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The Effect of Varying Degrees of Anxiety Upon Classroom Learning Performance

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To the Graduate Council:

I am submitting herewith a thesis written by Martha J. Thorne entitled "The Effect of Varying Degrees of Anxiety Upon Classroom Learning Performance." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Psychology.

W. O. Jenkins, Major Professor

We have read this thesis and recommend its acceptance:

R. S. Shrader, G. R. Pascal

Accepted for the Council:

Carolyn R. Hodges

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(Original signatures are on file with official student records.)

August 7, 1958

To the Graduate Council:

I am submitting herewith a thesis written by Martha J. Thorne entitled "The Effect of Varying Degrees of Anxiety Upon Classroom Learning Performance." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Psychology.

W. O. Jenkins
Major Professor

We have read this thesis
and recommend its acceptance:

R. R. Shrader
[Signature]

Accepted for the Council:

[Signature]
Dean of the Graduate School

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THE EFFECT OF VARYING DEGREES OF ANXIETY UPON
CLASSROOM LEARNING PERFORMANCE

A THESIS

Submitted to
The Graduate Council
of
The University of Tennessee
in
Partial Fulfillment of the Requirements
for the degree of
Master of Arts

by
Martha J. Thorne
August 1958

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Martha J. Thorne

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CHAPTER I

INTRODUCTION

A. Statement of the Problem

The purpose of this study was to evaluate the effects of varying degrees of anxiety, as measured by the fifty-item forced-choice Taylor Scale of Manifest Anxiety (TMAS) (24), upon the classroom learning performance of a group of thirty-one student nurses, as measured by the increase in scores on an objective-type final examination administered at the beginning and end of a course in psychiatric nursing. The thirty-one subjects were divided into three groups on the basis of low, medium, and high anxiety scores on the TMAS. The per cent gain scores from the pre- and post-final exam were then compared for these three groups in order to determine whether significant differences in learning performance had taken place.

B. Background

1. Anxiety and Learning

It has been generally agreed that anxiety may "somehow" affect learning and performance, but how much and what kind of anxiety does what and how much to what kind of learning--therein lies the crucial experimental

"battlefield," with about as many conflicting "armies" reporting results as allied ones.

The study by Rosecrans (41) points toward the importance of personality variables in learning:

Among the many factors which remain to be studied as sources of variability in human learning are personality traits, conceptual abilities, memory abilities, etc. . . . A major question which should be undertaken is that of determining differences, if any, in learning ability among individuals separated on certain personality attributes (41, pp. 69-70).

Anxiety, which is an important clinical concept, has been considered as a drive variable in experimental applications as well. Taylor and Spence (53) have cited a current tendency to regard the behavioral reactions of the neuroses either as direct expressions of anxiety or as a defense against this anxiety. The development of this concept of anxiety is based primarily on observational evidence gathered from clinical data. Anxiety is a term applied to a particular set of overt behavior patterns; this group of overt reactions, directly observable or measurable, Taylor and Spence identified as "manifest anxiety." As such, this behavior consisted of such verbal responses as reports of chronic worry and tension, and such nonverbal patterns as excessive activity of autonomically controlled effectors, disturbances in appetite and elimination, sleeplessness, panic attacks, etc. These overt behavior patterns were assumed to

represent the internal emotional state of the person. Thus the degree of manifest anxiety was assumed to relate to amount of the internal anxiety state, which in turn reflected the level of drive of a subject.

On the assumption that differences in manifest anxiety (as measured by the Taylor scale) represented systematic differences in motivational level, Grice (23) studied discrimination reaction time as a function of anxiety and intelligence. Although his low anxiety group was superior in performance on the reaction time task, it was found that this superiority could be due to intellectual differences rather than to differences in anxiety level. Grice concluded that possible relationships between anxiety measures and intellectual variables should be considered in designing future experiments of that type.

In a study of reaction time as a function of manifest anxiety (TMAS) and stimulus intensity (varied by using strong shock, weak shock, and a buzzer), Wenar (54) obtained results indicating that both increases in manifest anxiety and in stimulus intensity: 1) increased reaction speed in training, and, 2) raised the height of the temporal gradient of response strength, but was not effective in steepening the slope of the gradient. His results were interpreted as indicating that both increase in manifest anxiety and increase in stimulus intensity might be regarded as having

motivational effects.

Castaneda (12) studied reaction time and response amplitude as a function of CS intensity and anxiety (TMAS). The findings indicated that increased intensity resulted in significant increases in amplitude and speed of reaction.

A significant interaction was found between anxiety and intensity, based on a tendency for the speed of reaction of the anxious group, in comparison to the nonanxious group, to be slower at the weak intensity but faster at the strong intensity (12, p. 228).

Bitterman and Holtzman (7) studied rates of conditioning and extinction behavior in thirty-seven university subjects previously rated for susceptibility to anxiety on the basis of psychometric indices and performance in a laboratory stress situation, with the finding that "the galvanic skin response to shock conditioned more readily and extinguished less readily in the high anxiety group than in the low," and that this experiment represented "a most stringent test of the hypothesis that anxiety is related to the rate of conditioning and extinction" (7, p. 623).

Bindra, et al (6) found no difference in amount or rate of salivary response conditioning between anxious and nonanxious subjects (separated on TMAS scores). Kamin and Clark (29) suggested that the inverse relationship between anxiety score and speed of reaction might be interpreted by assuming that anxiety has a disorganizing rather than a

facilitating effect even upon such simple performances as reaction time.

Rockett (40) studied speed of form recognition as a function of stimulus factors and test anxiety (measured by the Saronson anxiety test), and found drive level and figure difficulty related to response time; the high anxiety subjects became slower with increasing figure difficulty during warm-up trials, but during the test series the predicted relationship was not found.

