.
- b. it is an antecedent stimulus
- c. the announcement comes before the specified behavior
- d. there is no consequence
- e. punishment is contingent on the behavior
- f. target response hasn't been emitted
- g. might be Sa-, but not punisher itself
- h. do not accept that statement is a warning
- i. does not follow behavior
9. Denise is sent to talk to her favorite guidance counselor when she misbehaves during an enjoyable assembly. Why is the teacher’s impression that she used timeout from the assembly probably a mistaken one?

a. Timeout is the removal of all opportunity to acquire additional reinforcers.
b. Denise being sent to reinforcing situation
c. She enjoys talking to the counselor
d. Because the timeout favorable to Denise
e. Don’t send to someone she likes
f. Timeout in presence of something non-reinforcing

10. Although punishment has resulted in a decrease in the number of times Hugh chews gum in class, he now clicks his heels together. What principle could have been used in conjunction with the punishment to avoid the replacement of one undesirable behavior with another?

a. Punishment should only be used in conjunction with a behavior development procedure designed to increase the occurrence of an appropriate behavior.
b. Reinforcement of an appropriate behavior
c. Reinforcement
d. Alt-R
e. Do not accept DRO
f. No reductive except Alt-R others have potential for side effects

11. Gordon screams every time his friends show him a snake to punish them for scaring him. What information is necessary before presentation of screaming can be considered punishment?

a. By definition, punishment involves a decrease in the likelihood of the future occurrence of a behavior.
b. If his friends’ behavior decreased
c. If his friends quit showing him the snake
d. If screaming stops others from scaring him

12. During an overcorrection procedure, Lonnie has just finished sanding and cleaning the desk on which he carved his initials. What should Lonnie be required to do next to implement overcorrection?

a. Implementation of overcorrection has two stages—restitution and positive practice.
b. Clean the other desks
c. Implement the positive practice stage
d. Paint the desk
e. Positive practice
f. Practice things should be doing at desk
g. Draw on paper
h. Do legitimate carving—practice appropriate use of carving instrument
13. George used to be kept in isolation for hours whenever he broke the rules during his favorite exercise time in prison. Why will short timeout periods in the halfway house in which he has been placed likely be ineffective?

a. Use of timeout for short periods is sometimes effective— the duration should be as short as possible based on the previous history of the subject.

b. has been in timeout for longer periods before

c. previous timeout has been longer

14. Mrs. Courtney's son keeps going through her purse even though he is punished with spankings. Being sure to describe any pertinent behavior(s) and consequence(s), why isn't punishment occurring in this situation?

a. By definition, punishment involves a decrease in the likelihood of the future occurrence of a behavior.

b. he keeps going through her purse even though he is spanked

c. spanking doesn't result in a decrease of going through her purse

d. must mention behavior and consequence somewhere in response

e. spanking having no aversive effect on behavior

15. Rod hates to eat asparagus for dinner and always makes a fuss when it is served; behavior which gets him sent to sit in the living room for a few minutes without any toys or books. What is the primary reason this procedure is not timeout?

a. Effective use of timeout requires insuring that the subject is being removed from a reinforcing situation.

b. he hates asparagus

c. timeout allows him not to eat asparagus

d. being reinforced not having to eat asparagus

e. getting out of eating asparagus

f. eating asparagus aversive
g. do not accept the sole response of he likes sitting in living room better than eating asparagus— but accept in conjunction with doesn't have to eat asparagus

h. escaping aversive situation
Scoring Criteria for Part A: Maintaining Behavior

1. Ellen is receiving reinforcers for the first button she glues on a doll after fifteen minute time blocks during her shift at the toy factory. State whether Ellen is more likely to be working at a high or low rate of gluing buttons and provide a reason for your response.

   a. Interval schedules of reinforcement usually result in low rates of responding.
   b. low rate- interval reinforcement schedule
   c. low- FI 15 minute schedule
   d. low- not being reinforced much
   e. low- knows reinforcement not delivered till after 15 minutes
   f. low- only has to glue one button every 15 minutes for reinforcement
   g. low- time determines reinforcement, not amount of dolls

