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Study requirements and higher-level performance in a PSI course : a thesis ...

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STUDY REQUIREMENTS AND HIGHER-LEVEL PERFORMANCE

IN A PSI COURSE

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A Thesis

Presented to

the Graduate Faculty of

The University of the Pacific

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In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

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by

Esther Shafer

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This thesis, written and submitted by

Esther Hannah Shafer

is approved for recommendation to the Committee

on Graduate Studies, University of the Pacific.

Department Chairman or Dean:

Thesis Committee:

_____ Chairman

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Abstract

This experiment investigated the effects of differential study guide assignments and testing requirements on higher-level performance in a PSI course. Twenty-six students who were enrolled in an elective psychology course in self-control at the University of the Pacific served as subjects. The taxonomy of educational processes developed by Bloom (1956) served as a guide to writing course materials corresponding to six levels of learning. Two levels of study guide assignments and testing requirements were varied across four groups of students in a multilevel design. The first level was the simplest, in which students were required to complete written exercises in the study guide corresponding to the two lowest levels of Bloom's taxonomy, and to pass a 10-item multiple-choice quiz. In the second level, students were required to complete all requirements for level one, and in addition, complete study guide exercises corresponding to the four higher levels of Bloom's taxonomy. During the last four units of the course, a choice procedure was in effect. Students stated whether they wished to complete the second level of study guide assignments at the time that they received a study guide for each unit. Most students did not choose to complete the second level of assignments and requirements. Student performance

on higher-level items on three major examinations indicated that the training procedure had some differential effect across the groups but the hypothesis was only partially supported by the results. This may have been due to the lack of consistency between requirements placed on students during training and criteria used to grade the essay questions on the examinations. Additionally, skills that may contribute to the students' ability to respond to higher-level questions were not defined or taught in a systematic way. Measures of student performance in the PSI lab indicated that the course procedures were a practical way to teach higher-level skills in a PSI course.

The Personalized System of Instruction (PSI),
introduced and described by Keller (1966, 1968), is a
system of instruction utilizing principles derived from
an experimental analysis of behavior (Johnson & Ruskin,
1977; Robin, 1976; Sheppard & MacDermot, 1970). Much of
the rationale for programmed learning as described by
Skinner (1961, 1968), is incorporated into the structure
of PSI, including an emphasis on task analysis, allowing
for individual progression of each student, and requiring
thorough mastery of each task before progressing to the
next (Keller, 1968).

Keller (1968) and Keller and Sherman (1974) summarize
the five components of PSI which distinguish it from
conventional teaching procedures. These are:

1. The self-paced feature, which permits each student
to determine the speed with which s/he will take unit
quizzes and progress through the course.

2. The unit-perfection requirement for advancing,
which requires the student to perform at a pre-
determined level of mastery before proceeding to
a new unit of instruction.

3. The use of lectures and demonstrations as
motivation tools or rewards for good progress, but
not as course requirements or methods for imparting
critical information.

4. The stress upon the written word in communication

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between teacher and student as evidenced by the
use of frequent unit quizzes and study guides.

5. The use of proctors as an integral part of
the course, particularly in providing immediate
scoring of quizzes, tutoring if necessary, and
establishing an interpersonal relationship with
the student.

Personalized system of instruction courses, therefore,
differ from courses taught in the traditional lecture
format in several important ways. Instead of requiring
students to memorize large amounts of material in order
to pass a heavily weighted midterm or final exam, material
in a PSI course is presented in smaller units with study
questions or objectives to emphasize the most important
information. Arrangement of materials and study objectives
to maximize learning is a crucial aspect of the PSI
method. In a PSI course, students are required to pass
unit quizzes at a predetermined level of mastery, usually
equivalent to that of a level equal to an "A" performance
in a traditional course (Keller, 1972). The use of such
a criterion ensures that all students achieve to the same
level as the top 25% of students achieve under typical
group-based instructional methods (Block, 1971). Unlike
the traditional course in which all students are expected
to progress through the course at the same rate, regardless
of knowledge or ability level, students in a PSI course

are allowed to progress at a pace suitable for the individual student. Finally, student contact with an instructor in the traditionally taught course is limited only to the lecture setting. PSI courses, through the use of the tutorial, allow the student to come into contact with the instructional staff more often and to receive individual assistance frequently and in more detail than is usually possible in a lecture course.

A great deal of research to date has investigated each of the components of PSI as Keller (1968) originally proposed. Subsequent research findings have supported each of these components with varying degrees of confidence (Hursh, 1976). Since the present study was conducted in a college course taught by a modified PSI method, research findings in the five component areas are briefly summarized, particularly in terms of how they related to the course which was the subject of study.

> 1. Variations of the self-pacing component have been
> investigated extensively, since most PSI courses are
> taught within the traditional structure of the
> university calendar, and many problems associated
> with procrastination often occur. Robin (1976)
> reports that two widely used attempts at dealing with
> the procrastination problem include the use of
> deadlines and point systems to reward desirable rates
> of performance. According to Robin, both of these

systems have been shown to result in steadier rates of unit completion.

2. A mastery criterion of "A" (90% or better) has been recommended by virtually all studies investigating this requirement since student performance closely conforms to the criterion in effect at the time a quiz is taken (Davis, 1975; Johnston & O'Neill, 1973; Semb, 1974).

3. The use of optional lectures to serve as rewards or motivational devices has been the least supported of the five components. In two studies which have utilized lectures as optional activities, students attended the lectures only when quizzes were administered or information relating to quizzes was being discussed. When permission to attend lectures was made contingent upon having completed course assignments, attendance decreased even further and the number of assignments completed showed no increase (Lloyd, Garlington, Lowry, Burgess, Euler, & Knowlton, 1969; Phillips & Semb; 1976). However, many instructors include the use of optional lectures because they allow increased interaction and contact with an authority in the topic being taught. For this reason, lectures were included in the course which was targeted for study. More investigation is needed in order to determine how lectures can be used to

greater advantage in PSI courses.

4. Studies which have investigated the usefulness of proctors versus no proctors have concluded that the use of proctors results in higher final exam scores (Farmer, Lachter, Blaustein, & Cole, 1972), and fewer quiz retakes (Farmer, et al., 1972; Johnson & Sulzer-Azaroff, 1975; Hursh, Sheldon, Minkin, Minkin, Sherman, & Wolf; 1975). The functions of feedback, tutoring, and social interaction have been demonstrated to shape student performance, but in ways yet to be definitely determined (Robin, 1976), and the training of these proctor behaviors do not necessarily result in better student performance and better course ratings (Hursh, 1976; White-Blackburn, Note 1).

5. The use of study materials which indicate the important points of information to be learned by the student is a part of most personalized courses and is advocated by many investigators (Born, Gledhill, & Davis, 1972; McMichael & Corey, 1969; Sherman, 1976). Giving students study objectives results in improved examination performance (Jenking & Deno, 1971; Jenkins & Neisworth, 1973; Miles, Kibler, & Pettigrew, 1967), and results in fewer attempts to reach mastery on unit quizzes (Santogrossi & Colussy, 1976).

Study Questions as Course Requirements

Since study materials emphasize the important points to be learned in a PSI course, some instructors have used them to determine a part of the students' grade, or have used them directly in a testing situation. In one experiment, study questions were used in place of unit quizzes (Semb, 1975). When students handed in answers to a random sample of study questions for grading instead of taking unit quizzes, their final examination performance was similar to that produced by students taking written quizzes over the same questions. Other investigators have used questions taken from study guides as questions on unit quizzes (Grant, Bono, Bacon, & Keenan, 1980; Grant, Keenan, & Hursh, 1980; Lloyd and Eastman, 1977; Semb, Hopkins, & Hursh, 1973). Results of these studies consistently indicated that when study questions were included as test questions, better test performance resulted. However, in two of these studies, when both study guide and non-study guide questions were used on unit quizzes, performance on the non-study guide questions was worse than when only non-study guide questions were used on other unit quizzes (Grant et al., 1980; Lloyd & Eastman, 1977). Lloyd & Eastman (1977) suggested that when students are given study questions, they skim the text to fill out the study guide and then study from the guide only. These authors also suggested that questions

from material not covered in study guides be included on unit quizzes to ensure that students will read all assigned material. However, since the purpose of study objectives as stated by Keller and Sherman (1974) is to facilitate the learning of all important material by probing all information to be learned on the unit tests, this solution is contradictory to the purpose of study questions in PSI. Another solution which is consistent with the objectives of PSI is simply to cover all important material with study objectives (Grant et al., 1980; Keenan & Medio, 1981).

Another variation on the use of study questions is whether to simply provide study objectives, to provide instructor-answered study questions, or to require students to produce written responses to study questions. A comparison of the use of instructor-answered study questions to student-answered study questions (Semb et al., 1973; Grant et al., 1980), resulted in better quiz performance in the instructor-answered study question condition in both investigations, although the difference between the two conditions was slight. Therefore, these results do not substantially favor the use of either instructor-answered study questions or student-answered study questions.

One study (Bunck & Iwata, 1980), compared the student-answered study questions requirement to simply providing the study objectives without the requirement to complete

them. In a multiple-baseline design across three sections
of an undergraduate psychology course, the baseline
condition consisted of merely providing study questions
to the student. During the required written-response
condition, quizzes were withheld until written study
question responses were examined by a monitor. All three
groups received study questions; only the requirements for
completion varied between groups. Small differences on
mean quiz scores were observed between these conditions
for both first and remedial weekly quizzes. Even when
students were not required to answer study questions,
63% of these non-required study questions were answered,
suggesting that the completion contingency is unnecessary.
The authors state that the small increase in test scores
as a result of the contingency may not be worth the
difficulty of monitoring student responses to study
questions. In addition, the fact that students completed
study questions was encouraging, since students were
assuming responsibility independently of an externally
imposed contingency.

However, results of a study by Peters (1975),
differed from those of Bunck and Iwata. One group of
students who had study guide questions checked by a
proctor before being allowed to take a unit quiz performed
significantly better on unit quizzes than another group
who did not have this response requirement. Each proctor

checked the study guides of students who were ready to take a unit quiz at the beginning of each class period. The time spent checking study guides for all students in each period reportedly lasted approximately 15 min. and was easily handled by one proctor for each 10 students. No data were reported on how many study questions were answered by students who were not required to do so. Since the results of these studies vary, it is unclear whether the requirement for students to produce written answers to study questions is necessary to increase performance in a testing situation, and if the gains achieved are great enough to justify the additional time required by staff.

Study Objectives and Higher-level Learning

Even though study objectives are used in most PSI courses, little attention has been paid to the levels of learning achieved as a direct result of study objectives. In fact, a common criticism of PSI as noted by Semb and Spencer (1976) is that the method does not teach students how to think, how to apply what they have learned, or how to solve problems. However, this problem is apparently not exclusive to the PSI method. An examination of the content of most PSI courses (Miller & Weaver, 1976), and of traditionally taught courses (Semb & Spencer, 1976), indicates that most of the material emphasized in tests and study objectives involves simple recall, rote memorization, or translation of the original material.

Even though such processes as creativity, problem solving, and concept formation are often part of the instructional goals for a course, most instructors in PSI and in traditionally taught courses teach and test only recall tasks (Semb & Spencer, 1976).

The method of instruction, or the use of study objectives alone, therefore, will not necessarily determine the type or complexity of student learning. Semb and Spencer (1976) and Keenan and Medio (1981) propose that requirements of students during study will determine the complexity of the learning produced. Specifically, by requiring students to respond to study objectives of a complex nature, later performance in a testing situation will result in performance of complex or higher-level skills.

Several investigators have succeeded in improving student performance on higher-level objectives by providing study objectives and study materials which are specifically programmed to produce concept formation (Miller, 1975; Miller & Weaver, 1975; Miller & Weaver, 1976). These study objectives require the student to apply or generalize concepts taught in the course to novel examples of concepts, and to discriminate them from examples of other concepts. Because concept formation requires the student to do more than simply recall definitions or recognize examples already presented in the text, concept formation is a

higher objective than a recall task (Miller & Weaver, 1975).

In two of these studies, the effect of the PSI package along with a textbook specifically written to teach students to discriminate instances of a concept from non-instances of a concept was analyzed. In both studies, the course was divided into four major units. A generalization test for each unit, containing novel examples of concepts taught in each of the four basic units was administered before, during, and after introduction of the concept programming package. Mean percent of correct answers on the generalization test increased during and after presentation of the concept program for that unit (Miller & Weaver, 1975; Miller & Weaver, 1976). A subsequent analysis of the concept programming component of the treatment package was done, in which the component was compared to the other two instructional components (identification of concept definitions and reading illustrations of concepts in the text). The concept program produced a large increase in generalization test scores over that produced by the other two components (Miller & Weaver, 1976). Additionally, two of these studies demonstrate that the concept programmed textbook itself is more effective in producing concept formation than more traditionally written, widely used alternative textbooks (Miller, 1975; Miller & Weaver, 1976). In both studies, students in different treatment groups were administered a generalization

test on a particular concept and then assigned either the
concept programmed materials or the relevant section from
the traditional text. Larger gains on the generalization
test were made by students who were assigned the text
based on concept programming.

Another method of programming study materials at
higher levels is to use a taxonomy of educational objectives
and educational processes as a guide. Bloom (1956)
constructed a taxonomy which describes the kinds of skills
that make up these higher-level processes and which can
be used to write behavioral objectives that correspond to
these higher-level processes. Specifically, the
"knowledge," "comprehension," "application," and "analysis"
levels involve understanding and concept formation, and
the "synthesis" and "evaluation" levels involve creativity
(Vargas, 1972). The use of programmed study materials to
produce concept formation in the studies previously
discussed resulted in higher-level learning up to the
"application" level in Bloom's taxonomy, according to
Miller and Weaver (1975). This achievement surpasses the
level of learning usually attained in most courses, since
recall tasks are included in the "knowledge" and
"comprehension" levels of Bloom's taxonomy.

A recent study by Kutner, Davis, and Beauchamp (Note
2), utilized study materials and items on mastery quizzes
which corresponded to all six levels in Bloom's taxonomy.

All study and quiz items were categorized into one of three levels of complexity: "knowledge-comprehension" (K-C), "application-analysis" (A-A), and "synthesis-evaluation" (S-E). Each of three groups of students was assigned to a different sequence of item requirements for the mastery quizzes according to the three levels of complexity from Bloom's taxonomy, to investigate whether the order of complexity requirements had an effect on examination performance. Most test items in the K-C level were multiple-choice, and most test items in the A-A and S-E levels were essay. Three different levels of study guides were also provided for each unit, each of which corresponded to the level of requirements that the student was assigned to for that unit. There was no requirement to complete the study guide; the purpose was merely to prompt the student to study at the level of questions that would be included on the quiz. Results of this study indicated that students did achieve higher-level learning as a result of programming study materials and quiz items. Students who received higher-level materials from the beginning of the course performed slightly better on the final examination. In addition, students in the S-E group passed more unit quizzes on the first attempt.

One practical problem as a result of using higher-level essay items on unit quizzes was that students often required approximately an hour in order to complete a

unit quiz, as compared to the recommended 15-20 minutes testing time for unit quizzes (Keller & Sherman, 1974). Two possible solutions to this problem might be: (a) construct quiz items that require less time to answer, or (b) require that the majority of student behavior occur in the study situation, rather than the testing situation.

To this date, several studies have demonstrated that study materials can be programmed to achieve higher levels of student performance. However, very few attempts have been made to utilize study materials which include more than one level of complexity. Also, it is unclear whether the student should be required to produce written responses to study questions in order to utilize these programmed materials most effectively. In addition, courses that utilize higher-level objectives and require written responses to study questions often require more staff time than is feasible. A system which combines practicality with maximum benefits for the student is needed.

In this study, Bloom's taxonomy was used as a guide for programming study objectives up to the highest levels in the taxonomy. Student performance on unit quizzes and on three major examinations was compared under two conditions: (a) with a requirement to complete higher-level study objectives, and (b) providing higher-level study objectives without the requirement being in effect.

Additionally, an effort was made to increase the practicality of the course procedures by decreasing the amount of student behavior required in the laboratory mastery testing situation.

Students completed all higher-level study questions outside of the PSI laboratory, and brought their completed study guides to the lab for spot-checking by the proctors. Students were only required to write answers to higher-level questions on the three major examinations. With these procedures, students could still complete higher-level study objectives while minimizing the amount of staff time necessary to provide instruction on these objectives.

Method

Subjects

Students in an elective psychology course entitled "Self-Control", taught in the Fall Semester, 1981, at the University of the Pacific were offered the opportunity to participate in this study. Students were informed at initial class meetings that their performance was to be monitored for research purposes and that participation in this study would have no effect on their grade. Student consent for participation was received in written form (Appendix A). All 29 students who took the first PSI quiz consented to be a part of this study and completed the course. All students were randomly divided into four

groups during the first week of the semester. Groups 1 through 3 contained seven students and Group 4 contained eight students. One subject from Group 1 and one subject from Group 2 were not included in the final data analysis. Because of cultural differences which included poor verbal performance in testing situations, the experimenter and instructor decided that these students were not from the same population as the other subjects. Another subject from Group 4 was not included in the final data analysis because he voluntarily completed extra course requirements equivalent to requirements for Group 1, thus resulting in his failure to conform with the experimental requirements for Group 4.

Setting

The class was scheduled to meet from 2:00 p.m. to 4:00 p.m. on Tuesdays and Thursdays, at which time, lectures about self-modification were presented. In addition, discussion meetings between each student and the instructor were scheduled weekly for the purpose of assisting students with their class projects. Testing was conducted in a room designated as the Learning Center, Room 118 of the Psychology Building. The testing center was open at various hours daily for a total of 19 1/2 hours weekly; times were arranged after the semester began in order to accomodate students. One graduate teaching assistant and the instructor served as proctors. The graduate teaching

assistant was scheduled to proctor for 14 hours weekly and the instructor was scheduled to proctor for 5 1/2 hours weekly.

Course Materials

Texts and units. The two textbooks used in the course were divided into 14 units for studying (Chance, 1979; Watson and Tharp, 1981). The Watson and Tharp textbook, which was organized as a guide for planning and administering a self-modification project, served as a framework for the course organization. The material covered in the Chance book was integrated into the Watson and Tharp framework and provided a theoretical basis for the course. The assignment of textbook materials to units is shown in Table 1. In addition to the 14 units of study, an introductory unit explaining course procedures and the PSI method of instruction was provided (Appendix C).

Course syllabus. The course syllabus (Appendix B), described the features of the course and grading procedures in detail. This course was designed to include, in a modified form, all five components of a personalized instruction course as described by Keller (1968). These are: (a) a modified form of self-pacing, in which students are allowed to take the unit quizzes at their own pace subject to the minimum rates specified by the instructor, (b) performance at 90% mastery level on the unit quizzes,

Table 1

Course Units and Corresponding Readings

Units	Title	Readings
0	Introduction	Introduction to course, course syllabus
1	Learning and Behavior	Chance, Chapter 1
2	Adjustment, Goals, Self-Management/Specifying the Goal, Building Committment	W & T* Chapters 1,2
3	Self-Knowledge: Observation and Recording	W & T, Chapter 3, Ch. 9, p.225-230
4	Behavior/Environment Relationships	W & T, Chapter 4
5	Basics of Classical Conditioning	Chance, Ch.2, p. 25-53
6	Basics of Operant (Instrumental) Conditioning	Chance, Ch. 3, p.81-113
7	Antecedents	W & T, Chapter 5
8	Operant Conditioning II	Chance, Ch. 3, p.113-134
9	Developing New Behaviors	W & T, Chapter 6
10	Observational Learning	Chance, Ch. 4, p.151-189
11	Consequences	W & T, Chapter 7
12	Planning For Change; Is it Working?	W & T, Ch. 8, Ch. 9, p.231-242
13	Limits of Learning	Chance, Chapter 5
14	Termination: Uses and Limits	W & T, Chapters 10,11

* Watson and Tharp

and 100% correct completion of study guide exercises,
(c) lectures which present supplementary information
about the topics in the course, but which the students
are not required to attend, (d) use of the written word
to present all information needed to fulfill course
requirements, in the form of a course syllabus, study
guides, and textbooks, and (e) use of proctors to provide
immediate scoring of quizzes, scoring of study guides, and
tutoring if necessary.

Students accumulated points in four areas to determine
their final grade: (a) completion of mastery requirements
for each unit, including unit quizzes, (b) midterm and
final examination, (c) self-management project submitted
as a term paper, and (d) attendance at consultation
meetings with the instructor and submission of written
assignments for the self-modification project.

Study guides. The use of study guides served as an
integral part of this course. A study guide was provided
for each unit of study, and included: (a) a brief descrip-
tion of material covered in the unit, (b) a list of concepts
covered in the unit, (c) an application of concepts section,
containing approximately 15 short answer or essay items,
(d) occasional suggestions on how to complete the items
on the study guide, and (e) occasional instruction about
the material presented in the unit.

The study guides were programmed in order to produce

two major divisions of items within the six levels of Bloom's taxonomy. The items in the concept section corresponded to Bloom's knowledge and comprehension levels, in which students were instructed to write a brief definition or description of each concept. In the application of concepts section, items corresponded to Bloom's application, analysis, synthesis, and evaluation objectives, which are considered to be the "higher-level" objectives of the taxonomy.

The type and number of items in the application of concepts sections vary with each unit on the basis of appropriateness to the material covered in the unit. However, most study guides contained at least one item from each of the four higher-level objectives. The course instructor and another faculty member in psychology read all study guide items, in order to validate the assumption that the items adequately represented the criteria for objectives suggested by Bloom (1956). Sample study guides are included as Appendix D.

Mastery quizzes. Three forms of a 10-item mastery quiz were written for each unit. Each quiz consisted of a combination of multiple-choice, true-false, and short-answer items. Sample mastery quizzes are included as Appendix E.

Examinations. Two midterm examinations, each being two hours in length, were administered to all students at

the end of the fifth and ninth units. The first midterm covered the first through fifth units, and the second midterm covered the sixth through ninth units. Test items were constructed to meet all of the objectives in Bloom's taxonomy, with multiple-choice and matching items to represent the knowledge and comprehension levels and essay items at the application, analysis, synthesis, and evaluation levels. At least one essay question was included from each unit, with some questions containing several parts which corresponded to more than one level from the taxonomy. An approximately equal division of items was made between the application-analysis levels and the synthesis-evaluation levels. Midterm 1 is included as Appendix F, and Midterm 2 is included as Appendix G.

A final examination was administered at the end of the course. Twenty percent of the tiems were taken from the first through ninth units, and 80% of the items were taken from units 10 through 14. As on the midterm, there was a division of items representing the application-analysis levels and the synthesis-evaluation levels. The final examination is included as Appendix H.

Mastery Requirement/Independent Variable

Study guide assignments and testing requirements. Two levels of study guide assignments/testing requirements were varied. All students received a complete study guide

for each unit, containing (a) a concept label and definition section, and (b) an application of concepts section. These two levels of study guide assignments/ testing requirements corresponded to the two major levels in Bloom's taxonomy. In the first level of requirements, the student was not expected to perform beyond the simple recall of facts either in the study or testing situation. The second level of requirements was designed to promote student performance up to the highest levels of the taxonomy in both the study and testing situations. By varying the kinds of requirements made of the student as well as the point in the course in which the more difficult requirement was introduced, this study attempted to assess which kinds of requirements are necessary to produce student performance at these "higher levels of learning".

Testing procedures for the first level of assignments/ requirements. The process for assigning materials to be studied and mastered, and for mastery testing was as follows:

1. The student was issued the appropriate study guide by the proctor after meeting mastery criteria for the previous unit. The mastery requirements for the next unit were reviewed with each student at this time.

2. After the student read the study guide and completed all written requirements, the student reported to the

testing center bringing completed study guide items.

3. The proctor scanned the parts of the study guide required for completion to see if the student wrote the answers to all items.

4. The concept label and definition portion of the study guide answers were sampled and scored. The proctor chose three concepts at random and the student was asked to orally define each, without written aids. If the student did so with 100% accuracy, he/she was allowed to proceed to the next step. However, if the student did not orally define all three concepts with 100% accuracy, the proctor sampled three other concepts. If the student orally defined each with 100% accuracy, he/she was allowed to proceed to the next step in the mastery sequence. If the student did not orally define each concept with 100% accuracy, he/she was not allowed to proceed to the next step in the mastery sequence. The proctor conducted a brief tutorial and the student received instructions to restudy and rewrite the study exercises.

5. When the student demonstrated mastery over the concept labels and definition portion of the study guide, he/she completed a written, 10-item mastery test, consisting of a combination of multiple-choice, true-false, and short-answer items. The student was required to answer 9 out of 10 items correctly. If the student did not correctly answer at least nine items, the proctor

read and sampled at least five and not more than one-half
of the items in the application of concepts section. All
items sampled were to be correct, although the student
was given the opportunity to orally clarify no more than
one answer. If the student did not answer all sampled
items correctly, the proctor conducted a tutorial
discussion with the student. The proctor ascertained
the reasons for failure and made suggestions for remedial
study. A failure to pass this step of the mastery sequence
did not require the student to retake the written quiz;
the student only had to complete all items on the
application of concepts section of the study guide and
resubmit them for reading and sampling by the proctor.
Testing procedures for both levels of assignments/
requirements are summarized in Table 2.

