THE EFFECTS OF STATE-TRAIT ANXIETY
AND TASK DIFFICULTY ON
PAIRED-ASSOCIATES LEARNING

by

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ABSTRACT

Two paired-associates learning tasks, varying in difficulty level, were used to test the prediction from state-trait theory and drive theory that high anxious (HA) Ss will perform superior to low anxious (LA) Ss on an easy task and inferior to LA Ss on a more difficult task. Results did not support this prediction, as performance of LA Ss was superior to that of HA Ss on both easy and difficult tasks. High A-Trait Ss responded with higher A-State in both pre and post-treatment conditions than did low A-Trait Ss, as predicted from state-trait theory. The prediction from state-trait theory that high A-Trait Ss will show greater increases in A-State from pre to post-treatment (nonstressful to stressful) than low A-Trait Ss was not supported, as low A-Trait Ss showed greater gains in A-State than did high A-Trait Ss. It was suggested that future studies employ more than two levels of each independent variable and that physiological measures of arousal be used in addition to self report measures. Also, a more adequate definition and manipulation of task difficulty and more consistent methods of inducing experimental stress must be found. Finally, the effects of different types of stress on performance must be clarified.

THE EFFECTS OF STATE-TRAIT ANXIETY AND TASK DIFFICULTY ON PAIRED-ASSOCIATES LEARNING

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Studies relating anxiety and task difficulty to verbal learning have long been plagued by a variety of conceptual and methodological issues, most of which originated in reactions to drive theory. Modern extensions of drive theory, such as Spielberger's (1972) state-trait anxiety theory, have inherited, rather than solved, many of these same troublesome issues.

A clear synopsis of Hullian drive theory is provided by Schmeck and Bruning (1970). The basic source of energy, according to drive theory, is considered to arise from physiological need states of the organism. The strength of any given response is assumed to be a function of excitatory potential (E) which in turn is a function of the interaction of a general motivational construct (drive, or D), an incentive construct (K), and a hypothetical learning construct (H). However, due to the variable inhibitory factors present in any situation (oscillatory inhibition, or I_O), the value of E is assumed to vary from moment to moment producing a normal probability distribution of momentary E values. In addition, it is

assumed that in order for a response to occur, the momentary excitatory potential of that response must exceed a minimum, or threshold (L) value. The probability that a response will occur on any particular trial is a function of the proportion of its normal distribution of momentary E values that extends above L. Thus the learning of a complex task can be viewed as a process of raising correct responses above L and lowering incorrect responses below L.

Spence (1956, 1960) extended Hull's drive theory and applied it to complex tasks such as verbal learning. Taylor (1953) devised the Manifest Anxiety Scale (MAS) as a measure of drive level (D). This scale has probably been the most widely used instrument among studies testing drive theory. The two assumptions which underlie the use of the scale in testing drive theory are: (1) that drive level of an individual is related to the level of internal anxiety or emotionality; and (2) that the intensity of this anxiety can be ascertained by a paper and pencil test consisting of items describing overt, or manifest, symptoms of anxiety.

Spence's extension of drive theory in relation to anxiety, task difficulty, and verbal learning is illustrated in a study by Spence, Taylor and Ketchell (1956) (this study is essentially a replication of Spence, Farber and McFann, 1956). In this study Ss who scored at the high and low ends of the MAS (the upper and lower 20 percent of the sample) were compared in their performance in learning paired-associates lists varying in degree of

competition (difficulty). A significant interaction was found between anxiety level and type of paired-associate item, with high anxiety (HA) Ss performing superior to low anxiety (LA) Ss on the easy list and LA Ss performing superior to HA Ss on the difficult list. It was assumed that anxiety level reflected, in part, the level of general drive (D) of an S. Therefore, it was expected that higher D levels would produce superior performance in situations in which the habit strength of the correct response is relatively strong compared with those of any other competing responses. Likewise, under conditions in which the habit strength of the correct response is weaker than one or more competing responses, a higher D level would be expected to result in poorer performance. This follows from the assumption that D will multiply the habit strengths of both the correct and incorrect responses, thus increasing the amount by which the excitatory strength (E) of any stronger competing response will exceed that of the correct response. Since performance was assumed to be a function of the magnitude of the difference between the excitatory potentials of the correct and incorrect responses, it is obvious that the higher the level of D the greater the advantages of the incorrect responses and therefore the greater the chance of the occurrence of such erroneous responses.

Saltz and Hoehn (1957), however, claim that such studies supporting the Taylor-Spence version of drive

theory have an increase in response competition accompanied and confounded by an increase in difficulty level. Because of the confounding of difficulty and competition, any theory based on the hypothesis that HA Ss perform more poorly than LA Ss as a function of task difficulty would be upheld by the same data which have been used as evidence for the competing response theory. To control for both difficulty and competition, Saltz and Hoehn performed two different experiments. In both experiments all Ss were given the MAS with the upper and lower 20 percent of the sample, based on MAS scores, being defined as HA and LA, respectively. In one experiment, competing and noncompeting lists were formed which had empirically been determined to have equal difficulty levels (a list of familiar syllables with high intralist competitiveness was found to be of essentially equal difficulty level to a less familiar list with little intralist competitiveness). The Taylor-Spence theory would predict that HA Ss should do more poorly on the competing material than on the noncompeting, since the increased drive of the HA Ss should increase the strength of competing, erroneous responses. This result was not found.

In the second experiment, the performance of HA Ss on easy, but competing, material was compared with their performance on difficult, but noncompeting, material. The Taylor-Spence theory would predict that HA Ss should learn faster than LA Ss when competition is reduced, even though

difficulty is increased. The results, however, were contrary to this prediction. It was suggested that results of previous studies may have been artifacts due to a lack of appropriate control over difficulty levels of competing and noncompeting responses.

Spence and Spence (1966), in reply to Saltz and Hoehn (1957), point to several studies (Taylor, 1958; Taylor and Chapman, 1955) which have used noncompetitional lists of nonsense syllables that, despite being shorter, were more difficult (as determined by mean number of correct responses on a given trial) than were competitional lists of meaningful words used in other studies under similar experimental conditions (i.e., Spence, Farber and McFann, 1956). The difference in difficulty between nonsense syllables and words would be expected. But the performance of HA Ss was better than that of LA Ss in the studies using the more difficult, noncompetitional nonsense syllable lists and worse in the studies using the easier but competitional lists of words, results predicted from drive theory, but opposite to what would be expected by Saltz and Hoehn's (1957) difficulty hypothesis.

More recently, Berkey and Hoppe (1972), using competitional and noncompetitional paired-associates lists, failed to find a significant effect for anxiety, as measured by the MAS, or a significant effect for the interaction of list difficulty and anxiety. Since Saltz and Hoehn's (1957) difficulty hypothesis was not mentioned in this study, it

can be assumed that difficulty level was equated with competition, a very common error according to Saltz and Hoehn. However, Berkey and Hoppe were treating difficulty level and competition just as Spence, Taylor and Ketchell (1956); and Spence, Farber and McFann (1956) did, yet they still managed to obtain conflicting results from studies supporting drive theory.

Boor (1974) duplicated the essential features of Spence, Farber and McFann (1956) pertaining to noncompetitional paired-associates learning. As in the Spence et al. study, Ss who scored in the upper and lower 20 percent of the MAS distribution were given the same noncompetitional paired-associates task. Performance of LA Ss was found to be superior to that of HA Ss (although the performance difference was nonsignificant), a result in the opposite direction of the significant performance differences reported by Spence et al. (1956), who found the performance of HA Ss to be superior to that of LA Ss on the noncompetitional task. Boor suggests that the influence of anxiety level on the task is relatively minor compared to that of other variables, such as possible subtle differences in experimental procedures.