2. Yuri's mother is so pleased when her son cleans up his room that she gives him a hug and a kiss every time he completes the task. What would Yuri's mother have to do to make this an example of intermittent reinforcement?

   a. Intermittent reinforcement is the reinforcement of some, but not all, occurrences of a behavior.
   b. don't give him a hug and a kiss after every time he cleans his room
   c. go to intermittent schedule of reinforcement
   d. increase number of times to get reinforcement
   e. fade consecutive reinforcement
   f. acceptable to give example- as in reinforce every other time

3. Mrs. Williams is trying to teach her students to remain just as quiet in Sunday School class as they do in the sanctuary by talking to them about how both activities take place on Sunday in church. What rule of effective generalization training is illustrated by this situation?

   a. Effective generalization training requires emphasizing common elements across stimulus situations.
   b. emphasizing common elements- or just common elements
   c. indicating similarities across situations
   d. make sure Sd's in both situations
   e. verbal reminders of different environments that behavior should take place
   f. comparing two places where wants quiet behavior

4. In establishing a two minute fixed-interval schedule of reinforcement, Mr. Tolliver reinforces the target behavior whenever it occurs during each two minute interval. State the correction that needs to be made in Mr. Tolliver's procedure to make it an example of interval reinforcement.

   a. An interval schedule of reinforcement is defined as the delivery of reinforcement contingent upon the first occurrence of a behavior following the passage of a pre-determined amount of time (fixed interval) or a variable amount of time based on a pre-determined average (variable interval).
   b. reinforce first occurrence after interval
In language training for the diplomatic corps, the ambassador's staff complete their training in Washington and then are sent overseas to begin their duties. What could be done during the first few months of the staff members' work at the foreign embassy to make the program a more appropriate example of generalization training?

- Effective generalization training requires training the behavior under a variety of stimulus conditions.
- Continue training.
- Work on their foreign language in a way similar to training.
- Try language in variety of settings.
- Make new situation similar to Washington or previous training.
- Sent to different offices to practice.
- Take trainer overseas from Washington for a while.

6. Zelda has been getting a gold star whenever she gets 90% or better on her math paper. What could Zelda's teacher do to make sure Zelda's performance will remain high under extinction?

- Intermittent reinforcement maintains behaviors under extinction more effectively than a continuous schedule of reinforcement.
- Don't reinforce Zelda every time she meets criterion, reinforce intermittently.
- Deliver reinforcement on intermittent schedule.
- Reinforce on longer intervals.
- Gradually reduce reinforcement.
- Gradually increase ratio requirement.
- Do not accept raising criteria as sole response.
- Accept example of gradual increase.
- Go to variable ratio.

7. In progressing from reinforcing his students whenever they make a correct bridge play to reinforcing every fifth play, Mr. Ridd first reinforces every other correct play, then every third correct play, and finally every fifth correct play. From the above information, state one reason this is an appropriate example of implementing intermittent reinforcement.

- The progress from frequent reinforcement to more intermittent reinforcement should be gradual.
- The progression is slow.
- Doesn't jump to a higher level too fast.
- Extinction happening gradually.
- Mention gradual or systematic.
- Do not accept because reinforcement not delivered for every occurrence as sole response.
8. Calvin's training as a salesman for the region of Illinois, Indiana, and Michigan involves reading training manuals, coursework at the home office, and field experiences in each of the states. What rule of effective generalization training is being illustrated in this example?

a. Effective generalization training requires training the behavior under a variety of stimulus conditions.
b. training in each place he will be working
c. training in a variety of locations
d. do things in one state to another
e. similar experiences in different locations
f. switch environments- use same response
g. variety of situations
h. do not accept common elements as sole response

9. The deadline for submission of Dr. Small's research grant proposal is approaching. What would be happening to his grant writing behaviors if a fixed interval scallop began to develop?

a. A fixed interval scallop is an increase in the rate of the occurrence of a behavior as the interval is ending and the opportunity for reinforcement getting nearer.
b. will be getting faster
c. will be doing more writing than before
d. writing more quickly- will be responding to finish before time elapses
e. step up his writing

10. Sharon has been complimenting her husband each evening he takes his dishes to the kitchen which has resulted in an increase in the occurrence of his clearing his place at the table. If Sharon gets tired of complimenting her husband and stops delivering any reinforcers, state whether his behavior will decrease quickly or slowly and provide a reason.

