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Lewis, Russell Arthur

THE EFFECTS OF EXPECTANCY AND SUGGESTION ON STUDENTS' PERFORMANCE OF A LEARNING TASK

The Ohio State University

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THE EFFECTS OF EXPECTANCY AND SUGGESTION ON STUDENTS' PERFORMANCE OF A LEARNING TASK

DISSERTATION

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

By

Russell Arthur Lewis, B.A.; M.A., C.C.M.H.C.

The Ohio State University

1982

Reading Committee:
Professor Barbara Newman
Professor Patrick McKenry
Professor Harold Pepinsky

Approved By
Advisor
Department of Family Relations and Human Development
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I would like to acknowledge Dr. Barbara Newman, Dr. Patrick McKenry, Dr. Anthony Riccio, and Dr. Harold Pepinsky for their kind assistance in my doctoral studies.

I would like to acknowledge Penny Winkle, who, when the going got rough, suggested that I might get angry enough to keep going.

I would like to acknowledge all the many friends who helped me through different aspects of my studies and this experiment.

Finally, I would like to especially acknowledge Barbara Baisden, who just seemed to always be there at the right time.
VITA

October 21, 1952 .......... Born - Cleveland, Ohio
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1977-1978. .......... Program Coordinator, Salvation Army Adult Rehabilitation and Treatment Center, Columbus, Ohio
March, 1978. .......... M.A., Counseling and Guidance, The Ohio State University, Columbus, Ohio
1979-1982. .......... Psychology Intern, Child and Adult Guidance Center, Columbus, Ohio

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Certified Clinical Mental Health Counselor, National Academy of Certified Clinical Mental Health Counselors
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VITA (continued)

FIELDS OF STUDY

<table>
<thead>
<tr>
<th>Human Development</th>
<th>Professor Barbara Newman</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Relations</td>
<td>Professor Patrick McKenry</td>
</tr>
<tr>
<td>Clinical/Counseling</td>
<td>Professor Harold Pepinsky</td>
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<td>Psychology</td>
<td></td>
</tr>
<tr>
<td>Counselor Education</td>
<td>Professor Anthony Riccio</td>
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CHAPTER I.

INTRODUCTION

Exploration into the role of suggestion as a way of enhancing learning has been a focal point for investigators interested in applying hypnosis and relaxation procedures to educational problems and situations (Salberg and DePiano, 1980). Hopes have been raised for educators for the application of such procedures to help increase the amount of material presented during a school year and to increase students' time for non-academic pursuits (Lazanov, 1971), to help in the remediation of children identified as learning-disabled and EMR (Kurkov, 1977), and to allow the teacher more time to increase the depth and scope of materials presented to students (Prichard and Taylor, 1980). However, there has been no wide-spread adaptation of such materials into our educational systems (Prichard and Taylor, 1980).

Barber (1965b) concluded, after reviewing the research in the field: "The influence of any one variable in this research will be found to depend upon the context of other variables. The determinants of response to test suggestions will be found to be multiple and complex. Viewed in this perspective the present state of research..."
Salzberg and DePiano (1980) argued that not enough research has been conducted into the nature of suggestion, hypnosis, and relaxation procedures in relation to learning materials and cognitive performance. They suggest that there is a need for further clarification of the associated variables that Barber (1965) alluded to and urged future research into the effects of these procedures.

A difficulty encountered in studying the effects of suggestion is related to the separation of extraneous process variables from the experimental procedures. A process variable in this sense is an effect related to how a procedure is accomplished rather than the procedure itself (Kerlinger, 1973). An example of this problem can be demonstrated in a study by Salzberg (1960) on the relation of suggestion and hypnosis to subjects' performance on a learning task. Salzberg used four conditions in his study: two that received suggestions with hypnosis, one that received suggestions alone, and a group used as a control. Salzberg reported significant effects for both conditions of the hypnotic suggestion. However, since no group received only hypnosis, the question may be raised: Can the results of the study be explained by the suggestions given to the subjects or by the
process of hypnosis? This study was criticized by Barber (1965a) because there were no controls for experimentor bias in the design of the study. Barber recommended that researchers incorporate a condition in their experiments where the individual involved in giving suggestions was unaware of whether or not the subject was hypnotized. This was to guard against the possibility that the subject may be implicitly guided toward a desired behavior.

Process variables are intertwined with what Rosenthal and Jacobsen (1968) have identified as teacher expectancy effects. In this manner it may be unreasonable to expect that teachers would spend time learning complex procedures without developing some kind of expectation about the efficacy of the procedures. Likewise, students undergoing a specific intervention may be implicitly guided toward the idea that a technique will be effective. Such implicit messages may have the effect of being indirect suggestions about an expectation for a performance.

PURPOSE OF THE STUDY

The major purpose of this study is to explore the relation of suggestion and expectancy on students' performance of a learning task with the effects of the specific process variables randomized by experimental
procedures. This study will attempt to study the interaction of suggestion and expectancy without the intervening effects of specific learning processes.

Suggestion will be manipulated in the form of direct statements made to students about the level of difficulty of a task. Expectancy will be manipulated in the form of false information given to the group leaders participating in the study about the academic ability of the students in their groups.

GUIDING PRINCIPLES OF THE RESEARCH

In this experiment suggestion refers to a specific indication of a desired mental set without any logical premises for the existence of that mental set. Expectancy in this study refers to the belief of an individual about a set of abilities of a group of students. This use of expectancy has been referred to as teacher expectancy in previous literature (Rosenthal and Jacobsen, 1968). This relates to a conscious or unconscious evaluation which the group leader forms about the students which leads the group leaders to treat the students in such a manner as if the evaluation was correct and anticipates that the students will respond in a manner consistent with the group leaders assessment (Finn, 1972).

The important difference between suggestion and expectancy for this study is related to the process of
the formation of the expectancy and the outcome of the suggestion. In this study a suggestion is made that a task has a quality of a certain level of difficulty, yet no evidence of this is given to support such a claim. The students are expected to behave in a manner as if what is suggested to them is true. Expectancy in this study is a belief about the students' academic ability that a group leader is expected to make when told that students were preselected on the basis of academic ability such that the group leaders' behavior toward the students is affected.

Rosenthal and Rubin (1978) report that the random assignment of subjects by experimenters who are unaware of the nature of the experiment and the experimental purpose is sufficient a procedure to control for the effects that a study might have related to experimenter bias. In this study subjects, group leaders, and experimental conditions are randomly assigned by experimenters assisting the author who are unaware of the purpose of the experiment and the procedures of the experiment. Such experiments have been called "Double Blind" experiments and are rare in psychology and education research (Kerlinger, 1973).

Process variables are conditions which affect an experimental procedure related to how a procedure is
accomplished as opposed to the procedure itself. In this study the specific process variables are variables related to how students' learn the experimental task. Kerlinger (1973) indicates that such process variables can be controlled by assigning subjects to different levels of a variable related to a learning process. In this manner the effect of the learning process may be accounted for by statistical testing. This procedure, however, does not control for the implicit suggestion to the students that a procedure may be effective because it was undertaken. To minimize the effects of such an implicit suggestion in this study students are asked to learn a list of words and randomly assigned to different conditions. The students are never taught a process for learning and it is assumed in this study that, in the absence of being taught a specific process, the students will proceed in a manner for learning the experimental task which is effective for them, and that will vary between individuals in a random manner. In other words, the effects of the learning processes will be assumed to be random and therefore not significantly an intervening factor in the study of the effects of the suggestion and expectancy variables.

RESEARCH QUESTIONS

The purpose of the study is to explore the effects
of the group leaders' expectancy about their students' performance of a learning task when a specific level of difficulty is suggested to the students and group leaders for the experimental task. The following research questions were asked:

1. Can a Group Leader's belief and expectation about a student's performance affect the student's performance on a learning task?

2. Can a suggestion made to the student about the level of difficulty of a task affect the student's performance on the task?

3. Can the combination of the Group Leader's expectancy and a suggestion given to the student affect the student's performance on a learning task?

4. Does congruency between the Group Leader's expectancy and the suggestion made to the student about the difficulty of a task affect the student's performance on the learning task.

This study is designed to explore these questions.
Chapter II.
Review of Research

In chapter I, the purpose and nature of the experimental study were discussed. The format of this chapter will be: a review of suggestion research, a review of suggestion and learning research using hypnosis and relaxation, a review of suggestion and learning research incorporating Lazanov's Methods, and a review of expectancy research.

SUGGESTION RESEARCH

Suggestion as a concept was first developed by Noizet in the early nineteenth century and was associated with the study of hypnotic phenomena during that time (Coffin, 1948). Noizet believed that a subject holding a particular idea in his mind could cause that idea to become an action. Bertrand attempted to use the concept of suggestion to demystify the hypnotic process, and, as a result of his work, the study of hypnosis was reduced to the study of suggestion. McDougal redefined suggestion as the "acceptance of a proposition in the absence of logically adequate grounds" (Coffin, 1948).

In the research of Binet (1900), suggestion was specifically separated from hypnotic phenomena. Binet
used a variety of procedures to lead subjects toward responses which prior events in the laboratory had indicated might occur. However, Clark Hull (1933) was the first researcher to apply controlled experimental procedures in the study of hypnosis and suggestion.

Thomas Coffin, in his review of suggestion research, noted that the investigation of suggestion appeared to move in the direction of using more complex levels of suggestion over time. He indicated that suggestion could be divided into two types: sensory-motor and verbal-motor suggestions.