Buss (9) found that level of clinical anxiety (TMAS) did not significantly affect the gradient of stimulus generalization. Eriksen (18) studied stimulus generalization under experimentally induced stress (anxiety); the results led to his suggesting that the Taylor scale of manifest anxiety was not so much a measure of anxiety level as it was a measure of how subjects respond to or handle their anxiety.

Taylor and Spence (53) found that conditioning performance of anxiety neurotics and other neurotics did not differ significantly, nor were there differences found in amount of anxiety exhibited between these two groups, as measured by the TMAS and psychiatric questionnaires filled out for each patient.

Several studies have been concerned with the relationship between anxiety and some form of perception.

Cowen, et al (13) found no relationship between anxiety scale responses on either rigidity or perceptual tasks. Bitterman and Kniffin (8) studied manifest anxiety and "perceptual defense"; they found no significant relation between anxiety level and tachistoscopic recognition threshold of neutral and taboo words. In 1957 Levy and Kurz (33) reported a study concerning the connotative impact of color on the Rorschach and its relation to anxiety; on the basis of their findings it was hypothesized that the more anxious the subjects were, the more likely research would demonstrate that color plays an important role; the less anxious the subjects were, the more likely that structure would be found to be predominate in accounting for Rorschach performance on chromatic cards.

Wesley (55) studied perseverative behavior in a concept-formation task (similar to the Wisconsin Card-Sorting Test) as a function of manifest anxiety and rigidity (defined on the basis of paper-and-pencil questionnaires) with the following results: 1) no relationship was found between manifest anxiety and rigidity; 2) no significant difference in number of trials to reach original learning criterion between rigid, anxious, and normal groups; 3) the anxious group made consistently lower scores than the normal group in number of trials required to shift set and in number of perseverative responses, but these

differences were not statistically significant.

Korchin and Levine (31) studied the effects of anxiety on several types of verbal learning tasks. The low anxiety students performed somewhat better on word associates, and were definitely superior in learning false equations. It was concluded that: 1) when dealing with simple and logically associated material, high and low anxiety subjects differed relatively little in amount learned; 2) in learning unfamiliar and difficult material contradictory to previous knowledge, the high and low anxiety groups differed significantly.

Beier's (3) study indicated that individuals in a state of high anxiety (experimentally induced) showed a loss of the abstract intellectual functioning abilities or, more specifically, a loss in flexibility of intellectual function and a disorientation of visual-motor coordination when measured by the particular instruments involved in that study. Stress had been defined as the perception of threat, with resulting anxiety.

Saltz and Hoehn (42) performed a test of the Taylor-Spence theory of anxiety and predicted that the anxious subjects should do more poorly on competing and noncompeting verbal learning materials, since the increased drive of the anxious subjects should increase the strength of competing, erroneous responses. It was predicted that anxious subjects should learn faster than nonanxious

subjects when competition was reduced, even though difficulty were increased. The results were opposite from those predicted and significant at beyond the .05 level; hence the results were interpreted as not supporting the Taylor-Spence theory.

In 1957 Sarason (44) reported an experiment to determine the effects of two kinds of failure and high and low anxiety (TMAS) on the learning of a list of nonsense syllables. The low anxiety experimental groups were superior to the high anxiety groups after failure, but the control groups of high and low anxiety who received no failure reports did not differ significantly. The low anxiety group, failed on a dissimilar task, was superior to both the high anxiety groups and the low anxiety group with similar task failure.

Sarason (45) has also studied the effect of anxiety (TMAS) and two kinds of motivating instructions (subject-oriented and experimenter-oriented) on serial learning and retention of nonsense syllables by college students. "Anxiety, motivating instructions, and the interaction of these two variables, were found to have significant effects on learning. Only anxiety had a significant effect when retention was measured twenty-four hours later" (45, p. 171).

In 1956 Sarason (46) evaluated the effects of anxiety (TMAS) and defensiveness (MMPI K-scale scores) on

intellectual performance (ACE scores and GPA). The results failed to show significant changes in the two measures of intellectual performance as a function of anxiety.

In a study reported in 1956 by Siegman (48) thirty-five psychiatric and medical patients were given the TMAS, the WAIS, Progressive Matrices, Bender-Gestalt, and the Bender-Gestalt Recall Test. Findings suggested that anxiety has a disruptive effect on abstraction, incidental learning, and timed intellectual tests.

Goodstein and Farber (22) studied the relationship between anxiety scale scores and digit symbol performance. It was hypothesized that this relationship was nonmonotonic, with subjects in the middle range of the Taylor scale performing better than those at the extremes. With subjects classified at six levels of anxiety, no consistent evidence was obtained to support this hypothesis or any more general hypothesis concerning a relationship between Taylor scale and Digit Symbol scores. For the men in this study, the performance of the least anxious subjects was superior to that of one medium group, and the performance of the most anxious subjects was best of all; the women with low anxious scores (0-5) did not differ significantly from subjects at any other level.

Matarazzo and Phillips (35) predicted a curvilinear relationship between performance on the Digit Symbol

subtest from the Wechsler-Bellevue Intelligence Scale and the Taylor scale (TMAS). The prediction was only partially borne out, with the performance of the middle anxiety groups being superior to the low anxiety group; it was not confirmed for the middle and high anxious groups, despite a trend in the predicted direction.

Matarazzo, Ulett, and Saslow (36) studied maze performance of 101 male seminary students divided into seven groups representing increasing anxiety levels on the TMAS. It was concluded that further research on anxiety and learning would reveal some tasks for which there would be found no relationship to anxiety level and still others which would show reversals and various other types of relationship.

Davids and Eriksen (17) correlated scores on the TMAS with performance on a 100-word chained association test and found significant positive correlations between anxiety scores and association productivity, lending support to the prediction based on the supposition that anxiety measures drive. Anxiety scores and association productivity were correlated with grade-point averages and performance on college entrance exams with the results indicating that both anxiety and productivity were independent of those measures of intelligence.

