CALIFORNIA STATE UNIVERSITY, NORTHRIDGE

THE EFFECT OF INSTRUCTIONS ON STATE ANXIETY AND ON PERFORMANCE ON A SERIAL ANTICIPATION LEARNING TASK

A thesis submitted in partial satisfaction of the requirements for the degree of Master of Arts in Psychology

by

Jo Sue Goldenberg

January, 1974
The thesis of Jo Sue Goldenberg is approved:

Committee Chairman

California State University, Northridge
November, 1973
ACKNOWLEDGMENTS

My sincere thanks to the many professors with whom I have studied for the knowledge and inspiration they imparted to me. Special thanks and appreciation go to the members of my thesis committee: Professor Melvin Hoffman, chairman, Professor Donald Butler, and Professor Jerry Shaw. Special effort and help was contributed by Professor Barbara Tabachnick; I am deeply grateful for her assistance.

This thesis is dedicated to my children, Michael, Jill, and Paul, for their love and patience while "Mommy's writing her thesis," and to Hugh Whisler for his guidance, understanding, and love which resulted in the completion of this thesis.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>v</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>vi</td>
</tr>
<tr>
<td>1. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Overview</td>
<td>1</td>
</tr>
<tr>
<td>The Effects of Anxiety on Performance of Verbal Learning Tasks</td>
<td>3</td>
</tr>
<tr>
<td>The Effect of Instructions on Performance on Verbal Learning Tasks</td>
<td>10</td>
</tr>
<tr>
<td>State Versus Trait Anxiety</td>
<td>18</td>
</tr>
<tr>
<td>Theoretical Formulations</td>
<td>24</td>
</tr>
<tr>
<td>2. METHOD</td>
<td>35</td>
</tr>
<tr>
<td>Subjects</td>
<td>35</td>
</tr>
<tr>
<td>Apparatus and Stimulus Materials</td>
<td>35</td>
</tr>
<tr>
<td>Procedure</td>
<td>36</td>
</tr>
<tr>
<td>Design</td>
<td>39</td>
</tr>
<tr>
<td>Test Instruments</td>
<td>40</td>
</tr>
<tr>
<td>3. RESULTS</td>
<td>43</td>
</tr>
<tr>
<td>State Anxiety</td>
<td>44</td>
</tr>
<tr>
<td>Performance</td>
<td>44</td>
</tr>
<tr>
<td>Correlation Between State Anxiety and Performance</td>
<td>49</td>
</tr>
<tr>
<td>Other Data</td>
<td>49</td>
</tr>
<tr>
<td>Chapter</td>
<td>Page</td>
</tr>
<tr>
<td>--------------------</td>
<td>------</td>
</tr>
<tr>
<td>4. DISCUSSION</td>
<td>51</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>59</td>
</tr>
<tr>
<td>APPENDIXES</td>
<td>65</td>
</tr>
<tr>
<td>Table</td>
<td>Page</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>1. Learning Lists of Medium Value Trigrams Scaled for Association Value and Meaningfulness in Serial Order of Presentation</td>
<td>37</td>
</tr>
<tr>
<td>2. Analysis of Variance of STAI-S Scores in a Serial Anticipation Learning Situation</td>
<td>45</td>
</tr>
<tr>
<td>3. Means of Performance and State Anxiety Scores for Instructional Groups in a Serial Anticipation Learning Situation</td>
<td>46</td>
</tr>
<tr>
<td>4. Analysis of Variance of Gains in Correct Anticipations on a Serial Anticipation Learning Task</td>
<td>48</td>
</tr>
<tr>
<td>5. Mean Scores for Instructional Groups for Questions on Self-Report Questionnaire</td>
<td>75</td>
</tr>
<tr>
<td>6. Frequency of Responses for Instructional Groups for Questions on Self-Report Questionnaire</td>
<td>76</td>
</tr>
</tbody>
</table>
ABSTRACT

THE EFFECT OF INSTRUCTIONS ON STATE ANXIETY AND ON PERFORMANCE ON A SERIAL ANTICIPATION LEARNING TASK

by

Jo Sue Goldenberg

Master of Arts in Psychology

January, 1974

The present investigation studied the effect of instructions, as stressor stimuli, on state anxiety and on performance on a serial anticipation learning task. Prior research has attributed the differential effects of such instructions to level of, what is here called, trait anxiety. This study differentiated between constructs of state anxiety (momentary reaction to stress) and trait anxiety (predisposition to perceive situations as stressful). Possible effects of trait anxiety were controlled for by use of a randomized block design.

Experimental groups were formed on the basis of differentially stressful instructions. The positive group was informed that performance related positively to
intelligence. The negative group was told that less intelligent people do better on the task. A control group received neutral instructions. Differential instructions were given prior to learning a second list of nonsense syllables. Performance was measured by a gain score in correct anticipation from List 1 to List 2. State anxiety was measured by a score on the STAI-S. Three-way analyses of variances and individual comparisons were performed on each outcome measure.

Results for the negative and control groups confirmed expectations. The former scored highest in state anxiety and lowest in performance. The latter group achieved the highest performance score and a low anxiety score. Results for the positive group were mixed: they showed a decrement in performance but the lowest anxiety score.

Results were discussed in terms of Spielberger's Trait-State theory of anxiety. Two hypotheses were advanced to account for the findings for the positive group and as areas of concern for future research.
Chapter 1

INTRODUCTION

Overview

More than 20 years of research have been conducted in which investigators have attempted to clarify the relationship between anxiety and performance on verbal learning tasks. Varying methods and areas of interest, depending upon the theoretical frame of reference followed, have produced inconsistent findings.

Some investigators (Montague, 1953; Taylor & Spence, 1952) have concluded essentially that variation of performance is a function of the level of general or chronic anxiety of the subject. Others (Mandler & Sarason, 1952; Sarason, 1956, 1957b, 1957d; Spielberger & Smith, 1966) have stated that general anxiety does not directly affect performance on verbal learning tasks. They have found that performance on these tasks vary for subjects differing in level of anxiety only when stress of some sort has been introduced into the learning situation. In pursuing this issue, much attention has been given to the role of situational variables (such as instructions) as stressor stimuli producing differential effects on performance (Long & Bessemer, 1971; Sarason, 1956, 1957b, 1957d). Recent research (Allen, 1970;
Spielberger, 1972; Spielberger, Lushene, & McAdoo, 1971) has emphasized the necessity of making a distinction between a construct of general anxiety and one of anxiety as a monetary situational reaction in attempting to understand the relationship between anxiety and performance.

From an examination of the literature, it is apparent that subjects vary in their performance as a function of the conditions of the specific situation. It is unclear, however, as to the nature of this effect; i.e., do situational variables, such as instructions, have a direct effect upon performance, or do they interact with a level of general anxiety thereby affecting performance, or do they function as stressor stimuli eliciting a state of anxiety, specific to the situation, and thus affect performance, independent of the general anxiety level of the subject?

Spielberger (1972) has pointed out the importance of a closer examination of the influence of these situational variables with reference to differentiating between a construct of general, or trait, anxiety and situationally aroused, or state, anxiety. Sarason and Smith (1971) suggest that such a distinction "may be useful in clarifying some of the inconsistent findings in anxiety research," and that

measures of state anxiety obtained in the criterion situation appear to relate more highly to behavior in that situation than do trait measures which might have been obtained weeks earlier.
It is the purpose of the present study to conduct an investigation similar to many in the past, in light of the new trend in anxiety research, in an effort to clarify some of the issues stated above. Specifically, this study will investigate the effect of instructions on state anxiety and on performance on a serial anticipation learning task. The literature review which follows presents the major issues and findings of the research dealing with the relationship of anxiety to performance on verbal learning tasks, the effect of instructions on performance, and state versus trait anxiety. Another section presents the theoretical formulations which have provided the bases for interpretation of past research. The Trait-State theory of anxiety (Spielberger, 1972), which provides the theoretical basis for much of the recent work and for the present study, is also included in this section. Finally, specific predictions for this investigation are presented.

The Effects of Anxiety on Performance of Verbal Learning Tasks

Research in the area of anxiety and verbal learning was initiated in 1952 by Taylor and Spence. In a study investigating the effects of anxiety level (as measured by the Manifest Anxiety Scale [MAS] developed by Taylor [1951]), on performance on a serial learning task, they found that low anxious subjects were superior to high anxious subjects both in number of errors made
and in number of trials to criterion (Taylor & Spence, 1952). The high and low anxious groups consisted of subjects whose scores on the MAS fell in the upper and lower portions of the class distribution. Both groups participated in a serial learning task which involved the presentation of a series of choices between two verbal responses, saying "left" or "right" at each point of choice in a memory drum setup. The results supported the predictions from Hull's drive theory that the performance of low anxious (low drive) subjects would be superior to that of high anxious (high drive) subjects in a learning situation involving competing responses.

