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THE COMPARATIVE EFFECT OF COLOR AND BLACK AND WHITE GUIDANCE FILMS EMPLOYED WITH AND WITHOUT "ANTICIPATORY" REMARKS UPON ACQUISITION AND RETENTION OF FACTUAL INFORMATION

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To my wife, Jeannine,

whose patience and understanding

were a constant source of inspiration.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

THE COMPARATIVE EFFECT OF COLOR AND BLACK AND WHITE GUIDANCE FILMS EMPLOYED WITH AND WITHOUT "ANTICIPATORY" REMARKS UPON ACQUISITION AND RETENTION OF FACTUAL INFORMATION

CHAPTER I

THE PROBLEM AREA

Audio-visual materials have been used in the educational processes of man since the beginning of his search for knowledge. Primitive man carved simple pictures in the rock walls of his cave as a method of visual communication; these pictures were probably further clarified by the use of sounds, or of a language as it may have been spoken then. Today, many instructional devices possessing both audible and visible qualities are used extensively to aid in the communication of ideas.

The Value of Audio-Visual Materials to the Learning Process

An individual learns as a result of responding to both past and present experiences which involve his basic drives and needs. Audio-visual materials lend themselves freely to the learning process by increasing the number and

variety of experiences which relate to the specific learning situation. Hoban and van Ormer (25) support this point by the following statement:

> When experiences derived from motion pictures and other environmental situations, (which may or may not be intentionally instructional), are integrated, especially through further thought and/or discussion, into . . . structures involving the basic drives and needs of the individuals, these experiences become involved in changes in the individual's way of looking at his private world and of behaving in response to the world around him.

Positive claims made by teachers for properly used audio-visual materials are upheld by research studies reviewed by Dale, Finn, and Hoban in the Encyclopedia of Educational Research edited by Monroe (16). They report the following values derived by using audio-visual materials:

1. They supply a concrete basis for conceptual thinking and hence reduce meaningless word-responses of students.
2. They have a high degree of interest for students.
3. They supply the necessary basis for developmental learning and hence make learning more permanent.
4. They offer a reality of experience which stimulates self-activity on the part of pupils.
5. They develop a continuity of thought; this is especially true of motion pictures.
6. They contribute to growth of meaning and hence to vocabulary development.
7. They provide experience not easily secured by other materials and contribute to the efficiency, depth, and variety of learning.

Need for the Study

In view of the findings of similar studies previously conducted and reported in the following chapter, it was felt that the research presented here would be of value. The following questions seemed pertinent:

1. Does color aid the student in the acquisition of facts from guidance instructional films?

2. Does color aid the student in retaining facts from guidance instructional films?

3. Does film employed with "anticipatory" remarks help the student to acquire and retain factual information?

4. Is color film more effective than black and white film for acquisition and retention of factual information when "anticipatory" remarks are employed?

Answers to these questions, it was felt, would provide information and data currently needed by educators who employ audio-visual techniques.

Statement of the Problem

This study was concerned with the comparative effect of color and black and white guidance films when they were presented in conjunction with, and without, "anticipatory" remarks. The effect was measured by testing for acquisition and retention of factual information presented by selected guidance films.

Definition of Terms

Certain terms presented in the Statement of the Problem and employed throughout the study are defined for the reader. They should be considered as synonymous with the operations performed as follows:

1. Acquisition -- the amount of facts learned from the films as determined by paper and pencil multiple-choice tests administered immediately after the students saw the films.

2. Retention -- the amount of facts remembered from the films as determined by paper and pencil multiple-choice tests administered six weeks after the students saw the films.

3. "Anticipatory" remarks -- these remarks should not be thought of as film introductions. The "anticipatory" remarks to be used in this study do not attempt to be so complete as film introductions, but are merely brief statements read by this writer to the students concerning the value of the film's lesson to them and the announcement that a test would follow the film presentation.

Hypotheses

The null hypotheses to be tested were: (1) There is no significant difference between the experimental and control groups in immediate learning from either the color or the black and white guidance films; (2) there is no significant difference between the experimental and control groups in the retention of facts from either the color or the black and white guidance films; and (3) there is no significant difference between the experimental and control groups in immediate learning or retention of learning from

either color or black and white guidance films as a result of the "anticipatory" remarks.

Preview of the Following Chapters

For the sake of clarity, a brief preview of the content of the following chapters is here presented.

The major findings of other related studies are shown in Chapter II. In Chapter III, the experimental design and its particular source of error, the procedure for the administration of the experiment, the response measures, the experimental population and their treatments, and the various materials employed are all described. Chapter IV contains the statistical or variance analysis of the results in terms of the empirical data obtained. Chapter V includes an interpretation of the significant results found in the preceding chapter and a comparative evaluation of these with previous research. A summary of the study and conclusions derived from it are set forth with their subsequent implications in Chapter VI.

CHAPTER II

RELATED RESEARCH

There have been very few studies in the area of audio-visual instruction corresponding directly to the present experiment. Many investigations have been conducted concerning acquisition and retention as related to black and white film, but not all of them have used motion pictures. For purposes of this research, only studies carried out using motion pictures, filmstrips, and flat pictures will be reported, since there is a similarity of their uses as audio-visual devices.

The Value of Black and White Film to Acquisition and Retention of Facts

Wood and Freeman (23) found that children in an experimental group using educational films out-performed children who were instructed by means other than film devices. Knowlton and Tilton (11) reported an over-all gain in knowledge of 19 per cent was accomplished by using educational films in the teaching of history. They also found that film-taught pupils retained from 19 to 25 per cent more than pupils instructed by other means. Other studies that

agree with the above conclusions are those of Arnspiger (30) and Weber (21). Rulon (19) found that teaching carried on with the aid of films was 20.5 per cent more effective than the usual unaided presentation of history lesson materials. He also reported that the retained gain of the film group was 38.5 per cent greater than that of the control group so that at the end of three months, the net gain in knowledge due to the use of film materials was 58.5 per cent above the gain of the control group. Film-taught groups also learned facts more readily and retained them longer when motion pictures were used to instruct them, according to a report made by Hansen (32). Gatto's (31) study found that the mean score of the group that saw the film increased 11 per cent on the test administered five weeks later to measure retention, as compared to the scores made on the test given immediately after the instruction. The mean score of the group that did not see the film decreased 11 per cent on the test administered five weeks later to measure retention, as compared to the score on the test given immediately after their instruction.

Several other studies have been completed with the purpose of measuring the effect of film instruction as compared to verbal instruction. Among these are experiments by Consitt (3), Marchant (14), and Watkins (39). All of these studies are in agreement that films aid in the acquisition of facts. Other studies in agreement concerning the retention

of facts have been made by Goodman (41), Lacy (33), McClusky (15), Skinner and Rich (36), Sumstine (38), and Young (40). McPherson's (26) report surveyed studies concerned with acquisition and retention of learning from films; and this survey is of particular interest and significance to one working with this phase of audio-visual research.

The Value of "Anticipatory" Remarks Employed with Black and White Film

Research conducted in this area is reported in order that some insight may be had into the problem. "Anticipatory" remarks cause an individual to be in a state of readiness or expectancy for a coming event, such as expecting certain things to happen in the film. He is on the alert for certain things that he may have been told to look for and tries to get the "important" points in the film because he has been forewarned of a test following the film, or for the more practical reason that he may need the knowledge. Studies have indicated that anticipation may arise either from the instructional activities or procedures which precede the film showing or from the introductory sequence and other comments or sequences presented within the film itself (25). Operation of the anticipation factor was studied by Dysinger and Ruckmick (7) who reported that anticipation appeared to serve as both a deterrent and a stimulant to emotional responses. Their findings may be interpreted to mean that

instructional films for some purposes, especially attitudinal development, may be more effective when an instructional stereotype is avoided. In a similar study conducted by Sturmthal and Curtis (37), it was found that as the anticipated events approached a level of personal reference and importance, the audience became increasingly involved in the film experience.

Studies on the effect of introductory remarks also pertain to this factor of anticipation. Hovland, Lumsdaine, and Sheffield (10) experimented with introductory remarks and review exercises in teaching military trainees about map reading. This study lends support to the notion that relevant introductory remarks have an anticipational or motivational effect, as well as to the theory that learning results from the practice effect of repeating material in different symbolic forms. Wittich and Fowlkes (22) studied the effects of (a) casual presentation of films, (b) anticipatory introduction, (c) practice after a film showing, and (d) repeated film showings. An evaluation of the results obtained indicated that the introduction or orientation phase of their study resulted in increased learning from the films. However, they also indicated that "over-instruction" of limited material to mature audiences tends to decrease the amount of mean differences existing between experimental groups which implies that effectiveness of a method of instruction may not be directly proportional to the time spent using it.

A similar study conducted by the Commonwealth Office of Education of Australia (24) lends support and verification to the findings of Wittich and Fowlkes (22).

The Comparative Value of Color and Black and White Film

VanderMeer (28) conducted a study consisting of two experiments with color and black and white instructional films. In the first investigation he showed five films to 500 ninth and tenth grade students, half of whom saw color, and half the black and white versions. The two groups were each tested immediately after the film showing and again six weeks later. His findings on this experiment indicated that there was no unanimous superiority for color film over the black and white versions. There was an indication, however, that students retained what they were tested over better from the color film versions. In the second experiment he used four films with a sample population of 199 high school students. He conducted this experiment using an alternation technique; that is, all students saw and were tested over at least two color and two black and white films. This technique was used to equate the differences in learner characteristics. The results of this experiment generally confirmed those of the first experiment. Below are the conclusions from the two experiments as reported by VanderMeer (28, pp. 1-2):

1. The use of color in the instructional films studied in these experiments does not seem to be justified in terms of greater learning on the part of those who view the films.

2. The contribution of color in these films seems to be related more to retention of learning than to immediate acquisition. People who see a color version of a film do not learn more than people who see a black and white version of the same film; but after six weeks, they have forgotten less.

3. Liking for a film and learning from that film are positively related. But the influence of color in determining such liking is not great enough to warrant the use of color as a means of increasing liking and thereby increasing learning.

4. Sex differences with regard to preferences for color films and learning from color films are slight.

5. The films used were selected because they appeared to make effective use of color for emphasis or because color was intrinsic to much of the subject matter being taught. However, it is possible that in these films color was not a crucial cue for learning. Apparently, other cues present in the films such as shape, contrast, texture, and the information in the commentary provided equally important cues for learning and color added little.

MacLean (44) conducted a study using still pictures and found that high school seniors remembered colored geography prints at a ratio of five to three over the black and white prints. He discovered that color occasionally distracted from "central scenes" while at other times color contrast appeared to increase the clearness of details as revealed by free-recall tests administered after students viewed the prints. Published excerpts from the above study appear in the Research Quarterly (34). He experimented with 152 high school boys equated approximately according to chronological age, intelligence quotient, and grade level in school. The boys were shown eleven anatomy slides in color and eleven similar slides in black and white, after

which they were requested to write statements about their observations. The results showed color to be of value in illustrating depth in those pictures where depth perception was important. Color was also of value where highly colored organs needed contrasting from other organs, although sometimes it detracted when attention should have been directed to other items. A comparative study of the written statements revealed that the control group (the group that viewed black and white slides) did not see the same items in the slides as "an impressive percentage" of the experimental group (the group that saw color slides). He writes his conclusions as follows:

1. Indiscriminately adding so-called natural color to anatomy and physiology slides does not increase their lesson value in proportion to the increased cost. An anatomy slide is not necessarily better because it is colored.

2. Some anatomy views better stimulate the arousal of meaning without detracting from attention and interest when they are presented without color.

3. To logically determine what anatomy slides should be colored requires a careful study of the total sensory situation.

In an experiment using the same students as previously indicated, MacLean (35) used ten flat pictures in color and ten uncolored flat pictures of similar likenesses. The pictures were presented so that for each boy who saw a color picture, a boy of similar age, grade level, and intelligence quotient viewed the similar uncolored picture. After seeing the pictures, two direct questions were asked concerning each

of the ten pictures. He reported the following findings:

> In nine cases of the twenty, the colored pictures were superior in eliciting the correct answers to the direct questions, in five the uncolored were superior and in six there was very little difference. The total superiority of the colored pictures was 30, insignificant when divided among twenty questions and seventy-six students.

He concluded from the findings that it would be advantageous to use both colored and uncolored pictures for instructional devices. The particular nature or purpose of the instructional situation would largely determine whether to use colored or uncolored pictures.

Ibison (42) conducted a study involving comparisons of textual materials illustrated by colored, black and white, and unillustrated texts. He divided 114 second grade students into three groups for the experimental investigation. Each student was verbally tested and asked to report all he remembered after reading one story from each of the three different types of texts. Ibison concluded from his results that textual materials with the colored illustrations were superior to the other editions as indicated by the tests administered to each student. Test scores indicated that the students scored significantly higher when reading from the textbooks illustrated by color. However, students remembered seeing almost as many black and white illustrations as they did the colored illustrations.

Long (43) carried out an investigation to ascertain the influence of color on acquisition and retention of facts

at two levels of pupil maturity: (1) the fifth and sixth grades and (2) the eleventh and twelfth grades. This population was equated according to intelligence and achievement ratings after which each saw five color and five black and white 16mm sound films. Tests revealed that color films were significantly superior at the sixth and twelfth grades on tests for acquisition of facts, whereas black and white films were significantly superior at the eleventh grade on tests for acquisition of facts. Color films were significantly superior at the sixth, eleventh, and twelfth grades on tests for retention of facts, while no significant differences existed at the fifth grade on either the tests for acquisition or retention of facts. Further implications presented by Long (43) indicated that schools need to experiment more with color films for varying types of learning material and with pupils of varying degrees of maturity.

CHAPTER III

DESIGN AND PROCEDURE

The Exploratory Study

Exploratory research was conducted using 27 college freshman students for the purpose of determining what problems would be involved in an investigation such as the present study. Factors to consider were those of testing and film presentation, establishing an experimental design, determining the number of subjects needed in each group to adequately test the hypotheses at specified levels of confidence, discovering what apparatus and materials were needed, and becoming better acquainted with experimental research procedures and the statistical techniques involved. A report of this study is presented in Appendix G.

Design of the Study

In order to obtain data for the total document herein presented, four experimental groups and one control group were used to test the hypotheses set forth in Chapter I. Two experimental groups were tested over instruction received from color films, with one of these groups being read "anticipatory" remarks prior to the film presentations. The

remaining two experimental groups were tested over instruction received from black and white films with one of these groups also being read "anticipatory" remarks prior to the film showings. A control group was also employed who received no formal instruction, but was administered the same tests as the other experimental groups.

The effect of the different methods of instruction from selected guidance films was measured in terms of immediate learning and this measure was identified as posttest (Y_1). The pretest (X) scores which indicated the students' previous knowledge about the information presented by the film were compared with the posttest (Y_1) scores. As a test for the permanency of the gains or losses caused by each method of instruction, posttest (Y_2) was administered seven weeks after the pretest (X). Comparisons were then made between pretest (X) and posttest (Y_2) scores.

The five groups of students were designated as groups A, B, C, D, and E and received treatment as follows: Group A saw color films; group B was read "anticipatory" remarks prior to color film presentations; group C saw black and white films; group D was read "anticipatory" remarks prior to black and white film presentations; and group E, the control, did not see the films nor did they receive any formal instruction concerning the content of the films. All groups were administered the same tests.

Subjects

Five hundred and fifty-one students of the Clinton, Elk City, Hydro, and Weatherford Public High Schools in Southwestern Oklahoma participated in the experiment. The eleventh and twelfth grades were selected as the age group suitable for the films being used in the study. Students were not told that they were involved in an experiment, but were led to believe that all testing and film presentations were part of their guidance program and its functions.

As an additional experimental control, students who were absent from any part of the testing or film presentation sessions were eliminated from the study. This resulted in unequal group N's and in order to facilitate statistical analysis, they were made numerically equal by using a table of random sampling numbers. Therefore, the final population used in this study was four hundred and forty subjects equally divided into five groups.

Procedure

Four black and white guidance films were presented in Clinton High School, where two groups had been selected by the use of a table of random sampling numbers. Weatherford students were used as the control group. Elk City and Hydro students were shown color prints of the guidance films with two groups also being randomly selected. Through use of this arrangement, it was possible to begin the experiment

with more than one hundred students in each of the five experimental groups.

The long distances between the cooperating schools made it necessary to initiate the experiment by installments. After consultation and agreement with the various administrators of each school involved, a schedule was set up whereby the same morning of each experimental week was used to work with the students in that particular school.

Instructors from the participating schools who normally taught the eleventh and twelfth grade students helped to administer the tests to the groups involved.

The first day of the experiment in each school was spent administering the pretest (X) to the eleventh and twelfth grade students. One week later, the film presentations and posttests (Y_1) were administered to the different groups with each group receiving the specific treatment previously decided upon. Six weeks later posttest (Y_2) was given to the various groups, but prior to its administration, the students who saw color films were subjected to a color perception test. Color perception charts by the American Optical Company (2) and Dvorine (5) were employed. Those students who did not possess the normal ability to distinguish colors or hues were withdrawn from the study for reasons of additional experimental control. A summary of the experimental procedure is presented in Table 1.

TABLE 1

SUMMARY OF EXPERIMENTAL PROCEDURES

Group	Treatment	Pretest (X)	Film Presentations (P)	Posttest (Y_1)	Posttest (Y_2)
A	Saw Color films.	Was given one week before the film presentations to measure the initial knowledge possessed by each student.	There were four separate film presentations. Each group received treatment as indicated under "Treatment" column of this table.	Was administered after each film was presented to measure the amount of factual information immediately acquired by each student. Control group merely took the test.	Was administered seven weeks after the pretest (X) for the purpose of checking retention of factual information acquired by each student.
B	Saw color films and were read "anticipatory" remarks.				
C	Saw black and white films.				
D	Saw black and white films with "anticipatory" remarks.				
E	Control. No film or verbal instruction.				

The Experimental Design and Its Source of Error

It is important that the particular design of this experiment be identified in order for one to understand which basic type of experimental error is most generally associated with it. The present study is a simple-randomized design in which each treatment was independently administered to selected experimental groups which had been assigned at random. Lindquist (13, p. 9) indicates that the type of error characterizing simple-randomized designs, which he calls "type S errors," occurs for the following reason:

> In any single replication of such an experiment, it is usually left to chance to determine which treatment each subject is to receive. If the subjects are assigned at random to the treatment groups, the group assigned to A_1 may by chance contain a larger proportion of the more intelligent pupils, or of those who like arithmetic, or of the more industrious pupils, or of the pupils who received superior instruction during the year preceding. . . . Accordingly, the mean criterion score may be higher for A_1 than for A_2, even though the treatments are on the average equally effective for all pupils in general in the particular school involved.

Lindquist (13, p. 9-11) also points out that "type G errors" (those due to extraneous factors which occur from the use of different teachers, classrooms, etc.) and "type R errors" (those resulting because of differences between schools) are a distinct possibility. A simple-randomized design such as employed in this study does not provide any systematic method of estimating the variability of these two types of errors. "Type S errors" are the only ones taken into consideration by this experimental design.

Response Measures

Multiple-choice paper and pencil test items with four choices from which to select the correct response were constructed in order to test for the factual content presented in each particular film. By previewing each film repeatedly and by checking the teacher's guide and master script frequently, it was possible to develop the test items.

The content validity of the response measures posed a major problem for the writer. A better insight into this concern was gained by studying from a publication of the American Council on Education (1) in which they pointed out that an ordinary paper and pencil test is usually considered to possess content validity to the extent that it tests the students' knowledge and effective grasp of those facts, principles, relations, patterns, and generalizations which are the results of immediate objectives of instruction. Hence, it was necessary that the test content parallel the content of the film instruction. In order to determine this degree of agreement, criteria which was compared with the content of the test was employed in the form of (1) analyses of the color and black and white films, (2) analyses of the teachers' guides and master scripts that accompanied the films, and (3) pooled judgments of competent persons. Each film and its test were carefully evaluated by a "jury of experts" until they were convinced that all the prerequisites underlying content validity had been satisfied. The names of the

"jury of experts" appear in Appendix B together with a discussion of the manner in which they helped validate the tests on film content.

The test-retest method of estimating the reliability of a test was employed for the pretest (X) and posttest (Y_2) scores obtained from the control group. The degree of agreement between the two sets of scores was determined by means of computing the coefficient of correlation by the Pearson Product-Moment Correlation (r) method. The r for each of the four tests was as follows: (1) Library Organization -- .79; (2) Heredity and Environment -- .97; (3) Choosing Your Occupation -- .96; and (4) Your Earning Power -- .95. All of the correlation coefficients were found to be significant beyond the .01 level of confidence when computations were made using Fisher's z function as presented by Garrett (9).

Identical test items were used in pretest (X), posttest (Y_1) and (Y_2) with the only difference between them being that the items were arranged in a different sequence of numerical order on each successive test.

Materials

Films. In order to investigate the comparative effect that color and black and white films had on the acquisition and retention of facts, four sets of 16mm sound films were selected with each set consisting of one color and one black and white print of the same version. Films were

selected from Coronet Films using the following criteria: (1) Those chosen must be of such a nature and maturity level that they would be suitable for use with the students being employed in the experiment. A film that was below or above the educational maturity level of the students would not be adequate for this study. (2) The selected films must be those classified as instructional rather than the common variety for entertainment purposes. (3) Photography in the films must be of acceptable quality. Films with scratches or other defects might have detracted from the facts being presented. (4) Sound of the film must be of acceptable quality. Films with poor sound tracks might have detracted from the facts being presented.

Projection room. Since the experimental groups were so large and space facilities available for projection limited in the experimental schools, it was decided to use auditoriums. This decision was further based on the strength of Hoban and van Ormer's (25) report of the research concerned with physical conditions of film use in which they reported that it appeared physical surroundings were not likely to be critical factors in affecting factual learning from films. Darkening facilities were more than adequate and the viewing angle and distance from the screen were carefully controlled.

IBM answer sheets. IBM answer sheets were supplied to each subject for each test taken because this form of answer sheet facilitated the scoring of the test responses

by electrical machine.

Electrographic pencils. These pencils were given to each student prior to the test in order that the test responses could be machine scored.

Response measures. Multiple-choice test items with four choices were constructed and content validity established by a "jury of competent persons." Each of the four films had twenty-two items constructed from its content. A copy of each test may be found in the Appendix A.

Testing room. Classrooms were used as testing rooms and were selected on the basis of their facilitating the groups of students and their movement from the auditorium to the testing room. No conflicts emerged during the experiments since students were carefully supervised so as to maintain an atmosphere conducive to test-taking.

Test directions. Directions for each test were developed and the test administrators read those directions to the students prior to taking the tests. Copies of the directions may be found in Appendix C.

Color perception charts. These charts were employed with the groups of students who saw color films in order to help detect which ones could not distinguish color or hues. Students with this handicap were not included in the present study.

Teacher's guide sheets. The guide sheets summarized what was presented in the film content and also suggested

activities for following up the film presentation. The teacher's guide sheets for each film were supplied by Coronet Films and helped in making out the response measures and "anticipatory" remarks.

Master scripts. The master scripts presented a description of the scenes of the film and the narration that accompanies each scene. The master scripts also helped in making out the response measures and "anticipatory" remarks.

"Anticipatory" remarks. These were the brief statements read by this investigator to the students concerning the value of the film's lesson to them and the announcement that a test would follow the film presentation. Copies of the "anticipatory" remarks are found in Appendix D.

CHAPTER IV

EMPIRICAL DATA AND QUANTITATIVE ANALYSIS

The primary statistical technique employed was analysis of covariance since it is applicable to situations where initial differences among groups need to be taken into account. In this investigation, initial differences were a distinct possibility since no attempt was made to "equate" the groups prior to introducing the experimental treatments.

Tate (20, p. 515), points out in his discussion on covariance that:

> it . . . is possible to introduce control in two or more classes of experimental data by making allowance for initial differences among the classes which may have prejudiced the results of the treatment . . . Such control is possible in situations where there is available an associated measure for each of the final experimental measures. The analysis of differences among classes of final experimental data, taking into account differences existing in the associated data, is conventionally known as analysis of covariance.

In addition to the above information, Tate (20, p. 522), later gives the following statements:

> Analysis of covariance may be used in any situation where it is logical to consider controlling a variable experimentally by equalizing groups or matching individuals on the basis of that variable. It ordinarily results in a substantial reduction of within-group or error variance and thus leads to more precise results.

The subjects of each group were presented with different experimental situations. These treatments were previously referred to as A, B, C, D, and E in Chapter III of this report.

Analysis of Scores on Tests for Acquisition of Facts from the Color and Black and White Guidance Films

In this chapter the variable Y_1 is considered to be the performance of the subjects under experimental conditions involving acquisition of facts that were presented in the color and black and white guidance films. Prior to obtaining the Y_1 scores, subjects were given a pretest which measured how much each student knew about the guidance films' contents at the beginning of the experiment. The results obtained from the tests constructed over the four films will be reported in this section as follows:

"Library Organization"

The X scores of the five groups of subjects are recorded in Table 2 according to numerical value beginning with the highest score and proceeding to the lowest, and the Y_1 scores of the five groups of subjects are recorded in Table 3. The position of each Y_1 score was arranged to correspond directly with the position of each X score for computational purposes. For example, the subject in group A who had an initial score on X of 17 had a score on Y_1 of 19 and the other scores were paired in like fashion.

TABLE 2

PRETEST (X) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"*

	GROUPS																
No.**	A	B	C	D	E	No.	A	B	C	D	E	No.	A	B	C	D	E
1.	17	10	13	11	21	31.	5	3	6	5	6	61.	2	2	3	2	3
2.	11	10	11	11	10	32.	5	3	6	5	6	62.	2	1	3	2	3
3.	11	9	10	10	10	33.	5	3	6	5	6	63.	2	1	3	2	3
4.	11	9	10	10	10	34.	5	3	6	5	6	64.	2	1	2	2	2
5.	10	9	10	9	9	35.	5	3	6	5	6	65.	2	1	2	2	2
6.	9	9	9	9	9	36.	5	3	5	5	5	66.	2	1	2	2	2
7.	9	9	9	7	9	37.	3	3	5	5	5	67.	2	1	2	2	2
8.	9	7	9	7	9	38.	3	3	5	5	5	68.	2	1	2	2	2
9.	7	7	7	7	9	39.	3	3	5	5	5	69.	1	-1	2	2	2
10.	7	7	7	7	9	40.	3	3	5	5	5	70.	1	-1	2	1	2
11.	6	7	7	7	8	41.	3	3	5	3	5	71.	1	-1	2	1	2
12.	6	6	7	7	7	42.	3	3	5	3	5	72.	1	-1	2	1	2
13.	6	6	7	7	7	43.	3	3	5	3	5	73.	1	-1	2	1	2
14.	6	6	7	6	7	44.	3	3	5	3	5	74.	1	-1	2	1	1
15.	6	6	7	6	7	45.	3	3	5	3	5	75.	1	-1	2	1	1
16.	6	5	7	6	7	46.	3	2	5	3	5	76.	1	-1	2	1	1
17.	6	5	7	6	7	47.	3	2	5	3	5	77.	-1	-1	2	1	1
18.	6	5	7	6	7	48.	2	2	5	3	5	78.	-1	-1	2	1	1
19.	6	5	7	6	7	49.	2	2	5	3	5	79.	-1	-2	2	1	1
20.	6	5	7	6	7	50.	2	2	5	3	5	80.	-1	-2	1	1	-1
21.	6	5	6	6	7	51.	2	2	5	3	3	81.	-1	-2	1	1	-1
22.	6	5	6	6	6	52.	2	2	5	3	3	82.	-1	-2	1	1	-1
23.	6	5	6	6	6	53.	2	2	5	3	3	83.	-1	-2	-1	1	-1
24.	6	5	6	5	6	54.	2	2	3	3	3	84.	-2	-3	-1	1	-1
25.	5	5	6	5	6	55.	2	2	3	3	3	85.	-2	-3	-1	-1	-2
26.	5	5	6	5	6	56.	2	2	3	3	3	86.	-2	-3	-1	-1	-2
27.	5	5	6	5	6	57.	2	2	3	3	3	87.	-2	-3	-2	-2	-3
28.	5	5	6	5	6	58.	2	2	3	3	3	88.	-2	-5	-2	-2	-3
29.	5	3	6	5	6	59.	2	2	3	3	3						
30.	5	3	6	5	6	60.	2	2	3	3	3						

* Scores were determined by the use of a correction formula for guessing. Score equals number right minus one-third number wrong.

** Number represents subjects. Subjects will maintain this assigned number in subsequent tables dealing with "Library Organization."

TABLE 3

POSTTEST (Y_1) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"*

	GROUPS																			
No.**	A	B	C	D	E	No.	A	B	C	D	E	No.	A	B	C	D	E
1.	19	10	9	19	13	31.	11	21	7	14	9	61.	17	10	13	17	3
2.	17	17	19	13	6	32.	13	11	18	14	7	62.	9	21	13	13	1
3.	17	21	19	17	13	33.	11	18	18	10	9	63.	11	15	13	17	3
4.	18	7	15	13	3	34.	14	10	17	11	6	64.	9	15	11	13	2
5.	17	10	6	14	2	35.	9	14	7	18	3	65.	11	14	14	14	5
6.	19	18	18	9	2	36.	14	15	11	14	7	66.	7	9	11	13	2
7.	17	9	19	21	7	37.	19	10	14	15	3	67.	17	7	15	14	6
8.	9	10	13	19	3	38.	13	10	15	5	3	68.	6	9	17	6	5
9.	11	15	17	22	7	39.	13	15	21	11	2	69.	18	15	17	15	2
10.	15	21	21	17	2	40.	18	7	14	7	-1	70.	11	7	21	18	-1
11.	17	7	15	18	5	41.	13	11	18	19	3	71.	17	9	17	19	-3
12.	19	15	13	10	6	42.	10	2	17	18	1	72.	14	13	10	17	2
13.	19	11	19	14	5	43.	10	13	14	21	3	73.	7	21	10	10	5
14.	21	13	17	21	7	44.	3	13	13	11	1	74.	10	13	7	19	-1
15.	11	6	17	14	5	45.	10	5	19	18	6	75.	7	7	9	10	6
16.	21	17	18	14	9	46.	18	17	15	14	11	76.	5	10	5	11	-2
17.	10	14	15	17	7	47.	14	19	10	21	2	77.	14	6	6	15	5
18.	13	17	19	17	3	48.	14	14	14	19	-1	78.	10	10	6	10	-1
19.	17	14	14	19	7	49.	18	13	7	11	7	79.	9	9	6	10	6
20.	17	14	11	19	5	50.	14	18	2	18	5	80.	9	13	17	10	-1
21.	13	17	19	19	7	51.	18	10	9	-1	6	81.	6	17	19	6	5
22.	22	11	21	7	5	52.	13	15	13	15	5	82.	6	7	13	6	6
23.	11	19	11	9	9	53.	9	15	7	13	1	83.	3	-1	17	9	-2
24.	1	9	17	19	3	54.	21	17	14	14	-2	84.	11	17	17	11	1
25.	21	14	18	18	7	55.	15	15	13	9	7	85.	13	7	10	14	5
26.	15	15	15	18	1	56.	10	11	21	19	2	86.	13	7	10	11	5
27.	13	15	18	15	5	57.	9	15	13	15	2	87.	8	1	1	11	3
28.	19	3	13	13	2	58.	10	13	14	14	3	88.	3	13	7	6	1
29.	13	9	19	21	1	59.	17	6	19	7	7						
30.	13	19	14	17	1	60.	13	17	14	13	-2						

*Scores were determined by the use of a correction formula for guessing. Score equals number right minus one-third number wrong.

**Number represents subjects. Subjects will maintain this assigned number in subsequent tables dealing with "Library Organization."

Prior to computing the analysis of covariance, Tate (20) indicates that an analysis of variance will need to be calculated on both the pretest (X) and the posttest (Y_1) scores. It was necessary to assume that the sampled populations were normal with equal variances, and this assumption was tested by Bartlett's Test of Homogeneity of Variance (20, pp. 486-490). Computations were made using the scores in Table 2, whereas the data employed in the Chi Square test of the homogeneity of five variance estimates is presented in Table 4.

TABLE 4

BARTLETT'S TEST OF THE HOMOGENEITY OF FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"

Group	Σx^2	df	$\frac{1}{n}$	Variance Estimate s^2	Log s^2	n Log s^2
A	1016.0	87	.0115	11.7	1.0682	92.9334
B	957.5	87	.0115	11.0	1.0414	90.6018
C	743.7	87	.0115	8.5	.9294	80.8578
D	651.7	87	.0115	7.5	.8751	76.1337
E	1108.0	87	.0115	12.7	1.1038	96.0306
SUM	4476.9	435	.0575			436.5573

The obtained x^2 of 9.22 failed to reach significance at the .05 level of confidence for 4 degrees of freedom. Therefore the assumption or hypothesis of equality of population variances was not contradicted.

In addition, Tate (20) points out that the fundamental assumption underlying correlation analysis is linearity of regression. Before beginning an analysis, it is advisable to plot the data both for the total group and for each group and to fit regression lines to the plotted data as has been done in Figures 1 and 2. Inspection of the regression lines and of the dispersion of the data about the lines indicated that the assumption of linearity of regression was questionable. Since an exact analysis is needed, Tate (20) suggests that the assumption should be tested by comparing the one variance estimate, based upon the squares of the deviations of the column means from the fitted straight line of regression, with a second variance estimate based upon the squares of deviations of the scores within columns about their respective means. The obtained F value of 96.73 for 3 and 435 degrees of freedom was significant beyond the .01 level of confidence, and we concluded that the assumption of linearity of regression was unsound. Therefore, when test data are nonlinear, the comparability of the X and Y_1 units is particularly questionable.

Table 5 contains a summary of the analysis of variance and the analysis of covariance. The F value obtained

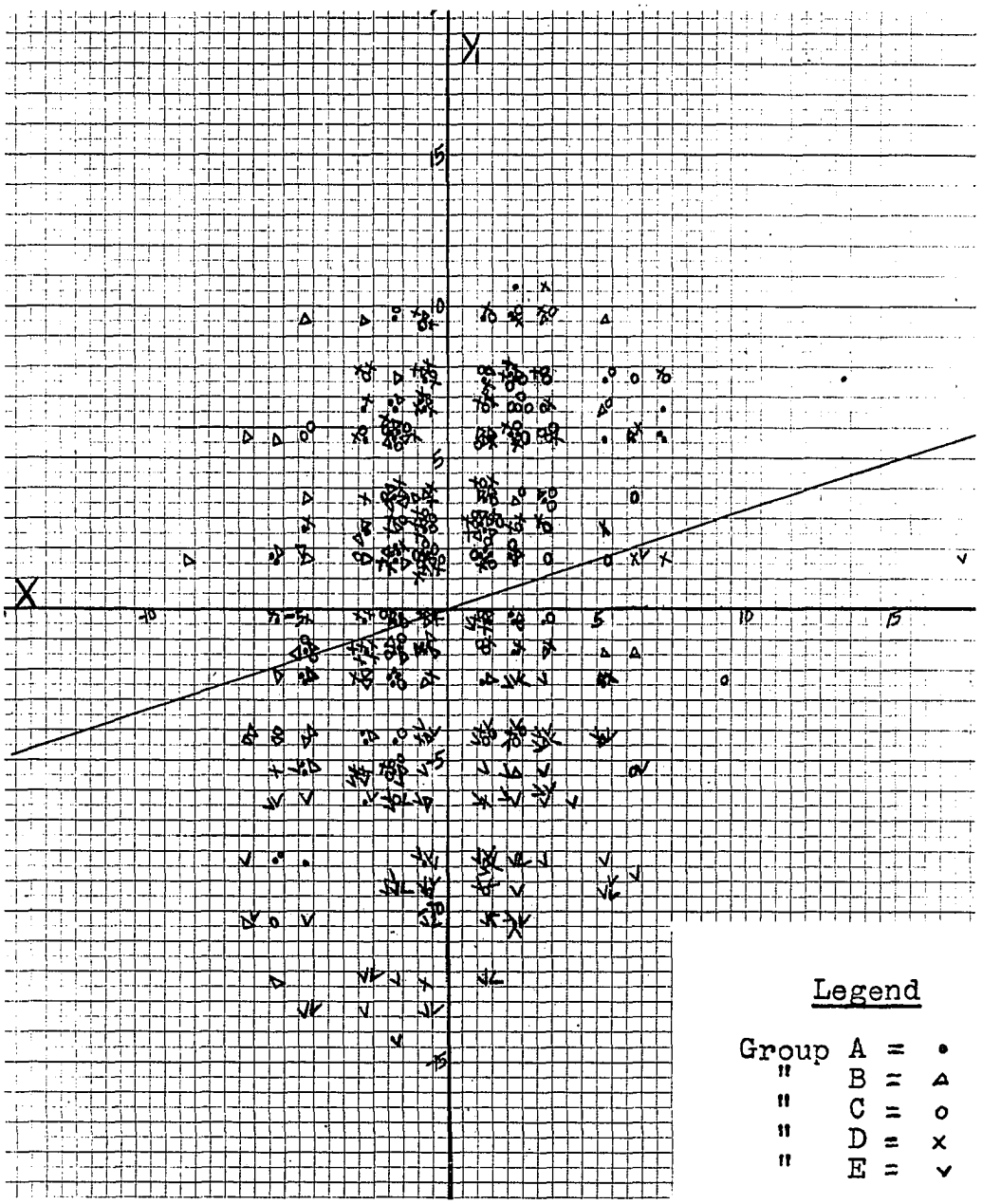

Figure 1. Deviations from total means and total line of regression of Y_1 on X scores made by five groups of eleventh and twelfth grade students on the test constructed from color and black and white guidance films entitled "Library Organization." (y' = .33x)

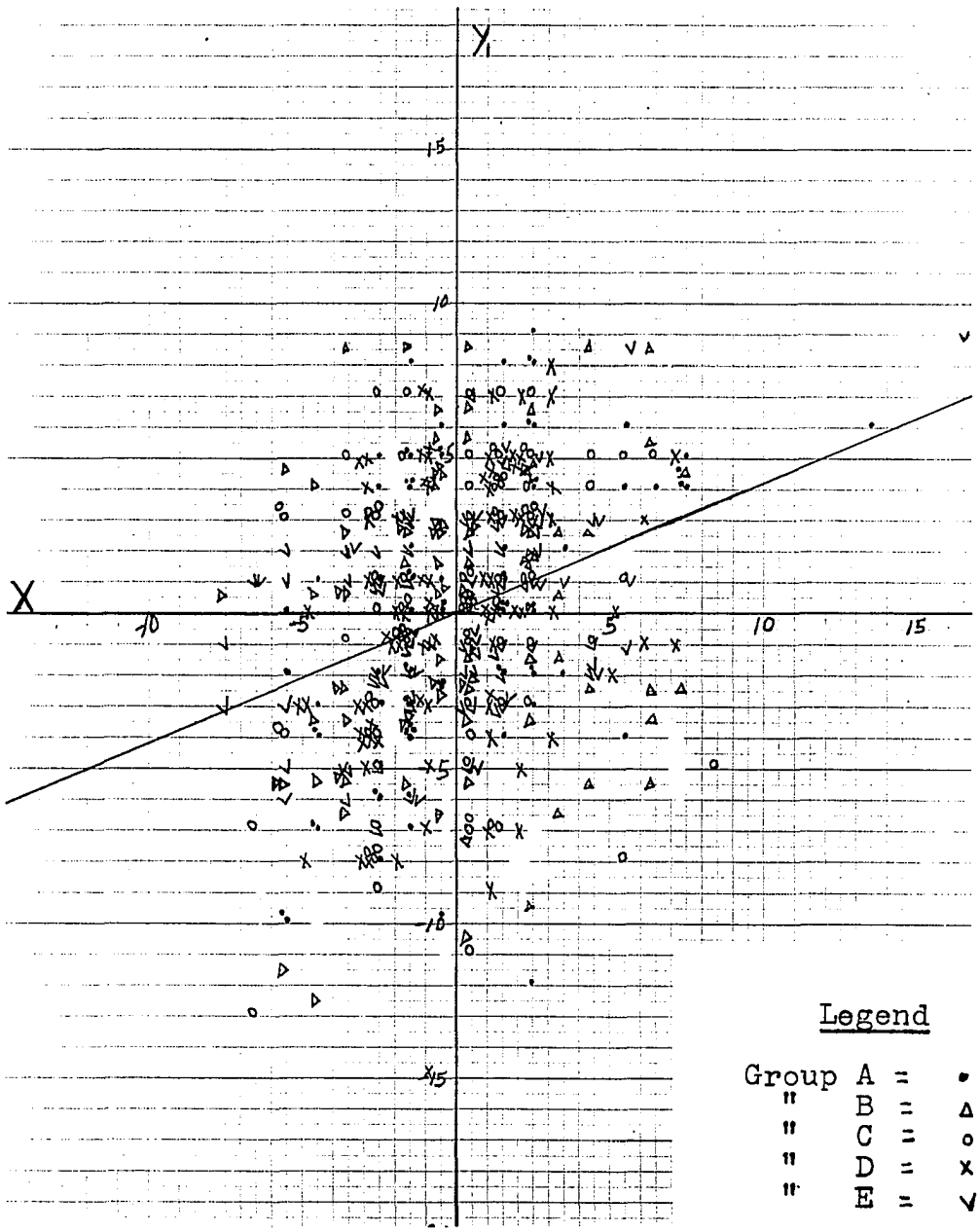

Figure 2. Deviations of Y_1 and X scores from group means and common within-group line of regression made by five groups of eleventh and twelfth grade students on the test constructed from color and black and white guidance films entitled "Library Organization." ($y' = .42x$)

TABLE 5

SUMMARY OF THE STATISTICAL ANALYSIS FOR SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION" (Group N = 88)

Source of Variation	Sum of Squares	df	Variance Estimate	F
Analysis of variance of pretest (X) scores				
Among groups	208.5	4	52.1	5.06*
Within groups	4476.3	435	10.3	
TOTAL	4684.8	439		
Analysis of variance of posttest (Y_1) scores				
Among groups	6148.5	4	1537.1	78.83*
Within groups	8469.1	435	19.5	
TOTAL	14617.6	439		

Source of Variation	df	ΣX^2	ΣXY	ΣY^2
Sums of squares and cross-products				
Among groups	4			
Within groups	435	4476.3	1897.4	8469.1
TOTAL	439	4684.8	1527.0	14617.6

Source of Variation	Sum of Squares Residuals	df	Variance Estimates	F
Covariance analysis between X and Y_1 scores				
Among groups	6455.1	4	1613.8	91.18*
Within groups	7664.8	434	17.7	
TOTAL	14119.9	438		

*Significant beyond the .01 level of confidence.

from the covariance analysis was 91.18 and from the table of F for 4 and 434 degrees of freedom it was seen that this value was statistically significant beyond the .01 level of confidence. The experimental treatments apparently resulted in real differences since the final posttest (Y_1) means of the five groups were not reasonably accounted for either by initial pretest (X) differences or by sampling fluctuations. Furthermore, it was seen that the precision of the study had been increased through the analysis of covariance technique by observing that the variance estimate had been reduced from 19.5 to 17.7.

The significant value of F indicated definite differences between the adjusted Y_1 means, but it did not reveal which of the Y_1 means was significant. In order to determine this, Garrett's Analysis of Covariance (9), steps 7, 8, and 9, were employed to compute the adjusted Y-means and test for differences by the t-test. Table 6 presents a summary of the adjusted Y_1 means.

Garrett (9) now directs one to calculate the standard error of the difference between any two adjusted means and this was found to be .63. The general formula for finding t-values was employed and it was discovered that the difference required between the adjusted means of any two groups was 1.23 at the .05 level of confidence and 1.63 at the .01 level of confidence for 434 degrees of freedom. Table 7 presents the magnitude of difference on the adjusted

TABLE 6

ADJUSTED MEANS ON POSTTEST (Y_1) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"

Groups	N	$\bar{X}$	$\bar{Y}$	$\bar{Y}_{\cdot X}$ (adjusted)
A	88	3.5	12.9	13.03
B	88	2.7	12.4	12.86
C	88	4.6	13.9	13.56
D	88	3.9	14.0	13.96
E	88	4.5	4.1	3.81
General Means		3.8	11.4	11.44

means between groups, taken two at a time.

Reference to Tables 6 and 7 reveals that the adjusted means for groups A, B, C, and D were significantly higher than the adjusted mean for group E at the .01 level of confidence. Furthermore, it is apparent that there were no significant differences between the adjusted means of groups A and B, A and C, A and D, B and C, B and D, or C and D.

"Heredity and Environment"

The X scores of the five groups of subjects are recorded according to rank order in Table 8. The scores of the same five groups of subjects under experimental conditions Y_1 are recorded in Table 9, and, for computational purposes,

TABLE 7

DIFFERENCES BETWEEN THE ADJUSTED MEANS ON POSTTEST (Y_1) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"

Groups*	Magnitude of Difference Between Groups Taken Two at a Time	Level of Significance .05	.01
A-B	.17	No	No
A-C	.53	No	No
A-D	.93	No	No
A-E	9.22	Yes	Yes
B-C	.70	No	No
B-D	1.10	No	No
B-E	9.05	Yes	Yes
C-D	.40	No	No
C-E	9.75	Yes	Yes
D-E	10.15	Yes	Yes

*Group A -- Color film

Group B -- Color film and anticipatory remarks

Group C -- Black and white film

Group D -- Black and white film and anticipatory remarks

Group E -- Controls who received no film or verbal instruction

TABLE 8

PRETEST (X) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"*

	GROUPS																
No.**	A	B	C	D	E	No.	A	B	C	D	E	No.	A	B	C	D	E
1.	19	19	19	19	19	31.	13	11	13	11	13	61.	7	6	9	7	7
2.	19	18	19	19	19	32.	13	11	13	11	11	62.	7	6	7	7	7
3.	18	18	18	17	19	33.	13	11	13	11	11	63.	7	6	7	7	7
4.	18	18	18	17	18	34.	13	11	13	11	11	64.	7	6	7	7	7
5.	18	17	18	17	18	35.	11	11	13	11	11	65.	7	6	7	7	7
6.	17	17	17	17	17	36.	11	11	13	11	11	66.	6	6	7	7	7
7.	17	17	17	17	17	37.	11	11	13	11	11	67.	6	5	7	6	7
8.	17	17	17	17	17	38.	11	11	13	11	11	68.	6	5	7	6	6
9.	15	17	17	17	17	39.	11	10	11	11	11	69.	5	5	7	6	6
10.	15	15	17	15	15	40.	11	10	11	10	11	70.	5	5	7	6	6
11.	15	15	17	15	15	41.	11	10	11	10	11	71.	5	5	6	6	6
12.	15	15	17	15	15	42.	11	10	11	10	11	72.	5	5	6	6	6
13.	15	15	15	14	15	43.	11	10	11	10	11	73.	5	5	6	6	6
14.	15	15	15	14	15	44.	10	10	11	10	11	74.	5	5	6	6	6
15.	15	14	15	14	15	45.	10	10	11	10	10	75.	5	5	6	6	5
16.	15	14	15	14	14	46.	10	10	11	10	10	76.	5	3	6	6	5
17.	15	14	15	14	14	47.	10	10	11	10	10	77.	3	3	5	6	5
18.	14	14	15	14	14	48.	10	10	11	10	10	78.	3	3	5	5	5
19.	14	13	15	14	14	49.	10	10	11	10	10	79.	2	2	3	5	3
20.	14	13	15	14	14	50.	10	10	10	10	10	80.	2	2	3	5	3
21.	14	13	14	13	13	51.	10	10	10	10	10	81.	2	1	3	5	3
22.	14	13	14	13	13	52.	9	9	10	9	10	82.	2	1	2	3	3
23.	14	13	14	13	13	53.	9	9	10	9	10	83.	1	1	2	3	3
24.	14	13	14	13	13	54.	9	9	10	9	9	84.	1	-1	2	3	3
25.	14	13	14	13	13	55.	9	9	10	9	9	85.	1	-1	1	3	2
26.	14	13	14	13	13	56.	9	9	9	9	9	86.	1	-1	1	3	1
27.	13	13	14	13	13	57.	9	9	9	9	9	87.	-1	-3	1	1	1
28.	13	11	14	13	13	58.	9	9	9	9	9	88.	-1	-3	1	-1	-3
29.	13	11	13	11	13	59.	9	9	9	7	9						
30.	13	11	13	11	13	60.	7	7	9	7	9						

* Scores were determined by the use of a correction formula for guessing. Score equals number right minus one-third number wrong.

** Number represents subjects. Subjects will maintain this assigned number in subsequent tables dealing with "Heredity and Environment."

TABLE 9

POSTTEST (Y_1) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"*

	GROUPS														
No.**	A	B	C	D	E	No.	A	B	C	D	E	No.	A	B	C	D	E
1.	15	19	21	22	19	31.	21	15	21	14	11	61.	14	18	15	11	7
2.	21	17	22	22	19	32.	15	17	10	19	13	62.	13	15	13	14	10
3.	18	19	22	19	15	33.	17	17	19	21	13	63.	11	18	7	17	11
4.	21	17	22	19	18	34.	15	17	22	15	17	64.	10	7	13	13	14
5.	19	18	19	19	17	35.	18	15	18	14	11	65.	10	15	13	11	11
6.	22	18	21	21	17	36.	19	19	19	14	11	66.	11	10	13	14	7
7.	17	19	22	21	13	37.	18	13	19	19	15	67.	21	15	9	11	10
8.	19	22	18	15	14	38.	13	15	14	15	10	68.	15	10	11	6	9
9.	21	18	22	21	14	39.	17	22	14	15	17	69.	11	10	15	11	13
10.	22	17	21	15	17	40.	15	19	19	19	13	70.	6	13	13	14	9
11.	17	21	22	19	13	41.	10	22	17	14	11	71.	13	7	5	15	11
12.	17	19	18	22	14	42.	17	13	17	17	13	72.	15	11	13	9	9
13.	19	17	21	18	15	43.	15	17	21	22	7	73.	10	9	7	18	5
14.	21	17	17	21	14	44.	19	18	19	13	5	74.	17	13	7	15	9
15.	19	19	19	22	17	45.	17	11	17	15	14	75.	9	15	14	5	6
16.	19	15	15	17	17	46.	15	19	14	17	11	76.	13	15	10	9	6
17.	19	17	21	19	15	47.	9	15	18	15	13	77.	3	10	10	15	3
18.	21	18	21	15	14	48.	10	18	10	14	13	78.	9	13	9	13	14
19.	22	15	22	19	15	49.	10	17	17	15	17	79.	13	11	14	14	1
20.	19	21	13	11	15	50.	15	13	22	11	11	80.	9	14	18	14	9
21.	18	14	19	19	13	51.	11	10	18	14	13	81.	6	10	15	7	10
22.	15	19	21	18	14	52.	13	18	18	21	11	82.	6	3	10	15	3
23.	15	11	21	17	15	53.	17	13	18	21	11	83.	17	3	10	14	2
24.	14	21	15	21	10	54.	22	11	13	11	11	84.	15	5	6	5	10
25.	17	17	18	19	10	55.	17	17	13	17	18	85.	5	9	5	10	7
26.	14	7	22	21	15	56.	13	13	18	13	7	86.	3	5	7	6	-1
27.	18	15	19	19	18	57.	13	13	17	10	10	87.	1	14	11	10	2
28.	15	19	19	18	17	58.	14	11	19	14	9	88.	6	-2	11	7	1
29.	15	17	18	18	15	59.	13	10	15	17	7						
30.	21	15	19	18	7	60.	15	17	11	14	6						

*Scores were determined by the use of a correction formula for guessing. Score equals number right minus one-third number wrong.