Measures of Student Performance

Mastery testing data. Several measures of student
performance in the mastery testing situation were taken
for individual students, and were recorded on a form
designed for proctor use (Table 3). Data were recorded
during each attempt to reach mastery for a unit, and data
were recorded for each step of the mastery sequence. At
four points in the mastery testing sequence, students were
required to meet a specified criterion in order to progress
to the next step in the testing sequence, and student
performance was recorded at each of these points. The
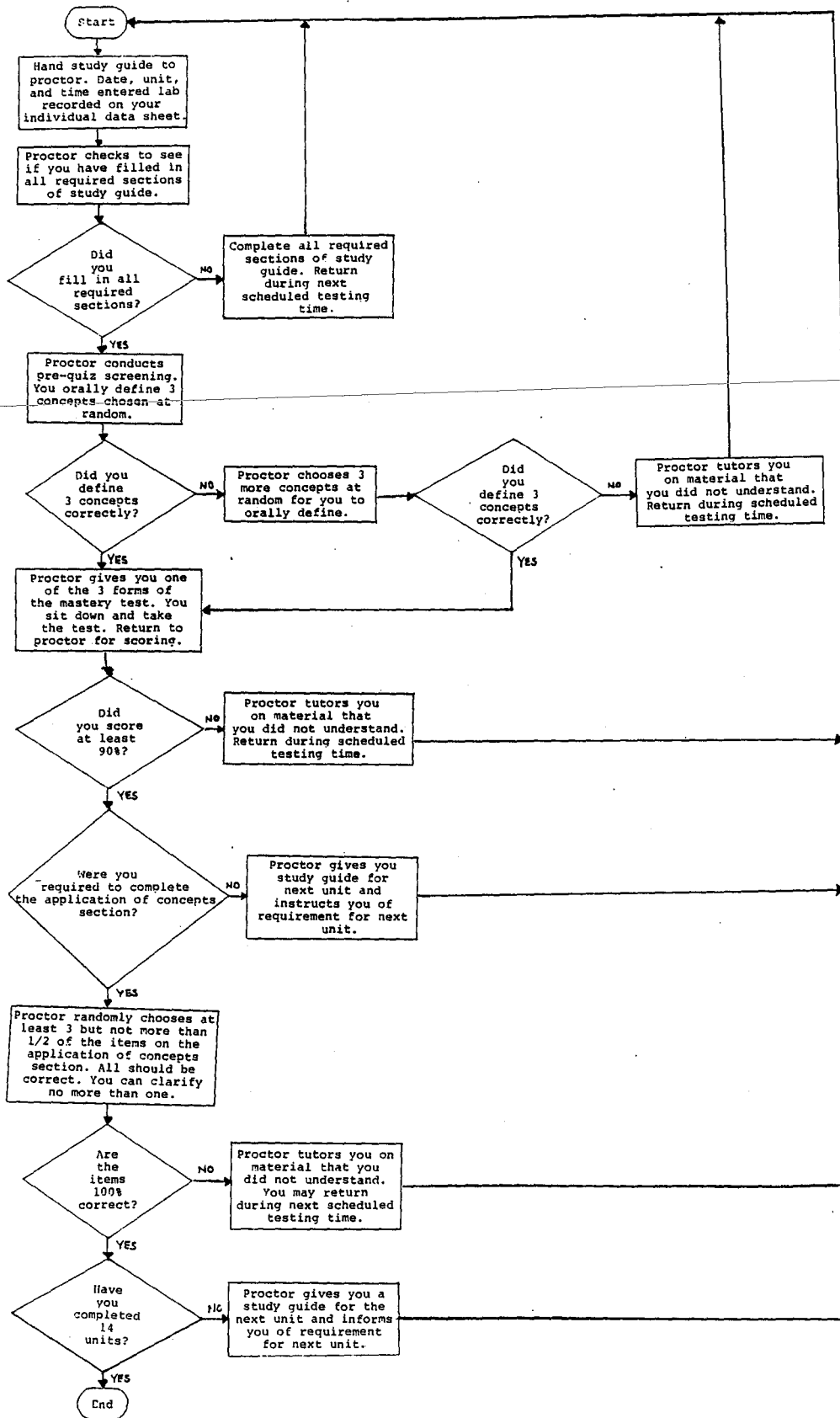
Table 2
PSI Lab Testing Procedures

Start

Hand study guide to proctor. Date, unit, and time entered lab recorded on your individual data sheet.

Proctor checks to see if you have filled in all required sections of study guide.

Did you fill in all required sections? — NO → Complete all required sections of study guide. Return during next scheduled testing time.

YES ↓

Proctor conducts pre-quiz screening. You orally define 3 concepts chosen at random.

Did you define 3 concepts correctly? — NO → Proctor chooses 3 more concepts at random for you to orally define. → **Did you define 3 concepts correctly?** — NO → Proctor tutors you on material that you did not understand. Return during scheduled testing time.

YES (second diamond) ↓

YES ↓

Proctor gives you one of the 3 forms of the mastery test. You sit down and take the test. Return to proctor for scoring.

Did you score at least 90%? — NO → Proctor tutors you on material that you did not understand. Return during scheduled testing time.

YES ↓

Were you required to complete the application of concepts section? — NO → Proctor gives you study guide for next unit and instructs you of requirement for next unit.

YES ↓

Proctor randomly chooses at least 3 but not more than 1/2 of the items on the application of concepts section. All should be correct. You can clarify no more than one.

Are the items 100% correct? — NO → Proctor tutors you on material that you did not understand. You may return during next scheduled testing time.

YES ↓

Have you completed 14 units? — NO → Proctor gives you a study guide for the next unit and informs you of requirement for next unit.

YES ↓

End

Table 3

Mastery Testing Data

Student_____

Date	Proctor	Unit	Time Begin	# questions correct/ concepts	# questions correct/ appl.	Pre-quiz score	P/F?	Mastery test form	Testing time	MTest Score	Time End

proctor recorded: (a) whether or not the student had completed the required portions of the study guide, (b) score on the pre-quiz oral screening of concepts, (c) score on the 10-item multiple-choice test, and (d) score on the sampling of items in the application of concepts section if the student was in the second level of study guide assignments/testing requirements.

Measures to assess the practicality and usefulness of the testing procedure were: (a) time in and time out of the PSI lab, yielding a measure of total time required to complete the testing sequence, (b) total time required for each attempt to pass the 10-item multiple-choice test/unit, and (c) number of questions answered in the application of concepts section of the study guide, even when the requirement was not in effect. Data were compiled for each student, each group, and for the class as a whole by units.

Scores on three major examinations. The essay items on the three major examinations were the main dependent variable used to measure whether the training procedures were effective in producing higher-level learning. Each item was assigned a point value by the instructor. An answer key prepared by the instructor was used to grade the examination questions. The instructor and proctor divided the items to be graded, and each person scored the same items across all students to maximize consistency.

Reliability. The experimenter obtained reliability measures on scoring of the essay items on the two midterms and final examination. Using the answer key prepared by the instructor, the experimenter rescored all essay items for all students independently. The instructor's score was used to assign the student's grade.

A Pearson product-moment correlation coefficient was used as a measure of reliability between the two scorings. The correlation coefficient was calculated for each item on each examination across all subjects. All items with a correlation that was significant at the .05 level or less were included in the later experimental analyses. The following criteria were used as an aid to the experimenter in deciding which of the remaining items to retain for the experimental analyses: (a) whether or not an item had an inflated standard deviation across subjects (above the mean standard deviation for all the items on the exam), (b) whether or not elimination of an item would result in the number of items in that level of the taxonomy being too low to effectively compare it with the other level of the taxonomy, and (c) whether or not inter-rater reliability (Pearson product moment correlation between the experimenter and the instructor) was at least .30. Two items of the original 10 on the first midterm were deleted, two items of the original 11 on the second midterm were deleted, and three items of the original 15

on the final examination were deleted.

Course evaluation. The IDEA Report (Cashin, Brock,
Owens, & Slawson, Note 3), a measure of student reactions
to the instructional procedures, materials, and objectives
used in this course, was administered at the time of the
final examination. Some of the questions used were
modified in order to assess student opinion about courses
taught specifically with the PSI format, and some of the
questions were written specifically to assess student
opinion about the higher-level materials used in this
course. The questions specific to the PSI method of
teaching had been revised during the previous year by the
course instructor and a graduate student, and the
questions pertaining to the higher-level materials used
in this course were written by the experimenter. The
modified IDEA form is included as Appendix I.

Experimental Design and Analysis

Study guide assignments and testing requirements. Two
levels of study guide assignments and testing requirements
were varied across four groups. Each of the four groups
of students began the second level of study guide assign-
ments/testing requirements at a different point in the
semester. Group 1 began the course under the second level
of study guide assignments/testing requirements on the
first unit. Groups 2, 3, and 4 began on Unit 1 at the
first level of requirements. The second level of

requirements was introduced for the second group at Unit 3, for the third group at Unit 6, and for the fourth group at Unit 8 (see Table 4). While students were in the first level of requirements, they were neither encouraged nor penalized for completing the written exercises in the application of concepts section of the study guide.

Choice. During units 10 through 14, students were given the opportunity to choose whether or not they wished to complete the written exercises in the application of concepts section of the study guide. Students stated their choice within the mastery test setting when they reached mastery criterion and were handed a study guide, beginning with the tenth unit. If the student answered "yes", the requirement to complete the second level of study guide assignments/testing requirements was in effect for that unit, including oral sampling of the items in the application of concepts section. Students were neither encouraged nor penalized for making either choice during interviews on units 10 through 14.

Statistical analyses. A mixed design was employed in this experiment to test the effect of three treatments. A completely randomized design with four levels was used to test the effects of timing of the two study guide assignments/testing requirements (required or not required to complete higher-level study objectives). A randomized blocks design with two treatments was used to examine the

Table 4

Experimental Design

Groups	1 2 3 4 5 * 6 7 8 9 * 10	11-14 **
1	Concept Label and Definition plus	Choice Procedure
2	Application of Concepts	
3	Concept Label and Definition Requirement	Requirement
4		

* Midterm

** Final Examination

effect of the three levels of Bloom's taxonomy and the three examinations, making this a split-plot factorial 4.33 design (Kirk, 1968). The first main effect was the independent variable Groups, which consisted of the point in time of introduction of the requirement to complete the application of concepts section of the study guide as varied across the four groups (Table 4). The second main effect was the test item level as specified by Bloom's taxonomy (Bloom). There were three levels of the second independent variable; all subjects were required to answer all three levels of test items. For purposes of analysis, the six levels of Bloom's taxonomy were collapsed into three levels, knowledge-comprehension, application-analysis, and synthesis-evaluation. The third main effect consisted of the three examinations (Tests), administered to all subjects in the four groups at different points during the semester.

The differential requirement across groups in treatment was expected to cause significant differences in performance, thereby causing a Group main effect. Also, significant differences in item scores between the three levels of Bloom's taxonomy were expected across all three tests, resulting in a Bloom main effect. These results were predicted since the three levels of the taxonomy are qualitatively different, and therefore come from different

populations. Also, students were expected to have more previous experience with multiple-choice items that test material at the recall level rather than with the higher-level items used on the exams. In addition, the tests were expected to be sensitive to changes in the number of students who had experience with higher-level performance, causing a significant Test main effect.

The examination of interactions between the independent variables were expected to reveal significant differences. The variations in study guide assignments and testing requirements were expected to have a differential effect on test performance across the four groups, resulting in a Group by Test interaction. On Midterm 1, Group 1 was expected to achieve the highest scores. Group 2 was expected to achieve the next highest scores, and Groups 3 and 4 were expected to perform equally, since these two groups remained in the first level of study guide assignments/testing requirements for all five units covered on the midterm. On Midterm 2, no differences were expected between Groups 1, 2, and 3. Group 4 was expected to perform significantly worse than the other three groups. On the Final Examination, no significant differences between groups were expected.

Across all three examinations, group performance was expected to vary according to the three levels of Bloom's taxonomy, causing a Group by Bloom interaction. No

significant differences were expected across groups on knowledge-comprehension items. On the application-analysis and the synthesis-evaluation items, the groups were expected to perform in descending order, with Group 1 achieving the highest scores.

Because of varying amounts of experience on the three different levels of Bloom's taxonomy, performance on the three levels of the taxonomy was expected to vary across the three exams, resulting in a Bloom by Test interaction. On Midterm 1, scores on knowledge-comprehension items were expected to be significantly higher than scores on the application-analysis or synthesis-evaluation items. On Midterm 2, a difference between the knowledge-comprehension and the higher-level items was also expected. No differences were expected between performance on levels of Bloom's taxonomy on the Final Examination. Scores on knowledge-comprehension items were not expected to vary across examinations. Scores on application-analysis items and synthesis-evaluation items were expected to vary across examinations.

In addition to the main effects and interaction effects described above, a triple interaction between the three independent variables was predicted. The difference in study requirements across the four groups, resulting in different amounts of experience on the three levels of Bloom's taxonomy, was expected to result in a significant

difference in performance across the three tests.

Some group differences in performance across levels of the taxonomy were expected on several of the examinations. All groups were expected to perform equally well on knowledge-comprehension items across the three examinations, since all groups had received the same training on knowledge-comprehension throughout the course. Group differences were expected on both the application-analysis and synthesis-evaluation items on Midterms 1 and 2, but not on the Final Examination. This effect was predicted because of the differential study and testing requirements in effect for groups on Midterms 1 and 2. Study requirements for all groups on the Final Examination were equivalent, so a difference in performance was not expected.

Differences in test performance on the three major levels of Bloom's taxonomy were predicted for each group. None of the four groups were expected to vary across exam performance on knowledge-comprehension items. On application-analysis and synthesis-evaluation items, Group 1 was not expected to vary in performance across examinations. The performances of Groups 2, 3, and 4 were expected to vary across the three examinations.

Differences in performance on the three levels of Bloom's taxonomy were examined for each group on each examination. On Midterm 1, Group 1 was not expected to

vary on the three levels of Bloom's taxonomy, while Groups 2, 3, and 4 were expected to vary in performance across the three levels of the taxonomy. On Midterm 2, no differences in scores on the three levels of the taxonomy were expected for groups 1, 2, and 3. Group 4 was expected to show a difference in performance across the levels of Bloom's taxonomy. On the Final Examination, no differences across the three levels of Bloom's taxonomy were predicted for any of the four groups.

Results

The results have been organized into three subsections, the measures of higher-level learning, measures of student performance in the PSI lab, and the measures of student opinion about the course. A Pearson-product moment correlation coefficient was calculated between the experimenter's scores and the instructor's scores on each higher-level item across subjects on the three major examinations. Those items not meeting the criteria as described in the Method section and in the following section were discarded from the analyses to follow. Since the instructor was considered to be an expert rater of questions into the levels of Bloom's taxonomy, and since the instructor has had experience in scoring higher-level essay questions, his scores were used for the data analysis. Also, it was felt that any scoring biases may have had an effect on students' performance on the second and third

examinations. Therefore, using the instructor's scores for all statistical analyses was considered a more accurate measure of actual experimental conditions.

A modification of the higher-level item scores on the two midterm examinations had to be made before further analyses could be run. All students had not passed all of the PSI units which were to be included on the first and second midterms by the date of the examinations. By the date of the first midterm, 8 of the 26 students had passed all of the units which were included on the examination, and by the date of the second midterm, 23 of the 26 students had passed all of the units. Since the student had to pass a unit in order to receive training in higher-level items for that unit and to be prepared for the upcoming examination, students' examination scores on items from those units which were not passed in the PSI lab were eliminated from the analyses. Each student's score represented a percentage correct on all higher-level items that were included in the analyses. An arcsin conversion was used in order to make the data amenable to the analysis of variance computations.

A one-way analysis of variance (ANOVA) was used to analyze student performance on higher-level items across the four groups and on each of the three examinations. This was accomplished by collapsing the four highest levels of Bloom's taxonomy to produce a total score of higher-,

level items for each examination. A trend analysis was performed according to procedures described in Kirk on the four group means for each examination. An analysis was also performed for the SPF 4.33 design according to procedures described in Kirk. This analysis examined the main effect between Group, Bloom, and Test. The interaction of treatments was also examined.

Measures of Higher-level Learning

Reliability. For the 10 essay items on Midterm 1, the correlations ranged from .21 to .72. The correlations for seven items had a probability of $< .001$, the correlation for three items had a probability of $< .05$, and the correlation for one item did not reach significance. Two items, evaluation 37A and application 37B, were discarded. One of the remaining items had a correlation of .46, another had a correlation of .57, and the remaining items had a correlation of .60 or above.

For 12 items on Midterm 2, correlations ranged from .20 to .85. The correlations for six items had a probability of $< .001$, the correlation for four items had a probability of $< .05$, and the correlation for two items did not reach significance. Two items, evaluation 4A and analysis 4B were discarded. Of the remaining items, one had a correlation of .39, two had correlations of .40 or above, and the remaining items had correlations of .53 or above.

For 15 items on the Final Examination, three of which were review items from Units 1-9, correlations ranged from .10 to .82. The correlation for eleven items had a probability of $< .001$, the correlation for three items had a probability of $< .05$, and the correlation for one item did not reach significance. Three items, application 36, evaluation 38, and evaluation 43A, were discarded. Of the remaining items, one item had correlations of .40, one item had correlations of .53, and the remaining items had correlations of .60 or above.

Analysis of variance SPF 4.33. A univariate analysis of variance (ANOVA) was performed with the three independent variables (Bloom's taxonomy, Group, and Test) in an SPF 4.33 design with all essay questions scores as the dependent measure. In this study, the variable Bloom was comprised of the three levels of Bloom's taxonomy (knowledge-comprehension, application-analysis, and synthesis-evaluation). The variable Group contained four levels, one for each group which was introduced at a different time, specifying the requirement to complete higher-level study and mastery testing requirements. The variable Test was composed of three levels, referring to the three major examinations administered at different points during the semester.

The experimental hypothesis that a differential performance between groups would occur was substantiated

by a significant Group main effect ($p < .05$, see Table 5).

A t-test was utilized to examine the differences between

group means (Table 6). The difference between Groups 1

and 2 reached significance ($p < .001$), with a Group 1

mean of 78% and a Group 2 mean of 66%. A t-test to examine

the differences between Groups 2 and 3 did not reach

significance, with a mean of 66% for Group 2 and 69% for

Group 3. A comparison of means between Groups 3 and 4

reached significance ($p < .05$), with means of 69% and

63%, respectively. These group differences further

tend to support the hypothesis that training on

higher-level items would cause differential performance

across groups, and the decreased performance across

groups in descending order from Group 1 to Group 4 was

also expected.

A performance difference on test items across the

three levels of Bloom's taxonomy was indicated by the

significance of the Bloom main effect ($p < .001$, see

Table 5). These results indicated that students scored

much higher on one level of the taxonomy than another,

A t-test used to examine the differences between performance

on levels of the taxonomy was significant ($p < .001$) between

all three groups. The means for each level of the taxonomy

were: knowledge-comprehension, 93%, application-analysis,

59%, and synthesis-evaluation, 55% (Table 7).

The prediction that a difference across the three

Table 5

Summary of Analysis of Variance

on Three Treatments (Group, Test, and Bloom)

Source	df	MS	F
Group	3	1.663	4.411*
Subject within group	22	0.377	
Test	2	0.117	0.579
Group x Test	6	0.077	0.381
Treatment x Subject within Group	44	0.202	
Bloom	2	22.870	193.814**
Bloom x Group	6	0.172	1.458
Bloom x Subject within Group	44	0.118	
Test x Bloom	4	2.595	20.273**
Group x Test x Bloom	12	0.236	1.844
Test x Bloom x Subject within Group	88	0.128	

*$p < .05$

**$p < .001$

Table 6

Percent Correct Mean Scores

of Groups on All Levels of

Bloom's Taxonomy and

on All Examinations

Group Number	Mean Score
1	78%
2	66%
3	69%
4	63%

Table 7

Percent Correct Mean Scores

of Three Levels of Bloom's Taxonomy

Across All Groups and

Across All Examinations

Level of Bloom's Taxonomy	Mean Score
Knowledge-Comprehension	93%
Application-Analysis	59%
Synthesis-Evaluation	55%

examinations would occur was not substantiated, since the main effect Test did not reach significance (Table 5).

The prediction that variations in study guide assignments and testing requirements were expected to have a differential effect on test performance across the four groups was not substantiated, since the interaction of Group by Test did not reach significance (Table 5). Since the interaction of Group by Bloom also did not reach significance (Table 5), the prediction that group performance was expected to vary across the three examinations according to the three levels of Bloom's taxonomy was not substantiated.

Varying amounts of experience on the three levels of Bloom's taxonomy were expected to result in differential performance across the three examinations, and the significant interaction of Bloom by Test ($p < .001$, see Table 5), supports this prediction. In order to identify differences across examinations at each level of Bloom's taxonomy, a test for simple main effects (Kirk, p. 263) was run (Table 8). Results indicated that performance did not significantly vary across examinations for knowledge-comprehension items, but did vary significantly across examinations on application-analysis items ($p < .001$), and synthesis-evaluation items ($p < .05$). The mean scores for each level of the variable Bloom at each level of the variable Test are provided in Table 9. In addition, performance on each examination was examined for each

Table 8

Summary of Analysis of Variance

For Simple Effects

Source	SS	df	MS	F
Between Test at K-C	0.509	1	0.509	3.327
Between Test at A-A	1.905	1	1.905	12.791**
Between Test at S-E	0.811	1	0.811	5.301*
Error Term			0.153	
Between Bloom at Mid 1	5.351	1	5.351	42.808**
Between Bloom at Mid 2	6,153	1	6.153	49.224**
Between Bloom at Final	7.805	1	7.805	62.440**
Error Term			0.125	

*$p < .05$

**$p < .001$

Table 9

Percent Correct Mean Scores

For Each Level of Bloom's Taxonomy

On Each Examination

Examination	Level of Bloom's Taxonomy		
	K-C	A-A	S-E
Midterm 1	89%	72%	44%
Midterm 2	94%	48%	64%
Final Examination	97%	56%	57%

level of Bloom's taxonomy. A significant difference in performance on all three levels of the taxonomy occurred on each examination ($p < .001$). Means are summarized in Table 9.

The difference in study requirements across the four groups, resulting in different amounts of experience on the three levels of Bloom's taxonomy, was expected to result in a significant difference in performance across the three examinations. Since this difference in performance was expected, a triple interaction between the three independent variables Bloom, Test, and Group was expected to be significant. This interaction did not reach significance (Table 5), but barely missed significance ($p = .053$). Because it was predicted that certain of the interactions would reach significance, a test for simple simple main effects was run for those variables which were predicted to reach significance (Table 10).

Group differences on Midterm 1 on application-analysis items reached significance ($p < .001$), which tends to support the prediction that group differences were expected on application-analysis items on Midterm 1. Means for group differences are summarized in Table 11. None of the other predicted group differences reached significance (Table 10).

Difference in test performance on application-analysis items of Bloom's taxonomy occurred for Groups 2 and 3

Table 10

Summary of Analysis of Variance

For Simple Simple Effects

Source	SS	df	MS	F
Between Group at Mid 1, A-A	3.582	1	3.582	13.753**
Between Group at Mid 2, A-A	0.915	1	0.915	3.513
Between Group at Mid 1, S-E	0.281	1	0.281	1.079
Between Group at Mid 2, S-E	0.240	1	0.240	0.921
Error Term			0.2605	
Between Test at Group 2, A-A	3.883	1	3.883	25.379**
Between Test at Group 3, A-A	1.960	1	1.960	12.810**
Between Test at Group 4, A-A	0.053	1	0.053	0.346
Between Test at Group 2, S-E	0.534	1	0.534	3.490
Between Test at Group 3, S-E	0.571	1	0.571	3.732
Between Test at Group 4, S-E	0.784	1	0.784	5.124*
Error Term			0.153	
Between Bloom at Group 2, Mid 1	3.586	1	3.586	28.688**
Between Bloom at Group 3, Mid 1	4.039	1	4.039	32.312**
Between Bloom at Group 4, Mid 1	6.095	1	6.095	48.760**
Between Bloom at Group 4, Mid 2	4.595	1	4.595	36.760**

*$p < .05$

**$p < .001$

Table 11

Percent Correct Mean Scores

of Groups on the First Midterm Exam

and on Application-Analysis Items

of Bloom's Taxonomy

Group	Mean Score
1	89%
2	76%
3	71%
4	55%

(p < .001), Table 10, and on synthesis-evaluation items
for Group 4 (p < .05), Table 10. Group means are
summarized in Tables 12 and 13. None of the other
differences in test performance reached significance
(Table 10).

Group differences in test performance on knowledge-
comprehension items of Bloom's taxonomy are represented
in Figure 1. The graph illustrates that group mean
differences in scores on knowledge-comprehension items
ranged between five and ten percentage points on each
examination for all groups, with a slight decrease in
differences across the three exams. It was not expected
that any significant differences would occur in knowledge-
comprehension items across examinations, and the graph
illustrates the obvious lack of differences across
exams.

Group differences in test performance on application-
analysis items of Bloom's taxonomy are represented in
Figure 2. The graph illustrates that group mean differences
for Groups 2 and 3 in scores on application-analysis items
were significant across exams. These differences are more
apparent for Groups 2 and 3, illustrating the contrast
between those groups that reached significance and those
that did not.