From this initial study evolved others, based on Hullian theory, which studied the relationship between level of anxiety and performance on verbal learning tasks when characteristics of those tasks were varied experimentally. Montague (1953) conducted a study in which he varied the similarity and association value of the lists of nonsense syllables in a serial learning task. His results were in the predicted direction. High anxious subjects performed more poorly than low anxious subjects on the difficult task, improved as the task became easier, and surpassed low anxious subjects on the task for which there existed the least number of incorrect response tendencies. Other investigators (Ramond, 1953; Spence, Farber, & McFann, 1956; Spence, Taylor, & Ketchel, 1956;
Taylor & Chapman, 1955) demonstrated the superiority of high anxious subjects on tasks with minimal intralist interference. Lucas (1952) found that high anxious subjects performed better on a simple task than they did on a complex one.

Saltz and Hoehn (1957), in a test of Taylor-Spence theory, failed to support drive theory predictions in terms of task variables and their relation to anxiety. They did, however, show performance differences between anxious and nonanxious subjects. In their first experiment competing and noncompeting verbal learning materials were equated for difficulty. Predictions based on drive theory (that anxious subjects would perform more poorly than nonanxious subjects) were not supported nor were results in the predicted direction. In the second experiment, performance was compared on easy but competing and difficult but noncompeting material. Again, the prediction that anxious subjects should learn faster than nonanxious subjects when competition is reduced was not supported. The deterioration in performance between the easy but competing and the difficult but noncompeting material was significantly greater for the anxious subjects than for the nonanxious subjects.

Sarason, commencing in 1956, conducted a series of studies in which he investigated the performance of subjects differing in levels of manifest anxiety on verbal
learning tasks in which situational stress was manipulated experimentally (Sarason, 1956, 1957a, 1957b, 1959; Sarason & Palola, 1960). The basic format of these studies was to present high and low anxious subjects with a verbal learning task. Subjects then were given differential instructions for a second task or differential performance reports for the first. They then were given the second task to complete. Two consistent findings, which were important for a clearer understanding of the relationship between anxiety and performance, emerged from this series of studies. First, Sarason found that his groups did not differ in performance on the initial task; i.e., in a neutral learning situation in which stress was not involved, high and low anxious subjects performed equally. Axelrod, Cowen, and Heilizer (1956) and Silverman and Blitz (1956) likewise found no difference in performing on high and low anxious subjects in non-stress conditions. Second, Sarason found that, when stress, in the form of instructions or performance reports, was introduced into the learning situation, high anxious subjects performed more poorly on the second task than did low anxious subjects. The importance of these findings lies in the fact that they lead to the hypothesis that situational stress mediates the effect of manifest anxiety upon performance as opposed to the hypothesis that differences in performance are a direct effect of
difference in level of manifest anxiety.

Taylor (1958) conducted a study as a response to investigations done by Lucas (1952) and Gordon and Berlyne (1954). In both of these former studies high anxious subjects who received negative performance reports between tasks were inferior on a subsequent task to high anxious subjects in a neutral condition. Low anxious subjects in the experimental conditions showed no such deterioration in performance under stress when compared to low anxious subjects in a neutral condition. Taylor's study, in using material which minimized competing responses, was expected to produce results opposite to those of Lucas and Gordon and Berlyne. Results, as predicted, indicated that high anxious subjects were superior in performance to low anxious subjects on a paired-associate learning task with minimal intratask interference and no psychological stress. High anxious subjects under stress were inferior to high anxious subjects under neutral conditions but no interaction was found between stress and anxiety level as was found in the Lucas and Gordon and Berlyne studies. Thus, in this study, the effect of stress did interfere with performance but high anxious subjects did not show any greater responsiveness to the stress than did the low anxious subjects. In fact, they maintained their superiority over the low anxious subjects in the stress conditions though both groups showed a decline in performance
compared to nonstress conditions.

Other researchers attempted to interrelate the effects of situational stress and task variables on the performance of high and low anxious subjects on verbal learning tasks. Nicholson (1958) designed an experiment similar to Montague's (1953) in which he varied the difficulty of the lists to be learned. In addition, he added differential instructions to create stress and non-stress conditions. Under nonstress conditions the performance of high and low anxious subjects was essentially the same on both easy and difficult tasks. Under stress the high anxious subjects performed more poorly than low anxious subjects and more poorly than their counterparts in the nonstress condition on both tasks. The low anxious scorers did better in the stress condition than in the nonstress condition. The Anxiety by Instructions interaction was significant. There was a significant effect of difficulty upon performance but no significant interaction of difficulty with anxiety. Spielberger and Smith (1966) found similar results when investigating the effects of word-position and stress on performance. Significant differences in performance of high and low anxious subjects were found only in the stress condition in which high anxious subjects performed more poorly than low anxious subjects early in learning and better later in learning. Performance in the neutral condition was unrelated to
anxiety. No interactions with word-position were found. Sarason (1958b) and Catalana and Kirkpatrick (1968) used instructional reassurance and verbal assurance respectively in investigations of anxiety and verbal learning. Sarason (1958b) found that reassuring subjects prior to learning lead to higher performance by subjects scoring high on his Test Anxiety Scale (TAS) but lowered performance for low scorers. In the Catalana and Kirkpatrick study verbal approval of correct responses in a serial learning task had the opposite effect of the instructional reassurance in Sarason's study. They acted more as a stress-producing variable yielding results similar to those of Nicholson (1958) and Spielberger and Smith (1966), i.e., the performance of high anxious subjects was inferior to that of low anxious subjects in the approval condition. However, in the nonapproval condition in the first of the two experiments in the Catalana and Kirkpatrick study, high anxious subjects were superior in performance to low anxious subjects. In both of their two experiments Catalana and Kirkpatrick found significant Anxiety by Approval interactions.

The literature dealing with anxiety and verbal learning yields mixed results on the relationship between manifest anxiety and performance under what have been called nonstress conditions. However, from reviewing a number of these studies, it seems that the specific effect
of different levels of manifest anxiety upon performance in a particular situation is a function of task characteristics such as task complexity, difficulty of material, and degree of intratask response competition. There has been little effort and less success in relating such task characteristics themselves to a concept of situational stress. The factor of situational stress has been manipulated primarily by administering differential instructions and performance reports between learning tasks. The bulk of the literature reviewed above indicates that under stress conditions the performance of high anxious subjects will deteriorate and is inferior to the performance of low anxious subjects.

The Effect of Instructions on Performance on Verbal Learning Tasks

Much of the research designed to assess the effects of instructions on the performance of high and low anxious subjects on verbal learning tasks was conducted by Sarason. His first study (1956) was designed to answer the question: "Do the effects of verbal instructions on performance depend on the degree of anxiety of Ss?" Sarason used high, middle, and low anxious subjects as measured by the MAS (Taylor, 1953). He employed what he termed high- and low-motivation instructions as well as neutral and failure reports. The task was serial rote learning of nonsense syllables. Subjects were given
preliminary instructions on how to complete the task. After learning a first list subjects were randomly assigned to conditions and, before learning a second list, were given a second set of instructions or a performance report. The high-motivation instructions stated that the second list was a short-form intelligence test. Subjects were told to pay close attention to the syllables because every error would lower their score when compared to their peers. The low-motivation instructions informed subjects that the experimenter was not concerned with performance but rather with the list characteristics uncovered.

Sarason found no difference in the performance of groups on the first list and thus attributed results obtained on the second list to the treatments. While there were no significant main effects, the Anxiety by Motivation interaction was significant. The high anxious, high-motivation groups performed significantly more poorly than did the high anxious, low-motivation groups. Performance of low and middle anxious groups in the high-motivation condition was superior to that of low and middle anxious subjects in the low-motivation condition. Sarason noted that the MAS may be sensitive only in the upper region of the score distribution, that only the highest anxiety scores delineate a group distinguishable from the rest of the subjects in the distribution. In this study anxiety proved to be a relevant variable with respect to the effect of
differential instructions.