In 1957 Dana (15) reported results suggesting that intelligence and manifest anxiety were not significantly

related when measured by the Wechsler-Bellevue, Form I, and the MMPI A-scale items. The design of the study attempted to control such variables as heterogeneity of intelligence and presence of psychopathology. The subjects (100 "normal" and 100 "neurotic") were similar in age and education, and were approximately normally distributed on intelligence test scores.

In 1955 Schulz and Calvin (47) failed to replicate a finding of a negative correlation between manifest anxiety and ACE scores, and concluded that a valid relationship between intelligence and TMAS scores was not yet established.

Farber (20) commented that:

The drive function of a variable is demonstrated if: a) its presence energizes or intensifies indiscriminately all reaction tendencies existing in a given situation; and/or b) its elimination or reduction in magnitude is reinforcing, i.e., leads to the increased probability of recurrence, in the same situation, of the responses preceding its modification (20, pp. 311-312).

Benton, Hartman, and Sarason (5) have examined the relationship between certain formal aspects of speech behavior and anxiety level (TMAS scores). If manifest anxiety reflects a higher drive level in the organism, then it was felt that this should be expressed in the form of a higher quantity of overt verbal behavior and a greater speed in verbal responsiveness. The results supported both the predictions, and were consistent with the results of Westrope (56) that high anxiety subjects showed significantly

higher productivity on the Rorschach test, and with the results of Wenar (54) that high anxiety subjects showed shorter latencies in a simple reaction time task.

In a study of assimilation, failure-avoidance, and anxiety, Hunt and Schroder (28) found that subjects high in anxiety scored significantly lower in assimilative tendencies and gave significantly more aggressive responses than subjects low in anxiety.

Mayzner, Sersen, and Tresselt (37) correlated TMAS scores with both Wechsler-Bellevue (individual) test scores and ACE (group) test scores for a college population and found positive, but insignificant, results.

Moltz and Thistlethwaite (39) conducted an experiment with 500 new recruits at a military base to determine the effects of anxiety arousal and anxiety reduction on reported conformity to recommendations contained in a recorded communication, and on the learning of the substance of the recommendations. The hypothesis that greater anxiety reduction would be associated with significantly better learning and significantly more conformity to the dental hygiene practices specified was not confirmed.

Taylor (52) has commented that many studies suggest that the data from anxiety studies using college students cannot reasonably be attributed to intellectual differences. She felt, however, that Grice's (23) conclusions that

intelligence must be taken into account in investigations using the TMAS with groups varying widely in intellectual ability certainly seemed warranted.

2. The Taylor Scale

Anxiety has become an increasingly important theoretical construct in recent years. In view of the increased need and desire for a reliable and valid index of anxiety, the Taylor Scale of Manifest Anxiety (51) and its variations has been widely used by experimenters to operationally define that variable which has a significant relationship to behavior in a variety of experimental situations. The items of the scale were selected by clinical psychologists in accordance with the specifications for manifest anxiety laid down by a descriptive psychiatrist of high repute (11). Farber (20) has said:

The "essential" validity of the Taylor A-scale depends upon its correlation with other indices of anxiety, e.g., those of a clinical or psychiatric nature. There is some evidence. . . that scores on this test do relate to clinically diagnostic measures, including psychiatric ratings (20, p. 324).

Many studies have appeared which are concerned with the reliability and validity of the Taylor scale (TMAS). Scores on the TMAS have been correlated with scores on similar types of scales and with evaluations of clinical judgements of anxiety. Buss, et al (10) attempted to evaluate anxiety (as defined by textbooks) in a clinical

situation and relate it to anxiety as measured by the TMAS. Seventy-three neuropsychiatric patients were interviewed, and sixty-four completed the TMAS. Four judges rated the subjects for various aspects of anxiety on the basis of the interview material. Dividing the components of anxiety into those observed by the clinician, and those reported by the patient, it was found that the TMAS had a much higher relationship to the reported categories (.93) than to the observed categories (.60), an expected finding inasmuch as the TMAS is composed of self ratings by the patient. The results were felt to indicate that the TMAS was a fairly adequate measure of anxiety.

Davids (16) found highly significant intercorrelations among three objective measures of anxiety, the TMAS, Psychosomatic Inventory, and anxiety self-rating scale. The subjects were two groups of male undergraduates; one group of volunteers, and one group had "induced motivation." Only on the TMAS did the two groups differ at the .01 level of significance. The conclusion was that the TMAS measured essentially the same variable or trait as that measured by several other available instruments, but that the TMAS might be more susceptible to deception than some of the other instruments.

In a study on goal-setting rigidity as a function of anxiety and task-ambiguity, Himmelstein (25) demonstrated

some evidence for TMAS validity by finding that of thirty-three subjects classified as anxiety neurosis, only five had scores below Taylor's eightieth percentile.

In a study by Lebo, et al (32) reported in 1958, an attempt was made to validate the TMAS directly by applying it to anxious subjects in a stress situation. The subjects were prison inmates whose anxiety already was diagnosed psychiatrically as sufficiently serious to warrant therapeutic intervention. Twenty-four subjects were selected and assigned randomly into experimental and control groups which were closely matched for length of institutionalization, age, and IQ. The anxiety of the subjects was then deliberately manipulated such that certain of them underwent carbon dioxide therapy (CO₂) to alleviate their anxiety, while the others were not treated therapeutically. It was hypothesized that as those persons receiving CO₂ had their directly observable anxiety reduced, there would be a concomitant reduction in TMAS score. The TMAS scores decreased in a statistically significant (.05 level) manner for the treated group, with scores remaining about the same for the control group. The TMAS was therefore said to reflect differences in the magnitude of manifest anxiety, and was found to be a valid measure of manifest anxiety.