a. Intermittent reinforcement maintains behaviors under extinction more effectively than a continuous schedule of reinforcement.
b. decrease quickly- was on continuous schedule
c. decrease quickly- was being reinforced every time
d. quickly- not being reinforced anymore
e. quickly- eliminate CRF gradually
f. quickly- under CRF extinction occurs quickly
g. too great a step to remove all reinforcers at once

11. Joshua is a writer and gets a bonus if he delivers magazine articles within two days after the preliminary deadline set by the publisher. Name the reinforcement procedure being used by the publisher.

a. A limited hold is a time period following the end of an interval during which reinforcement is available for the occurrence of the behavior.
b. limited hold(ing)
c. interval schedule- but not if fixed interval or variable interval
12. Tony is paid twenty dollars for every 5 bushels of apples he picks during harvesting. What schedule of reinforcement is used in this example?

   a. A ratio schedule of reinforcement is defined as the delivery of reinforcement contingent upon the first occurrence of a behavior following the occurrence of a pre-determined number of responses (fixed ratio) or a variable number of responses based on a pre-determined average (variable ratio).
   b. ratio schedule
   c. fixed ratio- FR 5 bushels

13. Harold notices that his poodle continues to do her tricks even though he has ignored her the last several times she has performed. State whether Harold was previously continuously or intermittently reinforcing his poodle and give one reason you know this.

   a. A variable ratio schedule of reinforcement with a high ratio requirement, or many responses required for reinforcement, results in behavior extremely resistant to extinction.
   b. intermittently- poodle's behavior maintains under extinction
   c. intermittent- tricks continue even though being ignored
   d. intermittent- if continuous would have stopped
   e. accept underlining of intermittently with explanation

14. Roy has been responding very well to his proctor's ratio schedule of reinforcement for correctly identifying parts of the body in his tutoring sessions. What is the name of the phenomenon which may occur if the proctor suddenly doubles the number of correctly identified body parts necessary for reinforcement?

   a. Ratio strain occurs when a behavior begins to deteriorate under a ratio schedule of reinforcement instead of becoming more resistant to extinction.
   b. ratio strain

15. The shooting contest Frank plans to enter requires that many shots be fired by the participants. State whether Frank's coach would use a ratio or interval schedule of reinforcement in training and state one reason for your choice.

   a. Ratio schedules of reinforcement usually result in high rates of the occurrence of a behavior.
   b. ratio for high rate of behavior
   c. ratio schedule to develop high rate of shooting
   d. ratio- highest success rate
   e. ratio- number of responses more important than time
   f. ratio- word "many" key to numbers
   g. ratio- reinforce more often for firing more shots
Scoring Criteria: Combinations and Comparisons of Behavior Change Programs

1. After four weeks of using card games on an Activity Table as potential reinforcers for parent participation in the weekly parent group meetings, Connie says "Now that I think about it, I'm not so sure these card games are working; it's time to try some other activities." What could Connie have been doing during the four weeks to enable her to make a better decision about the effectiveness of the card games?
   a. The selection of reinforcers for any group contingency package should be based on data indicating their effect on the level of the behavior.
   b. collecting data on the level of the behavior
   c. collecting data for reinforcer effectiveness on levels of behavior
   d. keeping track of behavior data
   e. keeping a record of amount of change
   f. keeping a record of outcomes of meetings
   g. charting a graph is not acceptable

2. In arranging a Treasure Box reinforcement program for the children in her music class, Andrea puts some of the toy and trinket reinforcers in the closet to be used in several days. What important rule for using the treasure box is Andrea following?
   a. The effectiveness of the treasure box is primarily due to the novelty of a variety of reinforcers.
   b. not putting all the reinforcers out at once- save some for later for novelty
   c. saving them to introduce as new reinforcers
   d. keep activities new and interesting
   e. keep reinforcers a surprise for children
   f. keep children from getting bored and satiated
   g. change items every few days
   h. keeping only a few reinforcers at a time not acceptable
   i. creating mystery as to reinforcer