Group differences in test performance on synthesis-
evaluation items of Bloom's taxonomy are represented in

Table 12

Percent Correct Mean Scores on Each Examination

For Application-Analysis Items and on Groups

Two and Three

| Groups | Examination | | |
	Mid 1	Mid 2	Final
2	76%	38%	47%
3	71%	46%	66%

Table 13

Percent Correct Mean Scores on Each Examination

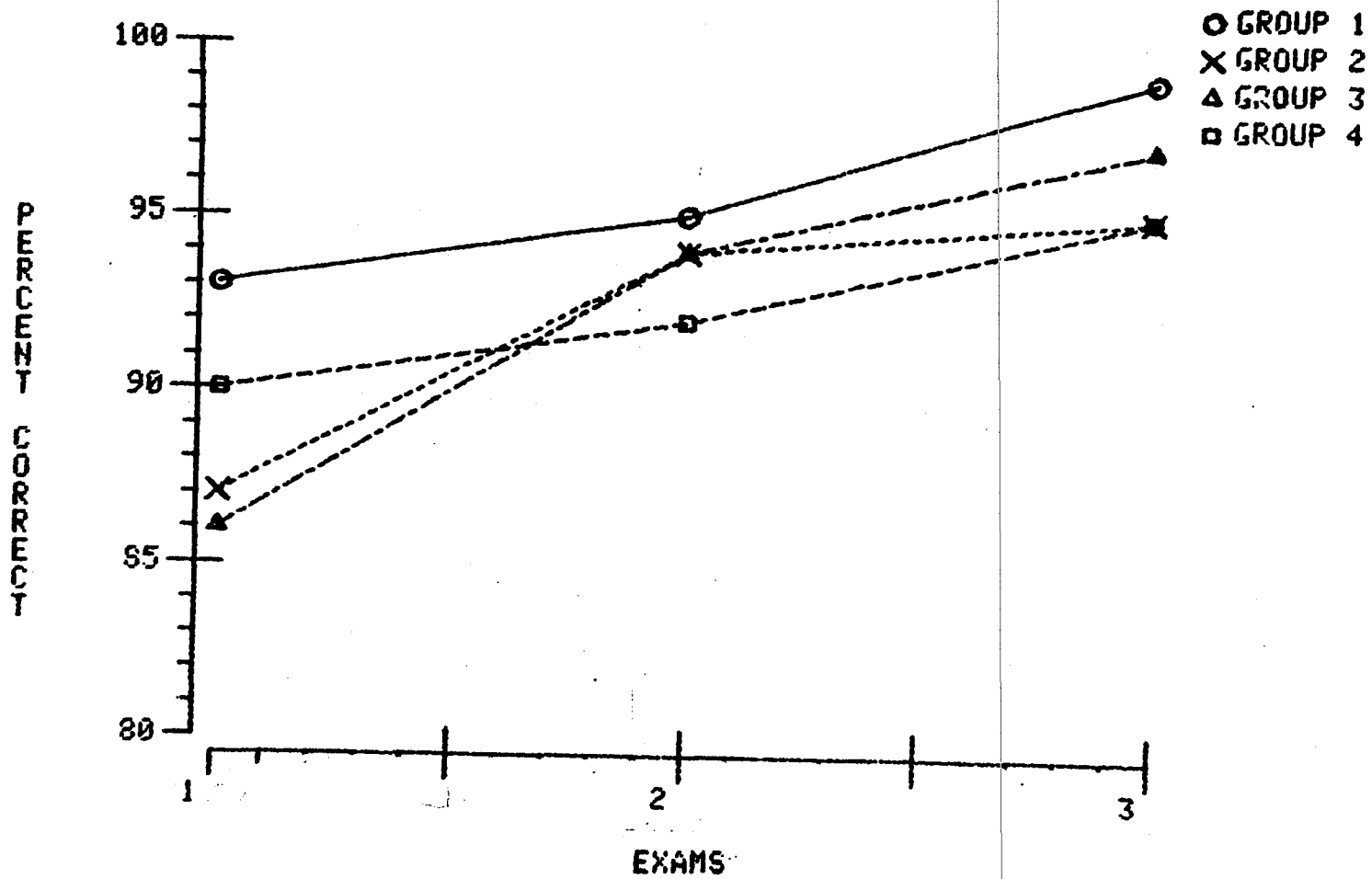For Synthesis-Evaluation Items and on Group 4

	Examination		
Group	Mid 1	Mid 2	Final
4	37%	60%	46%

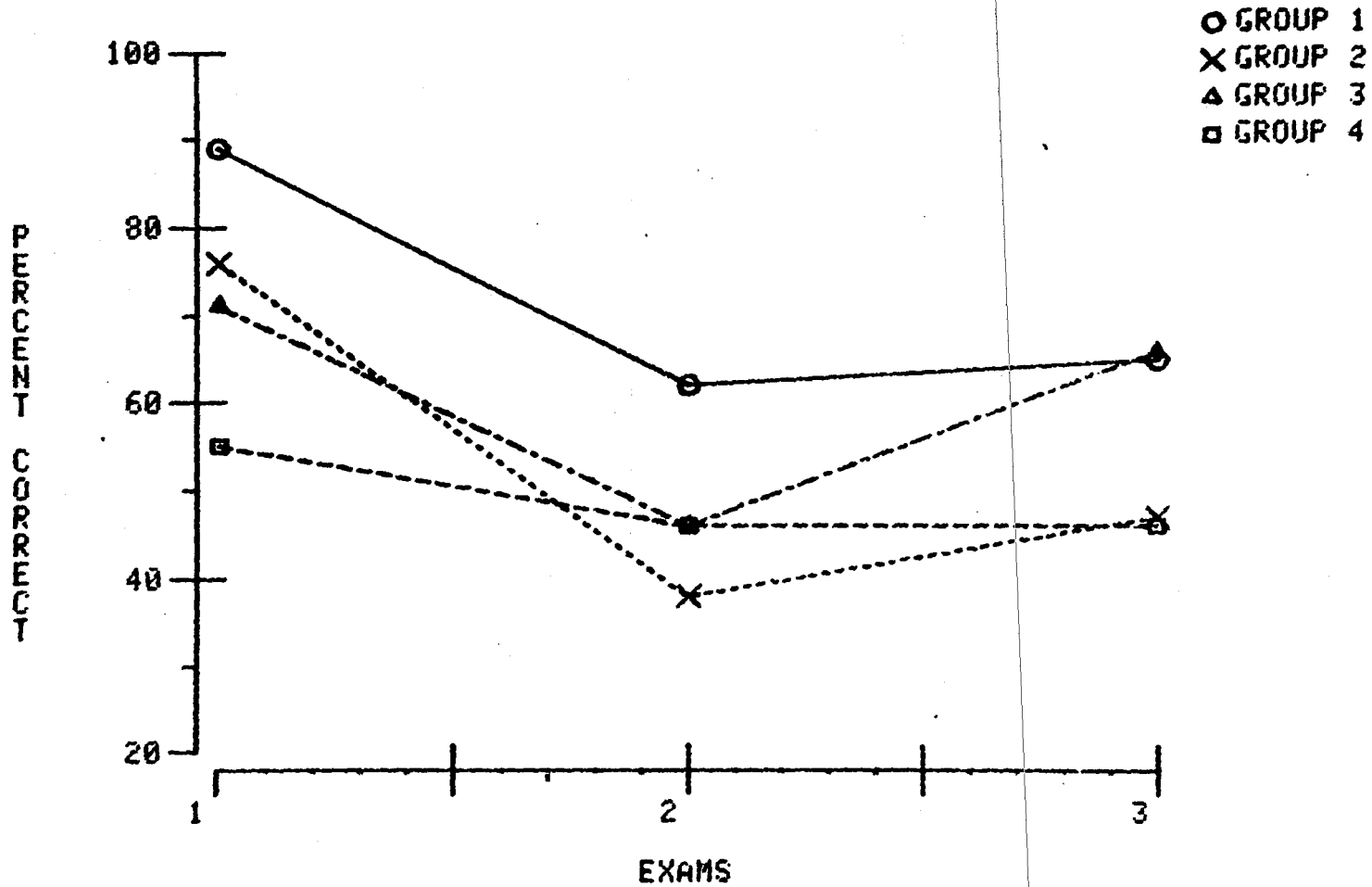Figure 1.   Group mean percent correct on K-C multiple-choice items across exams.

Figure 2. Group mean percent correct on A-A essay items across exams.

Figure 3, illustrating that group mean differences for Group 4 in scores on synthesis-evaluation items were significant across exams. The group mean differences for Group 2 appear to be almost as great, even though the simple simple main effects test did not reach significance. Groups 1 and 3 show obviously smaller differences between the other two groups.

Differences in performance on the three levels of Bloom's taxonomy were also tested for Groups 2, 3, and 4 on Midterm 1. All of these tests reached significance ($p < .001$), Table 10. A summary of means is included in Table 14. In addition, a test was run for Midterm 2, Group 4, which reached significance ($p < .001$), Table 10. A summary of means is included in Table 15.

One way analysis of variance. The results of the one way ANOVA (Table 16) on Midterm 1 were not significant. A trend analysis was run in order to identify if a point-to-point relationship exists between changes in the independent and dependent variables, respectively. Results of this test were significant ($p < .05$), indicating that such a relationship exists.

Results of the one-way ANOVA (Table 16) on Midterm 2 revealed no significant differences.

For the Final Examination, results of a one-way ANOVA (Table 16), revealed significance ($p < .05$), although no significant results were obtained on a Tukey (HSD) test
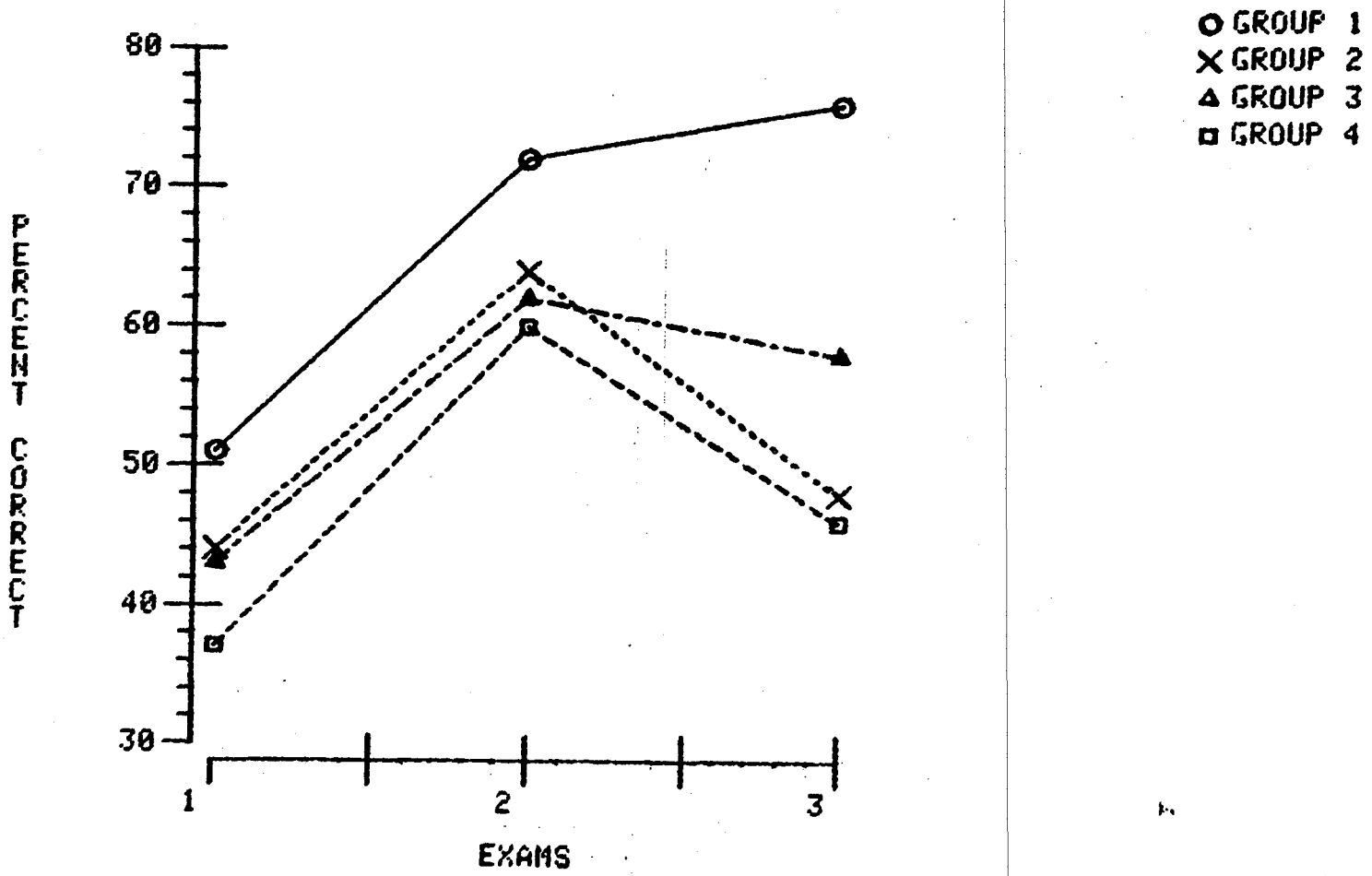
Figure 3.   Group mean percent correct on S-E essay items across exams.

Table 14

Percent Correct Mean Scores on Each Level

of Bloom's Taxonomy For the First Midterm Examination

For Groups Two to Four

	Level of Bloom's Taxonomy		
Group	K-C	A-A	S-E
2	87%	76%	44%
3	86%	71%	43%
4	90%	55%	37%

Table 15

Percent Correct Mean Scores on Each Level

of Bloom's Taxonomy For the Second Midterm

Examination and For Group 4

| Group | Level of Bloom's Taxonomy | | |
	K-C	A-A	S-E
4	92%	46%	60%

Table 16

Summary of One-Way Analysis of Variance

of Differences Between Groups on Essay Items (A-A & S-E)

Midterm 1

Source	df	MS	F
Between Groups	3	0.1897	2.671
Within Groups	22	0.0710	
Total	25		

Midterm 2

Source	df	MS	F
Between Groups	3	0.1025	1.828
Within Groups	22	0.0560	
Total	25		

Final Examination

Source	df	MS	F
Between Groups	3	0.3911	3.443[*]
Within Groups	22	0.1136	
Total	25		

*$p < .05$

**$p < .001$

for any conbination of groups. No significant differences in groups were expected, since all groups were considered equivalent in terms of study guide assignments and testing requirements during this phase of the semester.

Measures of Student Performance in the PSI Lab

Total lab time for completion of each unit per group was obtained by compiling start and end data from the individual student data form (Table 3). Group means for each unit are presented in Figure 4, and indicate a gradual decrease in total time spent in the PSI lab for all four groups, regardless of study guide/testing requirements.

Total time spent taking the mastery quiz for each unit per group was obtained by compiling start and end data from the individual student data form. This data is represented in Figure 5, and indicates a gradual decrease in total time spent taking the mastery quiz, regardless of study guide/testing requirement.

Date of completion of each PSI unit was obtained for each student, and compiled for each group from the individual student data form (Figure 6). The dates were then converted to available testing days and means for each unit per group were calculated. The graph indicates an almost identical progression of unit completion for each group as would be expected given the completion deadlines.

Number of mastery quiz retakes per unit was compiled
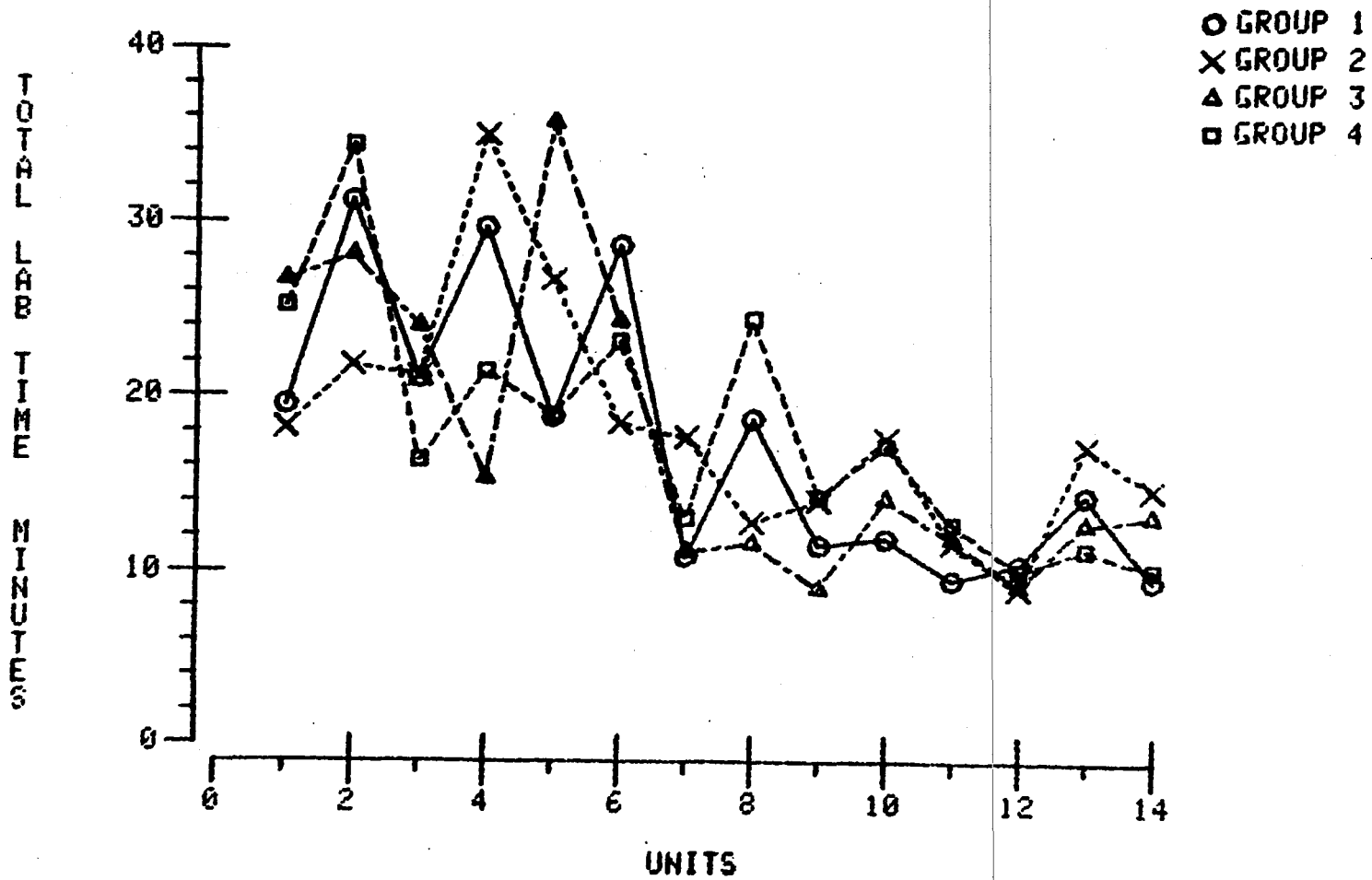
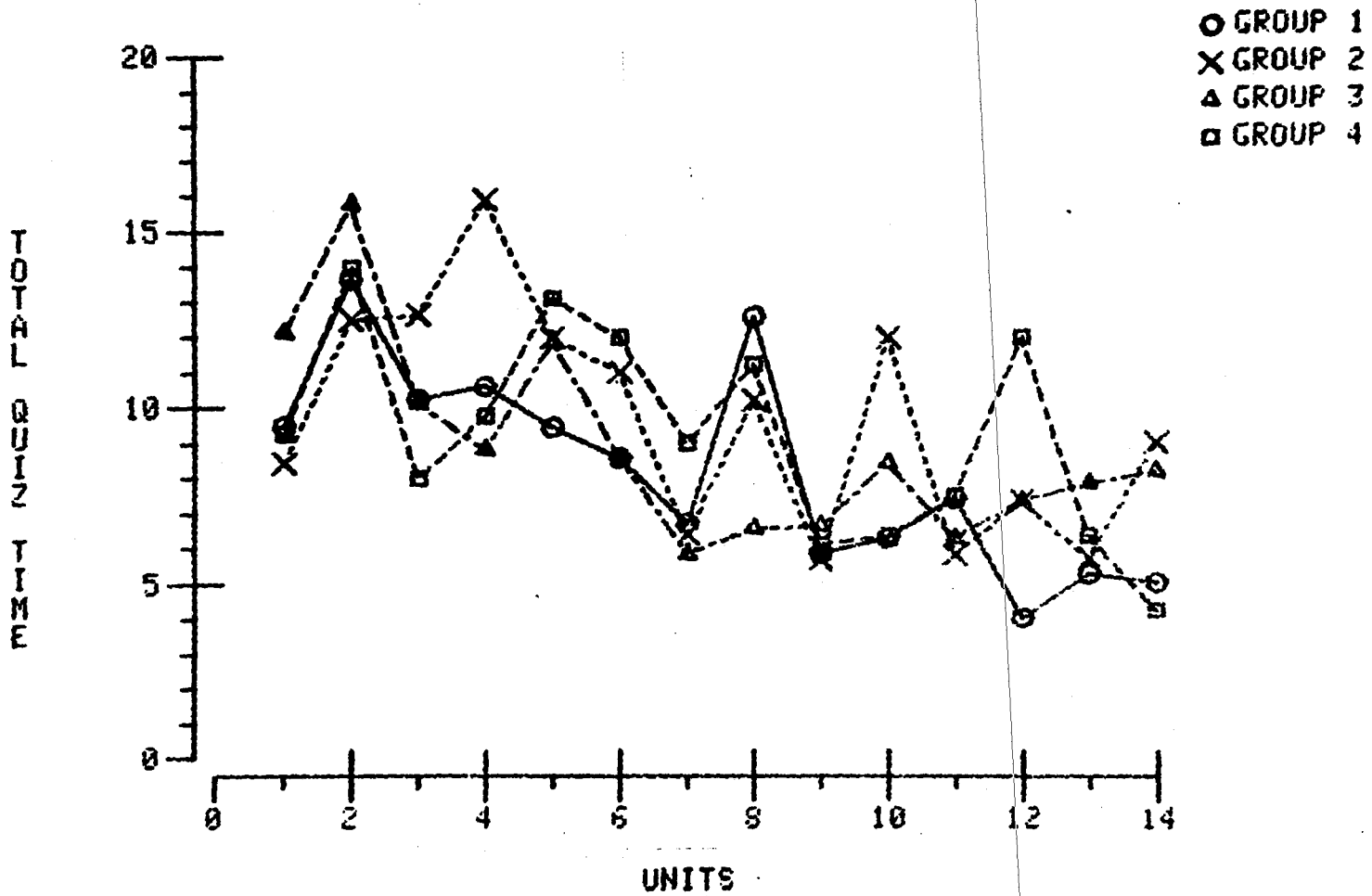Figure 4. Group mean lab time (min.) per unit of course material.

Figure 5.   Group mean quiz time (min.) per unit of course
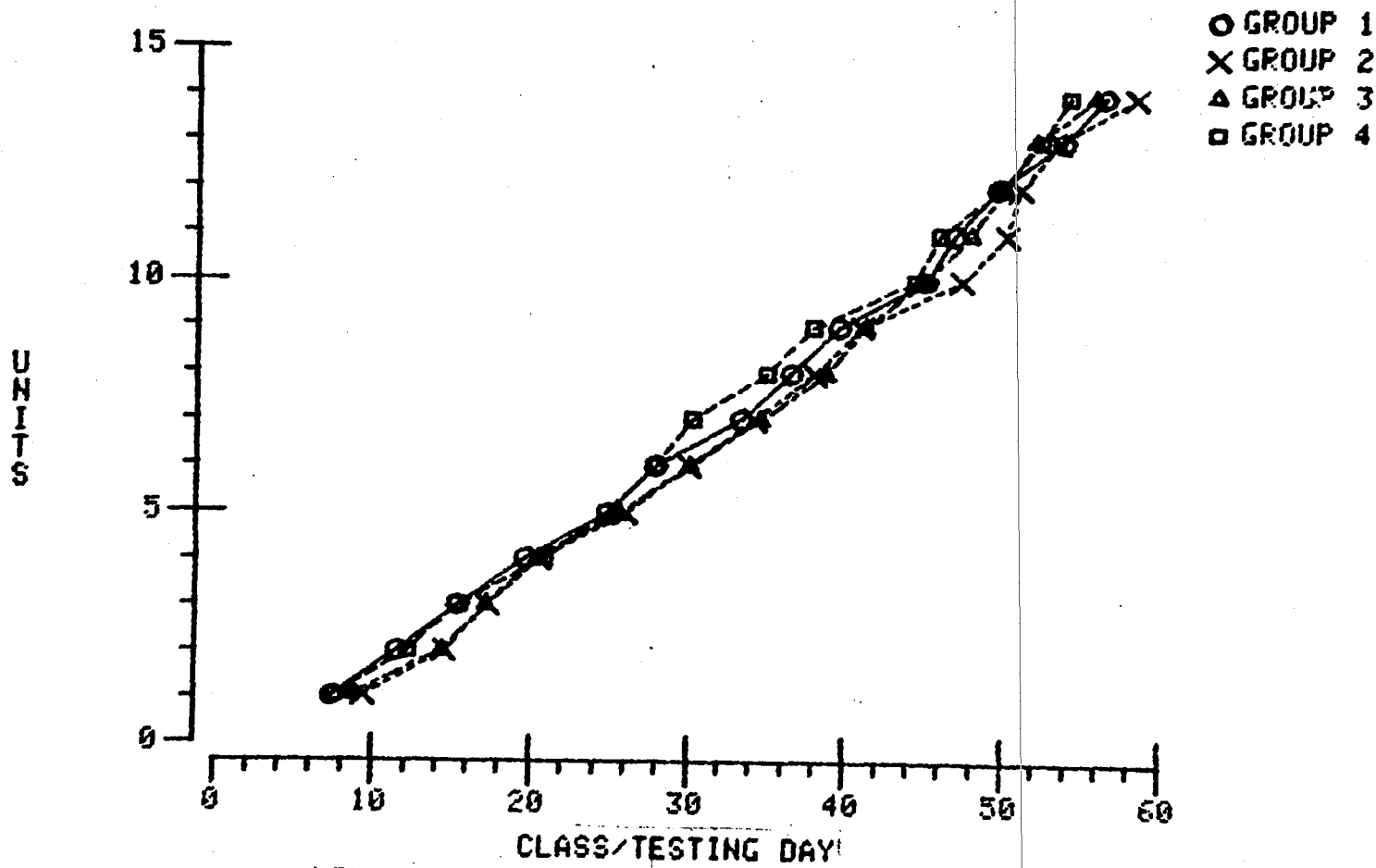material.

Figure 6.   Group cumulative number of units completed at
each consecutive class/testing day.

for the class as a whole (Figure 7), and for each group
separately (Figure 8). These data indicate an average of
about five retakes per unit for the first six units,
with a sharp drop in the number of retakes for the
remainder of the course. When the data were broken down
by group, after the first five units, Groups 3 and 4 had
very few retakes.

Measures of Student Opinion

Sixteen students completed the IDEA Report (Cashin,
Brock, Owens, and Slawson, Note 3), which was used to measure
student opinion about the course, and was administered at
the time of the Final Examination. Since the number of
students completing this report was so low (16 from the
26 used in the final data analysis), little inferential
confidence can be attached to the results of this measure.
Questions specific to the PSI method and the instructional
procedures used in this course will be discussed.

