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## Comparison of Programed-Text Instruction With the Methods of Tutoring and Classroom Lecturing at Three Levels of Learning Ability

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COMPARISON OF PROGRAMED-TEXT INSTRUCTION WITH THE METHODS  
OF TUTORING AND CLASSROOM LECTURING AT THREE LEVELS OF LEARNING ABILITY

being

A Thesis Presented to the Graduate Faculty  
of the Fort Hays Kansas State College in  
Partial Fulfillment of the Requirements for  
the Degree of Master of Science

by

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## ABSTRACT

This study made comparisons of the methods of programmed-text instruction, tutoring and lecturing in the classroom. A three by three factorial arrangement of treatments was used as an experimental design. One factor was the three methods of instruction, while the other factor consisted of three levels of learning ability. The three levels of learning ability were determined by the ACT scores of all S's participating in the study.

The results demonstrated that the method of tutoring was significantly better than the methods of programmed-text instruction and lecturing. There was no significant difference between the methods of programmed-text instruction and lecturing. The levels of learning ability were significantly linear in accordance with the three methods of instruction. No significant interaction between the methods of instruction and levels of learning ability was manifest.

In the discussion, the possibilities of a biased criterion and uncontrolled motivational factors were discussed.

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## CHAPTER I

### INTRODUCTION

In recent years, many aspects of modern life have been influenced by automation. Not the least among these is automated instruction. Automated instruction has grown rapidly since S. L. Pressey (1926) developed one of the early devices known today as a teaching machine. It is interesting to note that Pressey directed his research towards finding aids for the teacher, not a replacement. Today, some researchers have found automated instruction superior to lecturing in a classroom as a method for training individuals. Others have been critical of the recent research which finds that automated instruction is superior, and have contended that inadequate controls were used. Thus, the controversy emerges: "How valid are the devices of automated instruction, and/or, will they ever replace the teacher?" The present study will not answer the question completely. However, it is hoped that an investigation of the programmed-text as compared to other forms of instruction will contribute some insight towards the use and development of automated instruction.

## CHAPTER II

### HISTORICAL REVIEW

A review of the literature reveals that the programmed text was an outgrowth of the teaching machine. Since there are various kinds of programmed texts, the present author will restrict the review to the research on the Skinner type of programmed text.

The pioneer of automated instruction, S. L. Pressey (1926), developed a device which could give examinations automatically. The device which was similar to a typewriter, could also provide a means of practicing learning material. In the practice situation, a student pressed one of four available keys. His response was recorded on a tape by the machine. If the student failed to give the appropriate response to a question, he would continue pressing the available keys until the appropriate key was pressed. The device would then allow the student to advance to the next question. After the student responded to all of the questions of the examination, the device would repeat those questions which were not answered appropriately the first time until the questions were answered correctly two consecutive times. After all of the questions were answered appropriately, a small coupon, hopefully designed to reward the student's correct behavior, was released.



Pressey (1932) later developed a device which registered the number of responses made to each question on an examination as well as the number correct. The device exposed answers and also adjusted the amount of practice on each item until the student had mastered the material. Pressey created these machines to conserve the labor of handling tests and also to provide a means of scoring tests automatically.

J. C. Peterson (1931) developed a multiple-choice form of answer sheet in which the answer spaces were color sensitive to a wet felt. If the wet felt was rubbed over one of five available spaces, the space would change to either a color indicating a wrong response or a color indicating a correct response. In his study, the experimental group which was exposed to this device needed slightly more time for their learning task; however, a post-test indicated that they learned significantly more material than the control group whom were exposed to the conventional form of instruction.

J. F. Little (1934) divided the students of an educational psychology course into two groups to evaluate a Pressey testing and drill machine. The experimental group used the machine during every examination. The control group's examination papers were graded and handed back the following day. After each examination, the students of the experimental group practiced on the machine until every item was answered correctly. The control group received their test back without the aid of the drill.

The experimental group performed better on both the objective and essay parts of the final examination for the courses.