Sensory-motor suggestions consisted of those suggestions which capitalize on a person's tendency to repeat a response that has been previously made in a similar situation, and a tendency to maintain a singular sensory set in comparing very similar heights, weights, or sizes. Verbal-motor responses are simple responses to instruction to do or not to do a task. Coffin found that suggestions to the effect that a task was hard created more effort in the subject, and a suggestion that a task was easy created less effort in the subject to complete the task. Coffin argued that combining the different kinds of suggestions confused subjects and experimenters regarding the responses achieved. What were the effects of the different kinds of suggestion? What was the effect of combining
complex levels of suggestion? Coffin believed that the trends he saw in the research to use more complex levels of suggestion could lead to confounded findings (Coffin, 1948).

**SUGGESTION AND LEARNING RESEARCH USING HYPNOSIS AND RELAXATION PROCEDURES**

In studies involving suggestion to enhance learning, hypnosis and relaxation procedures have been used by a number of researchers (see Table 1). In each case, hypnosis and the hypnotic process were inseparable from the suggestion variables.

Salzburg (1960) used four groups in a study of the effects of suggestion on a learning task using two hypnotic suggestion conditions, a waking suggestion condition, and a control group. Salzburg's control group was dissimilar to his other groups, and there were no controls in this study for experimenter bias. Salzburg concluded that hypnotic suggestion and post-hypnotic suggestions were more effective than waking suggestions for memory tasks.

Rosenhan and London (1963) found that unsusceptible hypnotic subjects had consistently higher baseline levels than susceptible subjects. Unsusceptible subjects improved performances as much as highly susceptible subjects on the experimental task. Studying this problem using word recognition tasks Zamansky, Scharf, and Brightbill (1964),
### TABLE 1.

Summary of Suggestion Studies with Hypnosis

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>N</th>
<th>Effects Studied</th>
<th>Controls Present Process Variables</th>
<th>Experimenter Bias</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salzburg</td>
<td>1960</td>
<td>32</td>
<td>Hypnotic Suggestion; Post-hypnotic suggestion; waking suggestion</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Parker &amp; Barber</td>
<td>1964</td>
<td>32</td>
<td>same as above</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>St. Jean</td>
<td>1980</td>
<td>42</td>
<td>Hypnosis and Suggestion with Time Distortion</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Spanos, Radtke-Bodorick, &amp; Shabinsky</td>
<td>1980</td>
<td>45</td>
<td>Hypnosis and Task Motivating Instructions</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Salzburg &amp; DePiano</td>
<td>1980</td>
<td>48</td>
<td>Hypnosis and Suggestion on Learning</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Johnson, Johnson, Olsen, &amp; Newman</td>
<td>1981</td>
<td>33</td>
<td>Hypnosis and Suggestion on Self-esteem and Academic Performance</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Oldridge</td>
<td>1982</td>
<td>27</td>
<td>Hypnosis and Suggestion on Reading Problems</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>
found that hypnotizable subjects, knowing that they will be asked to perform in the hypnotic state, appear to depress their baseline performances. These findings support the importance of controlling for expectancy in such research efforts.

Parker and Barber (1964) attempted to replicate Salzburg's (1960) experiment but found no differences among groups of subjects' performances on memory or abstract reasoning tasks.

St. Jean (1980) used hypnosis with suggestions for time distortion to test the hypothesis that hypnotic time distortion facilitates learning. St. Jean failed to find significance for the time distortion condition. However, this study failed to incorporate controls for experimenter bias effects.

Spanos, Radtke-Bodorick, and Shabinsky (1980) studied the effects of hypnotized versus task motivated subjects regarding their responses to suggestions that they forget certain words. Each subject was taught how to learn the words, either through hypnosis or task-motivating suggestions, such as "If you organize the words in this fashion, you will learn them quickly." Subjects were then asked to forget certain words. Effects were uncovered for the suggestion variables, but the experiment lacked controls for the effects of the different levels associated with
process involved in the experiment. It also lacked controls for experimenter bias.

Salzburg and DePiano (1980) attempted to ferret out the effects of suggestions from the effects of hypnosis regarding the learning of a task. However, each group received hypnosis and suggestion; no group received only hypnosis. This experiment did include a group that simulated hypnosis, but the experimenters gave the suggestions to the subjects. This is not an adequate design to control for experimenter bias.

Johnson, Johnson, Olsen, and Newman (1981) used hypnosis with children who had been diagnosed as learning disabled to enhance self-esteem and school performance. The authors suggest that improvement in self-esteem and academic performance was related to the child's hypnotic susceptibility and the amount of practice in self-hypnosis in which the child engaged. However, no group within this study was given just suggestions for increased self-esteem and academic ability. Were the results related to the suggestions, the hypnosis, or, since the authors were the experimenters, to experimenter bias?

Oldridge (1982) studied the effects of hypnosis and suggestion with 27 students with reading problems. Oldridge used three groups: a group given hypnotic suggestion for anxiety reduction, better reading
performance, and higher self esteem; a waking suggestion condition for the same results; and a group given no suggestion. No hypnotic simulation control was used. Oldridge found that hypnotic suggestion subjects scored significantly higher on the dependent measures than waking suggestion subjects, but not significantly so. Both suggestion condition subjects scored significantly higher than controls.

Barber (1965a) criticized Salzburg for the flaws in the experimental design of his study, and recommended that future studies include blinds regarding whether or not the subject was in a state of hypnosis. Barber (1965b) wrote that simplistic explanations about the causes of subjects' responses to test suggestions were suspect. Barber reviewed the literature available and concluded: "Hypnosis itself, without suggestion for high performance, does not significantly enhance either learning or recall."

Many of the previously reported studies have found significant enhancements for learning when subjects are relaxed using hypnosis. Other research on the effects of anxiety and learning have mixed findings in this regard. Straughan and Dufort (1965), in a study not incorporating controls for experimenter bias, found that learning was enhanced by relaxation only for anxious subjects.

Hansen and O'Neil (1970) reported that students
responded with the greatest level of anxiety when they were told that a task with which they were presented was difficult. In a similar study Revelle and Michael (1976), found that students found problems presented to them as moderately difficult to be extremely motivating, but, when told that the problems were very difficult, the authors found that the students experienced low levels of motivation.

Mueller and Overcast (1976), studying the effects of relaxation on recall, found that subjects with high anxiety had greater recall than subjects with low anxiety from their short term memory. Eysenk (1979) concluded that high anxiety levels lead to enhanced effort in relation to the kind of feedback the subjects received about their performances. He based his conclusions on research conducted by Fremont, Means, and Means (1970) and Gaudry (1977), who found that: 1) Failure feedback increases anxiety; 2) The major responses of subjects with high anxiety to failure feedback is increased worry and task irrelevant thought material; 3) The major response of low anxiety subjects to failure feedback is increased effort. Eysenk (1979) concluded that: 1) Anxiety interacts with feedback with neutral feedback having less of an effect on learning and with failure feedback having a more deleterious effect on the performance of anxious subjects;
(2) Instructions involving self esteem variables tend to increase the subject's level of worry and fear; (3) Ego involving instructions were associated with a performance increment for low anxiety subjects and a performance decrement for high anxiety subjects.

In studies using suggestion with hypnosis and relaxation techniques researchers have concluded: (1) hypnosis was not necessarily a condition for suggestion to be effective; (2) when suggestion was for easier learning subjects did better than when the suggestion was for harder learning; (3) when relaxation was used it enhanced learning in low anxiety subjects and inhibited learning in non-anxious subjects; (4) there are differences in the effects of suggestion related to the anxiety of the student, the kind of suggestion given, and how the subjects interpret the feedback given to them about their performance.

Many of the studies fail to control for experimenter bias within the research designs, and many fail to control for the possible effects of intervening process related variables.
SUGGESTION AND LEARNING RESEARCH USING LAZANOV'S METHOD

Ostrander and Schroeder (1973) reported information about a method for enhancing learning developed at the Lazanov Institute in Bulgaria. Interest has developed among groups of American Educators for adapting the method to American classrooms (Prichard and Taylor, 1980).

An observer watching a class undergoing the Lazanov method may see students reclined with their eyes closed, listening to strains of Baroque music, while the teacher presents information using different vocal tones and inflections. Students are prepared beforehand by being told that such procedures will enhance their ability to learn material. In general, the method involves the use of suggestion, deep muscle relaxation, music, and several techniques of varying the presentation of classroom materials to enhance learning (Lazanov, 1971).