Another issue which has been a problem for drive theory is specifying the conditions under which HA and LA Ss can be expected to differ in degree of emotional responsiveness, and therefore to differ in performance in the manner predicted by drive theory. Regarding this matter, two

alternative hypotheses have been considered by Spence and Spence (1966). The chronic hypothesis states that the intensity of emotional responses of HA Ss tends to be greater than that of the LA Ss in any and all types of experimental situations, due to HA Ss tending to be chronically more anxious and emotionally aroused (implying that experimentally induced stress is not necessary to produce differences in performance between HA and LA Ss). The situational, or "emotional reactivity," hypothesis states that HA Ss differ from LA Ss primarily in their lower threshold for emotional arousal in response to situations perceived as having some degree of threat. If the situational hypothesis is correct, then performance differences due to differences in anxiety (drive) level would be expected to occur only in stressful situations, implying the necessity of creating stress in the experimental situation.

The studies mentioned above (Spence, Taylor and Ketchell, 1956; Taylor and Chapman, 1955) appear to support the chronic hypothesis, as stress in the experimental situations was not intentionally induced. It could be argued, however, that Ss perceive psychological experiments as being threatening, particularly when the experimental tasks appear to reveal something about their personality or intelligence. Mednick (1957), for example, found that while experimentally naive HA Ss differed from LA Ss in performance on a stimulus generalization task,

no differences between anxiety groups were found for Ss who had participated in several prior psychological experiments.

Spence and Spence (1966) tend to accept the situational hypothesis rather than the chronic one, suggesting the necessity of using experimentally induced stress to increase the probability that anxiety groups will differ in emotionality (drive level) in the experimental situation. However, it is also suggested that the use of experimentally induced stress to test drive theory may be inappropriate in that it may have effects in addition to increasing drive level. More specifically, the use of stress may increase both drive and drive stimulus (S_D), which has as components, both task-relevant and task-irrelevant (heightened autonomic reactions or covert verbalizations reflecting anger, desire to escape, etc.) responses. Whether an increase in D and S_D facilitates or hinders performance depends, in part, on whether the response tendencies elicited by S_D are compatible or incompatible with the response being performed. The "response interference" hypothesis (Spence and Spence, 1966) was therefore proposed and states that task-irrelevant responses, which in some situations may interfere with correct performance, are more easily elicited in HA Ss than in LA Ss.

Nicholson (1958), using low and high competitional serial lists, found an interaction between list and anxiety (as measured by the MAS) of the kind predicted by drive

theory when Ss were tested without experimentally induced stress. Under ego stress conditions, however, the HA groups were inferior to the LA groups, even on the low competitional list. This result was interpreted as supporting Spence and Spence's (1966) "response interference" hypothesis. Spielberger and Smith (1966) also used high and low competitional serial lists and ego stress instructions with Ss differing in anxiety level, as measured by the MAS. Their results, however, were exactly as drive theory would predict. That is, performance of HA Ss was superior to that of LA Ss on the low competitional list, but inferior on the high competitional list. The results of studies testing the "response interference" hypothesis, therefore, are conflicting. Likewise, evidence favoring the chronic or situational hypothesis is conflicting. In a discussion of experimentally induced stress, Spence and Spence (1966) conclude that future theories concerning anxiety and stress must specify the kinds of situations in which these variables are expected to operate and the precise manner in which they are expected to influence the overt behaviors being measured or observed. Therefore, according to Spence and Spence, a theory about the experimental situation itself must be developed.

Spielberger (1972), in proposing the state-trait theory of anxiety, has attempted to develop such a theory, but his theory is based heavily upon drive theory, in relation to anxiety and task difficulty, and is plagued by many of the

same issues. The State-Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch and Lushene, 1970) is probably the most widely used state-trait instrument, providing measures of A-State and A-Trait, with the A-State scale also being an index of drive (D) (Spielberger et al., 1970). Correlations between the STAI and MAS (a trait anxiety scale) are .80 and .79 for college females and males, respectively. A-State is "characterized by subjective consciously perceived feelings of apprehension and tension, accompanied by or associated with activation or arousal of the autonomic nervous system" (Spielberger, 1966*a*, p. 17). A-Trait is defined as "a motive or acquired behavioral disposition that predisposes an individual to perceive a wide range of objectively nondangerous circumstances as threatening, and to respond to these with state anxiety reactions disproportionated in intensity to the magnitude of the objective danger" (Spielberger, 1966*a*, p. 17). More simply, A-State refers to situational, transitory anxiety, while A-Trait refers to a more chronic, stable trait characteristic.

In defining situations in which high and low A-Trait Ss would be expected to differ in A-State, Spielberger (1972) maintains that high A-Trait Ss tend to interpret circumstances in which their personal adequacy is evaluated as more threatening than do low A-Trait Ss. Furthermore, situations that are characterized by physical danger are not interpreted as differentially threatening by high

and low A-Trait Ss. Therefore, differential elevations in A-State would be expected for persons who differ in A-Trait under circumstances characterized by some threat to self-esteem, but not in situations that involve physical danger, unless personal adequacy is also threatened. A number of studies (Spielberger and Smith, 1966; Hodges, 1968; Lamb, 1973) have supported the contention that some type of ego stress instructions are necessary to produce differences in A-State for Ss differing in A-Trait.

Spielberger's state-trait theory of anxiety predicts the same relationship between anxiety and task difficulty that drive theory predicts. That is, performance of HA Ss is expected to be superior to that of LA Ss on easy tasks, in which few competing responses are elicited, and inferior on more difficult tasks, in which a greater number of competing responses is elicited.

The results of studies testing this relationship, however, have not been consistent. O'Neil, Hansen and Spielberger (1969), for instance, using computer-assisted learning tasks varying in difficulty level, found high A-State Ss to make more errors on the difficult (competitional) task and fewer on the easy (noncompetitional) task than low A-State Ss--results consistent with state-trait theory and drive theory. Another study (Spielberger, O'Neil and Hansen, 1972), also using computer-assisted learning tasks varying in difficulty level,

did not find significant interactions between A-State, A-Trait, and task difficulty.

Johnsen, Hohn and Dunbar (1973), using prose learning tasks varying in difficulty level, also failed to find significant interactions between A-State, A-Trait, and task difficulty. The failure of this study to find significant interactions may be attributed to a lack of stress in the experimental conditions. Johnsen et al. did not use stressful instructions in their study. Reeves, Edmonds and Gowdy (1973) compared the performance of HA and LA (as measured by the STAI) Ss on serial learning tasks varying in difficulty level. The use of ego stress instructions relating Ss's performance to intellectual level was effective in producing different levels of A-State for Ss differing in level of A-Trait, but no performance differences between high and low A-Trait groups were found, a result contrary to predictions from state-trait and drive theories.

Saltz (1970) proposed that the extremes of the MAS isolate Ss who are sensitive to different sources of stress. Consequently, HA Ss are sensitive to failure and anticipation of failure (which is the same as state-trait theory), while LA Ss are sensitive to stress induced by pain. According to Saltz, pain produces poorer performance in LA Ss than in HA Ss and this is as true for material involving massive interference as for material in which the correct response is dominant. Martens (1971) reviewed

a large number of studies relating manifest anxiety to motor behavior and concluded that there is no evidence to support Saltz's (1970) hypothesis. This is not a completely valid criticism of Saltz's hypothesis, however, since Saltz is concerned with conditioning and verbal learning studies, and not motor behavior. In addition to his criticism of Saltz, Martens suggests that the use of the MAS be abandoned in favor of the STAI. Martens attributes the widespread popularity of the MAS to precedence and expediency and concludes that the MAS is not a viable means of measuring anxiety, at least as it relates to motor behavior.