**Number represents subjects. Subjects will maintain this assigned number in subsequent tables dealing with "Heredity and Environment."

their position corresponds directly with that of the scores in Table 8.

It was now necessary to test for homogeneity of variance between groups of data, using Bartlett's Test of Homogeneity of Variance (20, pp. 486-490). By employing the scores in Table 8 it was possible to obtain the data presented in Table 10, which was basic to the Chi Square test of the homogeneity of five variance estimates. At 4 degrees of freedom, the obtained x^2 of 3.73 failed to reach significance at the .05 level of confidence, thus indicating that the homogeneity of variance assumption had been satisfied.

TABLE 10

BARTLETT'S TEST OF THE HOMOGENEITY OF FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"

Group	$\sum x^2$	df	$\frac{1}{n}$	Variance Estimate s^2	Log s^2	n Log s^2
A	2180.9	87	.0115	25.1	1.3991	121.7217
B	2320.5	87	.0115	26.7	1.4265	124.1055
C	1986.5	87	.0115	22.8	1.3579	118.1373
D	1593.0	87	.0115	18.3	1.2625	109.8375
E	1878.9	87	.0115	21.6	1.3345	116.1015
SUM	9959.8	435	.0575			589.9035

Figures 3 and 4 present the plotted data and lines of regression. Inspection of the regression lines and of the scatter of the data about the lines showed that the linearity of regression assumption was supported, but an F test needed to be made to determine this exactly. The obtained F value of -59.64 for 3 and 435 degrees of freedom was not significant at the .05 level of confidence; therefore it may be reported that the assumption of linearity of regression was not contradicted.

A summary of the analysis of variance and the analysis of covariance is shown in Table 11. The covariance analysis revealed a value of F which was equal to 26.98, and from the table of F it was seen that this was statistically significant beyond the .01 level of confidence for 4 and 434 degrees of freedom. Such significance indicated that the differences between the means of the experimental groups on the Y_1 variable could not be accounted for by differences in mean level of initial ability as measured by X, the pretest trial. The variance estimate had been reduced from 21.3 to 10.0, which showed that the precision of the study had been increased through the analysis of covariance technique.

The significant F value indicated pronounced differences between the adjusted Y_1 means, but it did not reveal which Y_1 means differed significantly from each other. In order to find these differences, steps 7, 8, and 9 in

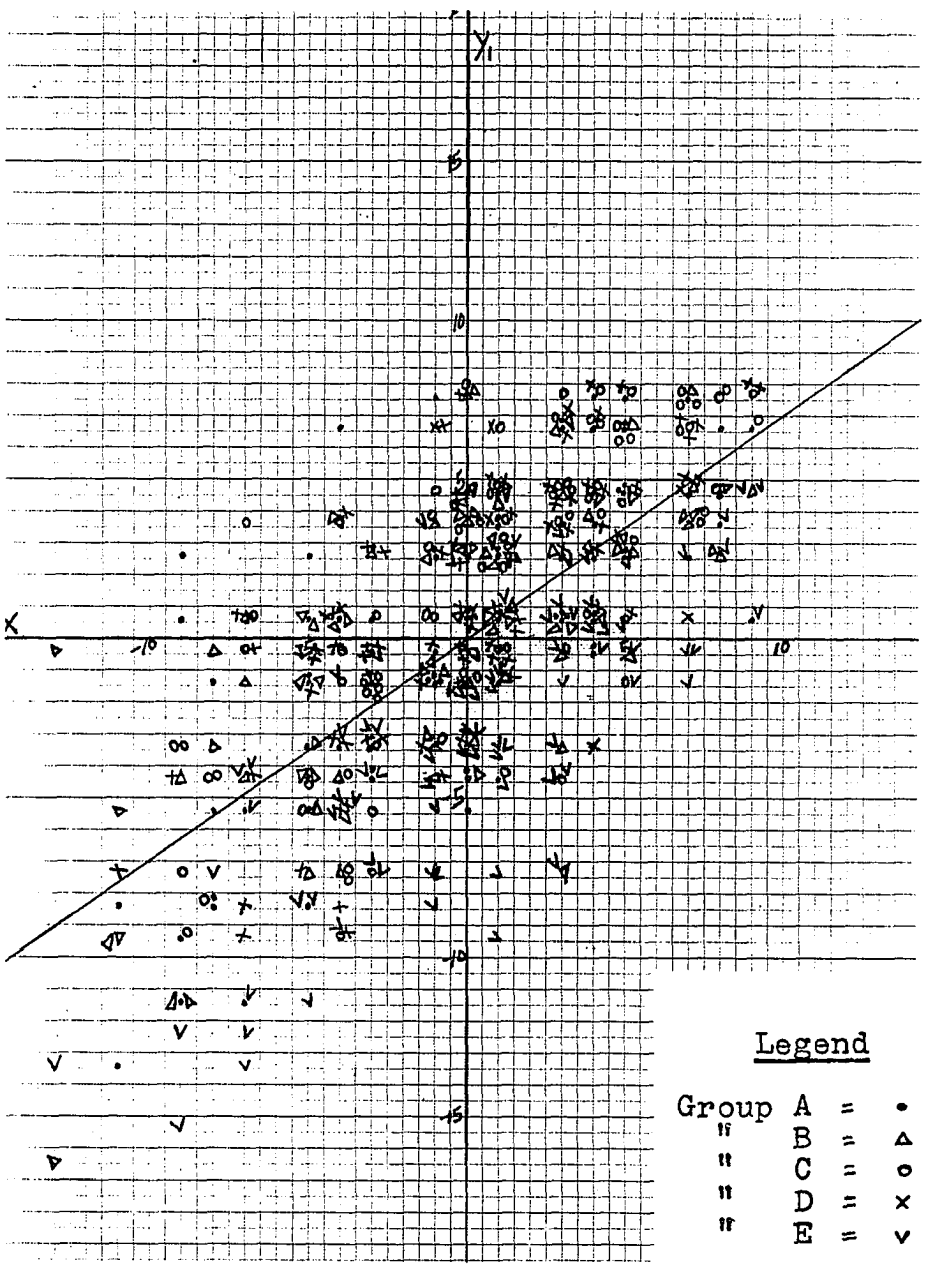

Figure 3. Deviations from total means and total line of regression of Y_1 on X scores made by five groups of eleventh and twelfth grade students on the test constructed from color and black and white guidance films entitled "Heredity and Environment." ($y' = .70x$)

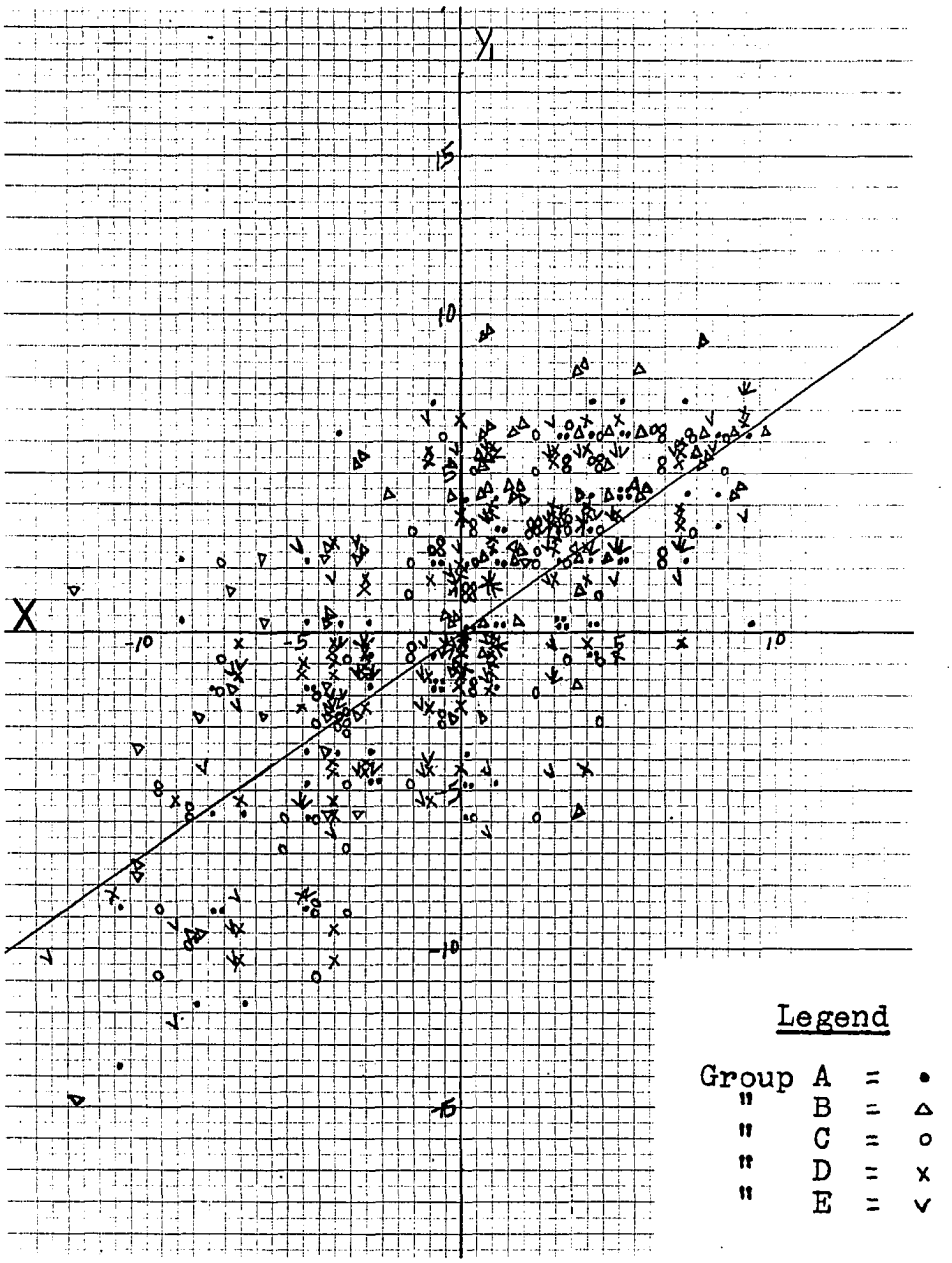

Figure 4. Deviations of Y_1 and X scores from group means and common within-group line of regression made by five groups of eleventh and twelfth grade students on the test constructed from color and black and white guidance films entitled "Heredity and Environment." ($y' = .70x$)

TABLE 11

SUMMARY OF THE STATISTICAL ANALYSIS FOR SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT" (Group N = 88)

Source of Variation	Sum of Squares	df	Variance Estimate	F
Analysis of variance of pretest (X) scores				
Among groups	72.6	4	18.2	
Within groups	9959.4	435	22.9	.79
TOTAL	10032.0	439		
Analysis of variance of posttest (Y_1) scores				
Among groups	1102.2	4	275.6	
Within groups	9256.3	435	21.3	12.94*
TOTAL	10358.5	439		

Source of Variation	df	ΣX^2	ΣXY	ΣY^2
Sums of squares and cross-products				
Among groups	4			
Within groups	435	9959.4	6985.6	9256.3
TOTAL	439	10032.0	7027.4	10358.5

Source of Variation	Sum of Squares Residuals	df	Variance Estimates	F
Covariance analysis between X and Y_1 scores				
Among groups	1079.2	4	269.8	
Within groups	4356.5	434	10.0	26.98*
TOTAL	5435.7	438		

*Significant beyond the .01 level of confidence.

Garrett's Analysis of Covariance (9) were again employed as a computational guide. As Garrett (9) suggests, the adjusted Y-means were computed and then tested for differences by the t-test. Table 12 presents the adjusted Y_1 means.

TABLE 12

ADJUSTED MEANS ON POSTTEST (Y_1) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"

Groups	N	$\overline{X}$	$\overline{Y}$	$\overline{Y \cdot X}$ (adjusted)
A	88	9.9	14.7	14.77
B	88	9.4	12.6	13.02
C	88	10.6	15.9	15.48
D	88	10.0	15.4	15.40
E	88	10.1	11.4	11.33
General Means		10.0	14.0	14.00

Following step 9 it was found that the standard error of the difference between any two adjusted means was .47. For 434 degrees of freedom the difference required between the adjusted means of any two groups was .92 at the .05 level of confidence and 1.21 at the .01 level of confidence. The obtained values were acquired by computing the general formula for finding t-values. Table 13 presents the magnitude

TABLE 13

DIFFERENCES BETWEEN THE ADJUSTED MEANS ON POSTTEST (Y_1) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"

Groups	Magnitude of Difference Between Groups Taken Two at a Time	Level of Significance .05	.01
A-B	1.75	Yes	Yes
A-C	.71	No	No
A-D	.63	No	No
A-E	3.44	Yes	Yes
B-C	2.46	Yes	Yes
B-D	2.38	Yes	Yes
B-E	1.69	Yes	Yes
C-D	.08	No	No
C-E	4.15	Yes	Yes
D-E	4.07	Yes	Yes

*Group A -- Color film

Group B -- Color film and anticipatory remarks

Group C -- Black and white film

Group D -- Black and white film and anticipatory remarks

Group E -- Controls who received no film or verbal instruction

of difference on the adjusted means between groups, taken two at a time.

It is clear by reference to Tables 12 and 13 that the adjusted means for groups A, B, C, and D were significantly higher than the adjusted mean for group E at the .01 level of confidence. Furthermore, groups A, C, and D had adjusted means that were significantly higher than the adjusted mean for group B at the .01 level of confidence. Differences in the adjusted means for groups A and C, A and D, and C and D did not differ significantly at the .01 or .05 level of confidence.

"Choosing Your Occupation"

Table 14 contains the X scores of the five groups of subjects, with these scores listed according to rank order numerical value. The Y_1 scores are recorded in Table 15, the position of each score corresponding directly with that of each X score.

As an initial step in computing the covariance analysis it is suggested that an analysis of variance be carried out for both X and Y_1 scores, but prior to this the assumptions of homogeneity of variance between groups of data and linearity of regression must be determined. In order to check the former, Bartlett's Test of Homogeneity of Variance (20, pp. 486-490) was calculated for the data in Table 14. The values employed in the Chi Square test of the homogeneity

TABLE 14

PRETEST (X) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION"*

No.**	GROUPS					No.						No.					
	A	B	C	D	E		A	B	C	D	E		A	B	C	D	E
1.	19	21	19	22	21	31.	13	13	14	13	14	61.	9	7	9	9	7
2.	19	19	19	21	21	32.	13	13	14	13	14	62.	8	7	9	7	7
3.	19	18	18	19	19	33.	13	13	13	13	14	63.	7	7	9	7	7
4.	18	18	18	19	18	34.	13	13	13	13	14	64.	7	7	9	7	7
5.	18	17	18	19	18	35.	13	13	13	13	14	65.	7	7	9	7	7
6.	18	17	18	18	18	36.	13	13	13	13	14	66.	7	7	7	7	7
7.	18	17	17	18	18	37.	13	13	13	11	13	67.	7	7	7	7	7
8.	17	15	17	18	18	38.	13	11	13	11	13	68.	7	7	7	7	7
9.	17	15	17	18	17	39.	13	11	13	11	13	69.	7	7	7	7	6
10.	17	15	17	18	17	40.	13	11	11	11	13	70.	7	7	7	6	6
11.	17	15	17	18	17	41.	11	11	11	11	13	71.	7	6	7	6	6
12.	17	15	15	17	17	42.	11	10	11	11	13	72.	6	6	7	6	6
13.	17	15	15	17	17	43.	11	10	11	11	13	73.	6	6	7	6	6
14.	17	15	15	17	17	44.	11	10	11	11	13	74.	6	6	7	6	6
15.	17	15	15	17	17	45.	11	10	11	11	11	75.	6	5	6	5	6
16.	17	15	15	15	17	46.	11	10	11	11	11	76.	6	5	6	5	6
17.	15	14	15	15	15	47.	11	10	11	11	11	77.	5	5	6	5	6
18.	15	14	15	15	15	48.	11	10	10	10	11	78.	5	3	6	5	6
19.	15	14	15	15	15	49.	11	10	10	10	11	79.	5	2	6	5	6
20.	15	14	15	15	15	50.	11	10	10	10	11	80.	5	2	5	5	6
21.	15	14	15	15	15	51.	10	10	10	10	11	81.	5	2	5	5	6
22.	15	14	15	14	15	52.	10	10	10	10	11	82.	2	2	5	3	5
23.	14	14	15	14	15	53.	10	9	10	10	10	83.	2	2	3	3	5
24.	14	13	14	14	15	54.	10	9	10	10	10	84.	2	2	3	3	5
25.	14	13	14	14	14	55.	9	9	10	9	9	85.	1	2	2	2	3
26.	14	13	14	14	14	56.	9	9	10	9	9	86.	-1	1	2	2	2
27.	14	13	14	14	14	57.	9	9	10	9	9	87.	-2	-2	-1	2	1
28.	14	13	14	14	14	58.	9	9	9	9	9	88.	-3	-6	-2	-1	-1
29.	13	13	14	13	14	59.	9	7	9	9	9						
30.	13	13	14	13	14	60.	9	7	9	9	9						

*Scores were determined by the use of a correction formula for guessing. Score equals number right minus one-third number wrong.

**Number represents subjects. Subjects will maintain this assigned number in subsequent tables dealing with "Choosing Your Occupation."

TABLE 15

POST TEST (Y_1) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION"*

	GROUPS																
No.**	A	B	C	D	E	No.	A	B	C	D	E	No.	A	B	C	D	E
1.	22	18	21	22	17	31.	11	19	18	15	14	61.	2	17	11	9	11
2.	18	19	19	21	19	32.	13	21	17	17	15	62.	13	14	15	10	9
3.	18	21	21	22	19	33.	17	13	19	11	15	63.	15	11	13	10	14
4.	18	17	21	18	21	34.	15	17	19	10	17	64.	11	13	15	9	6
5.	19	18	21	21	19	35.	13	13	18	13	15	65.	11	17	11	10	7
6.	21	14	19	19	14	36.	17	11	13	10	7	66.	-1	10	6	11	6
7.	22	19	17	17	14	37.	13	15	19	10	11	67.	17	7	13	11	9
8.	15	15	22	22	17	38.	11	18	7	17	13	68.	11	6	15	10	6
9.	21	14	19	21	15	39.	6	14	17	15	14	69.	11	11	10	10	14
10.	22	14	18	19	15	40.	18	15	15	15	14	70.	5	7	6	10	11
11.	19	21	15	14	15	41.	17	15	15	17	7	71.	6	10	10	6	9
12.	19	17	18	22	17	42.	18	17	15	17	7	72.	10	14	14	9	11
13.	19	15	19	19	18	43.	14	11	18	11	10	73.	2	7	2	7	10
14.	18	14	21	22	18	44.	18	14	11	10	15	74.	11	-2	14	9	9
15.	14	14	17	14	15	45.	15	14	15	10	13	75.	11	13	7	7	6
16.	18	17	18	19	14	46.	13	7	15	10	14	76.	14	6	5	6	5
17.	19	11	19	17	19	47.	15	13	6	10	14	77.	6	11	11	17	7
18.	18	18	21	18	18	48.	13	10	11	17	19	78.	5	9	9	6	5
19.	17	11	15	21	15	49.	10	11	15	14	14	79.	5	19	9	3	9
20.	9	13	18	14	15	50.	10	13	13	13	9	80.	10	10	11	6	9
21.	18	15	17	10	17	51.	13	11	13	6	13	81.	3	5	3	1	6
22.	11	22	18	18	18	52.	14	11	17	17	6	82.	5	11	9	10	5
23.	22	9	15	18	15	53.	18	11	17	7	13	83.	11	2	7	6	2
24.	21	15	15	18	15	54.	13	2	14	6	13	84.	3	5	10	2	9
25.	15	14	13	22	18	55.	9	13	14	10	10	85.	2	3	5	6	6
26.	22	17	18	18	17	56.	14	18	7	13	9	86.	-1	7	3	2	9
27.	18	13	19	18	17	57.	14	11	11	6	11	87.	9	10	2	2	1
28.	14	18	17	14	14	58.	7	10	15	11	10	88.	1	-7	9	10	-3
29.	21	14	18	10	17	59.	7	13	11	9	6						
30.	18	13	19	11	11	60.	17	13	14	11	10						

*Scores were determined by the use of a correction formula for guessing. Score equals number right minus one-third number wrong.

**Number represents subjects. Subjects will maintain this assigned number in subsequent tables dealing with "Choosing Your Occupation."

of five variance estimates, presented in Table 16, resulted in an x^2 of 1.02, which failed to reach significance at the .05 level of confidence for 4 degrees of freedom. Therefore, the assumption of equality of population variances was not contradicted.

TABLE 16

BARTLETT'S TEST OF THE HOMOGENEITY OF FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION"

Group	Σx^2	df	$\frac{1}{n}$	Variance Estimate s^2	Log s^2	n Log s^2
A	2197.3	87	.0115	25.3	1.4031	122.0697
B	2175.0	87	.0115	25.0	1.3979	121.6173
C	1827.0	87	.0115	21.0	1.3222	115.0314
D	2159.7	87	.0115	24.8	1.3945	121.3215
E	2035.6	87	.0115	23.4	1.3692	119.1204
SUM	10394.6	435	.0575			599.1603

In order to check the linearity of regression assumption, data was plotted, both for the total group and for each group, and regression lines fitted to the plotted data. Inspection of Figures 5 and 6 was helpful in judging whether the assumption was reasonable, but it was necessary, as before, to compare the variance estimate based upon the

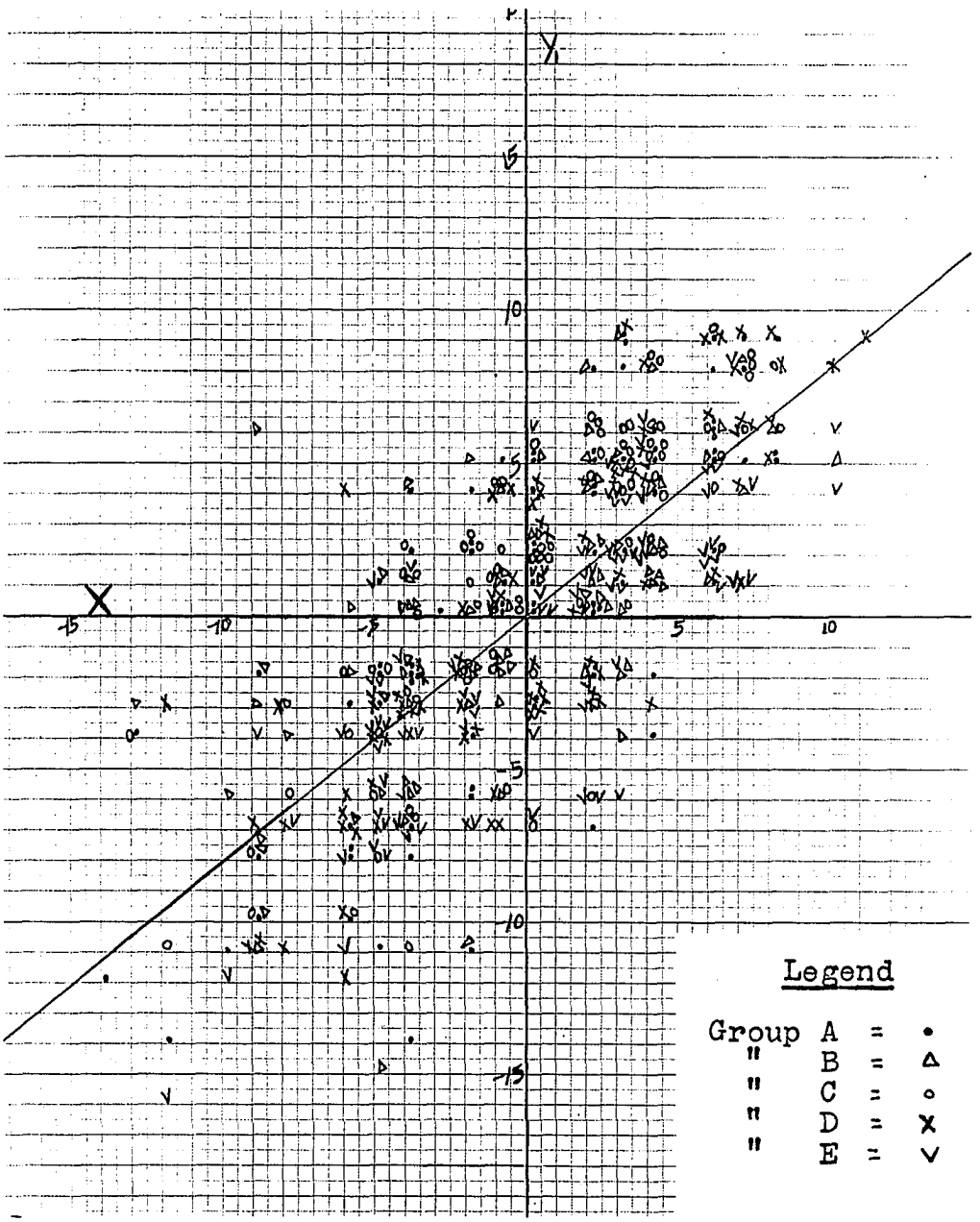

Figure 5. Deviations from total means and total line of regression of Y_1 on X scores made by five groups of eleventh and twelfth grade students on the test constructed from color and black and white guidance films entitled "Choosing Your Occupation." ($y' = .81x$)

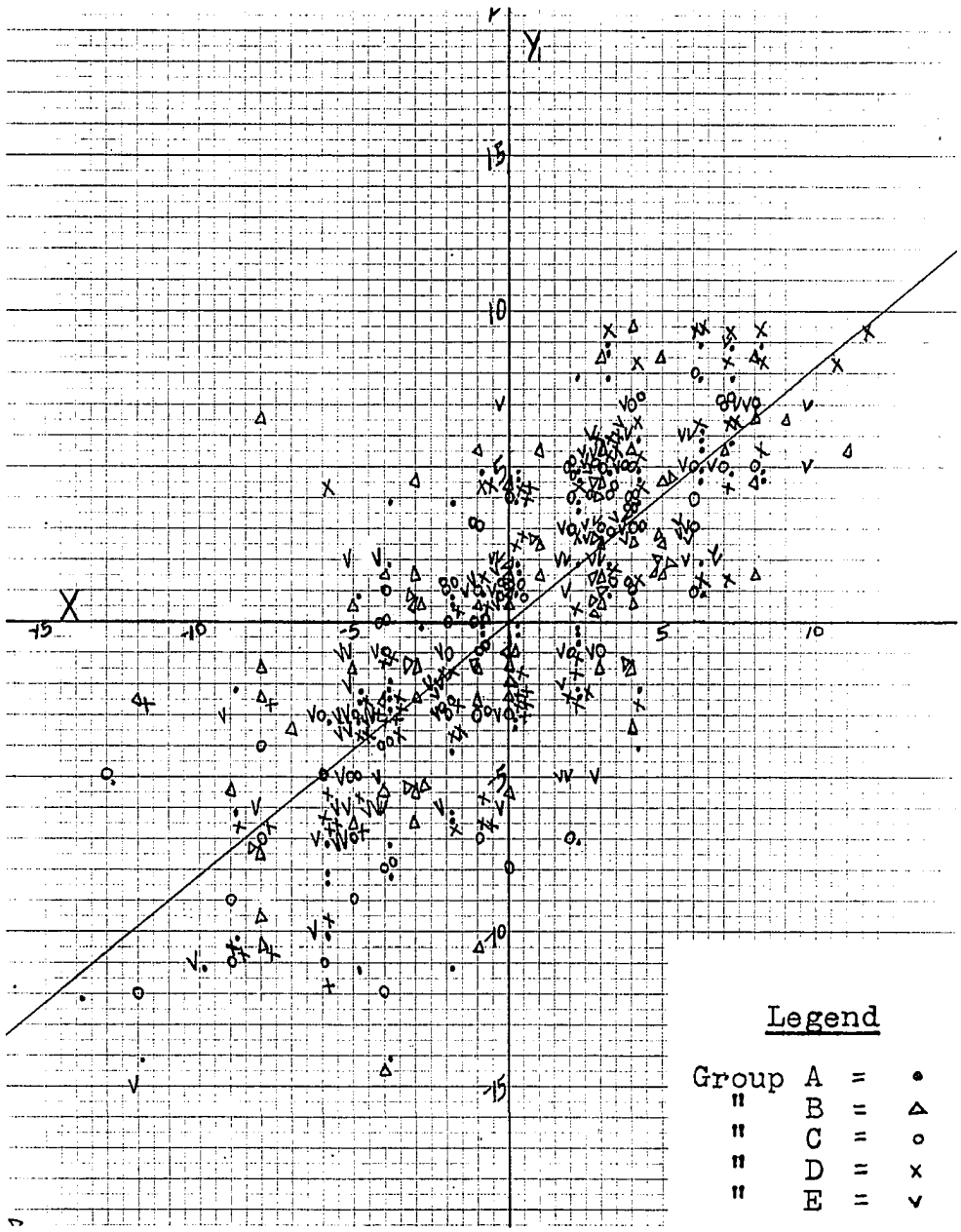

Figure 6. Deviations of Y_1 and X scores from group means and common within-group line of regression made by five groups of eleventh and twelfth grade students on the test constructed from color and black and white guidance films entitled "Choosing Your Occupation." ($y' = .82x$)

squares of the deviations of the column means from the fitted straight line of regression with that based upon the squares of deviations of the scores within columns about their respective means to arrive at an exact test for linearity of regression. The obtained F value of -81.04 for 3 and 435 degrees of freedom was not significant at the .05 level of confidence, which shows that the assumption was tenable.

The analysis of covariance summary contained in Table 17 reveals an F value of 5.46 based upon 4 and 434 degrees of freedom, which was statistically significant beyond the .01 level of confidence. This significance indicated that the differences in the means of the experimental groups on the Y_1 variable could not be accounted for by differences in mean level of initial ability as measured by X in the pretest; for the means of the groups on the Y_1 variable had been "adjusted" by the analysis to a common mean initial level of performance on X. The covariance analysis had increased the precision of the study as indicated by the reduction of the variance estimate from 27.6 to 11.6.

The significant F value indicated pronounced differences between the adjusted Y_1 means, but it did not reveal which Y_1 means differ significantly from each other. In order to find these differences, steps 7, 8, and 9 in Garrett's (9) Analysis of Covariance were employed to calculate the adjusted Y_1 means and test for significance. Table 18 presents the adjusted Y_1 means.

TABLE 17

SUMMARY OF THE STATISTICAL ANALYSIS FOR SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION" (Group N = 88)

Source of Variation	Sum of Squares	df	Variance Estimate	F
Analysis of variance of pretest (X) scores				
Among groups	77.9	4	19.5	
Within groups	10443.3	435	24.0	.81
TOTAL	10521.2	439		
Analysis of variance of posttest (Y_1) scores				
Among groups	197.4	4	49.4	
Within groups	12018.4	435	27.6	1.79
TOTAL	12215.8	439		

Source of Variation	df	ΣX^2	ΣXY	ΣY^2
Sums of squares and cross-products				
Among groups	4			
Within groups	435	10443.3	8535.0	12018.4
TOTAL	439	10521.2	8540.3	12215.8

Source of Variation	Sum of Squares Residuals	df	Variance Estimates	F
Covariance analysis between X and Y_1 scores				
Among groups	240.4	4	60.1	
Within groups	5043.0	434	11.6	5.46*
TOTAL	5283.4	438		

*Significant beyond the .01 level of confidence.

TABLE 18

ADJUSTED MEANS ON POSTTEST (Y_1) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION"

Groups	N	$\bar{X}$	$\bar{Y}$	$\overline{Y \cdot X}$ (adjusted)
A	88	10.8	13.1	13.10
B	88	10.0	12.5	13.15
C	88	11.0	14.0	13.84
D	88	10.9	12.6	12.52
E	88	11.3	12.0	11.59
General Means		10.8	12.8	12.84

Following step 9, as presented by Garrett (9), it was found that the standard error of the difference between any two means was .51, and for 434 degrees of freedom the difference required between the adjusted means of any two groups was 1.32 at the .01 level of confidence, and .99 at the .05 level of confidence. Table 19 presents the magnitude of difference on the adjusted means between groups, taken two at a time.

It is evident by reference to Tables 18 and 19 that the adjusted means for groups A, B, and C were significantly higher than the adjusted mean for group E at the .01 level of confidence. In addition, group C had an adjusted mean

that was significantly higher than the adjusted mean for group D at the .01 level of confidence.

TABLE 19

DIFFERENCES BETWEEN THE ADJUSTED MEANS ON POSTTEST (Y_1) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION"

Groups*	Magnitude of Difference Between Groups Taken Two at a Time	Level of Significance .05	.01
A-B	.05	No	No
A-C	.74	No	No
A-D	.58	No	No
A-E	1.51	Yes	Yes
B-C	.69	No	No
B-D	.63	No	No
B-E	1.56	Yes	Yes
C-D	1.32	Yes	Yes
C-E	2.25	Yes	Yes
D-E	.93	No	No

*Group A -- Color film

Group B -- Color film and anticipatory remarks

Group C -- Black and white film

Group D -- Black and white film and anticipatory remarks

Group E -- Controls who received no film or verbal instruction

TABLE 20

PRETEST (X) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"*

	GROUPS																
No.**	A	B	C	D	E	No.	A	B	C	D	E	No.	A	B	C	D	E
1.	17	17	15	17	15	31.	10	9	9	9	9	61.	5	6	3	3	5
2.	15	14	13	15	15	32.	9	9	9	9	9	62.	5	6	3	3	5
3.	14	14	13	14	15	33.	9	9	9	9	9	63.	5	6	3	2	5
4.	14	14	13	14	14	34.	9	9	9	9	9	64.	5	5	2	2	5
5.	13	13	13	14	14	35.	9	9	9	9	9	65.	5	5	2	2	5
6.	13	13	13	14	14	36.	9	9	7	9	8	66.	3	5	2	2	5
7.	13	13	13	14	14	37.	9	9	7	7	7	67.	3	5	2	2	5
8.	13	11	11	13	14	38.	9	9	6	7	7	68.	3	5	2	2	3
9.	13	11	11	13	14	39.	9	9	6	7	7	69.	3	3	2	2	3
10.	11	11	11	13	13	40.	9	9	6	7	7	70.	3	3	2	1	3
11.	11	11	11	13	13	41.	9	7	6	7	7	71.	3	3	2	1	3
12.	11	11	11	13	13	42.	7	7	6	7	7	72.	2	3	2	1	3
13.	11	11	10	11	13	43.	7	7	6	6	7	73.	2	2	2	1	3
14.	11	11	10	11	11	44.	7	7	6	6	7	74.	2	2	1	1	2
15.	11	11	10	11	11	45.	7	7	6	6	7	75.	2	2	1	1	2
16.	11	11	10	11	11	46.	7	7	6	6	6	76.	2	2	1	1	2
17.	11	10	10	11	11	47.	7	7	6	6	6	77.	1	2	1	-1	2
18.	11	10	10	11	11	48.	7	7	6	6	6	78.	1	2	1	-1	2
19.	11	10	10	11	11	49.	7	7	6	6	6	79.	1	1	1	-1	1
20.	11	10	10	11	11	50.	7	7	5	5	6	80.	1	1	1	-1	1
21.	11	10	10	10	11	51.	6	6	5	5	6	81.	1	1	-1	-1	1
22.	11	10	10	10	11	52.	6	6	5	5	6	82.	1	1	-1	-1	1
23.	11	10	10	10	10	53.	6	6	5	5	6	83.	1	-1	-1	-1	1
24.	11	10	10	10	10	54.	6	6	5	5	6	84.	1	-1	-1	-1	1
25.	10	10	9	10	10	55.	6	6	5	5	6	85.	1	-1	-1	-1	-1
26.	10	10	9	10	10	56.	6	6	5	5	6	86.	-1	-1	-1	-1	-1
27.	10	9	9	10	9	57.	6	6	5	5	6	87.	-1	-2	-2	-1	-1
28.	10	9	9	10	9	58.	6	6	3	3	6	88.	-1	-5	-2	-2	-2
29.	10	9	9	10	9	59.	5	6	3	3	6						
30.	10	9	9	10	9	60.	5	6	3	3	5						

*Scores were determined by the use of a correction formula for guessing. Score equals number right minus one-third number wrong.

**Number represents subjects. Subjects will maintain this assigned number in subsequent tables dealing with "Your Earning Power."

TABLE 21

POSTTEST (Y_1) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"*

	GROUPS																
No.**	A	B	C	D	E	No.	A	B	C	D	E	No.	A	B	C	D	E
1.	17	17	21	18	14	31.	14	15	13	19	6	61.	6	13	9	1	6
2.	18	18	17	19	13	32.	13	11	13	11	7	62.	10	5	7	9	5
3.	17	18	15	17	13	33.	17	14	11	15	6	63.	13	18	2	13	9
4.	17	14	17	17	15	34.	17	13	6	13	6	64.	10	11	14	17	13
5.	15	17	17	15	15	35.	11	14	5	14	6	65.	9	17	14	7	11
6.	15	18	15	14	17	36.	15	13	14	11	10	66.	10	13	11	11	11
7.	17	19	13	14	11	37.	13	11	13	14	11	67.	13	7	14	15	5
8.	18	18	14	17	11	38.	13	7	18	15	15	68.	11	3	13	5	14
9.	15	14	15	17	11	39.	11	11	11	14	3	69.	7	10	14	3	9
10.	17	15	14	17	10	40.	7	10	11	14	11	70.	7	6	-1	17	5
11.	15	15	14	18	13	41.	7	9	9	10	13	71.	1	13	5	14	2
12.	17	18	15	17	14	42.	17	19	13	7	9	72.	9	1	7	10	5
13.	13	15	17	18	18	43.	13	10	7	14	11	73.	3	11	3	13	6
14.	17	14	14	14	15	44.	10	10	9	10	9	74.	11	11	13	5	6
15.	14	11	18	17	17	45.	13	18	7	14	9	75.	5	9	17	10	6
16.	15	11	17	13	10	46.	6	13	9	3	9	76.	3	6	13	1	1
17.	14	15	21	13	11	47.	6	13	9	9	9	77.	15	2	21	9	5
18.	14	17	18	15	15	48.	13	14	11	13	10	78.	15	9	9	11	11
19.	14	17	15	11	15	49.	13	9	15	11	11	79.	8	15	7	18	7
20.	13	17	17	10	5	50.	11	6	17	13	13	80.	9	9	9	11	2
21.	19	10	14	15	6	51.	14	13	13	18	10	81.	10	13	17	9	5
22.	15	11	14	11	10	52.	7	10	5	1	9	82.	3	6	14	-1	6
23.	9	3	21	17	11	53.	11	17	7	14	6	83.	9	6	6	11	5
24.	9	15	17	14	10	54.	9	11	10	5	5	84.	7	3	11	10	1
25.	17	13	18	14	11	55.	11	11	15	11	10	85.	5	6	6	7	9
26.	14	10	15	14	10	56.	14	15	2	10	5	86.	7	5	10	6	3
27.	17	13	19	17	14	57.	11	17	13	7	7	87.	5	2	15	7	7
28.	13	14	9	10	11	58.	9	6	14	17	7	88.	2	3	13	9	2
29.	19	11	15	6	9	59.	13	10	15	11	5						
30.	9	13	11	9	9	60.	9	7	15	7	10						

*Scores were determined by the use of a correction formula for guessing. Score equals number right minus one-third number wrong.

**Number represents subjects. Subjects will maintain this assigned number in subsequent tables dealing with "Your Earning Power."

"Your Earning Power"

Table 20 presents the X scores of the five groups in rank order, and Table 21 shows the Y_1 scores of the same five groups.

Tate (20) suggests that Bartlett's Test of Homogeneity of Variance (20, pp. 486-490) be employed to test for the assumption that sampled populations with equal variance were normal. The scores in Table 20 were used for computation in the Chi Square test of the homogeneity of five variance estimates, and these are recorded in Table 22. The

TABLE 22

BARTLETT'S TEST OF THE HOMOGENEITY OF FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"

Group	Σx^2	df	$\frac{1}{n}$	Variance Estimate s^2	Log s^2	n Log s^2
A	1555.9	87	.0115	17.9	1.2529	109.0023
B	1517.0	87	.0115	17.4	1.2406	107.9322
C	1612.0	87	.0115	81.5	1.2672	110.2464
D	2122.3	87	.0115	24.4	1.3874	120.7038
E	1602.1	87	.0115	18.4	1.2648	110.0376
SUM	8409.3	435	.0575			557.9223

obtained x^2 of 2.97 for 4 degrees of freedom failed to reach significance at the .05 level of confidence, indicating that

the assumption of equality of population variances was sustained.

Figures 7 and 8 present the plotted data and lines of regression. Observation of the regression lines and of the scatter of the data about the lines indicated that the assumption of linearity of regression was tenable, but in an experiment such as the present study, an F test should be conducted to determine carefully this factor. An F value of -34.90 was obtained for 3 and 435 degrees of freedom, and since it was not significant at the .05 level of confidence, one may assume that linearity of regression exists.

Table 23 summarizes the analysis of variance and analysis of covariance. The obtained value of F, 15.75, revealed by the covariance analysis was statistically significant at the .01 level of confidence for 4 and 434 degrees of freedom. This significant value of F indicated that the differences between the means of the experimental groups on the Y_1 variable could not be accounted for by differences in mean level of initial ability as measured by the pretest (X) trial. The variance estimate had been reduced from 19.4 to 12.9, which indicated that the precision of the study had been increased through the analysis of covariance technique.

The significant F value indicated pronounced differences between the adjusted Y_1 means, but it did not reveal which means differed significantly from each other. Steps 7, 8, and 9 in Garrett's Analysis of Covariance (9) were

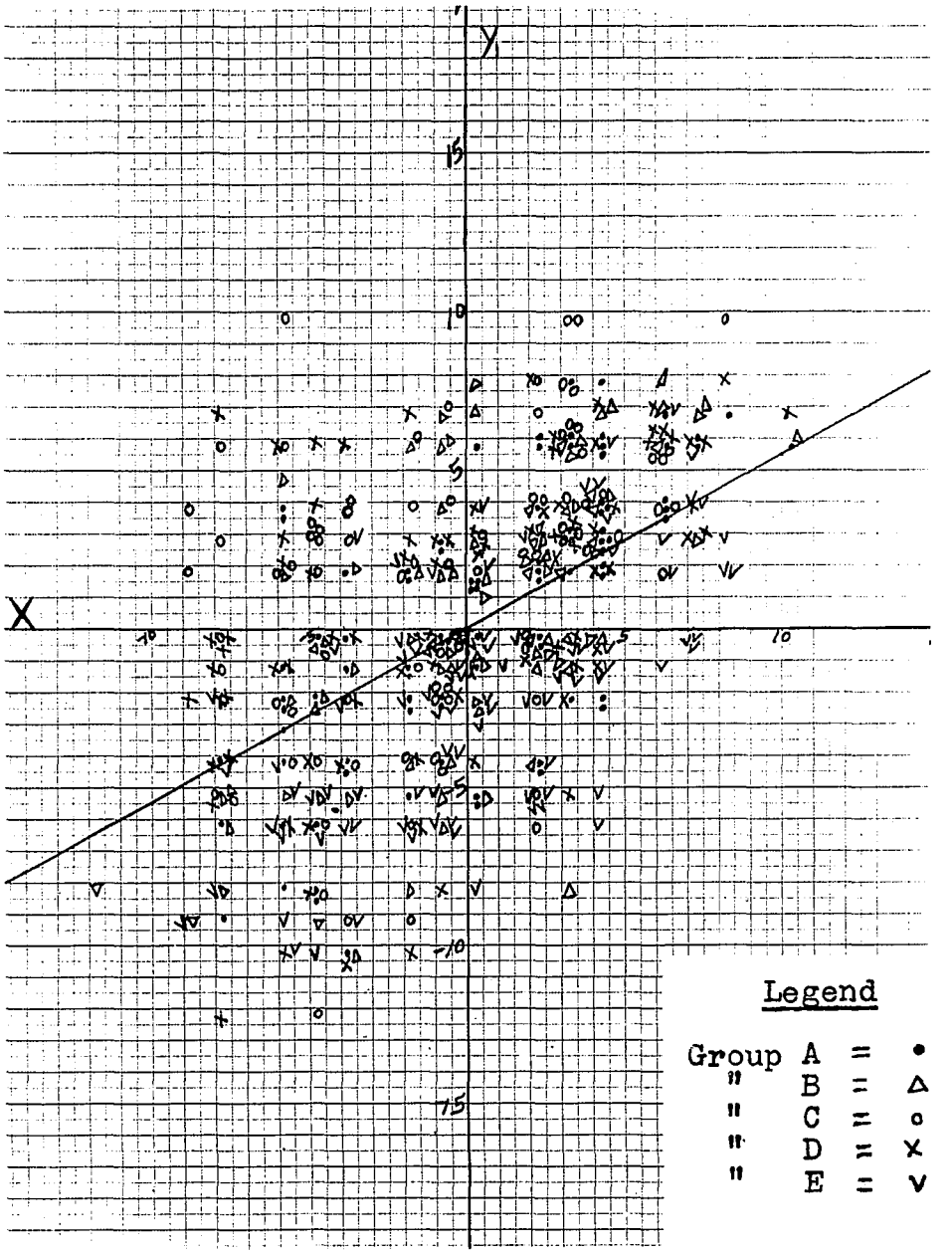

Figure 7. Deviations from total means and total line of regression of Y_1 on X scores made by five groups of eleventh and twelfth grade students on the test constructed from color and black and white guidance films entitled "Your Earning Power." (y' = .55x)

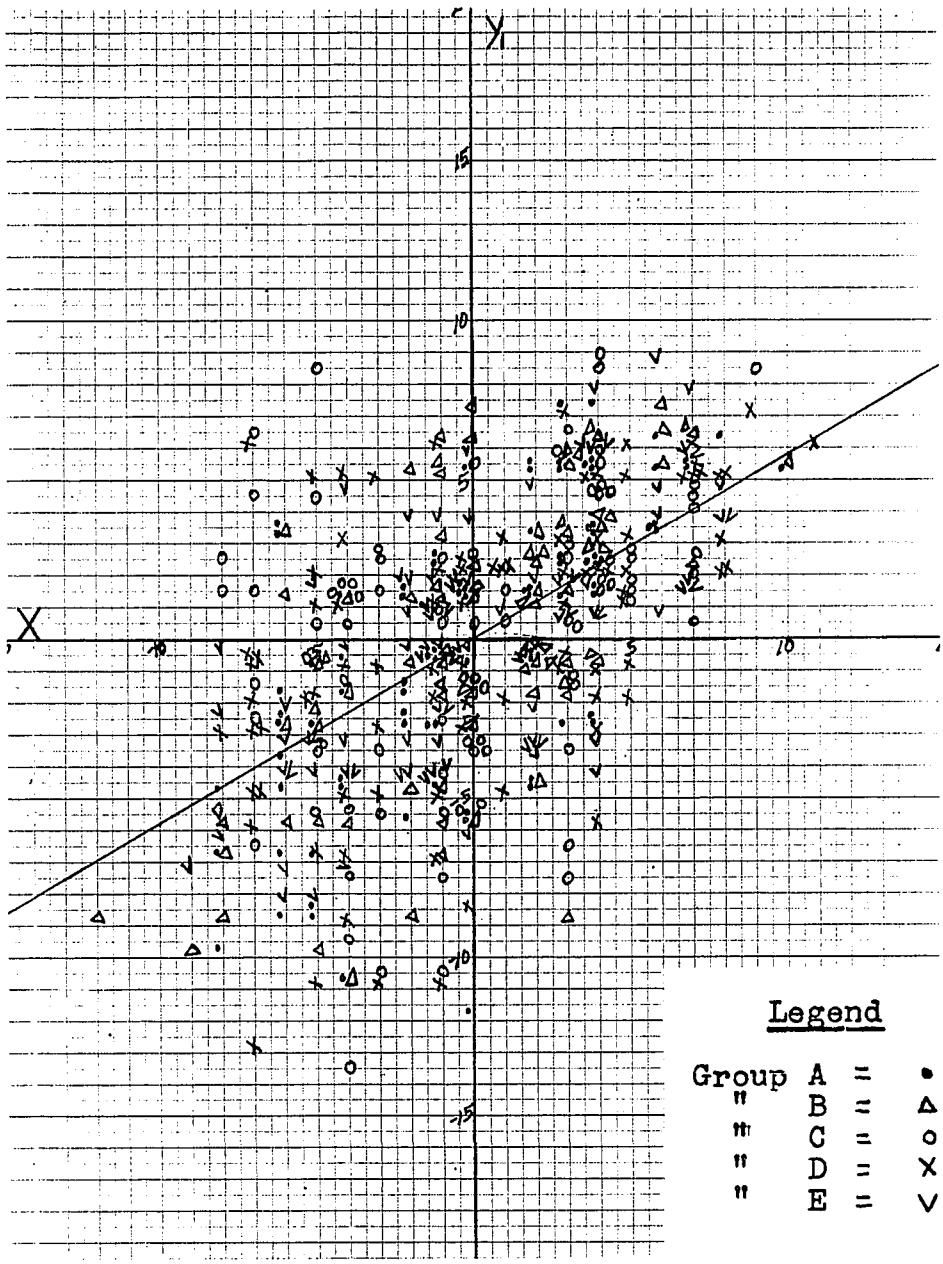

Figure 8. Deviations of Y_1 and X scores from group means and common within-group line of regression made by five groups of eleventh and twelfth grade students on the test constructed from color and black and white guidance films entitled "Your Earning Power." ($y' = .58x$)

TABLE 23

SUMMARY OF THE STATISTICAL ANALYSIS FOR SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER" (Group N = 88)

Source of Variation	Sum of Squares	df	Variance Estimate	F
Analysis of variance of pretest (X) scores				
Among groups	104.6	4	26.2	
Within groups	8536.5	435	19.6	1.34
TOTAL	8641.1	439		
Analysis of variance of posttest (Y_1) scores				
Among groups	602.9	4	150.7	
Within groups	8458.3	435	19.4	7.77*
TOTAL	9061.2	439		

Source of Variation	df	ΣX^2	ΣXY	ΣY^2
Sums of squares and cross-products				
Among groups	4			
Within groups	435	9959.4	6985.6	9256.3
TOTAL	439	10032.0	7027.4	10358.5

Source of Variation	Sum of Squares Residuals	df	Variance Estimates	F
Covariance analysis between X and Y_1 scores				
Among groups	812.7	4	203.2	
Within groups	5587.9	434	12.9	15.75*
TOTAL	6400.6	438		

*Significant beyond the .01 level of confidence.

employed as a model in order to find these differences. The adjusted Y-means were calculated and are presented in Table 24.