3. Mr. Bustle has divided his swimming class into two groups in implementing a Good Behavior Game to decrease the students' pushing in line while waiting to use the diving board. How should Mr. Bustle determine which group(s) will earn reinforcers each day?
   a. Delivery of reinforcement in the Good Behavior Game is made to the group exhibiting the best performance of a specified behavior.
   b. whichever pushes less
   c. whichever groups push fewer times than criterion
   d. observe to see which group exhibits best behavior
   e. team with least number of points
   f. points for positive behavior
4. Kelvin and Alexis have been sabotaging their group's efforts to earn reinforcers in a Good Behavior Game. How can the teacher eliminate Kelvin and Alexis' disruption of their group and still keep the system intact?
   a. One adaptation to the Good Behavior Game is to form a separate group with individuals whose behaviors consistently deprive the team of the opportunity for reinforcement.
   b. Have them form their group

5. Horace makes the unpopular job of cleaning out the stable stalls contingent on a relaxing ride on the family horse. From this information, what should Horace do to correctly implement Contingent Recreation?
   a. Contingent recreation is making high frequency activities (games, etc.) contingent upon low frequency activities (schoolwork, completion of chores, etc.).
   b. reverse the situation- make horse riding contingent on cleaning out the stalls
   c. any statement about horse riding being contingent on cleaning out the stalls

6. Mr. Nesbitt is trying to choose between the Contingency Bank and the Slot Machine in maintaining his 4-H group's attention at afternoon meetings. State which technique he should try first and provide a reason for your response.
   a. The least intrusive intervention should be attempted first and more obtrusive techniques used only if the level of the behavior indicates they are necessary.
   b. Contingency Bank is less intrusive or more natural
   c. Contingency Bank- allow meeting to continue without disruption
   d. Contingency Bank more quiet than having everyone go for Slot Machine
   e. Contingency Bank- use something in natural environment before artificial

7. Mrs. Carlton has established a maximum criterion of six talkouts during reading instruction for the two groups which are part of the Good Behavior Game. If Group One talks out five times and Group Two talks out two times, which group(s) will earn reinforcers?
   a. One adaptation to the Good Behavior Game is having the teams compete against a criterion instead of each other so that any team whose level of behavior falls below a certain criterion will be reinforced.
   b. Both groups
   c. Groups One and Two were both below the criterion

8. In reviewing Mr. Toller's plan for a token economy, the school psychologist says "I really like what you intend to do once the token economy has resulted in a sustained increase in the students' behaviors." What necessary part of Mr. Toller's plan does the school psychologist like so much?
   a. Procedures for gradually reducing the use of tokens should be included in the original plans for the program.
b. removing the tokens  
c. plans for getting rid of the system  
d. replace tokens with natural reinforcement  
e. eliminate or cut back on tokens  
f. phasing out  
g. delay in reinforcement, planned intermittent reinforcement, etc.

9. Mrs. Kindling is using little chips as tokens in accordance with the new token economy but the students' behaviors haven't changed. Assuming the reinforcement schedule and delayed back-up reinforcers are appropriate, what can Mrs. Kindling do to make the chips more reinforcing?

a. Tokens should be established as reinforcers by their pairing with existing unconditioned or conditioned reinforcers.  
b. pair them with praise or another reinforcer

10. At the end of the week, Eddie's father almost faints with surprise after seeing that Eddie's point sheet indicates he has earned 150 points in a token system geared to handle approximately 50 points a week. What should Eddie's father have been doing concerning token delivery during the week to prevent this problem?

a. Data to be collected during a token economy include the level of the target behavior, the number of tokens delivered, and the back-up reinforcers selected by the subjects.  
b. keep track of the tokens awarded  
c. take data on the number of points given  
d. keeping data  
e. observe schedule of token delivery  
f. more observant so not too many tokens delivered  
g. monitoring point system  
h. watching that each day Eddie doesn't earn too many points  
i. monitor application of recording more closely

11. Bruce is considering using the Grab Bag to reinforce his junior basketball team's completion of exercises during the conditioning portion of practice. In terms of the criteria for selecting the appropriate system, why might Bruce want to try Contingent Recreation first?