Glover and Cravens (1974) tested Saltz's (1970) hypothesis and contrasted it to drive theory and to Spielberger's state-trait theory in a paired-associates learning task. One neutral and two stressful (pain and failure stress) conditions were used. The measure of trait anxiety was the MAS and the measure of state anxiety was the A-State scale of the STAI. The prediction from drive theory and state-trait theory that HA Ss would give more correct responses than LA Ss on a task in which the correct response was dominated was not supported. Spence and Spence (1966) have suggested that evaluating drive theory with stress-inducing experimental manipulations does not legitimately test their theory because task-irrelevant responses may be elicited. The data collected in this study only under the neutral condition, however, also failed to support drive theory. The result that the A-State scores

of HA Ss were significantly higher for all stress conditions than were the A-State scores of LA Ss indicated that HA Ss were generally more aroused by the experiment than were LA Ss. This result was interpreted to indicate a differential drive level between HA and LA Ss and supported the argument that the conditions necessary for a test of drive theory had been met.

The learning data also failed to support predictions based on a state-trait theory application of drive theory concepts, because the performances of both HA failure and LA pain groups were disrupted in the task in which the correct habit was dominant, whereas the A-State scale data showed that only HA failure Ss were differentially aroused by the experimental treatment. State-trait theory can handle the disruption of learning in LA pain Ss only if it is assumed that LA Ss can experience arousal without reporting it. However, this interpretation implies that the verbal report of LA Ss must be regarded as inaccurate. Thus the state-trait theory of anxiety, with respect to conclusions about the measurement of A-State in LA Ss by means of the STAI, is weakened by the results of this study. The disruption in performance of HA failure and LA pain Ss supports Saltz's hypothesis, according to Glover and Cravens, since Saltz contends that HA and LA Ss react differentially to different types of stress.

Perhaps as a result of the conflicting nature of studies concerning state-trait theory and performance in

experimental situations, Gaudry, Vagg and Spielberger (1975) performed a study to validate the state-trait distinction in anxiety research. Gaudry et al. used Australian high school students in attempting to validate the state-trait distinction. Three measures of A-State were taken on each sample under conditions differing in amount of stress (one nonstress and two ego stress conditions). The A-Trait scale was also administered once to each sample. For the high school sample, the first measure of A-State was taken after the Ss had worked on recently mastered classroom materials (nonstressful condition). Two weeks later, a highly stressful situation was created by giving the Ss an exceptionally difficult mathematics test. The second measure of A-State was obtained immediately after this test with Ss instructed to respond according to how they felt while working on the mathematics test. Approximately three weeks after the mathematics test, a two-day examination, the Commonwealth Secondary Scholarship Examination, requiring the completion of four, three-hour papers, was given. After two days the third A-State measure was obtained with Ss instructed to respond according to how they felt while taking the examination.

The university students were required to participate in a three-hour testing session as part of their regular program. During this session, three measures of A-State were taken under three conditions of stress. At the beginning of the session the A-State scale was administered

to the Ss who were to respond according to how they felt "right now, at this very moment." About one hour into the three-hour session, the Minnesota Paper Form Board Test was given, and it was followed by the second administration of the A-State scale, where the Ss were asked to respond according to how they felt while doing the last test. The Tertiary Entrance Examination, which is similar to the Commonwealth Secondary Scholarship Examination, was then given. This was immediately followed by the third administration of the A-State scale, with Ss again being asked to respond according to how they felt while doing the last test. Finally, the A-Trait scale was given with standard instructions.

An analysis of the results showed that for the two different samples (high school and university students), three separate A-State factors emerged, each associated with different occasions of measurement that were associated with differing amounts of situational stress. Also, an A-State factor emerged that was separate from, but intercorrelated with, the A-State factors. The results were interpreted as providing strong support for the state-trait distinction in anxiety research, particularly in view of the differences between the samples and the procedures. The high school sample was younger, composed only of females, and had a wider range and lower average intelligence than the university sample. Also, different stress conditions were used for the two samples, and the time

interval between test administrations varied as well. According to the authors, these differences shown in subject characteristics and testing procedures would be expected to produce substantial differences in factorial structure. The fact that the obtained differences were small was viewed as supporting the meaningfulness and generality of the state-trait distinction and illustrating the importance of situational factors in research on stress and anxiety.

At present, therefore, the relationship between state-trait anxiety theory (and implications from drive theory), task difficulty, and paired-associates learning is unclear, particularly in view of Saltz's (1970) hypothesis and the implications of the effects of different types of stress upon HA and LA Ss. The present study was designed to test the relationship between anxiety level and task difficulty as predicted from state-trait and drive theories. In this respect, the present study entails a partial replication of Glover and Cravens (1974). This study differed from Glover and Cravens' study in that only Spielberger's state-trait theory and drive theory was tested. The present study employed both the STAI and MAS, thus providing a comparison of these two instruments in predicting performance differences between HA and LA Ss. Glover and Cravens (1974) used the MAS as the measure of trait anxiety and the A-State scale of the STAI as the measure of state anxiety. They did not use the A-Trait scale of the STAI, which may have

accounted, in part, for their failure to support state-trait theory. The present study corrected for this particular problem by using both the A-State and A-Trait scales of the STAI, as well as the MAS.

Specifically, two hypotheses were tested and are as follows:

> HYPOTHESIS I: There will be significant differences between the performance of high and low A-Trait groups as a function of task difficulty.
>
> HYPOTHESIS II: There will be significant differences between groups in level of post-treatment A-State as a function of A-Trait and type of instructions (stressful versus nonstressful) received.

Method

Research Design

Four different analyses of variance and a Pearson's product-moment correlation coefficient were used to determine if the data supported the two research hypotheses.

A completely randomized analysis of variance was used to determine if the groups were equivalent in scholastic aptitude, and SAT scores were the dependent variable.

A Pearson's product-moment correlation coefficient was computed between MAS and A-Trait raw scores. This was done to determine if Ss differing in level of A-Trait also differed in level of manifest anxiety.

The first ANOVA, a 2 X 2 X 2 factorial with two levels each of anxiety, task difficulty, and stress, was used on the learning scores of the eight groups, with the

total number of errors made by each S during the six trials being the response measure. This analysis determined if main effects of anxiety (A-Trait) level, task difficulty, and level of stress were found, as well as showing if any interaction effects among these three independent variables were present.

A four-way analysis of variance, repeated measures design, was used to determine if total errors decreased as a function of trials, and if trials interacted with any of the independent variables.

Another four-way analysis of variance, repeated measures design, was conducted with pre- and post-treatment A-State raw scores being the response measure. This analysis determined if level of A-State increased from pre- to post-treatment as a result of participation in the experiment, and if any of the independent variables, or their interaction, affected level of post-treatment A-State.

Subjects

The Ss were 80 undergraduates enrolled in psychology courses at Appalachian State University. Ss were screened with the A-Trait scale of the STAI until 40 high and 40 low A-Trait Ss were found. Ss scoring above the 80th percentile and below the 20th percentile on the norms for college undergraduates and freshmen were operationally defined as high or low A-Trait, respectively. During the screening process, an initial (pre-treatment) measure of

A-State was taken, followed by the A-Trait scale and the MAS, in that order. Scholastic Aptitude Test (SAT) scores were also obtained from each of the 80 Ss as a control for this variable. Spielberger (1966*b*) has shown that anxiety level has a minimal effect on complex learning for Ss with extreme levels of scholastic aptitude. Eight groups of 10 Ss each were formed on the basis of high versus low anxiety level, with HA and LA Ss being randomly assigned to the two levels of stress (stress and nonstress) and to the two levels of task difficulty (easy and difficult). More specifically, the eight experimental groups were referred to as: (1) high anxious, easy, stressful (HES), (2) high anxious, difficult, stressful (HDS), (3) high anxious, easy, nonstressful (HEN), (4) high anxious, difficult, nonstressful (HDN), (5) low anxious, easy, stressful (LES), (6) low anxious, difficult, stressful (LDS), (7) low anxious, easy, nonstressful (LEN), and (8) low anxious, difficult, nonstressful (LDN).