Teachers attempting to apply Lazanov's method to American classrooms have cited cultural differences between American and Bulgarian students as a cause of mixed results on the effectiveness of the method (Prichard and Taylor, 1980). Projects testing the method in America have been successful with elementary school children (Kline, 1974), the teaching of French and English at the college level (Bancroft, 1972), and teaching Naval Science (Peterson, 1977). Table 2 summarizes the
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>N</th>
<th>Variables</th>
<th>Process Variables Separated</th>
<th>Significant Findings?</th>
<th>Control for Experimenter Bias</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kurkov</td>
<td>1977</td>
<td>33</td>
<td>all Lazonov's procedures</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
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<td>Philipov</td>
<td>1973</td>
<td>6</td>
<td>music, suggestion on learning an alphabet</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
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<tr>
<td>Biggers &amp; Stricherz</td>
<td>1975</td>
<td>216</td>
<td>visual process, relaxation on learning words</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Borden &amp; Schuster</td>
<td>1976</td>
<td>32</td>
<td>effects of suggestion, music &amp; breathing on learning Spanish words</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
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<tr>
<td>Schuster</td>
<td>1976</td>
<td>32</td>
<td>all Lazonov procedures</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
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</table>

TABLE 2.
Summary of Suggestion and Learning Studies Using Lazonov's Method
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<tr>
<th>Author(s)</th>
<th>Year</th>
<th>N</th>
<th>Variables</th>
<th>Process Variables Separated</th>
<th>Significant</th>
<th>Control for Experimenter Bias</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schuster</td>
<td>1976 b</td>
<td>8</td>
<td>alpha mental state &amp; suggestion on word learning</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Mohr</td>
<td>1977</td>
<td>46</td>
<td>relaxation on learning words</td>
<td>NO</td>
<td>YES</td>
<td>N.B.- all 46 Ss used previously by author</td>
</tr>
<tr>
<td>Schuster &amp; Pansegrau</td>
<td>1977</td>
<td>42</td>
<td>word list exposure, sex, speaking volume, with music</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
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<tr>
<td>Stricherz</td>
<td>1979</td>
<td>30</td>
<td>relaxation on word learning</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Schuster &amp; Miller</td>
<td>1979</td>
<td>64</td>
<td>various methods of presenting material</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
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<tr>
<td>Author(s)</td>
<td>Year</td>
<td>N</td>
<td>Variables</td>
<td>Process Variables Separated</td>
<td>Significant</td>
<td>Control for Experimenter Bias</td>
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<tr>
<td>Peterson</td>
<td>1977</td>
<td>62</td>
<td>all Lazonov procedures</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Schuster &amp; Martin</td>
<td>1980</td>
<td>48</td>
<td>suggestion &amp; relaxation</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>
research using parts or all of the Lazanov method in their research projects. The examination of Table 2 will demonstrate that this body of literature contains research that is poorly controlled for experimenter bias effects, and research in which it is impossible to separate the effects of each of the processes used from the implicit message of the effectiveness that is incorporated in the method.

In each case cited, the author was the experimenter, which allows questions to be raised about the introduction of expectancy to be raised in relation to the significant and non-significant findings from these studies. In one case, Mohr (1977), the author had used all of his subjects in previous experimental research projects.

Philipov (1973), Borden and Schuster (1976), and Schuster and Pansegrau (1977) all studied the effects of the use of music and suggestion, two important Lazanov techniques, on students' ability to learn and recall words. In each case, the authors were the main experimenters and performed all levels of the experimental procedures. In each case the subjects were taught how to learn a series of words using the method
separately from the effects of the variables being studied. This has the effect of confounding the processes within the experiment.

Relaxation effects were explored by Biggers and Stricherz (1975), Schuster (1976b), Mohr (1977), and Stricherz (1979). Biggers and Stricherz (1975) undertook a study of the effects of relaxation and suggestion on a recognition task. Subjects were presented words on slides and audio tape and subjected to different levels of suggestion and relaxation. The authors found significant effects for how the material was presented to the subject, but the relaxation condition appeared to have significantly negative effects for the levels of retention of words. No effects for suggestion were uncovered. In this experiment, the authors were the main experimenters. In a related and similar study, Stricherz (1979) concluded that relaxation was associated with a sense of well-being, and this could be useful in the learning process. The author fails to discuss his findings in terms of the results of the 1975 study, and again fails to control for experimenter expectancy.

Schuster (1976b) used biofeedback to induce alpha mental states in 8 subjects and used indirect suggestions and associative methods of word presentation in a learning experiment. All the subjects took all levels of the intervention. Significance for the presentation of
materials and for the effects of suggestion were found. The experimental results indicated that there was no effect for the alpha mental state condition. This finding suggests that an altered state of consciousness is not an operational prerequisite for learning. In this study, however, there were no controls for experimenter bias, and, due to the small sample (8), the generalizability of this finding is questionable.

Mohr (1977), in a controlled study of the effects of relaxation on learning, found significant effects for relaxation on learning performance, but he fails to control in his research for the implicit suggestion that relaxation will affect learning in each level of the design.

Schuster and Martin (1980) studied the effects of suggestion and relaxation on 48 subjects' abilities to learn a list of 25 words in ten minutes. The subjects were divided into groups and were trained in Lazonov learning techniques. The authors found that when no suggestion was given the subjects learned better if they were tensed; when suggestions for easier learning were given under relaxed conditions the subjects learned better. The authors concluded that the effects of suggestion were not significant. Two major flaws in their design relate to a confounding of the Lazonov techniques with the suggestion
conditions, and no controls for experimenter expectancy effects.

**Summary**

Failures to control for the effects of process variables and failures to control for experimenter bias appear to be major flaws in the research using Lazonov's methods for accelerating learning. One wonders if it is possible to control for the implicit suggestion that a process will have an effect in any prolonged learning experiment. Most of the experiments appear reductionistic, which may also be a major difficulty in approaching such research.

**EXPECTANCY RESEARCH**

Rosenthal and Rubin (1979), in a review of research on expectancy effects, experimental bias, and self-fulfilling prophecy, suggest that the only way to control for such effects is the use of blinding procedures. However, in training instructors for applying complex procedures over a prolonged period of time, is not one implying that such procedures are expected to have an effect? Smale (1978) suggests a process for this implicit suggestion occurring as: (1) a prediction or belief is formed, (2) action and subsequent behavior are taken as a result of the prediction made, and (3) behavior brings about the
predicted event or behavior. Smale suggests that the instructor expectancy effects are important for educators as long as they have positive effects on the educational process. He suggests that by accepting teacher expectancy as a given operating condition in education that one makes a premature conclusion about their importance. Rosenthal and Rubin disagree with this.

Rosenthal and Rubin (1978) reviewed 345 studies of expectancy, experimenter bias, and interpersonal expectancy effects, of which only a few are relevant to this project. As a result of a meta-analysis of the studies the two authors have concluded that the probability that there is no such thing as expectancy effects is near zero and that the average magnitude of the expectancy effect is likely to be of practical importance in research.

Relevant to the present research project is the "Pygmalion Experiment" (Rosenthal and Jacobsen, 1968). In this study instructor expectancy effects were studied in relation to students' performance in the classroom. Students were randomly identified to teachers as being average, above average, or below average in academic ability. It was found that to a significant degree the students' performances were being assessed by the teachers in a manner consistent with what the teacher had been told about the student.
Other controlled studies have supported the significant findings for the importance of expectancy effects. Eder (1981) found that pupils who were expected to have learning problems were often subsequently exposed to learning environments whose social contexts were much less conducive to learning; Rose and Fantino (1981) found that students periodically punished by their teachers tended to perceive all stimuli from the teacher as punishment. Significant findings for the effects of differing levels of expectations for job performances of sailors (Crawford, Fink, and Thomas, 1980), blacks, (Derlega, McAnulty, Revis, and Strout, 1980), and handicapped persons (Byrd and Rhoden, 1981) have been demonstrated. Ciprani and Waite (1980) were able to predict the direction of experimenter bias in a replication of a research project by applying principles of expectancy.

What does it take for a teacher to develop an expectancy? Clairborn (1969) found that when teachers were introduced to data about the academic ability of a student after the student had been in the teacher's class for one month the information had no measurable effect on how the teacher perceived the student. This suggests that once an expectancy is formed it may be maintained even in the face of information to the contrary. How long does it take to form an expectancy? Aloia, Knutson, Minner
and Von Seggern (1980) found that they could manipulate teacher's expectations about a student's performance by presenting the teachers with information about the student's background relative to academic achievement. Other authors have found slightly different results with the same approach. Minner (1982), in a study using 66 classroom teachers, found that the presence of labeling information about students lowered the teacher's academic and behavioral expectations for the students. Martineck and Karper (1981) found that teachers developed expectations about the social relationships of students but not academic outcomes. Schuss and Miller (1982) had 56 teachers evaluate the records of a 14 year old boy; one half of the teachers received records stating that the boy had come from a regular school program and half were given records indicating that the boy had come from a residential educational program. The authors found that teachers' expectations about the program planning for this student varied, but not their expectations for the duration or outcome of the academic program.

When subjects are aware of the teacher's or researchers' expectations, how do they respond? Research into the responses of subjects to experimental demands suggest that in some cases subjects will refuse to believe an experimenter when they are exposed to information about an
experiment. Dolly, Bell, Reynolds, and Saunder (1979) looked at the different responses subgroups within a sample of undergraduate students experienced when they were exposed to different information about what was expected from them during the experiment. Subjects were told that: high scores were desired of them, low scores were desired of them, or, they were told nothing at all. There were no indicated differences in subjects compliance by race or sex, but responses to the expectations varied depending upon the level of information given to the subject about the expectancy. The authors concluded that the informational format of a research project may pose a threat to the internal validity of the study in relation to how subjects responded to the information.

A controversy exists about the existence and effects of expectancy. Authors such as Johnson (1978) and Page (1978) believe that not enough information exists to evaluate the specific conditions and operational variables to predict and control for the effects of expectancy. Rosenthal and Rubin (1978) disagree, stating that the use of experimental procedures where the experimenter is not aware of the hypotheses under study and where random assignment of subjects is used as well is sufficient to control for the effects of expectancy.
Because of failures to control for the effects of experimenter bias and the effects of teacher expectancy in the extant research where the effects of suggestion are studied in relation to the enhancement of learning some questions may be raised. What is the role of expectancy in regards to suggestions about learning? When a teacher has an expectation about the effectiveness of a procedure, does that have an effect on the students' performance? When specific process variables are not taught to the student, how are students' performances affected? Research into the relationship of expectancy and suggestion is needed to answer such questions.