TABLE 24

ADJUSTED MEANS ON POSTTEST (Y_1) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"

Groups	N	$\bar{X}$	$\bar{Y}$	$\overline{Y \cdot X}$ (adjusted)
A	88	7.2	11.6	11.31
B	88	7.0	11.6	11.43
C	88	6.0	12.5	12.90
D	88	6.2	11.8	12.09
E	88	7.1	9.1	8.87
General Means		6.7	11.3	11.32

Following step 9, as presented by Garrett (9), it was found that the standard error of the difference between any two adjusted means was .54. For 434 degrees of freedom the difference required between the adjusted means of any two groups was 1.37 at the .01 level of confidence and 1.04 at the .05 level of confidence. These values were acquired by computing the general formula for finding t-values. Table 25 presents the magnitude of difference on the adjusted means between groups, taken two at a time.

TABLE 25

DIFFERENCES BETWEEN THE ADJUSTED MEANS ON POSTTEST (Y_1) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"

Groups*	Magnitude of Difference Between Groups Taken Two at a Time	Level of Significance .05	.01
A-B	.12	No	No
A-C	1.59	Yes	Yes
A-D	.78	No	No
A-E	2.44	Yes	Yes
B-C	1.47	Yes	Yes
B-D	.66	No	No
B-E	2.56	Yes	Yes
C-D	.81	No	No
C-E	4.03	Yes	Yes
D-E	3.22	Yes	Yes

*Group A -- Color film

Group B -- Color film and anticipatory remarks

Group C -- Black and white film

Group D -- Black and white film and anticipatory remarks

Group E -- Controls who received no film or verbal instruction

Reference to Tables 24 and 25 indicates that the adjusted means for groups A, B, C, and D were significantly higher than the adjusted mean for group E at the .01 level of confidence. Furthermore, group C had an adjusted mean that was significantly higher than the adjusted means for groups A and B at the .01 level of confidence. Differences in the adjusted means for groups A and B, A and D, B and D, and C and D did not differ significantly at the .01 or .05 level of confidence.

Analysis of Scores Made on the Tests for Retention of Facts From the Color and Black and White Guidance Films

In this section the variable Y_2 was considered to be the performance of the subjects under experimental conditions involving the retention of factual information presented six weeks before in the films. Seven weeks prior to obtaining the posttest (Y_2) measures, each subject was given a pretest (X) which, as previously indicated, measured the initial knowledge possessed by the students relative to the films at the beginning of the experiment. The results obtained from each of the four films will be reported as follows:

"Library Organization"

The pretest (X) scores of the five groups of subjects are recorded in Table 2, and the posttest (Y_2) scores are presented in Table 26. The numerical order in which the posttest (Y_2) scores appear depends upon the position of

TABLE 26

POSTTEST (Y_2) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"*

	GROUPS																
No.**	A	B	C	D	E	No.	A	B	C	D	E	No.	A	B	C	D	E
1.	14	7	9	18	17	31.	3	18	6	9	2	61.	11	6	10	3	3
2.	14	11	14	10	5	32.	5	7	11	10	9	62.	14	10	7	5	3
3.	11	22	17	13	9	33.	1	10	17	7	3	63.	7	6	5	6	2
4.	17	10	10	2	5	34.	9	10	10	7	1	64.	5	1	13	1	6
5.	10	9	10	7	6	35.	7	5	5	10	5	65.	11	11	11	9	5
6.	15	-1	17	6	13	36.	14	5	7	9	6	66.	3	14	9	7	5
7.	17	11	17	15	2	37.	14	2	11	9	6	67.	5	7	11	6	-2
8.	-1	5	7	11	6	38.	10	3	15	5	6	68.	-1	9	10	7	3
9.	10	14	15	17	9	39.	10	10	9	5	8	69.	11	7	7	11	2
10.	11	13	17	7	-2	40.	9	5	11	11	7	70.	5	5	11	10	6
11.	9	7	9	10	3	41.	7	7	7	11	10	71.	5	6	10	11	-6
12.	14	9	13	10	6	42.	7	2	9	11	3	72.	10	3	7	13	3
13.	13	11	15	10	5	43.	1	6	15	15	3	73.	6	13	5	3	7
14.	19	6	7	21	9	44.	1	9	7	6	3	74.	6	5	3	10	3
15.	-1	5	18	9	5	45.	9	3	10	14	3	75.	6	6	3	5	3
16.	18	17	9	10	9	46.	15	11	1	3	11	76.	2	9	1	6	3
17.	9	6	14	17	9	47.	11	11	9	10	3	77.	9	1	3	13	5
18.	3	10	6	10	3	48.	10	1	10	18	2	78.	6	-1	5	6	1
19.	5	5	14	11	5	49.	7	9	6	6	3	79.	6	1	3	6	2
20.	7	13	10	10	5	50.	7	10	5	6	-2	80.	2	6	15	2	1
21.	3	6	15	15	3	51.	13	7	7	3	3	81.	3	3	6	-1	2
22.	15	3	19	3	5	52.	14	7	3	9	2	82.	10	7	5	7	5
23.	6	10	10	5	10	53.	5	10	1	7	9	83.	2	5	14	5	2
24.	1	5	9	18	-1	54.	10	9	9	11	3	84.	9	13	10	5	-2
25.	19	10	11	13	9	55.	10	6	11	3	11	85.	9	6	7	10	3
26.	7	5	9	14	5	56.	11	11	9	7	9	86.	6	2	7	10	5
27.	9	9	7	17	3	57.	3	6	10	5	3	87.	6	-3	3	7	5
28.	10	3	14	11	5	58.	6	1	2	9	3	88.	3	5	3	3	-1
29.	5	1	11	15	5	59.	9	3	10	5	9						
30.	3	18	11	13	5	60.	7	3	11	5	1						

*Scores were determined by the use of a correction formula for guessing. Score equals number right minus one-third number wrong.

**Number represents subjects. Subjects have maintained this assigned number in all previous tables dealing with "Library Organization."

each subject's pretest (X) score.

Following Tate's (20) model for computing the analysis of covariance, one finds it necessary to calculate the analysis of variance on both the pretest (X) and the post-test (Y_2) scores. Tate (20) indicates that homogeneity of variance between groups of data must exist before analysis of variance can be computed. Bartlett's Test of Homogeneity of Variance (20, pp. 486-490) was employed for the scores in Table 2, and the data obtained in the Chi Square test of the homogeneity of five variance estimates are presented in Table 4. It will be remembered that homogeneity of variance existed.

Before beginning an analysis, it is advisable to plot the data, for both the total group and for each group, and to fit regression lines to the plotted data as has been done in Figures 9 and 10. Inspection of the regression lines and the dispersion of the data about the lines indicated that the assumption of linearity of regression was unsound; however, it was advisable to employ an F test to determine the exactness of this assumption. The obtained F value of 6.41 for 3 and 435 degrees of freedom was significant beyond the .01 level of confidence, thus indicating that the assumption was not supported. Tate (20) points out that when test data are nonlinear the comparability of the X and Y_2 units is particularly questionable.

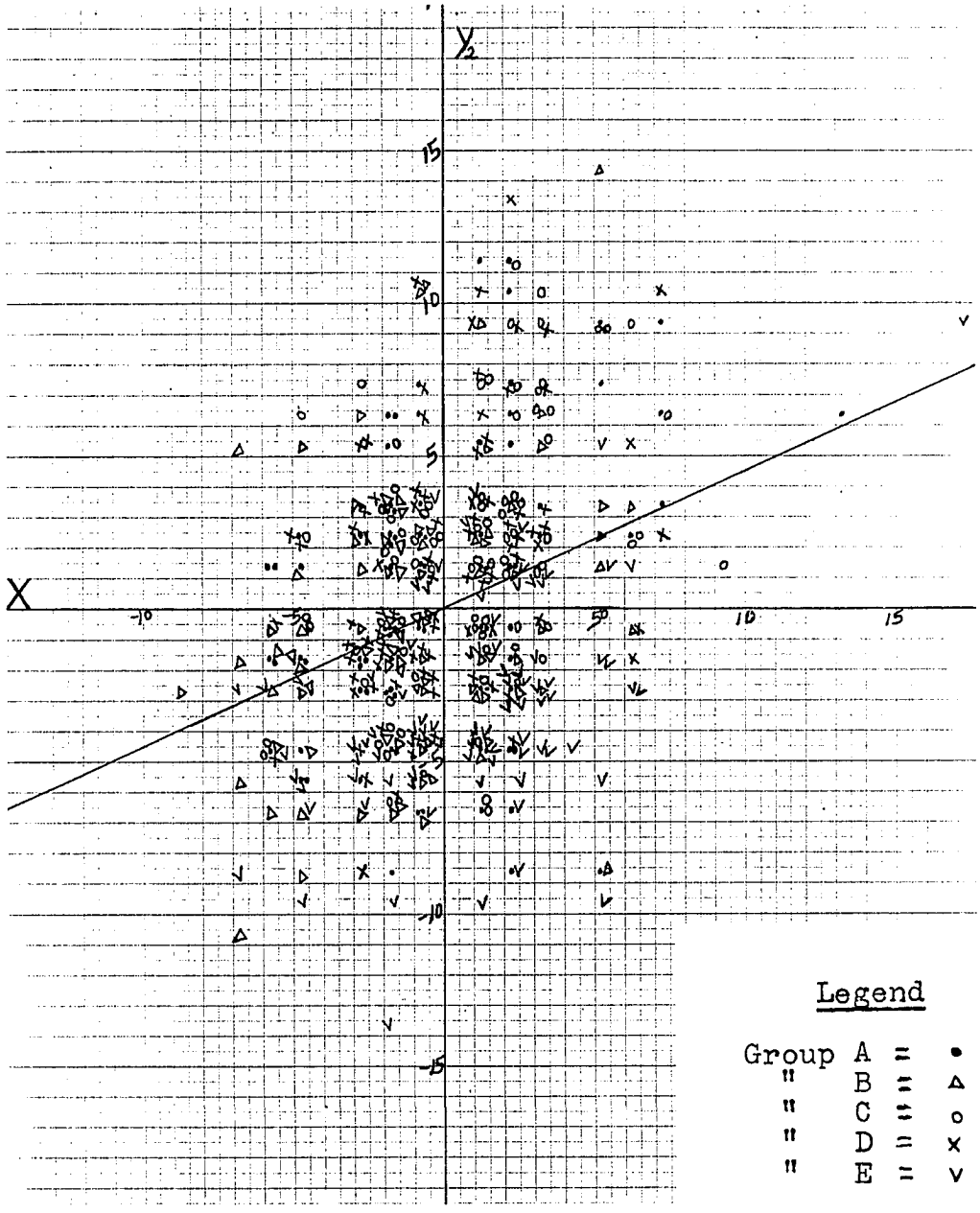

Figure 9. Deviations from total means and total line of regression of Y_2 on X scores made by five groups of eleventh and twelfth grade students on the test constructed from color and black and white guidance films entitled "Library Organization." ($y' = .45x$)

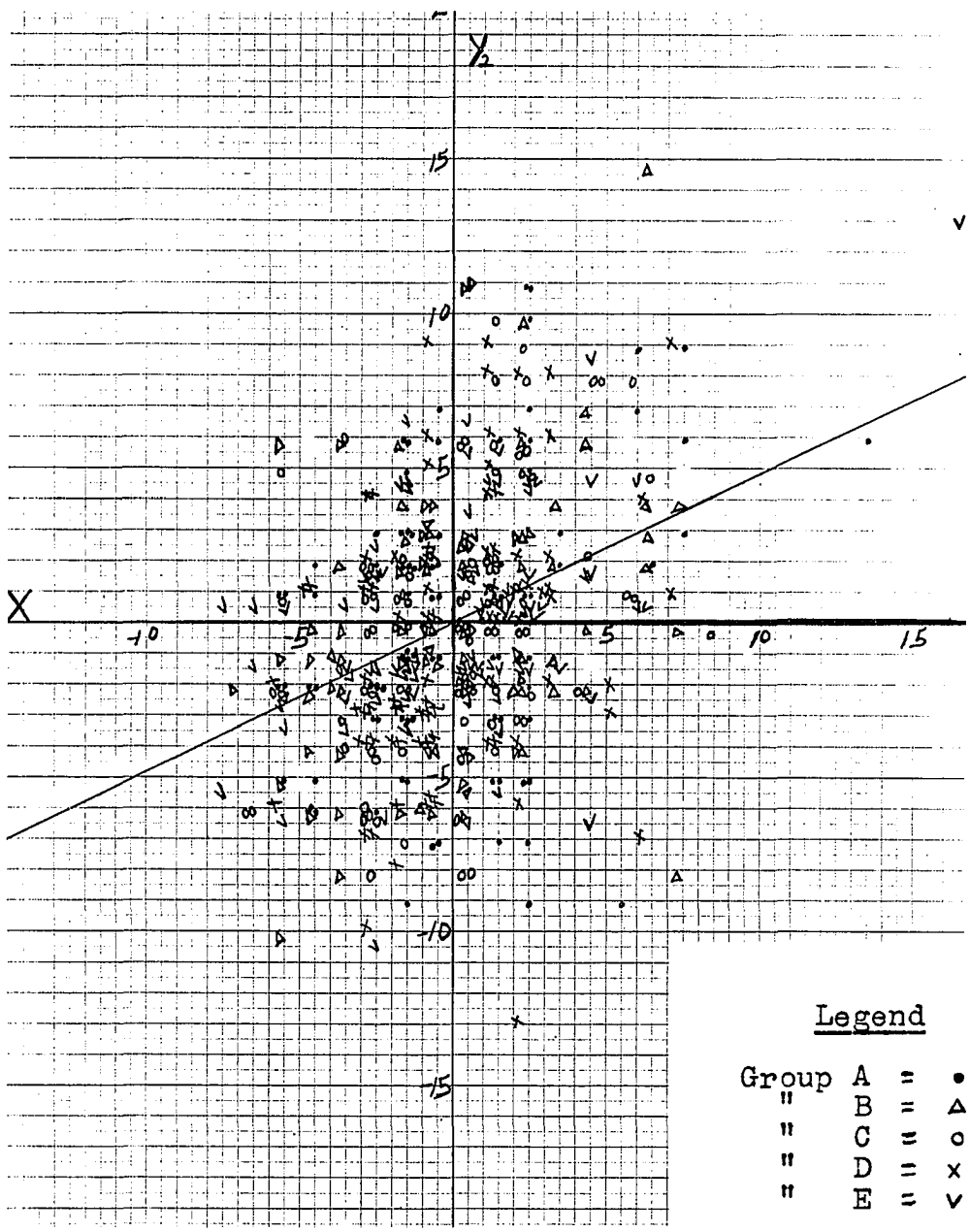

Figure 10. Deviations of Y_2 and X scores from group means and common within-group line of regression made by five groups of eleventh and twelfth grade students on the test constructed from color and black and white guidance films entitled "Library Organization." (y' = .48x)

Table 27 contains a summary of the analysis of variance and the analysis of covariance. The covariance analysis revealed an F value of 20.61, and from the table of F for 4 and 434 degrees of freedom this value was seen to be statistically significant beyond the .01 level of confidence. The differences among the final means were regarded as highly significant, independent of initial mean variances. The experimental treatments apparently resulted in real variations since the dissimilarities among the final posttest (Y_2) means of the five groups were not reasonably accounted for either by initial pretest (X) differences or by sampling fluctuations. One should observe that the precision of the experiment had been increased through the analysis of covariance technique inasmuch as the variance estimate had been reduced from 18.6 to 16.3.

The significant F value indicated pronounced variances between the adjusted Y_2 means, but it did not reveal which of the Y_2 means was significant. To determine this significance, Garrett's Analysis of Covariance (9), steps 7, 8, and 9, was followed. Table 28 presents a summary of the adjusted Y_2 means.

It was now necessary to calculate the standard error of the difference between any two adjusted means, and this value was found to be .61. The general formula for finding t-values was then employed, and it was discovered that the differences required between any two adjusted means was 1.20

TABLE 27

SUMMARY OF THE STATISTICAL ANALYSIS FOR SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION" (Group N = 88)

Source of Variation	Sum of Squares	df	Variance Estimate	F
Analysis of variance of pretest (X) scores				
Among groups	208.5	4	52.1	5.06*
Within groups	4476.3	435	10.3	
TOTAL	4684.8	439		
Analysis of variance of posttest (Y_2) scores				
Among groups	1280.7	4	320.2	17.22*
Within groups	8088.9	435	18.6	
TOTAL	9369.6	439		

Source of Variation	df	ΣX^2	ΣXY	ΣY^2
Sums of squares and cross-products				
Among groups	4			
Within groups	435	4476.3	2137.9	8088.9
TOTAL	439	4684.8	2118.4	9369.6

Source of Variation	Sum of Squares Residuals	df	Variance Estimates	F
Covariance analysis between X and Y_2 scores				
Among groups	1343.9	4	336.0	20.61*
Within groups	7067.8	434	16.3	
TOTAL	8411.7	438		

*Significant beyond the .01 level of confidence.

TABLE 28

ADJUSTED MEANS ON POSTTEST (Y_2) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"

Groups	N	$\bar{X}$	$\bar{Y}$	$\overline{Y \cdot X}$ (adjusted)
A	88	3.5	8.1	8.24
B	88	2.7	7.2	7.72
C	88	4.6	9.3	8.92
D	88	3.9	8.9	8.85
E	88	4.5	4.5	4.17
General Means		3.8	7.6	7.58

at the .05 level of confidence and 1.57 at the .01 level of confidence for 434 degrees of freedom. The magnitude of difference for the adjusted means between groups, taken two at a time, is recorded in Table 29.

Inspection of Tables 28 and 29 reveals that the adjusted means for groups A, B, C, and D were significantly greater than the adjusted mean for group E at the .01 level of confidence. One also finds significant differences between the adjusted means of groups B and C at the .05 level of confidence. Obviously this indicated that the adjusted mean for group C was significantly greater than the adjusted mean for group B. Apparently there were no

TABLE 29

DIFFERENCES BETWEEN THE ADJUSTED MEANS ON POSTTEST (Y_2) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"

Groups*	Magnitude of Difference Between Groups Taken Two at a Time	Level of Significance .05	.01
A-B	.52	No	No
A-C	.68	No	No
A-D	.61	No	No
A-E	4.07	Yes	Yes
B-C	1.20	Yes	No
B-D	1.13	No	No
B-E	3.55	Yes	Yes
C-D	.07	No	No
C-E	4.75	Yes	Yes
D-E	4.68	Yes	Yes

*Group A -- Color film

Group B -- Color film and anticipatory remarks

Group C -- Black and white film

Group D -- Black and white film and anticipatory remarks

Group E -- Controls who received no film or verbal instruction

significant differences between the adjusted means of groups A and B, A and C, A and D, B and D, or C and D.

"Heredity and Environment"

The X scores of the five groups of subjects are recorded in rank order in Table 8. Table 30 contains the scores of the same five groups of subjects under the experimental conditions Y_2, and for purposes of facilitating later calculations, the position of the scores in Table 8 corresponds directly with the position of the following Y_2 scores.

Bartlett's Test of Homogeneity of Variance (20, pp. 486-490) was computed for the data in Table 8 previously and the obtained Chi Square of 3.73 for 4 degrees of freedom failed to reach significance at the .05 level of confidence, indicating that the assumption of homogeneity of variance had not been contradicted. Table 10 contains the data which was necessary for the x^2 test of the homogeneity of five variance estimates.

In addition to the homogeneity of variance assumption, inspection of the regression lines and of the dispersion of the plotted data about the lines in Figures 11 and 12 shows that the assumption of linearity of regression was also plausible. However, for purposes of this study, it was requisite for one to determine this assumption by the F test. The obtained F value of -77.63 for 3 and 435 degrees of freedom was not significant at the .05 level of confidence,

TABLE 30

POSTTEST (Y_2) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"*

	GROUPS																
No.**	A	B	C	D	E	No.	A	B	C	D	E	No.	A	B	C	D	E
1.	17	15	21	21	19	31.	17	14	13	19	14	61.	10	14	14	14	7
2.	21	17	22	21	18	32.	14	17	9	15	14	62.	13	13	15	11	6
3.	18	17	21	15	22	33.	11	17	18	15	11	63.	5	11	13	15	5
4.	21	15	19	18	19	34.	15	19	19	9	11	64.	10	11	17	6	10
5.	18	17	17	19	17	35.	15	14	17	15	7	65.	6	14	7	10	5
6.	22	18	21	22	15	36.	14	14	17	15	9	66.	14	11	11	13	7
7.	17	19	22	21	17	37.	15	6	18	17	17	67.	17	14	10	10	6
8.	15	22	19	18	15	38.	13	13	10	13	14	68.	15	9	10	5	13
9.	14	18	21	19	17	39.	13	15	14	14	13	69.	10	5	11	13	10
10.	21	17	14	15	15	40.	10	15	19	18	17	70.	9	14	6	10	13
11.	14	21	19	17	17	41.	10	17	14	13	15	71.	10	5	7	9	9
12.	18	18	17	18	15	42.	11	15	13	13	13	72.	11	10	18	10	13
13.	18	13	17	19	15	43.	10	13	18	18	11	73.	10	5	6	10	3
14.	18	17	18	17	18	44.	17	17	17	10	10	74.	15	13	9	15	7
15.	22	11	19	22	19	45.	15	14	14	6	15	75.	13	2	15	5	11
16.	17	14	13	17	15	46.	13	13	9	11	11	76.	10	14	7	3	11
17.	17	13	18	19	18	47.	11	15	13	14	14	77.	1	13	9	3	6
18.	19	17	17	15	17	48.	7	14	11	7	17	78.	3	9	7	13	14
19.	21	14	22	11	14	49.	13	9	15	11	17	79.	11	13	9	11	3
20.	15	14	10	10	19	50.	17	11	18	11	15	80.	9	3	13	9	11
21.	17	17	21	18	11	51.	9	5	13	15	11	81.	7	6	7	3	10
22.	10	18	17	14	13	52.	14	15	13	18	13	82.	6	1	9	15	6
23.	13	5	17	18	10	53.	15	10	10	18	14	83.	14	1	9	13	1
24.	10	18	18	18	11	54.	10	14	10	9	15	84.	17	3	1	1	6
25.	15	13	18	21	9	55.	14	9	7	10	15	85.	3	5	2	9	2
26.	14	18	18	13	15	56.	11	17	17	10	15	86.	1	1	9	6	1
27.	15	17	13	14	14	57.	14	11	14	7	10	87.	1	3	7	7	2
28.	14	19	15	18	18	58.	14	13	19	14	13	88.	2	1	10	-6	-2
29.	14	14	14	14	13	59.	9	13	14	15	10						
30.	17	15	21	18	11	60.	10	15	10	15	7						

*Scores were determined by the use of a correction formula for guessing. Score equals number right minus one-third number wrong.

**Number represents subjects. Subjects have maintained this assigned number in all previous tables dealing with "Heredity and Environment."

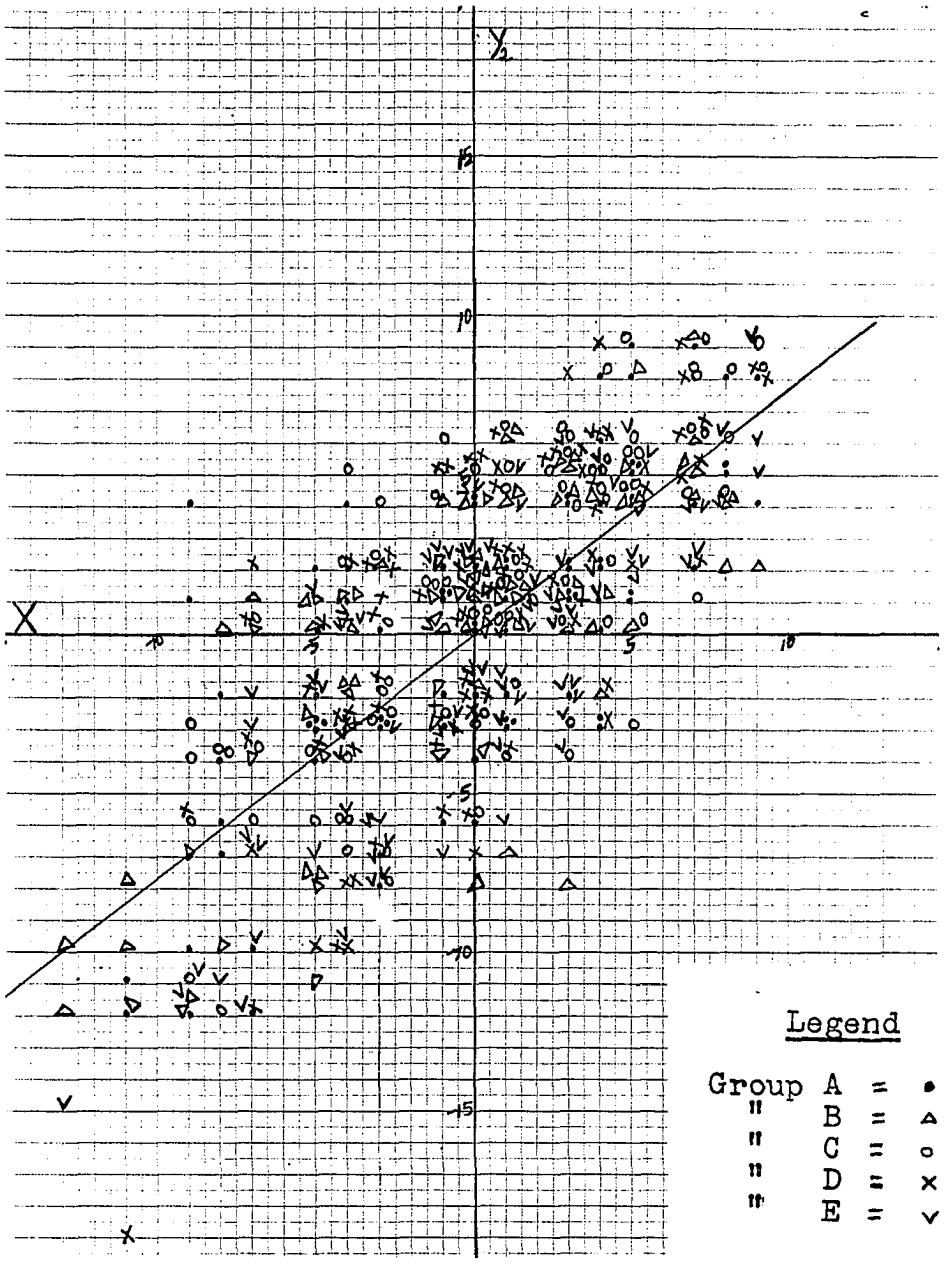

Figure 11. Deviations from total means and total line of regression of Y_2 on X scores made by five groups of eleventh and twelfth grade students on the test constructed from color and black and white guidance films entitled "Heredity and Environment." ($y' = .77x$)

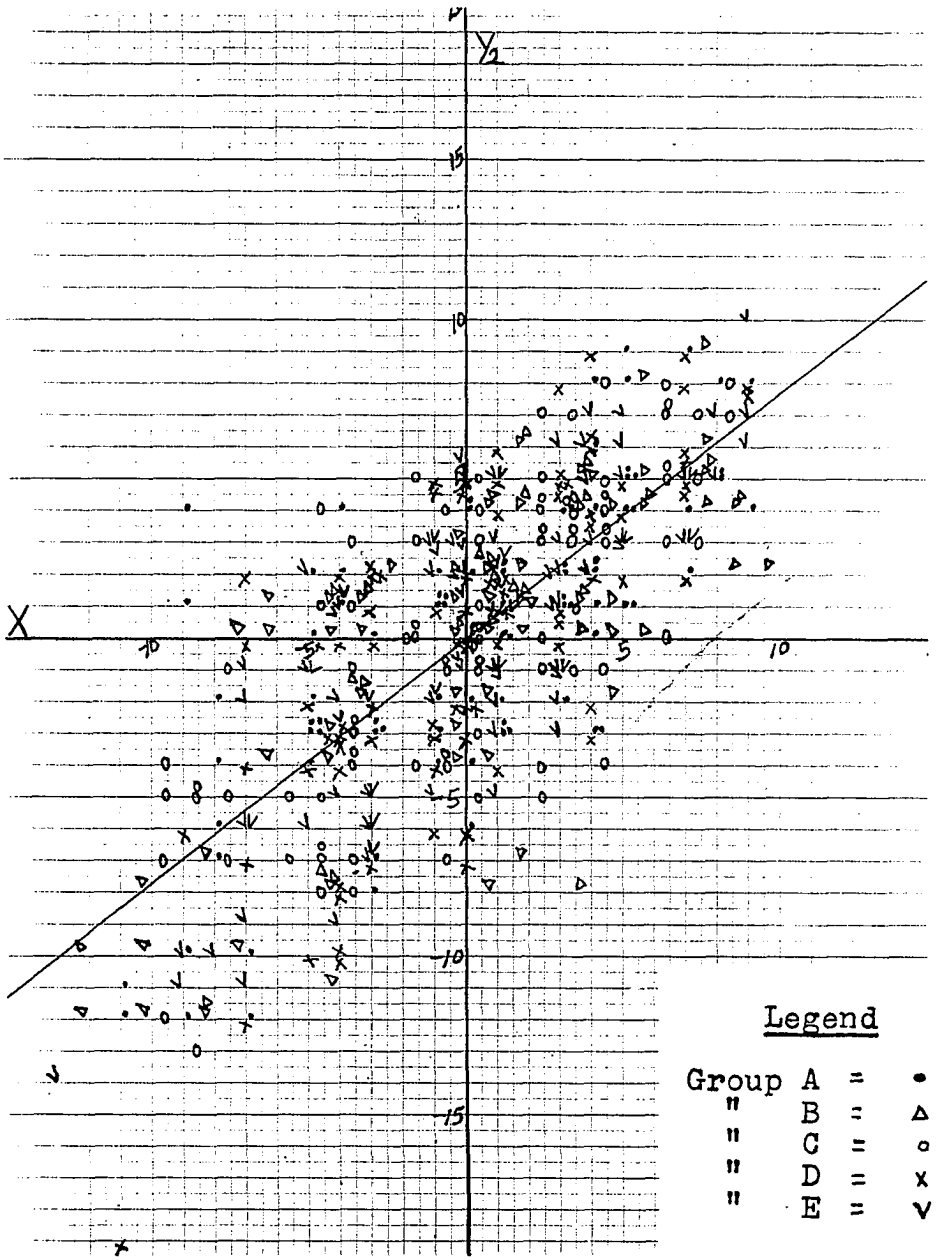

Figure 12. Deviations of Y_2 and X scores from group means and common within-group line of regression made by five groups of eleventh and twelfth grade students on the test constructed from color and black and white guidance films entitled "Heredity and Environment." ($y' = .77x$)

thereby indicating that the assumption of linearity of regression was satisfied.

Table 31 presents a summary of the analysis of variance and the analysis of covariance. The value of F obtained from the covariance analysis was 3.08 and was based upon 4 and 434 degrees of freedom. One may see from the table of F that this value was statistically significant beyond the .05 level of confidence. This indicated that the differences between the means of the experimental groups on the Y_2 variable could not be accounted for by differences in mean level of initial ability as measured by X, the pretest trial. The covariance analysis had increased the precision of the study, as indicated by the reduction of the variance estimate from 24.8 to 11.2.

The significant F value pointed out pronounced differences between the adjusted Y_2 means, but it did not reveal which of the means differed significantly from the other. In order to find these differences, steps 7, 8, and 9 in Garrett's Analysis of Covariance (9) were employed. Table 32 presents the adjusted Y-means, which will be tested for differences by the t-test.

Following step 9, as presented by Garrett (9), it was found that the standard error of the difference between any two adjusted means was .50. For 434 degrees of freedom the difference required between the adjusted means of any two groups was .98 at the .05 level of confidence and 1.29 at

TABLE 31

SUMMARY OF THE STATISTICAL ANALYSIS FOR SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT" (Group N = 88)

Source of Variation	Sum of Squares	df	Variance Estimate	F
Analysis of variance of pretest (X) scores				
Among groups	72.6	4	18.2	
Within groups	9959.4	435	22.9	.79
TOTAL	10032.0	439		
Analysis of variance of posttest (Y_2) scores				
Among groups	198.1	4	49.5	
Within groups	10791.8	435	24.8	2.00
TOTAL	10989.9	439		

Source of Variation	df	ΣX^2	ΣXY	ΣY^2
Sums of squares and cross-products				
Among groups	4			
Within groups	435	9959.4	7678.4	10791.8
TOTAL	439	10032.0	7745.3	10989.9

Source of Variation	Sum of Squares Residuals	df	Variance Estimates	F
Covariance analysis between X and Y_2 scores				
Among groups	138.1	4	34.5	
Within groups	4872.0	434	11.2	3.08*
TOTAL	5010.1	438		

*Significant beyond the .05 level of confidence.

TABLE 32

ADJUSTED MEANS ON POSTTEST (Y_2) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"

Groups	N	$\bar{X}$	$\bar{Y}$	$\overline{Y \cdot X}$ (adjusted)
A	88	9.9	12.9	12.98
B	88	9.4	12.6	13.06
C	88	10.6	14.0	13.54
D	88	10.0	13.2	13.20
E	88	10.1	11.9	11.82
General Means		10.0	12.9	12.92

the .01 level of confidence. The obtained values were acquired by computing the general formula for finding t-values. Table 33 presents the magnitude of difference on the adjusted means between groups, taken two at a time.

It is clear by reference to Tables 32 and 33 that the adjusted means for groups C and D were significantly higher than the adjusted mean for group E at the .01 level of confidence. Furthermore, groups A and B had adjusted means that were significantly higher than the adjusted mean for group E at the .05 level of confidence. The adjusted means of A and B, A and C, A and D, B and C, B and D, and C and D did not have differences between them at the .01 or

TABLE 33

DIFFERENCES BETWEEN THE ADJUSTED MEANS ON POSTTEST (Y_2) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"

Groups*	Magnitude of Difference Between Groups Taken Two at a Time	Level of Significance .05	Level of Significance .01
A-B	.08	No	No
A-C	.56	No	No
A-D	.22	No	No
A-E	1.16	Yes	No
B-C	.48	No	No
B-D	.14	No	No
B-E	1.24	Yes	No
C-D	.34	No	No
C-E	1.72	Yes	Yes
D-E	1.38	Yes	Yes

*Group A -- Color film

Group B -- Color film and anticipatory remarks

Group C -- Black and white film

Group D -- Black and white film and anticipatory remarks

Group E -- Controls who received no film or verbal instruction

.05 level of confidence.

"Choosing Your Occupation"

Table 14 contains the X scores of the five groups of students, listed in a numerical sequence starting with the topmost score and progressing through to the lowest. The scores of the same five groups of subjects are recorded in Table 34, and these represent the measure obtained under the experimental conditions Y_2. The position of each score listed in the Tables 14 and 34 corresponds in the same manner as previously described for the preceding tables.

It will be remembered that Bartlett's Test of Homogeneity of Variance (20, pp. 486-490) was computed for the data in Table 14. The obtained x^2 of 1.02 for 4 degrees of freedom failed to reach significance at the .05 level of confidence, thus indicating that the homogeneity of variance assumption had been satisfied. Table 16 presented the data necessary for the x^2 test of the homogeneity of five variance estimates.

Figures 13 and 14 embody the lines of regression and the dispersion of the plotted data about the lines, and an inspection of them helped determine that the requisite assumption of linearity of regression was feasible. However, an F test was made to give an exact interpretation of this assumption, and the obtained value of F, -88.30, for 3 and 435 degrees of freedom failed to reach significance at the

TABLE 34

POSTTEST (Y_2) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION"*

No.	GROUPS					No.						No.					
	A	B	C	D	E		A	B	C	D	E		A	B	C	D	E
1.	19	17	17	21	19	31.	17	17	19	14	14	61.	11	17	11	2	17
2.	21	21	19	19	19	32.	17	18	17	17	18	62.	9	15	15	11	9
3.	19	22	18	19	17	33.	14	17	19	13	15	63.	15	10	13	10	14
4.	17	18	19	17	17	34.	13	15	19	10	19	64.	14	6	11	10	14
5.	21	15	18	21	18	35.	14	6	17	10	17	65.	18	10	7	13	15
6.	21	17	18	18	18	36.	15	9	15	9	6	66.	3	15	3	14	3
7.	21	19	18	18	14	37.	17	13	17	14	14	67.	10	14	13	11	10
8.	17	17	18	21	18	38.	11	17	14	17	13	68.	7	7	15	10	6
9.	18	17	19	22	17	39.	10	13	18	13	17	69.	14	6	11	10	13
10.	21	18	17	22	18	40.	14	15	15	17	17	70.	3	6	6	11	11
11.	19	19	15	17	19	41.	17	14	17	15	19	71.	9	7	11	7	7
12.	17	15	18	21	19	42.	17	19	13	17	11	72.	13	14	13	7	7
13.	19	11	18	19	19	43.	9	10	14	11	13	73.	3	5	3	6	11
14.	19	14	21	18	18	44.	17	13	13	11	11	74.	13	6	7	3	7
15.	18	14	18	15	15	45.	14	13	17	15	17	75.	11	11	9	3	9
16.	18	17	15	21	17	46.	13	14	14	5	17	76.	6	5	2	7	5
17.	18	11	18	17	18	47.	7	11	10	7	17	77.	14	10	5	15	2
18.	17	18	19	15	17	48.	13	7	15	17	18	78.	1	9	3	10	11
19.	11	10	15	18	14	49.	14	10	17	14	13	79.	2	15	7	5	6
20.	14	15	18	14	17	50.	10	13	14	13	10	80.	6	11	10	7	13
21.	18	13	17	9	11	51.	11	10	14	9	11	81.	1	3	3	3	10
22.	13	22	15	21	19	52.	13	15	14	13	9	82.	9	5	7	6	6
23.	22	15	15	19	17	53.	14	14	13	7	11	83.	2	3	1	-2	-1
24.	18	17	19	15	14	54.	15	6	13	10	15	84.	6	1	7	3	10
25.	18	18	15	18	14	55.	10	15	6	9	5	85.	2	-1	3	9	7
26.	15	17	15	15	14	56.	14	14	7	14	13	86.	1	6	2	7	7
27.	15	10	19	15	19	57.	13	11	9	10	11	87.	6	5	-1	5	3
28.	14	13	14	14	17	58.	7	10	15	11	6	88.	5	-1	-2	5	2
29.	19	17	15	11	14	59.	7	6	17	6	3						
30.	17	11	19	14	11	60.	13	15	11	6	15						

*Scores were determined by the use of a correction formula for guessing. Score equals number right minus one-third number wrong.

**Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with "Choosing Your Occupation."

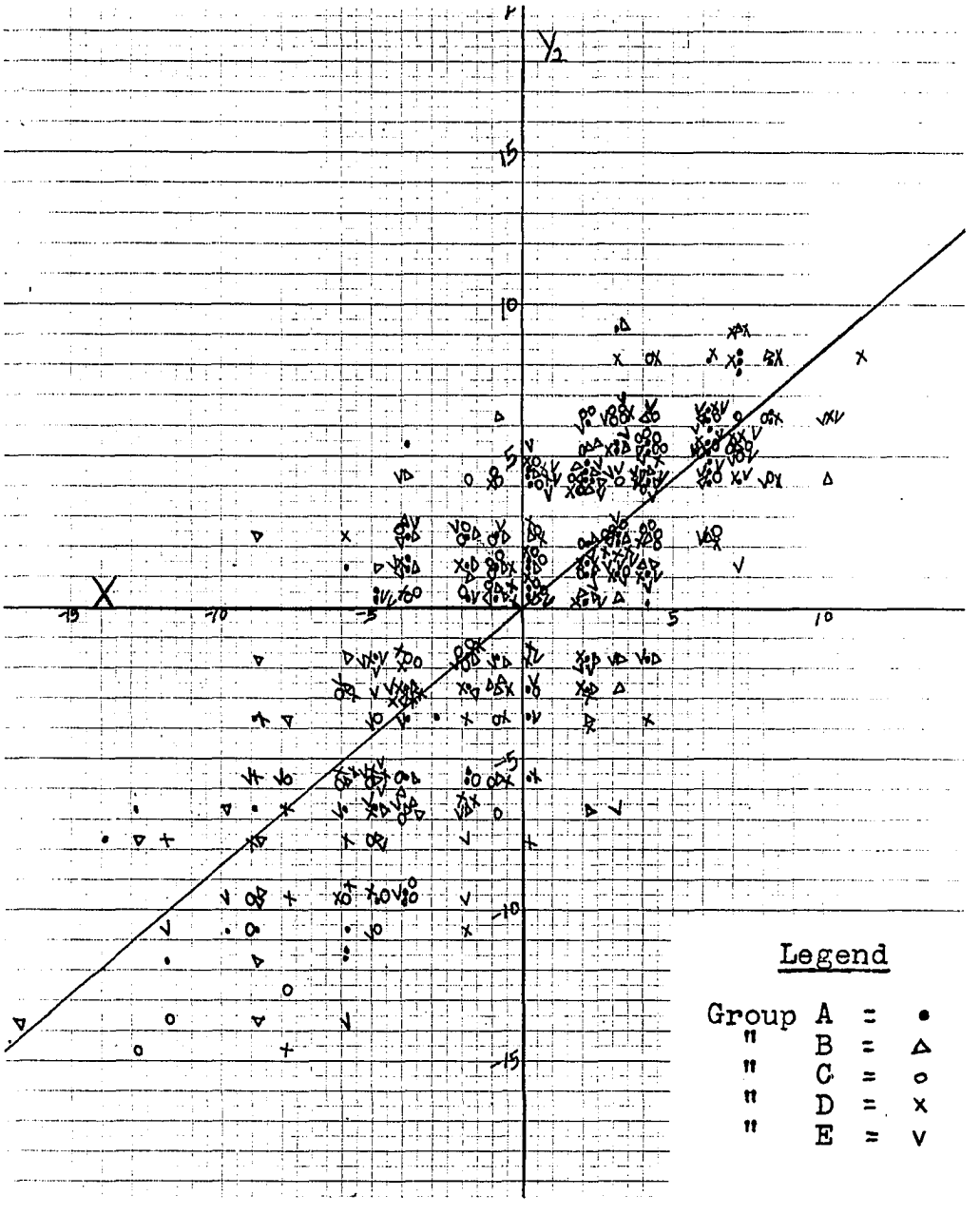

Figure 13. Deviations from total means and total line of regression of Y_2 on X scores made by five groups of eleventh and twelfth grade students on the test constructed from color and black and white guidance films entitled "Choosing Your Occupation." ($y' = .85x$)

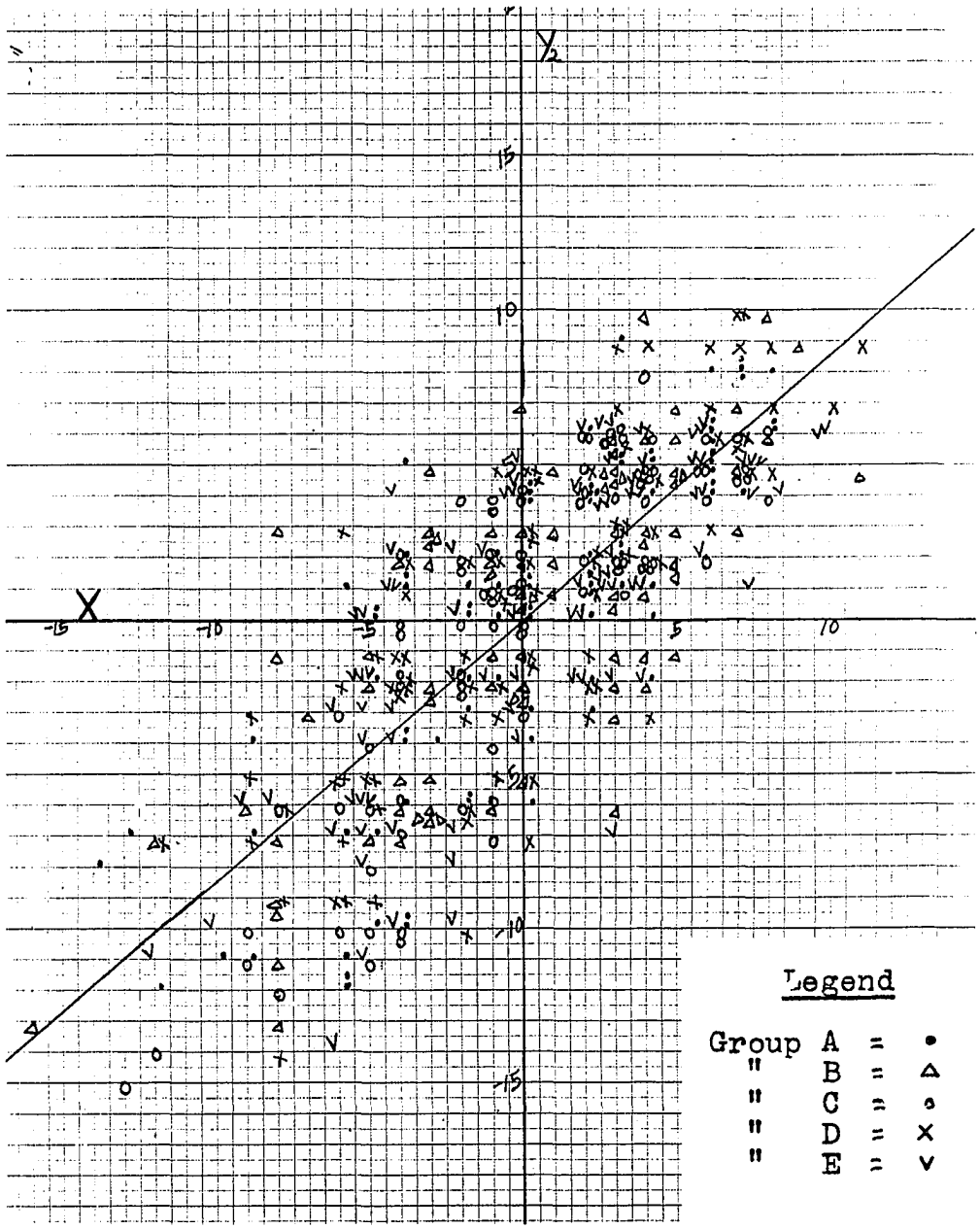

Figure 14. Deviations of Y_2 and X scores from group means and common within-group line of regression made by five groups of eleventh and twelfth grade students on the test constructed from color and black and white guidance films entitled "Choosing Your Occupation." ($y' = .85x$)

.05 level of confidence. Therefore the assumption of linearity of regression was not contradicted.

The analysis of variance and the analysis of covariance are summarized in Table 35. The obtained value of F, .82, was based on 4 and 434 degrees of freedom, and from the table of F one finds that this falls short of the value 5.63 required for a statistically significant difference at the .05 level of confidence. It can be concluded, therefore, that the differences between the means of the experimental groups on the Y_2 variable were only chance differences and not significant in any rigorous sense. The reduction of the variance estimate from 28.5 to 11.2 pointed out that the precision of the study had been increased through the covariance analysis technique.

Since the adjusted means of the experimental groups failed to yield statistically significant differences, it was unnecessary to apply the t-test.

"Your Earning Power"

The X scores of the five groups of subjects are recorded in Table 20, according to rank order numerical value. The scores of the same five groups of students for the experimental conditions Y_2 are presented in Table 36, with the position of each score corresponding directly to that of the scores in Table 20.

As an initial step in computing the covariance analysis, Tate (20, suggests that an analysis of variance be

TABLE 35

SUMMARY OF THE STATISTICAL ANALYSIS FOR SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION" (Group N = 88)

Source of Variation	Sum of Squares	df	Variance Estimate	F
Analysis of variance of pretest (X) scores				
Among groups	77.9	4	19.5	
Within groups	10443.3	435	24.0	.81
TOTAL	10521.2	439		
Analysis of variance of posttest (Y_2) scores				
Among groups	47.5	4	11.9	
Within groups	12416.0	435	28.5	.42
TOTAL	12463.5	439		

Source of Variation	df	ΣX^2	ΣXY	ΣY^2
Sums of squares and cross-products				
Among groups	4			
Within groups	435	10443.3	8892.1	12416.0
TOTAL	439	10521.2	8931.6	12463.5

Source of Variation	Sum of Squares Residuals	df	Variance Estimates	F
Covariance analysis between X and Y_2 scores				
Among groups	36.6	4	9.2	
Within groups	4844.7	434	11.2	.82
TOTAL	4881.3	438		

TABLE 36

POSTTEST (Y_2) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"

No.**	GROUPS					No.						No.					
	A	B	C	D	E		A	B	C	D	E		A	B	C	D	E
1.	18	15	18	14	15	31.	5	14	11	10	7	61.	2	11	14	6	7
2.	15	10	14	18	11	32.	9	11	11	10	13	62.	5	7	3	2	7
3.	17	18	17	13	15	33.	15	15	6	11	14	63.	10	11	7	7	11
4.	14	15	14	17	11	34.	9	11	9	3	14	64.	7	7	17	17	10
5.	15	14	17	17	17	35.	9	13	9	10	9	65.	7	2	13	-1	10
6.	15	15	19	15	18	36.	14	7	6	10	10	66.	7	3	11	6	1
7.	17	18	13	6	11	37.	9	9	9	15	15	67.	14	6	6	10	7
8.	15	15	11	13	15	38.	14	11	11	10	17	68.	6	2	10	-1	14
9.	13	10	15	15	10	39.	11	13	3	7	9	69.	-2	6	9	1	2
10.	15	11	11	17	5	40.	10	10	11	6	14	70.	7	5	-1	10	-2
11.	18	9	15	18	10	41.	10	10	9	7	13	71.	3	9	-1	13	-3
12.	13	15	10	13	13	42.	7	15	11	7	7	72.	7	7	5	3	2
13.	14	13	13	17	14	43.	9	9	9	14	7	73.	7	10	1	5	7
14.	15	14	13	13	14	44.	9	11	7	15	10	74.	6	15	7	2	7
15.	10	10	17	14	13	45.	11	11	7	5	13	75.	5	2	14	9	5
16.	14	10	17	7	14	46.	7	11	5	7	8	76.	-5	5	7	-1	5
17.	14	3	18	13	21	47.	13	11	10	3	11	77.	17	2	14	7	5
18.	14	15	14	10	14	48.	10	11	9	7	5	78.	11	2	5	9	11
19.	13	17	14	15	11	49.	10	6	9	6	10	79.	5	9	6	15	-1
20.	10	14	10	13	5	50.	10	11	14	9	15	80.	9	13	10	6	3
21.	15	11	11	10	13	51.	14	15	11	13	6	81.	5	11	19	9	6
22.	10	17	13	10	13	52.	5	10	7	5	7	82.	5	3	5	9	6
23.	13	11	18	17	13	53.	10	11	9	13	3	83.	1	10	5	10	3
24.	11	14	11	15	7	54.	9	9	14	9	10	84.	1	7	9	5	1
25.	13	3	15	13	9	55.	11	13	10	3	6	85.	6	6	-1	11	2
26.	14	3	15	17	10	56.	7	11	1	7	7	86.	1	6	9	6	6
27.	13	11	13	15	6	57.	9	9	13	7	11	87.	2	-2	13	3	10
28.	13	13	6	13	11	58.	9	6	11	15	6	88.	5	-1	10	2	1
29.	17	7	10	6	10	59.	11	11	13	13	2						
30.	5	15	13	7	14	60.	9	5	14	3	3						

*Scores were determined by the use of a correction formula for guessing. Score equals number right minus one-third number wrong.

**Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with "Your Earning Power"

carried out separately for both pretest and posttest scores. Since homogeneity of variance must exist before this is calculated, Bartlett's Test of Homogeneity of Variance was previously employed for the scores in Table 20. Table 22 presented the data obtained in the Chi Square test of the homogeneity of five variance estimates, and an x^2 of 2.97 for 4 degrees of freedom was revealed, which failed to reach significance at the .05 level of confidence, thus indicating that the requisite assumption of homogeneity of variance had been satisfied.

Data was plotted, both for total groups and for each group, and regression lines fitted to the plotted data as in Figures 15 and 16. Inspection of the regression lines and the dispersion of the data about the lines indicated that the assumption of linearity of regression was reasonably satisfied. In order to be certain of this assumption, an F test was administered and an F value of -52.57 obtained for 3 and 435 degrees of freedom, which indicated that the assumption of linearity of regression was not contradicted since it failed to reach significance at the .05 level of confidence.

Table 37 summarizes the analysis of variance and covariance analysis of the pretest (X) and posttest (Y_2) scores. For 4 and 434 degrees of freedom the obtained value of F was 4.38 and was statistically significant beyond the .01 level of confidence. The differences among the final means were regarded as highly significant, independent of initial mean

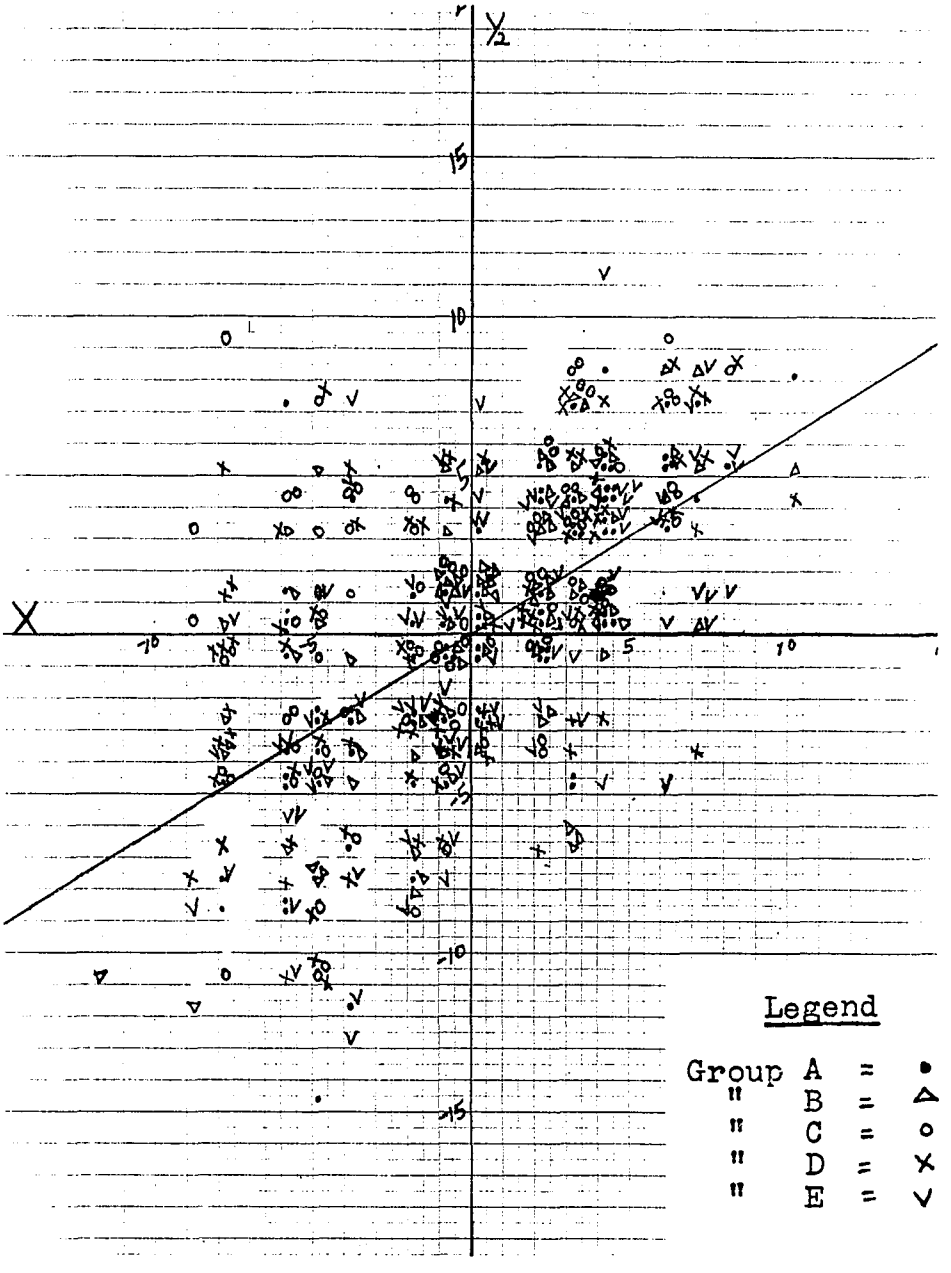

Figure 15. Deviations from total means and total line of regression of Y_2 on X scores made by five groups of eleventh and twelfth grade students on the test constructed from color and black and white guidance films entitled "Your Earning Power." ($y' = .62x$)

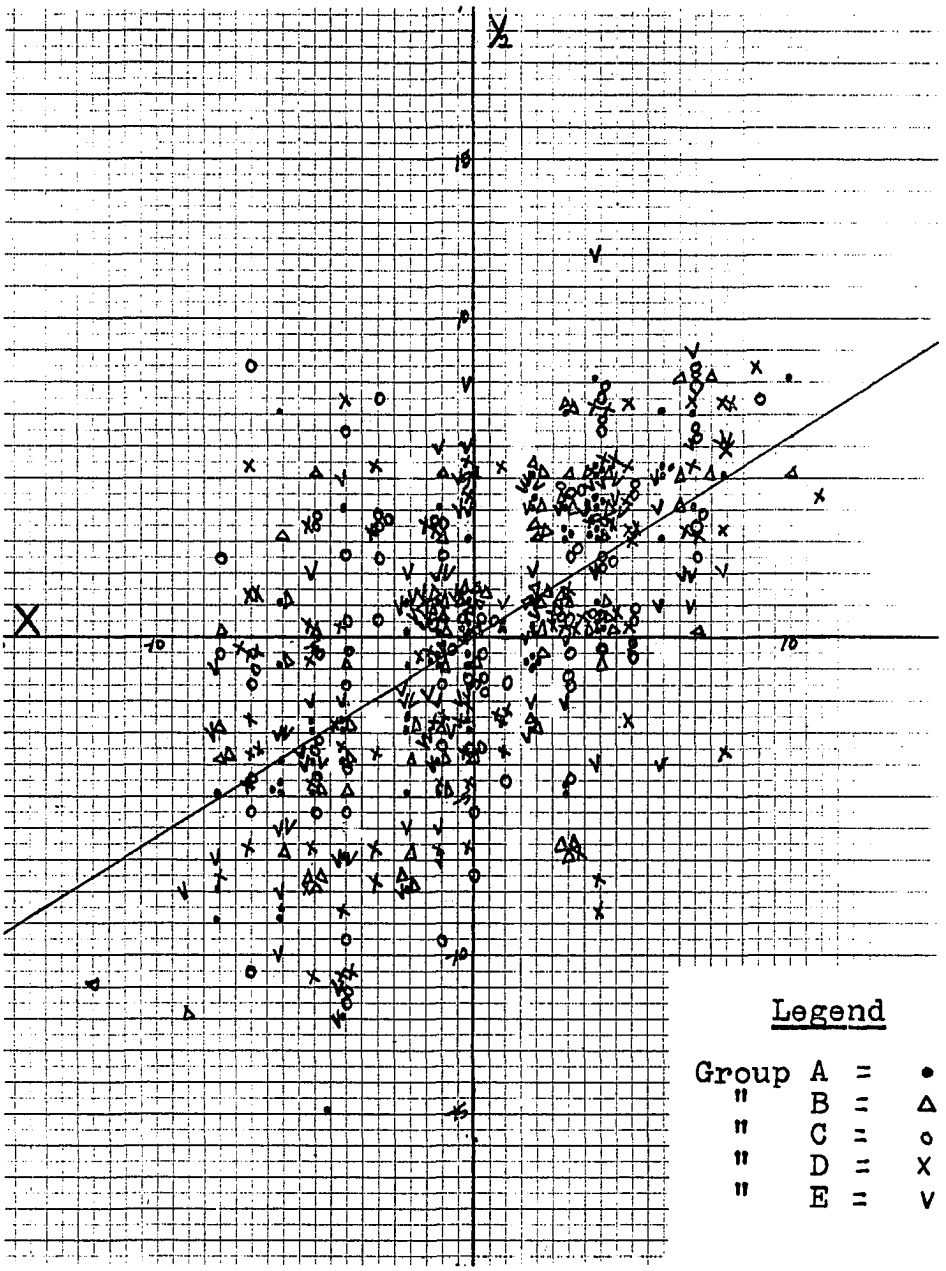

Figure 16. Deviations of Y_2 and X scores from group means and common within-group line of regression made by five groups of eleventh and twelfth grade students on the test constructed from color and black and white guidance films entitled "Your Earning Power." ($y' = .63x$)

TABLE 37

SUMMARY OF THE STATISTICAL ANALYSIS FOR SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER" (Group N = 88)

Source of Variation	Sum of Squares	df	Variance Estimate	F
Analysis of variance of pretest (X) scores				
Among groups	104.6	4	26.2	
Within groups	8536.5	435	19.6	1.34
TOTAL	8641.1	439		
Analysis of variance of posttest (Y_2) scores				
Among groups	101.8	4	25.5	
Within groups	8815.0	435	20.3	1.26
TOTAL	8916.8	439		

Source of Variation	df	ΣX^2	ΣXY	ΣY^2
Sums of squares and cross-products				
Among groups	4			
Within groups	435	8536.5	5387.9	8815.0
TOTAL	439	8641.1	5326.6	8916.8

Source of Variation	Sum of Squares Residuals	df	Variance Estimates	F
Covariance analysis between X and Y_2 scores				
Among groups	218.9	4	54.7	
Within groups	5414.4	434	12.5	4.38*
TOTAL	5633.3	438		

*Significant beyond the .01 level of confidence.

variations. The dissimilarities among the final posttest (Y_2) means of the five groups were not reasonably accounted for either by initial pretest (X) differences or by sampling fluctuations. One should also observe that the precision of the experiment had been increased through the analysis of covariance technique, by the reduction of the variance estimate from 20.3 to 12.5.

The significant F value indicated pronounced variances between the adjusted Y_2 means, but it did not reveal which of the Y_2 means was significant. In order to determine the above significance, Garrett's Analysis of Covariance (9), steps 7, 8, and 9, was employed as in the previous analyses. The adjusted Y_2 means are recorded in Table 38.

TABLE 38

ADJUSTED MEANS ON POSTTEST (Y_2) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"

Groups	N	$\bar{X}$	$\bar{Y}$	$\overline{Y \cdot X}$ (adjusted)
A	88	7.2	9.8	9.48
B	88	7.0	9.8	9.61
C	88	6.0	10.5	10.94
D	88	6.2	9.6	9.92
E	88	7.1	9.0	8.75
General Means		6.7	9.7	9.74

Following step 9 in Garrett's (9) text, the standard error of the difference between any two adjusted means was found to be .53. Table 39 presents the magnitude of difference on the adjusted means between groups, taken two at a time.

TABLE 39

DIFFERENCES BETWEEN THE ADJUSTED MEANS ON POSTTEST (Y_2) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"

Groups*	Magnitude of Difference Between Groups Taken Two at a Time	Level of Significance .05	Level of Significance .01
A-B	.13	No	No
A-C	1.46	Yes	Yes
A-D	.44	No	No
A-E	.73	No	No
B-C	1.33	Yes	No
B-D	.31	No	No
B-E	.86	No	No
C-D	1.02	No	No
C-E	2.19	Yes	Yes
D-E	1.17	Yes	No

*Group A -- Color film

Group B -- Color film and anticipatory remarks

Group C -- Black and white film

Group D -- Black and white film and anticipatory remarks

Group E -- Controls who received no film or verbal instruction

After computing the general formula for finding t-values, the difference required between any two adjusted means was found to be 1.04 at the .05 level of confidence and 1.37 at the .01 level of confidence for 434 degrees of freedom.

It may be seen by reference to Tables 38 and 39 that the adjusted mean for group C was significantly higher than the adjusted means for groups A and E at the .01 level of confidence. It is also obvious that the adjusted mean for group C was significantly higher than the adjusted mean for group B at the .05 level of confidence. Furthermore, the adjusted mean for group D was significantly greater than that for group E at the .05 level of confidence.

CHAPTER V

INTERPRETATION OF THE QUANTITATIVE ANALYSIS

Acquisition

This section of the study will discuss the significant differences found between the five groups of students as revealed by application of the covariance analysis for the pretest (X) and the posttest (Y_1) scores.

Tables 5, 11, 17, and 23[1] presented F values that were significant beyond the .01 level of confidence, which indicated that differences in the adjusted group means on the posttest (Y_1) variables could not be accounted for by variations in initial ability as measured by the pretest (X) trial. Although it was known by the obtained F values that significant differences were present, it was not known if one or more of the five groups was contributing to this fact. By referring to Tables 6, 12, 18, and 24[2], which presented the adjusted means for the (X) and (Y_1) scores, it was possible to evaluate the differences between the two kinds of

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[1] Tables are presented on pages 34, 44, 54, and 63, respectively.

[2] Tables are presented on pages 36, 45, 55, and 64, respectively.

film presentations as they were related to acquisition of facts from each of the four sets of film. The level of significance for the differences between groups receiving the various treatments can be inspected in Tables 7, 13, 19, and 25.[1]

The results obtained from each of the four films will be interpreted individually and reported as follows:

"Library Organization"

After careful consideration of the information in Table 7, it was seen that group A (who received instruction from color film), group B (who received instruction from color film after "anticipatory" remarks were read), group C (who received instruction from black and white film), and group D (who received instruction from black and white film after "anticipatory" remarks were read) had adjusted means that were significantly different at the .01 level of confidence from the adjusted mean of group E (the control group who received no formal instruction). Further inspection of Table 7 revealed no additional significant differences.

By referring to Table 6, one will find groups A, B, C, and D to have greater adjusted mean scores than group E. This information, combined with the significant differences presented in Table 7, prompted the writer to conclude that film instruction, employed with, and without, "anticipatory"

[1]Tables are presented on pages 37, 46, 56, and 65, respectively.

remarks, was reliably superior to no instruction. However, these results are questionable since the assumption of linearity of regression was found to be unsound.

"Heredity and Environment"

The information in Table 13 indicated that groups A, B, C, and D had adjusted means that were significantly different from the adjusted mean of group E, a significance existing beyond the .01 level of confidence. In addition, the adjusted means of groups A, C, and D were significantly different beyond the .01 level of confidence from the adjusted mean of group B. Table 13 revealed no other statistically significant differences.

Reference to Table 12 revealed that groups A, B, C, and D had greater adjusted mean scores than group E. This information, combined with the significant differences presented in Table 13, made plausible the conclusion that film instruction, employed with, and without, "anticipatory" remarks, was reliably superior to incidental learning. In addition, the adjusted means of groups A, C, and D were greater than the adjusted mean for group B. This occurrence, plus the information in Table 13, indicated that groups A, C, and D acquired, or learned significantly more than did group B.

"Choosing Your Occupation"

Upon careful examination of the information in Table 19, it was seen that groups A, B, and C had adjusted means

that were significantly different from the adjusted mean of group E. This significance may be accepted beyond the .01 level of confidence. Moreover, the adjusted mean of group C differed significantly from the adjusted mean of group D. This significance exceeded the .01 level of confidence. Table 19 revealed no other significant differences.

Inspection of Table 18 revealed that groups A, B, and C had higher adjusted mean scores than group E. This information, combined with the significant differences presented in Table 19, led one to conclude that color film instruction used with, and without, "anticipatory" remarks and black and white film used without "anticipatory" remarks were significantly superior to no formal instruction. The adjusted mean for group C was also higher than the adjusted mean for group D. This finding indicated that black and white film instruction used without "anticipatory" remarks was significantly superior to the same type of film instruction preceded by "anticipatory" remarks.

"Your Earning Power"

The information in Table 25 indicated that groups A, B, C, and D had adjusted means that were significantly different from the adjusted mean of group E. This significance may be accepted beyond the .01 level of confidence. In addition, the adjusted mean of group C was significantly different from the adjusted means of groups A and B, and this significance exceeded the .01 level of confidence. Table 25 revealed

no other statistically significant differences.

Reference to Table 24 revealed that groups A, B, C, and D had greater adjusted mean scores than group E. This information, combined with the significant differences revealed in Table 25, made plausible the conclusion that film instruction, employed with, and without, "anticipatory" remarks, was reliably superior to the treatment received by the control group. Furthermore, the adjusted mean of group C was greater than the adjusted means for groups A and B. This implied that black and white film instruction employed without "anticipatory" remarks was significantly superior to color film used with, and without, "anticipatory" remarks.

Retention

The significant differences found between the five groups of subjects on tests for retention of facts as revealed by application of the covariance analysis for pretest (X) and posttest (Y_2) scores will be discussed in this section.

The F values in Tables 27 and 37[1] were significant beyond the .01 level of confidence, in Table 31[1], significant beyond the .05 level, and in Table 35[1], there was no significance. The significant findings indicated that the differences in the means of the groups on the Y_2 variables could not be accounted for by variations in initial ability as measured by the pretest trial. Although it was known by the

[1]Tables are presented on pages 72, 93, 80, and 88, respectively.

obtained F values that significant differences were present, it was not known if one or more of the five groups was contributing to this fact. By referring to Tables 28, 32, and 38[1], which presented the adjusted means for the X and Y_2 scores, it was possible to evaluate the differences between the two kinds of film presentations as they were related to retention of facts from each of the four sets of film. The significance of the differences between groups receiving the various treatments can be seen in Tables 29, 33, and 39[2]. The Y_2 scores obtained 7 weeks after the pretest and 6 weeks after Y_1 may be accepted as indices of retention of facts presented by the four sets of film.

The results obtained from each of the four films will be interpreted individually and reported as follows:

"Library Organization"

It was evident from Table 29 that groups A, B, C, and D had adjusted means which were significantly different from the adjusted mean of group E. This significance may be accepted beyond the .01 level of confidence. In addition, the adjusted means of groups B and C differed significantly at the .05 level of confidence. No other variances between the adjusted means were significant.

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[1]Tables are presented on pages 73, 81, and 94, respectively.

[2]Tables are presented on pages 74, 82, and 95, respectively.

Table 28 indicated that groups A, B, C, and D had higher adjusted mean scores for retention of facts than group E. This denoted that film instruction, employed with, and without, "anticipatory" remarks, was reliably superior to no instruction. Referring to Table 28 again, it was seen that group C had the highest adjusted mean score for retention of facts. This occurrence, combined with the information contained in Table 29, seemed to indicate that group C significantly retained more facts presented by the film than did group B. However, it should be remembered that the assumption of linearity of regression was not satisfied; therefore, these results are particularly questionable.

"Heredity and Environment"

Observation of the information in Table 33 showed that groups A and B had adjusted means that were significantly different from the adjusted mean of group E; furthermore, this significance may be accepted beyond the .05 level of confidence. Moreover, Table 33 indicated that groups C and D had adjusted means that were significantly different at the .01 level of confidence from the adjusted mean of group E. No other statistically significant differences were revealed by Table 33.

Reference to Table 32 indicated that groups A and B at the .05 level of confidence, had higher adjusted mean scores than group E. In addition, groups C and D, at the .01 level of confidence, had adjusted mean scores higher

than that of group E. These occurrences, plus the information in Table 33, indicated that film instruction, with, and without, "anticipatory" remarks, was significantly superior to the treatment received by group E.

"Choosing Your Occupation"

Table 35 revealed an F value that was not significant. Therefore, the null hypothesis regarding the absence of significant differences between the four experimental groups and the control group on the measure for retention of facts was not contradicted for this film showing.

"Your Earning Power"

Careful examination of the information in Table 39 revealed that groups C and D had adjusted means that were significantly different from the adjusted mean of group E. The adjusted mean of group C was significantly different at the .01 level of confidence, whereas group D had an adjusted mean which was significantly different at the .05 level of confidence. In addition to these results, it was seen that group C had an adjusted mean which differed significantly from the adjusted mean of groups A and B. Group A differed at the .01 level of confidence, and group B differed at the .05 level of confidence. It will be remembered that group C received instruction from black and white film and group A received instruction from color film, but group B received instruction from color film after "anticipatory" remarks were read to them. No other significant differences were revealed

by Table 39.

Inspection of Table 38 revealed that groups C and D had higher adjusted mean scores than group E. This information, combined with the significant differences presented in Table 39, moved one to conclude that black and white film, employed with, and without, "anticipatory" remarks, was significantly superior to group E. Other findings revealed by Table 38 were as follows: Group C had an adjusted mean score which was higher than groups A and B; therefore, these findings indicated that black and white film instruction used without "anticipatory" remarks was significantly superior to color film instruction employed with, or without, "anticipatory" remarks.

Summary of the Discussion

By way of summary, it was concluded that film instruction was significantly superior to the treatment received by the control group -- no formal instruction. Not only did this apply to immediate acquisition, but also for retention of facts. Table 40 presents a summary of the significant findings.

A close inspection of the results indicated that on the "Library Organization" test, groups A, B, C, and D were significantly superior to only the controls, group E. It should be borne in mind that this result was questionable since linearity of regression was unsound. On the test over

TABLE 40

SUMMARY OF THE SIGNIFICANT FINDINGS ON POSTTEST (Y_1) AND POSTTEST (Y_2) SCORES MADE BY FIVE GROUPS OF ELEVENTH AND TWELFTH GRADE STUDENTS ON THE TESTS CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE GUIDANCE FILMS

Name of Film	Test (r)	Group	(Y_1) Superior to	Group	Group	(Y_2) Superior to	Group
Library Organization[1]	.79	A	**	E	A	**	E
		B	**	E	B	**	E
		C	**	E	C	**	E
		D	**	E	D	**	E
					C	*	B
Heredity and Environment	.97	A	**	E	A	*	E
		B	**	E	B	*	E
		C	**	E	C	**	E
		D	**	E	D	**	E
		A	**	B			
		C	**	B			
		D	**	B			
Choosing Your Occupation	.96	A	**	E	No significant differences existed for these experimental treatments.		
		B	**	E			
		C	**	E			
		C	**	D			
Your Earning Power	.95	A	**	E			
		B	**	E			
		C	**	E	C	**	E
		D	**	E	D	*	E
		C	**	A	C	**	A
		C	**	B	C	*	B

**Significant at the .01 level of confidence.
*Significant at the .05 level of confidence.
[1]Linearity of regression, an underlying assumption, was not supported. Therefore, the results for this film were particularly questionable.

"Heredity and Environment," groups A, C, and D were significantly superior to groups B and E. Furthermore, group B was significantly superior to group E. On the test constructed from "Choosing Your Occupation," groups A, B, and C were significantly superior to group E. Moreover, group C was significantly superior to group D. On the test constructed from "Your Earning Power," groups A, B, C, and D were significantly superior to group E. In addition, group C was significantly superior to groups A and B. In general, these findings indicated that group C performed with greater proficiency on the tests for acquisition of facts than any other group. However, these results did not indicate any unanimous superiority for group C over any one particular group except group E, the control group. The results obtained during this investigation did suggest, though, that black and white film contributed more to immediate learning than color film and that film contributed more to immediate learning when "anticipatory" remarks were not read to the audience.

After careful consideration of the information derived from the tests for retention of facts, similar conclusions were made to those advanced in the preceding paragraph. On the "Library Organization" test for retention, groups A, B, C, and D were again significantly superior to group E. Furthermore, group C was now significantly superior to group B, but linearity of regression was not tenable; these results, therefore, were particularly questionable.

Groups A, B, C, and D were again significantly superior to group E on the test constructed from "Heredity and Environment." No significant differences existed on the "Choosing Your Occupation" test results. On the test constructed from "Your Earning Power," group C was significantly superior to groups A, B, and E. Furthermore, group D was significantly superior to group E. In general, these results did not indicate any unanimous superiority for group C over any one particular group, except group E, the control group. The results suggested, however, that black and white film contributed more to retention of facts than did color film and that film contributed more to retention of facts when "anticipatory" remarks were not read to the audience; but these suggestions, of course, were limited to this particular experiment.

Comparative Evaluation with Previous Research

The preceding comments alone would not be in themselves an adequate discussion of this experiment, since a relative evaluation between this study and previous investigations would be lacking. Therefore a comparative evaluation will be presented, involving those studies relevant to the present investigation. Variations, insofar as they can be determined, will be resolved.

This study, while not agreeing unanimously with VanderMeer's (28) study, did agree with some of the suggestions he felt were implied by the findings of his study.

VanderMeer (28, p. 14) wrote the following comments which serve as a "point of departure" in making an evaluative comparison of the two studies.

> It seems clear that while color . . . appeared to be an important cue, it was not a crucial cue, indispensable for learning. Other equally relevant cues appear to have contributed to learning to such an extent that in some cases color added little, if anything. Black and white films may be as good as color films in communicating visual learning cues related to texture, light and dark contrast, shape and size, as well as the purely verbal cues found in the commentary. The presence of color may, in fact, operate to reduce the effectiveness of some of these cues by distracting the learner; the absence of color in black and white film may operate to increase the effectiveness of such cues by requiring more attention on the part of the learner to such cues as texture, contrast, shape and verbal descriptions.

A number of possible explanations for the superiority of black and white guidance films over the same color films may be advanced as follows: The factual information was presented by means of a narrator who commented upon the visual presentation. Test items employed in this study were selected because the visual presentation was reinforced by a verbal description. There was an indication that the presence of color seemed to have distracted from the commentary. Therefore, it is suggested that color was not, in these films, an important cue. In fact, it appeared that the absence of color in black and white guidance films operated to increase the learning. VanderMeer (28) states that the value of color in film was related more to retention of learning than to immediate acquisition. However, color was not superior to black and white film on measures for retention of facts in the

present study. In fact, for films such as the ones employed, black and white film appeared to have been significantly superior to color film on both measures for acquisition and those for retention of facts. That the present study does not find color to be superior should not be altogether surprising, since VanderMeer (28, p. 2) selected films for use in his study "because they appeared to make effective use of color for emphasis or because color was intrinsic to much of the subject matter being taught." No such attempt was made in the present investigation. Possibly VanderMeer (28) succeeded in selecting films in which color was a crucial cue.

MacLean's (35) findings indicated that colored slides and flat pictures were superior to those that were uncolored but these results were not statistically significant. Therefore he stated that it was not necessarily advantageous to use color. He felt that the particular nature or purpose of the instructional situation would largely determine whether color should be employed. The present study suggests that color may not be as crucially important to guidance instruction as it might possibly be for the lessons in geography, anatomy, and physiology with which MacLean (34, 44) experimented. This may account for the differences existing between the two studies. Moreover, the fact that one study dealt with still pictures whereas the other was concerned with motion pictures may be responsible, since color superiority may be due to the slower rate of development used in the actual

presentation of the still pictures, thus enabling the audience to study more closely contrasts, depth, and detail -- factors which MacLean (35) believed color could achieve to a better advantage than black and white.

The results of the present experiment agreed to a limited degree with Long's (43) findings. For instance, on tests for acquisition of facts at the eleventh grade level, similar results were found favoring black and white films over color films. However, this investigation did not agree with his significant results favoring color at the twelfth grade on tests for acquisition or with his findings significantly favoring color for both grade levels on the retention check. At the time his research was being carried on, Long (43, p. 68) implied that a "great deal of incidental learning was probably due to the current emphasis on South American countries," since his films centered around the theme, Good Neighbor Policy. This being so, the results may not independently measure the effect of film instruction. Furthermore, the black and white film groups were considered as controls rather than groups not receiving film or verbal instruction; thus it may be that such lack of consideration for the nature of control groups would make "realistic" comparisons between these studies impracticable since a "great deal of incidental learning" was possible.

"Anticipatory" remarks were employed in the present experiment for the purpose of determining what benefit, if

any, would be derived from briefly explaining to students what they might expect to see during the film presentation and what value this information might be to them. They also were told that they were going to be tested over the film after its presentation; however, this was of no significance since the groups not receiving this treatment knew even without being told that they were to be tested afterwards, too. The "anticipatory" remarks employed in this study did not attempt to approach what normally might be considered a properly employed film introduction. This should be kept in mind while reading the evaluative comparisons made between this study's findings and similar research.

Reference to Wittich and Fowlkes (22) and Hovland, Lumsdaine, and Sheffield (10) will indicate the value of using film introductions. The failure of "anticipatory" remarks to approach the effectiveness of film introductions properly employed probably lies in the lack of proper motivation and student-teacher planning of film purposes prior to film presentation. A study by Sturmthal and Curtis (37) revealed anticipation to be of value to film instruction if the anticipation approached a core of personal reference and importance. It may have been that students who heard the anticipatory remarks, failed to attach enough importance or personal reference to desire learning what the films would teach. Sturmthal and Curtis (37) found this to be true in their study. The anticipation factor was also studied by Dysinger

and Ruckmick (7). It is suggested that anticipation, as employed in the present study, appeared to serve as a deterrent to the development of interest. Students may have been told on many occasions by teachers that some specific information would be of value to them if they learned it, only to discover later that it hadn't been of value. Thus, when the "anticipatory" remarks were read to them, their responsiveness decreased or was entirely lacking. Dysinger and Ruckmick (7) found this to be in evidence in their study of anticipation.

By way of summary, it is concluded that when the results were interpreted, this investigation indicated that greater gains in learning and retaining factual information from guidance films were obtained by viewing black and white guidance films. The addition of color to the film presentations did not, in this experiment, add significantly to either immediate learning or retention of facts.

In the present study, "anticipatory" remarks did not add to the effectiveness of the guidance films. The groups who did not hear "anticipatory" remarks acquired and retained factual information from the films better than did the groups who heard "anticipatory" remarks.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The value of black and white film instruction to students has been repeatedly demonstrated by research workers and classroom teachers. However, the question of whether color film instruction is superior to black and white film instruction has not been adequately answered by either research or practice. This experiment was carried out to obtain empirical information concerning the comparative effect of color and black and white film instruction, as related to acquisition and retention of facts when employed with, and without, "anticipatory" remarks.

The purposes of the study were: (1) To determine the effect of guidance instruction upon acquisition and retention of facts when presented by color and by black and white film; (2) to determine the effect of "anticipatory" remarks upon acquisition and retention of facts when utilized in conjunction with color and with black and white guidance film; (3) to compare the results of color and black and white guidance film instruction, as related to acquisition and retention of facts; and (4) to compare the effect of "anticipatory" remarks upon

acquisition and retention of facts when employed with color and with black and white guidance film instruction.

Five groups were used in this experimental study: Group A (who received instruction from color guidance films), group B (who received instruction from color guidance films and were read "anticipatory" remarks), group C (who received instruction from black and white guidance films), group D (who received instruction from black and white guidance films and were read "anticipatory" remarks), and group E (the control group who received no formal instruction).

The 551 participating subjects were eleventh and twelfth grade students from Clinton, Elk City, Hydro, and Weatherford high schools, all located in southwestern Oklahoma. The students within any one school, where either color or black and white films were presented, were assigned to their different groups by the use of a table of random numbers. Instructors from the experimental schools who normally taught the students helped administer the tests to them. One week prior to the film presentations, a pretest (X) was given to each group. Each experimental group was then given guidance instruction via the proper films. Following each film presentation, each subject was given a posttest (Y_1) to determine the amount of immediate learning that had taken place due to the different experimental conditions. Six weeks later, each subject was given a posttest (Y_2) to ascertain the amount of learning that had been retained.

The null hypotheses to be tested were: (1) There is no significant difference between the experimental and control groups for immediate learning from either the color or the black and white guidance films; (2) there is no significant difference between the experimental and control groups in the retention of facts from either the color or the black and white guidance films; (3) there is no significant difference between the experimental and control groups relative to immediate learning or retention of learning from either color or black and white guidance films used in conjunction with "anticipatory" remarks.

Analysis of the data, using a covariance technique, revealed that it was necessary to reject each of the above hypotheses.

The results of this experiment indicated that the following conclusions could be offered:

1. Black and white guidance film emerged significantly superior to color guidance film on measures for both acquisition and retention of factual information presented by the films.

2. Groups who did not hear "anticipatory" remarks prior to seeing the films acquired and retained factual information from the films significantly better than did the groups who heard "anticipatory" remarks.

The following implications seem to be supported by the above conclusions:

1. The use of color in guidance films does not aid the learner in the acquisition or retention of factual information that is, for the most part, presented in the commentary. It is suggested that color may minimize or tend to reduce the amount of learning from film instruction in which the narrator, for the most part, verbally presents the factual information. In the present study, black and white guidance film emerged significantly superior to color guidance film on both measures for acquisition and retention of facts presented by the films. This result suggests that the lack of color in black and white guidance films operated to increase their effectiveness by causing the students' attention to be directed more closely to the verbal presentation.

2. It may be that the "anticipatory" remarks operated as a deterrent to learning because students heard little to stimulate their personal interest in the film. This implies that teachers must use effective film introductions as a part of their instructional techniques. For example, activities employed prior to a film presentation should include effective motivation, student-teacher planning of purposes for seeing the film, and adequate orientation to the film. "Anticipatory" remarks, as employed in this study, did not constitute adequate film introduction activities.

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APPENDIX A

SAMPLE OF THE RESPONSE MEASURE

Pretest (X) is included in the Appendix. Posttest (Y_1) and (Y_2) employed the same questions as pretest (X). The questions were rearranged in a different numerical sequence on each of the three response measures. This was the only difference between the response measures.

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TEST BOOKLET

****

Note to students:

Please do not write on any part of this test booklet. Respond only on the answer sheet with an electrographic pencil.

This test is designed to find out what knowledge students have regarding themselves with respect to certain areas in which guidance may be needed.

This test booklet is placed in your hands with the understanding that it will be returned to the examiner at the end of the time allowed to take the test.

A correction formula for guessing will be used in scoring your answer sheets.

****

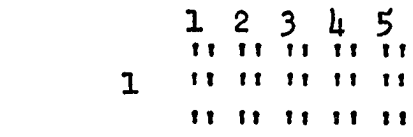
Directions:

Follow closely the method given below for marking the items of this test. You may be penalized for failing to follow directions.

This is a multiple-choice test. Each of the statements or questions can be correctly completed by one and only one of the numbered choices. Select the choice which you think most correctly completes the statement or question; then blacken the space on the answer sheet corresponding to the answer you have chosen.

Example:

1. A word that names a person, place or thing is called a (1) capital; (2) noun; (3) verb; (4) none of these.



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A summary of directions will be presented at the beginning of the next page. You will refer to this summary for help if you momentarily forget the above directions when you begin working on the test.

****

Directions: Please do not write on any part of this test booklet. Record your answers only on the answer sheet with an electrographic pencil. Each of the items can be best completed correctly by one and only one of the numbered choices. Select the choice which you consider completes the item most appropriately; then blacken the space on the answer sheet corresponding to the answer you have chosen.

LIBRARY ORGANIZATION

1. Books are listed in the card catalog by (1) subject (2) author (3) title (4) all of these.

2. The most important thing a librarian can do is to (1) find books for students (2) check out books to students (3) show students how to use the library efficiently (4) direct students to the card catalog.

3. A book about American poetry would be numbered (1) 511 (2) 821 (3) 521 (4) 811.

4. The organization system of the library is called the (1) Bradshaw Number System (2) Dewey Decimal System (3) Central File System (4) Webster Word System.

5. A book with the title "The Scarlet Letter" should have a card in (1) the "T" drawer of the card catalog (2) the "S" drawer of the card catalog (3) the "L" drawer of the card catalog (4) each of the above drawers.

6. If you were looking in the card catalog for a biography of Nathanial Hawthorne, the name would appear on the right card as (1) HAWTHORNE, NATHANIEL (2) Hawthorne, Nathaniel (3) hawthorne, nathaniel (4) HAWTHORNE, Nathaniel.

7. All books numbered 500 deal with (1) Sociology (2) Literature (3) General Works (4) Science.

8. The book, "1860—Year of Crises," would be filed in the card catalog under the letter (1) "Y" (2) "C" (3) "E" (4) all of these.

9. Cards in the card catalog are arranged alphabetically by (1) letter (2) word (3) groups of words (4) all of these.

10. In some card catalogs the subject of a book is (1) printed with red letters (2) printed and then underlined (3) printed with small black letters (4) printed and enclosed with quotation marks.

11. A book about English literature would be numbered (1) 830 (2) 920 (3) 820 (4) 930.

12. The first letter in the call number for a book, other than biography, refers to the (1) author (2) publisher (3) subject (4) title.

13. A book about German literature would be numbered (1) 810 (2) 530 (3) 830 (4) 510.

14. When "An" appears as the first word in the title of the book, (1) its card is found in the "A" drawer of the card catalog (2) "An" is disregarded (3) its card is found in a special drawer of the card catalog (4) none of these.

15. A book about American drama would be numbered (1) 822 (2) 912 (3) 922 (4) 812.

16. The first letter in the call number of a biography refers to the (1) author (2) publisher (3) the person written about (4) none of these.

17. All books numbered 520 deal with (1) physics (2) history (3) mathematics (4) astronomy.

18. The names "McCormick", "Mac Dougall", and "Macmillan" are filed in the card catalog (1) as though they were spelled "M-a-c" (2) as though they were spelled "M-c" (3) after the rest of the "M's" (4) before all of the "M's".

19. All books numbered 530 deal with (1) astronomy (2) physics (3) German literature (4) history.

20. An author's name on a catalog card appears as (1) Hawthorne, Nathaniel (2) hawthorne, nathaniel (3) HAWTHORNE, Nathaniel (4) HAWTHORNE, NATHANIEL.

21. A book about the life of James Fenimore Cooper would have a card in (1) the "J" drawer of the card catalog (2) the "C" drawer of the card catalog (3) the "F" drawer of the card catalog (4) all of these.

22. All books numbered 510 deal with (1) history (2) physics (3) mathematics (4) American literature.

HEREDITY AND ENVIRONMENT

23. If exotic varieties of pigeons were allowed to breed with each other at will, the results in a few generations (1) would be a new variety of pigeons (2) would be just plain pigeons (3) would not be noticeably different (4) none of these.

24. It is more correct to say that (1) heredity and environment make Hank Johnson the person he is (2) environment makes Hank Johnson the person he is (3) nature and society make Hank Johnson the person he is (4) heredity makes Hank Johnson the person he is.

25. A fine dairy cow will produce a large quantity of good milk because of its (1) heredity (2) feed (3) environment (4) all of these.

26. In comparison to parents, offspring (1) tend toward the average (2) tend to be superior (3) tend to be subnormal (4) tend to be exactly like them.

27. You change your environment every time you (1) work to improve your surroundings (2) choose a new friend (3) make plans for the future and carry them out (4) all of these.

28. Horses resemble or differ from each other because of (1) their heredity (2) their environment (3) the purpose they serve (4) their heredity and environment.

29. Scientists know that offspring will (1) vary according to known patterns of variation (2) differ from each other in appearance more than in temperament (3) vary, but not according to any known pattern of variation (4) differ from each other in temperament more than in appearance.

30. Your heredity is determined by (1) influences received from the world of nature itself (2) influences received from your parents, grandparents, and ancestors (3) influences received from the society in which you live (4) combination of answers (1) and (3) is correct.

31. Scientists have discovered that offspring (1) resemble their parents (2) are influenced only by their environment (3) tend to resemble their parents (4) are influenced only by their heredity.

32. The study of heredity is called (1) biology (2) genetics (3) zoology (4) physiology.

33. If you had grown up in a different environment, you would (1) be just the same as you now are (2) be a different person than you now are. (3) have a different heredity (4) all of these could be correct.

34. In order to assure himself of raising good dairy cows, a dairyman will keep a breeding bull (1) that is perfectly proportioned (2) that has a pedigree (3) whose heredity is favorable for high milk production (4) with a record for high reproduction.

35. The influence considered to be least a part of your heredity is (1) your mother (2) your father (3) the world of nature itself (4) your grandparents.

36. Your environment is made up of (1) the world of nature itself (2) the people around you (3) the society in which you live (4) all of these.

37. Scientists have discovered that offspring (1) are influenced only by their environment (2) vary from each other (3) will have the same temperament (4) are influenced only by their heredity.

38. Plants and animals (1) can control their environment to a great extent (2) can alter their environment (3) cannot control their environment to any great extent (4) are not affected by their environment.

39. It is a fact that our heredity (1) is determined for us (2) can be changed (3) is not as important as our environment (4) all of these.

40. To fulfill the best promise of our heredity we must (1) live a happier, fuller life (2) work constantly to improve our environment (3) control our heredity (4) none of these.

41. Identical twins will (1) resemble each other less than they do either parent (2) have the same fingerprints (3) resemble each other more than they do either parent (4) both (2) and (3) are correct.

42. It is generally recognized that people (1) can influence their environment (2) cannot influence their environment (3) are influenced by their heredity (4) combination of answers (1) and (3) is correct.

43. Broad principles of heredity (1) do not always hold true (2) have not been established (3) are not important because there are exceptions to them (4) always hold true.

44. Scientists have studied plant and animal hereditary influences (1) just in recent years (2) very little (3) through many generations (4) none of these.

CHOOSING YOUR OCCUPATION

45. Ideally, students should look for vocational guidance (1) after they graduate from high school (2) some years before they graduate from high school (3) just before graduation from high school (4) when they enter college.

46. Occupations can be investigated (1) by many ways (2) only by work experiences (3) in two ways (4) by few methods.

47. Interest in a hobby (1) might lead some people into a business of their own (2) might lead some people to become employees in a growing field (3) may not lead to a vocation (4) all of these.

48. Students should investigate the courses of study for college academic learning in order to determine the (1) length of time involved to get a degree (2) amount of money required to go to college (3) value of this learning to them (4) all of these.

49. To a large extent, the most successful career for a person depends on (1) his father's desire for him to follow in his footsteps (2) a wise choice of occupation (3) his mother's desire for him to be successful (4) combination of answers (1) and (3) is correct.

50. A vocational guidance counselor is a person who (1) tells you which occupation to choose (2) gives you a physical examination for various occupations (3) helps you to a better understanding of yourself in relation to various occupations (4) all of these.

51. The most difficult of all vocational guidance problems is trying to determine your (1) interests (2) personality (3) abilities (4) intelligence.

52. In the classified directory of your telephone book one can find information concerning the (1) preparation needed for an occupation (2) atmosphere of an occupation (3) opportunities present in various occupations (4) all of these.

53. What you can do at an occupation that takes manipulation of your hands and fingers can be partially discovered by (1) a manual dexterity test (2) an intelligence test (3) a motor reflex test (4) a physical reflex test.

54. Your selection of an occupation should be based upon (1) what your father wants you to do (2) what you want out of life (3) what your vocational guidance counselor wants you to do (4) combination of answers (1) and (3) is correct.

55. Primarily, choosing your occupation involves investigation(s) of (1) your real self (2) the library (3) occupations (4) combination of answers (1) and (3) is correct.

56. An interest test will help you discover (1) what your strong and weak points happen to be (2) the occupation in which you will be a success (3) what you like (4) what kind of a person you are.

57. The results of tests designed to investigate your intelligence, aptitudes, and interests (1) should be considered as conclusive evidence (2) should have little bearing on your vocational choice (3) should be regarded as signs indicating a possible vocational choice (4) will not help in selecting a vocation.

58. A field in which the aptitude test may serve could be listed as (1) computational (2) mechanical (3) social (4) all of these.

59. When you apply for that first job you should be (1) ready to let the employment manager figure out your abilities (2) ready with specific answers about yourself (3) neither of the above answers is correct (4) ready with general answers about yourself.

60. A preference record is a form of (1) interest test (2) ability test (3) personality test (4) all of these.

61. The atmosphere of an occupation is considered to be (1) the people and conditions around you as you work (2) the degree of intelligence required for the work (3) the amount of previous education required to become skilled in the work (4) the supply of workers seeking a job in the occupation.

62. Aptitude tests will help you discover (1) your strong and weak points (2) what kind of person you are (3) what you like to do (4) the occupation in which you will be a success.

63. Your attitude toward getting things done is (1) unimportant while you are in high school in so far as choosing an occupation is concerned (2) a measure of your abilities (3) a measure of your sense of responsibility (4) a measure of your intelligence.

64. A possible vocational choice might be indicated to you by the (1) classes you like (2) books and magazines you like to read (3) classes in which you make good grades (4) all of these.

65. You can investigate occupations through pamphlets provided by the (1) federal government (2) state governments (3) professional organizations (4) all of these.

66. Your personality and emotional outlook (1) will affect what you do on the job (2) are not important considerations in choosing an occupation (3) will not affect what you do on the job (4) combination of answers (2) and (3) is correct.

YOUR EARNING POWER

67. The kind of work you go into should be chosen (1) with some forethought (2) by your parents (3) carefully and methodically (4) by personnel in your school.

68. A good general education is a minimum requirement for (1) any job (2) almost any job that pays well (3) only the lower paying jobs (4) all jobs that pay well.

69. The single factor that always exists regardless of all other factors in affecting your earning power is (1) economic conditions (2) your personality (3) kind of work (4) your production.

70. Personality is especially important in (1) selling (2) managerial work (3) secretarial work (4) combination of answers (1) and (2) is correct.

71. The most important quality of a "Department Head" is the ability (1) to keep records well (2) to handle details readily (3) to get along easily with other people (4) to keep the workers busy at their respective jobs.

72. Managerial work involves (1) dealing directly with many people (2) working mostly with records (3) handling only stocks and money (4) no personal contacts with other people.

73. Your earning power is determined (1) entirely by the nature of the economic society in which we live (2) entirely by what you do (3) entirely by the amount of preparation you have for the job (4) none of these.

74. You are able to increase your earning power while you are in school (1) to a small degree (2) to varying degrees (3) to a large degree (4) none of these.

75. Our economic society is basically founded on the idea of (1) buying goods and services with money (2) exchanging different goods and services (3) selling goods and services for money (4) producing and exchanging different goods and services.

76. The set amount of salary a clerk is paid is called her (1) base pay (2) net income (3) commission (4) pay check.

77. Your time spent in high school should be thought of as (1) technical training (2) preparation for a specific job (3) on-the-job training (4) preparation for earning.

78. General economic conditions (1) do not affect our society (2) have an effect on our earning power (3) do not affect our society or our earning power (4) do not affect our earning power.

79. Basically, people work (1) for a pay check (2) for better living conditions (3) for job security (4) for social security.

80. Your earning power is influenced by (1) your production on the job (2) your personal qualities (3) the kind of work you do (4) all of these.

81. Good personal qualities are (1) important in any work (2) important only in some kinds of work (3) just important to personnel directors (4) important in selling but not in delivering packages.

82. Production is a factor in earning power (1) sometimes (2) infrequently (3) always (4) frequently.

83. As a worker, you (1) can control economic conditions (2) will not be able to do much about economic conditions (3) have no control over economic conditions (4) will not be affected by economic conditions.

84. Your personal qualities (1) are the result of your heredity (2) can be improved (3) remain constant throughout life (4) cannot be improved.

85. Your preparation for a job will depend a lot on (1) the kind of work you want to do (2) your personal qualities (3) your production ability (4) all of these.

86. Likeable personal qualities are (1) helpful but not essential to success (2) an asset to clerks (3) essential mostly to delivery men (4) more important to managers than to salesmen.

87. A clerk's production in a dry goods store is measured in terms of (1) the number of sales made (2) the amount of base pay collected (3) total checks cashed for customers (4) the number of customers waited on.

88. If a clerk who works on a commission increases her rate of production, she will (1) receive more base pay (2) improve her living standard (3) receive more commission but less base pay (4) earn more money.

APPENDIX B

"JURY OF COMPETENT PERSONS" AND PROCEDURE FOR VALIDATING THE CONTENT OF THE RESPONSE MEASURES

The concept of validity has meaning only in relation to specific purposes, subject matters, and instructional objectives. For this reason, persons were selected because of their particular competency in the field of specialization relative to the content of the films, purposes of the films, and the objectives of the film instruction.

The "jury of competent persons" employed the following procedure for establishing content validity of the response measures. Each test was compared with criteria such as the teacher's guide, the master script, repeated viewings of that particular film and judgments of other persons on the jury until all were convinced that content validity existed. In many instances new questions were formed and existing questions reworded. Care was exercised by all concerned to make the vocabulary content such that a high school Junior or Senior would be able to comprehend it. Persons on the jury who were familiar with test construction watched to see that all items were well constructed. All persons concerned themselves with making incorrect choices plausible. Throughout this procedure extreme care was taken to limit the test to what the film actually taught. The purposes of content validity were uppermost in the "jury's" thoughts at all times. The writer is extremely indebted to the persons who served as members of the jury to help establish content validity of the response measures. Their combined judgments and efforts were of tremendous importance to this study.

Each person who helped in establishing content validity of the response measures possessed qualifications and had had experiences which would cause one to assume that person to be competent for the professional services being rendered. The members of the jury are as follows:

Dr. Martin A. Satz
Dean of Student Affairs
Southwestern State College
Weatherford, Oklahoma

Mr. Earnest Thomas
Head Librarian
Southwestern State College
Weatherford, Oklahoma

Dr. Kirk E. Naylor, Head
Department of Education
Southwestern State College
Weatherford, Oklahoma

Mr. Ivan D. Cates, Director
Audio-Visual Education
Southwestern State College
Weatherford, Oklahoma

Dr. Harold H. Budde
Professor of Psychology
Southwestern State College
Weatherford, Oklahoma

Mr. Robert Tyler
Associate Professor of Education
Southwestern State College
Weatherford, Oklahoma

Mr. Otis M. King
Assistant Professor of Biology
Southwestern State College
Weatherford, Oklahoma

Dr. John E. Binnion, Chairman
Department of Business Education
The University of Denver
Denver, Colorado

APPENDIX C

SAMPLE OF PRETEST (X), POSTTEST (Y_1), AND POSTTEST (Y_2) INSTRUCTIONS

PRETEST (X) INSTRUCTIONS

(1) When students are seated, the examiner should say:

"THIS MORNING YOU ARE GOING TO TAKE A TEST THAT IS IMPORTANT TO YOU. THE PURPOSE OF THIS TEST IS TO INFORM US OF YOUR KNOWLEDGE ABOUT LIBRARY ORGANIZATION, HEREDITY AND ENVIRONMENT, CHOOSING YOUR OCCUPATION, AND YOUR EARNING POWER. IN ORDER FOR US TO FIND OUT HOW MUCH YOU REALLY KNOW ABOUT THESE SUBJECTS, IT WILL BE IMPORTANT TO BOTH OF US THAT YOU DO THE BEST YOU CAN. WHEN YOU RECEIVE YOUR TEST BOOKLET, ELECTROGRAPHIC PENCIL AND ANSWER SHEET, WAIT FOR FURTHER DIRECTIONS. DO NOT OPEN YOUR TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO."