Procedure

Once the Ss were randomly assigned to the various groups, they performed an easy or difficult task, with or without stressful instructions. All Ss received the paired-associates learning instructions. One-half of both HA and LA Ss also received stressful instructions, while the other half of the Ss received nonstressful instructions. Ss who received stressful instructions also received debriefing instructions describing the

true nature of the experiment after the collection of all experimental data. All necessary instructions were printed and handed out to each S prior to learning the list. E then explained the instructions and answered any questions about the instructions. See Appendix A for the exact nature of the paired-associates, stressful, nonstressful, and debriefing instructions. By giving stressful instructions to one-half of both high and low anxious Ss, and nonstressful instructions to the other half, a control was obtained for the effects of the stressful instructions between HA and LA groups. This procedure was a unique (to the author's knowledge) feature of the present study, as most other studies (i.e., Glover and Cravens, 1974) have used neutral groups to control for the effects of stress.

Two ten-item paired-associates lists composed of CVCs and English nouns were formed using the list of CVCs derived by Noble (1961) and the list of nouns derived by Paivio et al. (1968). Both lists had the same stimulus terms (noble CVCs with $\underline{m}'$ values from 1.33 to 1.42). The easy list had Paivio nouns with a concreteness (C) value from 6.69 to 7.70 as the response term. The difficult list had nouns with a C value from 1.42 to 2.03 as the response term. See Appendix B for the lists used.

Ss were tested in groups of five with a carousel slide projector used to present the stimulus material. This necessitated forming each of the eight groups into two sub-groups, thus forming sixteen sub-groups. The order

in which the sub-groups were run was counterbalanced. The study-test method of presentation was used. A three-second rate of presentation was used for all items in the "study" phase of the trials and a five-second rate was used in the "test" phase of the trials. All Ss received six trials with the total number of errors as the dependent variable. Ss recorded their responses in an answer booklet. Immediately after completion of the sixth trial, the post-treatment A-State measure was taken from all Ss instructing them to respond according to how they felt while learning the list. Ss who received stressful instructions were debriefed immediately after all data had been collected.

Results

Analysis of variance of SAT scores revealed no significant differences between groups. Therefore, the groups

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Insert Tables 1 and 2 about here

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were considered to be homogeneous with respect to scholastic aptitude.

The correlation (Pearson's r) between MAS and A-Trait raw scores was .90 ($p<.001$), which indicated that Ss who were already operationally defined as high or low A-Trait by the screening process also had comparably extreme levels of manifest anxiety. This was a true relationship as indicated by the probability level, and 81 percent of the variance in anxiety was accounted for by the measures used.

Analysis of total errors showed significance for the main effects of A-Trait (F=9.33, df=1/72, $p<.005$) and task difficulty (F=29.12, df=1/72, $p<.001$), but none of the

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Insert Table 3 about here

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interactions were significant. The main effect of A-Trait revealed that low A-Trait groups made fewer errors on both tasks than high A-Trait groups did. The main effect of

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Insert Table 4 about here

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task difficulty indicated that groups receiving the difficult task made more errors than those involved with the easy task.

The analysis of total errors as a function of trials (blocks of two trials) revealed main effects for A-Trait and task difficulty, as well as a main effect of trials

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Insert Table 5 about here

(F=396.49, df=2/144, $p<.001$). The main effect of trials showed that performance improved over trials for all groups.

Insert Figure 1 about here

Again, none of the interactions was significant.

Analysis of variance of pre- and post-treatment A-State scores revealed main effects of A-Trait (F=42.81, df=1/72,

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Insert Table 6 about here

$p<.001$) and A-State (F=14.09, df=1/72, $p<.001$). The effect of stress fell just below the .05 level of significance (F=3.53, df=1/72) and is discussed in more detail in the next section. A significant interaction (F=11.55, df=1/72, $p<.001$) between A-State and A-Trait was also observed. The main effect of A-Trait showed that, in general, high A-Trait groups responded with higher levels of A-State in both pre- and post-treatment conditions than did low A-Trait groups. The main effect of A-State indicated that, in general, the groups tended to increase in level of A-State from pre- to post-treatment. However, an examination of group means and standard deviations of pre- and post-treatment A-State gain

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Insert Table 7 about here

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scores revealed that the effect of A-State was produced almost completely by increases in level of A-State, from pre- to post-treatment, by the low A-Trait groups. In fact, two of the four high A-Trait groups (HDS and HDN) responded with very minimal increases in level of A-State, while the other two high A-Trait groups (HES and HEN) actually showed small decrements in level of A-State. Also,

the pre- to post-treatment A-State gain of low A-Trait groups largely accounted for the significant interaction between A-State and A-Trait. These two points can be seen

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Insert Figure 2 about here

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more clearly in Figure 2. The task difficulty variable was collapsed in this figure because it was the least significant of the three independent variables in this particular analysis, and because this permitted a more lucid view of the effects of the other variables.

Discussion

Most studies relating anxiety level to task difficulty have controlled for the effects of scholastic aptitude by random assignment of Ss to groups. The present study also did this, but in addition, analysed Ss's SAT scores to test if the randomization was effective. The analysis showed no differences between groups on scholastic aptitude, thus providing empirical evidence that the experimental groups were, in fact, homogeneous with respect to scholastic aptitude.

The significant correlation coefficient between MAS and A-Trait scores indicated that high and low A-Trait Ss also had comparably extreme levels of manifest anxiety. The obtained correlation of .90 also was considerably greater than the .79 and .80 correlation (for college males and females, respectively) reported by Spielberger

et al. (1970) in the STAI manual. The correlation obtained in this study, therefore, gave empirical evidence that high and low A-Trait Ss also differed in level of D (drive). It was important to obtain differences in level of both A-Trait and manifest anxiety to adequately test both state-trait and drive theories. Glover and Cravens (1974), as previously mentioned, used the MAS and the A-State scale of the STAI to test predictions from drive theory, state-trait theory, and Saltz's hypothesis. It was pointed out by this author that the failure to use the A-Trait scale of the STAI could have accounted for the failure to support state-trait theory. It could have been assumed that Ss differing in level of manifest anxiety also differed in level of A-Trait, since the correlation between the two scales is so high. However, finding dichotomized scores for both scales gave more solid, empirical evidence that prerequisites for testing predictions from state-trait theory and drive theory were met.

Drive theory and state-trait theory predict that performance of HA Ss will be superior to that of LA Ss on an easy (noncompetitional) task, and inferior on a difficult (competitional) task. This study did not find this interaction, since low A-Trait groups made fewer errors on both easy and difficult tasks than high A-Trait groups did. Spielberger's state-trait theory and Spence's "emotional reactivity" hypothesis, however, state that in order for this interaction between anxiety level and task

difficulty to occur, differences in A-State (stress) must be produced between HA and LA groups. State-trait theory asserts that HA Ss are more likely to respond with increased levels of A-State, in a wider variety of situations, than low A-Trait Ss. This is particularly true if the situation is viewed as a threat to personal adequacy or self-esteem (ego stress). Similarly, Spence's "emotional reactivity" hypothesis states that HA Ss have a lower threshold for emotional arousal in situations perceived as having some degree of threat. Spence, however, maintained that stress increases both drive and drive stimulus (S_D), which has as components, both task-relevant and task-irrelevant responses. Therefore, increases in stress may not always facilitate performance, according to Spence. Nevertheless, both Spielberger and Spence emphasize the necessity of producing stress in the experimental condition.