Matarazzo, et al (34) administered the TMAS individually to a clinical sample of medical and psychiatric outpatients and found significant differences in mean scores

and distributions, and a point biserial r of .57. These results were felt to indicate that the TMAS was reasonably efficient in distinguishing a psychiatric from a non-psychiatric population. Sampson and Bindra's (43) suggestion that Taylor scores within the range 19-33 were more likely to be associated with a clinical diagnosis of anxious than were scores above and below this range was not borne out. Both these findings were also confirmed in a cross validation study of hospitalized VA medical and psychiatric patients.

In a study by Eriksen and Davids (19) the TMAS was compared with the hysteria-psychasthenia scales from the MMPI. The correlation of .92 was interpreted as suggesting that both scales were measuring essentially the same variable.

Holtzman, et al (26) compared Winne and Taylor scores from the MMPI protocols of 348 college females and obtained a corrected coefficient of .86, which was felt to be a conservative estimate of the true relationship between Winne and Taylor scores. This result was felt to provide "direct evidence of the validity of criterion groups (Winne and Taylor scale) used in experiments on the relation of anxiety to learning" (26, p. 854). Winne (57) constructed the Scale of Neuroticism by an empirical analysis of items from the neurotic triad of the MMPI (Hs, D, and Hy) and used the items that discriminated most significantly. In

view of the careful empirical validation of Winne's scale, and since these two measures of anxiety were independently derived and had only seven items in common, a high correlation between the two was felt to provide strong support for the validity of Taylor's scale. Gallagher (21) used only thirty-four of the fifty TMAS items and found a high correlation (.62) between Taylor scale scores and Winne scores (confirming previous findings) in a study of manifest anxiety changes concomitant with client-centered therapy.

Holtzman, Calvin, and Bitterman's (26) previously mentioned corrected correlation of .86 was further supported by Kerrick's (30) uncorrected correlation of .69, which was significant ($P < .001$) for the Taylor and Winne scales. Kerrick also found that manifest anxiety as measured by the TMAS correlated significantly with general ability and intelligence measures. The TMAS scores were found to correlate significantly and negatively with all measures of intelligence or aptitude, including four standard Air Force tests: the AFQT, Arithmetic Reasoning, Word Knowledge, and Mechanical Aptitude. The preferred explanation for these results was that the presence of manifest anxiety might well serve to depress scores on intelligence or ability, which might be further explained by the drainage hypothesis of psychoanalytic theory by assuming that energy was dissipated which might otherwise be put into the performance being tested. Or, in terms of

Taylor and Spence's interpretation derived from Hullian theory, competing responses are more difficult to extinguish when drive is high, and therefore more trials are required for learning where competing responses are involved.

Dana (15) also found Winne and Taylor scale scores to be significantly related, and the degree of relatedness was comparable to past research.

Spence (50) recently presented a comprehensive interpretation of the basic theory behind the use of Taylor scale performance to differentiate subjects in terms of their emotional responsiveness or manifest anxiety in a series of experiments concerned with the role of aversive motivational factors, i.e., primarily stimulus intensity and manifest anxiety, in learning situations. This theory was derived from Hull's (27) basic assumption that the excitatory potential, E , determining the strength of a response is a multiplicative function of a learning factor, H , and a generalized drive factor, D , i.e.,

$$E = H \times D.$$

Spence does not doubt that a more satisfactory scale than the TMAS could be developed, and recommends that the many critics of the TMAS should direct their time and energy toward such. "The history of science clearly reveals that a theory is usually discarded only when a better theory is advanced. The same goes for the constructs within a theory" (50, p. 133). Spence then presents their experimental

evidence and its implications for the theory: "that level of performance will be a positive function of (a) the intensity of the US, (b) the level of score on the A-scale, and (c) the intensity of an extra stressful stimulation" (50, p. 133).

The reliability of the TMAS is high (.89 to .81) for test-retest after three weeks and nine to seventeen months respectively (34).

C. Hypotheses

Several studies using the TMAS (51) point to a curvilinear U-shaped relationship of anxiety and learning performance. Since most of the studies have evaluated learning in an experimentally-induced situation, the present study was designed to measure classroom learning performance of subjects enrolled in a course in psychiatric nursing. It was planned to compare learning performance as measured by the increase in score from the final exam given at the beginning and end of the twelve-week course, and to determine how these scores would increase in comparison with the amount of anxiety as measured by the TMAS administered before the course began. The subjects were subsequently divided into three teaching groups on the basis of low, medium, and high scores of anxiety on the TMAS.

The prediction was that a medium amount of anxiety (as measured by the fifty-item forced-choice TMAS) would be conducive to the best learning performance (as measured by the per cent improvement in final exam scores at the end of the course). With age, IQ, and grade-point average of all thirty-one subjects in the study relatively constant, the specific hypotheses to be tested were as follows:

1. The medium anxiety group will show the greatest per cent increase in exam scores.
2. The anxiety scores (TMAS) of the medium anxiety group will not change significantly.
3. The low anxiety group will have lower learning scores than the medium anxiety group.
4. The low anxiety group will show decreased anxiety scores from pre- to postTMAS.
5. The high anxiety group will show less improvement in learning scores than the medium anxiety group.
6. The high anxiety group will show increased anxiety scores from pre- to postTMAS.

Since the supporting evidence for any or all of the above hypotheses from past research is extremely controversial at this point, the experimenter in the present study concedes the highly speculative nature of these hypotheses, and suspects that the results of the

study herein presented may lead to the rejection of any or all of the above-listed hypotheses.

CHAPTER II

PROCEDURE

A. Subjects

The subjects used in this study were thirty-one female student nurses enrolled in a twelve-week course in psychiatric nursing at the Baptist Hospital in Memphis, Tennessee. All the subjects were on full-time psychiatric hospital duty, attended teaching conferences, and were enrolled in a course in psychiatry concurrently with the course in psychiatric nursing. They were in three teaching groups in the psychiatric nursing course, each group having the same female instructor using the same teaching methods, i.e., lecture presentation with maximum class participation encouraged. The subjects were all white females with a mean and median age of nineteen. The range of ages was from eighteen to twenty-three.