B. F. Skinner (1954) directed his interests to the problem of automated instruction. Following some of his previously established concepts, he states that once reinforcement is controlled, the shape of behavior can be arranged at will. Reinforcement is necessary for a response to be learned. According to Skinner, if the acquisition of a complex response is broken down into several small steps, or "progressive approximations," an organism's capacity to learn is greatly increased. However, the increase in capacity is solely dependent upon the immediate reinforcement of each developmental step of the complex response. Providing reinforcement after each successful approximation of a complex task would, thusly, shape the learning of an individual. Skinner argues that in a normal classroom setting, the student does not receive the appropriate number of reinforcements to efficiently learn the desired response. To alleviate the problem, Skinner developed a device which has been popularly called the teaching machine.

Generally, a teaching machine is designed to present subject matter in the form of a series of questions to be answered by a student. The questions are answered by various methods such as by pencil and paper or by depressing one of an assortment of keys. The correct answer appears immediately by various methods after the student has responded to the question. If the student has

responded correctly, according to Skinner, reinforcement is immediate. If the response is incorrect, the questions are repeated until all are answered appropriately.

Thus, the material presented in Skinner's machine is quite different than the material presented by Pressay's device. With Skinner's machine, the student learns the material to be learned by a series of small steps or "progressive approximations," as opposed to the random presentation of questions with little or no structure which characterizes Pressay's machine. According to Skinner, this allows the learner to understand the material better and reduce the number of wrong responses to the material.

L. E. Homme and R. Glaser (1959) adapted the Skinner teaching machine to a book form which is called a programmed text. The text consists of a series of frames each of which contain information and questions. Using the text, a student starts at the top of the page by answering the question on each frame and turning the page to determine whether his answer is correct. In comparison with the teaching machine, the programmed text which incorporates the major principles of the teaching machine should have similar effectiveness as a teaching device. This contention has been met with criticism; some claim that cheating cannot be controlled, and that the book offers lower motivation for the students to learn the material as compared to the motivation brought about by the teaching machine. Homme and Glaser (1959)

claim that cheating may, in fact, encourage learning and not damage the act of learning at all. They feel that if the programming of the text is adequate, cheating will be negligible. Homme and Glaser refer to inadequate programming as a program which has weak response tendencies manifest, i.e. the subject's willingness to respond is low. Some have criticised that the repetition of items, after a student has correctly responded to them, is inefficient. Homme and Glaser answer that if programmers follow Skinner's principles, adequate programming should result in fewer errors. Therefore, repetition of items should be at a minimum.

#### Current Research and Theory

Current research indicates that programmed texts do offer certain advantages. Homme and Glaser (1959) report that programmed texts are superior to conventional textbooks when they cover the same material. In the study, the experimental group was trained to read music by programmed-text instruction, while the control group used a conventional textbook for training. The criterion of the study was an achievement score on a test of fundamentals of music reading. The results showed that the performance of the programmed-text learners was superior to those students using the conventional text.

J. L. Hughes and W. J. McNamara (1961) found that, in an industrial setting, workers using a programmed text to learn the IBM 7070 Data Processing System performed better than workers

receiving 15 hours of conventional instruction in the classroom. By observing the worker's study habits, it was determined that those workers who used the programed text saved 27 percent in study time. A questionnaire given to the workers indicated that the savings in time used for homework was 60 percent for the users of the programed text.

Susan R. Meyer (1960) investigated the effects of immediate confirmation of results as compared to delayed confirmation in programed instruction. There were three experimental groups in which all S's were superior readers as determined by a reading examination. Group "A" used a programed text with no answers given. The answers were corrected by an instructor and handed back the following day. Group "B" used a programed text with answers and scored themselves by placing an "X" on an answer sheet for every incorrect answer. Group "C" recorded an incorrect response by placing a clip on the page of a programed text where the error was made. After finishing the text, they went through the text again, rereading those pages with clips on them. Groups "B" and "C," which had immediate confirmation of results, had better scores on a post-test (to the near significant level of .06) than Group "A," the students without immediate access to answers. Groups "B" and "C" also made more responses to the programed texts and fewer errors during the training trials than Group "A." Meyer concluded that though the advantage of immediate confirmation or reinforcement of an answer as provided by programed instruction

is not highly conclusive, the methods providing immediate confirmation of results do produce more responses and more accurate responding.