Study materials. Three questions (#47,48,51)
dealt with the higher-level study questions. A
large amount of variability was present in these responses.
Some students agreed that they learned more about how to
answer essay questions in general from completing the
application of concepts sections of the study guides, and
several used the application of concepts sections of the
study guides to prepare for the three major exams. In
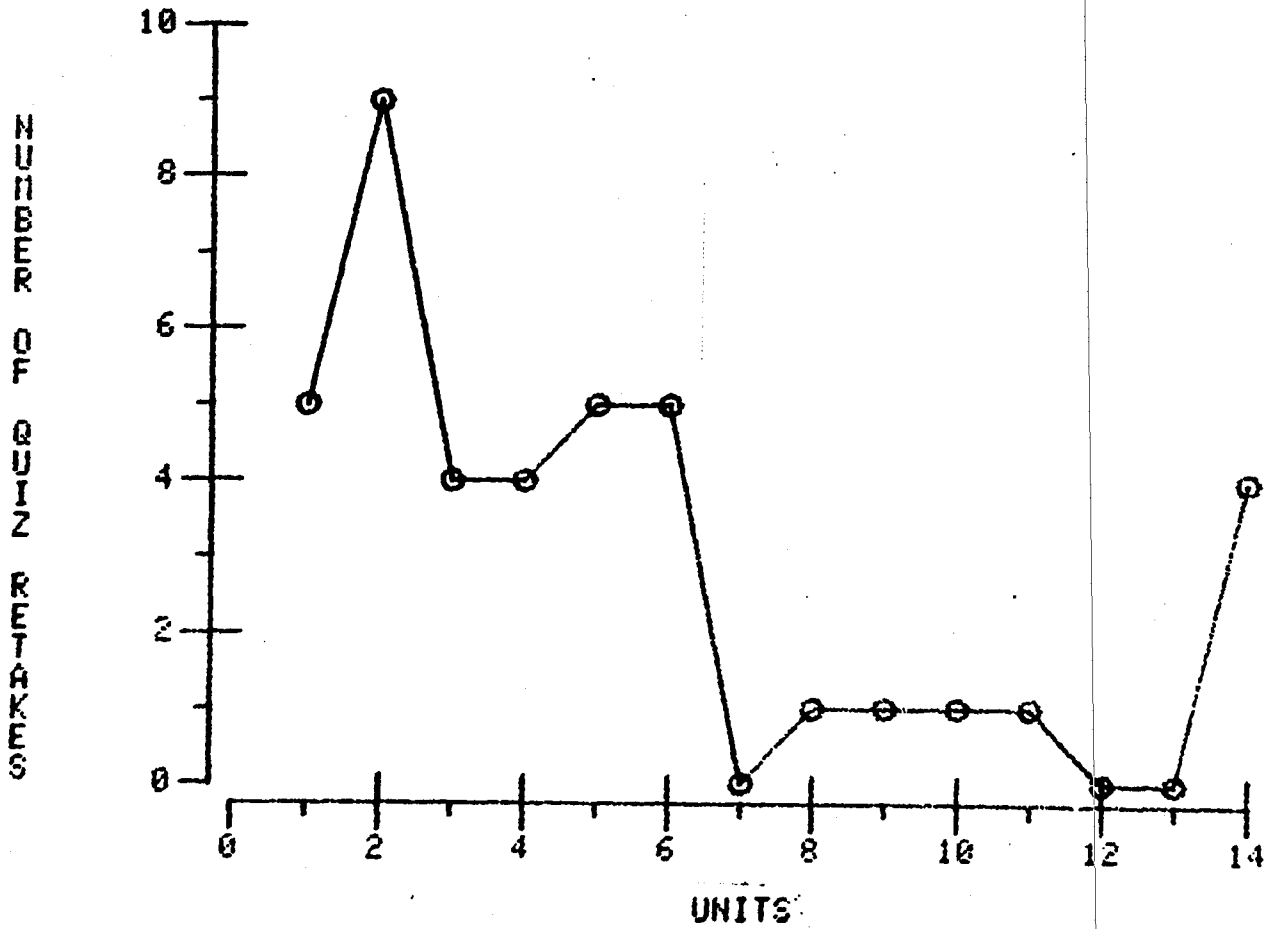general, students were inconsistent as a group as to whether

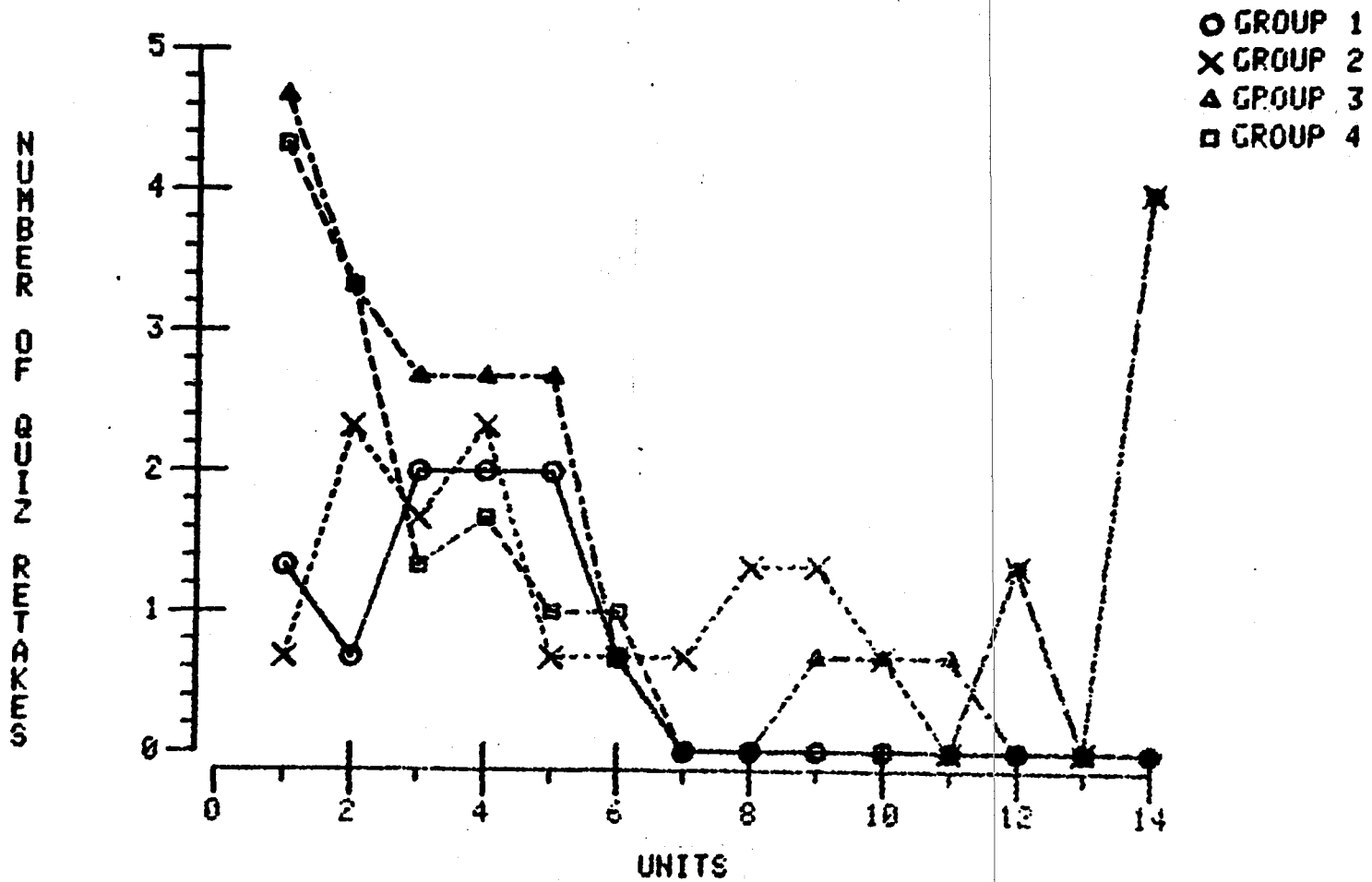Figure 7.   Total number of mastery quiz retakes per class.

Figure 8. Total number of mastery quiz retakes per group. The data was smoothed using a three-point moving average.

the essay questions on the exams were a fair representation of the application of concepts sections of the study guides.

Six questions dealt with the use of study materials, including study guides and texts (#9,10,14,16,17,20). On the average, students felt that the materials were frequently organized in a manner which aided learning and retention, the study guides frequently stated clear study objectives for each quiz, and the texts and study guides frequently explained the material clearly. Students tended to agree that, at least sometimes, the texts and study guides made it clear how each PSI unit fit into the course. Students felt that the texts were sometimes overly dry and dull. In general, most of the students felt that studying the material was intellectually stimulating some of the time.

Components of the PSI system. Three questions (#52,53,54) dealt with the self-pacing component of the PSI system. In general, students were undecided about self-pacing as a way to organize their activities in the course. However, students felt that the PSI system frequently enabled them to solve problems without outside help.

Responses to two questions (#55,56) assessing preference for PSI as compared to traditionally taught courses varied widely, with the average response being neutral or undecided.

Two questions (#11,40) dealt with the role of proctors

in this class, about which students were very positive. Proctors were reported as frequently helpful in explaining mistakes on unit quizzes, and in explaining difficult material in the tutoring situation.

Five questions (#6,12,44,45,46) assessed student opinion about mastery quizzes. Students tended to agree that the quizzes placed too much emphasis on memorization rather than understanding, and that the quizzes sometimes included questions that were unclear. Students strongly agreed that the quizzes were a fair test of the material in the concepts section of the study guides. Students were divided over whether they felt they had really mastered the material after they passed a quiz, but a plurality agreed that they did. On the average, students tended not to feel resentful if they had to retake a quiz.

Course objectives. The instructor identified two objectives which were considered important in this course. They were: (a) gaining factual knowledge (terminology, classifications, and methods, #21), and (b) learning fundamental laws, properties, principles, and generalizations, #22). Students rated these items on the progress that they felt they had made in this course compared with that made in all other courses taken at this university. This course was rated as average compared to all other courses taken at this university. When the responses of students were compared to responses of students in similar

courses in terms of class size and motivation level taken at this university, students rated this course as average.

Three objectives were identified as essential by the instructor. These were: (a) developing a sense of personal responsibility (#27), (b) developing skill in expressing oneself orally or in writing (#29), and (c) discovering the implications of the course material for understanding oneself (#30). In all three objectives, students rated this course as high average as compared to all courses taken at this university. Students also rated this course as high average when compared to similar courses in terms of class size and motivation level at this university.

Discussion

The manipulation that was employed in the present study was the nature of the study guide assignments and testing requirements in the mastery testing situation. At various points in the semester, groups of students were required to complete exercises in the study guide which corresponded to the first two levels of Bloom's taxonomy (knowledge and comprehension), and were only required to perform at that level in the mastery testing situation. At other points, all groups, in addition to completing exercises at the first two levels, were to complete additional study guide exercises corresponding to the four higher levels of Bloom's taxonomy (application,

analysis, synthesis, and evaluation), and to perform at those levels in the mastery testing situation.

The prediction was that requiring students to respond to study objectives of a complex, higher nature would improve later performance of complex or higher-level skills in a testing situation. Specifically, the second level of study guide assignments/testing requirements was designed to train students to perform to the highest levels in Bloom's taxonomy on three major examinations. The results of this study indicate that the basic hypothesis was partially confirmed; that requirements placed on students during study somewhat determined the complexity of learning that occurred. A statistical analysis of the results indicated that the training had some effect, but the hypothesis was only partially supported by the results.

Because the results tend to confirm the experimental hypothesis in this study, the use of complex study materials appears to be an effective method of achieving higher levels of performance. This conclusion is consistent with results reported by Kutner, Davis, and Beauchamp (Note 2), Miller (1975) and Miller and Weaver (1975, 1976) from courses using slightly different procedures. The effects of the procedures designed to produce higher-level learning in this study will be discussed as well as the practicality of the course

procedures.

Effectiveness of Higher-level Study Requirements

This study attempted to evaluate whether requirements of students during study to perform at higher levels will determine the complexity of learning produced as measured by examination performance. A differential performance across groups is a factor that indicates the effectiveness of the higher-level study requirements, since the amount of time spent in the higher-level requirement was varied across groups. The nature of the differential performance was expected to occur in descending order across groups, with Group 1 having the highest scores. Results of the analyses indicated this expected differential performance. In particular, Group 1, which was required to achieve higher levels of performance from the beginning of the course, showed higher levels of performance than the other three groups on several measures. Table 6 indicates the descending order across groups of percent correct mean scores on all levels of Bloom's taxonomy and on all examinations. Table 11 also shows this descending order of performance on percent correct mean scores of groups on application-analysis items on Midterm 1. Groups 2, 3, and 4 also showed differential performance on each level of the taxonomy in the expected direction, as shown in Table 14. Finally, a visual inspection of Figures 1, 2, and 3 shows Group 1 achieving superior performance to

the other three groups on all levels of the taxonomy over all three examinations. This superior performance of Group 1 indicates that training students to perform at higher-levels is most effective if the students begin this training at the beginning of the course. In this study, the length of time that a group was exposed to the higher-level training had a noticeable effect on later examination performance.

A difference in performance between the three levels of Bloom's taxonomy is another factor in judging the effectiveness of higher-level study requirements. Without the higher-level training, a large difference in performance between the knowledge-comprehension items and the higher-level items of the taxonomy would be expected, since higher-level performance is presumably a skill which requires training. The training was expected to minimize differences in performance between the knowledge-comprehension items and the higher-level items of the taxonomy. Differences between means on the three levels of the taxonomy across all groups and across all three examinations, as represented in Table 7 (K-C = 93%, A-A = 59%, S-E = 55%), indicates that the difference between the knowledge-comprehension items and the higher-level items is greater than might be expected if training had been most effective.

Another indication that training was not maximally

effective is an examination of the percent correct mean
scores for each level of the taxonomy on each examination
across all groups, as represented in Table 9. An upward
trend in performance on each level of the taxonomy with
each examination was expected, since students gained
increasing experience with higher-level items as the
course progressed. The scores on knowledge-comprehension
items showed this trend across exams (Midterm 1 = 89%,
Midterm 2 = 94%, and Final Examination = 97%). However,
scores on application-analysis items decreased sharply
after the first midterm, and increased only slightly on
the final examination (Midterm 1 = 72%, Midterm 2 = 48%,
and Final Examination = 56%). Scores on synthesis-
evaluation items increased on the second midterm, but
decreased slightly on the final examination (Midterm 1 =
44%, Midterm 2 = 64%, and Final Examination = 57%).

Practicality of Course Procedures

An important consideration in this study was the
practicality of the course procedures, since the nature
of the training procedures required more time to be spent
in the PSI lab than is often needed in most PSI courses.
Several measures of student performance in the PSI
laboratory provided information about the mastery testing
procedures. The measures of time spent in the mastery
testing situation were of particular interest, since a
previous course designed to produce higher-level performance

resulted in approximately one hour, on the average,

for a student to complete a unit quiz (Kutner, Davis,

and Beauchamp, Note 2). Measures of student opinion

were also of interest, since these yielded information

about student satisfaction with the course procedures.

Total lab time. The proctor recorded the time that

the student entered the PSI lab and the time that the

student left the PSI lab on the individual student data

form. Each visit to the lab was recorded, and the

total time per student for each unit was calculated.

These data were compiled to yield a measure of total

time spent in the PSI lab for completion of each unit

per group. As the course progressed, a gradual decrease

across all four groups was noted, indicating that as

students became more familiar with the testing procedures,

less time was needed to complete the procedures (Figure 4).

The mean amount of time per unit across all groups was

18 minutes. In general, this amount of time could be

considered a reasonable amount of lab time to reach

mastery for a particular unit when compared to similar

courses. In another study which attempted to teach

students to perform at higher levels of learning, students

often required approximately an hour of testing time in

order to pass a unit (Kutner, Davis, and Beauchamp, 1981).

In this study, since the majority of student behavior

occurred in the study and not the testing situation,

students were able to have more freedom in scheduling their time to complete the requirements for this course, as well as requiring less time of the proctors in the lab. The data do not reflect the actual time that the student spent completing testing procedures; some of this time could have been spent waiting to be tested or waiting for a quiz to be graded. Also, because of proctor distraction and recording errors, some of the measurements were inaccurate. This measure should only be considered as an estimate of total lab time; still, it indicates that the system was manageable by staff. In future studies of this kind, total lab time should be expected to increase if the requirements for the students to answer the higher-level questions on the study guides are made to be more stringent. However, the procedure used in this study, in which students completed questions outside of the lab and had them checked in the lab, instead of one in which students wrote answers to questions in the lab, would still seem to be a more practical procedure.

Pre-quiz monitoring. The procedure of pre-quiz monitoring, in which the students were screened on three concepts from the unit selected at random, appeared to be an effective procedure, as reflected in the number of retakes per unit needed for the student to pass the quiz. Number of retakes presented for the class as a whole is presented in Figure 7, and for each group separately in

Figure 8. The numner of retakes for the class as a whole and by group tended to decline over the course of the semester, indicating that students were becoming more skilled at preparing for and taking unit quizzes. These results were consistent with results of a study by Peters (1975), which showed that when pre-quiz monitoring was used, students performed significantly better on unit quizzes. In this study, the small amount of time needed to implement the pre-quiz monitoring procedure appeared to be well worth the effort by staff.

Total time spent taking the mastery quiz. The proctor recorded the time when the student was handed the 10-item, multiple-choice quiz, and the time when the student brought the quiz back for grading. A gradual decrease across all four groups was noted as the course progressed, indicating that the students were becoming more proficient at taking the quizzes (Figure 5). The mean amount of time per unit across all groups was 9 minutes, although this figure is expected to be slightly less than actuality because of possible recording error. This amount of time is consistent with the 10-15 minutes recommended by Keller and Sherman (1974) for students to take a mastery quiz. Because all students later averaged 93% on the K-C items across the three major examinations, this indicates that the procedures used to train students on K-C items were effective as well as efficient.

Date of completion of PSI unit. In Figure 6, a
steady rate of completion was evidenced over all groups.
This course utilized instructor-imposed deadlines and
bonus points in order to minimize procrastination,
and these methods apparently contributed to the uniform
rate of completion. Although bonus points were used to
reward students for completing more than the number of
units that were to be covered on the upcoming midterm
exams, the deadlines by which a student was required to
drop the course allowed students to complete less than
the number of units which would be covered on the
midterm. As a result, students were not always prepared
to answer the higher-level items on the midterms as well
as they could be prepared. This situation could have
adversely affected Midterm 1 performance. By the date
of the first midterm, only 8 of the 26 students used
in the final data analysis had passed the five units which
were covered on the midterm. By the date of the second
midterm, 23 of the 26 students had passed all the units
that were covered on the exam. The difference in the
number of units that students had completed by the first
examination as compared to the second examination may
indicate that students had learned to pace themselves more
effectively. However, because such large numbers of
students did not complete all of the units which were
covered on the first midterm, modification of the deadline
system to encourage students to complete all units that

will be covered on upcoming exams is suggested for future courses.

Choice procedure. By choosing to complete the application of concepts sections for the units in the choice condition, students were expressing their opinion about the usefulness of the training procedures. Three students out of 26 chose to complete at least one application of concepts section during the choice procedure. Out of 104 units for which the application of concepts section could have been completed over all 26 students, eight units were completed, all by these three students. Two students were in Group 1 and one student was in Group 2.

Three questions on the IDEA form pertaining to the application of concepts section were included in order to assess student opinion about the usefulness of the training procedures. Even though the validity of the responses to the IDEA form is low because of the small sample size, responses to these questions suggest why so few students completed the application of concepts section when given the choice to do so. Even though students indicated that they used the application of concepts section to prepare for the exams and that they learned more about how to answer essay questions from completing the application of concepts section, the wide variety of responses indicate that the training in answering higher-

level items was not seen as being as helpful as it should have been. In addition, students were neutral or undecided as to whether the essay questions on the three examinations were a fair representation of the questions from the application of concepts sections of the study guides. Since students ideally would have considered the completion of the application of concepts sections of the study guides as helpful in preparing for the higher-level questions on exams, responses to this item suggest that the training was not perceived as useful by students.

Conclusions

The results of this study indicate that training students to respond to higher-level objectives during study did have some effect on higher-level performance in a testing situation, but was as not as successful as expected. The procedures used in the PSI lab were successful and are recommended for future courses of this nature. Two explanations are offered for the failure of the training to have the desired results. First, the requirements placed on students during study were not as stringent as criteria used to grade essay questions on the exams. Second, the ability to respond to the types of questions used on the exams involves a subset of skills which were not directly addressed in treatment. These two factors will be discussed and

suggestions will be made for future study. Finally, the use of Bloom's taxonomy will be discussed as a method of classifying instructional tasks.

Requirements placed on students during study. Although students received higher-level essay questions on study guides that were consistent with those on exams, the responses of students on study guides were not evaluated as carefully as those on the exams. A detailed answer key was prepared by the instructor for grading exams, but no guidelines were provided for proctors when checking the higher-level study questions. As a result, proctors were not adequately trained to check study questions, and students were not adequately trained during study. The responses that students made to study guide questions were probably essentially correct, but the amount of detail which was considered acceptable for the study guide question usually was less that what was required to achieve a high score on the examination question. For example, examination questions often included requirements such as: (a) present two facts which would support a particular theory, (b) present two facts which would not support the theory, (c) identify several flaws in a plan, (d) present several suggestions for imporvement. These details were not specified as carefully on study guides. As a result, students may have been able to pass the screening of their answers in the PSI lab, yet the same

answers on the exams may have only earned them partial credit.

Another problem with the lack of guidelines for the study guide questions is evident in the traditionally low reliability between graders on essay questions. If the proctor in the PSI lab is not the person responsible for establishing the grading criterion on exams, differences in judgment between proctors and graders would likely occur. In future courses of this nature, criteria for each essay question on the study guides should be established by the same person who will establish the criteria for grading exams. To ensure consistency of grading procedures between proctors and the instructor, training in grading essay questions should be provided for proctors, with the goal of establishing reliability between the proctor and the instructor.

Skills indirectly involved in answering essay questions. Several related skills are involved in answering higher-level questions that were not directly addressed in the training procedures. The classes within the taxonomy, such as "analysis," "synthesis," and "evaluation", imply that the student must emit certain behaviors involved in analyzing or evaluating a problem or situation, and in synthesizing information to formulate a plan. However, these behaviors are not clearly defined for the item writer, and a degree of interpretation is left to the

item writer. Since students would not be expected to have
as much experience with tasks of this nature as they would
with behaviors required of them when answering the
knowledge and comprehension items (e.g. "define", "list",
"name"), students may need training in how to respond to
the instructional words in the higher-level items. The
understanding of these instructional words may vary from
student to student, and from instructor to instructor.
Some skills required of students when answering higher-
level questions are: (a) determining what is required in
answering the question and being able to identify the
main part or parts of the question, then addressing several
points separately, (b) being able to present a logical
argument, using facts from the texts and examples from
one's own experience, (c) presenting a plausible counter-
argument on the same topic, and (d) identifying subtleties
in meaning between words like "feasible," "appropriate,"
and "realistic" and discussing a problem in each of these
ways. In future courses of this nature, training of skills
indirectly involved in answering essay questions such
as these should be included as part of the total package.
This will involve defining the components of an acceptable
response, and to some extent, will be left up to the
instructor.

Bloom's taxonomy as a classification of instructional
tasks. Five major problems with the use of widely used
classification systems for instructional tasks have been

described by Johnson and Chase (1981). These are:
(a) classifying instructional tasks on the basis of
inferred mental operations which are not clearly
defined, (b) difficulties in precisely determining
how a given instructional task should be classified
within the taxonomy, (c) focus on formal or structural
properties of objectives and neglect of the conditions
under which the task will be performed, (d) assuming
that such tasks are hierarchical in nature, and (e)
focus on the qualitative features of behavior, to the
neglect of temporal characteristics. Each of these
problems will be discussed in relation to this study with
suggestions for future courses of this nature.

The problems with classifying instructional tasks
on the basis of inferred mental operations and the
necessity of defining the operations involved in Bloom's
taxonomy have already been addressed. A better way to
organize a course may be to first define what objectives
are to be taught and what material is to be emphasized,
and merely use a taxonomy as a guide. This process of
adapting a taxonomy to the course seems more desirable
than trying to fit the subject matter into a system which
may not be the most appropriate for the subject matter
taught. Johnson and Chase recommend the use of a system
which is based on the topography of the desired performance,
the conditions under which the performance will occur,

and the relation between such conditions and those that
prevailed during instruction.

In this study, the process of classifying items
into levels of Bloom's taxonomy did not present any
major problems, but formal or structural properties of
objectives were emphasized in order to provide an
equal division of questions within the taxonomy. If
the taxonomy were only used as a guide to writing objectives,
an instructor may wish to emphasize some levels of the
taxonomy more than others, depending on the subject
matter. In this course, since the main objective was
to teach students to formulate a self-modification plan
using principles of learning and behavior, the application
and evaluation levels were probably the most relevant
levels of the taxonomy to be emphasized because students
could directly apply the techniques to their own self-
modification plan, gain practice in evaluating a plan for
flaws, and offer suggestions for change. Requiring the
student to analyze differences between procedures or to
present arguments for or against a theory or idea may
provide the student with related knowledge about the subject
matter, but may not relate directly to the main objective
of the course.

The assumption that tasks in the six levels of Bloom's
taxonomy are hierarchical in nature presented several
problems in this study. For example, a student may

complete a higher-level task successfully on the basis of a previously memorized solution. If this occurs, the student would then be unprepared for subsequent higher-level items. Second, it is not clear whether successful higher-level tasks as used in this study were dependent on the completion of lower-level tasks in all instances. As mentioned previously, a system which specifies overt learner behavior would benefit both the designer of instruction and the student.

To some extent, the qualitative features of student behavior rather than the temporal characteristics of student behavior were emphasized, which may have caused lowered performance on the examinations. Although temporal demands were not specified for the 10-item multiple-choice mastery quizzes, the 10-15 minutes recommended by Keller and Sherman (1974) was used as a guide in evaluating whether the quizzes were being completed in a reasonable amount of time. For the higher-level questions, students were not under any time constraints in the study situation but were under time constraints in the examination situation, which may have adversely affected their performance on the higher-level items. Further investigation of ways to construct higher-level examination questions is needed in order to develop examinations that thoroughly test the higher-level material and can be easily completed within the 2-hour

time limit. The use of objective rather than essay questions for higher-level items may minimize this problem, although objective questions for this type of item are very difficult to write.

In summary, several problems were noted in this study with the use of Bloom's taxonomy to classify instructional tasks. The behaviors required of students are described in the taxonomy on the basis of inferred mental operations rather than being clearly defined, too much emphasis was placed on adapting the subject matter to the taxonomy, the assumption that tasks are hierarchical in nature did not seem to be valid, and temporal features of student behavior were ignored, which may have affected exam performance.

The use of a classification system for instructional objectives offers advantages to the instructional designer, since it provides guidelines to ensure that all objectives of a course are being covered. The use of such a system is particularly important when designing a curriculum to promote higher levels of learning. However, a taxonomy such as the one developed by Bloom is probably not equally applicable to all courses and all subject matter. An instructor should either adapt a taxonomy to fit the purposes of a particular course, or to use a classification system which eliminates most of the problems inherent in Bloom's taxonomy.

Another method of organizing instructional materials is proposed by Johnson and Chase, which is based on Skinner's (1957) verbal behavior classification system. This system can include all of the behaviors that are typically considered "higher-level", while clearly defining the behaviors included in higher-level skills. All of Skinner's functional verbal relations are classified into two categories: (a) elementary, which requires verbal behavior that is fixed, or memorized, and (b) conceptual, which requires the student to respond to novel stimuli. This system takes into account all of the possible situations in which speaking and writing can occur, and enables the instructional designer to use any combination of verbal tasks to produce objectives with the desired degree of complexity. The difficulty of a task is dependent on the student's prior history with the task, and whether new combinations of previously learned behaviors are used in the presence of new stimuli. In addition, the instructor may establish proficiency standards for completing a terminal task, such as whether a student can perform the task in a time limit deemed appropriate by the instructor. In future attempts to design curriculum which produce higher levels of learning in students, this system may prove to be more effective and more adaptable to the needs of instructors.

Reference Notes

1. White-Blackburn, G. The effects of trained and untrained proctors on student performance and satisfaction in a PSI course. Unpublished master's thesis, University of the Pacific, 1977.

2. Kutner, R. A., Davis, M. L., & Beauchamp, K. L. Higher-order learning in a PSI course on self-control. Paper presented at the meeting of the American Psychological Association, Los Angeles, August, 1981.

3. Cashin, W. E., Brock, S. C., Owens, R. E., & Slawson, H. M. IDEA. Understanding student reactions to instruction and courses. Interpretive Guide. (Available from [Center for Faculty Evaluation and Development in Higher Education, 1627 Anderson Avenue, Box 3000, Manhattan, KS., 66502]).

References

Block, J. H. (Ed.). Mastery learning: Theory and practice. New York: Holt, Rinehart, & Winston, 1971.

Bloom. B. S. (Ed.). Taxonomy of educational objectives. Handbook I: Cognitive domain. New York: Longman, 1956.

Born, D. G., Gledhill, S. M., & Davis, M. L. Examination performance in lecture-discussion and personalized instruction courses. Journal of Applied Behavior Analysis, 1972, 5, 33-43.

Bunck, T., & Iwata, B. Evaluation of an instructor-inposed contingency for responding to study questions in a contingency-managed course. Journal of Personalized Instruction, 1980, 3, 165-168.