This study attempted to produce experimental stress by giving Ss stressful instructions relating performance on the experimental task to scholastic aptitude. These instructions were not effective in producing significant differences in post-treatment A-State between high and low A-Trait groups. The analysis revealed that the effect of the stressful instructions fell just below the .05 level of significance, a result which merits discussion in this instance. The stressful instructions relating performance to scholastic aptitude were designed for freshmen and sophomores in introductory psychology classes. However,

when all possible introductory classes were screened, more extreme A-Trait Ss were still needed. Therefore, three upper division psychology classes (developmental and educational psychology courses) were screened to obtain the desired number of Ss. These three classes contained predominantly juniors. Upperclassmen, such as juniors and seniors, would not be expected to be as susceptible to instructions relating their performance to scholastic aptitude as freshmen and sophomores would. After all, they have succeeded in two previous years of college work which should dispell any doubts that they might have regarding their ability. One unsolicited report from a junior S stated this very idea. Therefore, if all freshman and sophomore Ss had been used, a significant effect for stressful instructions probably would have been observed. Nevertheless, the effect was not significant, and the instructions were not effective.

However, a closer examination of the analysis of A-State scores showed that high A-Trait groups had higher levels of A-State in both pre- and post-treatment conditions than low A-Trait groups. This difference in level of A-State was a function of A-Trait and would be predicted by state-trait theory. Also, since differences in A-State were present for groups differing in A-Trait, the prerequisite was met for testing the prediction of an interaction between anxiety level and task difficulty. Spielberger's main contention is that A-State differences between high

and low A-Trait groups must be present during the experiment, and whether these differences are produced by stress or as a function of A-Trait is inconsequential.

When the learning data is reexamined in these terms, it can be seen that even though A-Trait groups differed in level of post-treatment A-State, the predicted interaction between anxiety (A-Trait) and task difficulty was not observed. State-trait theory can not explain this result. A drive theory interpretation, however, would be that the differences in level of A-State (it will be remembered that A-State is an index of D, according to Spielberger et al. (1970), produced higher levels of D and S_D, with its component of task-irrelevant responses. This would support Spence and Spence's (1966) "response interference" hypothesis, which states that task-irrelevant responses are more easily elicited in HA Ss than in LA Ss.

A more plausible explanation, perhaps, of the failure to observe an interaction between anxiety level and task difficulty concerns the problem of defining the concept of "difficulty." A number of studies, including the present one, have used verbal learning tasks differing in difficulty (as defined by number of errors made) level. In spite of significant differences in the difficulty level, the predicted interaction was not observed. Of course, any definition of difficulty is somewhat arbitrary, but it may be that verbal learning tasks are universally difficult. That is, even the "easiest" verbal learning material

(by whatever arbitrary criteria) may arouse too many competing responses to allow the observation of the interaction between anxiety level and task difficulty. Spence (1958) even reported that some of his early failures to observe the interaction effect were due to an inadequate manipulation of difficulty.

Schmeck (1970) used error-produced frustration as a source of drive on nonverbal, linear maze tasks. He also failed to observe an interaction effect and concluded that even his easy task produced too many competing responses. At present, therefore, defining difficulty is still a major problem for studies testing the interaction prediction of drive theory and state-trait theory.

An examination of pre- and post-treatment A-State scores revealed some surprising results (see Figure 2). In general, high A-Trait groups had higher levels of A-State than low A-Trait groups in both pre- and post-treatment conditions. This occurred as a function of A-Trait and would be predicted by state-trait theory. The post-treatment A-State measure reflected level of this variable present during the experiment, which could be assumed to be a stressful situation. State-trait theory would predict increases in level of A-State from pre- to post-treatment, especially for high A-Trait Ss. This prediction was not supported (see Table 7), as two high A-Trait groups (HDS and HDN) responded with very minimal gains in A-State and the other two high A-Trait groups

(HES and HEN) actually showed decreases in A-State. Meanwhile, all low A-Trait groups showed substantial increases in A-State from pre- to post-treatment.

Saltz (1970) hypothesized that the extremes of the MAS isolate Ss who are sensitive to different sources of stress. According to Saltz, HA Ss are sensitive to failure (ego stress) while LA Ss respond to stress induced by pain. The results of the present study do not support this hypothesis, since LA Ss responded with higher A-State in the experimental situation than in the pre-treatment (non-stressful) situation.

Glover and Cravens (1974) found that the performance of HA failure and LA pain groups was disrupted on an easy task, while the A-State data showed that only HA failure groups were differentially aroused by the experimental treatment. This result was interpreted as supporting Saltz's (1970) hypothesis and not supporting Spielberger's and Spence's theories. The failure of LA pain Ss to report increased A-State was taken as an indication of the invalidity of the A-State scale. Also, Glover and Cravens deftly pointed out that since Saltz makes no statements concerning the ability of Ss to verbally report their experiences, his position is not weakened by the A-State data. Glover and Cravens apparently ignored the possibility that pain stress was just not effective in producing higher A-State for LA Ss.

In conclusion, the prediction from state-trait theory and drive theory that HA Ss perform better on easy tasks and LA Ss perform better on difficult tasks was not supported. High A-Trait groups responded with higher A-State in both pre- and post-treatment conditions than did low A-Trait groups, as predicted by state-trait theory. Low A-Trait groups showed greater gains in pre- to post-treatment A-State, a result which supported neither state-trait theory nor Saltz's (1970) hypothesis. Future studies should use more than two levels of each independent variable, perhaps, and use physiological measures of arousal as well as self-report measures. A more adequate definition and manipulation of task difficulty and consistent methods of inducing experimental stress must also be found, and the effects of different types of stress on performance must be clarified.

References

Berkey, A. S. & Hoppe, R. A. The combined effect of audience and anxiety on paried associates learning. Psychonomic Science, 1972, 29, 351-353.

Boor, M. Relation of anxiety (drive) level to performance on noncompetitional paired-associates learning: A failure to replicate. Catalogue of Selected Documents in Psychology, 1974, 4, 2-3.

Gaudry, E., Vagg, P., & Spielberger, C. D. Validation of the state-trait distinction in anxiety research. Multivariate Behavioral Research, July 1975.

Glover, C. B. & Cravens, R. W. Trait anxiety, stress, and learning: A test of Saltz's hypothesis. Journal of Research in Personality, 1974, 8, 243-253.

Hodges, W. F. Effects of ego threat and threat of pain on state anxiety. Journal of Personality and Social Psychology, 1968, 8, 364-372.

Johnsen, E. P., Hohn, R. L., & Dunbar, K. R. The relationship of state-trait anxiety and task difficulty to learning from written discourse. Bulletin of the Psychonomic Society, 1973, 2, 89-90.

Lamb, D. H. The effects of two stressors on state anxiety for students who differ in trait anxiety. Journal of Research in Personality, 1973, 7, 116-126.

Martens, R. Anxiety and motor behavior: A review. Journal of Motor Behavior, 1971, 3, 151-179.

Mednick, S. A. Generalization as a function of manifest anxiety and adaptation to psychological experiments. Journal of Consulting Psychology, 1957, 21, 491-494.

Nicholson, W. M. The influence of anxiety upon learning: Interference or drive increment? Journal of Personality, 1958, 26, 303-319.