(2) Pass out test booklets, electrographic pencils, and answer sheets. When students have these supplies the examiner should say:

"PRINT YOUR FULL NAME IN THE PROPER SPACE ON THE ANSWER SHEET. _____ pause for this to be done _____ PRINT THE NAME OF THIS SCHOOL IN THE PROPER SPACE ON THE ANSWER SHEET. _____ pause for this to be done _____ NOW, READ THE INFORMATION ON THE FRONT OF THE TEST BOOKLET WITH ME. _____ read all the information with the students _____ THE ANSWER SHEETS WILL BE SCORED BY MEANS OF AN ELECTRICAL MACHINE. THE IMPORTANT THING TO REMEMBER IS TO USE ONLY THE ELECTROGRAPHIC PENCIL WHICH WAS FURNISHED YOU AND TO MAKE HEAVY BLACK MARKS IN THE PROPER SPACE. IF YOU ERASE, BE SURE TO DO IT THOROUGHLY. YOU HAVE 36 MINUTES TO COMPLETE THIS TEST. NO QUESTIONS MAY BE ASKED AFTER THE TEST BEGINS. ARE THERE ANY QUESTIONS NOW?"

(3) Answer all legitimate questions, and then say:

"WHEN I SAY 'BEGIN', TURN TO THE FIRST PAGE OF THE TEST AND WORK AS FAST AS YOU CAN WITHOUT MAKING MISTAKES. USE ONLY THE ELECTROGRAPHIC PENCIL AND MAKE NO MARKS OTHER THAN YOUR MARK FOR THE ANSWER YOU SELECT. ONLY ONE ANSWER IS CORRECT SO MAKE ONLY ONE MARK PER QUESTION. IF YOU FINISH BEFORE THE TIME LIMIT EXPIRES, SIT QUIETLY UNTIL THE 36 MINUTES HAVE PASSED OR UNTIL EVERYONE HAS FINISHED. ASK NO QUESTIONS AFTER WE BEGIN. GET READY. _____ pause briefly for students and timer to make preparations for beginning the test _____ BEGIN."

POSTTEST (Y_1) INSTRUCTIONS

(1) When students are seated, the examiner should say:

"THIS TEST IS IMPORTANT TO YOU. THE PURPOSE OF THIS TEST IS TO INFORM US OF YOUR NEWLY ACQUIRED KNOWLEDGE ABOUT LIBRARY ORGANIZATION. IN ORDER FOR US TO UNDERSTAND HOW MUCH MORE YOU KNOW ABOUT THIS SUBJECT, IT WILL BE IMPORTANT TO BOTH OF US THAT YOU DO THE BEST YOU CAN. WHEN YOU RECEIVE YOUR TEST BOOKLET, ELECTROGRAPHIC PENCIL AND ANSWER SHEET, WAIT FOR FURTHER DIRECTIONS. DO NOT OPEN YOUR TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO."

(2) Pass out test booklets on Library Organization, electrographic pencils, and answer sheets. When students have these supplies, the examiner should say:

"PRINT YOUR FULL NAME IN THE PROPER SPACE ON THE ANSWER SHEET _____pause for this to be done _____ PRINT THE NAME OF THIS SCHOOL IN THE PROPER SPACE ON THE ANSWER SHEET. _____ pause for this to be done _____ NOW READ THE INFORMATION ON THE FRONT OF THE TEST BOOKLET WITH ME. _____ read all the information with the students _____ THE ANSWER SHEETS WILL BE SCORES BY MEANS OF AN ELECTRICAL MACHINE. THE IMPORTANT THING TO REMEMBER IS TO USE ONLY THE ELECTROGRAPHIC PENCIL WHICH WAS FURNISHED YOU AND TO MAKE HEAVY BLACK MARKS IN THE PROPER SPACE. IF YOU ERASE, BE SURE TO DO IT THOROUGHLY. YOU HAVE 9 MINUTES TO COMPLETE THIS TEST. NO QUESTIONS MAY BE ASKED AFTER THE TEST BEGINS. ARE THERE ANY QUESTIONS NOW?"

(3) Answer all legitimate questions, and then say:

"WHEN I SAY 'BEGIN', TURN TO THE FIRST PAGE OF THE TEST AND WORK AS FAST AS YOU CAN WITHOUT MAKING MISTAKES. USE ONLY THE ELECTROGRAPHIC PENCIL AND MAKE NO MARKS OTHER THAN YOUR MARK FOR THE ANSWER. ONLY ONE ANSWER IS CORRECT SO MAKE ONLY ONE MARK PER QUESTION. IF YOU FINISH BEFORE THE TIME LIMIT EXPIRES, SIT QUIETLY UNTIL THE 9 MINUTES HAVE PASSED OR UNTIL EVERYONE HAS FINISHED. ASK NO QUESTIONS AFTER WE BEGIN. GET READY. _____ pause briefly for students and timer to make preparations for beginning _____ BEGIN."

INSTRUCTIONS FOR SECOND TEST

(1) When students are seated, the examiner should say:

"THIS IS YOUR SECOND TEST THIS MORNING. IT IS ALSO IMPORTANT TO YOU. THIS TEST WILL INFORM US HOW MUCH MORE YOU NOW KNOW ABOUT HEREDITY AND ENVIRONMENT. IN ORDER FOR BOTH OF US TO FIND OUT HOW MUCH MORE YOU KNOW ABOUT HEREDITY AND ENVIRONMENT, IT WILL BE IMPORTANT THAT YOU DO THE BEST YOU CAN. WHEN YOU RECEIVE YOUR TEST BOOKLET AND ANSWER SHEET, WAIT FOR FURTHER DIRECTIONS. DO NOT OPEN YOUR TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO."

(2) Pass out test booklets on Heredity and Environment, and the answer sheets that the students used for the previous test. When the students have these supplies, the examiner should say:

"BE SURE YOU GET YOUR OWN ANSWER SHEET. CHECK TO SEE IF YOUR NAME IS ON IT. _____ pause for this to be done _____ THE INSTRUCTIONS FOR THIS TEST ARE THE SAME AS FOR THE PREVIOUS TEST. THE IMPORTANT THING TO REMEMBER IS TO USE THE ELECTROGRAPHIC PENCIL. DOES EVERYONE HAVE AN ELECTROGRAPHIC PENCIL? _____ check to see if they do _____ IF YOU HAVE TO ERASE, DO IT THOROUGHLY. THIS TEST BEGINS WITH NUMBER 23. BE SURE YOU BEGIN ANSWERING WITH NUMBER 23 ON THE ANSWER SHEET. THIS IS VERY IMPORTANT SINCE AN ELECTRICAL MACHINE WILL GRADE THESE ANSWER SHEETS. YOU HAVE 9 MINUTES TO COMPLETE THIS TEST. NO QUESTIONS MAY BE ASKED AFTER THE TEST BEGINS. ARE THERE ANY QUESTIONS NOW?"

(3) Answer all legitimate questions, and then say:

"WHEN I SAY 'BEGIN', TURN TO THE FIRST PAGE OF THE TEST AND WORK AS FAST AS YOU CAN WITHOUT MAKING MISTAKES. USE ONLY THE ELECTROGRAPHIC PENCIL AND BEGIN MARKING WITH NUMBER 23 ON YOUR ANSWER SHEET. MAKE NO MARKS OTHER THAN YOUR MARK FOR THE ANSWERS. WHEN YOU FINISH, SIT QUIETLY UNTIL THE TIME LIMIT HAS EXPIRED. ASK NO QUESTIONS AFTER WE BEGIN. GET READY TO START WITH NUMBER 23. _____ pause briefly for students and timer to get ready _____BEGIN."

INSTRUCTIONS FOR THIRD TEST

(1) When students are seated, the examiner should say:

"THIS IS YOUR THIRD TEST THIS MORNING. IT IS ALSO IMPORTANT TO YOU. THIS TEST WILL INFORM US HOW MUCH MORE YOU NOW KNOW ABOUT CHOOSING YOUR OCCUPATION. IN ORDER FOR BOTH OF US TO FIND OUT HOW MUCH MORE YOU KNOW ABOUT CHOOSING YOUR OCCUPATION, IT WILL BE IMPORTANT THAT YOU DO THE BEST YOU CAN. WHEN YOU RECEIVE YOUR TEST BOOKLET AND ANSWER SHEET, WAIT FOR FURTHER DIRECTIONS. DO NOT OPEN YOUR TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO."

(2) Pass out test booklets on Choosing Your Occupation, and the answer sheets that the students used for the previous tests. When the students have these supplies, the examiner should say:

"BE SURE YOU GET YOUR OWN ANSWER SHEET. CHECK TO SEE IF YOUR NAME IS ON IT. _____ pause for this to be done _____ THE INSTRUCTIONS FOR THIS TEST ARE THE SAME AS FOR THE FIRST TEST. THE IMPORTANT THING TO REMEMBER IS TO USE THE ELECTROGRAPHIC PENCIL. DOES EVERYONE HAVE AN ELECTROGRAPHIC PENCIL? _____ check to see if they do _____ IF YOU HAVE TO ERASE, DO IT THOROUGHLY. THIS TEST BEGINS WITH NUMBER 45. BE SURE YOU BEGIN ANSWERING WITH NUMBER 45 ON THE ANSWER SHEET. THIS IS VERY IMPORTANT SINCE AN ELECTRICAL MACHINE WILL GRADE THESE ANSWER SHEETS. YOU HAVE 9 MINUTES TO-COMPLETE THIS TEST. NO QUESTIONS MAY BE ASKED AFTER THE TEST BEGINS. ARE THERE ANY QUESTIONS NOW?"

(3) Answer all legitimate questions, and then say:

"WHEN I SAY 'BEGIN', TURN TO THE FIRST PAGE OF THE TEST AND WORK AS FAST AS YOU CAN WITHOUT MAKING MISTAKES. USE ONLY THE ELECTROGRAPHIC PENCIL AND BEGIN MARKING WITH NUMBER 45 ON YOUR ANSWER SHEET. MAKE NO MARKS OTHER THAN YOUR MARK FOR THE ANSWERS. WHEN YOU FINISH, SIT QUIETLY UNTIL THE TIME LIMIT HAS EXPIRED. ASK NO QUESTIONS AFTER WE BEGIN. GET READY TO START WITH NUMBER 45. _____ pause briefly for students and timer to get ready _____ BEGIN."

INSTRUCTIONS FOR FOURTH TEST

(1) When students are seated, the examiner should say:

"THIS IS YOUR FOURTH TEST THIS MORNING. IT IS ALSO IMPORTANT TO YOU. THIS TEST WILL INFORM US HOW MUCH MORE YOU NOW KNOW ABOUT YOUR EARNING POWER. IN ORDER FOR BOTH OF US TO FIND OUT HOW MUCH MORE YOU KNOW ABOUT YOUR EARNING POWER, IT WILL BE IMPORTANT THAT YOU DO THE BEST YOU CAN. WHEN YOU RECEIVE YOUR TEST BOOKLET AND ANSWER SHEET, WAIT FOR FURTHER DIRECTIONS. DO NOT OPEN YOUR TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO."

(2) Pass out test booklets on Your Earning Power, and the answer sheets that the students used for the previous tests. When the students have these supplies, the examiner should say:

"BE SURE YOU GET YOUR OWN ANSWER SHEET. CHECK TO SEE IF YOUR NAME IS ON IT. _____ pause for this to be done ___ THE INSTRUCTIONS FOR THIS TEST ARE THE SAME AS FOR THE PREVIOUS TEST. THE IMPORTANT THING TO REMEMBER IS TO USE THE ELECTROGRAPHIC PENCIL. DOES EVERYONE HAVE AN ELECTROGRAPHIC PENCIL? _____ check to see if they do _____ IF YOU HAVE TO ERASE, DO IT THOROUGHLY. THIS TEST BEGINS WITH NUMBER 67. BE SURE YOU BEGIN ANSWERING WITH NUMBER 67 ON THE ANSWER SHEET. THIS IS VERY IMPORTANT SINCE AN ELECTRICAL MACHINE WILL GRADE THESE ANSWER SHEETS. YOU HAVE 9 MINUTES TO COMPLETE THIS TEST. NO QUESTIONS MAY BE ASKED AFTER THE TEST BEGINS. ARE THERE ANY QUESTIONS NOW?"

(3) Answer all legitimate questions, and then say:

"WHEN I SAY 'BEGIN,' TURN TO THE FIRST PAGE OF THE TEST AND WORK AS FAST AS YOU CAN WITHOUT MAKING MISTAKES. USE ONLY THE ELECTROGRAPHIC PENCIL AND BEGIN MARKING WITH NUMBER 67 ON YOUR ANSWER SHEET. MAKE NO MARKS OTHER THAN YOUR MARK FOR THE ANSWERS. WHEN YOU FINISH, SIT QUIETLY UNTIL THE TIME LIMIT HAS EXPIRED. ASK NO QUESTIONS AFTER WE BEGIN. GET READY TO START WITH NUMBER 67. _____ pause briefly for students and timer to get ready _____ BEGIN."

POSTTEST (Y_2) INSTRUCTIONS

(1) When students are seated, the examiner should say:

"THIS MORNING YOU ARE GOING TO TAKE A TEST THAT IS IMPORTANT TO YOU. THE PURPOSE OF THIS TEST IS TO INFORM US ABOUT YOUR PRESENT KNOWLEDGE OF LIBRARY ORGANIZATION, HEREDITY AND ENVIRONMENT, CHOOSING YOUR OCCUPATION, AND YOUR EARNING POWER. IN ORDER FOR US TO FIND OUT HOW MUCH YOU REMEMBER ABOUT THESE SUBJECTS, IT WILL BE IMPORTANT TO BOTH OF US THAT YOU DO THE BEST YOU CAN. WHEN YOU RECEIVE YOUR TEST BOOKLET, ELECTROGRAPHIC PENCIL AND ANSWER SHEET, WAIT FOR FURTHER DIRECTIONS. DO NOT OPEN YOUR TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO."

(2) Pass out test booklets, electrographic pencils, and answer sheets. When students have these supplies, the examiner should say:

"PRINT YOUR FULL NAME IN THE PROPER SPACE ON THE ANSWER SHEET. _____ pause for this to be done _____ PRINT THE NAME OF THIS SCHOOL IN THE PROPER SPACE ON THE ANSWER SHEET. _____ pause for this to be done _____ NOW, READ THE INFORMATION ON THE FRONT OF THE TEST BOOKLET WITH ME. _____ read all the information with the students _____ THE ANSWER SHEETS WILL BE SCORED BY MEANS OF AN ELECTRICAL MACHINE. THE IMPORTANT THING TO REMEMBER IS TO USE ONLY THE ELECTROGRAPHIC PENCIL WHICH WAS FURNISHED YOU AND TO MAKE HEAVY BLACK MARKS IN THE PROPER SPACE. IF YOU ERASE, BE SURE TO DO IT THOROUGHLY. YOU HAVE 36 MINUTES TO COMPLETE THIS TEST. NO QUESTIONS MAY BE ASKED AFTER THE TEST BEGINS. ARE THERE ANY QUESTIONS NOW?"

(3) Answer all legitimate questions, and then say:

"WHEN I SAY 'BEGIN', TURN TO THE FIRST PAGE OF THE TEST AND WORK AS FAST AS YOU CAN WITHOUT MAKING MISTAKES. USE ONLY THE ELECTROGRAPHIC PENCIL AND MAKE NO MARKS OTHER THAN YOUR MARK FOR THE ANSWER YOU SELECT. ONLY ONE ANSWER IS CORRECT, SO MAKE ONLY ONE MARK PER QUESTION. IF YOU FINISH BEFORE THE TIME LIMIT EXPIRES, SIT QUIETLY UNTIL THE 36 MINUTES HAVE PASSED OR UNTIL EVERYONE HAS FINISHED. ASK NO QUESTIONS AFTER WE BEGIN. GET READY. _____ pause briefly for students and timer to make preparations for beginning the test ____ BEGIN."

APPENDIX D

SAMPLE OF THE "ANTICIPATORY" REMARKS

"ANTICIPATORY" REMARKS TO LIBRARY ORGANIZATION

The name of this film is Library Organization. Before we see this film I will tell you something about it.

The first scene shows a school library. You will notice that there is a great difference in the ability of students to find materials. Jean, for example, is uncertain and confused. She can't seem to find what she needs while Tom seems to use the library effectively and efficiently.

The film shows you how Miss Wilson, the librarian, helps Jean understand how to use the library efficiently. They begin by going to the card catalog. There Jean learns something about the system the library uses. Jean learns how materials are filed in the card catalog; she learns the meaning of the numbers used to classify the books; and she learns how and where to find the materials she needs on the library shelves.

The film should teach you how to effectively and efficiently use the library. This knowledge will help you become a better student in your classwork.

After seeing the film you will be tested over the information presented. The test is similar to the one taken by you a week ago. It will be interesting to see how much better you will do after having seen the film.

Now if you will watch the screen, I will present the film.

"ANTICIPATORY" REMARKS TO HEREDITY AND ENVIRONMENT

The name of this film is Heredity and Environment. Before we see this film, I will tell you something about it.

The film begins by showing a group of girls on horseback riding along a bridle path. The graceful saddle horses are compared with an old horse pulling a junk wagon. The question of "why the differences and resemblances" arises. This question forms the background for a film discussion about heredity and environment.

The speaker discusses the meaning and implications of heredity. You will see how the principles of heredity apply to dairy cattle, dogs, cats, pigeons, and people. Why do offspring tend to resemble their parents? Why do offspring vary from each other? Why do offspring tend toward the average?

The speaker defines environment. A discussion concerning the influence of environment on plants and animals is presented.

The film should help you understand yourself and others better in so far as heredity and environment is concerned.

After seeing the film, you will be tested over the information presented. The test is similar to the one taken by you a week ago. It will be interesting to see how much better you will do after having seen the film.

Now if you will watch the screen, I will present the film.

"ANTICIPATORY" REMARKS TO CHOOSING YOUR OCCUPATION

The name of this film is Choosing Your Occupation. Before we see this film, I will tell you something about it.

This film was produced to help individuals understand how to choose an occupation intelligently. Some years before you graduate, you should begin to investigate two large problems -- first, yourself, and second, occupations.

The Guidance Counselor in this film tells you that you should know what your interests are; what abilities you possess; and what type personality you have before you can make an intelligent decision regarding a possible occupation.

Occupations should be investigated with regard to the amount of preparation required; the kind of working atmosphere; and the number of opportunities any one occupation presents.

The Guidance Counselor says that when all these facts are fitted together, you will be better able to make an intelligent decision relative to a future vocation. The Counselor in the film emphasizes the importance of starting now to choose your occupation. A successful career depends to a large extent upon a wise choice of occupation.

After seeing the film you will be tested over the information presented. The test is similar to the one taken by you a week ago. It will be interesting to see how much better you will do after having seen the film.

Now if you will watch the screen, I will present the film.

"ANTICIPATORY" REMARKS TO YOUR EARNING POWER

The name of this film is Your Earning Power. Before we see this film, I will tell you something about it.

The film discusses a problem about which you students should be very much concerned. That problem is -- "How much will you earn?"

The speaker tells you that such factors as economic conditions, kinds of work, personal qualities, production on the job, and preparation are directly related to your earning power. The film shows how these factors actually operate in a large department store.

The film indicates that while you are in school preparing for future work, you should develop attitudes and work habits best suited for maximum production efficiency on the job.

After seeing the film, you will be tested over the information presented. The test is similar to the one taken by you a week ago. It will be interesting to see how much better you will do after having seen the film.

Now if you will watch the screen, I will present the film.

APPENDIX E

TABLES OF DEVIATIONS FROM WITHIN-GROUP MEANS

DEVIATIONS FROM WITHIN-GROUP A MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	13.5	6.1	5.9	31.	1.5	-1.9	-5.1	61.	-1.5	4.1	2.9
2.	7.5	4.1	5.9	32.	1.5	.1	-3.1	62.	-1.5	-3.9	5.9
3.	7.5	4.1	2.9	33.	1.5	-1.9	-7.1	63.	-1.5	-1.9	-1.1
4.	7.5	5.1	8.9	34.	1.5	1.1	.9	64.	-1.5	-3.9	-3.1
5.	6.5	4.1	1.9	35.	1.5	-3.9	-1.1	65.	-1.5	-1.9	2.9
6.	5.5	6.1	6.9	36.	1.5	1.1	5.9	66.	-1.5	-5.9	-5.1
7.	5.5	4.1	8.9	37.	-.5	6.1	5.9	67.	-1.5	4.1	-3.1
8.	5.5	-3.9	-9.1	38.	-.5	.1	1.9	68.	-1.5	-6.9	-9.1
9.	3.5	-1.9	1.9	39.	-.5	.1	1.9	69.	-2.5	5.1	2.9
10.	3.5	2.1	2.9	40.	-.5	5.1	.9	70.	-2.5	-1.9	-3.1
11.	2.5	4.1	.9	41.	-.5	.1	-1.1	71.	-2.5	4.1	-3.1
12.	2.5	6.1	5.9	42.	-.5	-2.9	-1.1	72.	-2.5	1.1	1.9
13.	2.5	6.1	4.9	43.	-.5	-2.9	-7.1	73.	-2.5	-5.9	-2.1
14.	2.5	8.1	10.9	44.	-.5	-9.9	-7.1	74.	-2.5	-2.9	-2.1
15.	2.5	-1.9	-9.1	45.	-.5	-2.9	.9	75.	-2.5	-5.9	-2.1
16.	2.5	8.1	9.9	46.	-.5	5.1	6.9	76.	-2.5	-7.9	-6.1
17.	2.5	-2.9	.9	47.	-.5	1.1	2.9	77.	-4.5	1.1	.9
18.	2.5	.1	-5.1	48.	-1.5	1.1	1.9	78.	-4.5	-2.9	-2.1
19.	2.5	4.1	-3.1	49.	-1.5	5.1	-1.1	79.	-4.5	-3.9	-2.1
20.	2.5	4.1	-1.1	50.	-1.5	1.1	-1.1	80.	-4.5	-3.9	-6.1
21.	2.5	.1	-5.1	51.	-1.5	5.1	4.9	81.	-4.5	-6.9	-5.1
22.	2.5	9.1	6.9	52.	-1.5	.1	5.9	82.	-4.5	-6.9	1.9
23.	2.5	-1.9	-2.1	53.	-1.5	-3.9	-3.1	83.	-4.5	-9.9	-6.1
24.	2.5	-11.9	-7.1	54.	-1.5	8.1	1.9	84.	-5.5	-1.9	.9
25.	1.5	8.1	10.9	55.	-1.5	2.1	1.9	85.	-5.5	.1	.9
26.	1.5	2.1	-1.1	56.	-1.5	-2.9	2.9	86.	-5.5	.1	-2.1
27.	1.5	.1	.9	57.	-1.5	-3.9	-5.1	87.	-5.5	-9.9	-2.1
28.	1.5	6.1	1.9	58.	-1.5	-2.9	-2.1	88.	-5.5	-9.9	-5.1
29.	1.5	.1	-3.1	59.	-1.5	4.1	.9				
30.	1.5	.1	-5.1	60.	-1.5	.1	-1.1				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Library Organization."

DEVIATIONS FROM WITHIN-GROUP B MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	7.3	-2.4	-.2	31.	.3	8.6	10.8	61.	-.7	-2.4	-1.2
2.	7.3	4.6	3.8	32.	.3	-1.4	-.2	62.	-1.7	8.6	2.8
3.	6.3	8.6	14.8	33.	.3	5.6	2.8	63.	-1.7	2.6	-1.2
4.	6.3	-5.4	2.8	34.	.3	-2.4	2.8	64.	-1.7	2.6	-6.2
5.	6.3	-2.4	1.8	35.	.3	1.6	-2.2	65.	-1.7	1.6	3.8
6.	6.3	5.6	-8.2	36.	.3	2.6	-2.2	66.	-1.7	-3.4	6.8
7.	6.3	-3.4	3.8	37.	.3	-2.4	-5.2	67.	-1.7	-5.4	-.2
8.	4.3	-2.4	-2.2	38.	.3	-2.4	-4.2	68.	-1.7	-3.4	1.8
9.	4.3	2.6	6.8	39.	.3	2.6	2.8	69.	-3.7	2.6	-.2
10.	4.3	8.6	5.8	40.	.3	-5.4	-2.2	70.	-3.7	-5.4	-2.2
11.	4.3	-5.4	-.2	41.	.3	-1.4	-.2	71.	-3.7	-3.4	-1.2
12.	3.3	2.6	1.8	42.	.3	-10.4	-5.2	72.	-3.7	.6	-4.2
13.	3.3	-1.4	3.8	43.	.3	.6	-1.2	73.	-3.7	8.6	5.8
14.	3.3	.6	-1.2	44.	.3	.6	1.8	74.	-3.7	.6	-2.2
15.	3.3	-6.4	-2.2	45.	.3	-7.4	-4.2	75.	-3.7	-5.4	-1.2
16.	2.3	4.6	9.8	46.	-.7	4.6	3.8	76.	-3.7	-2.4	1.8
17.	2.3	1.6	-1.2	47.	-.7	6.6	3.8	77.	-3.7	-6.4	-6.2
18.	2.3	4.6	2.8	48.	-.7	1.6	-6.2	78.	-3.7	-2.4	-8.2
19.	2.3	1.6	-2.2	49.	-.7	.6	1.8	79.	-4.7	-3.4	-6.2
20.	2.3	1.6	5.8	50.	-.7	5.6	2.8	80.	-4.7	.6	-1.2
21.	2.3	4.6	-1.2	51.	-.7	-2.4	-.2	81.	-4.7	4.6	-4.2
22.	2.3	-1.4	-4.2	52.	-.7	2.6	-.2	82.	-4.7	-5.4	-.2
23.	2.3	6.6	2.8	53.	-.7	2.6	2.8	83.	-4.7	-13.4	-2.2
24.	2.3	-3.4	-2.2	54.	-.7	4.6	1.8	84.	-5.7	4.6	5.8
25.	2.3	1.6	2.8	55.	-.7	2.6	-1.2	85.	-5.7	-5.4	-1.2
26.	2.3	2.6	-2.2	56.	-.7	-1.4	3.8	86.	-5.7	-5.4	-5.2
27.	2.3	2.6	1.8	57.	-.7	2.6	-1.2	87.	-5.7	-11.4	-10.2
28.	2.3	-9.4	-4.2	58.	-.7	.6	-6.2	88.	-7.7	.6	-2.2
29.	.3	-3.4	-6.2	59.	-.7	-6.4	-4.2				
30.	.3	6.6	10.8	60.	-.7	4.6	-4.2				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Library Organization."

DEVIATIONS FROM WITHIN-GROUP C MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	8.4	-4.9	-.3	31.	1.4	-6.9	-3.3	61.	-1.6	-.9	.7
2.	6.4	5.1	4.7	32.	1.4	4.1	1.7	62.	-1.6	-.9	-2.3
3.	5.4	5.1	7.7	33.	1.4	4.1	7.7	63.	-1.6	-.9	-4.3
4.	5.4	1.1	.7	34.	1.4	3.1	.7	64.	-2.6	-2.9	-.3
5.	5.4	-7.9	.7	35.	1.4	-6.9	-4.3	65.	-2.6	.1	1.7
6.	4.4	4.1	7.7	36.	.4	-2.9	-2.3	66.	-2.6	-2.9	-.3
7.	4.4	5.1	7.7	37.	.4	.1	1.7	67.	-2.6	1.1	1.7
8.	4.4	-.9	-2.3	38.	.4	1.1	5.7	68.	-2.6	3.1	.7
9.	2.4	3.1	5.7	39.	.4	7.1	-.3	69.	-2.6	3.1	-2.3
10.	2.4	7.1	7.7	40.	.4	.1	1.7	70.	-2.6	7.1	1.7
11.	2.4	1.1	-.3	41.	.4	4.1	-2.3	71.	-2.6	3.1	.7
12.	2.4	-.9	-3.3	42.	.4	3.1	-.3	72.	-2.6	-3.9	-2.3
13.	2.4	5.1	5.7	43.	.4	.1	5.7	73.	-2.6	-3.9	-4.3
14.	2.4	3.1	-2.3	44.	.4	-.9	-2.3	74.	-2.6	-6.9	-6.3
15.	2.4	3.1	8.7	45.	.4	5.1	.7	75.	-2.6	-4.9	-6.3
16.	2.4	4.1	-.3	46.	.4	1.1	-8.3	76.	-2.6	-8.9	-8.3
17.	2.4	1.1	4.7	47.	.4	-3.9	-.3	77.	-2.6	-7.9	-6.3
18.	2.4	5.1	-3.3	48.	.4	.1	.7	78.	-2.6	-7.9	-4.3
19.	2.4	.1	4.7	49.	.4	-6.9	-3.3	79.	-2.6	-7.9	-6.3
20.	2.4	-2.9	.7	50.	.4	-11.9	-4.3	80.	-3.6	3.1	5.7
21.	1.4	5.1	5.7	51.	.4	-4.9	-2.3	81.	-3.6	5.1	-3.3
22.	1.4	7.1	9.7	52.	.4	-.9	-6.3	82.	-3.6	-.9	-4.3
23.	1.4	-2.9	.7	53.	.4	-6.9	-8.3	83.	-5.6	3.1	4.7
24.	1.4	3.1	-3.1	54.	-1.6	.1	-.3	84.	-5.6	3.1	.7
25.	1.4	4.1	1.7	55.	-1.6	-.9	1.7	85.	-5.6	-3.9	-2.3
26.	1.4	1.1	-.3	56.	-1.6	7.1	-.3	86.	-5.6	-3.9	-2.3
27.	1.4	4.1	-2.3	57.	-1.6	-.9	.7	87.	-6.6	-12.9	-6.3
28.	1.4	-.9	4.7	58.	-1.6	1.1	-7.3	88.	-6.6	-6.9	-6.3
29.	1.4	5.1	1.7	59.	-1.6	5.1	.7				
30.	1.4	.1	1.7	60.	-1.6	.1	1.7				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Library Organization."

DEVIATIONS FROM WITHIN-GROUP D MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	7.1	5	9.1	31.	1.1	0	.1	61.	-1.9	3	-5.9
2.	7.1	-1	1.1	32.	1.1	0	1.1	62.	-1.9	-1	-3.9
3.	6.1	3	4.1	33.	1.1	-4	-1.9	63.	-1.9	3	-2.9
4.	6.1	-1	-6.9	34.	1.1	-3	-1.9	64.	-1.9	-1	-7.9
5.	5.1	0	-1.9	35.	1.1	4	1.1	65.	-1.9	0	.1
6.	5.1	-5	-2.9	36.	1.1	0	.1	66.	-1.9	-1	-2.9
7.	3.1	7	6.1	37.	1.1	1	.1	67.	-1.9	0	-3.9
8.	3.1	5	2.1	38.	1.1	-9	-3.9	68.	-1.9	-8	-2.9
9.	3.1	8	8.1	39.	1.1	-3	-3.9	69.	-1.9	1	2.1
10.	3.1	3	-1.9	40.	1.1	-7	2.1	70.	-2.9	4	1.1
11.	3.1	4	1.1	41.	-.9	5	2.1	71.	-2.9	5	2.1
12.	3.1	-4	1.1	42.	-.9	4	2.1	72.	-2.9	3	4.1
13.	3.1	0	1.1	43.	-.9	7	6.1	73.	-2.9	-4	-6.9
14.	2.1	7	-12.9	44.	-.9	-3	-2.9	74.	-2.9	5	1.1
15.	2.1	0	.1	45.	-.9	4	5.1	75.	-2.9	-4	-3.9
16.	2.1	0	1.1	46.	-.9	0	-5.9	76.	-2.9	-3	-2.9
17.	2.1	3	8.1	47.	-.9	7	1.1	77.	-2.9	1	4.1
18.	2.1	3	1.1	48.	-.9	5	9.1	78.	-2.9	-4	-2.9
19.	2.1	5	2.1	49.	-.9	-3	-2.9	79.	-2.9	-4	-2.9
20.	2.1	5	1.1	50.	-.9	4	-2.9	80.	-2.9	-4	-6.9
21.	2.1	5	6.1	51.	-.9	-15	-5.9	81.	-2.9	-8	-9.9
22.	2.1	-7	-5.9	52.	-.9	1	.1	82.	-2.9	-8	-1.9
23.	2.1	-5	-3.9	53.	-.9	-1	-1.9	83.	-2.9	-5	-3.9
24.	1.1	5	9.1	54.	-.9	0	2.1	84.	-2.9	-3	-3.9
25.	1.1	4	4.1	55.	-.9	-5	-5.9	85.	-4.9	0	1.1
26.	1.1	4	5.1	56.	-.9	5	-2.9	86.	-4.9	-3	1.1
27.	1.1	1	8.1	57.	-.9	1	-3.9	87.	-5.9	-3	-1.9
28.	1.1	-1	2.1	58.	-.9	0	.1	88.	-5.9	-8	-5.9
29.	1.1	3	6.1	59.	-.9	-7	-3.9				
30.	1.1	3	4.1	60.	-.9	-1	-3.9				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Library Organization."

DEVIATIONS FROM WITHIN-GROUP E MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	16.5	8.9	12.5	31.	1.5	4.9	-2.5	61.	-1.5	-1.1	-1.5
2.	5.5	1.9	.5	32.	1.5	2.9	4.5	62.	-1.5	-3.1	-1.5
3.	5.5	8.9	4.5	33.	1.5	4.9	-1.5	63.	-1.5	-1.1	-2.5
4.	5.5	-1.1	.5	34.	1.5	1.9	-3.5	64.	-2.5	-2.1	1.5
5.	4.5	-2.1	1.5	35.	1.5	-1.1	.5	65.	-2.5	.9	1.5
6.	4.5	-2.1	8.5	36.	.5	2.9	1.5	66.	-2.5	-2.1	.5
7.	4.5	2.9	-2.5	37.	.5	-1.1	1.5	67.	-2.5	1.9	-6.5
8.	4.5	-1.1	1.5	38.	.5	-1.1	1.5	68.	-2.5	.9	-1.5
9.	4.5	2.9	4.5	39.	.5	-2.1	3.5	69.	-2.5	-2.1	-2.5
10.	4.5	-2.1	-6.5	40.	.5	-5.1	2.5	70.	-2.5	-5.1	1.5
11.	3.5	.9	-1.5	41.	.5	-1.1	5.5	71.	-2.5	-7.1	-10.5
12.	2.5	1.9	1.5	42.	.5	-3.1	-1.5	72.	-2.5	-2.1	-1.5
13.	2.5	.9	.5	43.	.5	-1.1	-1.5	73.	-2.5	.9	2.5
14.	2.5	2.9	4.5	44.	.5	-3.1	-1.5	74.	-3.5	-5.1	-1.5
15.	2.5	.9	.5	45.	.5	1.9	-1.5	75.	-3.5	1.9	-1.5
16.	2.5	4.9	4.5	46.	.5	6.9	6.5	76.	-3.5	-6.1	-1.5
17.	2.5	2.9	4.5	47.	.5	-2.1	-1.5	77.	-3.5	.9	.5
18.	2.5	-1.1	-1.5	48.	.5	-5.1	-2.5	78.	-3.5	-5.1	-3.5
19.	2.5	2.9	.5	49.	.5	2.9	-1.5	79.	-3.5	1.9	-2.5
20.	2.5	.9	.5	50.	.5	.9	-6.5	80.	-5.5	-5.1	-3.5
21.	2.5	2.9	-1.5	51.	-1.5	1.9	-1.5	81.	-5.5	.9	-2.5
22.	1.5	.9	.5	52.	-1.5	.9	-2.5	82.	-5.5	1.9	.5
23.	1.5	4.9	5.5	53.	-1.5	-3.1	4.5	83.	-5.5	-6.1	-2.5
24.	1.5	-1.1	-5.5	54.	-1.5	-6.1	-1.5	84.	-5.5	-3.1	-6.5
25.	1.5	2.9	4.5	55.	-1.5	2.9	6.5	85.	-6.5	.9	-1.5
26.	1.5	-3.1	.5	56.	-1.5	-2.1	4.5	86.	-6.5	.9	.5
27.	1.5	.9	-1.5	57.	-1.5	-2.1	-1.5	87.	-7.5	-1.1	.5
28.	1.5	-2.1	.5	58.	-1.5	-1.1	-1.5	88.	-7.5	-3.1	-5.5
29.	1.5	-3.1	.5	59.	-1.5	2.9	4.5				
30.	1.5	-3.1	.5	60.	-1.5	-6.1	-3.5				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Library Organization."

DEVIATIONS FROM WITHIN-GROUP A MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	9.1	.3	4.1	31.	3.1	6.3	4.1	61.	-2.9	-.7	-2.9
2.	9.1	6.3	8.1	32.	3.1	.3	1.1	62.	-2.9	-1.7	.1
3.	8.1	3.3	5.1	33.	3.1	2.3	-1.9	63.	-2.9	-3.7	-7.9
4.	8.1	6.3	8.1	34.	3.1	.3	2.1	64.	-2.9	-4.7	-2.9
5.	8.1	4.3	5.1	35.	1.1	3.3	2.1	65.	-2.9	-4.7	-6.9
6.	7.1	7.3	9.1	36.	1.1	4.3	1.1	66.	-3.9	-3.7	1.1
7.	7.1	2.3	4.1	37.	1.1	3.3	2.1	67.	-3.9	6.3	4.1
8.	7.1	4.3	2.1	38.	1.1	-1.7	.1	68.	-3.9	.3	2.1
9.	5.1	6.3	1.1	39.	1.1	2.3	.1	69.	-4.9	-3.7	-2.9
10.	5.1	7.3	8.1	40.	1.1	.3	-2.9	70.	-4.9	-8.7	-3.9
11.	5.1	2.3	1.1	41.	1.1	-4.7	-2.9	71.	-4.9	-1.7	-2.9
12.	5.1	2.3	5.1	42.	1.1	2.3	-1.9	72.	-4.9	.3	-1.9
13.	5.1	4.3	5.1	43.	1.1	.3	-2.9	73.	-4.9	-4.7	-2.9
14.	5.1	6.3	5.1	44.	.1	4.3	4.1	74.	-4.9	2.3	2.1
15.	5.1	4.3	9.1	45.	.1	2.3	2.1	75.	-4.9	-5.7	.1
16.	5.1	4.3	4.1	46.	.1	.3	.1	76.	-4.9	-1.7	-2.9
17.	5.1	4.3	4.1	47.	.1	-5.7	-1.9	77.	-6.9	-11.7	-11.9
18.	4.1	6.3	6.1	48.	.1	-4.7	-5.9	78.	-6.9	-5.7	-9.9
19.	4.1	7.3	8.1	49.	.1	-4.7	.1	79.	-7.9	-1.7	-1.9
20.	4.1	4.3	2.1	50.	.1	.3	4.1	80.	-7.9	-5.7	-3.9
21.	4.1	3.3	4.1	51.	.1	-3.7	-3.9	81.	-7.9	-8.7	-5.9
22.	4.1	.3	-2.9	52.	-.9	-1.7	1.1	82.	-7.9	-8.7	-6.9
23.	4.1	.3	.1	53.	-.9	2.3	2.1	83.	-8.9	2.3	1.1
24.	4.1	-.7	-2.9	54.	-.9	7.3	-2.9	84.	-8.9	.3	4.1
25.	4.1	2.3	2.1	55.	-.9	2.3	1.1	85.	-8.9	-9.7	-9.9
26.	4.1	-.7	1.1	56.	-.9	-1.7	-1.9	86.	-8.9	-11.7	-11.9
27.	3.1	3.3	2.1	57.	-.9	-1.7	1.1	87.	-10.9	-13.7	-11.9
28.	3.1	.3	1.1	58.	-.9	-.7	1.1	88.	-10.9	-8.7	-10.9
29.	3.1	.3	1.1	59.	-.9	-1.7	-3.9				
30.	3.1	6.3	4.1	60.	-2.9	.3	-2.9				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Heredity and Environment."

DEVIATIONS FROM WITHIN-GROUP B MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	9.6	6.4	2.4	31.	1.6	2.4	1.4	61.	-3.4	5.4	1.4
2.	8.6	4.4	4.4	32.	1.6	4.4	4.4	62.	-3.4	2.4	.4
3.	3.6	6.4	4.4	33.	1.6	4.4	4.4	63.	-3.4	5.4	-1.6
4.	8.6	4.4	2.4	34.	1.6	4.4	6.4	64.	-3.4	-5.6	-1.6
5.	7.6	5.4	4.4	35.	1.6	2.4	1.4	65.	-3.4	2.4	1.4
6.	7.6	5.4	5.4	36.	1.6	6.4	1.4	66.	-3.4	-2.6	-1.6
7.	7.6	6.4	6.4	37.	1.6	.4	-6.6	67.	-4.4	2.4	1.4
8.	7.6	9.4	9.4	38.	1.6	2.4	.4	68.	-4.4	-2.6	-3.6
9.	7.6	5.4	5.4	39.	.6	9.4	2.4	69.	-4.4	-2.6	-7.6
10.	5.6	4.4	4.4	40.	.6	6.4	2.4	70.	-4.4	.4	1.4
11.	5.6	8.4	8.4	41.	.6	9.4	4.4	71.	-4.4	-5.6	-7.6
12.	5.6	6.4	5.4	42.	.6	5.4	2.4	72.	-4.4	-1.6	-2.6
13.	5.6	4.4	.4	43.	.6	4.4	.4	73.	-4.4	-3.6	-7.6
14.	5.6	4.4	4.4	44.	.6	5.4	4.4	74.	-4.4	.4	.4
15.	4.6	6.4	-1.6	45.	.6	-.6	1.4	75.	-4.4	2.4	-10.6
16.	4.6	2.4	1.4	46.	.6	6.4	.4	76.	-6.4	2.4	1.4
17.	4.6	4.4	.4	47.	.6	2.4	2.4	77.	-6.4	-2.6	.4
18.	4.6	5.4	4.4	48.	.6	5.4	1.4	78.	-6.4	.4	-3.6
19.	3.6	2.4	1.4	49.	.6	4.4	-3.6	79.	-7.4	-1.6	.4
20.	3.6	8.4	1.4	50.	.6	.4	-1.6	80.	-7.4	1.4	-9.6
21.	3.6	1.4	4.4	51.	.6	-2.6	-7.6	81.	-8.4	-2.6	-6.6
22.	3.6	6.4	5.4	52.	-.4	5.4	2.4	82.	-8.4	-9.6	-11.6
23.	3.6	-1.6	-7.6	53.	-.4	.4	-2.6	83.	-8.4	-9.6	-11.6
24.	3.6	8.4	5.4	54.	-.4	-1.6	1.4	84.	-10.4	-7.6	-9.6
25.	3.6	4.4	.4	55.	-.4	4.4	-3.6	85.	-10.4	-3.6	-7.6
26.	3.6	-5.6	5.4	56.	-.4	.4	4.4	86.	-10.4	-7.6	-11.6
27.	3.6	2.4	4.4	57.	-.4	.4	-1.6	87.	-12.4	1.4	-9.6
28.	1.6	6.4	6.4	58.	-.4	-1.6	.4	88.	-12.4	-14.6	-11.6
29.	1.6	4.4	1.4	59.	-.4	-2.6	.4				
30.	1.6	2.4	2.4	60.	-2.4	4.4	2.4				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Heredity and Environment."

DEVIATIONS FROM WITHIN-GROUP C MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	8.4	5.1	7	31.	2.4	5.1	-1	61.	-1.6	-.9	0
2.	8.4	6.1	8	32.	2.4	-5.9	-5	62.	-3.6	-2.9	1
3.	7.4	6.1	7	33.	2.4	3.1	4	63.	-3.6	-8.9	-1
4.	7.4	6.1	5	34.	2.4	6.1	5	64.	-3.6	-2.9	3
5.	7.4	3.1	3	35.	2.4	2.1	3	65.	-3.6	-2.9	-7
6.	6.4	5.1	7	36.	2.4	3.1	3	66.	-3.6	-2.9	-3
7.	6.4	6.1	8	37.	2.4	3.1	4	67.	-3.6	-6.9	-4
8.	6.4	2.1	5	38.	2.4	-1.9	-4	68.	-3.6	-4.9	-4
9.	6.4	6.1	7	39.	.4	-1.9	0	69.	-3.6	-.9	-3
10.	6.4	5.1	0	40.	.4	3.1	5	70.	-3.6	-2.9	-8
11.	6.4	6.1	5	41.	.4	1.1	0	71.	-4.6	-10.9	-7
12.	6.4	2.1	3	42.	.4	1.1	-1	72.	-4.6	-2.9	4
13.	4.4	5.1	3	43.	.4	5.1	4	73.	-4.6	-8.9	-8
14.	4.4	1.1	4	44.	.4	3.1	3	74.	-4.6	-8.9	-5
15.	4.4	3.1	5	45.	.4	1.1	0	75.	-4.6	-1.9	1
16.	4.4	-.9	-1	46.	.4	-1.9	-5	76.	-4.6	-5.9	-7
17.	4.4	5.1	4	47.	.4	2.1	-1	77.	-5.6	-5.9	-5
18.	4.4	5.1	3	48.	.4	-5.9	-3	78.	-5.6	-6.9	-7
19.	4.4	6.1	8	49.	.4	1.1	1	79.	-7.6	-1.9	-5
20.	4.4	-2.9	-4	50.	-.6	6.1	4	80.	-7.6	2.1	-1
21.	3.4	3.1	7	51.	-.6	2.1	-1	81.	-7.6	-.9	-7
22.	3.4	5.1	3	52.	-.6	2.1	-1	82.	-8.6	-5.9	-5
23.	3.4	5.1	3	53.	-.6	2.1	-4	83.	-8.6	-5.9	-5
24.	3.4	-.9	4	54.	-.6	-2.9	-4	84.	-8.6	-9.9	-13
25.	3.4	2.1	4	55.	-.6	-2.9	-7	85.	-9.6	-10.9	-12
26.	3.4	6.1	4	56.	-1.6	2.1	3	86.	-9.6	-8.9	-5
27.	3.4	3.1	-1	57.	-1.6	1.1	0	87.	-9.6	-4.9	-7
28.	3.4	3.1	1	58.	-1.6	3.1	5	88.	-9.6	-4.9	-4
29.	2.4	2.1	0	59.	-1.6	-.9	0				
30.	2.4	3.1	7	60.	-1.6	-4.9	-4				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Heredity and Environment."

DEVIATIONS FROM WITHIN-GROUP D MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	9	6.6	7.8	31.	1	-1.4	1.8	61.	-3	-4.4	.8
2.	9	6.6	7.8	32.	1	3.6	1.8	62.	-3	-1.4	-2.2
3.	7	3.6	1.8	33.	1	5.6	1.8	63.	-3	1.6	1.8
4.	7	3.6	4.8	34.	1	-.4	-4.2	64.	-3	-2.4	-7.2
5.	7	3.6	5.8	35.	1	-1.4	1.8	65.	-3	-4.4	-3.2
6.	7	5.6	8.8	36.	1	-1.4	1.8	66.	-3	-1.4	-.2
7.	7	5.6	7.8	37.	1	3.6	3.8	67.	-4	-4.4	-3.2
8.	7	-.4	4.8	38.	1	-.4	-.2	68.	-4	-9.4	-8.2
9.	7	5.6	5.8	39.	1	-.4	.8	69.	-4	-4.4	-.2
10.	5	-.4	1.8	40.	0	3.6	4.8	70.	-4	-1.4	-3.2
11.	5	3.6	3.8	41.	0	-1.4	-.2	71.	-4	-.4	-4.2
12.	5	6.6	4.8	42.	0	1.6	-.2	72.	-4	-5.4	-3.2
13.	4	2.6	5.8	43.	0	6.6	4.8	73.	-4	-9.4	-8.2
14.	4	5.6	3.8	44.	0	-2.4	-3.2	74.	-4	-.4	1.8
15.	4	6.6	8.8	45.	0	-.4	-7.2	75.	-4	-10.4	-8.2
16.	4	1.6	3.8	46.	0	1.6	-2.2	76.	-4	-5.4	-10.2
17.	4	3.6	5.8	47.	0	-.4	.8	77.	-4	-.4	-10.2
18.	4	-.4	1.8	48.	0	-1.4	-6.2	78.	-5	-2.4	-.2
19.	4	3.6	-2.2	49.	0	-.4	-2.2	79.	-5	-1.4	-2.2
20.	4	-4.4	-3.2	50.	0	-4.4	-2.2	80.	-5	-1.4	-4.2
21.	3	3.6	4.8	51.	0	-1.4	1.8	81.	-5	-8.4	-10.2
22.	3	2.6	.8	52.	-1	5.6	4.8	82.	-7	-.4	1.8
23.	3	1.6	4.8	53.	-1	5.6	4.8	83.	-7	-1.4	-.2
24.	3	5.6	4.8	54.	-1	-4.4	-4.2	84.	-7	-10.4	-12.2
25.	3	3.6	7.8	55.	-1	1.6	-3.2	85.	-7	-5.4	-4.2
26.	3	5.6	-.2	56.	-1	-2.4	-3.2	86.	-7	-9.4	-7.2
27.	3	3.6	.8	57.	-1	-5.4	-6.2	87.	-9	-5.4	-6.2
28.	3	2.6	4.8	58.	-1	-1.4	.8	88.	-11	-8.4	-19.2
29.	1	2.6	.8	59.	-3	1.6	1.8				
30.	1	2.6	4.8	60.	-3	-1.4	1.8				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Heredity and Environment."