a. The least intrusive intervention should be attempted first and more obtrusive techniques used only if the level of the behavior indicate they are necessary.  
b. because is less intrusive  
c. is more natural  
d. Grab Bag more intrusive  
e. do not accept because in recreational setting and activities related to basketball
12. In designing a token economy, Mr. Jumper is trying to decide when to deliver tokens for his students' accurate spelling of words during the spelling bee. State the best time for Mr. Jumper to deliver the tokens.
   a. A token economy is based on the delivery of tokens for immediate reinforcement until the more powerful back-up reinforcers become available.
   b. right after the behavior
   c. after word spelled correctly
   d. right after spelling bee not acceptable

13. Lisa is upset when she does not earn the reinforcer specified on her contract and says "But I thought I did exactly what the contract said to do!" What important component of Lisa's contract probably needs clarification?
   a. Contracts should contain the following specifications: observable behavior definition, reinforcer type, quantity, and schedule of delivery, and sanctions for failure to fulfill the contract.
   b. the behavior definition
   c. what Lisa is to be doing
   d. the amount of work- level of targeted behavior
   e. exactly what activity required of her
   f. communication of "rules" not acceptable

14. Mr. Dewey wants to communicate with the parents of his fifth graders about a possible reinforcement program for homework completion. How could Mr. Dewey accomplish this task without individually talking to each family?
   a. Home reports can serve to coordinate the reinforcement programs in two important settings of the subject's environment: the school and home.
   b. use notes home
   c. written communication with home
   d. letter
   e. write a contract
   f. accept reference to anything written

15. Miss Esting has included the behavior definitions, schedule of reinforcement, back-up reinforcers, and data collection procedures in her proposed token economy but feels like there is one piece missing. What else should Miss Esting include in the plan for her token economy?
   a. Procedures for gradually reducing the use of tokens should be included in the original plans for the program.
   b. how to reduce use of tokens
   c. getting rid of the program
Scoring Criteria for Part A: Maintenance Measure

1. Mrs. Drew wants to measure both the speed and accuracy, i.e., proficiency, of her students' completion of their spelling assignments. What one data measure can Mrs. Drew use to examine these facets of student performance?

   a. Rate is a measure of the proficiency and accuracy of performance.
   b. Rate
   c. Frequency/time

2. "As soon as the needle on the oil gauge beside the speedometer goes into the red range, stop the car and put some oil in the engine." What has the driving instructor done in this statement to increase the probability that relevant discriminative stimulus will occasion the responses of stopping the car and adding oil?

   a. Effective stimulus control requires clear identification of relevant stimulus characteristics.
   b. Clear definition of Sd
   c. Observable definition of relevant stimulus
   d. Described in detail the contingency
   e. Stated in clear language the directions
   f. Shown the student exactly what to look for
   g. Do not accept description of Sd or "give verbal instruction" alone

3. When Miss Bush sees her employees discussing their weekend travel plans instead of working on the overdue report, she becomes angry and impulsively says "You all just lost 5 minutes of your coffee break!" What rule for effective use of response cost has Miss Bush violated?

   a. Effective use of response cost requires communicating the "rules of the game", or the contingencies to be applied.
   b. Miss Bush didn't communicate ahead of time employees would lose part of break
   c. Employees didn't know rules of response cost - didn't expect it
   d. No warning of consequences
   e. Didn't specifically define consequences before intervention
   f. Not setting up contingency before behavior exhibited

4. In developing a Good Behavior Game for her Brownie Scouts, Mrs. Willis is trying to make sure each of the groups has an opportunity to earn reinforcers. How can Mrs. Willis arrange the Game so that each group of Brownies has the opportunity to earn reinforcers?

   a. One adaptation to the Good Behavior Game is having the teams compete against a criterion instead of each other so that any team whose level of behavior falls below a certain criterion will be reinforced.
   b. Establish criterion against which levels of behavior to be compared
   c. Establish criterion and whichever team does better will be reinforced
   d. Set criterion for reinforcement at low rate (for appropriate behavior), or high rate (for inappropriate behavior)
   e. Set limit of negative points above average number of negative points
   f. Make sure number of behaviors within their range
5. After every third successful completion of the cycle of swimming around the obstacles in the pool, Ty's dolphins are fed a piece of fish. State the reason this is an example of intermittent reinforcement of successfully maneuvering a cycle of the obstacle course.