Sarason (1957b), in another study, explored the question of content of instructions. If anxiety does interact with instructions, does the interaction depend upon the contents of such instructions? Subjects for this study again were drawn from the upper, middle, and lower ranges of the MAS distribution. Following preliminary instructions and trials on a first list, subjects received one of two sets of motivating instructions. One group received subject-oriented instructions which were the same as the high-motivation instructions cited above (Sarason, 1956). The second group received experimenter-oriented instructions which emphasized the "tight spot" in which the experimenter found himself. Subjects were told that whether or not the experimenter got his degree depended upon his getting good results in the experiment; subjects were asked to do their best. Control groups received neutral instructions which were similar to the low-motivating instructions previously used by Sarason (1956). Following differential instructions subjects learned a second list. Again Sarason found no difference in performance of anxiety groups on the first list. Anxiety, motivating instructions, and the interaction of these two variables were found to have significant effects on performance. Specifically, there was an overall superiority of performance in the subject- and
experimenter-oriented groups as compared to the neutral group. Within the experimenter-oriented condition there were no significant differences among anxiety groups. Within the subject-oriented condition the low anxious group performed significantly better than the others, with the middle anxious group performing better than the high anxious group. Within the neutral condition the high anxious subjects attained the highest performance level among anxiety groups. The subject-oriented low anxious subjects attained the highest performance level of all subjects in the experiment. Sarason suggested that the data (no difference among anxiety groups on list one, the superiority of the performance of high anxious subjects in the neutral condition, and the decline in performance of high anxious subjects) tend to support the hypothesis that high anxious subjects differ from the other subjects in the anxiety-score distribution in the degree to which they are detrimentally affected by stressful communications. In this study, the subject-oriented instructions appeared to be more stressful than experimenter-oriented instructions; both had a detrimental effect on the performance of high anxious subjects with the former having the greater effect.

In a study investigating the effects of associative value and differential instructions on serial learning (Sarason, 1957d), results confirmed previous findings
(Sarason, 1957b) that subject-oriented and experimenter-oriented instructions have a facilitative effect on the performance of moderately anxious subjects. This study, which used only subjects from the middle range of the MAS scale, showed no significant differences between the two experimental instruction groups. Both groups performed significantly better than the neutral control groups.

Nicholson (1958) designed a study to examine the effects of instructions and difficulty on performance on a serial learning task. His procedure was similar to the one used by Sarason in the above studies (Sarason, 1956, 1957b, 1957d). Nicholson's ego-orienting instructions stated that the second list was a test for mental ability and correlated highly with intelligence. His task-orienting instructions focused on the experimenter wanting information about nonsense syllables; subjects were informed that the interest was not in individual performance scores. High and low anxious groups, as defined by MAS scores, were used. Nicholson's results yielded a significant interaction between anxiety and instructions. Under task orientation, where an attempt was made to minimize anxiety, the two groups performed similarly. Under ego orientation, "where anxiety was aroused," performance improved for low anxious subjects and deteriorated for high anxious subjects. Nicholson concludes that the significant interaction between anxiety and instructions tends
to support the hypothesis that performance was influenced by responses elicited by anxiety as a stimulus, i.e., the instructions in the situation elicit anxiety which in turn elicits responses that affect performance.

Spielberger and Smith (1966) studied the effects of word-position and stress-nonstress conditions in a verbal learning situation. High and low anxious subjects, as measured by the MAS, were given either neutral procedural instructions or ego-stress instructions. The ego-stress instructions stated, and illustrated with a graph, that speed of learning increased with intelligence. Performance in the neutral condition was unrelated to anxiety. Significant differences in performance between anxiety groups were found only in the ego-stress condition in which the performance of high anxious students was inferior to the performance of low anxious subjects early in learning and superior later in learning.

Sarason (1958b) developed the Test Anxiety Scale (TAS) which was designed to measure levels of anxiety specifically related to test-taking conditions. In two experiments Sarason related a measure of test anxiety (TAS) and a measure of general anxiety (MAS) to subjects' performance on a word association test (Sarason, 1959, 1961). Data from these studies lent support to the hypothesis that the closer the nature of the experimental stress is to the content of the anxiety items the more
predictive are the items. When subjects were told that the word association test was a sensitive personality test (Sarason, 1959), the TAS by Instruction interaction was less than the MAS by Instructions; neither was significant. When subjects were informed that the word association test was a sensitive test of intelligence (Sarason, 1961), the TAS by Instructions interaction approached significance and was greater than the MAS by Instructions interaction. In the latter study the effect of instructions upon performance was significant.

Long and Bessemer (1971) conducted an analytical investigation of instructions designed to elicit test anxiety. They noted that the instructional condition which seemed to be most effective and was used often in research utilizing stressor instructions was that which informed the subject that the task was actually a test of intelligence, he should try to perform well, and that his performance would be compared to that of his peers. In this study the authors attempted to assess the effects of the various components with these instructions. Subjects were chosen from the top and bottom of the distribution of scores on a questionnaire made up of items modified from items on questionnaires by Sarason and Ganzer (1962) and Alpert and Haber (1960). These high and low anxious subjects were given 12 paired-associated lists of common English word pairs with experimental instructions given
between the eighth and ninth lists. The experimental conditions consisted of a control group, in which no additional instructions were given; a test group, in which it was pointed out that the remaining lists were a test; an intelligence test group, in which subjects were informed that the remaining lists were a test and one which was part of an intelligence test; an intelligence test plus evaluation group, in which subjects were told that the remaining lists were a test, an intelligence test, and that their performance would be compared to other typical students; and an evaluation alone group, in which the subjects were told they would be compared to other students. Significant differences were found only between the instruction containing all three components and the control condition. Long and Bessemer concluded that

While it may be that the full set of instructional components are not always necessary to produce a decrement in the performance of highly test-anxious Ss, such instructions are recommended when that effect is desired.

In summary, the research indicates that the performance of subjects is affected by instructions as a function of level of manifest anxiety. Instructions termed high-motivation, stress, or ego-orienting usually result in a deterioration in performance of high anxious subjects. These same instructions often have a facilitating effect on the performance of low and middle anxious subjects. Low-motivation, nonstress instructions may
result in superior performance for high anxious subjects and be detrimental to the performance of low and middle anxious subjects.

**State Versus Trait Anxiety**

Singer and Singer (1972) state that

Anxiety continues to play a significant role as a means of dividing subjects and proposing individual differences in performance based on some theoretical construct. A major new trend in the work with anxiety has been a shift towards new instruments which attempt to differentiate anxiety as a persisting predisposition (trait) and anxiety as a momentary reaction to stress (state).

Although most of the literature cited dealing with anxiety and performance on verbal learning tasks does not specifically differentiate between state and trait anxiety, and, in fact, almost uniformly uses the MAS as a means of measuring anxiety, some of the early research does hint at the possibility of such a distinction.

Early studies by Mandler and Sarason (1952; Sarason, Mandler, & Craighill, 1952) used a "questionnaire on attitudes toward test situations" as the means for measuring high and low anxious subjects for learning tasks. The questionnaire consisted of 67 items dealing with the student's subjective experience in and attitudes toward individual intelligence tests, group intelligence tests, course examinations, and general questions.

Sarason (1957c) used a text anxiety questionnaire (Mandler & Sarason, 1952) and a general anxiety
questionnaire (Gordon & Sarason, 1955) in a study designed
to evaluate the role of anxiety in academic achievement
"when anxiety is defined as a general characteristic and
also as one specific to a particular situation." He
noted evidence suggesting that high scorers on anxiety
scales differ in the extent to which their performance is
disrupted under conditions of stress (Lucas, 1952; Mandler
& Sarason, 1952; Sarason, 1956), and inferred that per­
formance might be disrupted to the extent to which an in­
dividual brings to a novel situation "anticipation of
failure, rejection, and the inability to cope with the
requirements of the situation." He proposed that unless
general and test anxiety were very highly correlated it
could not necessarily be expected that someone admitting
to anxiety under a variety of circumstances would be
anxious in a testing situation. The results of the study
yielded a negative correlation between test anxiety
scores and measure of academic achievement. General
anxiety scores failed to correlate significantly with
entrance examination scores but tended to correlate
positively with grade point averages. Sarason concludes
by stating that the results demonstrate that the rela­
tionship between anxiety and achievement variables depend
to a great extent on the nature of the instrument used
to measure anxiety.

In an investigation studying the effects of
anxiety, reassurance, and meaningfulness of materials on verbal learning (Sarason, 1958a), the author used two anxiety measures, the TAS and Bendig's short form of the MAS (Bendig, 1956) to assess the importance of the specificity of anxiety scales. Both scales were given to subjects prior to the learning situation. It was predicted that there would be significant interactions among anxiety, meaningfulness, and instructions.