DEVIATIONS FROM WITHIN-GROUP E MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	8.9	7.6	7.1	31.	2.9	-.4	2.1	61.	-3.1	-4.4	-4.9
2.	8.9	7.6	6.1	32.	.9	1.5	2.1	62.	-3.1	-1.4	-5.9
3.	8.9	3.6	10.1	33.	.9	1.6	-.9	63.	-3.1	-.4	-6.9
4.	7.9	6.6	7.1	34.	.9	5.6	-.9	64.	-3.1	2.6	-1.9
5.	7.9	5.6	5.1	35.	.9	-.4	-4.9	65.	-3.1	-.4	-6.9
6.	6.9	5.6	3.1	36.	.9	-.4	-2.9	66.	-3.1	-4.4	-4.9
7.	6.9	1.6	5.1	37.	.9	3.6	5.1	67.	-3.1	-1.4	-5.9
8.	6.9	2.6	3.1	38.	.9	-1.4	2.1	68.	-4.1	-2.4	1.1
9.	6.9	2.6	5.1	39.	.9	5.6	1.1	69.	-4.1	1.6	-1.9
10.	4.9	3.6	3.1	40.	.9	1.6	5.1	70.	-4.1	-2.4	1.1
11.	4.9	1.6	5.1	41.	.9	-.4	3.1	71.	-4.1	-.4	-2.9
12.	4.9	2.6	3.1	42.	.9	1.6	1.1	72.	-4.1	-2.4	1.1
13.	4.9	3.6	3.1	43.	.9	-4.4	-.9	73.	-4.1	-6.4	-8.9
14.	4.9	2.6	6.1	44.	.9	-6.4	-1.9	74.	-4.1	-2.4	-4.9
15.	4.9	5.6	7.1	45.	-.1	2.6	3.1	75.	-5.1	-5.4	-.9
16.	3.9	5.6	3.1	46.	-.1	-.4	-.9	76.	-5.1	-5.4	-.9
17.	3.9	3.6	6.1	47.	-.1	1.6	2.1	77.	-5.1	-8.4	-5.9
18.	3.9	2.6	5.1	48.	-.1	1.6	5.1	78.	-5.1	2.6	2.1
19.	3.9	3.6	2.1	49.	-.1	5.6	5.1	79.	-7.1	-10.4	-8.9
20.	3.9	3.6	7.1	50.	-.1	-.4	3.1	80.	-7.1	-2.4	-.9
21.	2.9	1.6	-.9	51.	-.1	1.6	-.9	81.	-7.1	-1.4	-1.9
22.	2.9	2.6	1.1	52.	-.1	-.4	1.1	82.	-7.1	-8.4	-5.9
23.	2.9	3.6	-1.9	53.	-.1	-.4	2.1	83.	-7.1	-9.4	-10.9
24.	2.9	-1.4	-.9	54.	-1.1	-.4	3.1	84.	-7.1	-1.4	-5.9
25.	2.9	-1.4	-2.9	55.	-1.1	6.6	3.1	85.	-8.1	-4.4	-9.9
26.	2.9	3.6	3.1	56.	-1.1	-4.4	3.1	86.	-9.1	-12.4	-10.9
27.	2.9	6.6	2.1	57.	-1.1	-1.4	-1.9	87.	-9.1	-9.4	-9.9
28.	2.9	5.6	6.1	58.	-1.1	2.4	2.1	88.	-13.1	-10.4	-13.9
29.	2.9	3.6	1.1	59.	-1.1	-2.4	-1.9				
30.	2.9	-4.4	-.9	60.	-1.1	-5.4	-4.9				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Heredity and Environment."

DEVIATIONS FROM WITHIN-GROUP A MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	8.2	8.9	6.1	31.	2.2	-2.1	4.1	61.	-1.8	-11.1	-1.9
2.	8.2	4.9	8.1	32.	2.2	-.1	4.1	62.	-2.8	-.1	-3.9
3.	8.2	4.9	6.1	33.	2.2	3.9	1.1	63.	-3.8	1.9	2.1
4.	7.2	4.9	4.1	34.	2.2	1.9	.1	64.	-3.8	-2.1	1.1
5.	7.2	5.9	8.1	35.	2.2	-.1	1.1	65.	-3.8	-2.1	5.1
6.	7.2	7.9	8.1	36.	2.2	3.9	2.1	66.	-3.8	-14.1	-9.9
7.	7.2	8.9	8.1	37.	2.2	-.1	4.1	67.	-3.8	3.9	-3.9
8.	6.2	1.9	4.1	38.	2.2	-2.1	-1.9	68.	-3.8	-2.1	-5.9
9.	6.2	7.9	5.1	39.	2.2	-7.1	-2.9	69.	-3.8	-2.1	1.1
10.	6.2	8.9	8.1	40.	2.2	4.9	1.1	70.	-3.8	-8.1	-9.9
11.	6.2	5.9	6.1	41.	.2	3.9	4.1	71.	-3.8	-7.1	-3.9
12.	6.2	5.9	4.1	42.	.2	4.9	4.1	72.	-4.8	-3.1	.1
13.	6.2	5.9	6.1	43.	.2	.9	-3.9	73.	-4.8	-11.1	-9.9
14.	6.2	4.9	6.1	44.	.2	4.9	4.1	74.	-4.8	-2.1	.1
15.	6.2	.9	5.1	45.	.2	1.9	1.1	75.	-4.8	-2.1	-1.9
16.	6.2	4.9	5.1	46.	.2	-.1	.1	76.	-4.8	.9	-6.9
17.	4.2	5.9	5.1	47.	.2	1.9	-5.9	77.	-5.8	-7.1	1.1
18.	4.2	4.9	4.1	48.	.2	-.1	.1	78.	-5.8	-8.1	-11.9
19.	4.2	3.9	-1.9	49.	.2	-3.1	1.1	79.	-5.8	-8.1	-10.9
20.	4.2	-4.1	1.1	50.	.2	-3.1	-2.9	80.	-5.8	-3.1	-6.9
21.	4.2	4.9	5.1	51.	-.8	-.1	-1.9	81.	-5.8	-10.1	-11.9
22.	4.2	-2.1	.1	52.	-.8	.9	.1	82.	-8.8	-6.1	-3.9
23.	3.2	8.9	9.1	53.	-.8	4.9	1.1	83.	-8.8	-2.1	-10.9
24.	3.2	7.9	5.1	54.	-.8	-.1	2.1	84.	-8.8	-10.1	-6.9
25.	3.2	1.9	5.1	55.	-1.8	-4.1	-2.9	85.	-9.8	-11.1	-10.9
26.	3.2	8.9	2.1	56.	-1.8	.9	1.1	86.	-11.8	-14.1	-11.9
27.	3.2	4.9	2.1	57.	-1.8	.9	.1	87.	-12.8	-5.1	-6.9
28.	3.2	.9	1.1	58.	-1.8	-6.1	-5.9	88.	-13.8	-12.1	-7.9
29.	2.2	7.8	6.1	59.	-1.8	-6.1	-5.9				
30.	2.2	4.9	4.1	60.	-1.8	3.9	.1				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Choosing Your Occupation."

DEVIATIONS FROM WITHIN-GROUP B MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	11	5.5	4.7	31.	3	4.5	4.7	61.	-3	4.5	4.7
2.	9	6.5	8.9	32.	3	8.5	5.7	62.	-3	1.5	2.7
3.	8	8.5	9.7	33.	3	.5	4.7	63.	-3	-1.5	-2.3
4.	8	4.5	5.7	34.	3	4.5	2.7	64.	-3	.5	-6.3
5.	7	5.5	2.7	35.	3	.5	-6.3	65.	-3	-5.5	-2.3
6.	7	1.5	4.7	36.	3	-1.5	-3.3	66.	-3	-2.5	2.7
7.	7	6.5	6.7	37.	3	2.5	.7	67.	-3	-5.5	1.7
8.	5	2.5	4.7	38.	1	5.5	4.7	68.	-3	-6.5	-5.3
9.	5	1.5	4.7	39.	1	1.5	.7	69.	-3	-1.5	-6.3
10.	5	1.5	5.7	40.	1	2.5	2.7	70.	-3	-5.5	-6.3
11.	5	8.5	6.7	41.	1	2.5	1.7	71.	-4	-2.5	-5.3
12.	5	4.5	2.7	42.	0	4.5	6.7	72.	-4	1.5	1.7
13.	5	2.5	-1.3	43.	0	-1.5	-2.3	73.	-4	-5.5	-7.3
14.	5	1.5	1.7	44.	0	1.5	.7	74.	-4	-14.5	-6.3
15.	5	1.5	1.7	45.	0	1.5	.7	75.	-5	.5	-1.3
16.	5	4.5	4.7	46.	0	-5.5	1.7	76.	-5	-6.5	-7.3
17.	4	-1.5	-1.3	47.	0	.5	-1.3	77.	-5	-1.5	-2.3
18.	4	5.5	5.7	48.	0	-2.5	-5.3	78.	-7	-3.5	-3.3
19.	4	-1.5	-2.3	49.	0	-2.5	-2.3	79.	-8	6.5	2.7
20.	4	.5	2.7	50.	0	.5	.7	80.	-8	-2.5	-1.3
21.	4	2.5	.7	51.	0	-1.5	-1.5	81.	-8	-7.5	-9.3
22.	4	9.5	9.7	52.	0	-1.5	2.7	82.	-8	-1.5	-7.3
23.	4	-3.5	2.7	53.	-1	-1.5	1.7	83.	-8	-10.5	-9.3
24.	3	2.5	4.7	54.	-1	-10.5	-6.3	84.	-8	-7.5	-11.3
25.	3	1.5	5.7	55.	-1	.5	2.7	85.	-8	-9.5	-13.3
26.	3	4.5	4.7	56.	-1	5.5	1.7	86.	-9	-5.5	-6.3
27.	3	.5	-2.3	57.	-1	-1.5	-1.3	87.	-12	-2.5	-7.3
28.	3	5.5	.7	58.	-1	-2.5	-2.3	88.	-16	-19.5	-13.3
29.	3	1.5	4.7	59.	-3	.5	-6.3				
30.	3	.5	-1.3	60.	-3	.5	2.7				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Choosing Your Occupation."

DEVIATIONS FROM WITHIN-GROUP C MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	8	7	3.9	31.	3	4	5.9	61.	-2	-3	-2.1
2.	8	5	5.9	32.	3	3	3.9	62.	-2	1	1.9
3.	7	7	4.9	33.	2	5	5.9	63.	-2	-1	-.1
4.	7	7	5.9	34.	2	5	5.9	64.	-2	1	-2.1
5.	7	7	4.9	35.	2	4	3.9	65.	-2	-3	-6.1
6.	7	5	4.9	36.	2	-1	1.9	66.	-4	-8	-10.1
7.	6	3	4.9	37.	2	5	3.9	67.	-4	-1	-.1
8.	6	8	4.9	38.	2	-7	.9	68.	-4	1	1.9
9.	6	5	5.9	39.	2	3	4.9	69.	-4	-4	-2.1
10.	6	4	3.9	40.	0	1	1.9	70.	-4	-8	-7.1
11.	6	1	1.9	41.	0	1	3.9	71.	-4	-4	-2.1
12.	4	4	4.9	42.	0	1	-.1	72.	-4	0	-.1
13.	4	5	4.9	43.	0	4	.9	73.	-4	-12	-10.1
14.	4	7	7.9	44.	0	-3	-.1	74.	-4	0	-6.1
15.	4	3	4.9	45.	0	1	3.9	75.	-5	-7	-4.1
16.	4	4	1.9	46.	0	1	.9	76.	-5	-9	-11.1
17.	4	5	4.9	47.	0	-8	-3.1	77.	-5	-3	-8.1
18.	4	7	5.9	48.	-1	-3	1.9	78.	-5	-5	-10.1
19.	4	1	1.9	49.	-1	1	3.9	79.	-5	-5	-6.1
20.	4	4	4.9	50.	-1	-1	.9	80.	-6	-3	-3.1
21.	4	3	3.9	51.	-1	-1	.9	81.	-6	-11	-10.1
22.	4	4	1.9	52.	-1	3	.9	82.	-6	-5	-6.1
23.	4	1	1.9	53.	-1	3	3.9	83.	-8	-7	-12.1
24.	3	1	5.9	54.	-1	0	-.1	84.	-8	-4	-6.1
25.	3	-1	1.9	55.	-1	0	-7.1	85.	-9	-9	-10.1
26.	3	4	1.9	56.	-1	-7	-6.1	86.	-9	-11	-11.1
27.	3	5	5.9	57.	-1	-3	-4.1	87.	-12	-12	-14.1
28.	3	3	.9	58.	-2	1	1.9	88.	-13	-5	-15.1
29.	3	4	1.9	59.	-2	-3	3.9				
30.	3	5	5.9	60.	-2	0	-2.1				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Choosing Your Occupation."

DEVIATIONS FROM WITHIN-GROUP D MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	11.1	9.4	8.7	31.	2.1	2.4	1.7	61.	-1.9	-3.6	-10.3
2.	10.1	8.4	6.7	32.	2.1	4.4	4.7	62.	-3.9	-2.6	-1.3
3.	8.1	9.4	6.7	33.	2.1	-1.6	.7	63.	-3.9	-2.6	-2.3
4.	8.1	5.4	4.7	34.	2.1	-2.6	-2.3	64.	-3.9	-3.6	-2.3
5.	8.1	8.4	8.7	35.	2.1	.4	-2.3	65.	-3.9	-2.6	.7
6.	7.1	6.4	5.7	36.	2.1	-2.6	-3.3	66.	-3.9	-1.6	1.7
7.	7.1	4.4	5.7	37.	.1	-2.6	1.7	67.	-3.9	-1.6	-1.3
8.	7.1	9.4	8.7	38.	.1	4.4	4.7	68.	-3.9	-2.6	-2.3
9.	7.1	8.4	9.7	39.	.1	2.4	.7	69.	-3.9	-2.6	-2.3
10.	7.1	6.4	9.7	40.	.1	2.4	4.7	70.	-4.9	-2.6	-1.3
11.	7.1	1.4	4.7	41.	.1	4.4	2.7	71.	-4.9	-6.6	-5.3
12.	6.1	9.4	8.7	42.	.1	4.4	4.7	72.	-4.9	-3.6	-5.3
13.	6.1	6.4	6.7	43.	.1	-1.6	-1.3	73.	-4.9	-5.6	-6.3
14.	6.1	9.4	5.7	44.	.1	-2.6	-1.3	74.	-4.9	-3.6	-9.3
15.	6.1	1.4	2.7	45.	.1	-2.6	2.7	75.	-5.9	-5.6	-9.3
16.	4.1	6.4	8.7	46.	.1	-2.6	-7.3	76.	-5.9	-6.6	-5.3
17.	4.1	4.4	4.7	47.	.1	-2.6	-5.3	77.	-5.9	4.4	2.7
18.	4.1	5.4	2.7	48.	-.9	4.4	4.7	78.	-5.9	-6.6	-2.3
19.	4.1	8.4	5.7	49.	-.9	1.4	1.7	79.	-5.9	-9.6	-7.3
20.	4.1	1.4	1.7	50.	-.9	.4	.7	80.	-5.9	-6.6	-5.3
21.	4.1	-2.6	-3.3	51.	-.9	-6.6	-3.3	81.	-5.9	-11.6	-9.3
22.	3.1	5.4	8.7	52.	-.9	4.4	.7	82.	-7.9	-2.6	-6.3
23.	3.1	5.4	6.7	53.	-.9	-5.6	-5.3	83.	-7.9	-6.6	-14.3
24.	3.1	5.4	2.7	54.	-.9	-6.6	-2.3	84.	-7.9	-10.6	-5.3
25.	3.1	9.4	5.7	55.	-1.9	-2.6	-3.3	85.	-8.9	-6.6	-3.3
26.	3.1	5.4	2.7	56.	-1.9	.4	1.7	86.	-8.9	-10.6	-5.3
27.	3.1	5.4	2.7	57.	-1.9	-6.6	-2.3	87.	-8.9	-10.6	-7.3
28.	3.1	1.4	1.7	58.	-1.9	-1.6	-1.3	88.	-11.9	-2.6	-7.3
29.	2.1	-2.6	-1.3	59.	-1.9	-3.6	-6.3				
30.	2.1	-1.6	1.7	60.	-1.9	-1.6	-6.3				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Choosing Your Occupation."

DEVIATIONS FROM WITHIN-GROUP E MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	9.7	5	6.2	31.	2.7	2	1.2	61.	-4.3	-1	4.2
2.	9.7	7	6.2	32.	2.7	3	5.2	62.	-4.3	-3	-3.8
3.	7.7	7	4.2	33.	2.7	3	2.2	63.	-4.3	2	1.2
4.	6.7	9	4.2	34.	2.7	5	6.2	64.	-4.3	-6	1.2
5.	6.7	7	5.2	35.	2.7	3	4.2	65.	-4.3	-5	2.2
6.	6.7	2	5.2	36.	2.7	-5	-6.8	66.	-4.3	-6	-9.8
7.	6.7	2	1.2	37.	1.7	-1	1.2	67.	-4.3	-3	-2.8
8.	6.7	5	5.2	38.	1.7	1	.2	68.	-4.3	-6	-6.8
9.	5.7	3	4.2	39.	1.7	2	4.2	69.	-5.3	2	.2
10.	5.7	3	5.2	40.	1.7	2	4.2	70.	-5.3	-1	-1.8
11.	5.7	3	6.2	41.	1.7	-5	6.2	71.	-5.3	-3	-5.8
12.	5.7	5	6.2	42.	1.7	-5	-1.8	72.	-5.3	-1	-5.8
13.	5.7	6	6.2	43.	1.7	-2	.2	73.	-5.3	-2	-1.8
14.	5.7	6	5.2	44.	1.7	3	-1.8	74.	-5.3	-3	-5.8
15.	5.7	3	2.2	45.	-.3	1	4.2	75.	-5.3	-6	-3.8
16.	5.7	2	4.2	46.	-.3	2	4.2	76.	-5.3	-7	-7.8
17.	3.7	7	5.2	47.	-.3	2	4.2	77.	-5.3	-5	-10.8
18.	3.7	6	4.2	48.	-.3	7	5.2	78.	-5.3	-7	-1.8
19.	3.7	3	1.2	49.	-.3	2	.2	79.	-5.3	-3	-6.8
20.	3.7	3	4.2	50.	-.3	-3	-2.8	80.	-5.3	-3	.2
21.	3.7	5	-1.8	51.	-.3	1	-1.8	81.	-5.3	-6	-2.8
22.	3.7	6	6.2	52.	-.3	-6	-3.8	82.	-6.3	-7	-6.8
23.	3.7	3	4.2	53.	-1.3	1	-1.8	83.	-6.3	-10	-13.8
24.	3.7	3	1.2	54.	-1.3	1	2.2	84.	-6.3	-3	-2.8
25.	2.7	6	1.2	55.	-2.3	-2	2.2	85.	-8.3	-6	-5.8
26.	2.7	5	1.2	56.	-2.3	-3	.2	86.	-9.3	-3	-5.8
27.	2.7	5	6.2	57.	-2.3	-1	-1.8	87.	-10.3	-11	-9.8
28.	2.7	2	4.2	58.	-2.3	-2	-6.8	88.	-12.3	-15	-10.8
29.	2.7	5	1.2	59.	-2.3	-6	-9.8				
30.	2.7	-1	-1.8	60.	-2.3	-2	2.2				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Choosing Your Occupation."

DEVIATIONS FROM WITHIN-GROUP A MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	9.8	5.4	8.2	31.	2.8	2.4	-4.8	61.	-2.2	-5.6	-7.8
2.	7.8	6.4	5.2	32.	1.8	1.4	-.8	62.	-2.2	-1.6	-4.8
3.	6.8	5.4	7.2	33.	1.8	5.4	5.2	63.	-2.2	1.4	.2
4.	6.8	5.4	4.2	34.	1.8	5.4	-.8	64.	-2.2	-1.6	-2.8
5.	5.8	3.4	5.2	35.	1.8	-.6	-.8	65.	-2.2	-2.6	-2.8
6.	5.8	3.4	5.2	36.	1.8	3.4	4.2	66.	-4.2	-1.6	-2.8
7.	5.8	5.4	7.2	37.	1.8	1.4	-.8	67.	-4.2	1.4	4.2
8.	5.8	6.4	5.2	38.	1.8	1.4	4.2	68.	-4.2	-.6	-3.8
9.	5.8	3.4	3.2	39.	1.8	-.6	1.2	69.	-4.2	-4.6	-11.8
10.	3.8	5.4	5.2	40.	1.8	-4.6	.2	70.	-4.2	-4.6	-2.8
11.	3.8	3.4	8.2	41.	1.8	-4.6	.2	71.	-4.2	-10.6	-6.8
12.	3.8	5.4	3.2	42.	-.2	5.4	-2.8	72.	-5.2	-2.6	-2.8
13.	3.8	1.4	4.2	43.	-.2	1.4	-.8	73.	-5.2	-8.6	-2.8
14.	3.8	5.4	5.2	44.	-.2	-11.6	-.8	74.	-5.2	-.6	-3.8
15.	3.8	2.4	.2	45.	-.2	1.4	1.2	75.	-5.2	-6.6	-4.8
16.	3.8	3.4	4.2	46.	-.2	-5.6	-2.8	76.	-5.2	-8.6	-14.8
17.	3.8	2.4	4.2	47.	-.2	-5.6	3.2	77.	-6.2	3.4	7.2
18.	3.8	2.4	4.2	48.	-.2	1.4	.2	78.	-6.2	3.4	1.2
19.	3.8	2.4	3.2	49.	-.2	1.4	.2	79.	-6.2	-3.6	-4.8
20.	3.8	1.4	.2	50.	-.2	-.6	.2	80.	-6.2	-2.6	-.8
21.	3.8	7.4	5.2	51.	-1.2	2.4	4.2	81.	-6.2	-1.6	-4.8
22.	3.8	3.4	.2	52.	-1.2	-4.6	-4.8	82.	-6.2	-8.6	-4.8
23.	3.8	-2.6	3.2	53.	-1.2	-.6	.2	83.	-6.2	-2.6	-8.8
24.	3.8	-2.6	1.2	54.	-1.2	-2.6	-.8	84.	-6.2	-6.6	-8.8
25.	2.8	5.4	3.2	55.	-1.2	-.6	1.2	85.	-6.2	-6.6	-3.8
26.	2.8	2.4	4.2	56.	-1.2	2.4	-2.8	86.	-8.2	-4.6	-8.8
27.	2.8	5.4	3.2	57.	-1.2	-.6	-.8	87.	-8.2	-6.6	-7.8
28.	2.8	1.4	3.2	58.	-1.2	-2.6	-.8	88.	-8.2	-9.6	-4.8
29.	2.8	7.4	7.2	59.	-2.2	1.4	1.2				
30.	2.8	-2.6	-4.8	60.	-2.2	-2.6	-.8				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Your Earning Power."

DEVIATIONS FROM WITHIN-GROUP B MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	10.0	5.4	5.2	31.	2.0	3.4	4.2	61.	-1.0	1.4	1.2
2.	7.0	6.4	.2	32.	2.0	-.6	1.2	62.	-1.0	-6.6	-2.8
3.	7.0	6.4	8.2	33.	2.0	2.4	5.2	63.	-1.0	6.4	1.2
4.	7.0	2.4	5.2	34.	2.0	-.6	1.2	64.	-2.0	-.6	-2.8
5.	6.0	5.4	4.2	35.	2.0	2.4	3.2	65.	-2.0	5.4	-7.8
6.	6.0	6.4	5.2	36.	2.0	1.4	-2.8	66.	-2.0	1.4	-6.8
7.	6.0	7.4	8.2	37.	2.0	-.6	-.8	67.	-2.0	-4.6	-3.8
8.	4.0	6.4	5.2	38.	2.0	-4.6	1.2	68.	-2.0	-8.6	-7.8
9.	4.0	2.4	.2	39.	2.0	-.6	3.2	69.	-4.0	-1.6	-3.8
10.	4.0	3.4	1.2	40.	2.0	-1.6	.2	70.	-4.0	-5.6	-4.8
11.	4.0	3.4	-.8	41.	0	-2.6	.2	71.	-4.0	1.4	-.8
12.	4.0	6.4	5.2	42.	0	7.4	5.2	72.	-4.0	-10.6	-2.8
13.	4.0	3.4	3.2	43.	0	-1.6	-.8	73.	-5.0	-.6	.2
14.	4.0	2.4	4.2	44.	0	-1.6	1.2	74.	-5.0	-.6	5.2
15.	4.0	-.6	.2	45.	0	6.4	1.2	75.	-5.0	-2.6	-7.8
16.	4.0	-.6	.2	46.	0	1.4	1.2	76.	-5.0	-5.6	-4.8
17.	3.0	3.4	-6.8	47.	0	1.4	1.2	77.	-5.0	-9.6	-7.8
18.	3.0	5.4	5.2	48.	0	2.4	1.2	78.	-5.0	-2.6	-7.8
19.	3.0	5.4	7.2	49.	0	-2.6	-3.8	79.	-6.0	3.4	-.8
20.	3.0	5.4	4.2	50.	0	-5.6	1.2	80.	-6.0	-2.6	3.2
21.	3.0	-1.6	1.2	51.	-1.0	1.4	5.2	81.	-6.0	1.4	1.2
22.	3.0	-.6	7.2	52.	-1.0	-1.6	.2	82.	-6.0	-5.6	-6.8
23.	3.0	-8.6	1.2	53.	-1.0	5.4	1.2	83.	-8.0	-5.6	.2
24.	3.0	3.4	4.2	54.	-1.0	-.6	-.8	84.	-8.0	-8.6	-2.8
25.	3.0	-1.4	-6.8	55.	-1.0	-.6	3.2	85.	-8.0	-5.6	-3.8
26.	3.0	-1.6	-6.8	56.	-1.0	3.4	1.2	86.	-8.0	-6.6	-3.8
27.	2.0	1.4	1.2	57.	-1.0	5.4	-.8	87.	-9.0	-9.6	-11.8
28.	2.0	2.4	3.2	58.	-1.0	-5.6	-3.8	88.	-12.0	-8.6	-10.8
29.	2.0	-.6	-2.8	59.	-1.0	-1.6	1.2				
30.	2.0	1.4	5.2	60.	-1.0	-4.6	-4.8				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Your Earning Power."

DEVIATIONS FROM WITHIN-GROUP C MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	9.0	8.5	7.5	31.	3.0	.5	.5	61.	-3.0	-3.5	3.5
2.	7.0	4.5	3.5	32.	3.0	.5	.5	62.	-3.0	-5.5	-7.5
3.	7.0	2.5	6.5	33.	3.0	-1.5	-4.5	63.	-3.0	-10.5	-3.5
4.	7.0	4.5	3.5	34.	3.0	-6.5	-1.5	64.	-4.0	1.5	6.5
5.	7.0	4.5	6.5	35.	3.0	-7.5	-1.5	65.	-4.0	1.5	2.5
6.	7.0	2.5	8.5	36.	1.0	1.5	-4.5	66.	-4.0	-1.5	.5
7.	7.0	.5	2.5	37.	1.0	.5	-1.5	67.	-4.0	1.5	-4.5
8.	5.0	1.5	.5	38.	0	5.5	.5	68.	-4.0	.5	-.5
9.	5.0	2.5	4.5	39.	0	-1.5	-7.5	69.	-4.0	1.5	-1.5
10.	5.0	1.5	.5	40.	0	-1.5	.5	70.	-4.0	-13.5	-11.5
11.	5.0	1.5	4.5	41.	0	-3.5	-1.5	71.	-4.0	-7.5	-11.5
12.	5.0	2.5	-.5	42.	0	.5	.5	72.	-4.0	-5.5	-5.5
13.	4.0	4.5	2.5	43.	0	-5.5	-1.5	73.	-4.0	-9.5	-9.5
14.	4.0	1.5	2.5	44.	0	-3.5	-3.5	74.	-5.0	.5	-3.5
15.	4.0	5.5	6.5	45.	0	-5.5	-3.5	75.	-5.0	4.5	3.5
16.	4.0	4.5	6.5	46.	0	-3.5	-5.5	76.	-5.0	.5	-3.5
17.	4.0	8.5	7.5	47.	0	-3.5	-.5	77.	-5.0	8.5	3.5
18.	4.0	5.5	3.5	48.	0	-1.5	-1.5	78.	-5.0	-3.5	-5.5
19.	4.0	2.5	3.5	49.	0	2.5	-1.5	79.	-5.0	-5.5	-4.5
20.	4.0	4.5	-.5	50.	-1.0	4.5	3.5	80.	-5.0	-3.5	-.5
21.	4.0	1.5	.5	51.	-1.0	.5	.5	81.	-7.0	4.5	8.5
22.	4.0	1.5	2.5	52.	-1.0	-7.5	-3.5	82.	-7.0	1.5	-5.5
23.	4.0	8.5	7.5	53.	-1.0	-5.5	-1.5	83.	-7.0	-6.5	-4.5
24.	4.0	4.5	.5	54.	-1.0	-2.5	3.5	84.	-7.0	-1.5	-1.5
25.	3.0	5.5	4.5	55.	-1.0	2.5	-.5	85.	-7.0	-6.5	-11.5
26.	3.0	2.5	4.5	56.	-1.0	-10.5	-9.5	86.	-7.0	-2.5	-1.5
27.	3.0	6.5	2.5	57.	-1.0	.5	2.5	87.	-8.0	2.5	2.5
28.	3.0	-3.5	-4.5	58.	-3.0	1.5	.5	88.	-8.0	1.5	-.5
29.	3.0	2.5	-.5	59.	-3.0	2.5	2.5				
30.	3.0	-1.5	2.5	60.	-3.0	2.5	3.5				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Your Earning Power."

DEVIATIONS FROM WITHIN-GROUP D MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	10.3	6.2	4.4	31.	2.8	7.2	.4	61.	-3.2	-10.8	-3.6
2.	8.8	7.2	8.4	32.	2.8	-.8	.4	62.	-3.2	-2.8	-7.6
3.	7.8	5.2	3.4	33.	2.8	3.2	1.4	63.	-4.2	1.2	-2.6
4.	7.8	5.2	7.4	34.	2.8	1.2	-6.6	64.	-4.2	5.2	7.4
5.	7.8	3.2	7.4	35.	2.8	2.2	.4	65.	-4.2	-4.8	-10.6
6.	7.8	2.2	5.4	36.	2.8	-.8	.4	66.	-4.2	-.8	-3.6
7.	7.8	2.2	-3.6	37.	.8	2.2	5.4	67.	-4.2	3.2	.4
8.	6.8	5.2	3.4	38.	.8	3.2	.4	68.	-4.2	-6.8	-10.6
9.	6.8	5.2	5.4	39.	.8	2.2	-2.6	69.	-4.2	-8.8	-8.6
10.	6.8	5.2	7.4	40.	.8	2.2	-3.6	70.	-5.2	5.2	.4
11.	6.8	6.2	8.4	41.	.8	-1.8	-2.6	71.	-5.2	2.2	3.4
12.	6.8	5.2	3.4	42.	.8	-4.8	-2.6	72.	-5.2	-1.8	-6.6
13.	4.8	6.2	7.4	43.	-.2	2.2	4.4	73.	-5.2	1.2	-4.6
14.	4.8	2.2	3.4	44.	-.2	-1.8	5.4	74.	-5.2	-6.8	-7.6
15.	4.8	5.2	4.4	45.	-.2	2.2	-4.6	75.	-5.2	-1.8	-.6
16.	4.8	1.2	-2.6	46.	-.2	-8.8	-2.6	76.	-5.2	-10.8	-10.6
17.	4.8	1.2	3.4	47.	-.2	-2.8	-6.6	77.	-7.2	-2.8	-2.6
18.	4.8	3.2	.4	48.	-.2	1.2	-2.6	78.	-7.2	-.8	-.6
19.	4.8	-.8	5.4	49.	-.2	-.8	-3.6	79.	-7.2	6.2	5.4
20.	4.8	-1.8	3.4	50.	-1.2	1.2	-.6	80.	-7.2	-.8	-3.6
21.	3.8	3.2	.4	51.	-1.2	6.2	3.4	81.	-7.2	-2.8	-.6
22.	3.8	-.8	.4	52.	-1.2	-10.3	-4.6	82.	-7.2	-12.8	-.6
23.	3.8	5.2	7.4	53.	-1.2	2.2	3.4	83.	-7.2	-.8	1.4
24.	3.8	2.2	5.4	54.	-1.2	-6.8	-.6	84.	-7.2	-1.8	-4.6
25.	3.8	2.2	3.4	55.	-1.2	-.8	-6.6	85.	-7.2	-4.8	1.4
26.	3.8	2.2	7.4	56.	-1.2	-1.8	-2.6	86.	-7.2	-5.8	-3.6
27.	3.8	5.2	5.4	57.	-1.2	-4.8	-2.6	87.	-7.2	-4.8	-6.6
28.	3.8	-1.8	3.4	58.	-3.2	5.2	5.4	88.	-8.2	-2.8	-7.6
29.	3.8	-5.8	-8.6	59.	-3.2	-.8	3.4				
30.	3.8	-2.8	-7.6	60.	-3.2	-4.8	-6.6				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Your Earning Power."

DEVIATIONS FROM WITHIN-GROUP E MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	7.9	4.9	6	31.	1.9	-3.1	-2	61.	-2.1	-3.1	-2
2.	7.9	3.9	2	32.	1.9	-2.1	4	62.	-2.1	-4.1	-2
3.	7.9	3.9	6	33.	1.9	-3.1	5	63.	-2.1	-.1	2
4.	6.9	5.9	2	34.	1.9	-3.1	5	64.	-2.1	3.9	1
5.	6.9	5.9	8	35.	1.9	-3.1	0	65.	-2.1	1.9	1
6.	6.9	5.9	9	36.	.9	.9	1	66.	-2.1	1.9	-8
7.	6.9	1.9	2	37.	-.1	1.9	6	67.	-2.1	-4.1	-2
8.	6.9	1.9	6	38.	-.1	5.9	8	68.	-4.1	4.9	5
9.	6.9	1.9	1	39.	-.1	-6.1	0	69.	-4.1	-.1	-7
10.	5.9	.9	-4	40.	-.1	1.9	5	70.	-4.1	-4.1	-11
11.	5.9	3.9	1	41.	-.1	3.9	4	71.	-4.1	-7.1	-12
12.	5.9	4.9	4	42.	-.1	-.1	-2	72.	-4.1	-4.1	-7
13.	5.9	8.9	5	43.	-.1	1.9	-2	73.	-4.1	-3.1	-2
14.	3.9	5.9	5	44.	-.1	-.1	1	74.	-5.1	-3.1	-2
15.	3.9	7.9	4	45.	-.1	-.1	4	75.	-5.1	-3.1	-4
16.	3.9	.9	5	46.	-1.1	-.1	-1	76.	-5.1	-8.1	-4
17.	3.9	1.9	12	47.	-1.1	-.1	2	77.	-5.1	-4.1	-4
18.	3.9	5.9	5	48.	-1.1	.9	-4	78.	-5.1	1.9	2
19.	3.9	5.9	2	49.	-1.1	1.9	1	79.	-6.1	-2.1	-10
20.	3.9	-4.1	-4	50.	-1.1	3.9	6	80.	-6.1	-7.1	-6
21.	3.9	-3.1	4	51.	-1.1	.9	-3	81.	-6.1	-4.1	-3
22.	3.9	.9	4	52.	-1.1	-.1	-2	82.	-6.1	-3.1	-3
23.	2.9	1.9	4	53.	-1.1	-3.1	-6	83.	-6.1	-4.1	-6
24.	2.9	.9	-2	54.	-1.1	-4.1	1	84.	-6.1	-8.1	-8
25.	2.9	1.9	0	55.	-1.1	.9	-3	85.	-8.1	-.1	-7
26.	2.9	.9	1	56.	-1.1	-4.1	-2	86.	-8.1	-6.1	-3
27.	1.9	4.9	-3	57.	-1.1	-2.1	2	87.	-8.1	-2.1	1
28.	1.9	1.9	2	58.	-1.1	-2.1	-3	88.	-9.1	-7.1	-8
29.	1.9	-.1	1	59.	-1.1	-4.1	-7				
30.	1.9	-.1	5	60.	-2.1	.9	-6				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Your Earning Power."

APPENDIX F

TABLES OF DEVIATIONS FROM TOTAL GROUP MEANS

DEVIATIONS FROM TOTAL GROUP A MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	13.2	7.6	6.4	31.	1.2	-.4	-4.6	61.	-1.8	5.6	3.4
2.	7.2	5.6	6.4	32.	1.2	1.6	-2.6	62.	-1.8	-2.4	6.4
3.	7.2	5.6	3.4	33.	1.2	-.4	-6.6	63.	-1.8	-.4	-.6
4.	7.2	6.6	9.4	34.	1.2	2.6	1.4	64.	-1.8	-2.4	-2.6
5.	6.2	5.6	2.4	35.	1.2	-2.4	-.6	65.	-1.8	-.4	3.4
6.	5.2	7.6	7.4	36.	1.2	2.6	6.4	66.	-1.8	-4.4	-4.6
7.	5.2	5.6	9.4	37.	-.8	7.6	6.4	67.	-1.8	5.6	-2.6
8.	5.2	-2.4	-8.6	38.	-.8	1.6	2.4	68.	-1.8	-5.4	-8.6
9.	3.2	-.4	2.4	39.	-.8	1.6	2.4	69.	-2.8	6.6	3.4
10.	3.2	3.6	3.4	40.	-.8	6.6	1.4	70.	-2.8	-.4	-2.6
11.	2.2	5.6	1.4	41.	-.8	1.6	-.6	71.	-2.8	5.6	-2.6
12.	2.2	7.6	6.4	42.	-.8	-1.4	-.6	72.	-2.8	2.6	2.4
13.	2.2	7.6	5.4	43.	-.8	-1.4	-6.6	73.	-2.8	-4.4	-1.6
14.	2.2	9.6	11.4	44.	-.8	-8.4	-6.6	74.	-2.8	-1.4	-1.6
15.	2.2	-.4	-8.6	45.	-.8	-1.4	1.4	75.	-2.8	-4.4	-1.6
16.	2.2	9.6	10.4	46.	-.8	6.6	7.4	76.	-2.8	-6.4	-5.6
17.	2.2	-1.4	1.4	47.	-.8	2.6	3.4	77.	-4.8	2.6	1.4
18.	2.2	1.6	-4.6	48.	-1.8	2.6	2.4	78.	-4.8	-1.4	-1.6
19.	2.2	5.6	-2.6	49.	-1.8	6.6	-.6	79.	-4.8	-2.4	-1.6
20.	2.2	5.6	-.6	50.	-1.8	2.6	-.6	80.	-4.8	-2.4	-5.6
21.	2.2	1.6	-4.6	51.	-1.8	6.6	5.4	81.	-4.8	-5.4	-4.6
22.	2.2	10.6	7.4	52.	-1.8	1.6	6.4	82.	-4.8	-5.4	2.4
23.	2.2	-.4	-1.6	53.	-1.8	-2.4	-2.6	83.	-4.8	-8.4	-5.6
24.	2.2	-10.4	-6.6	54.	-1.8	9.6	2.4	84.	-5.8	-.4	1.4
25.	1.2	9.6	11.4	55.	-1.8	3.6	2.4	85.	-5.8	1.6	1.4
26.	1.2	3.6	-.6	56.	-1.8	-1.4	3.4	86.	-5.8	1.6	-1.6
27.	1.2	1.6	1.4	57.	-1.8	-2.4	-4.6	87.	-5.8	-8.4	-1.6
28.	1.2	7.6	2.4	58.	-1.8	-1.4	-1.6	88.	-5.8	-8.4	-4.6
29.	1.2	1.6	-2.6	59.	-1.8	5.6	1.4				
30.	1.2	1.6	-4.6	60.	-1.8	1.6	-.6				

Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Library Organization."

DEVIATIONS FROM TOTAL GROUP B MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	6.2	-1.4	-.6	31.	-.8	9.6	10.4	61.	-1.8	-1.4	-1.6
2.	6.2	5.6	3.4	32.	-.8	-.4	-.6	62.	-2.8	9.6	2.4
3.	5.2	9.6	14.4	33.	-.8	6.6	2.4	63.	-2.8	3.6	-1.6
4.	5.2	-4.4	2.4	34.	-.8	-1.4	2.4	64.	-2.8	3.6	-6.6
5.	5.2	-1.4	1.4	35.	-.8	2.6	-2.6	65.	-2.8	2.6	3.4
6.	5.2	6.6	-8.6	36.	-.8	3.6	-2.6	66.	-2.8	-2.4	6.4
7.	5.2	-2.4	3.4	37.	-.8	-1.4	-5.6	67.	-2.8	-4.4	-.6
8.	3.2	-1.4	-2.6	38.	-.8	-1.4	-4.6	68.	-2.8	-2.4	1.4
9.	3.2	3.6	6.4	39.	-.8	3.6	2.4	69.	-4.8	3.6	-.6
10.	3.2	9.6	5.4	40.	-.8	-4.4	-2.6	70.	-4.8	-4.4	-2.6
11.	3.2	-4.4	-.6	41.	-.8	-.4	-.6	71.	-4.8	-2.4	-1.6
12.	2.2	3.6	1.4	42.	-.8	-9.4	-5.6	72.	-4.8	1.6	-4.6
13.	2.2	-.4	3.4	43.	-.8	1.6	-1.6	73.	-4.8	9.6	5.4
14.	2.2	1.6	-1.6	44.	-.8	1.6	1.4	74.	-4.8	1.6	-2.6
15.	2.2	-5.4	-2.6	45.	-.8	-6.4	-4.6	75.	-4.8	-4.4	-1.6
16.	1.2	5.6	9.4	46.	-1.8	5.6	3.4	76.	-4.8	-1.4	1.4
17.	1.2	2.6	-1.6	47.	-1.8	7.6	3.4	77.	-4.8	-5.4	-6.6
18.	1.2	5.6	2.4	48.	-1.8	2.6	-6.6	78.	-4.8	-1.4	-8.6
19.	1.2	2.6	-2.6	49.	-1.8	1.6	1.4	79.	-5.8	-2.4	-6.6
20.	1.2	2.6	5.4	50.	-1.8	6.6	2.4	80.	-5.8	1.6	-1.6
21.	1.2	5.6	-1.6	51.	-1.8	-1.4	-.6	81.	-5.8	5.6	-4.6
22.	1.2	-.4	-4.6	52.	-1.8	3.6	-.6	82.	-5.8	-4.4	-.6
23.	1.2	7.6	2.4	53.	-1.8	3.6	2.4	83.	-5.8	-12.4	-2.6
24.	1.2	-2.4	-2.6	54.	-1.8	5.6	1.4	84.	-6.8	5.6	5.4
25.	1.2	2.6	2.4	55.	-1.8	3.6	-1.6	85.	-6.8	-4.4	-1.6
26.	1.2	3.6	-2.6	56.	-1.8	-.4	3.4	86.	-6.8	-4.4	-5.6
27.	1.2	3.6	1.4	57.	-1.8	3.6	-1.6	87.	-6.8	-10.4	-10.6
28.	1.2	-8.4	-4.6	58.	-1.8	1.6	-6.6	88.	-8.8	1.6	-2.6
29.	-.8	-2.4	-6.6	59.	-1.8	-5.4	-4.6				
30.	-.8	7.6	10.4	60.	-1.8	5.6	-4.6				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Library Organization."

DEVIATIONS FROM TOTAL GROUP C MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	9.2	-2.4	1.4	31.	2.2	-4.4	-1.6	61.	-.8	1.6	2.4
2.	7.2	7.6	6.4	32.	2.2	6.6	3.4	62.	-.8	1.6	-.6
3.	6.2	7.6	9.4	33.	2.2	6.6	9.4	63.	-.8	1.6	-2.6
4.	6.2	3.6	2.4	34.	2.2	5.6	2.4	64.	-1.8	-.4	5.4
5.	6.2	5.4	2.4	35.	2.2	-4.4	-2.6	65.	-1.8	2.6	3.4
6.	5.2	6.6	9.4	36.	1.2	-.4	-.6	66.	-1.8	-.4	1.4
7.	5.2	7.6	9.4	37.	1.2	2.6	3.4	67.	-1.8	3.6	3.4
8.	5.2	1.6	-.6	38.	1.2	3.6	7.4	68.	-1.8	5.6	2.4
9.	3.2	5.6	7.4	39.	1.2	9.6	1.4	69.	-1.8	5.6	-.6
10.	3.2	9.6	9.4	40.	1.2	2.6	3.4	70.	-1.8	9.6	3.4
11.	3.2	3.6	1.4	41.	1.2	6.6	-.6	71.	-1.8	5.6	2.4
12.	3.2	1.6	5.4	42.	1.2	5.6	1.4	72.	-1.8	-1.4	-.6
13.	3.2	7.6	7.4	43.	1.2	2.6	7.4	73.	-1.8	-1.4	-2.6
14.	3.2	5.6	-.6	44.	1.2	1.6	-.6	74.	-1.8	-4.4	-4.6
15.	3.2	5.6	10.4	45.	1.2	7.6	2.4	75.	-1.8	-2.4	-4.6
16.	3.2	6.6	1.4	46.	1.2	3.6	-6.6	76.	-1.8	-6.4	-6.6
17.	3.2	3.6	6.4	47.	1.2	-1.4	1.4	77.	-1.8	-5.4	-4.6
18.	3.2	7.6	-1.6	48.	1.2	2.6	2.4	78.	-1.8	-5.4	-2.6
19.	3.2	2.6	6.4	49.	1.2	-4.4	-1.6	79.	-1.8	-5.4	-4.6
20.	3.2	-.4	2.4	50.	1.2	-9.4	-2.6	80.	-2.8	5.6	7.4
21.	2.2	7.6	7.4	51.	1.2	-2.4	-.6	81.	-2.8	7.6	-1.6
22.	2.2	9.6	11.4	52.	1.2	1.6	-4.6	82.	-2.8	1.6	-2.6
23.	2.2	-.4	2.4	53.	1.2	-4.4	-6.6	83.	-4.8	5.6	6.4
24.	2.2	5.6	1.4	54.	-.8	2.6	1.4	84.	-4.8	5.6	2.4
25.	2.2	6.6	3.4	55.	-.8	1.6	3.4	85.	-4.8	-1.4	-.6
26.	2.2	3.6	1.4	56.	-.8	9.6	1.4	86.	-4.8	-1.4	-.6
27.	2.2	6.6	-.6	57.	-.8	1.6	2.4	87.	-5.8	-10.4	-4.6
28.	2.2	1.6	6.4	58.	-.8	2.6	-5.6	88.	-5.8	-4.4	-4.6
29.	2.2	7.6	3.4	59.	-.8	7.6	2.4				
30.	2.2	2.6	3.4	60.	-.8	2.6	3.4				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Library Organization."

DEVIATIONS FROM TOTAL GROUP D MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	7.2	7.6	10.4	31.	1.2	2.6	1.4	61.	-1.8	5.6	-4.6
2.	7.2	1.6	2.4	32.	1.2	2.6	2.4	62.	-1.8	1.6	-2.6
3.	6.2	5.6	5.4	33.	1.2	-1.4	-.6	63.	-1.8	5.6	-1.6
4.	6.2	1.6	-5.6	34.	1.2	-.4	-.6	64.	-1.8	1.6	-6.6
5.	5.2	2.6	-.6	35.	1.2	6.6	2.4	65.	-1.8	2.6	1.4
6.	5.2	-2.4	-1.6	36.	1.2	2.6	1.4	66.	-1.8	1.6	-.6
7.	3.2	9.6	7.4	37.	1.2	3.6	1.4	67.	-1.8	2.6	-1.6
8.	3.2	7.6	3.4	38.	1.2	-6.4	-2.6	68.	-1.8	-5.4	-.6
9.	3.2	10.6	9.4	39.	1.2	-.4	-2.6	69.	-1.8	3.6	3.4
10.	3.2	5.6	-.6	40.	1.2	-4.4	3.4	70.	-2.8	6.6	2.4
11.	3.2	6.6	2.4	41.	-.8	7.6	3.4	71.	-2.8	7.6	3.4
12.	3.2	-1.4	2.4	42.	-.8	6.6	3.4	72.	-2.8	5.6	5.4
13.	3.2	2.6	2.4	43.	-.8	9.6	7.4	73.	-2.8	-1.4	-4.6
14.	2.2	9.6	13.4	44.	-.8	-.4	-1.6	74.	-2.8	7.6	2.4
15.	2.2	2.6	1.4	45.	-.8	6.6	6.4	75.	-2.8	-1.4	-2.6
16.	2.2	2.6	2.4	46.	-.8	2.6	-4.6	76.	-2.8	-.4	-1.6
17.	2.2	5.6	9.4	47.	-.8	9.6	2.4	77.	-2.8	3.6	5.4
18.	2.2	5.6	2.4	48.	-.8	7.6	10.4	78.	-2.8	-1.4	-1.6
19.	2.2	5.6	2.4	49.	-.8	-.4	-1.6	79.	-2.8	-1.4	-1.6
20.	2.2	7.6	2.4	50.	-.8	6.6	-1.6	80.	-2.8	-1.4	-5.6
21.	2.2	7.6	7.4	51.	-.8	-12.4	-4.6	81.	-2.8	-5.4	-8.6
22.	2.2	-4.4	-4.6	52.	-.8	3.6	1.4	82.	-2.8	-5.4	-.6
23.	2.2	-2.4	-2.6	53.	-.8	1.6	-.6	83.	-2.8	-2.4	-2.6
24.	1.2	7.6	10.4	54.	-.8	2.6	3.4	84.	-2.8	-.4	-2.6
25.	1.2	6.6	5.4	55.	-.8	-2.4	-4.6	85.	-4.8	2.6	2.4
26.	1.2	6.6	6.4	56.	-.8	7.6	-.6	86.	-4.8	-.4	2.4
27.	1.2	3.6	9.4	57.	-.8	3.6	-2.6	87.	-5.8	-.4	-.6
28.	1.2	1.6	3.4	58.	-.8	2.6	1.4	88.	-5.8	-5.4	-4.6
29.	1.2	9.6	7.4	59.	-.8	-4.4	-2.6				
30.	1.2	5.6	5.4	60.	-.8	1.6	-2.6				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Library Organization."