Chance, P. Learning and behavior. Belmont, Cal., Wadsworth, 1979.

Davis, M. L. Mastery test proficiency requirement affects mastery test performance. In J. M. Johnston (Ed.), Behavior research and technology in higher education. Springfield: Charles C. Thomas, 1975.

Farmer, J., Lachter, G. D., Blaustein, J. J., & Cole, B. K. The role of proctoring in personalized instruction. Journal of Applied Behavior Analysis, 1972, 5, 404-404.

Grant, L., Bono, S., Bacon, A., & Keenan, J. Effects of study techniques and quiz points on student study and quiz responding. Journal of Personalized Instruction, 1980, 4, 115-119.

Grant, L., Keenan, J., & Hursh, D. The effects of study questions, the SQ3R system of studying, and reading and rereading on academic performance. _Journal of Personalized Instruction_, 1980, _4_, 142-147.

Hursh, D. Personalized systems of instruction: What do the data indicate? _Journal of Personalized Instruction_, 1976, _1_, 91-105.

Hursh, D. E., Sheldon, J., Minkin, B., Minkin, N., Sherman, J. A., & Wolf, M. M. Proctor's discussion of student's quiz performance with students in a self-paced (PSI) undergraduate course. In J. M. Johnston (Ed.), _Behavior research and technology in higher education_. Springfield: Charles C. Thomas, 1975.

Jenkins, J. R., & Deno, S. L. Influence of knowledge and type of objectives on subject matter learning. _Journal of Educational Psychology_, 1971, _62_, 67-70.

Jenkins, J. R., & Neisworth, J. T. The facilitative influence of instructional objectives. _Journal of Educational Research_, 1973, _66_, 254-256.

Johnson, K. R., & Chase, P. N. Behavior analysis in instructional design: A functional typology of verbal tasks. _The Behavior Analyst_, 1981, _4_, 103-121.

Johnson, K. R., & Ruskin, R. S. _Behavioral instruction: An evaluative review_. Washington, D. C.: American Psychological Association, 1977.

Johnson, K. R., & Sulzer-Azaroff, B. The effects of different proctoring systems upon student examination performance and preference. In J. M. Johnston & G. M. O'Neill (Eds.), Research and technology in college and university teaching. Gainesville: University of Florida, Society for Behavioral Technology and Engineering, Psychology Department, 1975.

Johnston, J. M., & O'Neill, G. W. The analysis of performance criteria defining course grades as a determinant of college student academic performance. Journal of Applied Behavior Analysis, 1973, 6, 261-268.

Keenan, J. B., & Medio, F. J. Objectives-based instruction in the health sciences: Forming complex behavior. Notes for Faculty, 1981, 3.

Keller, F. S. A personal course in psychology. In R. Ulrich, T. Stachnik, & J. Mabry (Eds.), The control of behavior. Glenview, Ill.: Scott, Foresman, 1966.

Keller, F. S. Good-bye, Teacher. . . Journal of Applied Behavior Analysis, 1968, 1, 79-89.

Keller, F. S. Neglected rewards in the educational process. In S. R. Wilson & D. T. Tosti (Eds.), Learning is getting easier. San Rafael, Ca.: Individual Learning Systems, 1972.

Keller, F. S., & Sherman, J. G. PSI: The Keller plan handbook. Menlo Park, Ca.: W. A. Benjamin, 1974.

Kirk, R. E. Experimental design: Procedures for the behavioral sciences. Belmont, Cal.: Brooks/Cole Publishing Co., 1968.

Lloyd, M. E., & Eastman, E. M. Performance on study-guide and non-study-guide test questions as a function of study guide availability. Journal of Personalized Instruction, 1977, 2, 80-83.

Lloyd, K. E., Garlington, W. K., Lowry, D., Burgess, H., Euler, H. A., & Knowlton, W. R. A note on some reinforcing properties of university lectures. Journal of Applied Behavior Analysis, 1969, 2, 125-133.

McMichael, J. S., & Corey, J. R. Contingency management in an introductory psychology course produces better learning. Journal of Applied Behavior Analysis, 1969, 2, 79-83.

Miles, D. T., Kibler, R. J., & Pettigrew, L. E. The effects of study questions on college students' test performance. Psychology in the Schools, 1967, 32, 25-26.

Miller, L. K. The effects of a behaviorally engineered textbook and two traditionally designed textbooks on concept formation in university students. In J. M. Johnston & G. W. O'Neill (Eds.), Research and technology in college and university teaching. Gainesville: University of Florida, Society for Behavioral Technology and Engineering, Psychology Department, 1975.

Miller, L. K., & Weaver, F. H. The use of "concept
    programming" to teach behavioral concepts to
    university students. In J. M. Johnston (Ed.),
    Behavioral research and technology in higher
    education. Springfield: Charles C. Thomas,
    1975.

Miller, L. K., & Weaver, F. H. A behavioral technology
    for producing concept formation in university
    students. Journal of Applied Behavior Analysis, 1976,
    9, 289-300.

Peters, R. DeV. Prequiz monitoring of study materials
    improves performance in two PSI courses. In J. M.
    Johnston (Ed.), Research and technology in college and
    university teaching. Gainesville: University of
    Florida, 1975.

Phillips, T. W., & Semb, G. Quizzes, lecture attendance,
    and remediation procedures in a contingency-managed
    university course. In L. E. Fraley & E. A. Vargas
    (Eds.), Behavior research and technology in higher
    education. Gainesville: University of Florida,
    Society for Behavioral Technology and Engineering,
    Psychology Department, 1976.

Robin, A. L. Behavioral instruction in the college
    classroom. Review of Educational Research, 1976,
    46, 313-354.

Santogrossi, D. A., & Colussy, S. A.   A methodology for
systematic evaluation of the components of instructional
units.   Journal of Personalized Instruction, 1976, 1,
45-56.

Semb, G.   Personalized instruction: The effects of
grading criteria and assignment length on college
student test performance.   Journal of Applied
Behavior Analysis, 1974, 7, 61-69.

Semb, G.   An analysis of the effects of hour exams and
student-answered study questions on test performance.
In J. M. Johnston (Ed.), Behavior research and
technology in higher education.   Springfield:
Charles C. Thomas, 1975.

Semb, G., Hopkins, B. L., & Hursh, D.   The effects of
study questions and grades on student test performance
in a college class.   Journal of Applied Behavior
Analysis, 1973, 6, 631-643.

Semb, G., & Spencer, R.   Beyond the level of recall: An
analysis of higher-order educational tasks.   In L. E.
Fraley & E. A. Vargas, (Eds.), Behavior research and
technology in higher education.   Gainesville:
University of Florida, Society for Behavioral Technology
and Engineering, 1976.

Sheppard, W. G., & MacDermot, H. G.   Design and evaluation
of a programmed course in introductory psychology.
Journal of Applied Behavior Analysis, 1970, 3, 5-11.

Sherman, J. G. PSI, Current implications: Closing the gap between the theory and practice of individualized instruction. _Programmed Learning_: 1976, _13_, 36-40.

Skinner, B. F. _Verbal behavior_. New York: Appleton-Century-Crofts, 1957.

Skinner, B. F. Why we need teaching machines. _Harvard Educational Review_, 1961, _31_, 377-398.

Skinner, B. F. _The technology of teaching_. New York: Appleton-Century-Crofts, 1968.

Vargas, J. S. _Writing worthwhile behavioral objectives_. New York: Harper & Row, 1972.

Watson, D. L., & Tharp, R. G. _Self-Directed behavior. Self-Modification for personal adjustment_ (3rd ed). Monterey, Cal.: Brooks/Cole, 1981.

APPENDICES

A. Student Research Participation Consent Form

B. Course Syllabus

C. Unit 0 - Introduction to Self-Control

D. Sample Study Guides

E. Sample Mastery Quizzes

F. Midterm 1

G. Midterm 2

H. Final Examination

I. Modified IDEA Survey Form for P.S.I. Self-Control

APPENDIX A

PSYCHOLOGY (APY 73) STUDENT RESEARCH PARTICIPATION

CONSENT FORM

To help us improve the course, we would like to use information on your individual performance in the course as part of our research. By signing this release, you understand that, in addition to the two teaching staff (the instructor and graduate teaching assistant) a third person (a graduate student) will have access to records of your test-taking performance.

Whether or not you sign will have no effect on your course grade or on the way in which you are instructed in this course. If you do sign, we assure you that your name will never be mentioned in any written or verbal report about the research project. Permanent research records will use numerical codes instead of your name. Should you decide to withdraw your permission for the graduate student to use the data about your performance, you need only inform your instructor.

While all results of this study cannot be anticipated as of now, all participants will have the opportunity to hear or read a summary description of the study and its major results during the Spring, 1982 term.

I understand that records of my test-taking performance in this course will be used by a graduate student in psychology for research purposes and my signature authorizes

the use of my data.

_____   _____
     Signed   Date

Instructor: Kenneth Beauchamp

Graduate Student in Psychology: Esther Shafer

APPENDIX B

Course Syllabus - Self-Control

APY 73, Fall 1981

Beauchamp/Stegall

CLASS MEETINGS: "Lecture Sessions" TTH 2:00-4:00, CR 101

     Individualized Appointments with the Instructor
     will be arranged for Tuesday and Wednesday mornings.

TEXTS: Watson, D.L., & Tharp, R.G. Self-directed behavior.
        Self-modification for personal adjustment (3rd Ed.)
        Belmont, CA: Wadsworth, 1981.

        Chance, P. Learning and behavior. Belmont, CA:
        Wadsworth, 1979.

PREREQUISITES: None. This is a freshman-sophomore level,
        general education course open to all majors. It
        is not expected that the class members will have
        had prior experience to psychology course work.
        The course does not count towards the psychology
        major requirements. The course does count as a
        Behavioral Science general education course for
        C.O.P. requirements. Students may take this course
        as one-half of a general education pairing with
        Philosophy 29 (Philosophical Psychology). Those
        students seeking credit for such a pair should
        inform the instructor during the third or fourth
        week of the class.

GENERAL COGNITIVE GOAL: We will complete a brief survey of
        research and theorizing on the psychology of
        learning and on the application of behavior analysis
        to self-modification. The students will learn
        through study and application a small segment of
        behavior modification techniques, thus acquiring
        some appreciation of the general characteristics
        of one area of applied psychology. It is expected
        that the techniques learned will continue to be
        used by the students after completion of the course.

GENERAL STRUCTURE OF THE CLASS: The group meetings on
        Tuesday and Thursday will be devoted to:
        (a) instruction about the course requirements and
        assignments, (b) review tests on the texts,
        (c) instruction about the experimental character
        of the course, and lectures on the behavior
        modification techniques covered. Each student is
        expected to : (1) master the cognitive content of
        the texts through the medium of the Personalized

System of Instruction (PSI) approach, (2) complete
a personal adjustment, self-modification project,
and (3) write a paper completely, accurately, and
correctly describing the self-modification
project.

The procedures for selecting, planning, and
conducting a self-modification project are
presented in the Watson and Tharp text.   Students
will follow the procedures in the sequence
specified in that text; therefore, the maintenance
of an already underway modification project is not
an appropriate choice for this class unless a
major new subgoal is undertaken.

Students must also be willing to discuss their
projects in individual consultation meetings with
the instructor; as a consequence, extremely
personally embarrasing topics are inappropriate
behaviors for the behavior modification projects.

SCHEDULE   (L=Lecture, T=Test)

Week	Day T Th	Lecture Topic	PSI Critical Date	Individual Consultation Meeting - Topic & Assignment Due Date
1. Sept. 10	- L	Orientation	---	(No Meeting)
2. Sept. 15-17	L L	Orientation & Structured Diary Task	---	Written assignment in Watson & Tharp pp. 20,42, steps 1 and 2 of project: choice of goal from a list and description of goal as a behavior in a situation
3. Sept. 22-24	L L	Orientation & Structured Diary Analysis	---	First segment of structured diary. Watson and Tharp (W & T) p. 79: Step three.
Last day to add: 9/23 Last day for Pass/NC: 9/23				

Schedule (Continued)

Week	Day T Th	Lecture Topic	PSI Critical Date	Individual Consultation Meeting Topic & Assignment Due Date
4. Sept. 29-Oct.1	L L	Preliminary Plans 1&2; Example projects	---	(1) What are the antecedents, descriptive characteristics, and consequences of your behavior: Answer the 12 questions from W & T pp. 102-103 (step 4). (2) More structured diary.
5. Oct. 6-8	L L	Preliminary Plan 3 and Contract; Example Projects	---	(1) Preliminary Plan #1: Identifying and manipulating antecedents; W&T p. 128, step 5. (2) Preliminary Plan #2: Developing new behaviors using three of the four methods (shaping, incompatible behaviors, rehearsal-practice, and modeling); W&T p.161, step 6. (3) More structured diary.
6. Oct. 13-15	L T	Making Graphs, Example Projects, First Review Test, Units 1-5	---	(1) Preliminary Plan #3: Applying reinforcement, extinction, and/or punishment. Use at least one verbal reinforcement technique plus at least one other reinforcement technique; W & T p. 205, step 7. (2) More structured diary or log.

Schedule (Continued)

Week	Day T Th	Lecture Topic	PSI Critical Date	Individual Consultation Meeting Topic & Assignment Due Date
7. Oct. 20-22	L L	Return Test: Studying Strategies	---	(1) Produce a written contract including goal (& subgoals), rules, feedback procedures, and signature; W&T p. 223, step 8. (2) More structured diary, log, or baseline data.
				Please Note: Do not implement contract until it has been approved.
8. Oct. 27-30	L L	Writing Term Papers	Oct. 28	(1) Graph all of previous relevant data from diary, log, or other baseline record. (2) Graph 1st week of change project on graph paper; W&T p.242, step 9.
9. Nov. 3-5	L L	Writing Papers	---	More graphs.
	Begin advising Winter/Spring classes: 11/2 Last day to drop: 11/6			
10. Nov. 10- 12	L T	2nd Review Test - Units 6-9	Nov. 10	More graphs.
11. Nov. 17- 19	L -	Test Feedback	---	(1) Projection of termination plan; deal only with those questions (1-6) that may be relevant to your project and phrase the commands as questions; W&T, p. 257, step 10. (2) More graphs.

Schedule (Continued)

Winter registration/Spring sign-up: Sat. 11/21
Early paper submission due date: Nov. 25

	Week	Day T Th	Lecture Topic	PSI Critical Date	Individual Consultation Meeting Topic Assignment Due Date
12.	Nov. 24-26	--	THANKSGIVING VACATION	Nov. 25	(No Meeting)
13.	Dec. 1-3	L L	Observational Learning	---	More graphs and termination of project
14.	Dec. 8-10	L L	Prepare for Final Exam	Dec. 8	Term paper due date (if not submitted earlier) -- no rewrite privilege.
				Dec. 11	(No Meeting)
15.	Dec. 15	L L	Final Exam (Units 10-14) 4:00-6:00, CR 101 Grades due Dec. 18.		

STRUCTURE OF P.S.I ASPECTS OF CLASS:

The Watson and Tharp text has 11 chapters with 10 to 43 pages per chapter. These 11 chapters will be combined with the five chapters in the Chance text (19 to 70 pages per chapter) in the following manner to produce 14 units of material:

Unit #	Topic	Reading Assignment	pp#
0	Introduction	This course syllabus	
1	Learning & Behavior	Chance, Ch. 1	24
2	Adjustment,Goals, Self-management	W & T, Ch. 1 & 2	45
3	Observation & Recording	W&T, Ch.3, pp225-230	40
4	Behav./Environ. Relationship		21
5	Classical Conditioning	Chance, Ch.2, pp25-53	28
6	Operant Conditioning I	Chance, Ch.3, pp81-113	31
7	Antecedents	W&T, Ch. 5	27
8	Operant Conditioning II	Chance, Ch.3, pp113-134	21
9	Developing New Behaviors	W&T, Ch. 6	31
10	Observational Learning	Chance, Ch.4, pp151-189	38
11	Consequences	W&T, Ch. 7	43
12	Planning for Change, Feedback	W&T, Ch.8, Ch.9, pp 231-242	27
13	Limits of Learning	Chance, Ch. 5	21
14	Termination, Limits	W&T, Ch. 10,11	24

Unit zero is a practice unit to acquaint you with the P.S.I. process under low-stress conditions. Your performance on the unit zero quiz will not be graded.

Beginning on September 15, you will successfully complete quizzes on these 15 units at a rate slightly less than one unit every four week days (M-F). You must pass the quiz on a unit before taking the next unit quiz. The scheduling of each quiz will depend on your class schedule, the staff's (instructor and T.A.) schedule, and your determination of when you are ready to take a quiz. As you pass the quiz on a unit, the staff will provide a study guide for the next unit. The unit quizzes will be graded on a pass/no pass basis. All unit quizzes must be passed

in numerical sequence.

Failure to pass a test on the first, second, or even third try will not be held against you. However, the less attempts made to pass a quiz, the more credit you will receive. Passing each quiz will yield a varying amount of credit points, depending on the number of attempts at passing the quiz:

P.S.I. Quiz:	1st Try	2nd Try	3rd Try	4th Try
Credit:	15	14	12	9

Since there are 14 graded units, the possible range in credit received will be 126 to 210 points (if taken at a normal rate). The credit system is designed to reinforce your taking quizzes when you know the material well, rather than attempting a quiz after merely reading the material once. Each unit will have several different quizzes; thus, each time you fail to pass a quiz, your second attempt will involve a different version of the unit quiz, with perhaps two or three repeated questions.

The unit quizzes will consist of 4-8 multiple choice questions, 0-5 "fill-in-the-blank" questions, and 0-2 short-answer essay questions for a total of 10 questions. All questions on each quiz will be weighted equally, regardless of difficulty or of form. The quizzes on each text will be cumulative in the sense that each chapter builds on and extends the information contained in preceding chapters.

The unit quizzes will be graded immediately by one of the staff persons (T.A. or instructor). Grading may include asking for clarification of any written answer; if asked to clarify an answer you will also be asked to write your verbal clarification on your test answer sheet.

The passing criterion will be 90% (9 correct). If you pass on the first attempt, you will receive 15 credit points regardless of whether your score is 90% or 100%. You will not be able to keep your quiz answer sheet or the quiz questions.

When you are prepared to take a unit quiz, you will contact a staff person during one of the scheduled P.S.I. quiz-taking hours (see tentative schedule). Because of the total number of units to be completed, in order to complete the course on schedule, you will need to average about one and one-quarter passed units per week between September 15th and December 11th. You may move through

the unit quizzes at your own pace subject to the minimum rates specified in the following table and with the specified bonus points for fast rates of successful unit completion. The "critical date" is the "doomsday" time before which units must be passed.

Units: Standard Unit Rate	Time Span	Date by Which Quizzes Must Be Passed. Critical Date	Standard Cumulative Total # of Unit Quizzes Passed	Slow Rate Penalty Behind Standard	Fast Rate Bonus Points Cumulative Number Passed
0,1,2,3	9/15-10/5	Oct. 6	13	0 passed= Drop Class (Max Grade = F)	4 units= +5 points
4,5	10/6-10/13	Oct.14	5	3 passed= Drop Class	6 units= +5 points
6,7	10/14-10/27	Oct.28	7	5 passed= Drop Class	8 units= +5 points
8,9	10/28-11/9	Nov.10	9	7 passed= Drop Class	10 units= +5 points
10,11, 12	11/10-11/24	Nov.25	12	11 passed= Max grade of B+	13 units +5 points
13,14	11/30-12/10	Dec.11	14	13 passed= Max grade of C+	

Because of the personal scheduling procedure, there should be no reason for "make-up" P.S.I. quizzes, except in the case of not being able to take a quiz during a two week period because of a valid, long-lasting personal disaster. In such a case, please notify the instructor so that suitable arrangements can be made.

The purpose of the P.S.I. unit quiz system includes: (1) providing some individual flexibility in quiz taking time, (2) the predetermined minimum rates of quiz taking and passing are designed to establish the pace of studying necessary to pass the course, (3) the quiz administration procedures are designed to provide immediate feedback and possibly some tutoring assistance, (4) the high passing criterion (90%) is designed to promote mastery of the

textbook material, and (5) the rate of passing quizzes and the number of attempts needed to pass each quiz are major determinants of the final course grade.

The questions appearing on any one P.S.I. unit quiz will be sampled from a pool of questions for each unit. The study guide for each unit will indicate the material included in each question pool. All students will receive a study guide for each unit. All unit quizzes will test: (1) rote memorization (recognition and recall memory) of vocabulary, terms, definitions, facts, examples, rules, formats, classifications, techniques, categories, methods, sequences, procedures, principles, and generalizations; and (2) ability to illustrate principles, methods, techniques, rules, etc. in your own words.

Each unit study guide will present a list of concepts (terms) to be defined and a set of short-answer essay questions about the relationship between concepts or the application of techniques/procedures to hypothetical situations. The 10 question unit quizzes will test recognition and recall of the terms and their definitions in the concept lists.

The P.S.I. quizzes will be administered in the "Learning Center" (Room 118 of the new Psychology building). When you have completed the assigned definitions and short-answer questions on the study guide and believe that you are ready to complete a quiz, you will bring the completed study guide to Room 118. The instructional staff person present at that time will read all of the study guide answers, checking for ambiguity and correctness. If all the answers are sufficient and correct, the staff person will choose at random three concepts from the concept list and ask you to orally define each concept without reference to the written study guide answers. If you cannot successfully define one of these terms, three more will be selected and the procedure repeated. If you cannot successfully define all three, then you will be asked to restudy the material and try again at another time. If the oral questions are successfully passed, then the written quiz will be administered.

The short answer essay questions will test: (1) recognition of vocabulary, terms, definitions, etc.; (2) ability to illustrate principles, methods, techniques, rules, etc. in your own words; (3) ability to draw conclusions and to distinguish between methods and principles; (4) ability to apply (generalize) to new areas/problems various principles, methods, procedures, and techniques; (5) ability to discriminate between assumptions, conclusions, hypotheses, and to analyze relationships (compare and contrast) between principles, procedures, and techniques; (6) ability to write

plans, procedures, operations, solutions for given problems, (7) ability to synthesize principles in new combinations not directly discussed in the text, and (8) ability to evaluate courses of action, generalizations, hypotheses, and statements according to stated criteria.

You may check some of your answers to study guide questions with the teaching staff prior to attempting to take a quiz. If you do not understand a study guide question, be sure to seek tutorial assistance from one of the teaching staff before taking a quiz. Be sure to keep your study guides even after passing a quiz.

MAKE UP TESTS AND QUIZZES:

If anyone suffers a validated medical emergency, incapacitating trauma, or serious personal disaster such as a knife wound or incarceration, then quizzes, mid-term review exams, or the final exam may be individually taken on a specially arranged schedule. (A medical emergency may be validated by a doctor's written testament provided that the doctor is not a member of the student's immediate family). No make-up quizzes or exams will be given for reasons of tests or papers due in other classes, drug overdose, intramural games, forgetfulness, hangovers, or tired blood. If anyone participates in a University sanctioned forensic dramatic, academic, musical, or athletic event that conflicts with a scheduled exam, the exam session may be rescheduled. There will be no University sanctioned events during the final exam period. If you will not be able to attend an in-class examination because of an anticipated, valid reason, please notify the instructor before the examination.

MID-TERM REVIEW EXAMS:

On the two dates noted on the class schedule (Oct. 15, Nov. 10), a 2 hour review exam on the preceding four or five units of material will be given in class (CR 101). Each of these exams will consist of 20-30 multiple-choice questions, 0-10 fill-in questions, and 8-10 short answer essay questions. The fill-in and multiple-choice questions will be drawn from the P.S.I. unit question pools. The short-answer essay questions will be sampled from the study guides for the relevant units. The "final exam" (Dec. 15) will also be a "mid-term, review exam" covering the last five units (10-14); 20% of this exam will cover questions from units 1-9. Each of these three exams will have a total possible point value of 80 points; the short-answer essay questions will have varying point values.

TERM PAPER:

All students will complete a self-management, self-control project in a typed term paper which will be due December 8 (5:00 p.m.). Example papers are on one-hour reserve in the library. These papers will be graded by the instructor and the graduate teaching assistant. They will be returned on or before December 18. The format for these papers will be detailed during several lecture sessions. Paper grading criteria will include: (1) logic and organization of paper, (2) logic and coherence of paragraph structure, (3) grammar, diction, and syntax of sentences, (4) spelling, (5) uncorrected typographical errors, (6) completeness, comprehensiveness of the content, and (7) clarity of content. All papers must be typed; there will be no exceptions for any reason.

If a term paper is submitted on or before November 25, it witl be graded as quickly as possible, and may be rewritten and resubmitted within one week of the date it is returned in order to improve the grade. The maximum number of points to be earned is 150.

If a term paper is submitted after the due date (December 8), the following penalties will apply: one week day late= minus 25 points; two week days late = minus 60 points, three week days late = minus 100 points. The term papers will not be accepted after December 11, except that valid excuses as noted in the "make-up" quizzes section may lead to deadline extensions. See the instructor as quickly as possible if such a condition occurs.

INDIVIDUALIZED CONSULTATION APPOINTMENTS:

Attendance at these meetings is mandatory. There will be brief written assignments for nine of the eleven meetings (related to your self-modification project). You will receive 10 points credit for handing in a correctly done, written assignment on time at a discussion meeting. The maximum number of points to be earned is 90 (nine written assignments for the eleven weekly meetings). You will receive six points credit for handing in an erroneously done assignment (apparent misunderstanding of instructions) on time at a discussion meeting. You will receive 4 points credit for handing in a correctly done assignment at the discussion meeting one week after it is due (previously submitted, erroneously done assignments can be revised and resubmitted to gain the four points). The assignment for each discussion meeting is given in the course schedule (pp. 2-3).

GRADING SYSTEM: There will be five major sources of points
to be accumulated toward the final grade:

1. P.S.I. unit quizzes (14 quizzes, maximum of 15
    points each)   210 points (max)

2. Three mid-term, review quizzes (max 80 points
   each)   240 points (max)

3. Term paper   150 points (max)

4. Consultation meeting written assignments (9,
   maximum of 10 points each)   90 points (max)
                                                         ─────────────────
                               Total Possible   690 points (max)
     Fast rate, P.S.I. Bonus points   25 points (max)

                          Total Maximum Possible   715 points

Grading will not directly reflect "class participation"
in the form of verbal interaction with the instructional
staff except for the P.S.I. quiz grading sessions.

GRADING CRITERIA:

Grade	Number of unit Quizzes Passed	Term Paper Completed by Dec. 8	Min. PSI Unit Quiz Credit pts.	Min. total pts. from quizzes, exams, term paper, & assignment points	
D	14	yes	150	427	62% of max.
D+	14	yes	150	462	67% of max.
C-(Pass)	14	yes	150	483	70% of max.
C	14	yes	150	510	74% of max.
C+	14	yes	150	531	77% of max.
B-	14	yes	150	559	81% of max.
B	14	yes	150	580	84% of max.
B+	14	yes	150	600	87% of max.
A-	14	yes	150	628	91% of max.
A	14	yes	150	655	95% of max.