Some studies of automated instruction, according to some authors, are inadequately controlled. Concerning the comparison of teaching machines (the present author feels that programmed texts could be analogous) to instruction in the classroom, D. Porter (1957) argues, "Such experimentation may indeed show an advantage for one or the other method of teaching, but there is no guarantee that the results obtained can be repeated, for the outcome of those experiments depends upon unspecified parameters of the 'usual' classroom situation." Porter feels that the crucial test requires: (a) that both the experimental and the control groups are provided with equivalent information regarding the correctness of their response; (b) that the experimental group receives reinforcement as quickly as possible after the response has been made; and (c) that the control group receives delayed reinforcement.

H. N. Gagne and N. E. Paradise (1961) relate that there is little evidence about the nature of individual difference in completing learning programs beyond the fact that they occur. Gagne and Paradise have attempted to analyse these differences into three theoretical variables. First, differences exist in the knowledge or "learning sets" which an individual possesses. "Learning sets" refer to the basic learned materials in a hierarchy of more technical skills in a learning complex. Secondly, there may be a difference in the amount of general basic learning

skills acquired by each individual learner. Thirdly, there may be a difference in the general learning ability of the student.

In their study, in which simple linear algebraic equations were used as subject material, four classes of eighth grade mathematic's students were given eight booklets. Each of these booklets represented a hierarchical level or a "learning set" in theory i.e. a particular level or phase that must be learned by a student in order to go on to the next level or "learning set." All of the "learning sets" made up the complex task of solving algebraic equations. The booklets consisted of questions to be answered with a key provided to confirm the correctness or incorrectness of their responses. Each of the eight booklets represented a daily unit of material. During the training sessions, the students used the books for eight consecutive days. Pre-tests to the training sessions were administered to all of the students to differentiate those students which possessed relevant basic abilities to solve algebraic linear equations and those students who had irrelevant basic abilities. Those individuals who possessed relevant abilities made up the experimental group, while those students with irrelevant abilities made up the control group. After each training session, a test was administered to both groups. A final examination was given on the eighth day of training. The results demonstrated that there was higher correlation between the final test scores of the group possessing relevant basic abilities and their scores on the basic abilities

test than between the final test scores of the group with irrelevant basic abilities and their scores on the basic abilities test. Therefore, it appears that the individual learning skills of S's are important variables of instruction.

In conclusion, it appears that programed-text instruction may be superior to conventional methods of instruction. However, these results could be biased by some of the uncontrolled parameters discussed. In making comparisons of programed-text instruction with other forms of instruction, methodological controls of the following parameters, in the author's opinion, appear to be the most critical: (a) control of individual differences; (b) control of the amount of pertinent knowledge each individual possesses which is related to the particular material to be learned; and (c) control of the latency between a student's response and the knowledge of the correctness of his response.



## CHAPTER III

### PURPOSE

No comparison has been made between programmed-text instruction and the tutoring method of instruction. In the present study, the methods of tutoring and lecturing were compared with the method of programmed-text instruction to discover the relative merits of each.

The urgency of making a comparison between tutoring and programmed-text instruction is best explained by Skinner's (1954, 1958) statements concerning automated instruction. Skinner contends that training organisms to perform competently on complex tasks is contingent upon small-step reinforcements. The more immediately the reinforcement follows a given response of an organism, the more readily a particular task is learned. Also, if an organism is allowed to actively participate in the learning process and to pace the rate of acquisition of a particular skill, the learning is more readily acquired.

Since instruction by tutoring offers immediate and small-step reinforcement to a S's responses, the self-pacing by a S, and the active participation of a S which are similar in principle to the nature of programmed texts, the differences in effectiveness between the two methods, tutoring and programmed-text instruction, should be negligible. The inclusion of the method of lecturing in a classroom served as a control for the other two methods of instruction.

## CHAPTER IV

### METHOD

Subjects: Forty-five S's ranging from 18 to 22 years of age were drawn from two introductory psychology courses at Fort Hays Kansas State College. Both sexes were represented in the study. None of the S's had received any instruction over material closely related to that used in the experiment; therefore, the amount of knowledge of each S prior to the study should have been approximately equal.