This study will focus on controlling for the effects of specific process variables by randomizing the processes that students use for learning by randomizing students to experimental groups and allowing them to be "on their own" as regards to the learning task. Controls for experimenter bias and the effects of the Group Leaders' expectancy, and a simple form of direct suggest are used in a design to examine the effects of these variables in relation to students' performances in learning a list of randomly chosen rare words.
Chapter III.

Method

DESIGN OF THE EXPERIMENT

There are three levels of the independent variable of suggestion and three levels of the independent variable of expectancy.

Expectancy Conditions

Positive Expectancy, or E+: The group leaders were given a written statement to the effect that their students had been selected because of their above average academic abilities, with the goal of implanting an expectation in the group leader's mind that the students in their groups would tend toward above average performance in general on the learning task in the experiment.

Negative Expectancy, or E-: The group leaders were given a written statement to the effect that their students had been selected because of their below average academic abilities, with the goal of implanting an expectation in the group leaders' minds that the students in their groups would tend toward below average performance in general on the experimental task.

Control Expectancy Condition, or E0: The group leaders in this experimental condition were given no
FIGURE 1.
Experimental Design for Expectancy and Suggestion Effects with a Pretest-Post-test Only Group

Levels of Suggestion\textsuperscript{b}

\begin{array}{ccc}
+ & - & o \\
+ & ++ & +- & +o \\
- & -+ & -- & -o \\
0 & o+ & o- & oo \\
\end{array}

Levels of Expectancy\textsuperscript{a}

\begin{itemize}
  \item a = Levels of Expectancy
  \item + = above average
  \item - = below average
  \item o = no knowledge

  \item b = Levels of Suggestion
  \item + = task is easier
  \item - = task is harder
  \item o = no knowledge
\end{itemize}
information about the selection standards for their students.

These conditions follow principles developed and used by Aloia et al. (1980) and Minner (1982), who demonstrated that teachers' expectancy about students' performance can be manipulated by presenting the teacher with information about a student's academic abilities.

**Suggestion Conditions**

**Positive Suggestion, or S+**: The group leaders were given written instructions to read to the students in their groups as follows: "The word and definition list has been designed in such a manner as to make it easy to learn."

**Negative Suggestion, or S-**: The group leaders were given written instructions to read to the students in their groups the following statement: "The word and definition list has been designed in such a manner as to make it hard to learn."

**Control Suggestion Condition, or S0**: The group leaders and the students were given no information about the level of difficulty of the experimental task.

These conditions follow those developed and used by Schuster et al. (1980) in an experiment studying the effects of suggestion on a learning task.

The three levels of expectancy and the three levels
of suggestion are combined to make a nine celled design that can be collapsed to examine the effects of the group leaders' expectancy about the students' performance and the effects of the suggestion condition (See Figure 1). A tenth cell is included when students are not exposed to any of the levels of the independent variables, nor are they asked to perform an experimental task. This group, however, receives a pre-test and post-test of the dependent measure. This tenth condition is included as a control condition for monitoring the effects of testing and the effects of external events on the experimental conditions.

The design has four groups which combine levels of the expectancy and suggestion variable, two groups which constitute control conditions for the expectancy variable, two groups which constitute control conditions for the suggestion variable, and one condition where neither expectancy nor suggestion is manipulated but an experimental task and testing are included. This group is the main control group for the study.

**THE EXPERIMENTAL TASK AND THE DEPENDENT MEASURES**

The major experimental task involved the learning of the definitions of 30 words within a ten minute time period. The words were randomly chosen from *Dorland's Illustrated Medical Dictionary, 25th Edition* (1974).
Some examples from the word list given to the students as the experimental task include:

(1) Angoid—Resembling a blood vessel.
(2) Ecmnesia—Forgetfulness for recent events with good remote memory.
(3) Caprine—Derived from a goat.

See Appendix A for the list of words and the definitions exactly as they were presented in the experiment to the students.

The main measure for the statistical analysis was a score derived from the difference between a student's score on the post-test and the student's score on the pre-test. The pre-test and the post-test required the student to match a word with its definition. The pre-test and the post-test are identical and were administered to the students in exactly the same way. The test used for the experiment is included with a key for the correct responses in Appendix A.

Following completion of the post-test, the students were asked to respond to three questions that were included in the students' packet on a separate page.
Question 1. My instructor believes me to be
   a. an average student.
   b. an above average student.
   c. a below average student.

Question 2. I believe this learning task was
   a. very interesting to me.
   b. moderately interesting to me.
   c. moderately disinteresting to me.
   d. very disinteresting to me.

Question 3. I would characterize the difficulty of this learning task as
   a. very easy.
   b. moderately easy.
   c. moderately difficult.
   d. very difficult.

Question 1 is a direct measure of what may be directly communicated to the student from the teacher about the teacher's belief about the academic ability of the student. Question 2 is a measure of the subject's level of interest in the task as a means of assessing the student's level of motivation to perform on the experimental task. Question 3 is a direct measure of the student's response to the condition of the suggestion variable.
SUBJECTS AND OTHER PERSONNEL

Experimenters: The experimenters were two male graduate students from the Department of Psychology who were recruited by personal communication from the author and each paid $5.00 for their participation.

Group Leaders: Group leaders were individually found by an advertisement placed in the University newspaper. Ten female graduate students, each of whom had prior experience teaching, were selected and paid $5.00 for participating in the experiment. No demographic data were collected for this group.

Students: Students for the experiment were male and female undergraduate students recruited by advertisement and announcements made during classes. 50 students responded and were paid $3.00 for participating in the experiment. Table 3 outlines the demographic data collected from the students participating in the experimental task.

SETTING

The experiment took place in a University building, in such a manner that the rooms were similar with regard to seating arrangements, lighting, and noise levels.

EXPERIMENTAL PROCEDURES

The experimental procedures were undertaken by the experimenters under supervision of the author to insure
Table 3.
Summary of the Number of Subjects and Mean Years of College Education, Age, and Grade Point Average by the Subjects Sex in the Main Effects Groups.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number</th>
<th>College Education</th>
<th>Age</th>
<th>Grade Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>35</td>
<td>$\bar{X}=2.02$ years</td>
<td>$\bar{X}=19.74$</td>
<td>$\bar{X}=2.91/4.0$</td>
</tr>
<tr>
<td>Male</td>
<td>10</td>
<td>$\bar{X}=1.8$ years</td>
<td>$\bar{X}=20.9$</td>
<td>$\bar{X}=2.86/4.0$</td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
<td>$\bar{X}=2.02$ years</td>
<td>$\bar{X}=20.02$</td>
<td>$\bar{X}=2.90/4.0$</td>
</tr>
</tbody>
</table>
that the experimental controls for experimenter bias would be initiated. Communications from the author to the experimenters, students, and group leaders contained no specific information about the experiment, but did include a message that the task was a "Learning Experiment." Experimenters were given instructions to brief the participants; each experimenter was briefed alone and assigned to deal with group leaders or students. Each experimenter was assigned to monitor five rooms in case problems arose. The monitoring consisted of looking into the rooms during the procedures.

The group leaders were told to meet in a specific room. They were each randomly assigned a condition by means of being given a room number and a blank packet containing instructions. The experimenter was unaware of the contents of the packet and assigned rooms at random from a pool of room numbers. Each group leader had five minutes after reaching the assigned room to read their instructions before students arrived. The group leaders initiated the instructions, timed the procedures, collected the student booklets, sealed them into envelopes, and returned the envelopes to the experimenter assigned to monitor the classroom.

Fifty students were randomly assigned to classrooms by an experimenter who had no knowledge of the experimental
and control conditions with five students being assigned to each room.

The instructions read to the students and the instructions given to the group leaders are provided in Appendix A.

The complete procedure required 65 minutes. The following sequence of events was used:

1. Group leaders are assigned—Five minutes.
2. Students are assigned—Ten minutes.
3. The pre-test is administered—Ten minutes.
4. The post-test is administered—Ten minutes.
5. Debriefing—Twenty minutes.

The envelopes were given to two raters, who scored the pre-tests, post-tests, and questions. The raters, too, had no knowledge of the purpose of the experiment or conditions.

DEVELOPMENT OF RESEARCH HYPOTHESES

The following research hypotheses were developed as a means of answering the research questions:

Effects of Expectancy

(1) When group leaders hold different expectations about the ability of their students, there will be significant differences between their students' performances on the learning task.
Effects of Suggestion

(2) When students are given different suggestions about the level of difficulty of a learning task there will be significant differences in the level of the students' performance on the learning task.

The Combined Effects of Expectancy and Suggestion

(3) Students within different levels of the expectancy and suggestion conditions will perform in significantly different ways on the learning task.

(4) Students in the congruently positive expectancy and suggestion condition will perform significantly better than controls on the learning task.

(5) Students in the congruently negative expectancy and suggestion conditions will perform significantly poorer than controls on the learning task.

(6) Students in the congruently positive expectancy and suggestion condition will perform significantly better than students in the congruently negative expectancy and suggestion condition.

(7) Students in the incongruent conditions of expectancy and suggestion will not perform significantly different from controls on the learning task.
CHAPTER IV
PRESENTATION AND INTERPRETATION OF FINDINGS

In this chapter the results of the analysis of the data relevant to the hypotheses will be detailed. The format of this chapter will include: (1) A discussion of the procedures used to analyse the data; (2) A test of the hypotheses stated in chapter 1; (3) A discussion of the results of the questions asked of the students; and (4) a discussion of relevant post-test and pre-test score data.