a. Intermittent reinforcement is the reinforcement of some, but not all, occurrences of a behavior.
b. every cycle not reinforced
c. dolphin reinforced for every third cycle instead of every cycle
d. reinforced periodically

6. In teaching Gary how to be on time for scheduled meetings and events, Miss Porter first reinforces promptness in school, then several days later has Gary's work study employer begin reinforcing promptness, and finally in a week has Gary's parents begin delivering reinforcers for being on time for leaving for school. Assuming data on promptness in each setting has been collected since the beginning of the program, what is the primary reason Miss Porter has correctly implemented a multiple baseline design?

a. A multiple baseline design across subjects, settings, or behaviors consists of sequential presentation of the intervention in each tier after baseline.
b. interventions not introduced at same time
c. waited to intervene in each setting until after previous setting had been using treatment for a while
d. giving herself time in between each starting period
e. observed and reinforced in different settings— one after another
f. added to Gary's reinforcement gradually
g. implemented each baseline different number of times

7. Roger begins to analyze the task of starting the mower as the first step in a chaining procedure for teaching his son how to mow the lawn. What did Roger forget to do?

a. The first step in a shaping or chaining procedure is definition of the terminal behavior.
b. define the behavior
c. establish behavioral goal
d. determine expected outcome

8. After striking a small well, a wildcat oil driller stays in the same general location in Oklahoma and for two weeks continues to search for oil. Specifying any pertinent behavior(s) and consequence(s), state the primary reason striking oil can be considered a reinforcer.

a. By definition, reinforcement involves an increase in the level of the behavior.
b. striking oil maintained the behavior of searching for oil
c. kept looking for oil because struck a well
d. after reinforced by striking oil, searched for more
e. striking oil reinforcer— it continues, thinks will strike oil again
f. staying on location will bring oil
9. During dinner, Mrs. Winters said "Say Please", her daughter immediately complied by saying "please" when asking for some vegetables, and Mrs. Winters mistakenly passed the dish of vegetables her daughter dislikes. In terms of stimulus control, state why Mrs. Winter's verbal prompt may less effective in the future.

a. Stimulus control is established by the reinforcement of a response in the presence of an antecedent stimulus.
b. Behavior not reinforced in presence of request to say please
c. Daughter doesn't like vegetables and so behavior not reinforced in presence of antecedent
d. Had no desire for vegetables
e. Not reinforcement for saying please
f. Do not accept word "cause" or "elicit"

10. Gigi is paying her nephew a penny per weed for cleaning out her garden. State whether weed-pulling is likely to be a high or low rate behavior and give one reason for your choice.

a. Ratio schedules of reinforcement usually result in high rates of the occurrence of a behavior.
b. High- paid for every weed- is ratio schedule
c. High- on continuous schedule- reinforced for every response
d. High- more weeds nephew pulls, more money he will make
e. High- amount of reinforcers connected to amount of work

11. Ginger is yelling at her brother to get off the telephone. Describe the consequence that would negatively reinforce Ginger's brother's behavior of handing her the telephone.

a. Negative reinforcement entails the contingent removal of an aversive stimulus resulting in an increase in a behavior.
b. Ginger stopping yelling

12. In using interval recording to measure a violin student's behavior of looking at the sheet music, two observers have 10 intervals where they both marked the behavior as occurring, 4 intervals where they both marked the behavior as not occurring, and 2 intervals where one observer indicated the behavior did occur and the other indicated it did not occur. Calculate the two observers' agreement on the occurrence of the violinist looking at the sheet music.

a. Interobserver agreement is usually expressed as a percentage agreement between observers and is calculated by dividing the total number of agreements and disagreements for the occurrence of a behavior into the number of agreements and multiplying by 100.
b. 14/16, 14 over 16, 875
13. Interns on Dr. Banning's rotation are required to wear an ugly medallion for a misdiagnosis but do receive congratulations from the chief resident for correct identification of symptoms. What two principles have been combined to simultaneously reduce the interns' inappropriate diagnoses and increase appropriate ones?

a. Punishment should only be used in conjunction with a behavior development procedure designed to increase the occurrence of an appropriate behavior.
b. reinforcement and punishment
c. do not accept praise or aversive stimuli