Materials: The subject material of the study for all three groups was basically the same. The programed text, The Analysis of Behavior, by J. C. Holland and B. F. Skinner (refer to References, 1961) was used in the study. Fourteen concepts (Appendix A) were selected from the first three sets of the programed text, The Analysis of Behavior, and used as guide for instruction by tutors and lecturers. Thus, the S's of all three groups were presented similar material and quantitatively the same amount.

The criterion or the test of the study consisted of 23 multiple-choice, true or false, and fill-in statements with six application problems (Appendix C). The test was constructed from items submitted by the five tutors and two lecturers (one served as both a lecturer and a tutor) of the study. While constructing the test, the group attempted to deal with each of the 14 concepts used in the lectures and tutoring sessions in

the questions they submitted. Each question was discussed and revised in a meeting of the tutors and lecturers until it met with the approval of all those present. The group met a day after the last training session to construct the test.

The instructions (Appendix B) for all three groups included the purpose of the study and scheduling of training and testing. Instructions were read to the S's prior to the first learning session. All groups were asked not to study any related material during the week the experiment was being performed and not to study the material outside the experimental session.

Design: A three by three factorial design was used to compare the three methods of instruction at three levels of learning ability. One factor was the three methods of instruction, while the other factor was the three levels of learning ability. The S's were randomly assigned to nine treatment combinations. To determine the three levels of basic learning abilities, scores of the American College Test, ACT, of all S's were placed into either an upper, a middle, or a lower classification. The classification of each S was accomplished by ranking the scores of all the S's from the highest score through the lowest score. Dividing the total number of scores by three, the upper range, for example, was determined by counting from the highest score to a point on the ranked-scale equaling one-third of the total number of test scores. The other two classifications, middle

and lower, were determined in a similar manner.

Procedure: Subjects of all three groups met once on Monday and again on Wednesday of the same week for a 50 minute session, or a total time of two 50 minute periods of instruction.

The test to evaluate the methods of instruction was given on a Friday of the same week the instructions were given.

Eighteen S's of the programed-text group assembled in groups of six during the two training sessions. Three extra S's were used in this group to allow for absences during the training sessions and the text. The number of S's was reduced to 15 by the random selection of five S's from each of three levels of learning ability.

Instructions (Appendix B) were read prior to the beginning of each session for each group representing the programed-text method of instruction. The S's were instructed to use the text for 50 minutes and discontinue until the next learning session. On the second session, the S's were given another 50 minutes to complete the first three sets of the text. Answer sheets (Appendix D) were provided for the S's to record their answers. The S's were instructed to mark their answers either correct or incorrect. In this manner, a student received immediate reinforcement if his answer was correct.

Five graduate students majoring in psychology at Fort Hays Kansas State College were used in the study as tutors. All of the tutors had had a course in the psychology of learning. Each of the tutors were given a list of 14 concepts (Appendix A) and instructed to refer to Skinner's discussion of conditioning

if they had any questions relating to the concepts. In this manner, the tutor had a reliable guide to determine the kind of material and the amount to be presented.

The five tutors were allowed to outline the material as they wished. They were encouraged to ask their S's for questions so that the tutor would have some indication of the material the S had learned. Each tutor was assigned one S randomly selected from each of the three levels of learning ability (upper, middle, and lower thirds of the ACT scores). Tutors were told that the performance of the S's they tutored would be compared with the performance of the S's tutored by other tutors. In this manner, the competitive factor among tutors should have, hopefully, motivated each tutor to do his best towards instructing his pupils. The tutors reported, for the most part, that they attempted to incorporate Skinner's principle of immediate reinforcement by frequently asking their S's questions and informing each that his answer was correct or incorrect immediately after he responded.

The method of lecturing in a classroom was conducted in two introductory psychology classes. The S's of each of these classes were reduced in number since S's representing the other two methods of instruction were also drawn from these two classes. Two lecturers, one for each class, were used to allow for variation among lecturers. After the lecturers presented their material and the test was given, five S's were randomly chosen from each level of

learning ability as determined by the ACT scores from the two classes to make up the lecture group. Eight S's were selected from one class, while seven were selected from the other.