Statistical Analysis Procedures

The experimental data was analysed in part using the Statistical Package for the Social Sciences, 2d Edition (1979) for the general analysis of variance and analysis of covariance procedures.

Analysis of covariance procedures were initiated to insure the general similarity between groups in the experimental conditions, following the method of Schuster and Martin (1980).

Tukey's Honest Significant Difference test was used to assess the differences between the interaction condition means. This test uses the studentized range statistic in a multiple comparison procedure that takes
into account the number of means being compared and the relative sampling error. A range is calculated that must exist between two means being compared for a specific level of significance; in this case, the .05 level of confidence. This range is then applied to comparisons within the experimental interaction conditions.

**Statistical Tests of the Hypotheses**

The basic measure of analysis was the difference between the students' scores on the post-test and pretest measures. Table 4 presents an analysis of covariance of these scores by levels of the expectancy and suggestion conditions with the students' education, age, sex, and grade point average. None of the covariates were found to be significant in their contributions to the variances in the experiment.

**Effects of Expectancy**

**Hypothesis #1** When group leaders hold different expectations about the ability of their students, there will be significant differences between their students' performances on the learning task.

Table 5 summarizes the means and standard deviations for the teacher expectancy conditions. The result of the analysis of covariance (Table 4) with the corrected main effects was non-significant, $F(2,32)=0.840$, $p > .05$. A separate analysis of variance was calculated which
### TABLE 4.

**ANCOVA Summary Table for Post-test minus Pretest Scores by Expectancy and Direct Suggestion with the Subjects' Education, Age, Sex, and Grade Point Average**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>1</td>
<td>0.473</td>
<td>0.473</td>
<td>0.016</td>
</tr>
<tr>
<td>Age</td>
<td>1</td>
<td>0.084</td>
<td>0.084</td>
<td>0.003</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>51.245</td>
<td>51.245</td>
<td>1.697</td>
</tr>
<tr>
<td>GPA</td>
<td>1</td>
<td>57.781</td>
<td>57.781</td>
<td>1.914</td>
</tr>
<tr>
<td><strong>Corrected Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expectancy</td>
<td>2</td>
<td>50.711</td>
<td>25.356</td>
<td>0.840</td>
</tr>
<tr>
<td>Suggestion</td>
<td>2</td>
<td>124.578</td>
<td>62.289</td>
<td>2.063</td>
</tr>
<tr>
<td>Exp. x Sugg.</td>
<td>4</td>
<td>415.095</td>
<td>103.774</td>
<td>3.437*</td>
</tr>
<tr>
<td>Error (res)</td>
<td>32</td>
<td>966.091</td>
<td>30.190</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>44</td>
<td>1689.640</td>
<td>38.401</td>
<td></td>
</tr>
</tbody>
</table>

* \( p \leq 0.05 *
### TABLE 5

Summary Cell Means and Standard Deviations for Post-test minus Pretest Scores by Levels of Expectancy and Suggestion

<table>
<thead>
<tr>
<th></th>
<th>A⁺⁺</th>
<th>A⁻⁻</th>
<th>A⁻⁰</th>
</tr>
</thead>
<tbody>
<tr>
<td>B⁺⁺</td>
<td>(\bar{X} = 25.8)</td>
<td>(\bar{X} = 16.4)</td>
<td>(\bar{X} = 17.8)</td>
</tr>
<tr>
<td></td>
<td>(SD = 10.99)</td>
<td>(SD = 5.17)</td>
<td>(SD = 5.54)</td>
</tr>
<tr>
<td>n</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>B⁻⁻</td>
<td>(\bar{X} = 22.4)</td>
<td>(\bar{X} = 15.4)</td>
<td>(\bar{X} = 23.2)</td>
</tr>
<tr>
<td></td>
<td>(SD = 10.77)</td>
<td>(SD = 9.09)</td>
<td>(SD = 4.14)</td>
</tr>
<tr>
<td>n</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>B⁻⁰</td>
<td>(\bar{X} = 20.4)</td>
<td>(\bar{X} = 24.6)</td>
<td>(\bar{X} = 22.2)</td>
</tr>
<tr>
<td></td>
<td>(SD = 5.94)</td>
<td>(SD = 6.50)</td>
<td>(SD = 3.03)</td>
</tr>
<tr>
<td>n</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>A⁺⁻</th>
<th>A⁻⁺</th>
<th>A⁻⁻</th>
</tr>
</thead>
<tbody>
<tr>
<td>B⁺⁻</td>
<td>(\bar{X} = 20.0)</td>
<td>(\bar{X} = 20.33)</td>
<td>(\bar{X} = 20.33)</td>
</tr>
<tr>
<td></td>
<td>(SD = 6.05)</td>
<td>(SD = 7.29)</td>
<td>(SD = 7.29)</td>
</tr>
<tr>
<td>n</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>B⁻⁺</td>
<td>(\bar{X} = 22.4)</td>
<td>(\bar{X} = 22.4)</td>
<td>(\bar{X} = 22.4)</td>
</tr>
<tr>
<td></td>
<td>(SD = 5.28)</td>
<td>(SD = 5.28)</td>
<td>(SD = 5.28)</td>
</tr>
<tr>
<td>n</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

\(\bar{X}\) = Mean, \(SD\) = Standard Deviation, \(n\) = Sample Size

**a** = Levels of Expectancy
- **⁺⁺** = above average performance
- **⁻⁻** = below average performance
- **⁻⁰** = no knowledge

**b** = Level of Suggestion
- **⁺⁺** = easier
- **⁻⁻** = more difficult
- **⁻⁰** = no knowledge
supported this finding, $F (2,36)=0.792, p>.05$, which indicates that there was no significant differences in students' performances across the conditions of the expectancy variable. This hypothesis was rejected, which indicates that for this study group leaders expectancy had no effect on students performances when considered independently.

**Effects of Suggestion**

**Hypothesis #2** When students are given different suggestions about the level of difficulty of a task there will be significant differences between students' performances on the learning task.

Table 5 summarizes the means and standard deviations for the suggestion conditions and Table 4 summarizes the analysis of covariance with corrected main effects for the suggestion condition. The $F (2,32)=2.063, p>.05$ was not significant. A separate analysis of variance resulted in an $F (2,36)=1.945, p>.05$, which supported the finding that there was no significant differences in students' performances across the suggestion condition. The hypothesis was rejected, indicating that suggestion alone was not a significant effect in this study.

**The Combined Effects of Expectancy and Suggestion**

**Hypothesis #3** Students within different levels of the expectancy and suggestion conditions will perform in
significantly different ways on the learning task.

Table 4 summarizes the analysis of covariance with corrected main effects for the effects of expectancy and suggestion combined, and Table 5 summarizes the means and standard deviations for the interaction conditions. An $F(4,32)=3.437, p < .05$, was significant for the effects of the interaction of expectancy combined with suggestion. A separate analysis of variance, $F(4,36)=2.819, p < .05$, supported the findings. This indicates that the hypothesis was supported and that students' performances differed significantly within different levels of the combined expectancy and suggestion conditions.

Tukey's Honest Significant Difference post-hoc test was used to test the subsequent interaction comparisons. A range, df=(932), $p < .05$, was computed and the means were compared. Figure 2 details the significant comparisons using the procedure.

**Hypothesis # 4** Students in the congruently positive expectancy and suggestion condition will perform significantly poorer than controls on the learning task.

Figure 2 shows that the comparison between E+S+ and E0S0 is not significant, indicating that the congruently positive condition did not perform significantly different than controls, rejecting the hypothesis.
Hypothesis # 5  Students in the congruently negative expectancy and suggestion conditions will perform significantly poorer than controls on the learning task.

When E-S- and EOSO are compared the result is significant. An examination of Table 5 shows that the mean scores are in the predicted direction, indicating that E-S- performed significantly poorer than the EOSO group. The hypothesis is supported by the findings.

Hypothesis # 6  Students in the congruently positive expectancy and suggestion condition will perform significantly better than students in the congruently negative expectancy and suggestion conditions.

Figure 2 and Table 5 show that the comparison of E+S+ with E-S- is significant and in the predicted direction, with E+S+ performing significantly higher mean score than E-S-. The hypothesis was confirmed.

Hypothesis # 7  Students in the incongruent conditions of expectancy and suggestion will not perform significantly different from controls on the learning task.

Figure 2 shows that in one comparison of the incongruent conditions, the E+S-/EOSO, the result was significant. This is sufficient to reject the hypothesis, indicating that congruency between the expectancy and suggestion conditions is not necessary for significant
FIGURE 2.
Summary of Significant Interactions Between Within Group Means for the Post-test minus Pretest Scores Using Tukey's HSD Test at the 95% Confidence Level

<table>
<thead>
<tr>
<th>E+S+</th>
<th>E+S-</th>
<th>E+S0</th>
<th>E+S+</th>
<th>E+S-</th>
<th>E+S0</th>
<th>E+S+</th>
<th>E+S-</th>
<th>E+S0</th>
</tr>
</thead>
<tbody>
<tr>
<td>E+S+</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E+S-</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E+S0</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E+S+</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E+S-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E+S0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E+S+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>E+S-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>E+S0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Level of Expectancy
+ = above average performance + = easier task
- = below average performance - = harder task
o = no knowledge

Level of Suggestion

* = significant at the p ≤ .05 level
effects to occur for the expectancy and suggestion variables.