14. After examining the data in the first and second baselines, Nellie knows the verification portion of her study has been a success. Describe how the configurations of the two baselines compare if Nellie's conclusion is true.

a. The verification phase is the repetition of the baseline condition to be compared to the original baseline to determine if the data return to that level.
b. should be similar
c. shapes should be the same
d. diagram showing same shapes is appropriate
e. behavior returns to baseline after intervention
f. they are even

15. Stella is teaching the children in the foster home how to make their beds by linking consecutive steps, some of which include straightening the sheets on the bed, placing the pillow on the bed, and pulling the cover over the bed and the pillow. What function does pulling the cover over the bed and pillow serve in strengthening the behavior of putting the pillow on the bed?

a. In a chaining procedure, a link serves as an Sd for the next response and as a reinforcer for the behavior that precedes it.
b. reinforces putting the pillow on the bed
c. serves as a reinforcer
d. closer to being reinforced, tend to increase behavior before it
APPENDIX G

Scripts for Independent Variable Conditions
Implementation Sequence for the Book/Study Guide Only Condition

Description

Class is scheduled to start at 4:30 P.M.

1. The first component of the book/study guide only condition is an introduction. The introduction officially starts with the words "The topic for this week was...". The introduction officially ends with the words "Part A of the quiz reflects these procedures.". 5 minutes

2. The second component of the book/study guide only condition is the dependent variable measure, Part A of the quiz. Part A of the quiz officially commences with the word "Begin" and officially ends with the word "Stop" or when all the students are finished, whichever comes first. If Part A concludes before 45 minutes, the end is signalled by the words opening the next component, "Are there any questions about this week's material?" 45 minutes

3. The third component of the book/study guide only condition is the opportunity to ask questions about the material in the unit. The opportunity officially starts with the words "Are there any questions about this week's material?" and officially ends with the words "Now that we have finished with the questions, let's move on". approximately 45 minutes

4. The fourth component of the book/study guide only condition is the quiz for the grade, Part B of the quiz. Part B of the quiz officially commences with the words "When you are done this portion of the quiz...". After Part B of the quiz is completed and handed to the instructor, students are free to leave.
Script

1. Before 4:30 P.M., the instructor and the observers synchronize their
watches outside the room by the observers starting their stopwatches as the
instructor's sweep second hand reached 12. The number of full minutes
between pushing the stopwatch buttons and the start of class (4:30 P.M.) is
recorded on the observation sheet.

2. "THE topic for this week was (statement of topic included in the syllabus)"
   "The reading assignment for this week was (statement of the chapter titles
   from the week's reading assignment)"
   "Part A of the quiz reflects these PROCEDURES."

3. Distribute Part A of the quiz face down.
   "THE required response for each example or nonexample is specified in the
second sentence. Your answer should fit in the space provided. If more
room is necessary, use the back of the page being sure to mark the number
of the item. When you are done, bring your paper to the front of the room
and write down the time spoken by the observer. Then hand the paper to the
observer."
   "BEGIN"
   "STOP" (if necessary)

4. "ARE there any questions about the material for this unit?"
   "Now that we have finished with the questions, let's move ON."

5. Distribute Part B of the quiz face down.
   "WHEN you are done this portion of the quiz, place it on the table in the
front of the room and you are free to leave. Thank you for your attention
and I will see you next week."
Implementation Sequence for Examples/Nonexamples Condition

**Description**

**Class is scheduled to start at 4:30 P.M.**

1. **The first component of the examples/nonexamples condition is an introduction.** The introduction officially starts with the words "The topic for this week was...". The introduction officially ends with the beginning of the next component, review of the rules. 5 minutes

2. **The second component of the examples/nonexamples condition is review of the rules and written examples and nonexamples for the unit.** It consists of the instructor reading each rule, one corresponding example, and one corresponding nonexample. The students are then given the opportunity to ask questions. The review officially starts with the words "Let's look at the rules for this week...". The review officially ends with the words "Now that we have finished with the questions, let's move on." 45 minutes