Noble, C. E. Measurements of association value (a), related associations (a´), and scaled meaningfulness (m´) for the 2100 CVC combination of the English alphabet. Psychological Reports, 1961, 8, 487-521.

O'Neil, H. F., Hansen, D. N., & Spielberger, C. D. The effects of state and trait anxiety on computer-assisted learning. Unpublished paper, 1969.

Paivio, A., Yuille, J. C., & Madigan, S. A. Concreteness, imagery, and meaningfulness values for 925 nouns. Journal of Experimental Psychology Monograph Supplement, 1968, 76, 1-25.

Reeves, R. A., Edmonds, E. M., & Gowdy, M. J. Effects of state-trait anxiety on distribution of practice and task difficulty in serial learning. Unpublished research paper, Augusta College, 1973.

Saltz, E. Manifest anxiety: Have we misread the data? Psychological Review, 1970, 77, 568-573.

Saltz, E. & Hoehn, A. J. A test of the Taylor Spence theory of anxiety. Journal of Abnormal and Social Psychology, 1957, 54, 114-117.

Schmeck, R. R. Error-produced frustration as a factor influencing the probability of occurrence of further errors. Journal of Experimental Psychology, 1970, 86, 153-156.

Schmeck, R. R. & Bruning, J. L. Frustration theory and quality of performance: Elicitation and elimination of competing responses. Psychological Reports, 1970, 26, 987-994.

Spence, J. T. & Spence, K. W. The motivational components of manifest anxiety: Drive and drive stimuli. In C. D. Spielberger (Ed.), Anxiety and behavior. New York: Academic Press, 1966.

Spence, K. W. Behavior theory and conditioning. New Haven, Conn: Yale University Press, 1956.

Spence, K. W. A theory of emotionally based drive (D) and its relation to performance in simple learning situations. American Psychologist, 1958, 13, 131-141.

Spence, K. W. Behavior theory and learning: Selected papers. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1960.

Spence, K. W., Farber, I. E., & McFann, H. H. The relation of anxiety (drive) level to performance in competitional and noncompetitional paired-associates learning. Journal of Experimental Psychology, 1956, 52, 296-305.

Spence, K. W., Taylor, John, & Ketchell, R. Anxiety (drive) level and degree of competition in paired-associates learning. Journal of Experimental Psychology, 1956, 52, 306-310.

Spielberger, C. D. Theory and research on anxiety. In C. D. Spielberger (Ed.), Anxiety and behavior. New York: Academic Press, 1966. (*a*)

Spielberger, C. D. The effects of anxiety on complex learning and academic achievement. In C. D. Spielberger (Ed.), Anxiety and behavior. New York: Academic Press, 1966. (*b*)

Spielberger, C. D. (Ed.), Anxiety: Current trends in theory and research. New York: Academic Press, 1972.

Spielberger, C. D., Gorsuch, R. L., & Luchene, R. E. Manual for the State-Trait Anxiety Inventory. Palo Alto, California: Consulting Psychologists Press, Inc., 1970.

Spielberger, C. D., O'Neil, H. F., & Hansen, D. N. Anxiety, drive theory, and computer-assisted learning. In P. A. Maher (Ed.), Progress in experimental personality research. Vol. 6. New York: Academic Press, Inc., 1972.

Spielberger, C. D. & Smith, L. H. Anxiety (drive), stress, and serial-position effects in serial-verbal learning. Journal of Experimental Psychology, 1966, 72, 589-595.

Taylor, J. A. A personality scale of manifest anxiety. Journal of Abnormal and Social Psychology, 1953, 48, 285-290.

Taylor, J. A. The effects of anxiety level and psychological stress on verbal learning. Journal of Abnormal and Social Psychology, 1958, 57, 55-60.

Taylor, J. A. & Chapman, J. P. Anxiety and the learning of paired-associates. American Journal of Psychology, 1955, 68, 671.

APPENDIX A

PAIRED-ASSOCIATES LEARNING INSTRUCTIONS:

I have a list of ten paired-associates which I want you to learn. The first part of each pair is a nonsense syllable and the second part is an English noun. For each trial, the complete list will be shown and then only the nonsense syllable will be shown. When you see the nonsense syllable, try to think of the noun which was paired with it and write it down. After each trial the pairs will be randomly reordered. Therefore, you should only try to remember which noun goes with which nonsense syllable and not try to remember the nouns in any sort of order. We will go through six trials with fifteen seconds between each trial. If you learn the list in under six trials, keep responding anyway and see how many perfect trials you can complete.

STRESSFUL INSTRUCTIONS:

Before we begin I should tell you about the nature and purpose of this task. In recent years many studies have been finding that performance on such tasks is highly related to success in college. This means that the faster you are able to learn the list of paired-associates, the higher your scholastic aptitude is, and therefore the greater your chances of succeeding in college. Furthermore, performance on this type of task has even been shown to be a better prediction of success in college than the Scholastic Aptitude Test (SAT) in many instances.

NONSTRESSFUL INSTRUCTIONS:

Before we begin I should tell you about the nature and purpose of this type of task. This is a simple verbal learning task. Some people find it very easy to learn and some people find it a little difficult. However, performance on this type of task, particularly in an experimental situation such as this, has little or no relationship to real life situations such as performance on a classroom examination. Therefore, you should just try to do the best you can in learning the list.

DEBRIEFING INSTRUCTIONS:

The purpose of this experiment was to study the effects of stress on learning. Your performance in learning the list has no relationship to your scholastic aptitude. You were told that it did to create stress. This type of task, particularly in an experimental situation such as this, has no relationship to real life situations such as performance on a classroom examination. Everyone feels nervous and jittery to some extent in this type of situation, so don't worry about how you performed.

APPENDIX B

THE LISTS:

EASY	DIFFICULT
KEB-NAIL	KEB-HATRED
ZOT-HAMMER	ZOT-BETRAYAL
JEX-PENCIL	JEX-IDEA
YED-FOREST	YED-ABILITY
MIB-APPLE	MIB-TRUTH
FEP-TABLESPOON	FEP-PRIDE
YIS-LOBSTER	YIS-GLORY
VUG-UMBRELLA	VUG-SPIRIT
JOF-JELLY	JOF-CHANCE
ZIB-SHIP	ZIB-MERCY

APPENDIX C

TABLE 1

Analysis of Variance of SAT Scores

Source of Variation	Sum of Squares	df	Mean Square	F	p
Total	1,464,080	79	___	___	___
Between Groups	96,780	7	13,825.71	.73	NS
Within Groups	1,367,300	72	18,990.27	___	___

TABLE 2

Comparison of Mean SAT Scores

For Each Group

Group	Mean	Standard Deviation
HES	947	125.96
HEN	861	91.09
HDS	859	192.09
HDN	895	178.46
LES	887	140.32
LEN	919	165.22
LDS	960	66.33
LDN	888	87.28

TABLE 3

Analysis of Variance of Total Errors

Source of Variation	Sum of Squares	df	Mean Square	F	p
Total	9,197	79	———	———	—
A	751	1	751	9.33	<.005*
B	2,344	1	2,344	29.12	<.001*
C	38	1	38	<1.00	NS
A X B	188	1	188	2.33	NS
A X C	74	1	74	<1.00	NS
B X C	3	1	3	<1.00	NS
A X B X C	1	1	1	<1.00	NS
Error	5,798	72	80.5	———	—

A= A-Trait

B= Task

C= Stress

TABLE 4

Comparison of Mean Total Errors

For Each Group

Group	Mean	Standard Deviation
HES	17.1	8.21
HEN	20	7.30
HDS	30.6	10.07
HDN	34.3	14.31
LES	16	8.09
LEN	15	5.73
LDS	23.33	5.56
LDN	23.2	9.27