If the anxiety scale most closely related to the kinds of anxieties which might be aroused in a given situation leads to the most meaningful results, then the present results would be expected to more closely adhere to the stated expectations when Ss were categorized in terms of TAS than when categorized in terms of the MAS which contains no items specifically concerned with reactions to test situations.

The results supported the expectations. The Instructions by TAS interaction was significant; there was no tendency toward an Anxiety by Instructions interaction using the MAS scores. Sarason concludes that the findings of the study suggest that the more specific the measure of anxiety is to the type of situation involved, the more useful the measure will be.

Two other studies (Sarason, 1959, 1961) lend support to Sarason's hypothesis regarding the specificity of anxiety scales. In the first investigation, instructions which indicated that a word association test was a sensitive measure of personality interacted with MAS scores more than with TAS scores. In the second study instructions which stated that the word association test
was a sensitive test of intelligence approached a significant interaction with TAS scores and not with MAS scores. Sarason again concludes that the closer the nature of the stress is to the content of the anxiety items, the more predictive are the items.

Sarason and Palola (1960) investigated the relationship of test and general anxiety, difficulty of task, and experimental instructions to performance and found that test anxiety was related to subjects' performance more often than was general anxiety.

The previous investigations, while suggesting a difference between general anxiety and anxiety aroused in the experimental situation, dealt more specifically with the specificity of test instruments than with the distinction. They all used their instruments prior to the learning situation and thus as a measure of trait anxiety rather than as a measure of anxiety in the experimental situation.

Other investigators pointed more directly toward a distinction between general anxiety and a state of anxiety aroused within the experimental situation. Saltz and Hoehn (1957), in their test of Taylor-Spence theory discussed earlier, noted that the MAS measures "susceptibility toward anxiety, not necessarily the actual presence of anxiety in Ss. This point may be important for the interpretation of results obtained with the scale."
Nicholson (1958) emphasized the importance of taking into account the nature of the stimulus situation when predicting how anxiety will influence performance. "High scores on an anxiety questionnaire do not imply that the S is in a continual state of tension." Spence (1958) discussed two alternative hypotheses concerning the relationship between drive and the MAS score: a "chronic" hypothesis which purports that high anxious subjects manifest higher drive than low anxious subjects in all situations, whether stressful or not; and, an "emotional reactivity" hypothesis which states that high anxious subjects react with higher drive than low anxious subjects to situations containing some degree of stress. Spence (1964) stated that findings favor the "emotional reactivity" hypothesis. A study on anxiety, stress, and serial learning (Spielberger, 1966) was noted by the author to lend empirical support for Spence's "emotional reactivity" hypothesis. Later Spence and Spence (1966) indicate that anxiety is best understood as a predisposition toward increased drive but that stress in the immediate situation is necessary to initiate the increase in drive state for the anxious subject.

Spielberger, *et al.* (1971) specifically suggest that much of the confusion in anxiety research results from a failure to distinguish between anxiety as a stable trait of anxiety proneness (trait anxiety) and anxiety as
a transitory emotional state (state anxiety). Several studies offer support for this distinction. Lamb (1970) investigated the effects of stress on measures of state and trait anxiety in an experiment involving public speaking. He found large changes in state anxiety scores (STAI-S) due to stress. Trait anxiety scores remained stable and unaffected by the experimentally induced stress. McAdoo (1970) conducted a study investigating the effects on levels of state anxiety of success, mild failure, and strong failure feedback about performance on a memory task. Both high and low trait anxious subjects showed a significant increase in state anxiety scores from a rest period to a performance period prior to the administration of feedback. The specific effects of the feedback instructions upon state anxiety scores were a function of level of trait anxiety and the subject's confidence in his performance prior to the instructions. A study by Allen (1970) supported the hypothesis that trait anxiety measures; i.e., the TAS and State-Trait Anxiety Inventory-Trait (Spielberger & Gorsuch, 1972), would be insensitive to conditions of administration differing in degree of stress, while scores on state anxiety measures, i.e., the Anxiety Differential (Husek & Alexander, 1963) and the State-Trait Anxiety Inventory-State (Spielberger & Gorsuch, 1972), would increase as a function of stress. He also made the point that the test anxiety scales used
in the earlier studies were procedurally used as trait measures, administered up to months before the experimental manipulations were made, thus perhaps account for the contradictory findings concerning the correlation of such scales. Hodges and Spielberger (1969) found state anxiety but not trait anxiety to be negatively related to Wechsler Digit Span performance. O'Neill, Spielberger, and Hansen (1969) found that state anxiety and blood pressure both increased while subjects worked on a difficult programmed learning program and decreased when working on an easy problem.

The literature reviewed in this section leads to the conclusion that performance on verbal learning tasks seems to be affected by a "state" of anxiety aroused by stress-producing stimuli present in the learning situation. This state anxiety is aroused to different levels and/or has differential effects on performance as a function of the level of trait anxiety of the subject. There is evidence supporting a distinction between a construct of state anxiety and a construct of trait anxiety and evidence for a more direct relationship between state anxiety and performance.

Theoretical Formulations

A number of theoretical formulations have been developed or used by investigators in the field to account for the findings on the relationship between anxiety and
performance.

The initial research in the area of anxiety and verbal learning, conducted by Taylor and Spence and others later referred to by Child (1954) as the Iowa group, basically studied the effect of anxiety on performance as a function of task characteristics. The theoretical basis of interpretation of their results was based on Hullian learning theory (Hull, 1943) and emphasized the drive characteristics of anxiety. According to predictions based on drive theory, anxiety, as measured by the MAS, adds to total drive strength and increases reaction potential of all responses. Reaction potential is a multiplicative function of habit strength and drive. Responses with stronger habit strength will have greater increases in reaction potential as a result of increases in drive. Thus, in a simple conditioning study, the habit strength of the eyeblink response will be multiplied by a greater drive factor for high anxious subjects than for low anxious subjects leading to more rapid conditioning for high anxious subjects. In verbal learning situations there are usually several competing responses which can be made to any given stimulus. The habit strength for each of these competing or interfering response tendencies also will be multiplied by the higher drive factor of the high anxious subject. Thus results of verbal learning tasks and other complex tasks show high anxious subjects
performing more poorly than low anxious subjects.

When Montague (1953) found high anxious subjects superior in performance on any easy list of nonsense syllables but inferior on difficult lists he explained this interaction in terms of drive properties of anxiety which, for the high scorers, increased the reaction potential of the incorrect tendencies in the hard list. He also recognized that "alternative factors must be considered," and the "possibility that stimuli associated with anxiety itself might elicit responses (visceral, muscular, etc.) which might interfere with learning."

Alternative hypotheses, concerning the relationship between drive and MAS scores were later proposed by the Iowa group (Farber & Spence, 1956; Spence, 1958; Taylor, 1956) and set forth by Spence and Spence (1966). The "chronic" hypothesis assumes that high anxious subjects manifest higher drive than low anxious subjects in all situations. The "emotional reactivity" hypothesis posits that high anxious subjects react with higher drive than low anxious subjects only in situations involving some degree of stress. Spence and Spence (1966) propose that anxiety is a predisposition toward increased drive but that stress in the immediate situation is necessary to initiate the increase in drive state for the anxious subject.

Another group of researchers conducted a series
of investigations of the role of anxiety in learning situations. They were referred to by Child (1954) as the Mandler-Sarason studies. While the research of the Iowa group stressed the drive characteristics of anxiety, Mandler and Sarason, as well as Child and Sarason and his associates, emphasized the stimulus properties of anxiety. Anxiety, according to the theory developed by Mandler and Sarason (1952), can serve as a drive-stimulus, S_A, which may elicit competing responses, facilitating responses, or both. Competing, or "task-irrelevant," responses, designated R_A, may be manifest as feelings of inadequacy, helplessness, anticipations of punishment, loss of self-esteem, and the like. They interfere with task completion. Facilitating or "task-relevant" responses, R_AT, are directly related to completing the task. R_AT responses are considered to be specific to the task. They are not present in the response repertoire of an individual but are evoked and learned in the learning situation itself. R_A responses are not task-specific. They are present in the individual's response repertoire and, because of generalization, are easily evoked. Subjects who are highly anxious are assumed to have a large number of R_A anxiety responses in their response repertoire and will tend to make more R_A responses initially than low anxious subjects; conversely, with respect to the total number of responses available, low anxious subjects will tend to make more R_AT
anxiety responses than high anxious subjects.