3. **The third component of the examples/nonexamples condition is the dependent variable measure, Part A of the quiz.** Part A of the quiz officially commences with the word "Begin" and officially ends with the word "Stop" after 45 minutes or when all the students are finished, whichever comes first. If Part A concludes before 45 minutes, the end is signalled by the words opening the next component, "Are there any questions about this week's material?" 45 minutes

4. **The fourth component of the examples/nonexamples condition is the opportunity to ask questions about the material in the unit.** The opportunity officially starts with the words "Are there any questions about this week's material?" and officially ends with the words "Now that we have finished with the questions, let's move on." approximately 15 minutes

5. **The fifth component of the examples/nonexamples condition is the measure for the grade, Part B of the quiz.** After Part B of the quiz is completed and handed to the instructor, students are free to leave.
Script

1. Before 4:30 P.M., the instructor and the observers synchronized their watches outside the room by the observers starting their stopwatches as the instructor's sweep hand reached twelve. The number of full minutes between pushing the stopwatch buttons and the start of class (4:30 P.M.) was recorded on the observation sheet.

2. "THE topic for this week was (statement of topic included in the syllabus)"
   "The reading assignment for this week was (statement of the chapter titles from the week's reading assignment)"

3. "Let's look at the rules for this WEEK..."

   Distribute written examples and nonexamples.
   Read each rule with students following along on their papers- "LOOK at Rule Number One"
   Answer questions- look at principal investigator for indications of the time. If questions end before 45 minutes go on to Part A of the quiz. If questions continue, they must conclude after 45 minutes.
   "Now that we have finished with the questions, let's move ON."

4. Distribute Part A of the quiz face down.
   "THE required response for each example or nonexample is specified in the second sentence. Your answer should fit in the space provided. If more room is necessary, use the back of the page being sure to mark the number of the item. When you are done, bring your paper to the front of the room and write down the time spoken by the observer. Then hand the paper to the observer."
   "BEGIN"
   "STOP" (if necessary)

5. "ARE there any questions about this week's material?"
   "Now that we have finished with the questions, let's move ON." after 15 minutes or the end of questions, whichever comes first.

6. Distribute Part B of the quiz face down.
   "WHEN you are done this portion of the quiz, place it on the table at the front of the room and you are free to leave. Thank you for your attention and I will see you next week."
APPENDIX H

Dependent Variable Agreement Data Sheet
Agreement Scoring Sheet for Dependent Variable

Place a plus in the blank for correct items, a minus for incorrect items. No partial credit is to be given.

Unit Name: ____________________________

S.S. Number or Two-Digit Control Number: __________________________

<table>
<thead>
<tr>
<th>Agreement</th>
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<td>8.</td>
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</table>

Agreements: ______

Disagreements: ______

Agreements/15: ______
APPENDIX I

Course Evaluation Questionnaire
Course Evaluation

Your responses to the following questions will provide data useful in evaluating the instruction in ED-EXCEP 722. Use the back of the page when necessary. Thank you for taking the time to complete this questionnaire.

1. One of two procedures was used before presenting Part A of the quiz each session: reading the book and completing the study guide OR reading the book, completing the study guide, and discussing written examples and nonexamples. Circle the one method (a. or b. below) you preferred.
   a. Reading the book and completing the study guide only.
   b. Reading the book, completing the study guide, and reviewing written examples and nonexamples.

2. Circle the method (a. or b. below) you felt resulted in more learning of the principles and procedures of applied behavior analysis.
   a. Reading the book and completing the study guide only.
   b. Reading the book, completing the study guide, and reviewing written examples and nonexamples.

3. Approximately how many hours per week did you spend studying the text and study guide outside of class:
   Circle the number corresponding to how useful you considered the following items in preparing for Part A of the quiz?
   
   Useful | Not Useful
   ---|---
   Rules  | 1 2 3 4 5
   Book   | 1 2 3 4 5
   Study guide | 1 2 3 4 5

4. For several of the class sessions, written examples and nonexamples were read and discussed before Part A of the quiz was presented. What, if anything, could be done differently to make the use of examples and nonexamples more effective in teaching the principles and techniques of applied behavior analysis?

5. Please feel free to add comments on any aspect of Part A of the quiz, e.g., responses to questions, test protocol, feedback, etc.