TABLE 5

Analysis of Variance of Errors X Trials

(Blocks of 2 trials)

Source of Variation	Sum of Squares	df	Mean Square	F	p
Total	2,107.918	239	___	___	___
Between Groups	779.308	79	___	___	___
A	61.915	1	61.915	9.30	<.005*
B	3.48	1	3.48	<1.00	NS
C	194.58	1	194.58	29.22	<.001*
A X B	6.05	1	6.05	<1.00	NS
A X C	15.45	1	15.45	2.32	NS
B X C	.41	1	.41	<1.00	NS
A X B X C	.0031	1	.0031	<1.00	NS
Error b	497.42	72	6.659	___	___
Within Groups	1,328.61	160	___	___	___
W	1,110.12	2	555.06	396.49	<.001*
W X A	3.077	2	1.54	1.09	NS
W X B	.877	2	.438	<1.00	NS
W X C	.564	2	.282	<1.00	NS
W X A X B	.243	2	.121	<1.00	NS
W X A X C	6.88	2	3.44	2.46	NS
W X B X C	3.38	2	1.69	1.20	NS
W X A X B X C	1.879	2	.939	<1.00	NS
Error w	201.59	144	1.40	___	___

A= A-Trait B= Stress C= Task W= Trials

TABLE 6

Analysis of Variance of Pre and Post-treatment A-State

Source of Variation	Sum of Squares	df	Mean Square	F	p
Total	20,939.54	159	___	___	___
Between Groups	13,609.49	79	___	___	___
A	4,851.00	1	4,851.00	42.81	<.001*
B	400.06	1	400.06	3.53	NS
C	10.51	1	10.51	<1.00	NS
A X B	74.25	1	74.25	<1.00	NS
A X C	49.51	1	49.51	<1.00	NS
B X C	29.76	1	29.76	<1.00	NS
A X B X C	35.14	1	35.14	<1.00	NS
Error b	8,159.27	72	113.32	___	___
Within Groups	7,330.05	80	___	___	___
W	1,015.06	1	1,015.06	14.09	<.001*
W X A	832.66	1	832.66	11.55	<.001*
W X B	43.06	1	43.06	<1.00	NS
W X C	135.06	1	135.06	1.87	NS
W X A X B	.04	1	.04	<1.00	NS
W X A X C	35.15	1	35.15	<1.00	NS
W X B X C	45.16	1	45.16	<1.00	NS
W X A X B X C	35.15	1	35.15	<1.00	NS
Error w	5,188.72	72	72.07	___	___

A= A-Trait B= Stress C= Task W= A-State

TABLE 7

Comparison of Mean Pre to Post-treatment

A-State Gain Scores for Each Group

Group	Mean	Standard Deviation
HES	-.8	13.21
HEN	-.29	5.74
HDS	4.2	13.71
HDN	2.3	12.43
LES	12.7	16.55
LEN	5.7	16.30
LDS	10.0	6.98
LDN	7.1	12.31

APPENDIX D

FIGURE 1

Learning Curves for Groups Differing in A-Trait and Task Difficulty

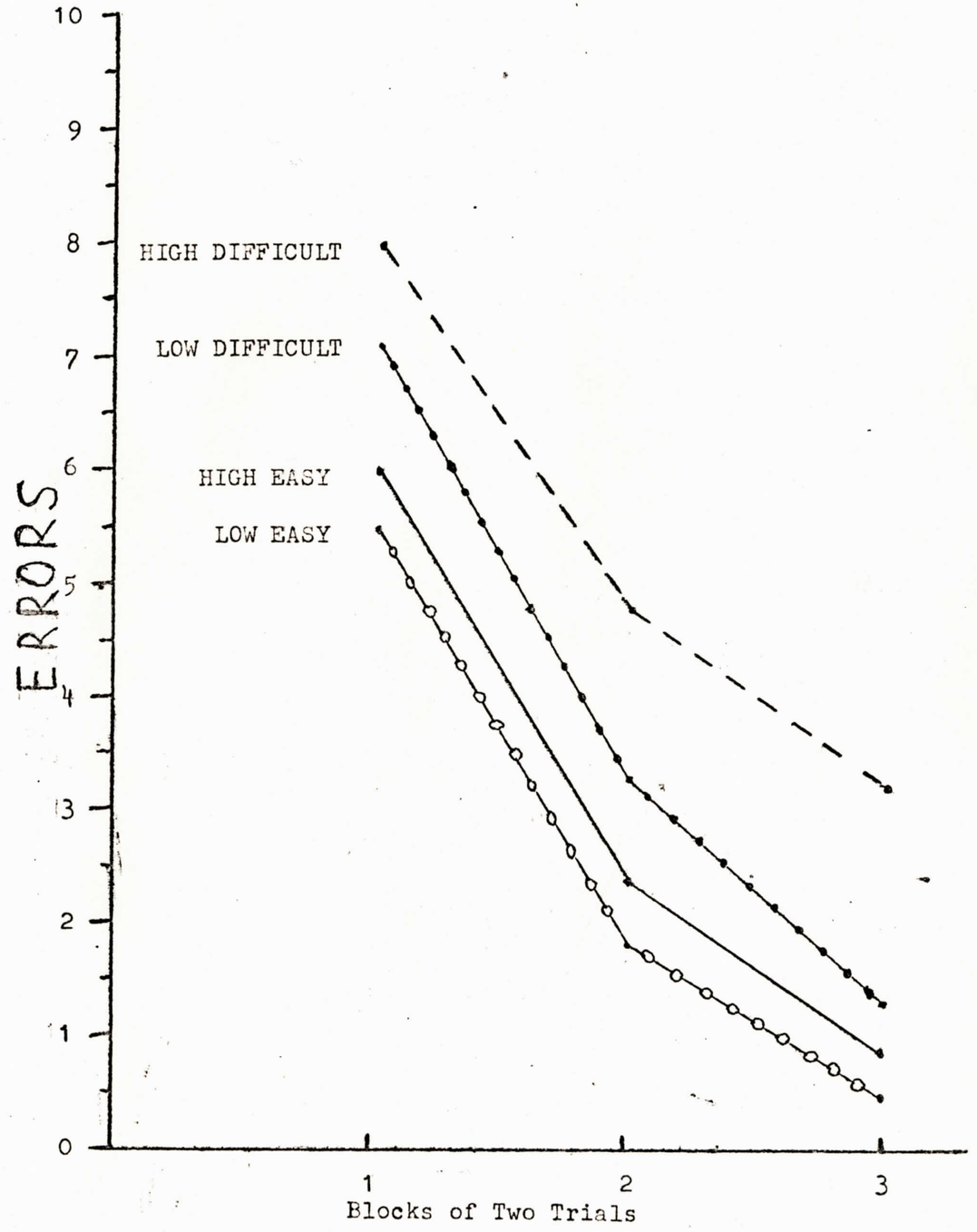
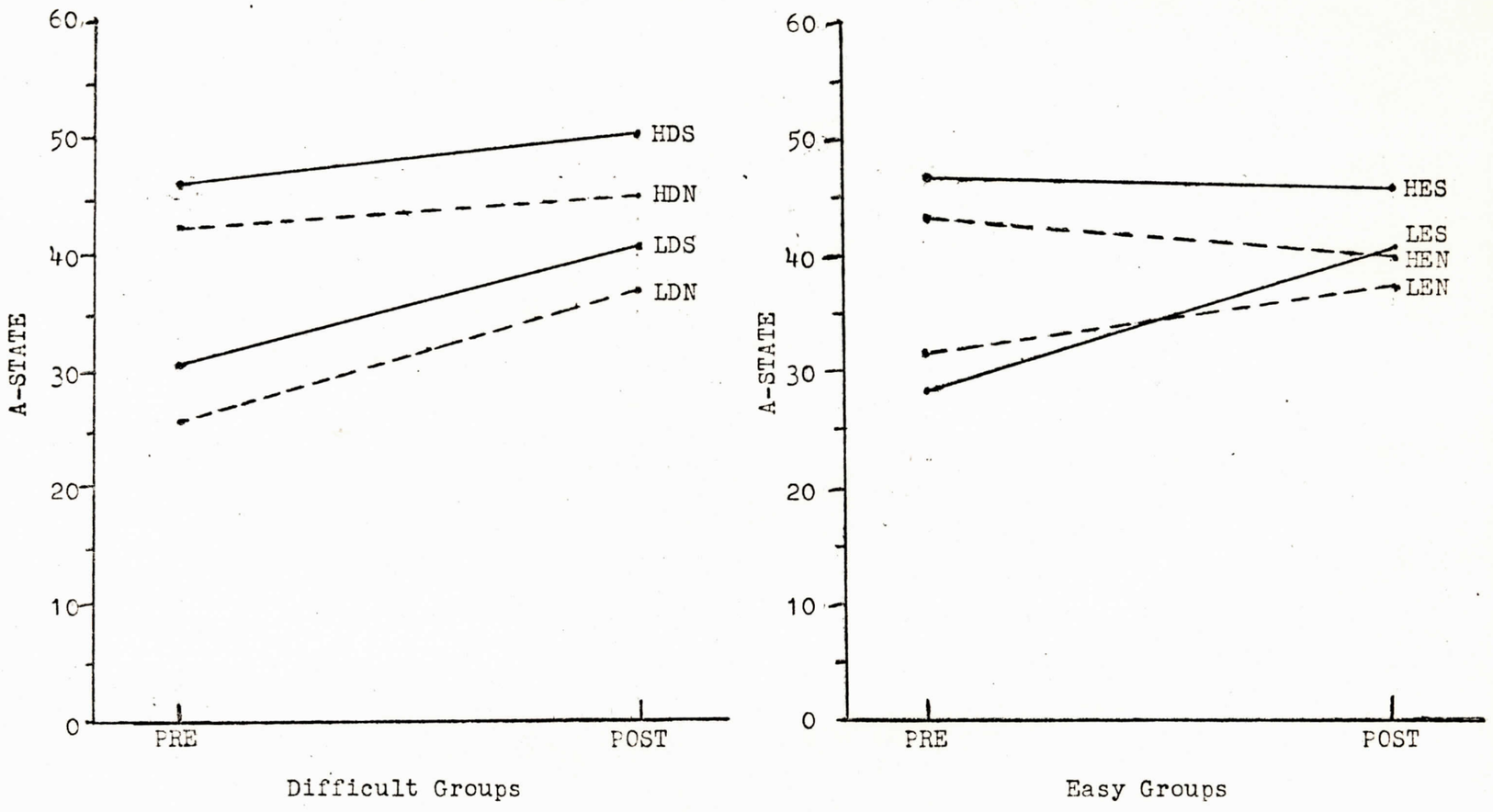