B. Materials

Materials used in the study were the fifty-item forced-choice Taylor Scale of Manifest Anxiety (24), the objective-type (eighty multiple-choice items) final exam used in the psychiatric nursing course, Henmon-Nelson IQ scores for all subjects, and grade-point averages at the

beginning of the junior year for all subjects.

The forced-choice form of the TMAS used in this study was set up by Heineman (24) in an attempt to reduce the influence of social desirability on test scores. The forced-choice technique involves the "grouping of alternative choices to make them appear of equal value and have unequal significance" (2, p. 427). Heineman's forced-choice form consisted of three statements, an anxiety statement and a nonanxiety statement of comparable social favorability, and a second nonanxiety statement differing in social favorability from the two matched statements. For example:

- A. I have strong political opinions.
- B. I sometimes tease animals.
- C. I am a high-strung person.

Item C is an anxiety statement matched for favorability with Item B, a nonanxiety statement. Item A is a nonanxiety statement rated as more favorable than the two matched statements. The position of the statements within each block was varied by means of a table of random numbers (24, p. 448).

It was found that anxious subjects differed from nonanxious subjects in their estimate of the social desirability of anxiety statements; therefore the investigators (24) felt that use of the forced-choice technique had not completely eliminated the influence of social favorability but that such influence could at least be considerably reduced.

C. Experimental Procedure

The TMAS and the final exam were administered to all subjects at the beginning and again at the end of the psychiatric nursing course. On the basis of anxiety scores on the TMAS administered at the beginning of the course, the subjects were divided into three subgroups according to low, medium, and high anxiety scores. Scores for all subjects ranged from two to twenty-five; the low anxiety group was composed of those ten subjects whose scores ranged from two to eight; the medium anxiety group was composed of those twelve subjects with scores from nine to twelve; and the high anxiety group consisted of those nine subjects with scores from thirteen to twenty-five. This division also formed the basis for the three teaching groups, with the exception of one subject who was later moved from the lower range of the medium anxiety group to the upper range of the low anxiety group when it was discovered that her TMAS had been incorrectly scored. This total group of thirty-one subjects, divided on the basis of pre-TMAS scores, will hereinafter be referred to as Group I.

Since only four of the thirty-one subjects received the same anxiety score on the post-TMAS (administered at the end of the course) as on the pre-TMAS (administered at the beginning of the course), the subjects and data were

further re-grouped into high, medium, and low anxiety subgroups on the basis of their post-TMAS scores. These three groups had the same cut-off points in terms of high, medium, and low scores as did Group I, but the number of subjects and the range of scores in each subgroup was as follows: the low anxiety group consisted of those ten subjects with scores ranging from one to eight; the medium anxiety group consisted of those nine subjects with scores ranging from nine to twelve; and the high anxiety group consisted of twelve subjects with scores from thirteen to twenty-eight. This total group will hereinafter be referred to as Group II.

Castaneda (12) observed that anxious persons were frequently distractible and unable to concentrate, particularly on tasks which required manipulation or retention of symbolic (verbal) material. The TMAS contains a number of items concerning inability to concentrate, preoccupation with failure, worry, etc. Manifest anxiety symptoms of this type may involve such persistent implicit verbal habits. There are also a number of items concerning sweating, heart palpitations, headaches, tension, etc., which could be interpreted to indicate that some of the habits associated with anxiety are chiefly somatic or nonverbal. This idea formed the basis for the separating out, in the present study, twenty "distractibility" items

and fourteen "somatic" items from the TMAS, and the setting up of Groups III and IV on the basis of scores on the distractibility items. Lists of these items (hereinafter referred to as D-items and S-items) will be found in Appendix E. Group III refers to the data as re-arranged on the basis of pre-TMAS D-item scores. Group IV refers to the data as re-arranged on the basis of post-TMAS D-item scores.

In view of the tremendous variability in individual pre- and post-TMAS scores, these scores were averaged for each subject. This re-arrangement of data will hereinafter be referred to as Group V.

The subgroup divisions of each of these five major groups (for subjects with low, medium, and high anxiety scores) will be designated by the first initial of the subgroup category, as follows:

II-L refers to low anxiety subgroup of Group II;

V-M refers to medium anxiety subgroup of Group V, etc.

D. Statistical Treatment

Product-moment correlation coefficients were computed for all subgroups and for the total groups in Group I and Group II for the following data:

- 1) IQ and grade-point averages (GPA)
- 2) Pre- and post-TMAS scores

3) Pre- and post-final exam scores.

4) Pre- and post-exam scores for those subjects in Groups I and II having the five highest and five lowest scores on the TMAS.

5) Average pre- and post-TMAS scores and the per cent gain scores on the final exam for each subgroup of Group V.

Further statistical treatment of the data involved the use of the F_{range} , a statistical technique based on the range as an index of variability.* F_{range} values were computed for the following measures of Groups I and II:

- 1) per cent gain scores from pre- and post-exam;
- 2) per cent gain scores for the five high and five low anxiety scorers in each group;
- 3) per cent gain scores and D-items.

F_{range} values were also computed for per cent gain scores for Groups III, IV, and V.

The Kruskal-Wallis rank analysis of variance technique was used to obtain X_H^2 values for the per cent gain scores of all groups.

Classical t tests were performed on the high and low five anxiety scorers in all groups for per cent gain scores.

*Dr. W. O. Jenkins, personal communication. (See unpublished manuscript, "Quick and Dirty Statistics: Techniques and Tables," Univ. of Tenn., 1955).