Nicholson (1958) points out the similarity of the Iowa and Mandler-Sarason positions. Both of their conceptualizations of anxiety are within the framework of stimulus-response theory and both attribute drive properties to anxiety. Their difference lies in where the emphasis falls in attempting to account for the influence of anxiety on performance. The Iowa group emphasizes that increase of reaction potential produced by the drive properties of anxiety while the Mandler-Sarason group stresses the mediating responses which are evoked by anxiety as a drive stimulus.

A major new trend in anxiety research is attempting to differentiate between a construct of anxiety as a predisposition to perceiving situations as threatening and a construct of anxiety as a reaction to stress. This trend reflects the move toward a more cognitive view of the nature of anxiety (Singer & Singer, 1972).

An adequate theory of anxiety must distinguish conceptually and operationally between anxiety as a transitory state and as a relatively stable personality trait. It is also apparent that a comprehensive theory of anxiety must differentiate between anxiety states, the stimulus conditions that evoke these states, and the defenses that serve to avoid or ameliorate them [Spielberger, 1966].

Spielberger's Trait-State theory of anxiety (1972; Spielberger, Gorsuch, & Lushene, 1970) which provides the theoretical basis of interpretation of much of the recent state-trait literature cited, attempts to
do this.

State anxiety (A-State) is defined as a
. . . transitory emotional state or condition of
the human organism that varies in intensity and
fluctuates over time. This condition is charac-
terized by feelings of tension, apprehension and
heightened autonomic nervous system activity
[Spielberger, 1972].

Trait anxiety (A-Trait) is defined as
. . . relatively stable individual differences in
anxiety proneness, that is, to differences in the
disposition to perceive a wide range of stimulus
situations as dangerous or threatening, and in the
tendency to respond to such threats with A-State
reactions [Spielberger, 1972].

A-Trait reflects individual differences in frequency and
degree of past A-State manifestations and in the future
probability of such states occurring.

The Trait-State anxiety theory is a cognitive
theory in which A-State and A-Trait are anxiety con-
structs and are distinguished from stressful stimulus
conditions which evoke different degrees of A-State
characteristics in individuals differing in A-Trait. When
a person cognitively appraises a stimulus situation as
dangerous or threatening an A-State reaction is evoked.
The rise in A-State has stimulus and drive properties
which initiate behavior designed to avoid the situation
or evokes defense reactions which either reduce the A-
State reaction or change the cognitive appraisal of the
situation.

Stimuli which initiate arousal of anxiety may be
external, such as physical danger or threat to self-esteem, or internal, such as a thought about a dangerous or stressful situation. Cognitive appraisal of a stimulus as threatening is determined by individual differences in A-Trait, past experience, a person's aptitude and abilities, and the objective danger of the situation. Individuals who are high in A-Trait, when compared to those low in A-Trait, are more likely to perceive a wider range of stimulus situations as threatening. They are also more likely to appraise situations involving failure or threat to self-esteem as threatening. Likewise, individuals high in A-Trait will tend to respond to situations perceived as threatening with more intense A-State reactions.

According to the theory, it is assumed that once a stimulus situation is perceived as threatening, an A-State reaction will occur. The intensity of the reaction will be proportional to the amount of threat. The duration of the reaction will depend upon the duration of the stimulus and past experience with similar situations. Coping responses are often developed with frequently encountered stressful situations. They quickly reduce the perceived threat and thus the A-State reaction.

Spielberger sees as a major task the description and specification of the characteristics of stressor stimuli which evoke different levels of A-State in individuals differing in A-Trait.
The theoretical formulations developed to account for the effects of anxiety on performance of verbal learning tasks have dealt with instructions, as stressor stimuli, which evoke anxiety and lead to a disruption in performance. Whether this situationally aroused anxiety is considered to be the arousal of trait anxiety directly, or the evocation of state anxiety as a function of trait anxiety, the effect of the stressor stimulus is seen ultimately as a function of the level of trait anxiety.

The present study, in an attempt to assess the effects of state anxiety itself, will investigate the effect of differential instructions, as stressor stimuli, on state anxiety and on performance in a serial-anticipation learning situation. Trait anxiety will be held constant across conditions, by use of randomized blocks. The use of randomized blocks insures the equality of groups in trait anxiety and allows for the assessment of any possible interactions between trait anxiety and other variables. If no interactions are found, any observed differences in the performances among groups would be attributable to the effects of state anxiety aroused by the stressor instructions or to an effect of the instructions themselves.

Differential instructions, given prior to the administration of a second list of nonsense syllables, will be used as the bases for experimental conditions in the present study.
For one group (positive condition), instructions state that performance is positively related to intelligence and that scores on the second task, which represent a measure of general intellectual ability, will be compared to those of classmates. It is accepted, in general, by researchers in the area, that instructions which relate performance to a personally relevant concept such as intelligence, function as a stressor stimulus, evoking a state of anxiety (as a result of the fear of failure or loss of self-esteem), which detrimentally affects performance.

The second experimental group (negative condition) will receive instructions which imply a negative correlation between performance and intelligence; less intelligent people, it is stated, learn the second list more quickly than more intelligent people. It is assumed, in this study, that these instructions are an even more effective stressor stimulus. There are two reasons for this assumption. First, these instructions also relate performance on the learning task to intelligence, albeit in a negative fashion, which makes performance ego-relevant. Second, although the learning situation itself implicitly demands optical performance, and such performance has been made ego-relevant, the negative relationship between performance and intelligence should make it more difficult for the subject to reduce his anxiety by doing well.
because optimal performance itself has been related to a threat to self-esteem, i.e., low intelligence.

The third group (neutral condition) will receive instructions to learn the second list in the same way in which the first was learned. Such instructions, as supported by the research, are expected to produce no stress and no interference with performance.

A score on the short form of the Taylor Manifest Anxiety Scale (Bendig, 1956), given prior to the learning situation, will be used as a measure of trait anxiety by which blocking will be accomplished. The use of this scale is consistent with the bulk of the literature reported and is considered by Spielberger (1966) to be a measure of trait anxiety. State Anxiety will be measured by Form X-1 of the State-Trait Anxiety Inventory (STAI-S) developed by Spielberger, et al. (1970). The STAI-S will be given after the learning task has been completed. In addition, a self-report questionnaire will be completed by subjects so as to assess the subject's cognitive appraisal of the learning situation. Gain scores in correct anticipation from the first list learned to the second list learned will be used as a measure of performance. Because two lists are used, order of administration will be counterbalanced within conditions.

The specific hypotheses that will be tested in the present study are as follows:
Hypothesis I. There will be a significant effect of instructions on state anxiety with subjects in the negative group scoring highest on the STAI-S, subjects in the positive group scoring next highest, and subjects in the control group scoring lowest on the STAI-S.

Hypothesis II. There will be a significant effect of instructions on performance with the negative group achieving the lowest gain score, the positive group scoring higher than the negative group, and the control group achieving the highest gain score.

Hypothesis III. There will be a significant negative correlation between STAI-S scores and performance scores. This, of course, reflects the assumption that instructions, as stressor stimuli, directly affect STAI-S scores, which, in turn, negatively affect performance scores.
Chapter 2

METHOD

Subjects

The 36 subjects were volunteers from an introductory psychology class at California State University, Northridge. They were given the Bendig short form of the Taylor Manifest Anxiety Scale (Bendig, 1956), rank-ordered from low to high on the scale, blocked into six groups of six subjects, and then randomly assigned, within blocks, to each of the six experimental conditions. The testing and random assignment were done prior to the experiment. An independent observer assigned subjects to conditions; a coding procedure was used so that the experimenter did not know the anxiety ratings of the subjects.

Apparatus and Stimulus Materials

The stimulus materials consisted of two test lists typed in capital letters on white tapes. They were presented on standard Rogers-type memory drums. Each syllable appeared in the drum aperture for two seconds; there were two seconds between syllables and an intertrial interval of six seconds. Each list consisted of 12 medium value trigrams, scaled for association value and meaningfulness (Runquist, 1966). Items of medium value were
chosen so as to minimize any differential effects of difficulty; previous studies have found mixed effects as a function of easy and hard materials. Half of the subjects received List 1 prior to List 2; half of the subjects learned List 2 prior to List 1. The two lists are presented in Table 1. The 24 trigrams were randomly assigned to the two lists. Order of items within each list was also accomplished by use of a table of random numbers.