For those students electing the "pass/no credit" option
on the proper form (Registrar's Office) on or before
September 23rd, the minimum requirements for a "pass"
grade are the requirements of the "C-" grade. Under no
circumstances will a late (after 9/23) "pass/no credit"
request form be accepted.

Incomplete ("I") grades will be granted <u>only</u> for validated, extenuating "hardship" circumstances that prevent the completion of assigned work during the semester. Circumstances that shall or shall not be deemed "hardship" cases are listed under the preceding "make-up quizzes" section. No "incomplete" grades will be given unless the instructor and student have completed an "incomplete" contract form on or before 12/18.

UNIVERSITY HONOR CODE:

The University Honor Code is an essential element in academic integrity. It is a violation of the Honor Code to give or receive information from another student during an examination; to use unauthorized sources during an examination; or to submit all or part of someone else's work or ideas as one's own. If a student violates the Honor Code, the faculty member may refer the matter to the Office of Student Life. If found guilty, the student may be penalized with failure of the assignment or failure of the course. The student may also be reprimanded or suspended from the University. A complete statement of the Honor Code may be found in the Student Handbook, <u>Tiger Lore</u>.

APPENDIX C - Unit 0

Introduction to Self-Control

(APY 73)

The purpose of this unit is to clarify the procedures that will be used in this course. The method by which this course is structured is called Personalized System of Instruction, or PSI. The procedures used may seem very complicated and somewhat confusing, especially if this is your first experience with a PSI course. The course has been carefully structured to run smoothly and to maximize your learning opportunities and your freedom while learning. When you complete a unit or two, you will probably feel a lot more comfortable with the procedures, and may even enjoy them!

There are several important differences between a PSI course and a traditionally taught course. Research has shown that the use of the PSI method not only produces superior student performance over traditionally taught courses in most cases, but also results in greater student satisfaction with the PSI method. These differences are discussed here.

1. This course is self-paced, which means that you will have the freedom, to some extent, to decide how fast or slow you wish to progress through the course. There are deadlines by which you must pass a certain number of unit quizzes, and if you do not meet these deadlines, you will be given a penalty of either having to drop the class or be given a lower grade, depending on where you are in the semester. If you progress through the course at a faster rate than required, you will be rewarded with bonus points. The reason for these deadlines is to prevent procrastination, which often occurs when there are no deadlines or when the deadlines are too far in the future. This kind of self-pacing allows you freedom but ensures that you will finish the course on time. These procedures are explained on pages 5 and 6 of your course syllabus.

2. As explained in the syllabus, the course is divided into 14 units of study. You must pass each unit before proceeding to the next unit. Procedures for taking unit quizzes and passing units are described later in this unit. If you do not pass on the first

try, this will not be held against you, and you will
be given the opportunity to try again as many times
as you need to. However, the fewer number of attempts
to pass a unit, the more credit points you will
receive for that unit. The purpose of this procedure
is to make sure that all students master the material,
instead of just learning enough to make a "C" or "D"
and pass the course. In this way, all students will
finish the course knowing as much as an "A" student
is expected to know! This is a crucial part of the
PSI procedure.

3. Study guides, which will accompany each unit of study,
   are a very important part of this course. Each study
   guide contains several sections: (a) introduction
   to the unit, (b) a list of concepts covered in the
   unit with written exercises to complete, (c) an
   application of concepts section containing exercises
   about the material in the unit, and (d) instruction
   about how to do the written exercises. All the
   material which you will need to know to pass the
   unit quizzes is contained in your textbooks, and
   your study guide will help you to focus on the
   most important material that you will be expected to
   know on the quizzes. You will be required to complete
   the exercises in the concept section of the study
   guides for all 14 units. For some units, you will
   be required to complete the exercises in the application
   of concepts section as well. The instructor or teaching
   assistant will inform you whether or not you have to
   complete these exercises for each unit when you are
   ready to begin work on that unit.

4. The instructor and teaching assistant play a different
   role than is the case in most other traditional courses.
   When you are ready to take a unit quiz, they will be
   available to check your study guides, administer your
   quizzes, and most importantly, to provide tutoring
   and suggestions for study if you are having problems
   with the material. Because of the way this PSI course
   is set up, you will have more interaction with a
   staff person than is possible in most other courses.

Here is a self-quiz about the PSI method as it relates to
this course. Fill in the blanks.

1. Because your textbook and study guides are designed for
   self-instruction and because you will receive a lot of
   personal attention from your instructor and teaching
   assistant, this course is called a "_____
   _____ of _____" course, or PSI course.

2. You have some freedom in deciding how fast or slow you wish to progress through the course, but you must meet certain _____. If you do not meet then you will either receive a lower _____ or _____ the course.

3. If you meet your deadlines ahead of time, you will receive _____ _____.

4. The course is divided into _____ units of study.

5. If you do not pass a unit on the first try, this will/will not be held against you.

6. The fewer attempts it takes you to pass a unit, the more _____ you will receive for that unit.

7. You will be required to complete the written exercises in each study guide for the _____ section.

8. You may or may not be required to complete the written exercises for the _____ ___ _____ section of the study guide. A staff person will inform you of the requirement when you are ready to begin work on the unit.

Procedures to follow when preparing for and taking unit quizzes:

A. Preparing for the quiz:

1. You will be issued a study guide by a staff person (instructor or teaching assistant) when you have passed the previous unit. The staff person will tell you what written exercises you have to complete in the study guide for that unit.

2. After you have read the textbook and completed all written requirements on the study guide, be sure that you can orally define (without using your study guide) all concepts in the concept section of the study guide.

B. When you are ready to take the quiz:

1. Report to the Learning Center (Room 118 of the Psychology Building). The testing center will be open for several hours daily; times will be arranged to accomodate students during the first week of classes.

2. The staff person will check to see if you have filled in all required portions of the study guide. You will not be allowed to proceed further with testing until you have done so. The staff person will be recording data about the testing situation (did you complete your exercises, how long does the testing take, etc.). This data will be used for research purposes and will not affect your grade.

3. The staff person will choose three concepts at random from the concept portion of the study guide, and you will be asked to orally define each in a sentence or two.
   a. If you define all three concepts correctly, you can proceed to the next step in the testing sequence.
   b. If you do not define all three concepts correctly, the staff person will choose three more concepts for you to define. If you define all three correctly, you may proceed to the next step in the testing sequence.
   c. If you do not define all three concepts correctly, you will receive instructions and tutoring if necessary, and will be allowed to try again during the next scheduled testing time.

4. You will be given a written, 10-item quiz, consisting of a combination of multiple-choice, short-answer, and true-false items. You must answer 9 out of 10 correctly to pass. If you do not pass the quiz, the staff person will provide tutoring as needed. You will be able to retake the quiz during the next scheduled testing time. There are 3 forms of each quiz.

5. If you were required to complete the written exercises for the application of concepts section of the study guide, the staff person will read and score a sample of at least _five_ and not more than _half_ of items on the application of concepts section. You will have the opportunity to orally clarify not more than _one_ answer; however, all items sampled must essentially be correct. If you did not answer all of the sampled items correctly, the staff person will provide tutoring on those sections which are difficult for you. If you do not pass this part of the testing sequence, you may return during the next scheduled testing time. You will not have to redo any other part of the testing sequence - just this part.

Here is a self-quiz about the studying and testing
procedures:

1. Before you are ready to attempt a unit quiz, be sure
   that you can _____ _____ all concepts in the
   _____ section of your study guide.

2. The testing will be conducted in the _____ _____
   of the _____ Building.

3. The first thing that the staff person will do is
   check _____ _____. You
   will not be allowed to proceed in the testing
   sequence unless you have done so.

4. You will be asked to orally define _____ concepts
   from the _____ portion of the study guide. If you
   cannot define all _____ correctly, you will
   _____.

5. If after the second attempt, you still cannot define
   three concepts correctly, you will/will not be allowed
   to proceed in the testing sequence.

6. The written quiz consists os _____ items.

7. To pass the written quiz, you must score ____ out of
   ____ correctly.

8. If you do not pass the written quiz, you will be
   allowed to take another form of the quiz during
   _____.

9. If you were required to complete the written exercises
   in the application of concepts section of the study
   guide, the staff person will read and score ____
   and not more than _____ of the items in this section.

10. You must answer ____ of the sampled items in the
    application of concepts section correctly.

11. If you do not pass the sampling of items on the
    application of concepts section, you will/will not
    have to repeat the entire testing sequence again.

APPENDIX D

Sample Study Guides

Unit 5 - Basics of Classical Conditioning

I. Readings: Chance, Chapter 2, P. 25-53

   In this chapter, you will learn the basics of classical
(or respondent) conditioning. As discussed in Unit 4,
most chains of events involve both classical and operant
conditioning. Classical conditioning is often responsible
for eliciting emotional reactions, such as fear, depression,
or joy. Your self-change project may involve decreasing
an unwanted emotion.

II. Concepts - write a one-sentence definition of each term.

   A. Primary classical conditioning (also called
      respondent conditioning and Pavlovian conditioning)

      1. Two kinds of reflexes (p. 29)

         a. Unconditional reflex (p. 30)
            1) unconditional stimulus (us) (p. 30)
            2) unconditional response (ur) (p. 30)

         b. Conditional reflex (p. 30)
            1) conditional stimulus (cs) (p. 30)
            2) conditional response (cr) (p. 30)

      2. Primary classical conditioning (p. 31)

      3. Appetitive conditioning (p. 32)

         a. Conditioned emotional responses (cer) (p. 33)
         b. Behavioral facilitation (p. 34)

      4. Defense conditioning (p. 36)

         a. Behavioral suppression (p. 38)

   B. Secondary classical conditioning (p. 40)

   C. Factors in classical conditioning

      1. Pairing neutral and significant stimuli

         a. trace conditioning (p. 44)
         b. delayed conditioning (p. 44)
         c. simultaneous conditioning (p. 45)
         d. backward conditioning (p. 45)

2. Inter-Stimulus interval (ISI) (p. 45)

3. Inter-trial interval (p. 46)

4. Number of stimulus pairings (p. 47)

5. Number of times neutral stimulus appears alone (p. 48)

6. Prior experience with neutral and significant stimuli

III. Relation between concepts and application of concepts

1. In your own words, describe the basic classical conditioning paradigm developed by Pavlov (pp. 30-31)

2. Develop an example of a classical conditioning paradigm using shock as the US, a person jumping as the UR, and seeing a mouse as the CS. (p. 30-31)

3. Describe how conditioned emotional responses become associated with food and how this may become a problem for someone who is overweight. (p. 33-34)

4. Describe how behavioral facilitation could play a part in advertising gimmicks presently used in grocery stores to entice customers to buy more (p. 34)

5. Some people say that boxing is a sport full of blood, pain, and violence. The boxers say they "enjoy" fighting and getting beat to a pulp. How could you train a fighter using classical conditioning to truly "enjoy" being hit and liking it? (p. 34-35)

6. Describe how behavioral suppression may play a part in producing a person who talks at a very low rate, or not at all in a classroom situation (p. 36-39). Also discuss how respondent conditioning and language as mentioned in Watson and Tharp, Chapter 4 (p. 100) could also be involved in this situation.

7. Suppose that you wanted to stop smoking. Think of several words or thoughts that elicit negative emotional responses which would be incompatible

with smoking and which you could say to
yourself each time that you want to light
up a cigarette. (p. 41-43)

8. Suppose that you are going to condition a
   dog to salivate at the sould of his master's
   voice saying "dinnertime". Describe how
   you would plan your experiment, taking these
   factors into consideration:

   a. Pairing neutral and significant stimuli
      (p. 44-45)
   b. ISI (p. 45)
   c. ITI (p. 46)
   d. Stimulus characteristics of master's
      voice (p. 47)
   e. No. of stimulus pairings (p. 47)
   f. No. of times neutral stimulus appears
      alone (p. 48)
   g. Prior experience with neutral and
      significant stimuli (p. 50)
   h. Characteristics of the learner (p. 51)

Unit 9

Developing New Behaviors

I. Readings: Watson & Tharp, Chapter 6

This chapter introduces four new techniques for
developing new behaviors. These techniques are based
on the principles of behavior which you have studied
in previous units. Your understanding of behavior
principles will greatly help you in using these
techniques. They can be used alone or in combination,
and can be used with almost any target behavior.

II. Concepts: Write a one-sentence definition for each:

    A. Shaping (p. 133)

    B. Incompatible response (p. 138)

    C. Phobia (p. 143)

    D. Tension-release method of relaxation (p. 148)

    E. Imagined (covert) rehearsal (p. 157)

    F. Modeling (p. 160)

    G. Plateau (p. 136)

    H. Meditation (p. 146)

III. Application of concepts, and relations between
      concepts:

      1. What are the two rules that should always be
         kept in mind when using shaping? (p. 134)

2. Shaping can be used in any situation in which you gradually increase the criterion. Suggest how you might increase the criterion for the following behaviors: (p. 135)

   a) Talking to your professors:

   b) Stopping smoking:

3. John was able to increase his jogging from 1 1/2 times around the track to 1/2 mile a day, which he did for one week. Instead of increasing his jogging to one mile the next week as written on his self-change program, he began skipping days. On the days when he did jog, he never went beyond 1/2 mile. What suggestions can you give John about continuing with his program? (p. 136-137)

4. Why is the approach of reinforcing an incompatible behavior more effective than trying to punish the undesired behavior? (p. 138)

5. If your initial problem was an undesired behavior and you then decided to increase an incompatible response, how does that affect the method of data collection you should follow? (suppose the incompatible behavior is one that you intend to continue permanently) (p. 141)

6. Watson & Tharp state that "reducing tension and extinguishing the avoidance behavior seems easier, and is in fact more effective than forcing oneself into the feared situation" (p. 143)

   Using the old rule that "you should throw someone into the water who is afraid of it", argue for or against Watson & Tharp's position.

7. Why do Watson & Tharp state that relaxation is the most reliable incompatible behavior in coping with tension and anxiety? (p. 144-146)

8a. What are the three purposes of practicing relaxation? (p. 150)

8b. What behavioral principle (Chapter 5) is the third purpose an example of?

9. State what behavioral principles were operating in Susan's test anxiety case (box 6-4, P. 152).

10. In what situations can imagined (covert) rehearsal be used? (p. 157)

11. Explain Lisa's error in using covert rehearsal (p. 159) in terms of behavioral principles.

12. Your target behavior is to stop smoking. Why should you or why should you not choose a friend as a model who has never smoked? (p. 160)

Unit 12

Planning for Change; Is it Working?

I. Readings: Watson & Tharp, Chapter 8
   Watson & Tharp, Chapter 9, P. 231-242

These two chapters in Watson and Tharp deal with
formulating your final plan by integrating all of the
material covered in the chapters on antecedents, behaviors,
and consequences. They also are concerned with keeping
accurate records and being able to tell whether a plan
is working or not.

II. Concepts:

    1. Two-stage process for consummatory behaviors (p. 209)

    2. Features of a successful plan (p. 214)

    3. Brainstorming (p. 218)

    4. Rules (p. 214)

    5. Tinkering and trouble shooting (p. 237-238)

III. Relations between concepts and application of
     concepts. (We're saving money, so answer on paper
     attached to the study guide).

    1. Explain how the idea of stimulus control relates
       to the two-stage process for consummatory behaviors
       (p. 210)

    2. The features of a good plan are listed on pp. 214-
       216. Describe why you think or why you do not
       think that each of these features are essential.

3. Young people react to the word "rules" with distaste. Why? Why then, do Watson & Tharp require you to state and follow more rules? What are the two chief differences between the usual rules we are compelled to follow and the rules included in a change contract? (p. 214)

4. Give an example of some subgoals appropriate for your project (p. 215)

5. Using the brainstorming process, list three alternative rules that you have chosen not to use in your final plan (p. 218-219)

6. Suppose the student who wanted to increase verbal interactions with her professors came to you for help. She complained that after the initial question (with professors other than "Professor A"), whe did not know what to say. How should she revise her shaping plan to reach the ultimate goal of talking with her professors for about 15-20 minutes on each occasion (p. 219-222)

7. On p. 225, Watson & Tharp state that "more often, progress is gradual rather than dramatic". What does this mean and how does it relate to the necessity of keeping accurate data over each step of your plan?

8. Indicate whether the indicated shaping plan worked to produce the desired behavior change. Tell why you decided it was or was not effective (p. 231-234).

Shaping steps

Frequency of smoking per 2 days

Baseline   Step 1: 23   Step 2: 20   Step 3:14

2   4   6   8   10   12   14   16   18   20   22   24   26   28   30
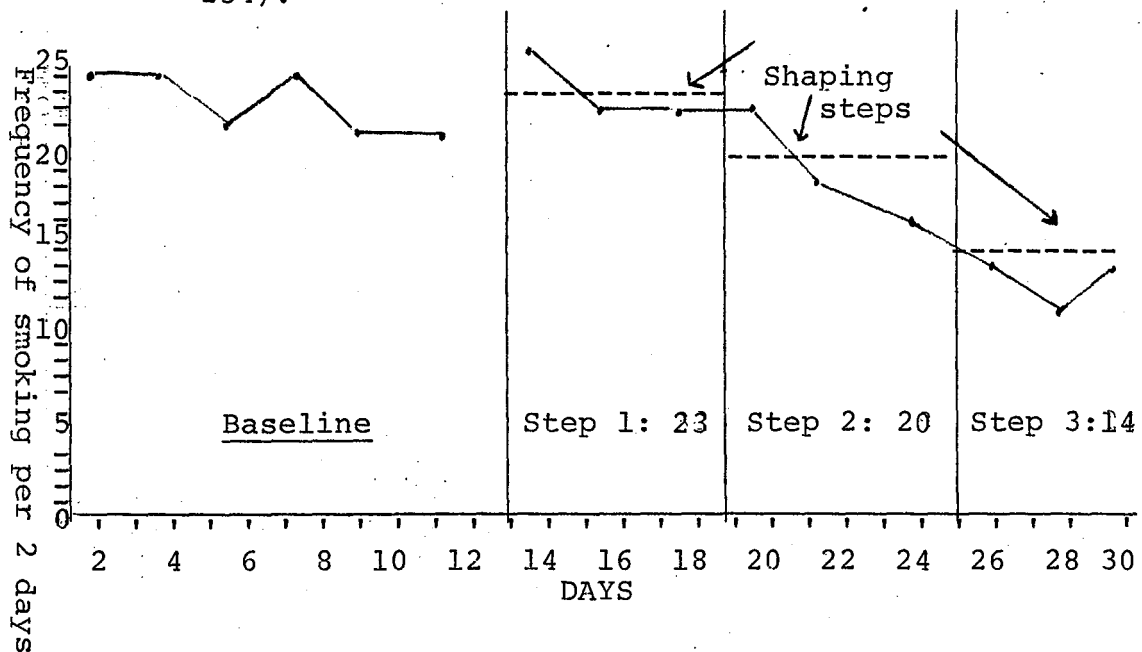
DAYS

9. Name two instances in which you would need a new baseline (p. 236-237)

10. You've just started a behavior change project and after the first few days you noticed that it doesn't seem to be working. You decide to "tinker" with the original plan. What are two "technical flaws" that may have occurred and what steps would you take to alleviate each? (p. 237-241).

APPENDIX E - Sample Mastery Quizzes

UNIT 5 - Form C

1. The two kinds of reflexes described by Pavlov are:

    _____ (programmed into the organism at birth)

    _____ (acquired or learned)   (p. 30)

2. Classical conditioning is the procedure by which a
   _____ stimulus, one that does not elicit a reflex
   response, becomes a _____ stimulus for that
   response (p. 31).

3. Label these parts of an unconditional reflex: (p. 30)

    ┌ ─ ─ ─ ─ ─ ─ ─ ─→
   _____   _____
   Meat powder   salivation
   in mouth

4. The dog was scratched on the head, and then bread
   crumbs were placed in its' mouth. After the procedure
   was repeated several times, the dog began salivating
   when it was scratched. This procedure is called: (p. 31)
   a) primary classical conditioning
   b) defensive conditioning
   c) neutral conditioning
   c) secondary classical conditioning

5. The length of the interval between the neutral and
   significant stimuli is the: (p. 45)
   a) inter-stimulus interval
   b) inter-trial interval
   c) inter-conditioning interval
   d) unconditional interval

6. Look at this experimental paradigm and determine whether
   it is one of those listed below (p. 44-45)
   a) delayed conditioning
   b) simultaneous conditioning
   c) backwards conditioning
   d) trace conditioning

   T=tone
   S=shock

7. In _____ conditioning, the neutral stimulus appears
   before the significant stimulus, but it does not stop
   until after the significant stimulus has appeared.
   a) simultaneous
   b) backward
   c) delayed
   d) trace

8. Spence's study (1953) compared the effects of two strengths
   of unconditional stimuli in an eyelid conditioning
   experiment. The number of conditional responses in a
   20-trial time period varied according to the strength
   of the stimulus. This is an example of which factor
   in classical conditioning? (p. 47)
   a) prior experience with neutral and significant stimuli
   b) number of times neutral stimulus appears alone
   c) number of stimulus pairings
   c) stimulus characteristics

9. In the experiment by Marquis (1931), babies learned
   to suck in response to the neutral stimulus of a
   buzzer by first sounding a buzzer and then presenting
   a bottle. This type of classical conditioning is: (p. 33)
   a) defense conditioning
   b) simultaneous conditioning
   c) behavioral suppression
   d) appetitive conditioning

10. The dog that salivates when food is put into its'
    mouth illustrates _____ (p. 30)
    a) unconditional reflexes
    b) conditional operants
    c) behavioral suppression
    d) defense conditioning

UNIT 9

Form A

1. When teaching yourself a new, complex behavior, you should start with a behavior that you can already perform, which is the closest approximation to the desired behavior. You will then take small steps to reach your ultimate goal by using successive approximations to the goal. This technique is known as _____ (p. 133)

2. Some people fear heights so much that they will not go up elevators in tall buildings. This kind of fear is considered to be irrational by most persons and significantly interferes with the life of the person who suffers from it. It is called a (n) (p. 143)
   a) imagined behavior
   b) incompatible behavior
   c) phobia
   d) plateau

3. Your friend has a lot of skills in dealing with the opposite sex, and you observe and imitate your friend's behavior. This technique is called: (p. 160)
   a) rehearsal
   b) relaxation
   c) meditation
   c) modeling

4. When you choose some behavior to replace an undesired behavior, the new behavior is called a(n) _____ behavior. (p. 138)

5. The method of relaxation in which you first tense a set of muscles and then relax them is called the _____ - _____ method. (p. 148)

6. The U.S. Olympic team, before making downhill runs, would rehearse the entire run in their imaginations before they actually made the run. This resulted in improved performance of the desired behavior (making better downhill runs). This technique is called: (p. 157)
   a) shaping
   b) imagined (covert) rehearsal
   c) trancendental meditation
   d) tension-release method of relaxation

7. When you follow a shaping schedule, you are likely to make excellent progress for a while, and then have difficulty on a new step. This means that you have reached a _____. (p. 136)

8. All of the following are generally true about shaping EXCEPT (p. 133)
   a) you may reach a plateau in which you cannot make any progress on that step
   b) you should use successive approximations to reach your goal
   c) you should start at the highest or most complex level of your goal
   d) you should use positive reinforcement for successful achievement of each step

9. All of the following are true about the tension-release method of relaxation EXCEPT: (p. 147)
   a) you think about yourself performing your target behavior
   b) you think about one muscle group at a time
   c) you can achieve deep muscle relaxation
   d) you first tense a set of muscles and then relax them

10. Which of the following is true about meditation? (p. 146)
    a) you imagine yourself performing the desired behavior
    b) you observe someone else performing the desired behavior
    c) you find a behavior that prevents the occurrence of the undesired behavior
    d) you concentrate on a word or on your breathing to the exclusion of all other thoughts or behaviors

Unit 12

Form A

1. A procedure in which you first avoid antecedents that
   cue the unwanted behavior and then gain control of
   them by building new behaviors is called: (p. 209)
   a) tinkering
   b) trouble-shooting
   c) two-stage process
   d) brainstorming

2. A 55-year old man wrote a plan to run a mile every
   day. However, he could never get started with the
   plan. He then listed all the reasons why it was
   not working and redesigned his plan to deal with the
   interference. This technique of dealing with
   unforseen difficulties and revising the plan is
   called: _____. (p. 237)

3. Jim has a bad case of acne. He wants to stop the
   habit of picking his face because it makes the acne
   worse. In order to come up with a plan, he thinks of
   as many ideas as possible, without being critical of
   them. This process is called: (p. 218)
   a) brainstorming
   b) tinkering
   c) troubleshooting
   d) two-stage process

4. A good plan will include all of these features EXCEPT:
   (p. 214)
   a) feedback on how you are progressing
   b) explicitly stated rules
   c) explicit procedures so that no adjustments are needed
   d) comparison of feedback to goals and subgoals

5. All of the following is true about using rules EXCEPT:
   (p. 214)
   a) rules must be explicit
   b) rules describe techniques that you will use in your
      plan
   c) rules are included in all successful plans
   d) rules should be set by others rather than yourself

6. Larry had unsuccessfully tried to quit smoking several
   times. He decided to use a procedure in which he first
   avoided all antecedents to his smoking for two weeks,
   and then began a plan in which he reinforced himself
   for not smoking when those antecedents occurred. This
   procedure is called:
   a) brainstorming
   b) tinkering
   c) two-stage process
   d) trouble-shooting

7. In a successful plan: (p. 214)
   a) rules set by others are more effective than rules which you set for yourself
   b) the original plan must be followed as written
   c) feedback is used to measure progress on goals and subgoals
   d) feedback gathering is only necessary in the baseline phase

8. One feature of a successful plan includes explicitly stating the techniques or procedures that you will use to make the desired behaviors more likely. You are using: (p. 214)
   a) brainstorming
   b) rules
   c) tinkering
   d) feedback gathering

9. Sometimes an unforseen event interferes with your plan. When you revise your plan to deal with the interference, you are using a procedure called: (p. 237)
   a) two-stage process
   b) tinkering and trouble shooting
   c) stating rules
   d) feedback gathering

10. The process in which you think of a variety of possible solutions to use in your plan is called _____. (p. 218)

APPENDIX F

First Mid-Term

Units 1-5; October 15

Multiple choice questions are one point each: essay question point value is indicated in parentheses by the question #. If you wish to take a break, go to the restroom, have a cigarette, etc., then just leave the room and return when you are ready. This is a two hour exam. (2:00-4:00). Please ask for help if you need it.