CHAPTER III

RESULTS, DISCUSSION, AND CONCLUSIONS

A. Results

It may be seen from an inspection of the raw data presented in Appendix B that all of the subjects in this study except four changed scores on the TMAS from pre- to posttest ($p = < .01$). In the low anxiety subgroup of Group I, eight of the ten subjects increased their anxiety scores from one to six points each, while two subjects decreased their scores by one point each. The mean pre-TMAS score for this group was 5.6 as compared with a mean post-TMAS score of 8.1. Thus Hypothesis 4, that the low anxiety group would show decreased anxiety scores from pre- to post-TMAS, was rejected.

Hypothesis 2, that the TMAS scores of the medium anxiety group would not change significantly, was not borne out. Of the twelve subjects in this group, one did not change, three subjects increased their scores from two to six points each, and eight subjects decreased their scores from two to five points each. The mean pre-TMAS score for this group was 10.67 as compared with a mean post-TMAS score of 9.58.

Hypothesis 6, that the high anxiety group would show increased scores from pre- to post-TMAS, must also be

rejected. Of the nine subjects in this group, three stayed the same, three subjects decreased their scores from three to seven points each, and three increased their scores from three to seven points each. The mean pre- and post-TMAS scores for this group were 17.11 and 17.00 respectively.

The low anxiety group showed the greatest per cent gain scores on the final exam over the high and medium anxiety groups. Thus Hypothesis 3, that the low anxiety group would show less learning than the medium anxiety group, was rejected.

Hypothesis 5, that the high anxiety group would show less improvement in learning scores than the medium anxiety group, is upheld by the fact that the high anxiety group had a mean per cent gain score of 52.22 as compared with the mean per cent gain score of 54.08 for the medium anxiety group.

Hypothesis 1, that the medium anxiety group would show the greatest increase in exam scores, was also rejected, since the low anxiety group showed a mean per cent gain of 74.11 as compared with a mean of 54.08 for the medium anxiety group.

Means and ranges for all subgroups in Groups I and II will be found in Appendix C.

A summary of the results obtained from correlations

performed on the data is presented in Table I. Here it may be seen that:

1) the relationship between IQ and GPA for the high anxiety subjects in Group I reached the .01 level of significance (.78);

2) pre- and post-TMAS scores for the low anxiety group of Group I reached the .01 level (.90);

3) pre- and post-TMAS scores for the low anxiety subjects of Group II reached the .01 level (.78);

4) pre- and post-TMAS scores for the high anxiety subjects of Group II reached the .05 level (.53);

5) pre- and post-TMAS scores for the medium anxiety subjects of Group II were significant and negative at the .05 level (-.60).

None of the remaining correlations performed reached significant levels. The results of some additional correlations performed on Group I raw data which do not relate specifically to this study are given in Appendix D.

None of the F_{range} values (presented in Table II) reached a level of statistical significance, nor were any of the rank analysis of variance values (Table III) statistically significant.

In Table IV are presented t test values for per cent gain scores for the high and low five anxiety scorers in each major group. Here it can be seen that the value of

TABLE I

SUMMARY OF RESULTS OF CORRELATIONS PERFORMED

Group	IQ & GPA	Pre- & Post-TMAS	Pre- & Post-Exam	Pre- & Post-Exam for Top and Low Five
I-L	.21	.90 ^a	.17	
I-M	.21	.27	.53	
I-H	.78 ^a	.50	.38	
II-L	.48	.78 ^a	.22	
II-M	-.04	-.60 ^b	.49	
II-H	.06	.53 ^b	.50	
I (Top 5)				.34
I (Low 5)				-.02
II (Top 5)				.44
II (Low 5)				.74
V-L ^c			-.41	
V-M ^c			-.05	
V-H ^c			-.11	

^asignificant at .01 level.

^bsignificant at .05 level.

^cPer cent gain scores from pre- and post-exam were used in this computation instead of raw scores.

TABLE II
SUMMARY OF F RANGES AND SIGNIFICANCE LEVELS

Group	Per Cent Gain Scores		Per Cent Gain Scores for High and Low Five		df
I	2.67	NS	3.23	NS	27, 8
II	2.46	NS	3.05	NS	27, 8
III	.92	NS			24
IV	2.76	NS			24
V	2.92	NS			24

TABLE III

SUMMARY OF χ^2_H VALUES AND SIGNIFICANCE LEVELS FOR
PER CENT GAIN SCORES OF ALL GROUPS

Group	N	df	χ^2_H Value	Significance Level
I	31	2	3.51	NS
II	31	2	3.13	NS
III	31	2	4.54	NS
IV	31	2	1.58	NS
V	31	2	3.63	NS

TABLE IV

SUMMARY OF t TEST VALUES AND SIGNIFICANCE LEVELS FOR
PER CENT GAIN SCORES OF HIGH AND LOW FIVE
ANXIETY SCORERS IN ALL GROUPS

Group	N	df	<u>t</u> -Value	Significance Level
I	10	8	2.19	.06
II	10	8	5.08	.01
III	10	8	2.43	.05
IV	10	8	1.57	.15
V	10	8	2.04	.08

5.08 for Group II was significant at the .01 level, and the value of 2.43 for Group III was significant at the .05 level. None of the values for Groups I, IV, and V were statistically significant.

Raw scores and per cent scores on distractibility items (D-items) from the TMAS are given in Appendix B. Raw scores and per cent scores on somatic items (S-items) are also included. From an inspection of this data, however, it appears that for the subjects in the present study, somatic and distractibility scores did not exclude each other, but that high somatic scorers tended also to have high distractibility scores. Apparently for these subjects, it might be concluded that the two "types" of anxiety tend to be present in the same subjects.

B. Discussion

The fact that so many of the subjects in the present study changed anxiety scores from pre- to post-TMAS made the analysis of data difficult and the overall results more questionable. In an attempt to partially resolve this difficulty, the data were re-grouped and analyzed separately several times: first, on the basis of post-TMAS scores; (Group II); secondly, on the basis of TMAS distractibility item scores (Groups III and IV); and lastly, on the basis of the average of the combined pre- and post-TMAS scores

(Group V). This procedure, however, did not seem to alter the results significantly.