The lecturers used the same list of concepts (Appendix A) as the tutors as a guide for the material to be covered in the lectures. They were allowed to present the material in any manner they wished. If the lecturers had any questions regarding the nature of the concepts given to them, they were instructed to refer to Skinner's discussion of conditioning.

The lecturers followed basically the same instructions as the tutors; however, since the lecturers dealt with a group, they could not have been expected to interact as much with the individual S's.

## CHAPTER V

### RESULTS

A three by three factorial analysis was applied to the test scores. The treatment effect for the instructional methods was significant ( $F = 7.009$ ; d.f., 2 & 36;  $p < .05$ , Table I). Orthogonal comparisons (Edwards, 1962, pp. 144-146) were performed to determine if differences were manifest between the tutoring and programmed-text methods of instruction. In an orthogonal comparison made of the tutoring and programmed-text methods of instruction, the tutored group performed significantly better ( $F = 7.210$ ; d.f., 1 & 36;  $p < .05$ ) than the programmed-text group. Consequently, the null hypothesis of negligible differences between the methods of programmed-text instruction and tutoring was rejected.

To compare the scores of the control group, lecturing, with the combined methods of programmed-text instruction and tutoring, another orthogonal comparison was made. The lectured group differed significantly from the programmed-text and tutor groups of instruction ( $F = 6.310$ ; d.f., 1 & 36;  $p < .05$ ). Since the mean score (Table II) for the group exposed to the lecturing method was lower than the other two groups, one can safely infer that the performance of the lectured group was inferior to the performance of the other two groups.

TABLE I

TABLE OF THE ANALYSIS OF VARIANCE OF TEST SCORES

Source	d.f.	$\sum x^2$	MS	F
Total	44	521.78		
Treatment	8	281.38	35.17	5.265 <sup>1</sup>
Instruction	2	93.64	46.82	7.009 <sup>1</sup>
Comparison of Lecture with P-T and Tutoring	1	45.51	45.51	6.810 <sup>1</sup>
Comparison of P-T with Tutoring	1	46.13	46.13	7.205 <sup>1</sup>
Levels of Learning Ability	2	122.84	61.42	9.195 <sup>1</sup>
Linearity	1	120.00	120.00	17.960 <sup>2</sup>
Non-Linearity	1	2.84	2.84	.425
Interaction	4	64.90	16.23	2.429
Error	36	240.40	6.68	

<sup>1</sup>  
significant at the .05 level.

<sup>2</sup>  
significant at the .01 level.



TABLE II

MEANS FOR EACH METHOD OF INSTRUCTION AND EACH LEVEL  
OF LEARNING ABILITY

		Methods of Instruction			
		Tutor	Programed Text	Lecture	Total Means for Levels of Learning Ability
Levels of Learning Ability	High 1/3	21.80	20.00	16.40	19.40
	Middle 1/3	17.20	16.00	17.40	16.87
	Low 1/3	18.60	16.00	13.60	15.40
	Total Means for Methods of Instruction	19.20	16.66	15.80	

TABLE III

\*t\* TESTS COMPARING MEANS FOR INSTRUCTIONAL METHODS

Means	Comparisons					
	*t*	vs Lecture	*t*	vs Tutor	Tutor vs Lecture	
15.85		15.80	16.55	19.20	19.20	15.80
*t*		.502		3.28 <sup>1</sup>		3.21 <sup>2</sup>

<sup>1</sup> significant at the .05 level.

<sup>2</sup> significant at the .01 level.

Subsequent "t" tests (Table III) of the mean score for each of the instructional groups were performed to determine how the lecture group compared with each of the other two methods of instruction. The tutored group performed significantly better than the lecture group ( $p < .01$ ). However, a comparison of the means of the test scores of the programmed-text group and the lecture group failed to yield significance ("t" = .602 with 28 d.f.;  $p .60$ ).

The effects of the other factor, levels of learning ability, was significant ( $F = 9.20$ ; d.f., 2 & 36;  $p < .05$ ). A subsequent test of linearity via orthogonal polynomials was used to analyse the degree of linearity or non-linearity of the test scores in accordance with the levels of learning ability. The test for linearity was significant ( $p < .01$ ; Table I), while the test for non-linearity was not significant ( $F = .425$ ; d.f., 1 & 36;  $p > .25$ ). A test for an interaction between the methods of instruction and levels of learning ability was non-significant ( $F = 2.429$ ; d.f., 4 & 36;  $p < .10$ ).