MULTIPLE CHOICE:

Unit 1

1. All of these are ways to measure learning as described in the Chance textbook except: (p. 17-20)
   a) errors
   b) topography
   c) speed
   d) growth

2. Sometimes a reflexive response will be weakened through exposure to a stimulus. For example, walking into the dorm cafeteria can stimulate your sense of smell in a very pleasant way (hopefully). But after a few minutes, you get used to it. This is an example of the phenomenon called _____. (p. 3-5)

3. A person will blink his/her eye when a puff of air is blown into it. This automatic, predetermined response is called a(n): (p. 2)
   a) reflex
   b) learned behavior
   c) instince
   d) maturational response

4. Which statement about learning is true? (p. 17)
   a) Learning includes changes in behavior due to fatigue, injury, or disease.
   b) Changes in behavior are predetermined and automatically emerge over time.
   c) Experience is the most important factor in learning.
   d) Instincts account for part of learning.

5. Some behaviors are due to automatic, predetermined changes in an organism and will emerge at a certain time in the organism's development (for example, walking in humans emerges at around one year of age). This phenomenon is called:
   a) experience
   b) maturation
   c) reflexive behavior

6. "Both reflexes and instincts occur in all members
   of a given species, and are elicited by specific
   stimuli. The only important difference is that
   _____ are more important than _____." (p. 6)

   a) instincets, reflexes
   b) reflexes, instincts

Unit 2

7. Which statement applies to the behavioral-skill
   model? (p. 9-10)
   a) changes in our environment produce changes in our
      behavior
   b) people have stable personality structures which
      account for their behavior
   c) getting rid of outer symptoms does not eliminate
      inner causes
   d) if the inner illness is treated, the outer symptom
      will disappear

8. All of the following are ways to build committment to
   change except: (p. 35-42)
   a) making a self-contract
   b) asking others to punish your unwanted beahvior
   c) using an escape clause when appropriate
   d) giving yourself reminders when tempted

9. Which of the following is the best example of phrasing
   a behavior-in-a-situation? (p. 23-26)
   a) to start being assertive with friends
   b) to be less rude to people
   c) to say "hello" to people I pass on campus
   d) to be friendly to everyone I meet

10. When you are ready to commit yourself to working in
    a specific behavior, you write: "My goal is to
    increase (behavior) in (situation) and I will carry
    out the steps suggested in the text". Then you sign
    your name. This is called:
    a) getting advice
    b) a self-contract
    c) an escape clause
    d) specifying the chain of events

11. Situations can arbitrarily be divided into two
    elements: the events that come before a behavior and
    those that come after it. These are called: _____
    and _____ (p. 9)

12. All of the following are ways to specify your target behavior in situations <u>except</u>:
   a) make a list of concrete examples of your problem behavior
   b) look for several examples of the behavior in your daily life
   c) determine the personality traits that are causing your behavior
   d) become a good observer of your behavior in various situations

Unit 3

13. Before you actually try to change your target behavior, you will observe and record your behavior until your behavior shows a clear pattern. This phase of your self-modification plan is called:
   a) abcissa
   b) reliability
   c) reactivity
   d) baseline

14. Interval recording should be used when: (p. 72)
   a) you want to count how long it takes to do something
   b) you want to count the total number of times you co something
   c) you cannot continuously record the behavior as it occurs
   d) you want to know what events precede and follow the behavior

15. Which statement about reactivity is true? (p. 67)
   a) undesired behaviors tend to increase
   b) self-recofding can produce an increase in desired behavior
   c) you should try to discourage reactivity
   d) reactivity usually occurs if you don't care about the behavior

16. Place the words "behavior" and "chronological time" (e.g. days) on the appropriate lines on the axes of this graph (p. 226)
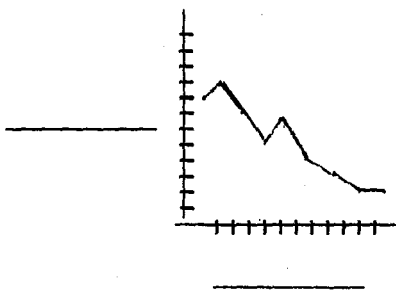
17. When two or more observations of the same event
    resulted in the same recording, this is called
    (p.77):
    a) reactivity
    b) reliability
    c) interval recording
    d) duration recording

18. When the intensity of an event is a factor, such as
    intensity of pain, depression, of joy, you should use:
    (p. 62)
    a) frequency recording
    b) duration recording
    c) rating scales
    d) interval scales

Unit 4

19. Reinforcement that follows each instance of a behavior
    is called _____ reinforcement. Reinforcement
    that occurs after only some instances of a behavior is
    called _____ reinforcement (p. 91).

20. A behavior that was once reinforced but is no longer
    reinforced will begin to occur less often. This is
    the principle of: (p. 91)
    a) extinction
    b) negative reinforcement
    c) punishment, type 1
    d) punishment, type 2

21. All of these statements about punishment are true
    except: (p. 90)
    a) it can lead to the loss of something pleasant
    b) it causes a beahvior to occur less often
    c) it can involve the occurrence of some unpleasant
       event
    d) it strengthens behavior by its' added presence

22. If you want to learn how to call someone and ask for
    a date, and you observe your friend calling someone
    for a date, you are learning through _____. (p. 101)

23. Which statement about reinforcement is true? (p. 87)
    a) behavior that is reinforced may occur less often
    b) positive reinforcement may cause behavior to be
       weakened
    c) negative reinforcement may cause behavior to be
       weakened
    d) reinforcement always strengthens behavior

24. A(n) _____ behavior is anything you do that has an effect on your environment, while a(n) _____ behavior is controlled by antecedent stimuli which are adequate to produce the behavior. (p. 86,98)

Unit 5

25. Pavlov used the name _____ reflexes for those reflexes that are programmed into the organism at birth, and _____ reflexes for those reflexes that are acquired or learned. (p. 30)

26. Brady (1961) trained a thirsty rat to press a lever for water. Then he periodically sounded a clicker; when the clicker stopped, the rat received electrical stimulation of a pleasure center in the brain. After repeatedly pairing the clicker with pleasureable brain sti,ulation, the rat began to press the lever at a faster rate than the clicker sounded. This phenomenon is called: (p. 34)
    a) behavioral suppression
    b) backward conditioning
    c) behavioral facilitation
    d) defense conditioning

27. All are factors in classical conditioning except: (p. 44-48)
    a) length of inter-trial interval
    b) number of stimulus pairings
    c) characteristics of the learner
    d) consequences applied to behaviors

28. If the unconditional stimulus used in classical conditioning is something that the organism would usually seek out, such as food or water, the procedure is called _____ conditioning. If the unconditional stimulus is aversive (something the organism would ordinarily avoid (such as electric shock or extreme heat), the procedure is called _____ conditioning (p. 32-36)

29. A rat was trained to press a lever for food. Then the experimenters paired a tone with shock. After several pairings, the rat decreased its' rate of lever pressing when it heard the tone, and did not resume its' previous rate of lever pressing until after it had received the shock. This phenomenon is called: (p. 38)
    a) behavioral suppression
    b) appetitive conditioning
    c) backward conditioning
    d) behavioral facilitation

30. Stroking a baby's skin is an unconditional stimulus that elicits certain unconditional responses, such as smiling, cooing, etc., or what we call happiness or love. The parent, who was originally a neutral stimulus, is regularly paired with the stimuli that elicit "love", and become conditioned stimuli for love. The child's responses are called: (p. 33)
    a) conditioned reinforcers
    b) conditioned emotional responses
    c) unconditioned responses
    c) unconditioned emotional responses

Unit 1

You have been assigned to study the behavior of a newly discovered species of animal. You notice that the animal occasionally changes color from purple (its' normal color) to blue, but you have not yet identified the situations in which it changes colors or what events precede or follow the change. Your task is to discover whether the color change is best described as a reflex or is learned. (p. 2-17) (Synthesis)

Keeping in mind the purpose of your "experiment", choose the best alternative for each of the following items (questions 31,32, & 33)

31. Knowing about the complexity of the animal's nervous system:
    a) is not really helpful because most organisms have both reflexes and learned behavior
    b) is important because only lower organisms have reflexes
    c) is important because only higher organisms have reflexes
    d) is not important because reflexes don't contribute to survival as much as learned behavior does

32. Observing the behavior over many trials:
    a) is important because the reflex may only occur several times a year
    b) is important because you may see habituation and sensitization phenomena
    c) is not important because a reflexive behavior will be exactly the same over many trials
    d) is not important because a learned behavior will be exactly the same over many trials

33. Which of the information would be <u>most</u> helpful in
determining whether the color change is reflexive or
learned?
   a) knowing whether the color change response is
      specific to males or females
   b) knowing what the animal usually eats
   c) knowing whether the response occurs to several
      different stimuli
   c) knowing whether the situation (stimulus) involves
      danger to the animal

34. MATCHING (1 point each)

For each of the following situations, match the way of
measuring learning that was used (application)

____ 1. You are nervous the first time you have to speak in class. After several times in which you speak in class, your anxiety diminishes.	A. topography B. errors C. strength D. speed E. rate

____ 2. Your cigarette smoking has
decreased from 1 pack/day
to 1 cigarette/day.

____ 3. You used to run a mile in
30 minutes. Now you can
run a mile in only 10
minutes.

____ 4. You are trying to make your
dance steps look exactly like
your dance teacher's.

____ 5. The first time you took a PSI
quiz, you missed 5 questions.
The second time you took the
quiz, you didn't miss any.

ESSAY QUESTIONS

Unit 1

35. Some scientists believe that instincts "form the
very foundation of human society". For example,
they believe that the incest taboo, maternal behavior
of females, and altruistic behaviors are all instincts.
Other scientists believe that these kinds of behaviors
are not instinctive at all, but are learned. Argue
in support of <u>either</u> theory. Be sure to describe the
<u>difference</u> between instinctual behavior and learned
behavior in answering this question, and show how the
difference supports your choice. <u>Do not merely give
examples</u>. (Evaluation).

(3) 36. Describe the behavior that you have chosen for
your self-modification project from the point of
view of the three theories below. Use one
sentence to describe your behavior for each theory.
(p. 6-9) (application)

a) Trait theory

b) Medical model

c) Behavioral-skill model

(6) 37. John decided that his goal is to be more popular
with the opposite sex. He decided that he would
consider himself successful when the most popular
girl on campus would accept a date with him. A
description of John reveals that he doesn't have
very many friends of either sex. He has gained
thirty pounds since he began college because he
eats when he is lonely, and his grades have been
"C's" and "D's" because he feels too depressed
about his social life to concentrate on his
studies. John plans to record the duration of
time that the girl will talk to him when he calls
her on the telephone. (p. 24-33) (evaluation)

a) Evaluate John's choice of
   1. His goal

2. His choice of a behavior to record

    (b) Suggest some different behaviors for him to
        begin observing.

UNIT 3

(8) 38. Judy's target behavior is to lose twenty pounds.
       She is taking data on how many fattening foods
       she eats daily, and how many calories she eats
       at each meal. Sometimes she forgets to write down
       this information until she gets home at night, or
       the next morning. When this happens, she tries
       to remember as best she can, and writes it down
       then. Her graphs look like this:

Number of
fattening
foods eaten
daily

No.
of
cals.
eaten
at
each
meal

MEALS
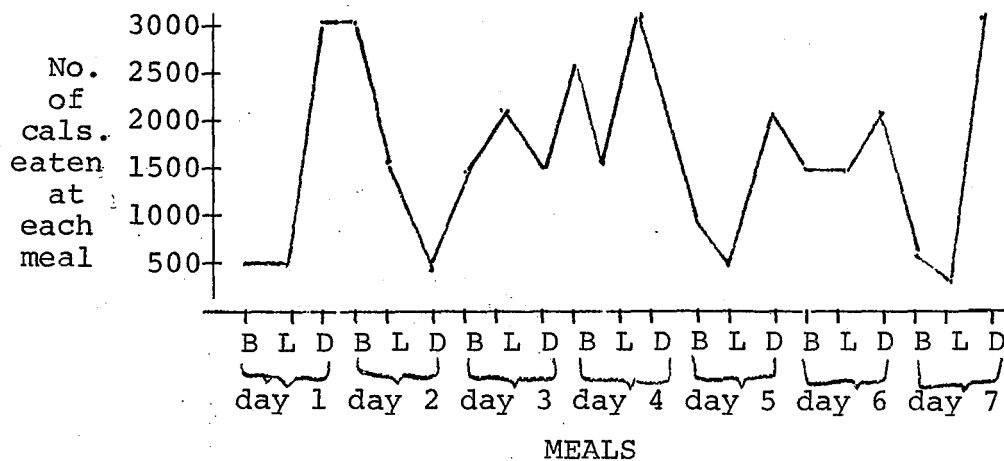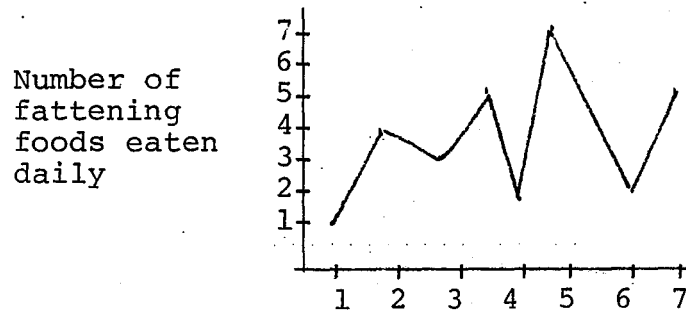
A. Evaluate good and bad points about her data collection system, suggesting any changes that you feel are necessary.

B. Evaluate good and bad points about her target behaviors, suggesting any changes that you feel are necessary.

C. Do her baseline data indicate that she is ready to begin intervention? Why or why not? (application)

UNIT 4

(8) 39. Janet is a music major. Her target behavior is to practice the violin two hours one day, but she is presently practicing about two hours weekly. She planned to practice in her dorm room, but her structured diary revealed that she spends most of her time talking to others, talking on the phone, or taking naps. Her diary also revealed that she has no consistent time of day scheduled in which to practice. She has made several attempts to go to the practice rooms in the music building, but she usually meets up with a friend on the way and never makes it to the music building.

Propose a self-modification plan that Janet might use to increase her target behavior. Be sure to address all of these points (synthesis)

a) antecedents and consequences that may be maintaining her present behaviors.

b) choice of goal

c) Suggest specific procedures or techniques as discussed in Watson & Tharp, to deal with her counterproductive behaviors in the dorm room.

d) Suggest specific procedures or techniques as discussed in Watson & Tharp, to deal with her counterproductive behaviors while going to the music building.

(3) 40. For your own target behavior, describe a way to
utilize each principle of behavior, using one
sentence for each principle. (application)

a) positive reinforcement:

b) negative reinforcement:

c) punishment:

(6) 41. Using secondary classical conditioning, describe
how you would create a society in which short people
are positively valued and tall people have secondary
status. In several sentences, describe the procedure
you would use and illustrate it with a diagram
showing how conditioning will take place. (application)

(3) When you walk into the kitchen, your dog is there
wagging hiw tail and drooling. You probably say to
yourself "he's happy to see me". Assuming that you
(a conditional stimulus) have been paired with the
dog's food (an unconditional stimulus), draw a diagram
which illustrates the classical conditioning paradigm
that has taken place. (application).

APPENDIX G

Second Mid-Term

Units 6-9, November 12

Multiple choice questions and matching questions are one point each; essay question point value is indicated in parentheses by the question #. Total point value is 80 points. If you wish to take a break, leave and return when you wish. This is a two-hour exam (2:00-4:00). There is a class in this room at 4:00. Please ask for help if you need clarification.

MULTIPLE CHOICE

Unit 6

1. A rat received a shock through a grid floor every 20 seconds. If the rat pressed a lever during the 20 second interval between shocks, this postponed the shock for another 10 seconds. The rat began pressing the lever often enough so that it never received any shocks. This procedure by which the rat learned to behave so as not to receive any shocks is called: (p. 93)
   a) positive punishment
   b) negative punishment
   c) escape-avoidance training
   d) Premack principle

2. A _____ reinforcer is one which originally has no reinforcing value to the organism, but becomes a reinforcer when it is paired with a variety of primary and secondary reinforcers. It can then function as a reinforcer in a variety of situations. (p. 101)
   a) primary
   b) secondary
   c) superstitious
   d) generalized

3. Behavior that is engaged in freely by the organism may be used to reinforce low probability behavior. For a child, playing (a high probability behavior) may be used to reinforce eating spinach (a low probability behavior). This is called: (p. 111)
   a) negative punishment
   b) Premack Principle
   c) time out
   d) deprivation

4. A pigeon was reinforced with grain every 15 seconds, regardless of what it was doing at the time. As a result, the pigeon learned to perform strange rituals. This effect of a reinforcer when it coincidentally follows the behavior is called: (p. 95)
   a) positive punishment
   b) negative punishment
   c) superstition
   d) shaping

5. A rat was positively reinforced for lever pressing when the rat applied 35-40 grams of pressure to the lever. The experimenter gradually increased the amount of pressure required to press the lerer before reinforcement occurred. In this way, the experimenter was able to train the rat to press the lever at 60 grams; a response it had never made before. This process of reinforcing closer and closer approximations to a desired response is called: (p. 97)
   a) shaping
   b) fading
   c) avoidance
   d) superstition

6. In negative punishment (punishment, type II) (p. 94):
   a) the organism's behavior terminates an aversive stimulus
   b) the rate of undesired behavior increases
   c) the organism is deprived of some positive stimulus that would normally be available
   d) some aversive stimulus wuch as electric shock is presented

Unit 7

1. _____ is the process by which a behavior that was learned in the presence of one antecedent is performed in the presence of other, similar antecedents. (p. 126)
   a) stimulus discrimination
   b) stimulus generalization
   c) stimulus control
   d) stimulus differentiation

2. All of the following could be examples of antecedents EXCEPT: (p. 106)
   a) When did it happen?
   b) Where were you when it happened?
   c) What happened as a result?
   d) What were you saying to yourself?

3. Your problem is that you drink too much. The sequence of behaviors involved in drinking can be described as: getting the alcohol, making the drink, sitting down, and then drinking. By identifying the sequence of antecedents and consequences that lead to drinking, you have described the _____ that produces the unwanted behavior. (p. 113)
   a) unwanted thoughts
   b) chain of events
   c) irrational beliefs
   d) classifications

4. A method of arranging in advance for helpful antecedents to occur may include enlisting the help of family or friends, arranging for daily or weekly reminders, or arranging for reminders to take place just before the problem situation occurs. This is called: (p. 127)
   a) self-instructions
   b) stimulus generalizations
   c) changing the chain of events
   d) precommittment

5. The class of behaviors known as _____ behaviors, which include eating, drinking, and smoking, produce their own reinforcement automatically. (p. 111)

6. The underlying assumptions on which your self-speech and other behaviors are based, such as "I want approval from everyone all the time", or "Everyone must love me all the time", are called: (p. 109)
   a) beliefs
   b) self-instructions
   c) problem classifications
   d) chains of behavior

Unit 8

1. An S^D or S^Δ is a stimulus that precedes the behavior and indicates that the behavior will be reinforced. (p. 123)
   a) S^D
   b) S^Δ

2. In one form of differential reinforcement, any behavior other than the unwanted response is reinforced. This procedure is called: (p. 132)
   a) differential punishment
   b) differential reinforcement of incompatible behavior
   c) differential reinforcement of low rate
   d) differential reinforcement of other behavior

3. Which of the following intermittent schedules of reinforcement regulates reinforcement according to the number of responses that have been made? (p. 115)
   a) fixed interval
   b) fixed ratio
   c) variable interval
   d) none of the above

4. A rat was trained to press a lever using positive reinforcement (food). After about a hundred responses had been reinforced, the feeding magazine was disconnected so that lever presses were no longer reinforced. The result was a gradual decline in lever pressing. This process is called: (p. 127)
   a) response generalization
   b) response discrimination
   c) extinction
   d) positive punishment

5. In one type of reinforcement schedule, the period during which responses are not reinforced varies around some average amount of time. For example, a lever press may be reinforced after 2 seconds, 8 seconds, 6 seconds, and 4 seconds, with the average being 5 seconds. This schedule is a: (p. 115)
   a) fixed ratio
   b) variable ratio
   c) fixed interval
   d) variable interval

6. If a pigeon is trained to peck a disc of a certain color, it is likely to peck other discs of a similar color, but it is not likely to peck a disc that is very different in color. In other words, since the pecking response was reinforced in the presence of certain stimuli, it is likely to occur in the presence of other similar stimuli. This phenomenon is called: (p. 120)
   a) response differentiation
   b) differential reinforcement of low rates
   c) stimulus generalization
   d) response generalization

Unit 9

1. When teaching yourself a new, complex behavior, you should start with a behavior that you can already perform, which is the closest approximation to the desired behavior. You will then take small steps to reach your ultimate goal by using successive approximations to the goal. This technique is known as _____ (p. 133)

2. Which of the following is true about meditation? (p. 145)
   a) You think about solutions to your problems as you meditate.
   b) You think about yourself performing your target behavior.
   c) You think about a word, a mantra, or your breathing as you meditate.
   d) You think about your fears or phobias as you meditate.

3. All of the following are true about the tension-release method of relaxation EXCEPT: (p. 147)
   a) you first tense a set of muscles and then relax them
   b) you use it to achieve deep muscle relaxation
   c) you focus your attention on one muscle group at a time
   d) you focus your attention on an image of yourself performing your target behavior

4. If you know someone who has the skills you lack and want to learn, you can watch that person and imitate their behavior. This technique is called: (p. 157)
   a) modeling
   b) meditation
   c) covert rehearsal
   d) tension-release method

5. A strong fear that interferes with the life of the person and which most people would consider irrational is called a(n): _____ (p. 143)
   a) plateau
   b) phobia
   c) imagined behavior
   d) incompatible behavior

6. You want to improve your conversational skills when introduced to a stranger. You think about the way the person looks, what he or she says, how you react, and all the other details of the physical situation. This procedure, in which you practice a behavior in imagination, is called: (p. 157)
   a) shaping
   b) modeling
   c) covert rehearsal
   d) trancendental meditation

Unit 7

Match the technique which <u>best</u> describes each scenario.
Use each technique only once. (Chapter 5)

_____ 1. Donna was consistently late to her 8:00 class because she overslept. She asked her roommate to remind her to set her alarm clock the night before.

_____ 2. Lisa was depressed because she had just broken up with her boyfriend. She would come home from school, sit in her room, and think about him for hours while looking at pictures of him. In order to stop doing this, she decided to call a friend immediately after coming home, make plans to do something with that friend, change clothes, and meet her friend somewhere else.

_____ 3. Whenever Lisa began thinking about her ex-boyfriend, she would immediately think to herself, "<u>Stop</u> thinking about him!", and then substitute images of herself talking to Bob, a good friend.

_____ 4. Lisa still felt uncomfortable whenever she saw her ex-boyfriend. She prepared a short "script" to think about whenever she saw him. On these occasions, she thought to herself, "Be calm, smile, say "hello", and politely walk by".

_____ 5. Jim drank a 6-pack of beer every night during dinner and while watching T.V. He wanted to cut down on his beer-drinking, so he only allowed himself to drink beer while sitting in the bathroom.

A. Thought-stopping
B. Narrowing antecedents
C. Changing the chain-of-events
D. Self-instructions
E. Precommittment

Unit 8

Label each scenario with the schedule of reinforcement that is operating in that particular situation. There may be more than one example of each schedule (fixed ratio, variable ratio, fixed interval, variable interval). (pp. 113-116)

_____1. Janet found that if she nagged her husband long enough, he would eventually pick up his clothes that had been lying around the house. Sometimes he wouldn't give in the first time that she asked. Janet's husband's behavior of picking up his clothes is on what schedule of reinforcement?

_____2. Gloria is a peeper; she can see into Dave's room from her own room. She starts watching his room at 11:30 each night. Dave comes into his room and starts undressing at exactly 11:40 every night. What schedule of reinforcement is Gloria's peeping behavior on?

_____3. Angie had a hearing problem. She never answered a question the first time it was asked of her. She always said "what?" to the questioner and then would answer the question the second time it was asked. What is the name of the schedule of reinforcement that Angie had the questioners on?

_____4. When Patti got home from school, she would check to see if she got any messages that her boyfriend had called. She found a message on the average of once every month. What schedule of reinforcement is she on for looking for messages?

_____5. Elaine was fascinated by comets. She usually watched several times every night to catch sight of one, which occurred on the average of once every month. What schedule of reinforcement is Elaine's watching for comets on?

_____6. Don was on a self-modification project for losing weight. For every 3 pounds that he lost, he allowed himself to make a long-distance call to a friend. What schedule of reinforcement is Don's weight loss behavior on?

Unit 9

Match the technique which <u>best</u> describes each scenario.
Use each technique only <u>once.</u> (Chapter 6)

___1. Debbie was trying to lose 10 pounds,
and had a hard time passing up
tempting desserts. She thought of
her friend, Joan, who had recently
lost a lot of weight, saying "No,
thanks" while being presented with
delicious foods. Debbie thought of
how slim Joan looked.

A. Shaping
B. Incompatible Response
C. Covert Rehearsal
D. Imagined modeling

___2. Debbie was invited out to dinner
and wanted to stick to her diet.
Before she went, she thought about
herself ordering something non-
fattening from the menu, not eating
any bread, and ordering fresh fruit
for dessert instead of a piece of
cake.

___3. Bill had a habit of fidgeting in
his chair and scratching his head
when he talked to some authority
figure, such as a professor. The
next time he met with his advisor,
he practiced keeping both feet on
the floor and his hands clasped in
his lap.

___4. Bill made a list of situations in
which he had to talk to some
authority figure. He ranked them
from easiest to hardest and began
requiring himself to stop fidgeting
in two of the easiest situations.
He then added others one at a time.

SHORT-ANSWER ESSAY

Unit 6

(5) 1. (a) For your own self-control project, describe why you will _or_ why you will not use: (1) primary reinforcers, and/or (2) secondary reinforcers. Defend your choice of type of reinforcer (including no reinforcer) by specifying what it is about the nature of primary and secondary reinforcers that make them appropriate or inappropriate for your project (pp. 97-101) (evaluation)

    (b) Describe _explicitly and in detail_ how you might use one of the types of reinforcement that you find suitable (check with instructor if you find neither suitable) (application)

(2) 2. Give one example of how each of the following events could affect the behavior that you are attempting to change in your self-control project (p. 101) (application)

    (a) A social reinforcer:

(b) A social punisher:

Unit 7

(6) 3. Ann's target behavior is to lose 25 pounds. Her
eating patterns fluctuate between almost fasting
for a day or two and then raiding the refrigerator
and cabinets eating a lot of high-caloric foods
such as ice-cream and cookies. She has not lost
any weight. She cannot identify any other
antecedents for eating too much except feeling
hunger pangs, but she does know that she tends to
feel depressed occasionally about being overweight,
and tells herself that "everything is hopeless"
when she overeats. Ann is using a shaping program
in which she tries to go longer and longer without
eating. She also used avoidance of antecedents by
placing the fattening foods in a hard-to-reach place
in her kitchen. Evaluate Ann's program and make
suggestions for change if needed. Be sure to
address these three points explicitly:

(a) Ann's identification of the antecedents to
overeating,

(b) the chain of events involved in Ann's overeating,

(c) possible problems with Ann's shaping program;
also suggest two other techniques for achieving
antecedent control.