The correlations tended to be low, although mostly positive. It seems unusual that IQ and grade-point average did not correlate more substantially. It is interesting to note the drastic changes in TMAS scores of the medium anxiety group from pre- to posttest, which was quite contradictory to the original prediction of no significant change. The medium anxiety subgroup of Group II was found to show a negative and significant (.05 level) correlation between pre- and posttest TMAS scores.

Cronbach and Meehl (14) have discussed categories of validity, pointing out that:

. . . high correlations and high stability may constitute either favorable or unfavorable evidence for the proposed interpretation, depending on the theory surrounding the construct When a predicted relation fails to occur, the fault may lie in the proposed interpretation of the test or in the network (14, p. 300).

Silverman (49) has commented that:

The TMAS was designed to provide a technique for distinguishing drive level in humans in order to test aspects of Hullian learning theory. It was assumed that the scale measured differences in emotional responsiveness which contribute to the total effective drive state. According to Taylor, the title of the test should not be construed as suggesting special clinical validity since the scale was not designed for clinical purposes (49, p. 94).

Miller (38) has noted that "great differences may be observed . . . between different motives in the same person

and between the same motive in different people" (38, p. 469). With regard to his theory, Spence commented that "the problems involved in the extension of the theory to more complex types of learning are quite formidable, and at this stage there necessarily must be a considerable amount of trial and error in our theorizing" (50, p. 137).

Farber (20) adds that:

Since the A-scale was not devised, nor ever considered by those associated with its construction, to be a measure of all of the variables influencing performance, some sort of limit is to be expected, under most conditions, in the amount of variance in performance that is associated with scores on the A-scale. It is only in certain kinds of controlled situations that variations in performance are likely to be primarily due to variations in drive (20, p. 324).

Certainly the problem under consideration here is a complex one--that of trying to evaluate the possible effects of one personality variable, anxiety, upon learning performance. Perhaps it was to be expected that the tremendous variety of experimental situations in which researchers have sought to evaluate the problem would inevitably lead to a similar variety of controversial results.

C. Conclusions

On the basis of the results obtained in this study, it is not felt possible or realistic to make either general or specific conclusions on the broad topic of anxiety and learning performance, or to make predictions concerning the results which would likely be found in any other population sample. For the thirty-one subjects in this study, however, the following conclusions may be drawn:

1. Amount of manifest anxiety as measured by the TMAS showed the greatest increase from pre- to post-TMAS for low anxiety subjects. Both the high and medium anxiety groups showed a small decrease in pre- and post-TMAS scores. Individuals in the medium anxiety group showed the most change in individual TMAS scores, but these tended to balance out for the total group.

2. The low anxiety group showed the highest per cent gain increase in final exam scores from pre- to postexam; the high anxiety group showed the lowest per cent gain increase in final exam scores, as was originally predicted.

3. It was not possible to say that subjects differ in learning performance on the basis of their having higher scores on distractibility items versus somatic items on the TMAS. The two "types" of scores tended to cling together, with high D-item scorers tending also to have high S-item

scores.

4. No significant overall relationships were found between IQ and TMAS scores, or between grade-point averages and TMAS scores.

5. The test-retest reliability of the pre- and post-TMAS (administered twelve weeks apart) was .75, which was found to be significant at the .01 level.

CHAPTER IV

IMPLICATIONS FOR FUTURE RESEARCH

The difficulties and results encountered in the present study have led the experimenter to the belief that a more definitive measure of anxiety (or manifest anxiety) than the Taylor scale must be found in order to obtain research results which will not continue to be conflicting or controversial in nature. The variety of results of studies reported in the literature at this point cannot possibly lead to any general or specific conclusions concerning the role of varying degrees of clinically-observed or test-measured anxiety upon verbal or other kinds of learning performance, intelligence, or other types of special abilities. It is felt that researchers have tended to stray far afield in attempting to use the Taylor scale for a vast multitude of purposes beyond that for which it was originally intended. It is further felt that the nebulous divisions made by researchers (see Appendix F) between groups for high, medium, and low anxiety scorers have tended to confuse the results and make them more incomparable for replication studies.

A speculative observation derived from review of the literature leads this experimenter to suspect that some of the differences found may be attributable to

differences in responses and reactions of males versus female subjects. Once a definitive measure of anxiety is found, an exploration of sexual differences in anxiety responding would be in order.

Since studies have shown that observer-reported measures of anxiety differ from patient-reported measures, it is suspected that a more directly observable measure of anxiety would prove most efficient. Because of the tremendous importance of the concept of anxiety and its possible implications with regard to personal adjustment, educational objectives, and career goals, the finding of such a definitive measure of anxiety would provide a springboard for research into an infinite variety of human behavior patterns.

CHAPTER V

SUMMARY

The purpose of this study was to evaluate the effects of high, medium, and low anxiety (as measured by the forced-choice Taylor Scale of Manifest Anxiety) on the classroom learning performance of thirty-one female student nurses (as measured by per cent gain scores on an objective-type final examination given at the beginning and end of a course in psychiatric nursing). The results of the study did not support five of the six proposed hypotheses: 1) that the medium anxiety group would show the greatest increase in exam scores; 2) that the anxiety scores of the medium anxiety group would not change significantly; 3) that the low anxiety group would show less learning than the medium anxiety group; 4) that the low anxiety group would show decreased anxiety scores from pre- to post-TMAS; and 6) that the high anxiety group would show increased anxiety scores from pre- to post-TMAS. The fifth hypothesis, that the high anxiety group would show less improvement in learning scores than the medium anxiety group, was supported by mean per cent gain scores for the two groups.

It was suggested that future researchers should attempt to construct a more definitive measure of

anxiety than the Taylor scale (or any other of the presently available measuring instruments) in order to prevent continued controversial and conflicting reports and results.