Procedure

Subjects were given the MAS, as a group. Scoring sheets and the "biographical inventory" were distributed and the following instructions were read:

Before you participate in the learning task, we need some information. This is a short biographical inventory. Your papers will be kept confidential so please answer each item truthfully. If a statement is true or mostly true as applied to you, blacken between the lines in the first column marked T. If a statement is false or not usually true as applied to you blacken between the lines in the column headed F.

After completion of the MAS subjects signed up for individual times in which to participate in a learning experiment.

At the individual testing session the subject entered the room and was asked to sit in one of two chairs (half in front of List 1, half in front of List 2). All subjects were given the same set of initial instructions which are similar to those used by Sarason (1956):

You are going to learn a list of nonsense syllables. Each will appear, one at a time, in the opening
Table 1
Learning Lists of Medium Value Trigrams Scaled for Association Value and Meaningfulness in Serial Order of Presentation (Runquist, 1966)

<table>
<thead>
<tr>
<th>List 1</th>
<th>List 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>YOM</td>
<td>LUQ</td>
</tr>
<tr>
<td>VEM</td>
<td>FIP</td>
</tr>
<tr>
<td>PIF</td>
<td>NEF</td>
</tr>
<tr>
<td>SIQ</td>
<td>RAJ</td>
</tr>
<tr>
<td>DEH</td>
<td>TOH</td>
</tr>
<tr>
<td>BEH</td>
<td>CIY</td>
</tr>
<tr>
<td>GEZ</td>
<td>YUH</td>
</tr>
<tr>
<td>JIR</td>
<td>JAT</td>
</tr>
<tr>
<td>WIY</td>
<td>WEH</td>
</tr>
<tr>
<td>NEQ</td>
<td>BOH</td>
</tr>
<tr>
<td>MOY</td>
<td>ZIN</td>
</tr>
<tr>
<td>FOH</td>
<td>SOQ</td>
</tr>
</tbody>
</table>
in front of you. After each will be a blank space. Your task will be to spell out the syllable which follows the one appearing in the window. Of course the first time through you won't be able to spell any, since you haven't yet seen what's to follow, but after the first trial, that is when all syllables in the list have been presented once, you will spell out as many syllables as you can each trial. After one complete trial, which ends with three blank spaces, three asterisks will appear, indicating that the list is to begin again. When you see them, spell out the first syllable in the list. When the first syllable in the list appears in the opening, spell out the second, and so on through the list. We will go through the list several times. Are there any questions?

If questions were asked a sample list, consisting of three trigrams (other than those in the learning lists), was used to illustrate the procedure.

The first list was presented for ten trials. Correct and incorrect responses were recorded. After a three-minute rest period, and prior to presentation of the second list, the subject was given a second set of instructions in accordance with his assigned condition. The instructions were one of the following:

Positive condition.

All right, let's go on. Now you'll learn another list. These lists are actually short-form IQ tests; we've found that ability to learn these lists is highly related to intelligence. From your performance on this next list, we will obtain a score measuring your level of general intellectual ability. So, please pay close attention to each syllable and try to anticipate correctly because every mistake you make lowers your score. The results we get will be compared to those of your classmates. The procedure for learning the list is the same as for the first.
Negative condition.

All right, let's go on. Now you'll learn another list. Strangely enough, we have found that people with lower intelligence actually do better on this second list. We're not sure why, but we think it's because the syllables have higher association values, and less intelligent people don't make as many interfering associations. The procedure for learning the list is the same as for the first.

Neutral condition. "All right, let's go on. Now you'll learn another list. The procedure for learning the list is the same as for the first."

The second list was given for ten trials and a record of responses kept as for the first. After completing the second list, the subject was asked to fill out Form X-1 of the State-Trait Anxiety Inventory (STAI-S), answering in terms of how he felt at the moment. He was asked, next, to complete the self-report questionnaire. Finally, the subject was told that, because of the nature of the study, debriefing would occur in class after all subjects had participated. Subjects were asked not to discuss the nature of the experiment with anyone.

Design

A randomized block design was used for the two 6x3x2 analyses of variances. MAS scores were employed as a blocking variable; i.e., the six lowest MAS scorers formed block 1 and were randomly assigned to each of the conditions, and so on through block 6. The order of list presentation was counterbalanced within conditions. Each
subject received one of the three instructional conditions discussed above. A three-way analysis of variance was performed on each of the two dependent variables and individual comparisons were performed to analyze the results with respect to the specific hypotheses about the relative performance among groups on the two outcome measures:

Gain in correct anticipations--the measure of performance was a difference score between the number of correct anticipations on the first list learned and the number of correct anticipations on the second list learned.

STAI-S scores--the score on STAI Form X-1 was used as a measure of state anxiety.

Data from the self-report questionnaire were examined and reported (see Appendix C) but not subject to statistical analysis.

Test Instruments

The MAS was used as a measure of trait anxiety because of its "impressive credentials" (Spielberger, 1966), and because it has been used in more studies than all other anxiety measures combined, thus allowing a broad basis of comparison of present results and past findings. The Bendig (1956) short form of the MAS was used because it

(a) has eliminated from the standard MAS items of low internal consistency and validity; (b) provides scores that are about as reliable as the 50-item MAS and are
highly related to scores on the standard form; and (c) is more parsimonious of testing time and probably more valid than the longer MAS.

Also, many of the studies cited used the Bendig version (Sarason, 1958, 1959, 1961; Sarason & Palola, 1960). The scale, consisting of 28 items, and titled a "biographical inventory," asks the subject to respond in terms of whether or not each statement is true, or usually true, or false, or not usually true, as applied to them. Some sample questions include: "I am often sick to my stomach," "I do not have as many fears as my friends," and "I feel anxious about something or someone almost all the time." A copy of the scale is presented in Appendix A.

The State-Trait Anxiety Inventory, Form X-1, was chosen as the measure of state anxiety because it was developed out of the Trait-State theory of anxiety, which provides the theoretical underpinning of this study, and thus appears to best measure the anxiety phenomena in which this study is interested. Evidence of concurrent and construct validity are reported by Spielberger, et al. (1970). They note that the low r for test-retest reliability (a median of .32, based on a sample of more than 3,000 college undergraduates) was expected because "a valid measure of A-State should reflect the influence of unique situational factors existing at the time of testing." Whereas trait anxiety scales ask people to describe how they generally feel, the STAI A-State scale requires
that the subject report his present feelings, or feelings at a specified point in time, so as to reflect the subject's anxiety level at that moment. The scale consists of 20 statements that ask for a description of how the subject feels at the moment (or at any designated time); the subject responds by rating himself on a 4-point scale: (a) not at all, (b) somewhat, (c) moderately so, and (d) very much so. Included are items such as, "I feel calm," "I am tense," and "I feel self-confident." A copy of the STAI-S is presented in Appendix B.
Chapter 3

RESULTS

The data first were analyzed by two 6x3x2 analyses of variances, one for each outcome measure, so as to assess any possible main effects and/or interactions. The independent variables were: (a) blocks, based on MAS scores, (b) differential instructions, and (c) order. The outcome measure for performance was gain in correct anticipations, i.e., the difference between the number of correct anticipations on the first list learned and the number of correct anticipations on the second list learned. The outcome measure for state anxiety was a score on Form X-1 of the State-Trait Anxiety Inventory (STAI-S). A pooled error term, including the triple interaction and the double interactions with order, was used because it was assumed that any interactions with order would be nonsignificant and would not reflect any genuine experimental effect. An alpha level of .05 was selected. For the specific a priori predictions, individual comparisons of group means were also performed. Because these predictions were directional, one-tailed tests of significance were made (all df = 1, 17).
State Anxiety

The results of the analysis of variance of STAI-S scores, presented in Table 2, yield significant main effects of blocks and instructions. The type of instructions given the subjects did significantly affect overall state anxiety. Levels of trait anxiety were positively related to levels of state anxiety. The effect of the instructions on state anxiety was not dependent on the level of trait anxiety.

Hypothesis I predicted that the negative group would score highest on the STAI-S, the positive group would achieve an intermediate score, and the control group would score lowest on the state anxiety measure. The negative group did achieve the highest STAI-S score and that score was significantly higher than that of the positive group ($F = 7.12, p < .01$). The negative group scored higher than the control group but results of the individual comparison did not reach significance ($F = 2.80, .05 < p < .10$). The order of scores of the positive and control group was not as predicted. The positive group scored lower on the STAI-S than did the control group although the difference was not significant ($F < 1.00$).

Group means for STAI-S scores are presented in Table 3.