DEVIATIONS FROM TOTAL GROUP E MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "LIBRARY ORGANIZATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	17.2	1.6	9.4	31.	2.2	-2.4	-5.6	61.	-.8	-8.4	-4.6
2.	6.2	-5.4	-2.6	32.	2.2	-4.4	1.4	62.	-.8	-10.4	-4.6
3.	6.2	1.6	1.4	33.	2.2	-2.4	-4.6	63.	-.8	-8.4	-5.6
4.	6.2	-8.4	-2.6	34.	2.2	-5.4	-6.6	64.	-1.8	-9.4	-1.6
5.	5.2	-9.4	-1.6	35.	2.2	-8.4	-2.6	65.	-1.8	-6.4	-1.6
6.	5.2	-9.4	5.4	36.	1.2	-4.4	-1.6	66.	-1.8	-9.4	-2.6
7.	5.2	-4.4	-5.6	37.	1.2	-8.4	-1.6	67.	-1.8	-5.4	-9.6
8.	5.2	-8.4	-1.6	38.	1.2	-8.4	-1.6	68.	-1.8	-6.4	-4.6
9.	5.2	-4.4	1.4	39.	1.2	-9.4	.4	69.	-1.8	-9.4	-5.6
10.	5.2	-9.4	-9.6	40.	1.2	-12.4	-.6	70.	-1.8	-12.4	-1.6
11.	4.2	-6.4	-4.6	41.	1.2	-8.4	2.4	71.	-1.8	-14.4	-13.6
12.	3.2	-5.4	-1.6	42.	1.2	-10.4	-4.6	72.	-1.8	-9.4	-4.6
13.	3.2	-6.4	-2.6	43.	1.2	-8.4	-4.6	73.	-1.8	-6.4	-.6
14.	3.2	-4.4	1.4	44.	1.2	-10.4	-4.6	74.	-2.8	-12.4	-4.6
15.	3.2	-6.4	-2.6	45.	1.2	-5.4	-4.6	75.	-2.8	-5.4	-4.6
16.	3.2	-2.4	1.4	46.	1.2	-.4	3.4	76.	-2.8	-13.4	-4.6
17.	3.2	-4.4	1.4	47.	1.2	-9.4	-4.6	77.	-2.8	-6.4	-2.6
18.	3.2	-8.4	-4.6	48.	1.2	-12.4	-5.6	78.	-2.8	-1.2	-6.6
19.	3.2	-4.4	-2.6	49.	1.2	-4.4	-4.6	79.	-2.8	-5.4	-5.6
20.	3.2	-6.4	-2.6	50.	1.2	-6.4	-9.6	80.	-4.8	-13.4	-6.6
21.	3.2	-4.4	-4.6	51.	-.8	-5.4	-4.6	81.	-4.8	-6.4	-5.6
22.	2.2	-6.4	-2.6	52.	-.8	-6.4	-5.6	82.	-4.8	-5.4	-2.6
23.	2.2	-2.4	2.4	53.	-.8	-10.4	.4	83.	-4.8	-13.4	-5.6
24.	2.2	-8.4	-8.6	54.	-.8	-13.4	-4.6	84.	-4.8	-10.4	-9.6
25.	2.2	-4.4	1.4	55.	-.8	-4.4	3.4	85.	-5.8	-6.4	-4.6
26.	2.2	-10.4	-2.6	56.	-.8	-9.4	1.4	86.	-5.8	-6.4	-2.6
27.	2.2	-6.4	-4.6	57.	-.8	-9.4	-4.6	87.	-6.8	-8.4	-2.6
28.	2.2	-9.4	-2.6	58.	-.8	-8.4	-4.6	88.	-6.8	-10.4	-8.6
29.	2.2	-10.4	-2.6	59.	-.8	-4.4	1.4				
30.	2.2	-10.4	-2.6	60.	-.8	-13.4	-6.6				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Library Organization."

DEVIATIONS FROM TOTAL GROUP A MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	9	.6	4.1	31.	3	6.6	4.1	61.	-3	-.4	-2.9
2.	9	6.6	8.1	32.	3	.6	1.1	62.	-3	-1.4	.1
3.	8	3.6	5.1	33.	3	2.6	-1.9	63.	-3	-3.4	-7.9
4.	8	6.6	8.1	34.	3	.6	2.1	64.	-3	-4.4	-2.9
5.	8	4.6	5.1	35.	1	3.6	2.1	65.	-3	-4.4	-6.9
6.	7	7.6	9.1	36.	1	4.6	1.1	66.	-4	-3.4	1.1
7.	7	2.6	4.1	37.	1	3.6	2.1	67.	-4	6.6	4.1
8.	7	4.6	2.1	38.	1	-1.4	.1	68.	-4	.6	2.1
9.	5	6.6	1.1	39.	1	2.6	.1	69.	-5	-3.4	-2.9
10.	5	7.6	8.1	40.	1	.6	-2.9	70.	-5	-8.4	-3.9
11.	5	2.6	1.1	41.	1	-4.4	-2.9	71.	-5	-1.4	-2.9
12.	5	2.6	5.1	42.	1	2.6	-1.9	72.	-5	.6	-1.9
13.	5	4.6	5.1	43.	1	.6	-2.9	73.	-5	-4.4	-2.9
14.	5	6.6	5.1	44.	0	4.6	4.1	74.	-5	2.6	2.1
15.	5	4.6	9.1	45.	0	2.6	2.1	75.	-5	-5.4	.1
16.	5	4.6	4.1	46.	0	.6	.1	76.	-5	-1.4	-2.9
17.	5	4.6	4.1	47.	0	-5.4	-1.9	77.	-7	-11.4	-11.9
18.	4	6.6	6.1	48.	0	-4.4	-5.9	78.	-7	-5.4	-9.9
19.	4	7.6	8.1	49.	0	-4.4	.1	79.	-8	-1.4	-1.9
20.	4	4.6	2.1	50.	0	.6	4.1	80.	-8	-5.4	-3.9
21.	4	3.6	4.1	51.	0	-3.4	-3.9	81.	-8	-8.4	-5.9
22.	4	.6	-2.9	52.	-1	-1.4	1.1	82.	-8	-8.4	-6.9
23.	4	.6	.1	53.	-1	2.6	2.1	83.	-9	2.6	1.1
24.	4	-.4	-2.9	54.	-1	7.6	-2.9	84.	-9	.6	4.1
25.	4	2.6	2.1	55.	-1	2.6	1.1	85.	-9	-9.4	-9.9
26.	4	-.4	1.1	56.	-1	-1.4	-1.9	86.	-9	-11.4	-11.9
27.	3	3.6	2.1	57.	-1	-1.4	1.1	87.	-11	-13.4	-11.9
28.	3	.6	1.1	58.	-1	-.4	1.1	88.	-11	-8.4	-10.9
29.	3	.6	1.1	59.	-1	-1.4	-5.9				
30.	3	6.6	4.1	60.	-3	.6	-2.9				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Heredity and Environment."

DEVIATIONS FROM TOTAL GROUP B MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	9	4.6	2.1	31.	1	.6	1.1	61.	-4	3.6	1.1
2.	8	2.6	4.1	32.	1	2.6	4.1	62.	-4	.6	.1
3.	8	4.6	4.1	33.	1	2.6	4.1	63.	-4	3.6	-1.9
4.	8	2.6	2.1	34.	1	2.6	6.1	64.	-4	-7.4	-1.9
5.	7	3.6	4.1	35.	1	.6	1.1	65.	-4	.6	1.1
6.	7	3.6	5.1	36.	1	4.6	1.1	66.	-4	-4.4	-1.9
7.	7	4.6	6.1	37.	1	-1.4	-6.9	67.	-5	.6	1.1
8.	7	7.6	9.1	38.	1	.6	.1	68.	-5	-4.4	-3.9
9.	7	3.6	5.1	39.	0	7.6	2.1	69.	-5	-4.4	-7.9
10.	5	2.6	4.1	40.	0	4.6	2.1	70.	-5	-1.4	1.1
11.	5	6.6	8.1	41.	0	4.6	4.1	71.	-5	-7.4	-7.9
12.	5	4.6	5.1	42.	0	3.6	2.1	72.	-5	-3.4	-2.9
13.	5	2.6	.1	43.	0	2.6	.1	73.	-5	-5.4	-7.9
14.	5	2.6	4.1	44.	0	3.6	4.1	74.	-5	-1.4	.1
15.	4	4.6	-1.9	45.	0	-3.4	1.1	75.	-5	.6	-10.9
16.	4	.6	1.1	46.	0	4.6	.1	76.	-7	.6	1.1
17.	4	2.6	.1	47.	0	.6	2.1	77.	-7	-4.4	.1
18.	4	3.6	4.1	48.	0	3.6	1.1	78.	-7	-1.4	-3.9
19.	3	.6	1.1	49.	0	2.6	-3.9	79.	-8	-3.4	.1
20.	3	6.6	1.1	50.	0	-1.4	-1.9	80.	-8	-.4	-9.9
21.	3	-.4	4.1	51.	0	-4.4	-7.9	81.	-9	-4.4	-6.9
22.	3	4.6	5.1	52.	-1	3.6	2.1	82.	-9	-11.4	-11.9
23.	3	-3.4	-7.9	53.	-1	-1.4	-2.9	83.	-9	-11.4	-11.9
24.	3	6.6	5.1	54.	-1	-3.4	1.1	84.	-11	-9.4	-9.9
25.	3	2.6	.1	55.	-1	2.6	-3.9	85.	-11	-5.4	-7.9
26.	3	-7.4	5.1	56.	-1	-1.4	4.1	86.	-11	-7.4	-11.9
27.	3	.6	4.1	57.	-1	-1.4	-1.9	87.	-13	-.4	-9.9
28.	1	4.6	6.1	58.	-1	-3.4	.1	88.	-13	-16.4	-11.9
29.	1	2.6	1.1	59.	-1	-4.4	.1				
30.	1	.6	2.1	60.	-3	2.6	2.1				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Heredity and Environment."

DEVIATIONS FROM TOTAL GROUP C MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	9	6.6	8.1	31.	3	6.6	.1	61.	-1	.6	1.1
2.	9	7.6	9.1	32.	3	-4.4	-3.9	62.	-3	-1.4	2.1
3.	8	7.6	8.1	33.	3	4.6	5.1	63.	-3	-7.4	.1
4.	8	7.6	6.1	34.	3	7.6	6.1	64.	-3	-1.4	-4.1
5.	8	4.6	4.1	35.	3	3.6	4.1	65.	-3	-1.4	-7.9
6.	7	6.6	8.1	36.	3	4.6	4.1	66.	-3	-1.4	-1.9
7.	7	7.6	9.1	37.	3	4.6	5.1	67.	-3	-5.4	-2.9
8.	7	3.6	6.1	38.	3	-.4	-2.9	68.	-3	-3.4	-2.9
9.	7	7.6	8.1	39.	1	-.4	1.1	69.	-3	.6	-1.9
10.	7	6.6	1.1	40.	1	4.6	6.1	70.	-3	-1.4	-6.9
11.	7	7.6	6.1	41.	1	2.6	1.1	71.	-4	-9.4	-5.9
12.	7	3.6	4.1	42.	1	2.6	.1	72.	-4	-1.4	5.1
13.	5	6.6	4.1	43.	1	6.6	5.1	73.	-4	-7.4	-6.9
14.	5	2.6	5.1	44.	1	4.6	4.1	74.	-4	-7.4	-3.9
15.	5	4.6	6.1	45.	1	2.6	1.1	75.	-4	-.4	2.1
16.	5	.6	.1	46.	1	-.4	-3.9	76.	-4	-4.4	-5.9
17.	5	6.6	5.1	47.	1	3.6	.1	77.	-5	-4.4	-3.9
18.	5	6.6	4.1	48.	1	-4.4	-1.9	78.	-5	-5.4	-5.9
19.	5	7.6	9.1	49.	1	2.6	2.1	79.	-7	-.4	-3.9
20.	5	-1.4	-2.9	50.	0	7.6	5.1	80.	-7	3.6	.1
21.	4	4.6	8.1	51.	0	3.6	.1	81.	-7	.6	-5.9
22.	4	6.6	4.1	52.	0	3.6	.1	82.	-8	-4.4	-3.9
23.	4	6.6	4.1	53.	0	3.6	-2.9	83.	-8	-4.4	-3.9
24.	4	.6	5.1	54.	0	-1.4	-2.9	84.	-8	-8.4	-11.9
25.	4	3.6	5.1	55.	0	-1.4	-5.9	85.	-9	-9.4	-10.9
26.	4	7.6	5.1	56.	-1	3.6	4.1	86.	-9	-7.4	-3.9
27.	4	4.6	.1	57.	-1	2.6	1.1	87.	-9	-3.4	-5.9
28.	4	4.6	2.1	58.	-1	4.6	6.1	88.	-9	-3.4	-2.9
29.	3	3.6	1.1	59.	-1	.6	1.1				
30.	3	4.6	6.1	60.	-1	-3.4	-2.9				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Heredity and Environment."

DEVIATIONS FROM TOTAL GROUP D MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	9	7.6	8.1	31.	1	-.4	6.1	61.	-3	-3.4	1.1
2.	9	7.6	8.1	32.	1	4.6	2.1	62.	-3	-.4	-1.9
3.	7	4.6	2.1	33.	1	6.6	2.1	63.	-3	2.6	2.1
4.	7	4.6	5.1	34.	1	.6	-3.9	64.	-3	-1.4	-6.9
5.	7	4.6	6.1	35.	1	-.4	2.1	65.	-3	-3.4	-2.9
6.	7	6.6	9.1	36.	1	-.4	2.1	66.	-3	-.4	.1
7.	7	6.6	8.1	37.	1	4.6	4.1	67.	-4	-3.4	-2.9
8.	7	.6	5.1	38.	1	.6	.1	68.	-4	-8.4	-7.9
9.	7	6.6	6.1	39.	1	.6	1.1	69.	-4	-3.4	.1
10.	5	.6	2.1	40.	0	4.6	5.1	70.	-4	-.4	-2.9
11.	5	4.6	4.1	41.	0	-.4	.1	71.	-4	.6	-3.9
12.	5	7.6	5.1	42.	0	2.6	.1	72.	-4	-5.4	-2.9
13.	4	3.6	6.1	43.	0	7.6	5.1	73.	-4	3.6	-2.9
14.	4	6.6	4.1	44.	0	-1.4	-2.9	74.	-4	.6	2.1
15.	4	7.6	9.1	45.	0	.6	-6.9	75.	-4	-9.4	-7.9
16.	4	2.6	4.1	46.	0	2.6	-1.9	76.	-4	-5.4	-9.9
17.	4	4.6	6.1	47.	0	.6	1.1	77.	-4	.6	-9.9
18.	4	.6	2.1	48.	0	-.4	-5.9	78.	-5	-1.4	.1
19.	4	4.6	-1.9	49.	0	.6	-1.9	79.	-5	-.4	-1.9
20.	4	-3.4	-2.9	50.	0	-3.4	-1.9	80.	-5	-.4	-3.9
21.	3	4.6	5.1	51.	0	-.4	2.1	81.	-5	-7.4	-9.9
22.	3	3.6	1.1	52.	-1	6.6	5.1	82.	-7	.6	2.1
23.	3	2.6	5.1	53.	-1	6.6	5.1	83.	-7	-.4	.1
24.	3	6.6	5.1	54.	-1	-3.4	-3.9	84.	-7	-9.4	-11.9
25.	3	4.6	8.1	55.	-1	2.6	-2.9	85.	-7	-4.4	-3.9
26.	3	6.6	.1	56.	-1	-1.4	-2.9	86.	-7	-8.4	-6.9
27.	3	4.6	1.1	57.	-1	-4.4	-5.9	87.	-9	-4.4	-5.9
28.	3	3.6	5.1	58.	-1	-.4	1.1	88.	-11	-7.4	-18.9
29.	1	3.6	1.1	59.	-3	2.6	2.1				
30.	1	3.6	5.1	60.	-1	-.4	2.1				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Heredity and Environment."

DEVIATIONS FROM TOTAL GROUP E MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "HEREDITY AND ENVIRONMENT"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	9	4.6	6.1	31.	3	-3.4	1.1	61.	-3	-7.4	-5.9
2.	9	4.6	5.1	32.	1	-1.4	1.1	62.	-3	-4.4	-6.9
3.	9	.6	9.1	33.	1	-1.4	-1.9	63.	-3	-3.4	-7.9
4.	8	3.6	6.1	34.	1	2.6	-1.9	64.	-3	-.4	-2.9
5.	8	2.6	4.1	35.	1	-3.4	-5.9	65.	-3	-3.4	-7.9
6.	7	2.6	2.1	36.	1	-3.4	-3.9	66.	-3	-7.4	-5.9
7.	7	-1.4	4.1	37.	1	.6	4.1	67.	-3	-4.4	-6.9
8.	7	-.4	2.1	38.	1	-4.4	1.1	68.	-4	-5.4	.1
9.	7	-.4	4.1	39.	1	2.6	.1	69.	-4	-1.4	-2.9
10.	5	2.6	2.1	40.	1	-1.4	4.1	70.	-4	-5.4	.1
11.	5	-1.4	4.1	41.	1	-3.4	2.1	71.	-4	-3.4	-3.9
12.	5	-.4	2.1	42.	1	-1.4	.1	72.	-4	-5.4	.1
13.	5	.6	2.1	43.	1	-7.4	-1.9	73.	-4	-9.4	-9.9
14.	5	-.4	5.1	44.	1	-8.4	-2.9	74.	-4	-5.4	-5.9
15.	5	2.6	6.1	45.	0	-.4	2.1	75.	-5	-8.4	-7.9
16.	4	2.6	2.1	46.	0	-3.4	-1.9	76.	-5	-8.4	-1.9
17.	4	.6	5.1	47.	0	-1.4	1.1	77.	-5	-11.4	-6.9
18.	4	-.4	4.1	48.	0	-1.4	4.1	78.	-5	-.4	1.1
19.	4	.6	1.1	49.	0	2.6	4.1	79.	-7	-13.4	-9.9
20.	4	.6	6.1	50.	0	-3.4	2.1	80.	-7	-5.4	-1.9
21.	3	-1.4	-1.9	51.	0	-1.4	-1.9	81.	-7	-4.4	-2.9
22.	3	-.4	.1	52.	0	-3.4	.1	82.	-7	-11.4	-6.9
23.	3	.6	-2.9	53.	0	-3.4	1.1	83.	-7	-12.4	-11.9
24.	3	-4.4	-1.9	54.	-1	-3.4	2.1	84.	-7	-4.4	-6.9
25.	3	-4.4	-3.9	55.	-1	3.6	2.1	85.	-8	-7.4	-10.9
26.	3	.6	2.1	56.	-1	-7.4	2.1	86.	-9	-15.4	-11.9
27.	3	3.6	1.1	57.	-1	-4.4	-2.9	87.	-9	-12.4	-10.9
28.	3	2.6	5.1	58.	-1	-5.4	.1	88.	-13	-13.4	-14.9
29.	3	.6	.1	59.	-1	-7.4	-2.9				
30.	3	-7.4	-1.9	60.	-1	-8.4	-5.9				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Heredity and Environment."

DEVIATIONS FROM TOTAL GROUP A MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	8.2	9.1	6.3	31.	2.2	-1.9	4.3	61.	-1.8	-10.9	-1.7
2.	8.2	5.1	8.3	32.	2.2	.1	4.3	62.	-2.8	.1	-3.7
3.	8.2	5.1	6.3	33.	2.2	4.1	1.3	63.	-3.8	2.1	2.3
4.	7.2	5.1	4.3	34.	2.2	2.1	.3	64.	-3.8	-1.9	1.3
5.	7.2	6.1	8.3	35.	2.2	.1	1.3	65.	-3.8	-1.9	5.3
6.	7.2	8.1	8.3	36.	2.2	4.1	2.3	66.	-3.8	-13.9	-9.7
7.	7.2	9.1	8.3	37.	2.2	.1	4.3	67.	-3.8	4.1	-2.7
8.	6.2	2.1	4.3	38.	2.2	-1.9	-1.7	68.	-3.6	-1.9	-5.7
9.	6.2	8.1	5.3	39.	2.2	-6.9	-2.7	69.	-3.6	-1.9	1.3
10.	6.2	9.1	8.3	40.	2.2	5.1	1.3	70.	-3.8	-7.9	-9.7
11.	6.2	6.1	6.3	41.	.2	4.1	4.3	71.	-3.8	-6.9	-3.7
12.	6.2	6.1	4.3	42.	.2	5.1	4.3	72.	-4.8	-2.9	.3
13.	6.2	6.1	6.3	43.	.2	1.1	-3.7	73.	-4.8	-10.9	-9.7
14.	6.2	5.1	6.3	44.	.2	5.1	4.3	74.	-4.8	-1.9	.3
15.	6.2	1.1	5.3	45.	.2	2.1	1.3	75.	-4.8	-1.9	-1.7
16.	6.2	5.1	5.3	46.	.2	.1	.3	76.	-4.8	1.1	-6.7
17.	4.2	6.1	5.3	47.	.2	2.1	-5.7	77.	-5.8	-6.9	1.3
18.	4.2	5.1	4.3	48.	.2	.1	.3	78.	-5.8	-7.9	-11.7
19.	4.2	4.1	-1.7	49.	.2	-2.9	1.3	79.	-5.8	-7.9	-10.7
20.	4.2	-3.9	1.3	50.	.2	2.9	-2.7	80.	-5.8	-2.9	-6.7
21.	4.2	5.1	5.3	51.	-.8	.1	-1.7	81.	-5.8	-9.9	-11.7
22.	4.2	-1.9	.3	52.	-.8	1.1	.3	82.	-8.8	-7.9	-3.7
23.	3.2	9.1	9.3	53.	-.8	5.1	1.3	83.	-8.8	-1.9	-10.7
24.	3.2	8.1	5.3	54.	-.8	.1	2.3	84.	-8.8	-9.9	-6.7
25.	3.2	2.1	5.3	55.	-1.8	-3.9	-2.7	85.	-9.8	-10.9	-10.7
26.	3.2	9.1	2.3	56.	-1.8	2.1	2.3	86.	-11.8	-13.9	-11.7
27.	3.2	5.1	2.3	57.	-1.8	2.1	1.3	87.	-12.8	-3.9	-6.7
28.	3.2	1.1	1.3	58.	-1.8	-5.9	-5.7	88.	-13.8	-11.9	-7.7
29.	2.2	8.1	6.3	59.	-1.8	-5.9	-5.7				
30.	2.2	5.1	4.3	60.	-1.8	4.1	.3				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Choosing Your Occupation."

DEVIATIONS FROM TOTAL GROUP B MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	10.2	5.1	4.3	31.	2.2	6.1	4.3	61.	-3.8	4.1	4.3
2.	8.2	6.1	8.3	32.	2.2	8.1	5.3	62.	-3.8	1.1	2.3
3.	7.2	8.1	9.3	33.	2.2	.1	4.3	63.	-3.8	-1.9	-2.7
4.	7.2	4.1	5.3	34.	2.2	4.1	2.3	64.	-3.8	.1	-6.7
5.	6.2	5.1	2.3	35.	2.2	.1	-6.7	65.	-3.8	-5.9	-2.7
6.	6.2	1.1	4.3	36.	2.2	-1.9	-3.7	66.	-3.8	-2.9	2.3
7.	6.2	6.1	6.3	37.	2.2	2.1	.3	67.	-3.8	-5.9	1.3
8.	4.2	2.1	4.3	38.	.2	5.1	4.3	68.	-3.8	-6.9	-5.7
9.	4.2	1.1	4.3	39.	.2	1.1	.3	69.	-3.8	-1.9	-6.7
10.	4.2	1.1	5.3	40.	.2	2.1	2.3	70.	-3.8	-5.9	-6.7
11.	4.2	8.1	6.3	41.	.2	2.1	1.3	71.	-4.8	-2.9	-5.7
12.	4.2	4.1	2.3	42.	-.8	4.1	6.3	72.	-4.8	1.1	1.3
13.	4.2	2.1	-1.7	43.	-.8	-1.9	-2.7	73.	-4.8	-5.9	-7.7
14.	4.2	1.1	1.3	44.	-.8	1.1	.3	74.	-4.8	-14.9	-6.7
15.	4.2	1.1	1.3	45.	-.8	1.1	.3	75.	-5.8	.1	-1.7
16.	4.2	4.1	4.3	46.	-.8	-5.9	1.3	76.	-5.8	-6.9	-5.7
17.	3.2	-1.9	-1.7	47.	-.8	.1	-1.7	77.	-5.8	-1.9	-2.7
18.	3.2	5.1	5.3	48.	-.8	-2.9	-5.7	78.	-7.8	-3.9	-3.7
19.	3.2	-1.9	-2.7	49.	-.8	-1.9	-2.7	79.	-8.8	6.1	2.3
20.	3.2	.1	2.3	50.	-.8	.1	.3	80.	-8.8	-2.9	-1.7
21.	3.2	2.1	.3	51.	-.8	-1.9	-2.7	81.	-8.8	-7.9	-9.7
22.	3.2	9.1	9.3	52.	-.8	-1.9	2.3	82.	-8.8	-1.9	-7.7
23.	3.2	-3.9	2.3	53.	-1.8	-1.9	1.3	83.	-8.8	-10.9	-9.7
24.	2.2	2.1	4.3	54.	-1.8	-10.9	-6.7	84.	-8.8	-7.9	-11.7
25.	2.2	1.1	5.3	55.	-1.8	.1	2.3	85.	-8.8	-9.9	-13.7
26.	2.2	4.1	4.3	56.	-1.8	5.1	1.3	86.	-9.8	-5.9	-6.7
27.	2.2	.1	-2.7	57.	-1.8	-1.9	-1.7	87.	-12.8	-2.9	-7.7
28.	2.2	5.1	.3	58.	-1.8	-2.9	-2.7	88.	-16.8	-19.9	-13.7
29.	2.2	1.1	4.3	59.	-3.8	.1	-6.7				
30.	2.2	.1	-1.7	60.	-3.8	.1	2.3				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Choosing Your Occupation."

DEVIATIONS FROM TOTAL GROUP C MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	8.2	8.1	4.3	31.	3.2	5.1	6.3	61.	-1.8	-1.9	-1.7
2.	8.2	6.1	6.3	32.	3.2	4.1	4.3	62.	-1.8	2.1	2.3
3.	7.2	8.1	5.3	33.	2.2	6.1	6.3	63.	-1.8	.1	.3
4.	7.2	8.1	6.3	34.	2.2	6.1	6.3	64.	-1.8	2.1	-1.7
5.	7.2	8.1	5.3	35.	2.2	5.1	4.3	65.	-1.8	-1.9	-5.7
6.	7.2	6.1	5.3	36.	2.2	.1	2.3	66.	-3.8	-6.9	-9.7
7.	6.2	4.1	5.3	37.	2.2	6.1	4.3	67.	-3.8	.1	.3
8.	6.2	9.1	5.3	38.	2.2	-5.9	1.3	68.	-3.8	2.1	2.3
9.	6.2	6.1	6.3	39.	2.2	4.1	5.3	69.	-3.8	-2.9	-1.7
10.	6.2	5.1	4.3	40.	.2	2.1	2.3	70.	-3.8	-6.9	-6.7
11.	6.2	2.1	2.3	41.	.2	2.1	4.3	71.	-3.8	-2.9	-1.7
12.	4.2	5.1	5.3	42.	.2	2.1	.3	72.	-3.8	1.1	.3
13.	4.2	6.1	5.3	43.	.2	5.1	1.3	73.	-3.8	-10.9	-9.7
14.	4.2	8.1	8.3	44.	.2	-1.9	.3	74.	-3.8	1.1	-5.7
15.	4.2	4.1	5.3	45.	.2	2.1	4.3	75.	-4.8	-5.9	-3.7
16.	4.2	5.1	2.3	46.	.2	2.1	1.3	76.	-4.8	-7.9	-10.7
17.	4.2	6.1	5.3	47.	.2	-6.9	-2.7	77.	-4.8	-1.9	-7.7
18.	4.2	8.1	6.3	48.	-.8	-1.9	2.3	78.	-4.8	-3.9	-9.7
19.	4.2	2.1	2.3	49.	-.8	2.1	4.3	79.	-4.8	-3.9	-5.7
20.	4.2	5.1	5.3	50.	-.8	.1	1.3	80.	-5.8	-1.9	-2.7
21.	4.2	4.1	4.3	51.	-.8	.1	1.3	81.	-5.9	-9.8	-9.7
22.	4.2	5.1	2.3	52.	-.8	4.1	1.3	82.	-5.8	-3.9	-5.7
23.	4.2	2.1	2.3	53.	-.8	4.1	4.3	83.	-7.8	-5.9	-11.7
24.	3.2	2.1	6.3	54.	-.8	1.1	.3	84.	-7.8	-2.9	-5.7
25.	3.2	.1	2.3	55.	-.8	1.1	-6.7	85.	-8.8	-7.9	-9.7
26.	3.2	5.1	2.3	56.	-.8	-5.9	-5.7	86.	-8.8	-9.9	-10.7
27.	3.2	6.1	6.3	57.	-.8	-1.9	-3.7	87.	-11.8	-10.9	-13.7
28.	3.2	4.1	1.3	58.	-1.8	2.1	2.3	88.	-12.8	-3.9	-14.7
29.	3.2	5.1	2.3	59.	-1.8	-1.9	4.3				
30.	3.2	6.1	6.3	60.	-1.8	1.1	-1.7				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Choosing Your Occupation."

DEVIATIONS FROM TOTAL GROUP D MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	11.2	9.1	8.3	31.	2.2	2.1	1.7	61.	-1.8	-3.9	-10.7
2.	10.2	8.1	6.3	32.	2.2	4.1	4.3	62.	-3.8	-2.9	-1.7
3.	8.2	9.1	6.3	33.	2.2	-1.9	.3	63.	-3.8	-2.9	-2.7
4.	8.2	5.1	4.3	34.	2.2	-2.9	-2.7	64.	-3.8	-3.9	-2.7
5.	8.2	8.1	8.3	35.	2.2	.1	-2.7	65.	-3.8	-2.9	.3
6.	7.2	6.1	5.3	36.	2.2	-2.9	-3.7	66.	-3.8	-1.9	1.3
7.	7.2	4.1	5.3	37.	.2	-2.9	1.3	67.	-3.8	-1.9	-1.7
8.	7.2	9.1	8.3	38.	.2	4.1	4.3	68.	-3.8	-2.9	-2.7
9.	7.2	8.1	9.3	39.	.2	2.1	.3	69.	-3.8	-2.9	-2.7
10.	7.2	6.1	9.3	40.	.2	2.1	4.3	70.	-4.8	-2.9	-1.7
11.	7.2	1.1	4.3	41.	.2	4.1	2.3	71.	-4.8	-6.9	-5.7
12.	6.2	9.1	8.3	42.	.2	4.1	4.3	72.	-4.8	-3.9	-5.7
13.	6.2	6.1	6.3	43.	.2	-1.9	-1.7	73.	-4.8	-5.9	-6.7
14.	6.2	9.1	5.3	44.	.2	-2.9	-1.7	74.	-4.8	-3.9	-9.7
15.	6.2	1.1	2.3	45.	.2	-2.9	2.3	75.	-5.8	-5.9	-9.7
16.	4.2	6.1	8.3	46.	.2	-2.9	-7.7	76.	-5.8	-6.9	-5.7
17.	4.2	4.1	4.3	47.	.2	-2.9	-5.7	77.	-5.8	4.1	2.3
18.	4.2	5.1	2.3	48.	-.8	4.1	4.3	78.	-5.8	-6.9	-2.7
19.	4.2	8.1	5.3	49.	-.8	1.1	1.3	79.	-5.8	-9.9	-7.7
20.	4.2	1.1	1.3	50.	-.8	.1	.3	80.	-5.8	-6.9	-5.7
21.	4.2	-2.9	-3.7	51.	-.8	-6.9	-3.7	81.	-5.8	-11.9	-9.7
22.	3.2	5.1	8.3	52.	-.8	4.1	.3	82.	-7.8	-2.9	-6.7
23.	3.2	5.1	6.3	53.	-.8	-5.9	-5.7	83.	-7.8	-6.9	-14.7
24.	3.2	5.1	2.3	54.	-.8	-6.9	-2.7	84.	-7.8	-10.9	-9.7
25.	3.2	9.1	5.3	55.	-1.8	-2.9	-3.7	85.	-8.8	-6.9	-3.7
26.	3.2	5.1	2.3	56.	-1.8	.1	1.3	86.	-8.8	-10.9	-5.7
27.	3.2	5.1	2.3	57.	-1.8	-6.9	-2.7	87.	-8.8	-10.9	-7.7
28.	3.2	1.1	1.3	58.	-1.8	-1.9	-1.9	88.	-11.8	-2.9	-7.7
29.	2.2	-2.9	-1.7	59.	-1.8	-3.9	-6.7				
30.	2.2	-1.9	1.3	60.	-1.8	-1.9	-6.7				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Choosing Your Occupation."

DEVIATIONS FROM TOTAL GROUP E MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "CHOOSING YOUR OCCUPATION"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	10.2	4.1	6.3	31.	3.2	1.1	1.3	61.	-3.8	-1.9	4.3
2.	10.2	6.1	6.3	32.	3.2	2.1	5.3	62.	-3.8	-3.9	-3.7
3.	8.2	6.1	4.3	33.	3.2	2.1	2.3	63.	-3.8	1.1	1.3
4.	7.2	8.1	4.3	34.	3.2	4.1	6.3	64.	-3.8	-6.9	1.3
5.	7.2	6.1	5.3	35.	3.2	2.1	4.3	65.	-3.8	-5.9	2.3
6.	7.2	1.1	5.3	36.	3.2	-5.9	-6.7	66.	-3.8	-6.9	-9.7
7.	7.2	1.1	1.3	37.	2.2	-1.9	1.3	67.	-3.8	-3.9	-2.7
8.	7.2	4.1	5.3	38.	2.2	.1	.3	68.	-3.8	-6.9	-6.7
9.	6.2	2.1	4.3	39.	2.2	1.1	4.3	69.	-4.8	1.1	.3
10.	6.2	2.1	5.3	40.	2.2	2.1	4.3	70.	-4.8	-1.9	-1.7
11.	6.2	2.1	6.3	41.	2.2	-5.9	6.3	71.	-4.8	-3.9	-5.7
12.	6.2	4.1	6.3	42.	2.2	-5.9	-1.7	72.	-4.8	-1.9	-5.7
13.	6.2	5.1	6.3	43.	2.2	-2.9	.3	73.	-4.8	-2.9	-1.7
14.	6.2	5.1	5.3	44.	2.2	2.1	-1.7	74.	-4.8	-3.9	-5.7
15.	6.2	2.1	2.3	45.	.2	.1	4.3	75.	-4.8	-6.9	-3.7
16.	6.2	1.1	4.3	46.	.2	1.1	4.3	76.	-4.8	-7.9	-7.7
17.	4.2	6.1	5.3	47.	.2	1.1	4.3	77.	-4.8	-5.9	-10.7
18.	4.2	5.1	4.3	48.	.2	6.1	5.3	78.	-4.8	-7.9	-1.7
19.	4.2	2.1	1.3	49.	.2	1.1	.3	79.	-4.8	-3.9	-6.7
20.	4.2	2.1	4.3	50.	.2	-3.9	-2.7	80.	-4.8	-3.9	.3
21.	4.2	4.1	-1.7	51.	.2	.1	-1.7	81.	-4.8	-6.9	-2.7
22.	4.2	5.1	6.3	52.	.2	-6.9	-3.7	82.	-5.8	-7.9	-6.7
23.	4.2	2.1	4.3	53.	-.8	.1	-1.7	83.	-5.8	-10.9	-13.7
24.	4.2	2.1	1.3	54.	-.8	.1	2.3	84.	-5.8	-3.9	-2.7
25.	3.2	5.1	1.3	55.	-1.8	-2.9	-7.7	85.	-7.8	-6.9	-5.7
26.	3.2	4.1	1.3	56.	-1.8	-3.9	.3	86.	-8.8	-3.9	-5.7
27.	3.2	4.1	6.3	57.	-1.8	-1.9	-1.7	87.	-9.8	-11.9	-9.7
28.	3.2	1.1	4.3	58.	-1.8	-2.9	-6.7	88.	-11.8	-15.9	-10.7
29.	3.2	4.1	1.3	59.	-1.8	-6.9	-9.7				
30.	3.2	-1.9	-1.7	60.	-1.8	-2.9	2.3				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Choosing Your Occupation."

DEVIATIONS FROM TOTAL GROUP A MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	10.3	5.7	8.3	31.	3.3	2.7	-4.7	61.	-1.7	-5.3	-7.7
2.	8.3	6.7	5.3	32.	2.3	1.7	-.7	62.	-1.7	-1.3	-4.7
3.	7.3	5.7	7.3	33.	2.3	5.7	5.3	63.	-1.7	1.7	.3
4.	7.3	5.7	4.3	34.	2.3	5.7	-.7	64.	-1.7	-1.3	-2.7
5.	6.3	3.7	5.3	35.	2.3	-.3	-.7	65.	-1.7	-2.3	-2.7
6.	6.3	3.7	5.3	36.	2.3	3.7	4.3	66.	-3.7	-1.3	-2.7
7.	6.3	5.7	7.3	37.	2.3	1.7	-.7	67.	-3.7	1.7	4.3
8.	6.3	6.7	5.3	38.	2.3	1.7	4.3	68.	-3.7	-.3	-3.7
9.	6.3	3.7	3.3	39.	2.3	-.3	1.3	69.	-3.7	-3.4	-11.7
10.	4.3	5.7	5.3	40.	2.3	-4.3	.3	70.	-3.7	-4.3	-2.7
11.	4.3	3.7	8.3	41.	2.3	-4.3	.3	71.	-3.7	-10.3	-6.7
12.	4.3	5.7	3.3	42.	.3	5.7	-2.7	72.	-4.7	-2.3	-2.7
13.	4.3	1.7	4.3	43.	.3	1.7	-.7	73.	-4.7	-8.3	-2.7
14.	4.3	5.7	5.3	44.	.3	-1.3	-.7	74.	-4.7	-.3	-3.7
15.	4.3	2.7	.3	45.	.3	1.7	1.3	75.	-4.7	-6.3	-4.7
16.	4.3	3.7	4.3	46.	.3	-5.3	-2.7	76.	-4.7	-8.3	-14.7
17.	4.3	2.7	4.3	47.	.3	-5.3	3.3	77.	-5.7	3.7	7.3
18.	4.3	2.7	4.3	48.	.3	1.7	.3	78.	-5.7	3.7	1.3
19.	4.3	2.7	3.3	49.	.3	1.7	.3	79.	-5.7	-3.3	-4.7
20.	4.3	1.7	.3	50.	.3	-.3	.3	80.	-5.7	-2.3	-.7
21.	4.3	7.7	5.3	51.	-.7	2.7	4.3	81.	-5.7	-1.3	.3
22.	4.3	3.7	.3	52.	-.7	-4.3	-4.7	82.	-5.7	-8.3	-4.7
23.	4.3	-2.3	3.3	53.	-.7	-.3	.3	83.	-5.7	-2.3	-8.7
24.	4.3	-2.3	1.3	54.	-.7	-2.3	-.7	84.	-5.7	-4.3	-8.7
25.	3.3	5.7	3.3	55.	-.7	-.3	1.3	85.	-5.7	-6.3	-3.7
26.	3.3	2.7	4.3	56.	-.7	2.7	-2.7	86.	-7.7	-4.3	-8.7
27.	3.3	5.7	3.3	57.	-.7	-.3	-.7	87.	-7.7	-6.3	-7.7
28.	3.3	1.7	3.3	58.	-.7	-2.3	-.7	88.	-7.7	-9.3	-4.7
29.	3.3	7.7	7.3	59.	-1.7	1.7	1.3				
30.	3.3	-2.3	-4.7	60.	-1.7	-2.3	-.7				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Your Earning Power."

DEVIATIONS FROM TOTAL GROUP B MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	10.3	5.7	5.3	31.	2.3	3.7	4.3	61.	-.7	1.7	1.3
2.	7.3	6.7	.3	32.	2.3	-.3	1.3	62.	-.7	-6.3	-2.7
3.	7.3	6.7	8.3	33.	2.3	2.7	5.3	63.	-.7	6.7	1.3
4.	7.3	2.7	5.3	34.	2.3	1.7	1.3	64.	-1.7	-.3	-2.7
5.	6.3	5.7	4.3	35.	2.3	2.7	3.3	65.	-1.7	5.7	-7.7
6.	6.3	6.7	5.3	36.	2.3	1.7	-2.7	66.	-1.7	1.7	-6.7
7.	6.3	7.7	8.3	37.	2.3	-.3	-.7	67.	-1.7	-4.3	-3.7
8.	4.3	6.7	5.3	38.	2.3	-4.3	1.3	68.	-1.7	-8.3	-7.7
9.	4.3	2.7	.3	39.	2.3	-.3	3.3	69.	-3.7	-1.3	-3.7
10.	4.3	3.7	1.3	40.	2.3	-1.3	.3	70.	-3.7	-5.3	-4.7
11.	4.3	3.7	-.7	41.	.3	-2.3	.3	71.	-3.7	1.7	-.7
12.	4.3	6.7	5.3	42.	.3	7.7	5.3	72.	-3.7	-10.3	-2.7
13.	4.3	3.7	3.3	43.	.3	-1.3	-.7	73.	-4.7	-.3	.3
14.	4.3	2.7	4.3	44.	.3	-1.3	1.3	74.	-4.7	-.3	5.3
15.	4.3	-.3	.3	45.	.3	6.7	1.3	75.	-4.7	-2.3	-7.7
16.	4.3	-.3	.3	46.	.3	1.7	1.3	76.	-4.7	-5.3	-4.7
17.	3.3	3.7	-6.7	47.	.3	1.7	1.3	77.	-4.7	-9.3	-7.7
18.	3.3	5.7	5.3	48.	.3	2.7	1.3	78.	-4.7	-2.3	-7.7
19.	3.3	5.7	7.3	49.	.3	-2.3	-3.7	79.	-5.7	4.7	-.7
20.	3.3	5.7	4.3	50.	.3	-5.3	1.3	80.	-5.7	-2.3	3.3
21.	3.3	-1.3	1.3	51.	-.7	1.7	5.3	81.	-5.7	1.7	1.3
22.	3.3	-.3	7.3	52.	-.7	-1.3	.3	82.	-5.7	-5.3	-6.7
23.	3.3	-8.3	1.3	53.	-.7	5.7	1.3	83.	-7.7	-5.3	.3
24.	3.3	3.7	4.3	54.	-.7	-.3	-.7	84.	-7.7	-8.3	-2.7
25.	3.3	1.7	-6.7	55.	-.7	-.3	3.3	85.	-7.7	-5.3	-3.7
26.	3.3	-1.3	-6.7	56.	-.7	3.7	1.3	86.	-7.7	-6.3	-3.7
27.	2.3	1.7	1.3	57.	-.7	5.7	-.7	87.	-8.7	-9.3	-11.7
28.	2.3	2.7	3.3	58.	-.7	-5.3	-3.7	88.	-11.7	-8.3	-10.7
29.	2.3	-.3	-2.7	59.	-.7	-1.3	1.3				
30.	2.3	1.7	5.3	60.	-.7	-4.3	-4.7				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Your Earning Power."

DEVIATIONS FROM TOTAL GROUP C MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	8.3	9.7	8.3	31.	2.3	1.7	1.3	61.	-3.7	-2.3	4.3
2.	6.3	5.7	4.3	32.	2.3	1.7	1.3	62.	-3.7	-4.3	-6.7
3.	6.3	3.7	7.3	33.	2.3	-.3	-3.7	63.	-3.7	-9.3	-2.7
4.	6.3	5.7	4.3	34.	2.3	-5.3	-.7	64.	-4.7	2.7	7.3
5.	6.3	5.7	7.3	35.	2.3	-6.3	-.7	65.	-4.7	2.7	3.3
6.	6.3	3.7	9.3	36.	.3	2.7	-3.7	66.	-4.7	-.3	1.3
7.	6.3	1.7	3.3	37.	.3	1.7	-.7	67.	-4.7	2.7	-3.7
8.	4.3	2.7	1.3	38.	-.7	6.7	1.3	68.	-4.7	1.7	.3
9.	4.3	3.7	5.3	39.	-.7	-.3	-6.7	69.	-4.7	2.7	-.7
10.	4.3	2.7	1.3	40.	-.7	-.3	1.3	70.	-4.7	-12.3	-10.7
11.	4.3	2.7	5.3	41.	-.7	-2.3	-.7	71.	-4.7	-6.3	-10.7
12.	4.3	3.7	.3	42.	-.7	1.7	1.3	72.	-4.7	-4.3	-4.7
13.	3.3	5.7	3.3	43.	-.7	-4.3	-.7	73.	-4.7	-8.3	-8.7
14.	3.3	2.7	3.3	44.	-.7	-2.3	-2.7	74.	-5.7	1.7	-2.7
15.	3.3	6.7	7.3	45.	-.7	-4.3	-2.7	75.	-5.7	5.7	4.3
16.	3.3	5.7	7.3	46.	-.7	-2.3	-4.7	76.	-5.7	1.7	-2.7
17.	3.3	9.7	8.3	47.	-.7	-2.3	.3	77.	-5.7	9.7	4.3
18.	3.3	6.7	4.3	48.	-.7	-.3	-.7	78.	-5.7	-2.3	-4.7
19.	3.3	3.7	4.3	49.	-.7	3.7	-.7	79.	-5.7	-4.3	-3.7
20.	3.3	5.7	.3	50.	-1.7	5.7	4.3	80.	-5.7	-2.3	.3
21.	3.3	2.7	1.3	51.	-1.7	1.7	1.3	81.	-7.7	5.7	9.3
22.	3.3	2.7	3.3	52.	-1.7	-6.3	-2.7	82.	-7.7	2.7	-4.7
23.	3.3	9.7	8.3	53.	-1.7	-4.3	-.7	83.	-7.7	-5.3	-4.7
24.	3.3	5.7	1.3	54.	-1.7	-1.3	4.3	84.	-7.7	-.3	-.7
25.	2.3	6.7	5.3	55.	-1.7	3.7	-.7	85.	-7.7	-5.3	-10.7
26.	2.3	3.7	5.3	56.	-1.7	-9.3	-8.7	86.	-7.7	-1.3	-.7
27.	2.3	7.7	3.3	57.	-1.7	1.7	3.3	87.	-8.7	3.7	3.3
28.	2.3	-2.3	-3.7	58.	-3.7	2.7	1.3	88.	-8.7	1.7	.3
29.	2.3	3.7	.3	59.	-3.7	3.7	3.3				
30.	2.3	-.3	3.3	60.	-3.7	3.7	4.3				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Your Earning Power."

DEVIATIONS FROM TOTAL GROUP D MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	10.3	6.7	4.3	31.	2.3	7.7	.3	61.	-3.7	-10.3	-3.7
2.	8.3	7.7	8.3	32.	2.3	-.3	.3	62.	-3.7	-2.3	-7.7
3.	7.3	5.7	3.3	33.	2.3	3.7	1.3	63.	-4.7	1.7	-2.7
4.	7.3	5.7	7.3	34.	2.3	1.7	-6.7	64.	-4.7	5.7	7.3
5.	7.3	3.7	7.3	35.	2.3	2.7	.3	65.	-4.7	-4.3	-10.7
6.	7.3	2.7	5.3	36.	2.3	-.3	.3	66.	-4.7	-.3	-3.7
7.	7.3	2.7	-3.7	37.	.3	2.7	5.3	67.	-4.7	3.7	.3
8.	6.3	5.7	3.3	38.	.3	3.7	.3	68.	-4.7	-6.3	-10.7
9.	6.3	5.7	5.3	39.	.3	2.7	-2.7	69.	-4.7	-8.3	-8.7
10.	6.3	5.7	7.3	40.	.3	2.7	-3.7	70.	-5.7	5.7	.3
11.	6.3	6.7	8.3	41.	.3	-1.3	-2.7	71.	-5.7	2.7	3.3
12.	6.3	5.7	3.3	42.	.3	-4.3	-2.7	72.	-5.7	-1.3	-6.7
13.	4.3	6.7	7.3	43.	-.7	2.7	4.3	73.	-5.7	1.7	-4.7
14.	4.3	2.7	3.3	44.	-.7	-1.3	5.3	74.	-5.7	-6.3	-7.7
15.	4.3	5.7	4.3	45.	-.7	2.7	-4.7	75.	-5.7	-1.3	-.7
16.	4.3	1.7	-2.7	46.	-.7	-8.3	-2.7	76.	-5.7	-10.3	-10.7
17.	4.3	1.7	3.3	47.	-.7	-2.3	-6.7	77.	-7.7	-2.3	-2.7
18.	4.3	3.7	-.3	48.	-.7	-2.3	-2.7	78.	-7.7	-.3	-.7
19.	4.3	-1.3	5.3	49.	-.7	-.3	-3.7	79.	-7.7	6.7	5.3
20.	4.3	-1.3	3.3	50.	-1.7	1.7	-.7	80.	-7.7	-.3	-3.7
21.	3.3	3.7	.3	51.	-1.7	6.7	3.3	81.	-7.7	-2.3	-.7
22.	3.3	-.3	.3	52.	-1.7	-10.3	-4.7	82.	-7.7	-12.3	-.7
23.	3.3	5.7	7.3	53.	-1.7	2.7	3.3	83.	-7.7	-.3	1.3
24.	3.3	2.7	5.3	54.	-1.7	-6.3	-.7	84.	-7.7	-1.3	-4.7
25.	3.3	2.7	3.3	55.	-1.7	-.3	-6.7	85.	-7.7	-4.3	1.3
26.	3.3	2.7	7.3	56.	-1.7	-1.3	-2.7	86.	-7.7	-5.3	-3.7
27.	3.3	5.7	5.3	57.	-1.7	-1.3	-2.7	87.	-7.7	-4.3	-6.7
28.	3.3	-1.3	3.3	58.	-3.7	5.7	5.3	88.	-8.7	-2.3	-7.7
29.	3.3	-5.3	-3.7	59.	-3.7	-.3	3.3				
30.	3.3	-2.3	-2.7	60.	-3.7	-4.3	-6.7				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Your Earning Power."

DEVIATIONS FROM TOTAL GROUP E MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE GUIDANCE FILMS ENTITLED "YOUR EARNING POWER"

No.*	X	Y_1	Y_2	No.	X	Y_1	Y_2	No.	X	Y_1	Y_2
1.	8.3	2.7	5.3	31.	2.3	-5.3	-2.7	61.	-1.7	-5.3	-2.7
2.	8.3	1.7	1.3	32.	2.3	-4.3	3.3	62.	-1.7	-6.3	-2.7
3.	8.3	1.7	5.3	33.	2.3	-5.3	4.3	63.	-1.7	-2.3	1.3
4.	7.3	3.7	1.3	34.	2.3	-5.3	4.3	64.	-1.7	1.7	.3
5.	7.3	3.7	7.3	35.	2.3	-5.3	-.7	65.	-1.7	-.3	.3
6.	7.3	5.7	8.3	36.	1.3	-1.3	.3	66.	-1.7	-.3	-8.7
7.	7.3	-.3	1.3	37.	.3	-.3	5.3	67.	-1.7	-6.3	-2.7
8.	7.3	-.3	5.3	38.	.3	3.7	7.3	68.	-3.7	2.7	4.3
9.	7.3	-.3	.3	39.	.3	-8.3	-.7	69.	-3.7	-2.3	-7.7
10.	6.3	-1.3	-4.7	40.	.3	-.3	4.3	70.	-3.7	-6.3	-11.7
11.	6.3	1.7	.3	41.	.3	1.7	3.3	71.	-3.7	-9.3	-12.7
12.	6.3	2.7	3.3	42.	.3	-2.3	-2.7	72.	-3.7	-6.3	7.3
13.	6.3	6.7	4.3	43.	.3	-.3	-2.7	73.	-3.7	-5.3	-2.7
14.	4.3	3.7	4.3	44.	.3	-2.3	.3	74.	-4.7	-5.3	-2.7
15.	4.3	5.7	3.3	45.	.3	-2.3	3.3	75.	-4.7	-5.3	-4.7
16.	4.3	-1.3	4.3	46.	-.7	-2.3	-1.7	76.	-4.7	-10.3	-4.7
17.	4.3	-.3	11.3	47.	-.7	-2.3	1.3	77.	-4.7	-6.3	-4.7
18.	4.3	3.7	4.3	48.	-.7	-1.3	-4.7	78.	-4.7	-.3	1.3
19.	4.3	3.7	1.3	49.	-.7	-.3	.3	79.	-5.7	-4.3	-10.7
20.	4.3	-6.3	-4.7	50.	-.7	1.7	5.3	80.	-5.7	-9.3	-6.7
21.	4.3	-5.3	3.3	51.	-.7	-1.3	-3.7	81.	-5.7	-6.3	-3.7
22.	4.3	-1.3	3.3	52.	-.7	-2.3	-2.7	82.	-5.7	-5.3	-3.7
23.	3.3	-.3	-2.7	53.	-.7	-5.3	-6.7	83.	-5.7	-6.3	-6.7
24.	3.3	-1.3	-2.7	54.	-.7	-6.3	.3	84.	-5.7	-10.3	-8.7
25.	3.3	-.3	-.7	55.	-.7	-1.3	-3.7	85.	-7.7	-2.3	-7.7
26.	3.3	-1.3	.3	56.	-.7	-6.3	-2.7	86.	-7.7	-8.3	-3.7
27.	2.3	2.7	-3.7	57.	-.7	-4.3	1.3				
28.	2.3	-.3	1.3	58.	-.7	-4.3	-3.7				
29.	2.3	-2.3	.3	59.	-.7	-6.3	-7.7				
30.	2.3	-2.3	4.3	60.	-1.7	-1.3	-6.7				

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film entitled "Your Earning Power."