To determine whether the differences of the preceding tests were due to unequal variances, a test of homogeneity (Walker and Lev, 1951, p. 192) was performed on the nine treatment combinations. The "F" value, or quotient of the largest amount of variance divided by the smallest amount of variance of the nine cells, was equal to 2.21 ( $p > .05$  with 2 d.f.). Thus, the assumption that the nine population variances were equal was not rejected and can be considered tenable.

## CHAPTER VI

### DISCUSSION

The results of this study suggest that the tutoring method of instruction is superior to both the programmed-text method of instruction and the conventional form of instruction, lecturing. Some of the differences among instructional methods may be due to the nature of the criterion. Since the test was constructed by a panel of five tutors and two lecturers (one served as both a lecturer and a tutor), it is quite apparent that the tutored group had a greater representation on the panel which assembled the examination than the other two groups. The programmed-text group had no representation on the panel. Also, the competitive factor among tutors could have provided more motivation for the method of tutoring, since no competitive factor was introduced to the other two groups, programmed-text and lecturing. If these biasing factors are manifest, less differences in reality between the methods of programmed-text instruction and tutoring would be expected. Also, the differences between the methods of programmed-text instruction and lecturing would increase. However, the amount of biasing by these factors is uncertain.

If no biasing factors are manifest within the test, some of the following conclusions can be drawn. First, the tutoring method of instruction appears to be superior to both the programmed-text and lecturing methods of instruction. Secondly, the results indicate that no difference exists between the methods of programmed-text instruction and the conventional form of instruction, lecturing.

However, due to the disagreement with former studies, the lack of difference between the two methods is somewhat questionable. Thirdly, there appears to be no interaction between the methods of programmed-text instruction, tutoring and lecturing and levels of learning ability.

Hypothetically, several advantages of the tutoring method as compared to the programmed-text method could account for the superiority of the tutoring method. First, a tutor is more flexible and can adapt himself better to the needs of the students. Secondly, a tutor may perhaps develop superior motivation in a student because of personality variables. To conclude, a tutor is better able to present and, if necessary, present specific material which a student may have difficulty comprehending.

The study needs to be repeated to determine if the superiority of tutoring as a method of instruction is real or simply a manifestation of criterion bias or motivation of the tutors. Perhaps in a replication, a party who is neutral regarding the nature of the three methods of instruction in this study could construct the test prior to the evaluation of the methods of instruction. Also, the motivational variables of competition among tutors should be eliminated to prevent biasing in favor of the tutoring method. This possibly would lead to a more unbiased comparison of the effectiveness of instructional methods.

## CHAPTER VII

### SUMMARY

Comparisons of the methods of programmed text, tutoring, and lecturing were made. The three methods of instruction and three levels of ACT performances were compared factorially.

It was found that the tutoring method was superior to the method of programmed-text instruction. No difference was manifest between the programmed-text method and the lecturing method of instruction. The method of tutoring was superior to lecturing. A test of linearity and non-linearity revealed that the scores of the ACT performances were linearly related to methods of instruction.

The discussion pointed out the possibility of a biased criterion and an uncontrolled variable of motivation.

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APPENDIX A

## CONCEPTS TO BE COVERED BY TUTORS

The following concepts are to be presented to the subjects by the tutors in any manner that is suitable to the individual tutor. If there is a concept which you do not understand, refer to any work dealing with behavior written by or about B. F. Skinner. These terms were taken from Skinner's theory of behavior. DO NOT read the programmed text, entitled, The Analysis of Behavior, by J. G. Holland and B. F. Skinner.