Performance

There were no significant results obtained in the
Table 2
Analysis of Variance of STAI-S Scores in a Serial Anticipation Learning Situation

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blocks (B)</td>
<td>5</td>
<td>152.04</td>
<td>3.51**</td>
</tr>
<tr>
<td>Instructions (I)</td>
<td>2</td>
<td>157.44</td>
<td>3.63*</td>
</tr>
<tr>
<td>Order (O)</td>
<td>1</td>
<td>13.44</td>
<td>&lt;1.00</td>
</tr>
<tr>
<td>B X I</td>
<td>10</td>
<td>65.94</td>
<td>1.52</td>
</tr>
<tr>
<td>Error</td>
<td>17</td>
<td>43.81</td>
<td>--</td>
</tr>
</tbody>
</table>

*p < .05
**p < .025
Table 3
Means of Performance and State Anxiety Scores for Instructional Groups in a Serial Anticipation Learning Situation

<table>
<thead>
<tr>
<th></th>
<th>Positive</th>
<th>Negative</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Anxiety</td>
<td>37.33</td>
<td>44.50</td>
<td>40.00</td>
</tr>
<tr>
<td>Performance</td>
<td>13.50</td>
<td>10.08</td>
<td>24.00</td>
</tr>
</tbody>
</table>
analysis of variance of gains in correct anticipations for the three instructional groups as shown in Table 4.

From these results it can be concluded that neither the type of instructions given the subject (positive versus negative versus neutral), nor level of trait anxiety, significantly affected the overall performance level. While order did not significantly affect overall performance, the relatively large F value (.05 < p < .10) does suggest that the lists might have been of different difficulties to learn even though they were equated for meaningfulness and association value.

Hypothesis II predicted that subjects in the negative group would gain the fewest correct anticipations from List 1 to List 2, subjects in the positive group would achieve intermediate scoring, and subjects in the control group would achieve the highest gain scores. The order of performance scores was as predicted. The negative group scored lower than the positive group (F< 1.00) and the positive group scored lower than the control group (F = 2.59, .05 < p < .10) but the results of both individual comparisons were nonsignificant. The negative group did score significantly lower than the control group (F = 4.55, p < .025). Group means for gains in correct anticipations are presented in Table 3.
<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blocks (B)</td>
<td>5</td>
<td>153.16</td>
<td>&lt;1.00</td>
</tr>
<tr>
<td>Instructions (I)</td>
<td>2</td>
<td>631.19</td>
<td>2.47</td>
</tr>
<tr>
<td>Order (O)</td>
<td>1</td>
<td>930.16</td>
<td>3.63</td>
</tr>
<tr>
<td>B X I</td>
<td>10</td>
<td>103.16</td>
<td>&lt;1.00</td>
</tr>
<tr>
<td>Error</td>
<td>17</td>
<td>255.78</td>
<td>--</td>
</tr>
</tbody>
</table>

Table 4

Analysis of Variance of Gains in Correct Anticipations on a Serial Anticipation Learning Task
Correlation Between State Anxiety and Performance

Hypothesis III predicted a significant negative correlation between STAI-S scores and gains in correct anticipations. The results were in the predicted direction but a test using Pearson's r yielded a statistically nonsignificant correlation of -.154 (n = 36). Thus, although to some extent high STAI-S scores were accompanied by low gain scores, this relationship was not significant.

Other Data

The self-report questionnaire was administered primarily to provide information about the subject's subjective cognitive appraisal of the experimental situation. It was not subject to statistical analysis; therefore, the data on this questionnaire will not be presented in this chapter. Specific impressions gained from the report, together with the appropriate results, will be included in the discussion where relevant. A report of group means for each question (Table 5), a summary of frequencies of responses (Table 6), and a copy of the questionnaire itself can be found in Appendix C.

In light of past research in the field of anxiety and verbal learning, it was decided to do post hoc examinations of the relationship between trait anxiety and performance and of the relationship between state and trait anxiety. A test of the relationship between MAS
scores and gains in correct anticipations yielded a non-significant correlation coefficient of .089, indicating essentially no relationship between trait anxiety and performance in this study. A test of the relationship between MAS and STAI-S scores resulted in a Pearson's r of .50 which is statistically significant beyond the .05 level. Thus, in this study, there is a significant positive relationship between state and trait anxiety.
Chapter 4

DISCUSSION

The present study was designed to investigate the effect of instructions on performance and on state anxiety in a verbal learning situation. The bulk of the early literature dealing with the effects of anxiety on performance indicates differential effects of stressor instructions for groups of subjects differing in levels of trait anxiety. In this study, trait anxiety was held constant across instructional groups in order to eliminate differential effects due to level of trait anxiety and thus enable a distinction, as suggested by recent researchers (Sarason & Smith, 1971; Spielberger, 1972), between the effects of state and trait anxiety upon performance.

Instructional groups were essentially equal in trait anxiety. Group means for MAS scores, the measure of trait anxiety used in this study, were as follows: positive group = 11.67, negative group = 12.17, control group = 11.58, grand mean for all MAS scores = 11.81. Within the context of the Trait-State theory of anxiety (Spielberger, 1972), groups equal in level of trait anxiety would be equal in their proneness to perceive stimuli in the learning situation as threatening to
self-esteem or stressful, and thus equal in their tendency to respond with an A-State reaction. Any effects of instructions upon performance would be attributable to the effect of state anxiety evoked by the instructions or to the instructions themselves. It was expected that levels of state anxiety and decrements in performance (when compared to the performance of a control group) of the groups would vary as a function of the degree of stress or threat of the instructions.

With respect to performance these expectations were confirmed. Although there was no overall main effect of instructions upon performance, and only one of the individual comparisons was statistically significant, the experimental groups, considered together (those receiving positive and negative instructions) performed significantly lower ($F = 4.66, p < .05$) than the control group (which received neutral instructions). The gain scores were ordered in parallel fashion to the degree of stress of the instructions. That is, the control group achieved the greatest gain score, the positive group gained less than the control group, and the negative group, whose instructions were assumed to be most stressful and most difficult to cope with, achieved the lowest gain score of all groups.

While results on performance are in accord with the theory and expectations of this study, the data on
state anxiety, when examined in conjunction with the data on performance, are somewhat mixed and thus not so readily interpretable. It was expected, since all groups were essentially equal in their proneness to perceive the experimental conditions as stressful or threatening, that the three instructional groups would differ on a measure of A-State reaction as a function of the stressfulness of the instructions administered prior to the learning of List 2. It was expected that the control group, where no stress was induced, would score lower on the STAI-S than would the experimental groups which received stressor instructions. It was predicted, specifically, that the negative group would score highest on the STAI-S, the positive group would receive an intermediate score, and the control group would score lowest on the STAI-S. The overall main effect of instructions on state anxiety was significant and the negative group did score highest on the STAI-S and that score was significantly higher than the score for the positive group. However, it was the positive group that scored lowest on the STAI-S although that score was not significantly lower than the score of the control group.

Results for the negative and control groups confirmed expectations. The former, which received the most stressful instructions, scored highest on the measure of state anxiety and lowest on the performance measure. The
latter, which received neutral instructions, achieved the highest performance score and a low anxiety score. The problem at hand, then, seems to be to account for the results of the positive group which reveal a decrement in performance but no concomitant high anxiety score.

Two hypotheses may be considered in attempting to account for the findings for the positive group. First, it is possible that subjects in the positive group did not perceive the instructions as threatening, no A-State reaction was evoked, and the decrement in performance was due to something in the nature of the instructions themselves. There is some evidence that the subjects may not have perceived the situation as threatening. In response to the self-report questionnaire (see Appendix C for a full report of subject responses), more subjects in the positive group stated that the second set of instructions were "pretty phony" or "not at all believable" than did subjects in the other conditions, and fewer said that the instructions were "quite" or "completely believable." The mean scores for the positive group on the questions dealing with the believability of the instructions were lower than either of the other two conditions. Although the differences among group responses were not great, the self-report does lend some support to the hypothesis that the subjects in the positive group did not believe the second set of instructions and thus did not perceive them as
threatening. If, in fact, the subjects did not perceive the situation as threatening and no A-State reaction was evoked, it seems necessary to consider the instructions themselves as possibly accounting for the decrement in performance.

Perhaps instructions actually change the task for a subject; i.e., on the first task he is learning a list and on the second he is taking an intelligence test. If such is the case, any learning-to-learn or transfer of learning effects would be less direct than in a neutral condition where the second set of instructions specifically asks the subject to repeat the same task. Prior research has inspected the nature of instructions with respect to stress; they have assumed that the differential effects they had on performance were due to the stress they produced. The results for the positive group, in this study, indicate a need to investigate the differential effects of instructions as a function of their implied meaning to the subject, separate and apart from their stress value.