Further overall comparisons within the levels of the expectancy and suggestion conditions indicate that for this study the effects of suggestion overpower the effects of expectancy; in each condition of the suggestion variable the results for expectancy were not significant; when there is no suggestion given to the student expectancy alone has a significant effect on performance (See Table 6).

In Table 7, group means are compared. When expectancy is present in a suggestion condition, the students performed in the predicted direction; i.e., the students told that a task was easy performed better than students told that a task was hard, but not significantly. When expectancy was not present, students' performances were significantly better when they were told that a task was hard. When students are not given a suggestion, the E-S0 group performed better than the E+S0 group.

**Summary of Findings**

The results of an analysis of covariance and an analysis of variance for the effects of expectancy and suggestion resulted in the rejection of the two main effects hypothesis, indicating that for this study expectancy and suggestion were not significant effects when...
TABLE 6.

Comparisons Between Positive and Negative Suggestion Conditions within Levels of the Expectancy Conditions and Between Expectancy Conditions Within Levels of the Suggestion Conditions Using Tukey's HSD Procedure

<table>
<thead>
<tr>
<th>Expectancy Condition</th>
<th>Comparisons of Suggestion Groups</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>+ with -</td>
<td>significant*</td>
</tr>
<tr>
<td>-</td>
<td>+ with -</td>
<td>significant*</td>
</tr>
<tr>
<td>0</td>
<td>+ with -</td>
<td>significant*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Suggestion Condition</th>
<th>Comparisons of Expectancy Groups</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>+ with -</td>
<td>non-sign.</td>
</tr>
<tr>
<td>-</td>
<td>+ with -</td>
<td>non-sign.</td>
</tr>
<tr>
<td>0</td>
<td>+ with -</td>
<td>significant*</td>
</tr>
</tbody>
</table>

* p \( \leq .05 \)
TABLE 7.
A Comparison of the Interaction Means within Levels of Expectancy Conditions and Suggestion Conditions Using Tukey's HSD Procedure at the p ≤ .05 Level

<table>
<thead>
<tr>
<th>Expectancy</th>
<th>Suggestion Condition Means</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Easy</td>
<td>Hard</td>
</tr>
<tr>
<td>Above average</td>
<td>25.8</td>
<td>16.4</td>
</tr>
<tr>
<td>Below average</td>
<td>22.4</td>
<td>15.4</td>
</tr>
<tr>
<td>None</td>
<td>20.4</td>
<td>24.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Suggestion</th>
<th>Expectancy Condition Means</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Above Average</td>
<td>Below Average</td>
</tr>
<tr>
<td>Easy</td>
<td>25.8</td>
<td>22.4</td>
</tr>
<tr>
<td>Hard</td>
<td>16.4</td>
<td>15.4</td>
</tr>
<tr>
<td>None</td>
<td>17.8</td>
<td>23.2</td>
</tr>
</tbody>
</table>
considered independently. The combination of expectancy and suggestion effects were found to be significant and this hypothesis (#3) was supported. Further analysis with Tukey's HSD procedure revealed that:

1. The comparison E+S+/EOS0 was not significant, resulting in a rejection of hypothesis #4.
2. E-S- performed significantly poorer than EOS0, supporting hypothesis # 5.
3. E+S+ performed significantly better on the learning task than E-S-, supporting hypothesis # 6.
4. The comparison E+S-/EOS0 was significant, indicating that congruency was not necessary for expectancy and suggestion to have a significant effect on performance, rejecting hypothesis #7.
5. When E was + or -, students appeared to perform better when S was +, but not significantly better than the S- group.
6. Expectancy alone appears to be significant when suggestion is absent, indicating that the effects of suggestion may be more powerful than the effects of expectancy.
7. Students in the EOS- condition scored significantly better than both E+ and E- S- conditions.
The $E+S+$ condition performed significantly better than students in the $E+S-$ and $E+S0$ groups.

**Students Response to Questions**

Table 8 presents the findings of an analysis of covariance for the students' responses to the question regarding their interest in the task. The covariates and main effects were not significant, but the interaction of the main effects, $F(4,32)=3.718, p < .05$, was significant. Analysis using Tukey's HSD post-hoc procedure resulted in two significant comparisons:

- The $E+S+$ and $E-S+$ students reported significantly more interest in the task than students in the $E+S0$ condition.

The analysis of covariance for students' perceptions of the group leaders' belief about their academic ability and for students' rating of the level of difficulty of the task were not significant. These results are contained in Appendix B.

**Relevant Pre-test and Post-test Score Information**

Appendix B contains a summary of the means and standard deviations for the pretest scores. The analysis of covariance and one-way analysis of variance for the expectancy condition resulted in findings that were not significant, indicating that there were no differences between groups on the pre-test results (See Appendix B).
TABLE 8.

Analysis of Covariance Summary for Subjects' Interest in the Task by Expectancy and Suggestion with Subjects' Education, Age, Sex, and Grade Point Average

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>Ms</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covariates</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>1</td>
<td>0.463</td>
<td>0.463</td>
<td>0.722</td>
</tr>
<tr>
<td>Age</td>
<td>1</td>
<td>0.245</td>
<td>0.245</td>
<td>0.374</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>GPA</td>
<td>1</td>
<td>0.009</td>
<td>0.009</td>
<td>0.001</td>
</tr>
<tr>
<td>Corrected Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expectancy</td>
<td>2</td>
<td>0.133</td>
<td>0.067</td>
<td>0.163</td>
</tr>
<tr>
<td>Suggestion</td>
<td>2</td>
<td>0.133</td>
<td>0.067</td>
<td>0.163</td>
</tr>
<tr>
<td>Exp. X Sugg.</td>
<td>4</td>
<td>6.066</td>
<td>1.516</td>
<td>3.718*</td>
</tr>
<tr>
<td>Error (res)</td>
<td>32</td>
<td>13.051</td>
<td>6.408</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>23.200</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p ≤ .05
The post-test score results followed the general pattern established by the analysis of the post-test minus pre-test scores, and are contained in Appendix B.

The condition that received pre-test and post-test only was designed as a control for the effects of testing and the effects of events occurring during the experiment. The mean difference in the post-test minus-pre-test scores was .6, indicating that on the average the students in the group gained .6 words in their performance on the post-test. This is not enough of a gain to be considered significant, indicating that the effects of the testing procedure need not be evaluated for this study. When compared to gains made by the experimental groups, however, it can be shown that the students in the experimental groups did effectively apply learning processes during the experimental task.
CHAPTER V
DISCUSSION

Limitations of the Study

Limitations of the study may be identified as limitations due to sample size, the lack of power of the dependent measure, and ambiguity over whether the group leaders in the experiment formed the desired expectation about their students' direction of performance on the learning task. These limitations raise questions about the internal and external validity of the experimental findings.

The sample size of 45 students in the main experimental conditions may have severely limited the power of the statistical analysis. This may explain the failure to find significance for either of the main effects under study when analysed independently.

The dependent measure in the experiment consisted of a list of 30 words randomly chosen from a dictionary and formed into a task that required the subjects to match the words with their definitions following a study period of ten minutes. Though no significant differences between the groups on the pre-test, 13 of the 45 students achieved perfect scores on the post-test. This may have
created an artificially low post-test minus pre-test score difference in a manner that could have significantly masked the results and effects of the main conditions and the comparisons between groups. The mean score for some groups may have been significantly higher in several of the research groups which may have lead to more significant findings. This difficulty affects the internal and external validity of the research findings.

An important area of concern regarding the internal validity of the experiment rests in the area of the formation of the expectancy conditions. The attempt was made in this experiment to create for certain group leaders an expectation for above or below average performance from the students in their groups. The assumptions for this are: (1) when information about a students' academic ability is revealed to a group leader the group leader will develop an expectation about the students' future performance; (2) the expectancy that is formed will be in the direction consistent with the information given to the group leader; (3) the expectancy will be formed quickly and maintained throughout the procedure. Though studies have supported that these assumptions may be made (See Aloia et al., 1980) this study incorporates no controls for assuring that the expectancy conditions exist as indicated for this experiment. Did the group leaders form the desired expectancies?
If the desired expectancies were formed, were they maintained throughout the procedure? Were expectancies formed in the desired directions? There is no evidence available that expectancy as a manipulated variable was successfully accomplished for this study.

The experiment was structured and prepared in such a manner as to control for many extraneous variables. The conditions for the formation of an expectancy as used by Minner (1982) and Aloia et al. (1981) were initiated for this experiment, but expectancy was assumed to exist, and was not measured or verified. This research differs from previous research in that the existence of an expectancy was a finding in the previous research, and not a manipulated variable. For this experiment, then, it may be said that the procedures which resulted in a finding for expectancy for other studies were initiated, but expectancy was not verified. If expectancy was not an operating condition in this experiment, then to what may we attribute the results? What condition was operating instead of the expectancy variable? The use of expectancy as a manipulated variable needs to be clarified for further research.

Given the limitations of the study, some findings appear to be important. Given a limited amount of interaction and a limited amount of time, subjects in the combined conditions of expectancy and suggestion
demonstrated significant differences in their performances on a learning task. Though expectancy was difficult to establish and track in the experiment, it appeared that when combined with suggestion expectancy may have some significant effects in these types of conditions. The effect of combining a suggestion that the task was hard to learn... with an expectancy for below average performance resulted in significantly lower scores for the subjects in that group when compared to controls. The magnitude of this negative effect, when considered with the relatively impersonal and short length of time for the relationship between the students' and group leaders to form, indicates a need for further study into the effects of such conditions.