1. Conditioning
  - a. define
  - b. mechanics and sequence of events
2. Responses
3. Stimulus
4. Reflex
5. Stimulus Threshold
6. Unconditioned Stimulus
7. Conditioned Stimulus
8. Unconditioned Response
9. Conditioned Response
10. Conditioned Reflex
11. Unconditioned Reflex
12. Extinction
13. Pavlov
  - a. significance
  - b. classical model of conditioning - dog studies
14. Experimental Control
15. Status of Condition Stimulus before and after conditioning
16. Latency - relationship to conditioning

APPENDIX B

## PROGRAMED TEXT INSTRUCTIONS

The purpose of your participation in the study is to investigate methods of instruction. You are going to learn some material in the area of conditioning. Please pay close attention to the material presented, for you will have a test over this material. Today, you will have the first learning session; on Wednesday, you will have the second learning session with a test scheduled on Friday. Do not study any related material concerning the material you are going to learn outside of the training sessions between now and the test you will take over this material.

Before you is a text which provides questions, which occasionally includes a statement, to be answered. Starting at the very top of the second page of the first set, read the material and answer the question by placing your answer on this answer sheet. After recording your response, turn the page and you will find the answer at the top left-hand corner of the right page of the book. Adjacent to the answer, you will find another question or statement to be answered. Follow the same procedure as before by answering the question and placing it on this answer sheet. If you should miss a response, place a checkmark by your answer. To facilitate your learning, it is important that you answer the question by marking your response on this answer sheet before turning the page to find the answer to the question. When you come to the end of the set, you will find a page number which will refer you back to the beginning of the

set as you had previously done. After completing the first set, go on to the next two sets. At the end of this 50 minute period, stop and continue on Wednesday. During the second session on Wednesday, use as much time as you need to finish the first three sets. Please do not study any related material other than the programed material for the test on Friday. Are there any questions?

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## INSTRUCTIONS FOR THE TUTORED GROUP

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Since you will control the rate of learning in this tutoring situation, it is suggested that you adjust to a rate which is comfortable to your own rate of comprehension. If you need a break, ask me and we will arrange it. Try to work conscientiously and carefully towards learning the material, for you will later have a test over this material. Again, may we remind you that you should not study any related material to the material you are going to learn between now and the test.

## INSTRUCTIONS FOR THE LECTURE GROUP

The purpose of your participation in the study is to investigate methods of instruction. You are going to learn some material in the area of conditioning. Please pay close attention to the material presented, for you will have a test over this material. Today, you will have the first learning session; on wednesday, you will have the second learning session with a test scheduled on Friday. Do not study any related material concerning the material you are going to learn outside of the training sessions between now and the test you will take over this material.

APPENDIX C



## TEST

1. If a dog is conditioned to salivate to the sound of a bell and then the meat powder (unconditioned stimulus) is taken away indefinitely, what is likely to occur
  - A. Extinction
  - B. Conditioning
  - C. Reflexive Input
  - D. Latency
2. The type of conditioning most clearly involving reflexes is
  - A. Perceptual Conditioning
  - B. Instrumental Conditioning
  - C. Classical Learning
  - D. Classical Conditioning
3. A conditioned response is acquired by
  - A. Presenting the unconditioned stimulus alone for several trials
  - B. Pairing the unconditioned stimulus and the conditioned stimulus
  - C. Pairing the unconditioned stimulus and the unconditioned response
  - D. Presenting the conditioned stimulus alone for several trials
4. In Pavlov's famous experiment, the meat powder was the
  - A. Conditioned Stimulus
  - B. Neutral Stimulus
  - C. Unconditioned Stimulus
  - D. Unconditioned Response
5. The period of time elapsing between the presentation of the stimulus and the response is called the \_\_\_\_\_ of the response.
6. A neutral stimulus following conditioning becomes a \_\_\_\_\_ stimulus.
7. Stimulus threshold is that point at which a stimulus is just barely adequate to elicit a response. (True or False)
8. Extinction is that time interval between the presentation of a stimulus and the onset of the response. (True or False)
9. Regulation of conditions that may affect the results of an experiment are referred to as
  - A. Status of the conditions
  - B. Experimental control
  - C. Elicitation
  - D. Procedural mechanics
10. The conditioned reflex involves two concepts; they are the
  - A. Conditioned stimulus and unconditioned response
  - B. Conditioned response and conditioned stimulus
  - C. Latency and extinction
  - D. Response and reflex