In attempting to account for the results for the positive group, a second hypothesis can be considered. It is possible that the subjects in this group did perceive the situation as threatening, an A-State reaction was evoked, performance was affected by this reaction, but the A-State reaction dissipated by the time state anxiety
was measured. It may be, particularly with the positive group where performance was related positively to intelligence, that in the process of learning the second list and doing better than on the first list, there was a change in the subject's cognitive appraisal of the situation. If they began to see the situation as one of successful achievement rather than one of threat, it could be expected that the A-State reaction would be reduced thereby yielding low STAI-S scores by the time they were measured. Another possible explanation for the low state anxiety scores for this group lies in Spielberger's claim that the duration of an A-State reaction will depend upon the duration of the stimulus and past experience with similar situations. Specific coping responses, which quickly reduce the perceived threat and thus the A-State reaction, are often developed with frequently encountered stressful situations. Since psychology experiments often relate tasks positively to intelligence, it is possible, for the positive group, that such coping responses were evoked thereby reducing the A-State reaction before the STAI-S was administered.

Because the measure of state anxiety was given after completion of the second list (ten trials), and subjects were instructed to answer in terms of their feelings at that moment, the STAI-S scores for all the groups actually reflect the level of state anxiety at the end of
the learning situation, which may or may not be directly related to the level of state anxiety at the time the instructions were read or while the subjects were learning the lists. It is suggested that, in future research, measures of state anxiety such as the STAI-S be given either after the differential instructions or early in learning. If they are given at the end of the task, subjects should be instructed to answer the questionnaire in terms of how they felt after the instructions were read or early in learning. It is believed that a measure of state anxiety taken at an earlier point in time in the learning situation might relate more closely to performance in the situation.

Both of the hypotheses raised to account for the findings for the positive group, and the resulting methodological suggestions, of course, have implications for the results of the negative group in this study, and for any and all instructional groups in research dealing with instructions, performance, and anxiety. The decrement in performance for the negative group, in this study, might be due, in part or totally, to the effects of the instructions themselves. The state anxiety score may or may not reflect the level of state anxiety during learning when performance declined. Future research, as suggested above, needs to separate the effects of the implied meaning of instructions from their stress-producing ability, and
measure state anxiety at the time it would be affecting performance, so as to more clearly account for what it is about instructions that affects performance and how state anxiety and performance are related.

The results of this investigation, while not totally in harmony with the expectations and theory set forth, can be viewed as evidence on behalf of a distinction between state and trait anxiety. First, as suggested by Sarason and Smith (1971), the measure of state anxiety, in this study, does relate somewhat more closely ($r = -0.154$) to performance scores than does the trait anxiety measure ($r = 0.089$). Second, neither the analysis of state anxiety of scores nor the analysis of performance scores yields an interaction between instructions and blocks. Thus, in this investigation, the effect of instructions on performance and on state anxiety was not dependent upon level of trait anxiety. Third, there was a significant main effect of instructions on state anxiety. While the mixed results do not allow the conclusion that state anxiety affects performance, it seems that the distinction between state and trait anxiety is a useful one, and, with the methodological suggestions taken into account, future research might find that state anxiety itself does affect performance.
REFERENCES


Sarason, I. G. Interrelationships among individual difference variables, behavior in psychotherapy, and verbal conditioning. *Journal of Abnormal and Social Psychology, 1958, 56, 339-344.* (b)


APPENDIX A

Manifest Anxiety Scale
(Bendig Short Form)
Biographical Inventory

1. I am often sick to my stomach.
2. I am about as nervous as other people.
3. I work under a great deal of strain.
4. I blush as often as others.
5. I have diarrhea ("the runs") once a month or more.
6. I worry quite a bit over possible troubles.
7. When embarrassed I often break out in a sweat which is very annoying.
8. I do not often notice my heart pounding and I am seldom short of breath.
9. Often my bowels don't move for several days at a time.
10. At times I lose sleep over worry.
11. My sleep is restless and disturbed.
12. I often dream about things I don't like to tell other people.
13. My feelings are hurt easier than most people.
14. I often find myself worrying about something.
15. I wish I could be as happy as others.
16. I feel anxious about something or someone almost all the time.
17. At times I am so restless that I cannot sit in a chair for very long.
18. I have often felt that I faced so many difficulties I could not overcome them.
19. At times I have been worried beyond reason about something that really did not matter.
20. I do not have as many fears as my friends.
21. I am more self-conscious than most people.
22. I am the kind of person who takes things hard.
23. I am a very nervous person.
24. Life is often a strain for me.
25. I am not at all confident of myself.
26. At times I feel that I am going to crack up.
27. I don't like to face a difficulty or make an important decision.
28. I am very confident of myself.
APPENDIX B

State-Trait Anxiety Inventory Form X-1
SELF-EVALUATION QUESTIONNAIRE

Developed by C. D. Spielberger, R. L. Gorush
and R. Lushene

STAI FORM X-1

Name _____________________________ Date __________________

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you feel right now, that is, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

1. I feel calm.
2. I feel secure.
3. I am tense.
4. I am regretful.
5. I feel at ease.
6. I feel upset.
7. I am presently worrying over possible misfortunes.
8. I feel rested.
9. I feel anxious.
10. I feel comfortable.
11. I feel self-confident.
12. I feel nervous.
13. I am jittery.

Not at all Somewhat Moderately so Very much so
14. I feel "high strung."
15. I am relaxed.
16. I feel content.
17. I am worried.
18. I feel over-excited and rattled.
19. I feel joyful.
20. I feel pleasant.
APPENDIX C

Self-Report Questionnaire
**Questionnaire**

We are interested in your reactions to the learning task you have just completed. Please read the statements below and, for each, circle the numeral which best approximates your response. Thank you for your cooperation and your honesty.

1. **I tried to learn the second list**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>harder than I tried to learn the first</td>
<td>about the same</td>
<td>with less effort than I tried to learn the first</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. **The second set of instructions were**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>not at all believable to me</td>
<td>reasonably believable to me</td>
<td>completely believable to me</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. **While learning the second list I felt**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>even more calm than during the first</td>
<td>about the same</td>
<td>less calm than during the first</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. **I thought that**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>list 1 was harder than list 2</td>
<td>they were both about the same</td>
<td>list 2 was harder than list 1</td>
<td>in difficulty</td>
<td></td>
</tr>
</tbody>
</table>

5. **The second set of instructions sounded**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pretty phony</td>
<td>reasonable</td>
<td>quite believable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

73
6. After hearing the second set of instructions, some people try to do better on the second list, some try to do more poorly, and some try about the same amount. We would appreciate your telling us, honestly, what you did.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I tried to do more poorly</td>
<td>I tried about the same</td>
<td>I tried to do better</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. I thought the lists, in general, were

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>very easy to learn</td>
<td>not too easy or too hard to learn</td>
<td>very hard to learn</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. As a result of the second set of instructions I felt

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>less nervous than before</td>
<td>about the same as I did before</td>
<td>more nervous than before</td>
<td></td>
<td></td>
</tr>
<tr>
<td>they were given</td>
<td>they were given</td>
<td>they were given</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5
Mean Scores for Instructional Groups for Questions on Self-Report Questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>Positive</th>
<th>Negative</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.83</td>
<td>2.33</td>
<td>2.25</td>
</tr>
<tr>
<td>2</td>
<td>2.50</td>
<td>2.92</td>
<td>3.80</td>
</tr>
<tr>
<td>3</td>
<td>2.50</td>
<td>2.25</td>
<td>2.50</td>
</tr>
<tr>
<td>4</td>
<td>3.08</td>
<td>2.17</td>
<td>2.58</td>
</tr>
<tr>
<td>5</td>
<td>2.08</td>
<td>2.42</td>
<td>3.40</td>
</tr>
<tr>
<td>6</td>
<td>3.50</td>
<td>4.00</td>
<td>3.90</td>
</tr>
<tr>
<td>7</td>
<td>3.08</td>
<td>3.33</td>
<td>3.17</td>
</tr>
<tr>
<td>8</td>
<td>2.67</td>
<td>2.83</td>
<td>2.36</td>
</tr>
<tr>
<td>Response Group</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>----------------</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>P</td>
<td>N</td>
<td>C</td>
</tr>
<tr>
<td>Question 1</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>