Outside the laboratory such conditions may exist when an individual goes for a job interview, or takes a driver's test, or when an independent evaluator administers competency tests or achievement tests such as the ACT's, SAT's, or GRE's, in schools where the students may be considered disadvantaged, below standards, or consisting of predominantly minority students. The effects of an individuals expectations made about such tasks need to be explained in further research.

In a classroom, much could be done to study the effect of suggestion. Recordings could be made and
evaluated with the following questions in mind:

(1) How often do teachers give suggestions about the nature of a learning task? (2) How frequently does verbal or non-verbal information contain a suggestion? (3) How frequently does a teacher indicate a desired outcome for the work a student initiates? (4) How are the teacher's suggestions in the classroom related to the performances of the students in the classroom?

Questions may be raised about how teacher expectancy may be manipulated in the classroom and perceived by students. Smale (1978) indicated that an individual with an expectancy behaved toward another individual in a manner consistent with the expectancy formed and in such a way that caused the expected behavior to occur. Eysenck (1979) said that feedback to students about their performances during a task had an effect on the students' subsequent performance. Could teacher expectancy be perceived as a form of feedback to the student? Eysenck indicated that the effect of negative or failure feedback had a greater impact on the student than neutral feedback. Similar findings for the expectancy conditions were observed in this experiment. How is an individual's expectancy perceived by others? How is this interpreted? These are areas for future research.
Appendix A.

Information for the Experimental Task
APPENDIX A-1

Pretest, Post-test, and Key

1. composed of matter
2. lowest
3. sign language
4. a bell shaped organ or part
5. an anchoring or supportive structure
6. a monster with two faces, one incomplete
7. without a nose
8. distended with gas
9. accelerating
10. milk sickness
11. a fat-like substance derived from sheep's wool
12. psychic material with an idealistic quality
13. derived from a goat
14. the process or state of being hard
15. urination
16. the doctrine that all matter in the universe is alive
17. a girdle encircling a structure or pattern
18. pertaining to life
19. a morbid thirst
20. resembling a plant
21. near the ear
22. an individual with two full sets of chromosomes
23. a loop of cord or tape
24. one in whom a certain stimulus produces an arrest of function
25. forgetfulness of recent events, good remote memory
26. resembling a blood vessel
27. the maintenance of a relatively constant body fluid volume and composition
28. a yellowish substance derived from corn
29. pertaining to the development or evolution of animals
30. resembling a network

5. trabs
8. tympanism
10. wambles
11. suint
12. anagogy
22. diplont
15. miction
16. hylzoism
23. fillet
2. ima
14. induration
20. phytoid
24. inhibi-trope
18. zoetic
28. zein
3. dactylology
4. campanula
30. retiform
13. caprine
29. zoogeny
21. parotic
7. anaric
17. zoster
9. fastinant
19. dipsosis
6. iniops
APPENDIX A-2

Words and Definitions Chosen from *Dorland's Medical Dictionary* (25th Ed.)

1. angoid - resembling a blood vessel
2. a girdle encircling a structure or pattern - zoster
3. fillet - a loop of cord or tape
4. resembling a network - retiform
5. diplont - an individual with two full sets of chromosomes
6. distended with gas - tympanism
7. miction - urination
8. forgetfulness or recent events with good remote memory - ecminesia
9. hylic - composed of matter
10. a yellowish substance derived from corn - zein
11. inhibitrope - one in whom certain stimuli produce an arrest of function
12. the maintenance of a relatively constant body fluid and composition - isorrhea
13. caprine - derived from a goat
14. the doctrine that all matter in the universe is alive - hylozoism
15. ima - lowest
16. an anchoring or supportive structure - trabs
17. campanula - a bell shaped organ or structure
18. accelerating - fastinant
19. iniops - a monster with two faces, one incomplete
20. sign language - dactylology
21. anaric - without a nose
22. the process or state of being hard - induration
23. anagogy - psychic material with an idealistic quality
24. near the ear - parotic
25. phyctoid - resembling a plant
26. pertaining to the development or evolution of animals - zoogeny
27. zoetic - pertaining to life
28. a morbid thirst - dipsosis
29. wambles - milk sickness
30. a fat-like substance derived from sheep's wool - suint
APPENDIX A-3

Format for the Instructions Given to Teachers and Read to Students

You are participating in a learning experiment. Please follow all the instructions completely. You are not to answer any specific question from a student in your group, but you may repeat instructions, as long as you repeat the instructions completely each time. Please follow the time limits strictly.

(Insert condition statement)

Read the following instructions to your class:

"Turn to the cover of your work booklet. Fill in the date and section number exactly as I have written them on the board."

Allow students to complete the task. Then say:

"Answer questions A through D to the best of your ability."

Allow students to complete the questions. Then say:

"Turn to page two in your booklet. Match the correct word with the correct definition by placing the number of the correct definition in the blank space next to the correct word. Begin when I say begin. DO NOT TURN THE PAGE. You have ten minutes. Complete as many as you are able. Begin."

Allow students ten minutes. Then say:

(Insert condition statement)

At the end of ten minutes, say:

"Stop. Turn to page four. Complete this test in the same manner as you completed the first one. You have ten minutes. Complete as many as you can. Do not turn the page when you are done. Begin."
Allow ten minutes. Then say:

"Stop. Turn to page five. Answer these questions to the best of your ability."

Allow time to do so. Then say:

"Stop. Check the top of each page to make sure the identification number is the same. Pass all work booklets to the front of the room. Thank you for your assistance."
Appendix B.

Non-Significant Data
APPENDIX B-1

Analysis of Covariance Summary for Subjects Perception of the Teacher's Expectancy by Expectancy and Suggestion with Subjects' Education, Age, Sex, and Grade Point Average

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>Ms</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covariates</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>1</td>
<td>0.003</td>
<td>0.003</td>
<td>0.011</td>
</tr>
<tr>
<td>Age</td>
<td>1</td>
<td>0.050</td>
<td>0.050</td>
<td>0.153</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>0.133</td>
<td>0.133</td>
<td>0.411</td>
</tr>
<tr>
<td>GPA</td>
<td>1</td>
<td>0.223</td>
<td>0.223</td>
<td>0.688</td>
</tr>
<tr>
<td>Corrected Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expectancy</td>
<td>2</td>
<td>0.311</td>
<td>0.156</td>
<td>0.479</td>
</tr>
<tr>
<td>Suggestion</td>
<td>2</td>
<td>0.578</td>
<td>0.289</td>
<td>0.890</td>
</tr>
<tr>
<td>Exp. x Sugg.</td>
<td>4</td>
<td>0.781</td>
<td>0.195</td>
<td>0.602</td>
</tr>
<tr>
<td>Error (res)</td>
<td>32</td>
<td>10.383</td>
<td>0.324</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>0.286</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

p < .05
**APPENDIX B-2**

Analysis of Covariance Summary of Subjects Rating of the Difficulty of the Task by Expectancy and Suggestion with the Subjects' Education, Age, Sex, and Grade Point Average

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>Ms</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Covariates</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>1</td>
<td>0.121</td>
<td>0.121</td>
<td>0.197</td>
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<tr>
<td>Age</td>
<td>1</td>
<td>0.749</td>
<td>0.749</td>
<td>1.224</td>
</tr>
<tr>
<td>Sex</td>
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<td>0.450</td>
<td>0.450</td>
<td>0.736</td>
</tr>
<tr>
<td>GPA</td>
<td>1</td>
<td>0.926</td>
<td>0.926</td>
<td>1.515</td>
</tr>
<tr>
<td><strong>Corrected Main Effects</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Expectancy</td>
<td>2</td>
<td>0.178</td>
<td>0.089</td>
<td>0.145</td>
</tr>
<tr>
<td>Suggestion</td>
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<td>1.244</td>
<td>0.622</td>
<td>1.017</td>
</tr>
<tr>
<td>Exp. x Sugg.</td>
<td>4</td>
<td>5.049</td>
<td>1.262</td>
<td>2.064</td>
</tr>
<tr>
<td>Error (res)</td>
<td>32</td>
<td>19.570</td>
<td>0.612</td>
<td></td>
</tr>
</tbody>
</table>

| Total           | 44 | 28.311 | 0.643 |      |

\[ p \leq 0.05 \]
APPENDIX B-3

Group Means for the Subjects' Reported Interest in the Task by Expectancy and Suggestion Conditions

<table>
<thead>
<tr>
<th></th>
<th>Easy</th>
<th>Hard</th>
<th>Suggestion</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>above average</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expectancy below average</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>none</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>( \bar{X} = 2.60 )</th>
<th>( \bar{X} = 2.20 )</th>
<th>( \bar{X} = 2.00 )</th>
<th>( \bar{X} = 2.27 )</th>
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</thead>
<tbody>
<tr>
<td>n</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>( \bar{X} = 2.40 )</td>
<td>( \bar{X} = 2.40 )</td>
<td>( \bar{X} = 2.40 )</td>
<td>( \bar{X} = 2.40 )</td>
</tr>
<tr>
<td>n</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>( \bar{X} = 2.60 )</td>
<td>( \bar{X} = 2.40 )</td>
<td>( \bar{X} = 2.40 )</td>
<td>( \bar{X} = 2.47 )</td>
</tr>
<tr>
<td>n</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>