(Chapter 5 - evaluation)

Unit 8

(7) 4. (a) You are a marriage counselor. Many of the couples that you see interact mainly by arguing and criticizong one another. Given your knowledge of extinction, differential reinforcement, and punishment, which of these procedures or combinations of procedures do you think would be most effective in this type of situation for decreasing the frequency of arguments and increasing the number of positive interactions? (evaluation)

(b) Be sure to describe the difference between the three procedures in answering this question as well as telling exactly why your choice of procedure(s) would be most effective. (pp. 127-134) (analysis)

(7) 5. In chapter 5, Watson and Tharp state that "self-directed messages and thoughts are among the most powerful of influences on subsequent behavior. They classify self-speech into three types: self-instructions, classifications, and beliefs.

   (a) In your owm opinion, how important are self-directed messages in influencing behavior? (evaluation)
Argue for or against Watson and Tharp's statement.

   (b) Be sure to describe the difference between self-directed messages and thoughts and two of the following three forms of antecedent control: (Do not merely give examples.)
(analysis)

1. avoiding antecedents (including narrowing antecedents)
2. changing chains of behavior (including pauses)
3. Precommittment

Unit 9

(7) 6. (a) Evaluate each of the following four methods
described in chapter 6 according to whether
you feel that it is really useful for your
own self-change project. Be sure to
specifically discuss all of the aspects of
each method that do or do not make it suitable
for your project. (evaluation)

(b) Describe explicitly and in detail how you
might use one of the methods that you find
suitable. (application). If no method is
suitable for your project, then use decreasing
test anxiety as an example project. (chapter 6)

a. Shaping

b. Incompatible behaviors

c. Imagined (covert) rehearsal

d. Modeling

(7) 7. You are helping to develop a self-modification
plan for someone who is afraid of driving across
bridges or high freeway overpasses. This person
is spending an extra hour in commuting to work
because he/she takes a longer route to avoid
the freeway overpasses. This person will also
turm down invitations to friends' houses or
trips out of town if they will involve crossing
any bridges or overpasses. This person is
trying to decide whether to use shaping by itself
or to use the tension-release method of relaxation
in combination with shaping. In your own opinion,
do you think that the use of relaxation is
necessary in this situation? Tell why relaxation
is or is not necessary for this problem. Be sure
to describe and compare the procedures and
purposes of the two techniques in this context.
(chapter 6)

APPENDIX H
SELF-CONTROL
FINAL EXAM
Fall'81
75% - Units 10-14
25% - Units 1-9

Multiple choice questions and matching questions are one
point each; essay question point value is indicated in
parentheses by the question #. Total point value is 80
points. If you wish to take a break, leave and return when
you wish. This is a two-hout exam (4:00-6:00), however,
you may arrange for additional time. Please ask for help
if you need clarification.

MULTIPLE CHOICE

1. Some behaviors are due to automatic, predetermined
   biological changes in an organism and will emerge at
   a certain time in the organism's development (for
   example, walking in humans emerges at around 1 year
   of age). This phenomenon is called: (Unit 1)
   a. experience
   b. maturation
   c. habituation
   d. reflexive behavior

2. When keeping a structured diary, you will record the
   events that come before a behavior and those that come
   after it. These are called: _____ and _____.
   (Unit 2)

3. Before you actually implement your self-modification
   plan, you will observe and record your behavior until
   your behavior shows a clear pattern. This phase of
   your self-modification plan is called recording a _____
   (Unit 3).

4. Which statement about reinforcement is true? (Unit 4)
   a. behavior that is reinforced may occur less often
   b. positive reinforcement may cause behavior to be
      weakened
   c. negative reinforcement may cause behavior to be
      weakened
   d. positive and negative reinforcement always strengthen
      behavior

5. According to Pavlov, reflexes that are programmed into
   the organism at birth are called _____ reflexes, and
   reflexes that are acquired or learned later are called
   _____ reflexes. (Unit 5)

For questions 6 & 7, match each procedure with the
correct term (Unit 6)
    A. Negative punishment (punishment, type II)
    B. Positive punishment (punishment, type I)

6. ____ Following a specific behavior, the organism is
    deprived of some pleasant stimulus that would
    normally be available.

7. ____ An aversive stimulus such as electric shock is
    presented to the organism following a specific
    behavior.

8. _____ is the process by which a behavior that was
learned in the presence of one antecedent is performed
in the presence of other, similar antecedents. (Unit 7)
    a. stimulus control
    b. stimulus discrimination
    c. stimulus generalization
    d. stimulus differentiation

9. In a _____ schedule, reinforcement is regulated
according to the number of responses that have been
made, while in a _____ schedule, reinforcement
is regulated according to the amount of time that
has elapsed. (Unit 8)
    a. interval, ratio
    b. ratio, interval
    c. fixed, variable
    d. variable, fixed

10. When teaching yourself a new, complex behavior, you
should start with a behavior that you can already
perform, which is the closest approximation to the
desired behavior. You will then take small steps to
reach your ultimate goal by using successive approximations
to the goal. This technique is known as _____
(Unit 9).

11. A technique in which the observer first watches the
model perform the desired act, and then the model
guides the observer through the same behavior is called:
(p. 189)
    a. participant modeling
    b. vicarious classical conditioning
    c. covert rehearsal
    d. meditation

12. In one study, a model received shock (an aversive stimulus) shortly after a buzzer (a neutral stimulus) sounded. The observer, who was never shocked, watched as the model underwent training. The buzzer eventually came to elicit a change in the observer's galvanic skin response, (which is a measure of emotional response to the shock). This is an example of (p. 156)
    a. vicarious reinforcement
    b. vicarious punishment, Type II
    c. vicarious appetitive conditioning
    d. vicarious defense conditioning

13. One way of teaching someone how to get from point A to point B is to represent the appropriate behavior and its consequences in some symbolic fashion, such as drawing a map or presenting instructions. This type of conditioning is called: (p. 173)
    a. vicarious superstition
    b. vicatious classical conditioning
    c. primary vicarious conditioning
    d. secondary vicarious conditioning

14. A monkey observes one of its' peers lift the larger of two cups, under which it finds a raisin. As a result of this procedure, the model monkey learns to lift the larger of two cups. If the observer also lifts the appropriate cup when faced with the same situation then _____ _____ has occurred. (p. 159)
    a. vicatious defensive conditioning
    b. vicatious superstition
    c. vicatious reinforcement
    d. vicatious punishment

15. Someone with the flu tried a bizarre home remedy. The person recovered, but the fact that he recovered was really a coincidence. As a result of observing this person, you try the flu remedy the next time that you have a cold. This phenomenon of watching a model's behavior become coincidentally reinforced and then acquiring the same behavior is called: (p. 172)
    a. secondary vicarious conditioning
    b. vicarious superstitious behavior
    c. vicarious classical conditioning
    d. vicarious punishment

16. When you use the thought of some pleasant outcome or enjoyable daydream to reinforce behavior, you are using the technique called: (p. 175)
    a. token reinforcement
    b. imagined extinction
    c. covert reinforcement
    d. verbal self-reinforcement

17. Another name for a symbolic reinforcer (something that can be converted or exchanged for other reinforcers) is a _____ reinforcer. (p. 180)

18. When a reinforcer is delivered after, and only after a certain desirable response, we say that the reinforcer is _____. (p, 165)
    a. related
    b. covert
    c. contingent
    d. imagined

19. You use imagined extinction when: (p. 191)
    a. you wish to increase a behavior by removing the actual reinforcement
    b. you wish to reduce a behavior but cannot remove the actual reinforcement
    c. you wish to decrease a behavior by removing the actual reinforcement
    d. you wish to reduce a behavior by adding actual reinforcement

20. If you use positive self-speech following some desired behavior, such as saying "Good, you did it" after being assertive, you are using a technique called: (p. 174)
    a. mediated reinforcement
    b. verbal self-reinforcement
    c. token reinforcement
    d. the Premack Principle

21. A procedure in which you first avoid antecedents that cue the unwanted behavior and then gain control of them by building new behaviors, which include resisting old temptations, is called: (p. 209)
    a. tinkering
    b. trouble-shooting
    c. the two-stage process
    d. brainstorming

22. A good self-modification plan will include all of these features EXCEPT: (p. 214)
    a. feedback on how you are progressing
    b. explicitly stated rules
    c. explicit procedures so that no adjustments are needed
    d. comparison of feedback to goals and subgoals

23. In brainstorming you should: (p. 218)
    a. only use common, simple, ordinary solutions
    b. try to limit the number of ideas
    c. evaluate your ideas as soon as you think of them
    d. try to combine ideas to get new ones

24. When you explicitly state the techniques or procedures that you will use in specific situations, you are using: (p. 214)
    a. brainstorming
    b. rules
    c. tinkering
    d. troubleshooting

25. Sometimes an unforseen event interfered with your plan. When you revise your plan to deal with the interference, you are using a procedure called: (p. 237)
    a. stating rules
    b. feedback gathering
    c. two-stage process
    d. tinkering and trouble-shooting

26. Sometimes an organism will acquire a particular behavior more readily at one point at its' development than any other. These stages for optimal learning are called: (p. 212)
    a. critical periods
    b. overadaptability
    c. Lamarckian evolution
    d. instinctive drift

27. In the 1960's, researchers began to notice that a given animal might learn quite readily in one situation, yet have trouble learning in a slightly different situation. This difficulty was not due to the learning task, but rather to a predisposition in the organism. This situation is described by the phrase: (p. 206)
    a. complexity of the environment
    b. nonhereditability of learned behavior
    c. Lamarckian view of evolution
    d. a continuum of preparedness

28. Human beings are noted for their ability to adjust to increasingly undesirable conditions; if we were not so able to adjust, we might be more inclined to find ways of improving our environment. This phenomenon is called: (p. 217)
    a. Lamarckian evolution
    b. continuum of preparedness
    c. overadaptability
    d. critical periods

29. In the process of teaching animals to perform simple
    tricks, the trainers found that the animals often
    reverted to an inborn, unlearned behavior which inter-
    fered with performance of the trick. This phenomenon
    is called: (p. 208)
    a. instinctive drift
    b. imprinting
    c. critical periods
    d. overadaptability

30. Which of the following statements is FALSE? (p. 219)
    a. The physical structure of an organism sets limits
       on what it can learn.
    b. The quality of an organism's nervous system affects
       what it can learn.
    c. Organisms are prepared to acquire most behaviors
       with equal difficulty.
    d. Humans have an almost unlimited ability to adapt
       to adverse conditions.

31. The four-step process of problem solving includes:
    (p. 253)
    a. considering informal termination of your program
    b. always seeking professional help for your problem
    c. trying to think of as many solutions as you can
    d. waiting to see how serious the problem becomes before
       trying any new solutions

32. When you have learned a new behavior, you do not want
    to keep reinforcing yourself for performing the behavior.
    Instead, you should make a list of the kinds of situations
    in which you are likely to be able to perform the behavior
    and be reinforced for it by other people or events. In
    other words, you want the behavior to be maintained by:
    (p. 248)
    a. extinction
    b. natural contingencies
    c. formal termination
    d. primary reinforcement

33. The best way to make sure that your newly learned
    behaviors do not extinguish is to change the reinforcement
    schedule for your target behavior from continuous to
    intermittent. Another name for this concept is: (p. 249)
    a. transfer
    b. thinning
    c. informal termination
    d. problem solving

34. When you have developed new behaviors, you want to make sure that you perform these behaviors in a variety of _new_ situations. Watson and Tharp named this concept: (p. 248)
   a. transfer
   b. thinning
   c. informal termination
   d. problem solving

35. For some problems, you may need to use small steps to achieve your goal. However, sometimes it is impossible to arrange the kinds of situations that you need because events are too unpredictable. The success of your project will be limited because: (p. 261)
   a. your goals are unclear
   b. you have not used thinning properly
   c. you have insufficient skill in designing a plan for change
   d. you have insufficient control over the natural environment

ESSAYS (point value beside question number)

Choose one of the following three goals (it must _not_ be the same as your actual self-change project):
(a) increasing study time, (b) losing weight, or
(c) acquiring all the skills involved in successfully asking someone for a date. After choosing the goal, answer questions 36, 37, and 38 in terms of that choice.

(1) 36. Describe the goal as a behavior in a situation

(3) State two behaviors for which you will take baseline data and describe an appropriate method of recording data for each behavior.

(6) 38. Choose the one of the following consequences which you feel is <u>most</u> important to use for this problem: Positive <u>reinforcement</u>, negative reinforcement, <u>or</u> negative punishment. In order to explain <u>why</u> the procedure that you have chosen is most use<u>ful</u> in modifying the chosen behavior, state which procedure seems to be: (There may be no great difference. Be sure to compare all 3 procedures in each answer.):

(2) A. Most feasible (most practical to do) Why?

(2) B. Most appropriate to the goal. Why?

(2) C. Most realistic (most likely to actually be used by a person in a self-control project) Why?

(6) 39. Suppose that you are a psychologist conducting an assertiveness training group for college students, in which people learn to stand up for their rights, politely but firmly. Each member of your group has different situations in which he/she wants to learn to be assertive, but the same training techniques can be used with all members of the group. Given your knowledge of: (a) shaping through direct instrumental conditioning, (b) primary vicarious conditioning, and (c) secondary vicarious conditioning:
(analysis)

(3) A. Describe the difference between the procedure that you have chosen and the other two procedures. That is, what are the procedural differences between: (1) instrumental shaping and secondary vicarious conditioning, (2) instrumental shaping and primary vicarious conditioning, and (3) primary vicarious conditioning and secondary vicarious conditioning. Do not define the procedures. Deal only with differences.

39. continued
    (evaluation)

(3) B. Which one of these three procedures do you
       think would be most <u>effective</u> for teaching
       the members of your <u>groups to</u> be assertive?
       Explain <u>why</u> the procedure that you have
       chosen is most <u>applicable</u> to teaching those
       kinds of skills. In your explanation, state
       <u>why</u> the procedure you have chosen is:
       (1) most feasible (most practical to do),
       (2) most appropriate to the goal, and
       (3) most realistic for this teaching situation.

(2) 40. Many adults criticize the teaching of sex education
in schools and the availability of explicit
information about sexual behavior in our society,
such as in movies, t.v., and magazines. They
feel that if this kind of information were not so
readily available, the incidence of sexual
intercourse among teenagers would not be so high.
In other words, they feel that teenagers learn
about sexual behavior through observational
learning with vicarious reinforcement and are more
likely to engage in sexual behavior as a result.
Argue for OR against the position that vicarious
reinforcement does influence teenagers to engage
in sexual behavior. In your argument you should
refer to at least two of the following:
(a) your own experience or the experience of
friends, (b) statements made by authorities such
as your textbook authors, and/or (c) the logical
analysis of the nature of vicarious reinforcement
and its applicability to this kind of behavior.
(pp. 173-181; evaluation)

(6) 41.

(4 1/2) A. Evaluate each of the following three
types of reinforcers described in
Chapter 7 according to whether you feel
that it would be an effective method of
using consequences for your self-change
project. For each type of reinforcer,
discuss whether it is: (1) feasible
(practical), (2) appropriate to your
goal, and (3) do you believe that it
is a good method despite what the book
says.
(evaluation)

(1 1/2) 1. Premack-type reinforcer

(1 1/2) 2. Verbal self-reinforcement

(1 1/2) 3. Imagined reinforcement

41. continued

(1 1/2)   B. Describe in detail how you might use one of
   the methods that you find suitable. (application)

(4) 42. Patti was having a lot of arguments with her
         boyfriend and was trying to increase the number
         of positive interactions with him. Her baseline
         data showed that she was making an average of
         10 negative statements and critical comments
         to him each week, most of which developed into
         arguments. She asked him to cooperate in a
         precommitted punishment plan, in which he would
         tell her that she was acting selfishly and rudely
         to him when a negative interaction occurred.
         In addition, if she made over five negative
         statements or critical comments to him per week,
         she was to call him and tell him that she could
         not see him on Saturday night. Discuss each
         point listed below:
         (evaluation)

(3) a. According to the four rules that should be
        followed if punishment is used, does Patti's
        punishment plan involve appropriate use of
        punishment? Why or why not? (pp. 197-198)

(1) b. Suggest one other technique that Patti could
        use for achieving more positive interactions
        with her boyfriend.

(6) 43. John wrote a self-modification plan to increase the time that he spent studying. He stated a rule as follows: "I will increase my study time each week to a higher level than the previous week". As his graph shows, his study behavior increased for 5 weeks, after which his study behavior did not increase. He anticipated that the rewards of getting better grades would remind him to study more and also reinforce his behavior of studying.
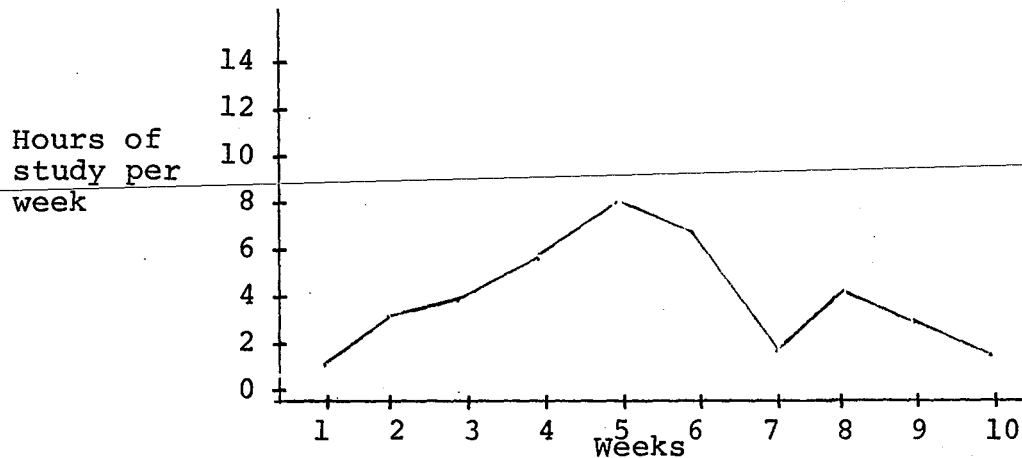
Discuss each point listed below:

(4) A. Does John's plan clearly and completely include all of the features of a good plan (1) stating rules, (2) stating goals and subgoals, (3) feedback about progress, (4) comparison of feedback to goals and subgoals?

43. continued

    (2) B. Look for technical flaws concerning antecedents
         and consequences in John's plan and offer
         suggestions for tinkering and troubleshooting
         (list each flaw and its solution together).
         (evaluation - chapter 8 & 9)

(2)   44. Describe how you would use the two-stage process
          for consummatory behaviors for <u>either</u>:

          (a) Your own target behavior if applicable,
          OR
          (b) Excessive cookie eating (the "Cookie Bear")

          (application)

(7) 45. Some scientists believe that <u>heredity</u> has some influence on the quality of the nervous system. On the basis of animal research in which offspring of bright rats differed in performance from offspring of dull rats, the argument could then be made that in humans, the children of intelligent parents will inherit superior nervous systems, while children of average or dull parents are not likely to be intelligent. Other scientists claim that the quality of the <u>environment</u> is the crucial factor in producing intelligent offspring, because many of the world's geniuses have had unusually enriched environments. In answering the questions, "which explanation of "genius" is most likely?", discuss these points:

(2) a. Examples from the Chance text which <u>support</u> your chosen explanation

(2) b. Examples from your own experience which <u>support</u> your choice

(3) c. Examples from your experience and/or the Chance text which do <u>not</u> support or are antagonistic to the other explanation.

(2) 46. For your own self-control project, on the basis of the suggestions in Watson and Tharp, discuss when you would consider obtaining professional help, and, if you did seek professional help, how you would go about seeking it.

APPENDIX I
Modified IDEA Survey Form for P.S.I. Self-Control

Please use the following code to respond to statements 1-20

1-Hardly ever	3-Sometimes	5-Almost always
2-Occasionally	4-Frequently	

1. My discussion leader promoted discussion of general problem-solving methods in addition to how to solve a specific problem.

2. Because of the course structure, I found myself better able to solve my problems without outside help.

3. My discussion leader was courteous to me and I felt free to ask for help.

4. My discussion leader was enthusiastic and encouraging.

5. If I needed it, my discussion leader was able to explain a problem in more than one way.

6. Given that some memorization is necessary, I feel that the PSI quizzes placed too much emphasis on memorization rather than understanding.

7. The instructor presented lecture material that was interesting and useful.

8. The T.A. presented lecture material that was interesting and useful.

9. I felt the two texts were overly dry and dull.

10. The text and study guides made it clear how each PSI unit fit into the course.

11. After discussing unit quizzes with the person giving the quiz, I understood my mistakes.

12. The PSI quizzes included questions which were unclear.

13. My discussion leader was patient with me, even when I didn't understand.

14. The materials were organized in a manner which aided learning and retention.

15. Leave blank

16. The study guides clearly state study objectives for each quiz.

17. The texts and study guides explained the material clearly, and explanations were to the point.

18. I will be able to use (in later courses or after college) the skills and knowledge gained in this course.

19. The quizzes and tests included questions which were unreasonable, detailed, and picky.

20. I found that studying the material was intellectually stimulating.

On each of the objectives listed below, rate the progress you have made in this course compared with that made in other courses taken at this university. In this course my progress was:

    1 - Low (lowest 10 percent of courses I have taken here)
    2 - Low average (next 20 percent of courses)
    3 - Average (middle 40 percent of courses)
    4 - High Average - (next 20 percent of courses)
    5 - High (highest 10 percent of courses)

Progress on:

21. Gaining factual knowledge (terminology, classifications, methods)

22. Learning fundamental laws, properties, principles, and generalizations

23. Learning to apply course material to improve my rational thinking and my problem solving

24. Developing specific skills and competencies needed to progress toward my major

25. Leave blank

26. Developing my creative capacities

27. Developing a sense of personal responsibility (self-reliance, self-discipline)

28. Gaining a broader understanding and appreciation of intellectual-cultural activity (music, science, literature, etc.)

29. Developing skill in expressing myself orally or in writing

30. Discovering the implications of the course material for understanding myself (interests, talents, values, needs, abilities, etc.)

On the next four questions, compare this course with others you have taken at this institution, using the following code:

    1 - Much less than most courses   4 - More than most
    2 - Less than most   5 - Much more than most
    3 - About average

31. Amount of reading

32. Amount of work (including study time, paper-writing, assignments, test-taking)

33. Difficulty of subject matter

34. Degree to which the course hung together (various topics and class activities were related to each other)

Describe your attitudes toward, and behavior in, this course, using the following code:

    1 - Definitely false   4 - More true than false
    2 - More false than true   5 - Definitely true
    3 - In between

35. I worked harder on this course than on most college courses I have taken

36. I had a strong desire to take this course

37. If given the opportunity, I would take another course using the PSI system

38. As a result of taking this course, I have more positive feelings toward psychology

39. I have given thoughtful considerations to the questions on this form

Describe your status on the following by blackening the appropriate space on the Response Card.

A. To which sex-age group do you belong?
    1 - Female, under 25   3 - Female, 25 or over
    2 - Male, under 25   4 - Male, 25 or over

B. Do you consider yourself to be a full-time or a part-time student?
1 - Full time   2 - Part time

C. Counting this present term, for how many terms have you attended this university?
1 - 1 term   3 - 4 or 5
2 - 2 or 3   4 - 6 or more

D. What is your classification?
1 - Freshman   3 - Junior or senior
2 - Sophomore   4 - Graduate   5 - Other

E. What grade do you expect to receive in this course?
1 - A   3 - C   5 - Other
2 - B   4 - D or F

F. For how many courses have you filled out an IDEA form during the present term?
1 - This is the first course   3 - 4 or more courses
2 - 2 or 3 courses

G. How well did the questions 1 - 39 permit you to describe your impressions of this course?
1 - Very well   3 - Not very well
2 - Quite well   4 - Poorly

EXTRA QUESTIONS:

Please respond to these statements according to the following code:

"1" strongly agree
"2" agree
"3" neutral or undecided
"4" disagree
"5" strongly disagree

40. My T.A. and instructor helped me to understand material that I had difficulty with.

41. Based on the size of this class, I think we should have had more hours available in which we could take PSI quizzes.

42. Completing the application of concepts sections of the study guides prepared me for the midterm exams.

43. There was usually little delay in having my tests and quizzes graded.

44. The PSI quizzes were generally a fair test of the material in the concepts section of the study guide.

45. I usually felt resentful if I did not pass the PSI quiz and had to retake it.

46. When I pass a PSI quiz with a grade of 90% or above, I feel I have really mastered the material.

47. The essay questions on the midterm examinations were a fair representation of the questions on the <u>application</u> of concepts section of the study guides.

48. I used the application of con-epts section of the study guides to prepare for midterms and the final exam.

49. The weekly assignments, discussion meetings, and handouts provided in class adequately prepared me for writing the final paper.

50. During the course of the semester, I became less anxious about taking tests and quizzes.

51. I learned more about how to answer essay questions in general from doing the <u>application</u> of concepts section of the study guides.

52. The way in which this course was structured allowed me to organize my time better for my courses and activities.

53. I found it frustrating to have to pace myself through this course.

54. I felt that I had to hurry over large amounts of material in order to complete this course.

55. I would prefer a regular lecture class with in-class midterms only, instead of the PSI system this course included.

56. In general, I would have preferred more structure (e.g., schedules, deadlines, etc.) than this course included.

57. This course improved my confidence in my ability to control my behavior.

58. I would recommend this class to someone who needs to improve his/her self-control.

59. Overall, this course was an enjoyable experience.

60. The lectures were helpful in preparing me for the PSI quizzes and exams.

For the following questions, choose the most appropriate response from those given below.

61. On the average, I devoted, outside of class, approximately the following number of hours per week to studying materials for this course:
(1) 0 to 2   (2) 2 1/2 to 4   (3) 4 1/2 to 6   (4) more than 6

62. In comparison with other courses, my understanding of the basic concepts and skills in this course was:
(1) much greater   (2) greater   (3) about the same
(4) less   (5) much less

63. Compared with what I initially hoped to gain from this course, I feel that I learned:
(1) Far more than I expected
(2) More than I expected
(3) About what I expected
(4) Less than I expected
(5) Far less than I expected

64. My college major is in the following area: (Primary area if a double major)
(1) Humanities (Music, Art, Dance, Drama, Language, Philosophy, Religion)
(2) Natural Science and Engineering (Bio, Chem, Math, Physics, Geo, Pharmacy)
(3) Social Science (History, Sociology, Poli. Sci., Econ, Blk. Studies, Anthropology)
(4) Behavioral Science, Business, Education (Com. Dis., Com. Arts, Psych, P.E., Public Adm.)
(5) Undeclared, Undecided, no major

PLEASE MAKE ANY ADDITIONAL COMMENTS ON THE BACK OF THIS FORM. WE WELCOME YOUR RESPONSES TO HELP US IMPROVE WHERE NEEDED AND TO KEEP THE ELEMENTS OF THE COURSE THAT YOU LIKE.