APPENDIX G

THE EXPLORATORY STUDY REPORT

EXPLORATORY STUDY

Six months prior to beginning the experiment that has been presented on the preceding pages, an exploratory study was conducted. The purposes were: (1) To determine problems of measuring the effect of instruction upon acquisition and retention of facts when presented by color film; (2) to determine problems of measuring the effect of instruction upon acquisition and retention of facts when presented by black and white film; (3) to help ascertain problems of comparing the results of the two different kinds of film instruction as they pertain to acquisition of facts; (4) to help determine problems of comparing the results of the two different kinds of film instruction as they relate to retention of facts; (5) to help ascertain what problems would be encountered in a similar study of larger proportions; (6) to statistically indicate the approximate size of population sample needed to get reliable results in another study of larger respects; and (7) to become better acquainted with experimental research procedures.

The three groups employed in this exploratory study were: Group A (who received instruction from color film); group C (who received instruction from black and white film);

and group E (the controls who received no instruction).

The 27 subjects participating in this study were freshman students enrolled in a General Psychology class at Southwestern State College, Weatherford, Oklahoma. The students were assigned to each group by random selection.

Immediately prior to seeing the film the subjects were given a pretest (X) to determine their initial knowledge of the facts presented by film. Following the pretest (X), group A saw a color film and as soon as this showing was completed, group C saw a black and white film presentation.

Group E received no instruction but waited for posttest (Y_1) to be administered. Following each type of film presentation groups A and C were given a posttest (Y_1) which tested for immediate acquisition of facts. Four weeks later, each subject was given a posttest (Y_2) to ascertain the amount of learning that had been retained.

The null hypotheses tested were: (1) There is no significant difference between the experimental and control groups in immediate learning from either the color or the black and white film; and (2) there is no significant difference between the experimental and control groups in the retention of facts from either the color or black and white film.

The procedures used to conduct the exploratory study were comparable to the foregoing research. Response measures, testing directions, experimental design and apparatus employed

were similar in scope and technique to that of the dissertation presented on the previous pages.

STATISTICAL ANALYSIS

Determining Sample Size

One of the first statistical procedures was that of determining what size population sample would be needed under comparable experimental conditions to be reasonably assured of obtaining reliable results. Lacey (12) points out that the mean and standard deviation of each group is needed for these computations and Table 1 presents this data. For the reader who is desirous of understanding the statistical procedures involved, Lacey's Statistical Methods in Experimentation (12, pp. 210-229) is suggested as a source of information.

TABLE 1

MEAN SCORES AND STANDARD DEVIATIONS OBTAINED FROM THREE GROUPS OF COLLEGE FRESHMEN ON PRETEST (X), POSTTEST (Y_1), AND POSTTEST (Y_2) MEASURES OF KNOWLEDGE ABOUT COLOR AND BLACK AND WHITE FILM CONTENT

Groups	Pretest (X)		Posttest (Y_1)		Posttest (Y_2)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
A	17.11	1.79	21.44	1.70	20.11	1.50
B	15.22	3.26	22.11	1.10	21.00	1.76
E	18.22	1.39	17.88	2.07	17.33	2.16

The statistical procedure employed for finding the number of subjects needed in each experimental group for reliable results revealed the following information: (1) On the posttest (Y_1), 37 subjects in each experimental group would be required for reliable results at the .05 level of confidence. (2) On the same measure, 62 students would be necessary in each group to get results at approximately the .01 level of confidence. (3) 27 subjects in each experimental group would be needed for results at the .05 level of confidence on posttest (Y_2). (4) On the same measure, 46 subjects in each group would be required to get results at about the .01 level of confidence.

Analysis of Scores During Acquisition

Selection of the primary statistical technique employed for analyzing the data was based upon the fact that previous equating of the groups was not attempted. This obviously introduced the possibility for initial differences in ability to exist. Hence, in any experiment where this may be an important source of variation, a method of analysis will need to be employed in which adjustments are made to the data in hand. Analysis of covariance is applicable to this situation because it makes valid comparisons possible, as Edwards (8, p. 335) points out in the following statements:

> The analysis of covariance is applicable to an experiment in which a source of variation, which it may not be possible to equalize between the various experimental groups prior to the experiment proper, can be measured. An adjustment is then made for this source of variation in

the analysis of the outcomes of the experiment. A case in point would be where levels of initial ability may condition the outcomes of the experiment, but where the subjects in the various groups have not been equated with respect to this variable prior to their assignment to the experimental conditions. If a record can be obtained of initial performance during the course of the experiment proper, the outcomes of the experiment may be adjusted for this source of variation.

The subjects of each group were presented with three different experimental situations: Group A, the group that received instruction from a color film presentation; group C, the group that received instruction from a black and white film presentation; and, group E, the control group that did not receive instruction, but who merely took the same tests as the other groups.

In this section of the Statistical Analysis the variable Y_1 was considered to be the performance of the subjects under experimental conditions involving the acquisition of facts that were presented in the film. Prior to obtaining the Y_1 measures, each subject was given a pretest which was designated as X. X scores were considered to be the initial knowledge about the film content which the subjects possessed at the beginning of the experiment.

The X scores of the three groups of subjects are recorded in Table 2 according to the numerical value of the score beginning with the highest score and proceeding to the lowest. The Y_1 scores of the three groups of subjects are recorded in Table 3. The order in which the Y_1 scores appear depends upon the position of each subject's X score. For

TABLE 2

PRETEST (X) SCORES MADE BY THREE GROUPS OF COLLEGE FRESHMEN ON THE TEST CONSTRUCTED FROM THE FILM CONTENT*

	Groups		
No.**	A	C	E
1.	21	21	20
2.	19	18	19
3.	16	18	19
4.	16	17	19
5.	15	17	19
6.	14	17	18
7.	14	16	18
8.	13	16	17
9.	9	14	15

*Scores are expressed in units of the number of correct responses.

**Number designates subjects. Subjects will maintain this assigned number in subsequent tables.

TABLE 3

POSTTEST (Y_1) SCORES MADE BY THREE GROUPS OF COLLEGE FRESHMEN ON THE TEST CONSTRUCTED FROM COLOR AND BLACK-WHITE FILM CONTENT

	Groups		
No.	A	C	E
1.	23	24	21
2.	24	21	20
3.	22	22	20
4.	21	23	16
5.	22	22	15
6.	22	23	18
7.	22	19	16
8.	23	20	19
9.	20	19	16

example, the subject in group A who has an X score of 21 has a Y_1 score of 23. The scores are placed in this manner for the purpose of later computations.

Prior to computing the analysis of covariance, Edwards (8) indicates than an analysis of variance will need to be calculated on both the pretest (X) and posttest (Y_1) scores. Edwards (8) also states that homogeneity of variance between groups of data must exist before an analysis of variance can be computed. This assumption can be tested by the use of Bartlett's Test of Homogeneity of Variance (8, pp. 195-197). Computations were made using the data in Table 2. Table 4 presents the data used in the Chi Square test of the homogeneity of three variance estimates. Since there are three groups, this Chi Square has 2 degrees of freedom. The obtained Chi Square of 5.91 failed to reach significance at the .05 level of confidence indicating that the assumption of equality of population variances was not contradicted.

TABLE 4

CHI SQUARE TEST OF THE HOMOGENEITY OF THREE GROUPS OF COLLEGE FRESHMEN

Group	Σx^2	df	$\frac{1}{n}$	Variance Estimate s^2	Log s^2	n Log s^2
A	95.6	8	.125	12.0	1.07918	8.63344
C	28.9	8	.125	3.6	.55630	4.45040
E	17.6	8	.125	2.2	.34242	2.73936
SUM	142.1	24	.375			15.82320

Tate (20) states that the fundamental assumption underlying correlation analysis is that of linearity of regression. Before beginning an analysis it is advisable to plot the data both for the total group and for each group and to fit regression lines to the plotted data as has been done in Figures 1 and 2. Inspection of the regression lines and the dispersion of the data about the lines indicates that the assumption of linearity of regression can be considered tenable.

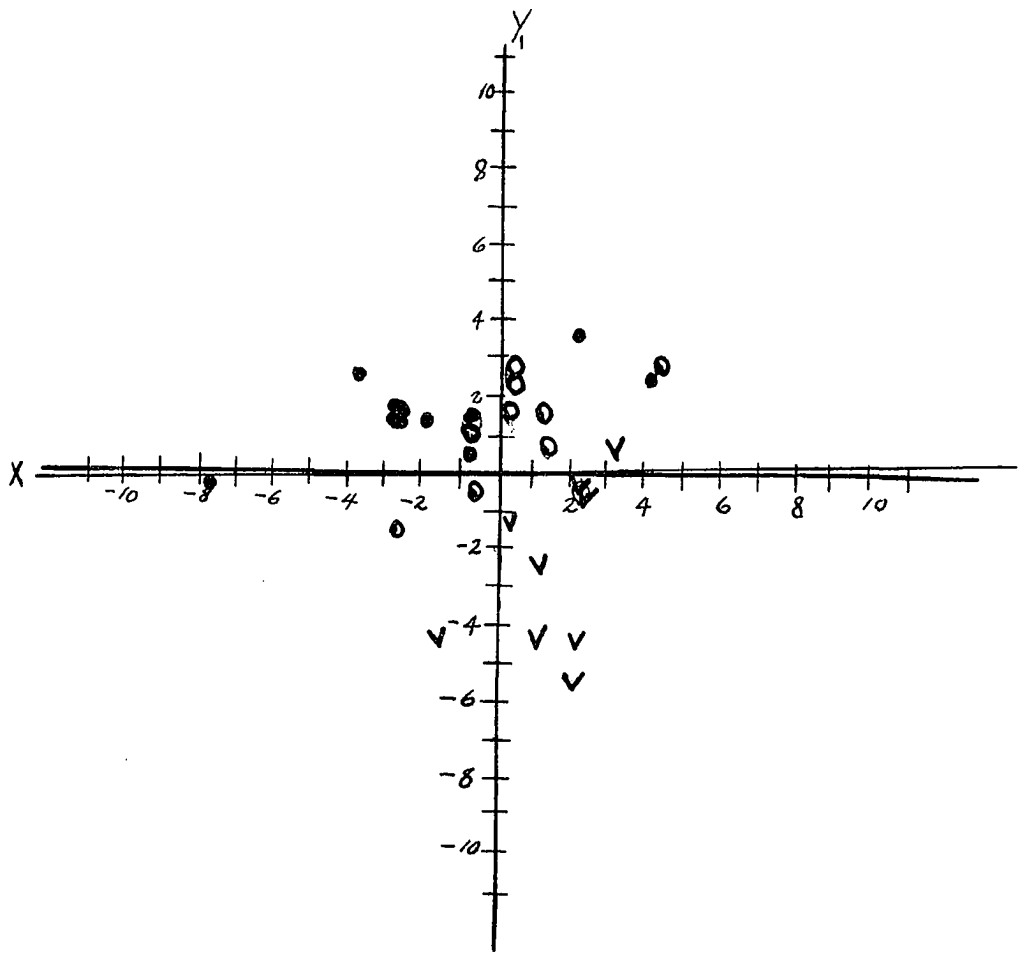
Having established the homogeneity and linearity of regression assumptions, the appropriate analysis of variance was calculated for the pretest (X) scores of all subjects. The summary of this analysis is presented in Table 5. The obtained F value of 3.50 was sufficient to indicate that statistically significant differences existed beyond the .05 level of confidence for 2 and 24 degrees of freedom. It can

TABLE 5

ANALYSIS OF VARIANCE OF PRETEST (X) SCORES MADE BY THREE GROUPS OF COLLEGE FRESHMEN ON THE TEST CONSTRUCTED FROM THE FILM CONTENT

Source of Variation	Sum of Squares	df	Mean Square	F
Between groups	41.3	2	20.7	3.50*
Within groups	142.1	24	5.9	
TOTAL	183.4	26		

*Significant beyond the .05 level of confidence.



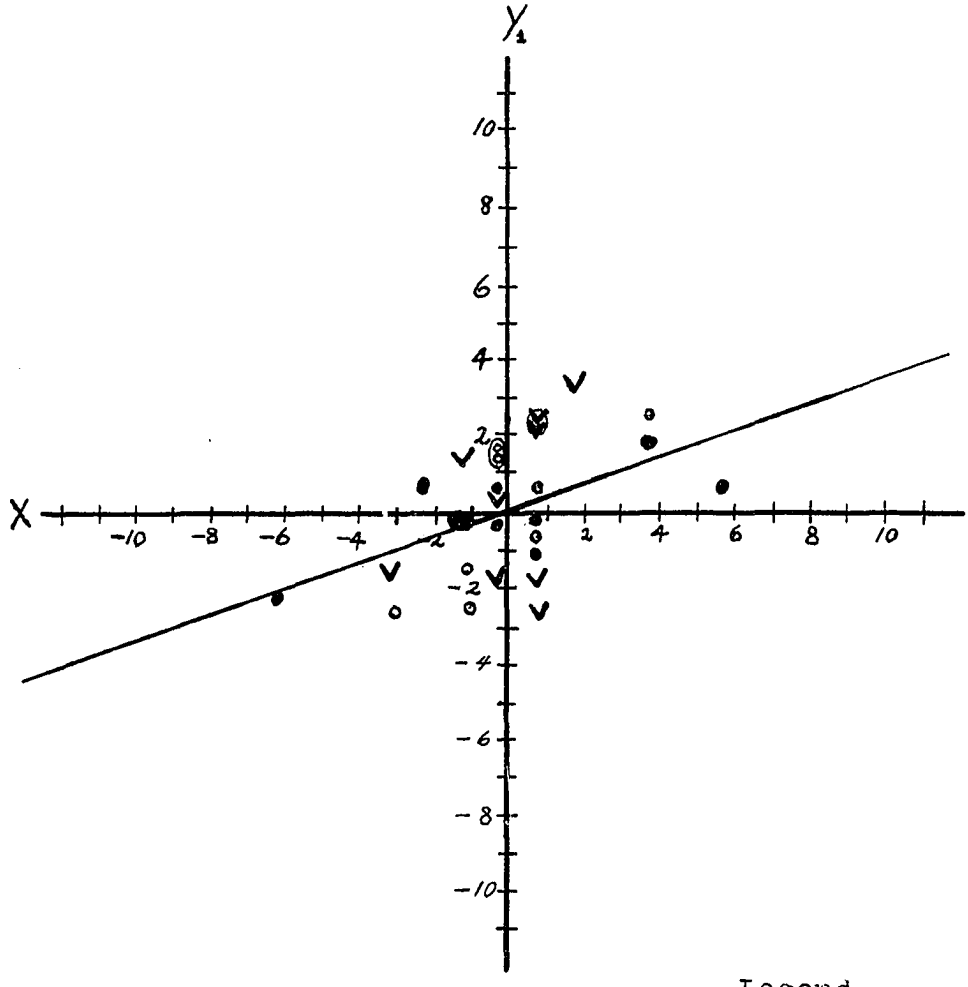
Legend

Group A-- ●

" C-- O

" E-- V

Figure 1. Deviations from total means and total line of regression of Y_1 on X scores made by three groups of college freshmen on the tests constructed from color and black and white film content. ($y' = .005x$)



Legend

Group A-- •

" C-- o

" E-- V

Figure 2. Deviations of Y_1 and X scores from group means and common within-group line of regression made by three groups of college freshmen on the tests constructed from color and black and white film content. ($y' = .39x$)

be concluded, therefore, that the differences between the X means are significant.

Using Edwards' (8) presentation of the analysis of covariance as a guide, the analysis of variance was computed for the Y_1 scores. Table 6 presents the summary of the analysis. From the table of F for 2 and 24 degrees of freedom it was seen that the obtained F value of 14.50 was statistically significant beyond the .01 level of confidence. Therefore, it can be concluded that significant differences existed between the experimental groups on the posttest (Y_1) measure.

TABLE 6

ANALYSIS OF VARIANCE OF POSTTEST (Y_1) SCORES MADE BY THREE GROUPS OF COLLEGE FRESHMEN ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE FILM CONTENT

Source of Variation	Sum of Squares	df	Mean Square	F
Between groups	92.7	2	46.4	14.50*
Within groups	76.0	24	3.2	
TOTAL	168.7	26		

*Significant beyond the .01 level of confidence.

Following Edwards' (8) next step in the analysis of covariance, it was necessary to analyze the total sum of cross products in exactly the same manner that the total sums of squares for X and Y_1 had been analyzed. The sums of

squares and cross products of the X and Y_1 scores as derived from the data presented in Tables 2, 3, 5, and 6 were summarized and presented in Table 7.

TABLE 7

SUMS OF SQUARES AND CROSS PRODUCTS OF PRETEST (X) AND POSTTEST (Y_1) SCORES MADE BY THREE GROUPS OF COLLEGE FRESHMEN ON THE TESTS CONSTRUCTED FROM COLOR AND BLACK AND WHITE FILM CONTENT

Source of Variation	df	ΣX^2	ΣXY	ΣY^2
Between groups	2	41.3	-53.7	92.7
Within groups	24	142.1	135.6	76.0
TOTAL	26	183.4	81.9	168.7

Table 7 presents the essential parts of the analysis needed to compute the errors of estimate required for computing the final step in the analysis of covariance. The analysis of covariance on the X and Y_1 scores is presented in Table 8. The reader will note that the sum of squares of errors of estimate within groups will have 23 degrees of freedom, which is one less than the 24 degrees of freedom available for the within-groups sum of squares. The additional degree of freedom is lost in the calculation of the regression coefficient. It will also be noted that the degrees of freedom for the sum of squares of errors of estimate for total will be one less than the number of degrees of freedom for

TABLE 8

ANALYSIS OF COVARIANCE OF PRETEST (X) AND POSTTEST (Y_1) SCORES MADE BY THREE GROUPS OF COLLEGE FRESHMEN ON THE TESTS CONSTRUCTED FROM COLOR AND BLACK AND WHITE FILM CONTENT (Group N = 9)

Source of Variation	Sum of Squares of Errors of Estimate	df	Mean Square	F
Total	123.9	25		
Within groups	-53.4	23	-2.3	
Adjusted Means	177.3	2	88.7	38.57*

*Significant beyond the .01 level of confidence.

the total sum of squares, an additional degree of freedom being lost here also by the calculation of the regression coefficient for the total. Therefore, the degrees of freedom for this sum of squares will be equal to 25.

The obtained value of F, 38.57, was based upon 2 and 23 degrees of freedom. From the table of F it was seen that this value was statistically significant beyond the .01 level of confidence. The conclusion followed that the differences among final means was highly significant, taking into account differences among initial means. In other words, the differences among the final posttest (Y_1) means of the three groups are not reasonably accounted for either by initial pretest (X) differences or by sampling fluctuations. Furthermore, it should be stated that the precision of the study has been

increased through the analysis of covariance technique. This was indicated by observing that the variance estimate had been reduced from 3.2 to a -2.3.

It is clear from the F value obtained that the adjusted Y_1 means differ significantly after they have been adjusted for initial differences in X. However, it does not reveal which of the Y_1 means is significant; therefore Garrett's Analysis of Covariance (9), steps 7, 8, and 9, were employed as a guide. Table 9 presents a summary of the adjusted Y_1 means.

TABLE 9

ADJUSTED MEANS ON POSTTEST (Y_1) SCORES MADE BY THREE GROUPS OF COLLEGE FRESHMEN ON THE TESTS CONSTRUCTED FROM COLOR AND BLACK AND WHITE FILM CONTENT

Groups	N	$\bar{X}$	$\bar{Y}_1$	$Y_1 \cdot X$ (adjusted)
A	9	15.22	22.11	23.66
C	9	17.11	21.44	21.19
E	9	18.22	17.88	16.58
General Means		16.85	20.47	20.47

Using step 9 as a guide, Garrett (9) directs one to find the standard error of the difference between any two adjusted means. It was found that the standard error of the difference between any two adjusted means was .71 and for 23 degrees of freedom the difference required between the

adjusted means of any two groups is 1.47 at the .05 level of confidence and 2.00 at the .01 level of confidence. The obtained values were arrived at by computing the general formula for finding t-values. Table 10 designates the magnitude of difference on the adjusted means between groups, taken two at a time.

TABLE 10

DIFFERENCES BETWEEN THE ADJUSTED MEANS ON POSTTEST (Y_1) SCORES MADE BY THREE GROUPS OF COLLEGE FRESHMEN ON THE TESTS CONSTRUCTED FROM COLOR AND BLACK AND WHITE FILM CONTENT

Groups*	Magnitude of Difference Between Groups Taken Two at a Time	Levels of Confidence .05	.01
A-C	2.47	Yes	Yes
A-E	7.08	Yes	Yes
C-E	4.61	Yes	Yes

*Group A -- Received instruction from color film.
Group C -- Received instruction from black and white film.
Group E -- Controls who received no instruction.

Reference to Tables 9 and 10 indicates that the adjusted means of groups A and C are significantly higher than that of group E at the .01 level of confidence. In addition, the adjusted mean of group A is significantly higher than that of group C at the .01 level of confidence. The implications involved in these results will be reported in the section concerned with discussing the results.

Analysis of Scores on Retention Check

In this section of the Statistical Analysis the variable Y_2 will be considered to be the performance of the subjects under experimental conditions involving the retention of facts that were presented in the film. Four weeks prior to obtaining the Y_2 measures under the experimental conditions, each subject was given a pretest which is designated by the letter X. X scores were considered to be the initial knowledge about the film content that the subjects possessed at the beginning of the experiment.

The X scores of the three groups of subjects are recorded in Table 2 according to rank order numerical value. The Y_2 scores of the three groups of subjects are recorded in Table 11. The order in which the Y_2 scores appear depends upon the position of each subject's X score. For example, in group A the subject who has an X score of 15 has a Y_2 score of 23. The scores are placed in this manner for the purpose of computations to be administered later.

Following the model presented by Edwards (8) for computing the analysis of covariance, one will find that it is necessary to calculate the analysis of variance on both the pretest X scores and the posttest Y_2 scores. Edwards (8) points out that homogeneity of variance between groups of data must exist before analysis of variance can be computed. In order to discover whether homogeneity of variance does exist, Bartlett's Test of Homogeneity of Variance (8, pp. 195 - 197) was employed for the data in Table 2. It will

TABLE 11

POSTTEST (Y_2) SCORES MADE BY THREE GROUPS OF COLLEGE FRESHMEN ON THE TESTS CONSTRUCTED FROM COLOR AND BLACK AND WHITE FILM CONTENT

	Groups		
No.*	A	C	E
1.	22	24	18
2.	21	20	17
3.	21	22	16
4.	22	17	18
5.	23	21	20
6.	20	20	19
7.	20	19	14
8.	19	18	20
9.	21	20	14

*The number of the subjects remains the same as previously presented in Table 1.

be remembered that homogeneity of variance existed and this fact was presented previously to the reader.

Tate (20) states that the fundamental assumption underlying correlation analysis is that of linearity of regression. Before beginning an analysis, it is advisable to plot the data both for the total group and for each group and to fit regression lines to the plotted data as has been done in Figures 3 and 4. Inspection of the regression lines and the dispersion of the data about the lines indicates that the assumption of linearity of regression is unsound. Therefore, meaningful correlation analysis is particularly questionable when the linearity of regression assumption cannot be considered tenable. The reader should bear this in mind

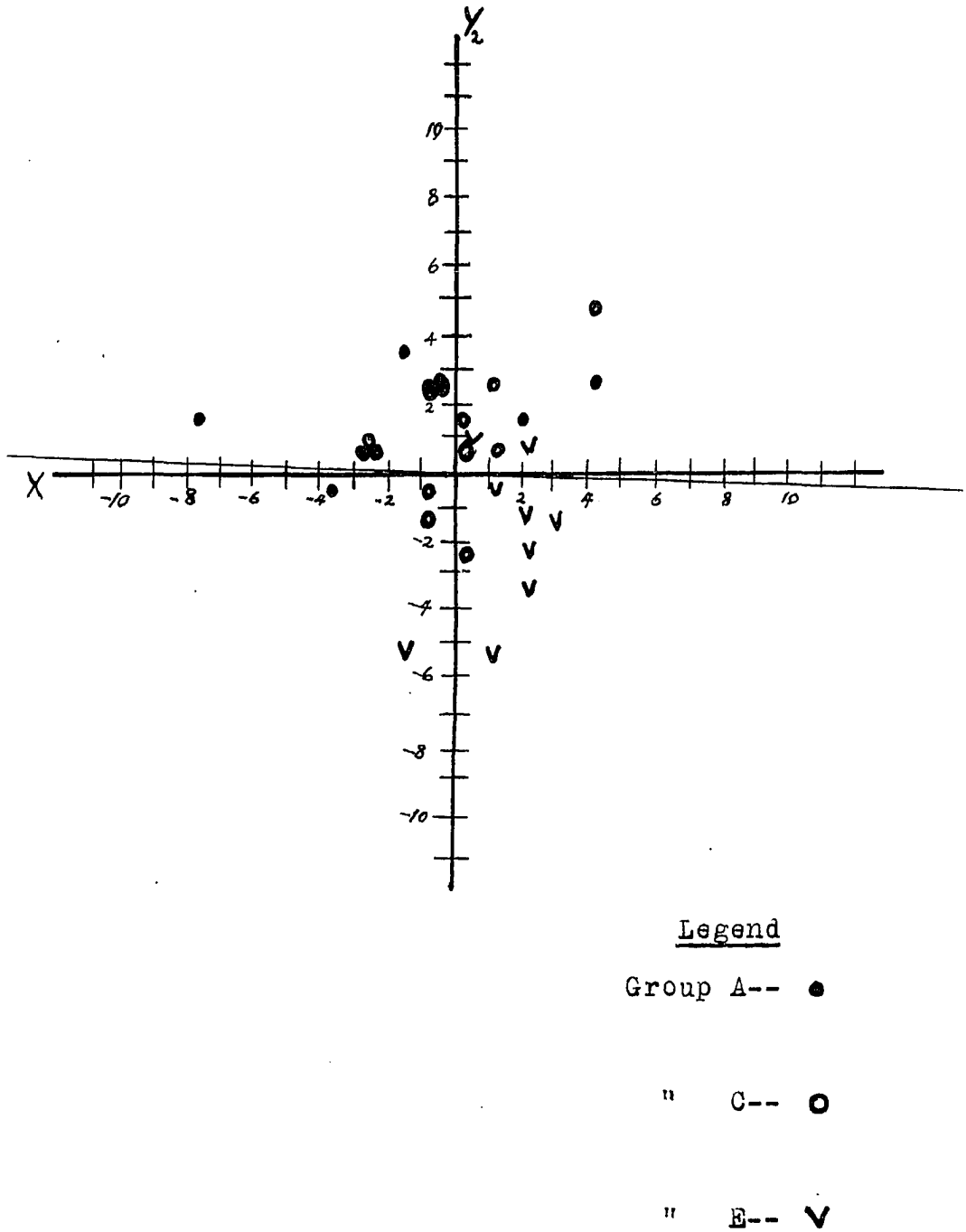


Figure 3. Deviations from total means and total line of regression of Y_2 on X scores made by three groups of college freshmen on the tests constructed from color and black and white film content. ($y' = -.02x$)

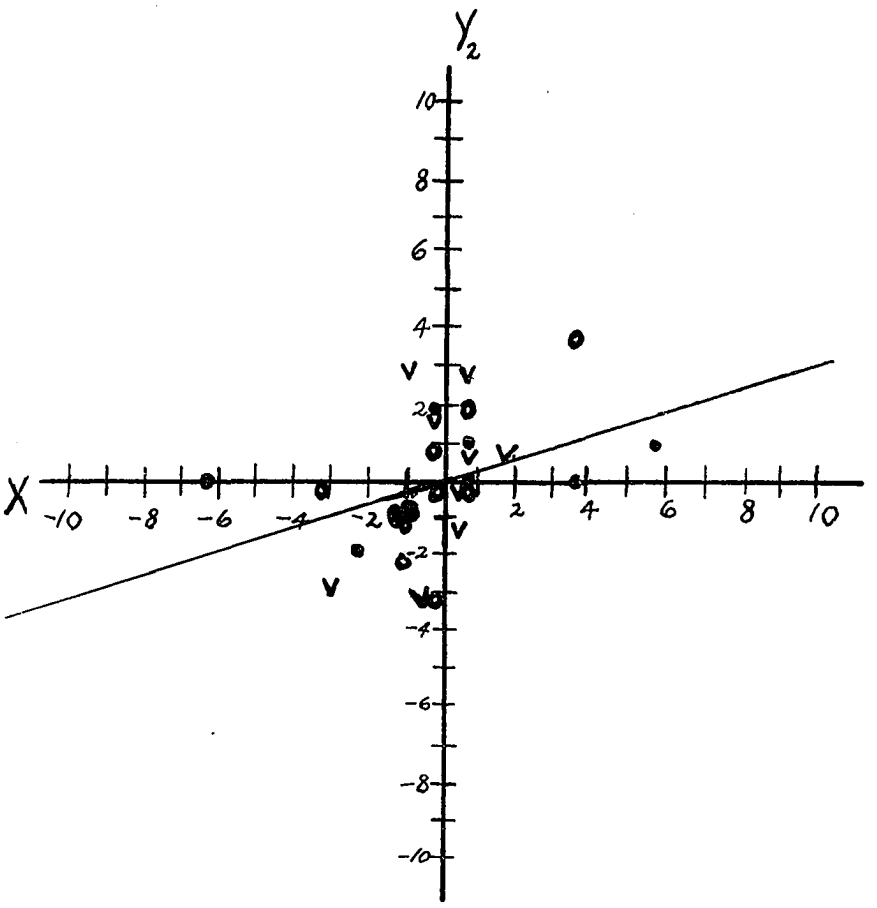


Figure 4. Deviations of Y_2 and X scores from group means and common within-group lines of regression made by three groups of college freshmen on tests constructed from color and black and white film content. ($y' = .61x$)

when surveying the following analyses.

Having been informed as to the previously mentioned assumptions, the appropriate analysis of variance was computed for the X scores. The reader may refer to Table 5 for the presentation of this analysis. The obtained F value of 3.50 indicated that statistically significant differences existed beyond the .05 level of confidence for 2 and 24 degrees of freedom.

Again Edwards' (8) model for computing the analysis of variance was followed for finding the F value of the Y_2 scores. Table 12 summarizes this analysis. From the table of F for 2 and 24 degrees of freedom one finds that the obtained F value of 8.89 is statistically significant beyond the .01 level of confidence. The null hypothesis regarding significant differences between the posttest (Y_2) means must be rejected.

TABLE 12

ANALYSIS OF VARIANCE OF POSTTEST (Y_2) SCORES MADE BY THREE GROUPS OF COLLEGE FRESHMEN ON THE TEST CONSTRUCTED FROM COLOR AND BLACK AND WHITE FILM CONTENT

Source of Variation	Sum of Squares	df	Mean Square	F
Between groups	65.8	2	32.9	8.89*
Within groups	88.9	24	3.7	
TOTAL	154.7	26		

*Significant beyond the .01 level of confidence.

Using the same computational model one finds that the next step in the analysis of covariance was to analyze the total sums of cross products in exactly the same manner that the total sums of squares for X and Y_2 had been analyzed. The sums of squares and cross products of the X and Y_2 scores are derived from the data presented in Tables 2, 5, 11, and 12, and are summarized and presented in Table 13.

TABLE 13

SUMS OF SQUARES AND CROSS PRODUCTS OF PRETEST (X) AND POSTTEST (Y_2) SCORES MADE BY THREE GROUPS OF COLLEGE FRESHMEN ON THE TESTS CONSTRUCTED FROM COLOR AND BLACK AND WHITE FILM CONTENT

Source of Variation	df	ΣX^2	ΣXY	ΣY^2
Between groups	2	41.3	-47.3	65.8
Within groups	24	142.1	44.2	88.9
TOTAL	26	183.4	-3.1	154.7

Table 13 contains the essential parts of the analysis necessary to compute the errors of estimate required for computing the final step in the analysis of covariance. The analysis of covariance on the X and Y_2 scores is presented in Table 14. The reader will find that the sum of squares of errors of estimate within groups will have 23 degrees of freedom, which is one less than the 24 degrees of freedom available for the within-groups sum of squares. The additional

TABLE 14

ANALYSIS OF COVARIANCE OF PRETEST (X) AND POSTTEST (Y_2) SCORES MADE BY THREE GROUPS OF COLLEGE FRESHMEN ON THE TESTS CONSTRUCTED FROM COLOR AND BLACK AND WHITE FILM CONTENT (Group N = 9)

Source of Variation	Sum of Squares of Errors of Estimate	df	Mean Square	F
Total	154.6	25		
Within groups	75.2	23	3.3	
Adjusted Means	79.4	2	39.7	12.03*

*Significant beyond the .01 level of confidence.

degree of freedom is lost in the calculation of the regression coefficient. It will also be noted that the degrees of freedom for the sum of squares of errors of estimate for total will be one less than the number of degrees of freedom for the total sum of squares, an additional degree of freedom being lost here by the calculation of the regression coefficient for the total. Therefore, the degrees of freedom for this sum of squares will be equal to 25.

From Table 14 one finds that the obtained F value of 12.03 is based upon 2 and 23 degrees of freedom. From the table of F it is seen that this is statistically significant beyond the .01 level of confidence. This significance indicates that the differences in the means of the experimental groups on the Y_2 variable cannot be accounted for by

differences in mean level of initial ability as measured by X in the pretest; for the means of the groups on the Y_2 variable have been "adjusted" by the analysis to a common mean initial level of performance on X. Moreover, it should be stated that the precision of the study has been increased through the analysis of covariance technique. This was indicated by observing that the variance estimate had been reduced from 3.7 to 3.3. This was a difference of .4.

The obtained F value indicated that the adjusted Y_2 means differed significantly after they had been adjusted for initial differences in X, but it did not reveal which means were significant. Garrett's Analysis of Covariance (9), steps 7, 8, and 9, was employed to determine this. Table 15 presents a summary of the adjusted Y_2 means.

TABLE 15

ADJUSTED MEANS ON POSTTEST (Y_2) SCORES MADE BY THREE GROUPS OF COLLEGE FRESHMEN ON THE TESTS CONSTRUCTED FROM COLOR AND BLACK AND WHITE FILM CONTENT

Groups	N	$\bar{X}$	$\bar{Y}_2$	$\overline{Y_2 \cdot X}$ (adjusted)
A	9	15.22	21.00	21.51
C	9	17.11	20.11	20.03
E	9	18.22	17.33	16.91
General Means		16.85	19.48	19.48

Following Garrett's (9) step 9, the standard error of the difference between any two adjusted means was found to be

.86. For 23 degrees of freedom the difference required between the adjusted means of any two groups is 1.78 at the .05 level of confidence, and 2.42 at the .01 level of confidence. The obtained values were arrived at by computing the general formula for finding t-values. Table 16 presents the magnitude of difference on the adjusted means between groups, taken two at a time. It may be seen by reference to Tables 15 and 16 that the adjusted means for groups A and C were significantly greater than the adjusted mean for group E at the .01 level of confidence. One may also see that there is no reliable difference existing between the adjusted means of groups A and C. The significance of these findings reported in Table 16 will be discussed in the following section.

TABLE 16

DIFFERENCE BETWEEN THE ADJUSTED MEANS ON POSTTEST (Y_2) SCORES MADE BY THREE GROUPS OF COLLEGE FRESHMEN ON THE TESTS CONSTRUCTED FROM COLOR AND BLACK AND WHITE FILM CONTENT

Groups*	Magnitude of Difference Between Groups Taken Two at a Time	Levels of Confidence .05	.01
A-C	1.48	No	No
A-E	4.60	Yes	Yes
C-E	3.12	Yes	Yes

*Group A -- Received instruction from color film.

Group C -- Received instruction from black and white film.

Group E -- Controls who received no instruction.

DISCUSSION OF THE RESULTS

This section will discuss the statistical differences found among the three groups as indicated from the analysis of covariance.

The F value of 38.57 presented by Table 8 was significant beyond the .01 level of confidence. This significant F value indicated that the differences in the means of the groups on the posttest (Y_1) variable, which was the test for acquisition of facts from the color and black and white films, cannot be accounted for by differences in initial ability as measured by the pretest (X). Pretest (X) tested for the initial knowledge possessed by the subject previous to the film presentation. Although it was known by the obtained F value that significant differences were present, it was not immediately evident which group or groups was responsible for this. It is necessary to refer to Table 9, which presented the adjusted means for the pretest (X) and posttest (Y_1) scores, to determine the effect of the treatment administered to the experimental and control groups. The significance of the difference between groups receiving the various treatments can be found in Table 10.

After careful consideration of the information in Table 10, it may be seen that group A (who received instruction from color film), and group C (who received instruction from black and white film) had adjusted means that were significantly different from the adjusted mean of group E (the

control group who received no instruction). This significance may be accepted beyond the .01 level of confidence. In addition, the adjusted mean of group A was reliably different from the adjusted mean of group C. This fact can be accepted at the .01 level of confidence.

When one refers to Table 9, it is found that group A had the highest adjusted mean score for acquisition of facts and it will be remembered that this group received instruction from the color film. The findings reported in Tables 9 and 10 lead one to believe that group A acquired, or learned, more facts than did groups C and E from their respective treatments. Referring to Table 9 again, one finds that group C had a higher adjusted mean score for acquisition of facts than group E. Therefore, it may be concluded that black and white film instruction is superior to treatment as received by group E, the control, on measures for acquisition of factual information.

A summary statement is appropriate and indicates that for immediate learning, color film instruction is reliably superior to black and white film. Moreover, film instruction, color or black and white, is reliably superior to treatment such as that which the control group received.

Table 14 presents the results of the analysis of covariance of the pretest (X) and posttest (Y_2) variable, which was the test for retention of facts from color and black and white films. The F value, 12.03, reported in Table 14, was

significant beyond the .01 level of confidence. This significant F value indicates that the differences in the means of the groups on the posttest (Y_2) variable can not be accounted for by differences in initial ability as measured by the pretest (X). Pretest (X) tested for the initial knowledge possessed by the subjects previous to the film presentation. Although it was known by the obtained F value that significant differences were present, it was not known which of the one or more groups was significant. To determine which of the possible differences was significant, it is necessary to refer to Table 15 which summarizes the adjusted means. Here one finds it possible to evaluate the different sources of instruction with regard to retention of facts. The significance of the difference between groups is presented in Table 16.

It may be seen from Table 16 that groups A (who received instruction from color film), and C (who received instruction from black and white film) had adjusted means which were significantly different from the adjusted mean of group E (the control group who received no instruction). This significance may be accepted beyond the .01 level of confidence. Furthermore, it may be seen that group A's significant superiority over group C on measures for acquisition no longer existed on the tests for retention administered four weeks later since Table 16 presented no significant difference between the groups.

Table 15 indicated that groups A and C had higher

adjusted mean scores for retention of facts than group E. This event denoted that film instruction was significantly superior to treatment such as that administered to the control group E on measures for retention of facts.

In summation, it may be concluded that film instruction was significantly superior to mere test taking for both immediate acquisition and retention of facts. Moreover, immediate learning from color film was reliably superior to black and white film instruction; but four weeks later on tests for retention, this significant superiority did not exist.

At this time it is appropriate and requisite that a word of caution regarding the above findings be advanced.

First, during the experiment it was discovered that five students had just completed a unit on the library in a Freshman Orientation course of study. Three of these students were in group A, (the group who received instruction from color film), 1 student was in group C (the group who received instruction from black and white film), and 1 student was in group E (the control group who received no instruction). Furthermore, one student in group C and one student in group E were student librarians in the college library. This information causes the writer to hesitate reporting the exploratory results because the film employed was named "Know Your Library," a Coronet Film publication. What bearing this had on the test results is not known; however, the covariance

technique is applicable to situations where initial differences may be present. Therefore, the findings are reported with the above information included. It may have been that for the students indicated above, the film presentation was a review exercise rather than new information being presented to them. Perhaps this accounted for color film being reliably superior to black and white film.

Second, the results obtained on the retention phase of the exploratory study are questionable because the assumption of linearity of regression was not tenable. The assumption of linearity is one necessary prerequisite prior to the application of the covariance analysis.

SUMMARY AND CONCLUSIONS

The value of black and white film instruction to students has been repeatedly demonstrated by research workers and classroom teachers. Research investigators have found that black and white film enables students to learn more in a given time and, in addition, remember that which has been learned over longer periods of time. However, the question of whether color film instruction is superior to black and white film instruction in regard to acquisition and retention has not been adequately answered by either research or practice.

This "exploratory" study conducted prior to the study previously reported served the writer's purposes in the

following ways:

1. It helped to determine problems of measuring the effect of instruction upon acquisition and retention of facts when presented by either the color or the black and white film.

2. It helped to determine the problems involved in comparing the results of the two different kinds of film instruction as they pertain to acquisition and retention of those facts.

3. It helped to ascertain what problems would be encountered in a similar study of larger proportions.

4. It helped to indicate the approximate size of population sample needed to get reliable results in a similar study of larger respects.

5. It helped the writer to become better acquainted with experimental research procedures.

The three groups used in this exploratory study were: Group A, (who received instruction from color film), group C, (who received instruction from black and white film) and group E, (the control group that did not receive instruction). The 27 subjects were freshman students enrolled in a General Psychology class at Southwestern State College, Weatherford, Oklahoma. The students were assigned to each experimental group by random selection. Prior to the instruction from film the subjects were given a pretest (X) to determine their initial knowledge of the facts to be presented by film, then each subject was given a posttest (Y_1) to determine the amount of immediate learning resulting from the different experimental treatments. Four weeks later, each subject was given a posttest (Y_2) to ascertain the amount of learning that had been retained.

The null hypotheses tested were: (1) There is no significant difference between the experimental and control groups in immediate learning from the color and black and white films; and (2) there is no significant difference between the experimental and control groups in the retention of facts from the color and black and white films.

Analysis of the data using a covariance technique revealed that it was necessary to reject both hypotheses.

The results of the experiment indicated that the following conclusions could be offered with respect to this exploratory study:

1. Thirty-seven subjects in each experimental group would be required for reliable results at about the .05 level of confidence on tests for acquisition of facts from color and black and white film. Lacey (12) was used as a model for this as well as the following population size computations.

2. On measures for acquisition of facts from film, 62 students are necessary in each group to get results at approximately the .01 level of confidence.

3. Twenty-seven subjects in each experimental group would be needed for results at the .05 level of confidence on posttest (Y_2) retention checks.

4. On retention measurements, 46 subjects in each group would be required to get results at about the .01 level of confidence.

5. The group who received instruction from color film immediately learned more facts than did the other groups. This conclusion is made with some reservations since the small size of the population sample makes it difficult to generalize from the findings presented here.

6. No significant differences existed between the two groups who saw films on measures for retention of facts; however, this conclusion is made with some reservation since the assumption of linearity of regression

was not satisfied. This assumption is required for accurate and reliable covariance analyses. Analysis involving correlations between groups is particularly questionable when the linearity of regression assumption is violated.

7. Film instruction is reliably superior to mere test taking on measures for immediate learning and retention of facts.

APPENDIX H

SAMPLE OF THE EXPLORATORY STUDY RESPONSE MEASURE

The same test was employed for all three test measurements. In other words, pretest (X), posttest (Y_1), and posttest (Y_2) were the same response measures used throughout the experiment.

KNOW YOUR LIBRARY

Multiple-Choice Test

Directions: Select the answer that most correctly completes the meaning of the statement and place the number in parentheses before that statement in the space provided on the response sheet. One and only one answer is considered to be the best completion to the statement.

1 1. The vertical file contains (1) pamphlets printed by government agencies; (2) information about fictional materials; (3) lists of the new books in the library; (4) none of these.

4 2. Locating a book on the library shelf is made possible by the (1) call number; (2) class number; (3) author's last name; (4) all of these.

3 3. Into how many main sections are the books in the library divided? (1) 12 (2) 8 (3) 10 (4) 6.

1 4. Which of the following would be considered the best example of a general reference book? (1) encyclopedia (2) periodical (3) reserve book (4) atlas

4 5. A person who doesn't know how to use the card catalog will (1) use the library inefficiently; (2) probably get discouraged and leave the library without getting what he wants; (3) probably find the book he wants by looking through the library shelves; (4) combination of answers (1) and (2).

1 6. Books classified as Social Science are numbered from (1) 300-399; (2) 000-009; (3) 200-299; (4) 100-199.

3 7. The librarian's most important job should be to (1) find books for students; (2) help students get their lessons; (3) help students understand how to use the library; (4) keep the library atmosphere conducive to study conditions.

2 8. The Reader's Guide to Periodical Literature is (1) a guide which tells the reader how to enjoy current literature; (2) an index to articles in magazines; (3) an American literature book for readers; (4) none of these.

3 9. A person who is not familiar with the values of the library probably thinks of it as (1) a study room; (2) a resource center; (3) a room full of books; (4) a collection of books kept for studying and reading.

4 10. A card catalog is a guide or an index to (1) the magazines on the library shelves; (2) the encyclopedias; (3) the literature in the vertical file; (4) the books on the library shelves.

2 11. The front of the card catalog drawers (1) are numbered to indicate their contents; (2) are letter alphabetically to indicate their contents; (3) have statements to describe their contents; (4) none of these.

1 12. What is a quick way to discover if a book has what you want? (1) look at the table of contents; (2) look at the preface; (3) look at the first chapter; (4) none of these.

4 13. Encyclopedias are helpful aids for (1) getting historical information; (2) finding a quick reference about a topic; (3) getting information about the arts and sciences; (4) all of these.

1 14. Books are classified in the library according to the (1) Dewey Decimal System; (2) Bradshaw Number System; (3) Central File System; (4) Webster Word System.

3 15. The Reader's Guide to Periodical Literature basically lists (1) all of the literature according to the authors' names; (2) all of the literature according to the names of the magazines; (3) all of the literature according to main subject headings; (4) none of these.

2 16. A card catalog card will occasionally contain (1) the name of the publisher of the book; (2) a brief summary of the book's contents; (3) the date the book was published; (4) none of these.

3 17. Located in the upper left hand corner of a card catalog card is the (1) title of the book; (2) author's name; (3) call number; (4) combination of answers (1) and (2).

1 18. The library can be helpful and interesting when (1) you know how to use it; (2) your instructor assigns you a term paper; (3) you are looking for a book to read; (4) you have a lesson to study.

3 19. How are the card catalog cards arranged? (1) by class numbers (2) by call numbers (3) by alphabetical order (4) by all of these.

4 20. A person who can use the library efficiently considers it (1) a simple task to check out a book; (2) a valuable aid for getting lessons; (3) a useful and functional building; (4) all of these.

4 21. The card catalog lists literature by (1) subject; (2) title; (3) author; (4) all of these.

3 22. Books classified as Religion and Mythology are numbered from (1) 000-009; (2) 400-499; (3) 200-299; (4) 100-199.

4 23. Books classified as General Works are numbered from (1) 400-499; (2) 200-299; (3) 300-399; (4) 000-009.

1 24. The encyclopedia index volume can be used to (1) find out if the encyclopedias have a certain topic; (2) help you gain an understanding about the different kinds of encyclopedias; (3) get reports directly from it; (4) none of these.

4 25. A librarian's introduction about the use of the library by students should include the (1) organization of the library; (2) use of the card catalog; (3) arrangement of the books on the library shelves; (4) all of these.

APPENDIX I

TABLES OF DEVIATIONS FROM WITHIN-GROUP AND TOTAL GROUP MEANS FOR THE EXPLORATORY STUDY

DEVIATIONS FROM WITHIN-GROUP MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE FILM CONTENT

	Groups								
	A			C			E		
No.*	X	Y_1	Y_2	X	Y_1	Y_2	X	Y_1	Y_2
1.	5.8	.9	1.0	-.1	1.6	-3.1	.8	2.1	-1.3
2.	3.8	1.9	0.0	-1.1	-1.4	-2.1	-.2	-1.9	-3.3
3.	.8	-1.1	1.0	3.9	2.6	3.9	.8	-2.9	2.7
4.	.8	-.1	0.0	.9	-.4	-.1	-3.2	-1.9	-3.3
5.	-.2	-.1	2.0	.9	.6	1.9	.8	2.1	-.3
6.	-1.2	-.1	-1.0	-.1	.6	.9	.8	-1.9	.7
7.	-1.2	-.1	-1.0	-.1	1.6	-.1	-1.2	1.1	2.7
8.	-2.2	.9	-2.0	-1.1	-2.4	-1.1	-.2	.1	1.7
9.	-6.2	-2.1	0.0	-3.1	-2.4	-.1	1.8	3.1	.7

DEVIATIONS FROM TOTAL GROUP MEANS OBTAINED FROM SCORES MADE ON THE TEST CONSTRUCTED FROM THE COLOR AND BLACK AND WHITE FILM CONTENT

	Groups								
	A			C			E		
No.*	X	Y_1	Y_2	X	Y_1	Y_2	X	Y_1	Y_2
1.	4.1	2.5	2.5	.1	2.5	-2.5	2.1	-.5	-3.5
2.	2.1	3.5	1.5	-.9	-.5	-1.5	1.1	-4.5	-5.5
3.	-.9	.5	2.5	4.1	-1.5	4.5	2.1	-5.5	.5
4.	-.9	1.5	1.5	1.1	.5	.5	-1.9	-4.5	-5.5
5.	-1.9	1.5	3.5	1.1	1.5	2.5	2.1	-1.5	-2.5
6.	-2.9	1.5	.5	.1	1.5	1.5	2.1	-4.5	-1.5
7.	-2.9	1.5	.5	.1	2.5	.5	.1	-1.5	.5
8.	-3.9	2.5	-.5	-.9	-1.5	-.5	1.1	-2.5	-.5
9.	-7.9	-.5	1.5	-2.9	-1.5	.5	3.1	.5	-1.5

*Number represents subjects. Subjects have maintained this assigned number in all previous tables of scores dealing with the film.