FIGURE 2

Pre and Post-treatment A-State Scores



APPENDIX E

SELF-EVALUATION QUESTIONNAIRE

Developed by C. D. Spielberger, R. L. Gorsuch 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.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	①	②	③	④
2. I feel secure	①	②	③	④
3. I am tense	①	②	③	④
4. I am regretful	①	②	③	④
5. I feel at ease	①	②	③	④
6. I feel upset	①	②	③	④
7. I am presently worrying over possible misfortunes	①	②	③	④
8. I feel rested	①	②	③	④
9. I feel anxious	①	②	③	④
10. I feel comfortable	①	②	③	④
11. I feel self-confident	①	②	③	④
12. I feel nervous	①	②	③	④
13. I am jittery	①	②	③	④
14. I feel "high strung"	①	②	③	④
15. I am relaxed	①	②	③	④
16. I feel content	①	②	③	④
17. I am worried	①	②	③	④
18. I feel over-excited and rattled	①	②	③	④
19. I feel joyful	①	②	③	④
20. I feel pleasant	①	②	③	④

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SELF-EVALUATION QUESTIONNAIRE

STAI FORM X-2

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 *generally* feel. 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 how you generally feel.

	ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS
21. I feel pleasant	①	②	③	④
22. I tire quickly	①	②	③	④
23. I feel like crying	①	②	③	④
24. I wish I could be as happy as others seem to be	①	②	③	④
25. I am losing out on things because I can't make up my mind soon enough	①	②	③	④
26. I feel rested	①	②	③	④
27. I am "calm, cool, and collected"	①	②	③	④
28. I feel that difficulties are piling up so that I cannot overcome them	①	②	③	④
29. I worry too much over something that really doesn't matter	①	②	③	④
30. I am happy	①	②	③	④
31. I am inclined to take things hard	①	②	③	④
32. I lack self-confidence	①	②	③	④
33. I feel secure	①	②	③	④
34. I try to avoid facing a crisis or difficulty	①	②	③	④
35. I feel blue	①	②	③	④
36. I am content	①	②	③	④
37. Some unimportant thought runs through my mind and bothers me	①	②	③	④
38. I take disappointments so keenly that I can't put them out of my mind	①	②	③	④
39. I am a steady person	①	②	③	④
40. I become tense and upset when I think about my present concerns	①	②	③	④

Code Number 2

BIOGRAPHICAL INVENTORY

1. I do not tire quickly.
2. I am often sick to my stomach.
3. I am about as nervous as other people.
4. I have very few headaches.
5. I work under a great deal of strain.
6. I cannot keep my mind on one thing.
7. I worry over money and business.
8. I frequently notice my hand shakes when I try to do something.
9. I blush as often as others.
10. I have diarreah (the runs) once a month or more.
11. I worry quite a bit over possible troubles.
12. I practically never blush.
13. I am often afraid that I am going to blush.
14. I have nightmares every few nights.
15. My hands and feet are usually warm enough.
16. I sweat very easily even on cool days.
17. When embarrassed I often break out in a sweat which is very annoying.
18. I do not often notice my heart pounding and I am seldom short of breath.
19. I feel hungry almost all the time.
20. Often my bowels don't move for several days at a time.
21. I have a great deal of stomach trouble.
22. At times I lose sleep over worry.
23. My sleep is restless and disturbed.
24. I often dream about things I don't like to tell other people.
25. I am easily embarrassed.
26. My feelings are hurt easier than most people.
27. I often find myself worrying about something.
28. I wish I could be as happy as others.
29. I am usually calm and not easily upset.
30. I cry easily.
31. I feel anxious about something or someone almost all of the time.
32. I am happy most of the time.
33. It makes me nervous to have to wait.
34. At times I am so restless that I cannot sit in a chair for very long.
35. Sometimes I become so excited that I find it hard to get to sleep.
36. I have often felt that I faced so many difficulties I could not overcome t
37. At times I have been worried beyond reason about something that really did not matter.
38. I do not have as many fears as my friends.
39. I have been afraid of things or people that I know could not hurt me.
40. I certainly feel useless at times.
41. I find it hard to keep my mind on a task or job.
42. I am more self-conscious than most people.
43. I am the kind of person who takes things hard.
44. I am a very nervous person.
45. Life is often a strain for me.
46. At times I think I am no good at all.
47. I am not at all confident of myself.
48. At times I feel that I am going to crack up.
49. I don't like to face a difficulty or make an important decision.
50. I am very confident of myself.