11. If an individual would not respond to the prick of a needle on a sensitive area of the skin, we could explain that the \_\_\_\_\_ had not been reached, or that the nerve endings were not functioning correctly.
  - A. Stimulus threshold
  - B. Latency period
  - C. Sensory Conditioning
  - D. None of these
12. The ability of a normal individual to pull his finger back from a hot iron is known behaviorally as a
  - A. Stimulus
  - B. Phenomenon
  - C. Perceptual stimulate
  - D. Reflex
13. The act of pulling one's finger back from a hot iron is a (or an)
  - A. Conditioned response
  - B. Unconditioned stimulus
  - C. Conditioned reflex
  - D. Unconditioned response
14. The conditioned stimulus must be paired
  - A. seldom with the conditioned response to bring about a behavioral pattern
  - B. often with the unconditioned stimulus to bring about an unconditioned response
  - C. a moderate number of times with the unconditioned response to develop a conditioned stimulus
  - D. often with the unconditioned stimulus to produce a conditioned response
15. The unconditioned response of an individual is generally controlled by an individual's thought processes. (True or False)
16. What physiologist discovered the conditioned reflex \_\_\_\_\_?
17. To condition a monkey to blink his eye to a puff of air, the experimenter should
  - A. Hold him gently to secure good social relationship
  - B. Give him a slightly inadequate sustenance to develop a sufficient drive to condition him
  - C. Isolate him in a room with all factors controlled before introducing the neutral stimulus
  - D. Determine his genetic background

An undergraduate psychology student has noticed that his roommate has been coming late to several of his classes. He also observes that the usual excuse for his tardiness is that he stops several times on his way to class to talk with pretty coeds. Our psychology student decides to attempt to interfere with this time-wasting activity.

That night, and for several nights after, he creeps over to his sleeping roommate's bed, sprays a small amount of a popular perfume toward him, and, a few seconds later, throws a pinch of black pepper into his nostrils. Each time this is done, his roommate sneezes violently.

After a week, with three of these episodes nightly, he notices that his roommate is usually in class on time. His eyes and nose are sometimes a little red. He also notices that each time his roommate leans over to whisper something to the young lady beside him, he sneezes.

During the weekend his roommate tells him that his social life is ruined because every time he tries to speak to a girl, he sneezes.

Identify the following:

Unconditioned stimulus \_\_\_\_\_

Unconditioned response \_\_\_\_\_

Conditioned stimulus \_\_\_\_\_

Conditioned response \_\_\_\_\_

Conditioned reflex \_\_\_\_\_

Unconditioned reflex \_\_\_\_\_

APPENDIX D

PROGRAMED-TEXT INSTRUCTION

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Set Number One

Response	✓	No.	Response	✓
_____	_____	15.	_____	_____
_____	_____	16.	_____	_____
_____	_____	17.	_____	_____
_____	_____	18.	_____	_____
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_____	_____	21.	_____	_____
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_____	_____	23.	_____	_____
_____	_____	24.	_____	_____
_____	_____	25.	_____	_____
_____	_____	26.	_____	_____
_____	_____	27.	_____	_____

No.	Response	✓
29.	_____	_____
30.	_____	_____
31.	_____	_____
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38.	_____	_____
39.	_____	_____
40.	_____	_____
41.	_____	_____

No.	Response	✓
42.	_____	_____
43.	_____	_____
44.	_____	_____
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49.	_____	_____
50.	_____	_____
51.	_____	_____
52.	_____	_____
53.	_____	_____
54.	_____	_____

## Set Number Two

No.	Response	✓
1.	_____	_____
2.	_____	_____
3.	_____	_____
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5.	_____	_____
6.	_____	_____
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8.	_____	_____
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10.	_____	_____
11.	_____	_____

No.	Response	✓
12.	_____	_____
13.	_____	_____
14.	_____	_____
15.	_____	_____
16.	_____	_____
17.	_____	_____
18.	_____	_____
19.	_____	_____
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22.	_____	_____

Response

_____	_____
_____	_____
_____	_____
_____	_____

No.      Response

27.	_____	_____
28.	_____	_____
29.	_____	_____
30.	_____	_____

Set Number Three

Response

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No.      Response

16.	_____	_____
17.	_____	_____
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