\( \bar{X} = 2.53 \) \( \bar{X} = 2.33 \) \( \bar{X} = 2.27 \)
## APPENDIX B-4

Means and Standard Deviations for Post-test Scores by Expectancy and Suggestion

<table>
<thead>
<tr>
<th>Suggestion (^b)</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Expectancy</strong></td>
<td>(\bar{X} = 27.2)</td>
<td>(\bar{X} = 19.2)</td>
<td>(\bar{X} = 21.0)</td>
</tr>
<tr>
<td>(SD)</td>
<td>2.16</td>
<td>.052</td>
<td>5.19</td>
</tr>
<tr>
<td>(n)</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2</th>
<th>(\bar{X} = 25.4)</th>
<th>(\bar{X} = 19.4)</th>
<th>(\bar{X} = 25.0)</th>
<th>(\bar{X} = 23.53)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SD)</td>
<td>6.76</td>
<td>7.76</td>
<td>4.82</td>
<td>6.73</td>
</tr>
<tr>
<td>(n)</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3</th>
<th>(\bar{X} = 22.0)</th>
<th>(\bar{X} = 28.2)</th>
<th>(\bar{X} = 25.2)</th>
<th>(\bar{X} = 25.13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SD)</td>
<td>5.24</td>
<td>7.35</td>
<td>5.01</td>
<td>5.15</td>
</tr>
<tr>
<td>(n)</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>

\(\bar{X} = 24.85\) \(\bar{X} = 22.26\) \(\bar{X} = 24.0\) \(\bar{X} = 25.13\)

\(SD = 5.41\) \(SD = 7.35\) \(SD = 5.02\) \(SD = 5.15\)

\(n = 15\) \(n = 15\) \(n = 15\) \(n = 15\)

\(a = \) Levels of Expectancy\n1 = above average performance  
2 = below average performance  
3 = no knowledge

\(b = \) Levels of Suggestion\n1 = easier task  
2 = harder task  
3 = no knowledge
APPENDIX B-5

ANCOVA Summary Table of Post-test Scores by Expectancy and Suggestion with Subjects' Education, Age, Sex, and Grade Point Average

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>Ms</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>1</td>
<td>2.726</td>
<td>2.726</td>
<td>0.097</td>
</tr>
<tr>
<td>Age</td>
<td>1</td>
<td>1.054</td>
<td>1.054</td>
<td>0.038</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>11.836</td>
<td>11.836</td>
<td>0.422</td>
</tr>
<tr>
<td>GPA</td>
<td>1</td>
<td>110.703</td>
<td>10.703</td>
<td>3.949</td>
</tr>
<tr>
<td><strong>Corrected Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expectancy</td>
<td>2</td>
<td>24.622</td>
<td>24.622</td>
<td>0.878</td>
</tr>
<tr>
<td>Suggestion</td>
<td>2</td>
<td>27.756</td>
<td>27.756</td>
<td>0.990</td>
</tr>
<tr>
<td>Exp. x Sugg.</td>
<td>4</td>
<td>403.126</td>
<td>100.782</td>
<td>3.595*</td>
</tr>
<tr>
<td>Error (res)</td>
<td>32</td>
<td>897.158</td>
<td>28.036</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>44</td>
<td>1548.307</td>
<td>35.189</td>
<td></td>
</tr>
</tbody>
</table>

*p ≤ .05
## ANOVA Summary of Post-test Scores By Expectancy and Suggestion

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
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<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expectancy</td>
<td>2</td>
<td>49.244</td>
<td>24.622</td>
<td>0.812</td>
</tr>
<tr>
<td>Suggestion</td>
<td>2</td>
<td>55.511</td>
<td>17.756</td>
<td>0.915</td>
</tr>
<tr>
<td>Expectancy X Suggestion</td>
<td>4</td>
<td>351.957</td>
<td>87.989</td>
<td>2.902*</td>
</tr>
<tr>
<td>Error</td>
<td>36</td>
<td>1091.595</td>
<td>30.322</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>44</td>
<td>1548.307</td>
<td>35.189</td>
<td></td>
</tr>
</tbody>
</table>

*p ≤ 0.05
APPENDIX B-7

Summary of Significant Comparisons Between Group Means of the Post-test Scores Using Tukey's HSD Test at the 95% Confidence Interval

\[ a \times b \]

\[ + + + - - - - - - - - - o + o - o - o \]

\[ + + \]

\[ * c * * * * \]

\[ + - \]

\[ * * * * \]

\[ + o \]

\[ * \]

\[ - + \]

\[ * \]

\[ - - \]

\[ * * * \]

\[ - - \]

\[ o + \]

\[ * \]

\[ - o \]

\[ o - \]

\[ o o \]

\[ a = \text{Level of Expectancy} \quad b = \text{Level of Suggestion}
\]

\[ + = \text{above average performance} \quad + = \text{easier task}
\]

\[ - = \text{below average performance} \quad - = \text{harder task}
\]

\[ o = \text{no knowledge} \quad o = \text{no knowledge} \]

\[ c = *= \text{significance at the } p \leq 0.05 \text{ level} \]
APPENDIX B-8

Summary of Means and Standard Deviations for Pretest Scores by Expectancy and Suggestion

<table>
<thead>
<tr>
<th>Suggestion&lt;sup&gt;b&lt;/sup&gt;</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\overline{X} = 1.6)</td>
<td>(\overline{X} = 2.8)</td>
<td>(\overline{X} = 3.4)</td>
<td>(\overline{X} = 2.6)</td>
</tr>
<tr>
<td>SD = 1.51</td>
<td>SD = 2.48</td>
<td>SD = 2.60</td>
<td>SD = 2.22</td>
</tr>
<tr>
<td>n = 5</td>
<td>n = 5</td>
<td>n = 5</td>
<td>n = 5</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\overline{X} = 2.8)</td>
<td>(\overline{X} = 4.0)</td>
<td>(\overline{X} = 2.6)</td>
<td>(\overline{X} = 3.2)</td>
</tr>
<tr>
<td>SD = 1.3</td>
<td>SD = 2.54</td>
<td>SD = 1.14</td>
<td>SD = 1.82</td>
</tr>
<tr>
<td>n = 5</td>
<td>n = 5</td>
<td>n = 5</td>
<td>n = 15</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\overline{X} = 1.6)</td>
<td>(\overline{X} = 1.6)</td>
<td>(\overline{X} = 3.0)</td>
<td>(\overline{X} = 2.73)</td>
</tr>
<tr>
<td>SD = 1.14</td>
<td>SD = 3.28</td>
<td>SD = 2.44</td>
<td>SD = 2.43</td>
</tr>
<tr>
<td>n = 5</td>
<td>n = 5</td>
<td>n = 5</td>
<td>n = 15</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\overline{X} = 2.06)</td>
<td>(\overline{X} = 3.46)</td>
<td>(\overline{X} = 3.46)</td>
<td>(\overline{X} = 3.46)</td>
</tr>
<tr>
<td>SD = 1.48</td>
<td>SD = 2.64</td>
<td>SD = 3.06</td>
<td>SD = 3.06</td>
</tr>
<tr>
<td>n = 15</td>
<td>n = 15</td>
<td>n = 15</td>
<td>n = 15</td>
</tr>
</tbody>
</table>

<sup>a</sup> Expectancy
1 = above average performance
2 = below average performance
3 = no knowledge

<sup>b</sup> Suggestion
1 = task is easier
2 = task is harder
3 = no knowledge
APPENDIX B-9

Analysis of Covariance for Pretest Scores by Expectancy and Suggestion with the Subjects' Education, Age, Sex, and Grade Point Average

<table>
<thead>
<tr>
<th>Source</th>
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<th>MS</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>1</td>
<td>0.927</td>
<td>0.927</td>
<td>0.211</td>
</tr>
<tr>
<td>Age</td>
<td>1</td>
<td>1.733</td>
<td>1.733</td>
<td>0.394</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>13.825</td>
<td>13.825</td>
<td>3.142</td>
</tr>
<tr>
<td>GPA</td>
<td>1</td>
<td>8.527</td>
<td>8.527</td>
<td>1.938</td>
</tr>
<tr>
<td><strong>Corrected Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expectancy</td>
<td>2</td>
<td>2.978</td>
<td>1.489</td>
<td>0.338</td>
</tr>
<tr>
<td>Suggestion</td>
<td>2</td>
<td>15.244</td>
<td>7.622</td>
<td>1.732</td>
</tr>
<tr>
<td>Exp. X Sugg.</td>
<td>4</td>
<td>4.494</td>
<td>1.124</td>
<td>0.255</td>
</tr>
<tr>
<td>Error (res)</td>
<td>32</td>
<td>140.824</td>
<td>4.401</td>
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</tr>
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<td><strong>Total</strong></td>
<td>44</td>
<td>201.911</td>
<td>4.589</td>
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</tr>
</tbody>
</table>

p \( \leq .05 \)
### APPENDIX B -10

One-Way Analysis of Variance for Pretest Scores by Teachers' Expectancy

<table>
<thead>
<tr>
<th>Source</th>
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<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2</td>
<td>2.977</td>
<td>1.488</td>
<td>0.314</td>
</tr>
<tr>
<td>Error</td>
<td>42</td>
<td>198.933</td>
<td>4.736</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td>44</td>
<td>201.9109</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

p \( \leq .05 \)
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LIST OF REFERENCES (continued)


LIST OF REFERENCES (continued)


LIST OF REFERENCES (continued)


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