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APPENDICES

APPENDIX A

(The Taylor Scale)

Name _____ AGE _____ Date _____

Instructions

The statements below represent experiences, ways of doing things, or beliefs or preferences that are true of some people but are not true of others. Read each statement and decide whether or not it is true with respect to yourself. If it is true or mostly true, place a "T" on the line by the number of the statement. If the statement is not usually true or is not true at all, place an "F" on the line by the number of the statement. Answer the statement as carefully and honestly as you can. There are no correct or wrong answers. Answer each statement to show the way you work or the things in which you believe.

- _____ 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 diarrhea (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 am almost never bothered by pains over the heart or in my chest.

APPENDIX A (Cont.)

- _____ 19. I feel hungry most of 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 have lost 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 seem to be.
- _____ 29. I am usually calm and not easily upset.
- _____ 30. I cry easily.
- _____ 31. I feel anxiety about something or someone almost all the time.
- _____ 32. I am happy most of the time.
- _____ 33. It makes me nervous to have to wait.
- _____ 34. I have periods of such great restlessness that I cannot sit long in a chair.
- _____ 35. Sometimes I become so excited that I find it hard to get to sleep.
- _____ 36. I have sometimes felt that difficulties were piling up so high that I could not overcome them.
- _____ 37. I must admit that I have at times been worried beyond reason over something that really did not matter.
- _____ 38. I have very few fears compared to 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 unusually self-conscious.
- _____ 43. I am inclined to take things hard.
- _____ 44. I am a high-strung person.

APPENDIX A (Cont.)

- _____ 45. Life is a strain for me much of the time.
- _____ 46. At times I think I am no good at all.
- _____ 47. I am certainly lacking in self-confidence.
- _____ 48. I sometimes feel that I am about to go to pieces.
- _____ 49. I shrink from facing a crisis or difficulty.
- _____ 50. I am entirely self-confident.

APPENDIX B

SUMMARY OF RAW DATA FOR ALL SUBJECTS

<u>S</u>	<u>Age</u>	<u>IQ</u>	<u>GPA</u>	<u>Pre- TMA5</u>	<u>Post TMA5</u>	<u>Pre- Exam</u>	<u>Post Exam</u>	<u>Gain</u>	<u>Per Cent Gain</u>
1	18	100	2.1	2	1	38	73	35	92
2	20	96	2.2	3	4	41	73	32	78
3	18	118	2.2	5	4	47	81	34	72
4	20	113	2.1	6	10	49	79	30	61
5	19	105	2.7	6	7	30	82	52	173
6	19	121	3.4	6	7	53	85	32	60
7	19	105	3.1	6	12	45	74	29	64
8	19	122	2.0	7	11	53	81	28	53
9	20	104	1.9	7	12	43	64	21	49
10	19	111	2.6	8	13	51	71	20	39
11	19	101	2.5	9	9	41	76	35	85
12	19	105	2.3	9	7	66	82	16	24
13	20	99	2.2	9	6	53	78	25	47
14	20	111	3.2	9	12	47	77	30	64
15	20	106	2.7	11	6	45	78	33	73
16	23	121	3.2	11	9	60	84	24	40
17	19	102	2.5	11	10	38	77	39	103
18	19	106	2.6	11	13	48	67	19	40
19	19	102	2.0	12	7	44	61	17	39
20	18	105	1.8	12	8	50	69	19	38
21	19	107	2.8	12	10	51	77	26	51
22	20	101	2.0	12	18	58	84	26	45
23	19	117	2.9	13	16	52	81	29	56
24	19	100	2.6	14	14	46	73	27	59
25	21	107	2.5	14	14	53	86	33	62
26	20	113	3.1	14	14	55	73	18	33
27	19	107	2.2	15	22	47	71	24	51
28	19	101	2.1	17	14	45	71	26	58
29	19	106	2.7	19	13	52	83	31	60
30	19	118	3.0	23	28	50	81	31	62
31	19	109	2.1	25	18	58	75	17	29

APPENDIX B (Cont.)

<u>S</u>	<u>Final Grade in Course</u>	<u>Pre-TMAS D-Item Score</u>	<u>Per cent D*</u>	<u>Pre-TMAS S-Item Score</u>	<u>Per cent S*</u>
1	92	0	0	1	7
2	89	0	0	1	7
3	90	1	5	3	21
4	91	2	10	1	7
5	90	3	15	1	7
6	95	1	10	1	7
7	95	0	0	3	21
8	92	3	15	2	14
9	89	3	15	2	14
10	80	2	10	1	7
11	93	5	25	2	14
12	93	4	20	2	14
13	92	5	25	1	7
14	96	2	10	3	21
15	93	6	30	2	14
16	95	6	30	1	7
17	80	7	35	3	21
18	90	3	15	2	14
19	85	4	20	3	21
20	82	7	35	2	14
21	92	3	15	4	29
22	89	3	15	3	21
23	97	7	35	2	14
24	92	6	30	2	14
25	96	3	15	6	43
26	89	4	20	6	43
27	90	5	25	4	29
28	89	8	40	3	21
29	96	8	40	4	29
30	92	9	45	7	50
31	89	10	50	8	57

*D refers to distractibility items; S to somatic items from the TMAS.

APPENDIX C

SUMMARY OF MEANS AND RANGES FOR GROUPS I AND II

	<u>Group</u>						<u>Total</u>
	<u>I-L</u>	<u>I-M</u>	<u>I-H</u>	<u>II-L</u>	<u>II-M</u>	<u>II-H</u>	
N	10	12	9	10	9	12	31
IQ	109.50*	105.50	108.67	105.70	109.56	108.00	107.71
	26.00**	22.00	18.00	25.00	21.00	18.00	26.00
GPA	2.52	2.55	2.54	2.47	2.67	2.50	2.54
	1.30	1.10	1.00	1.30	1.10	1.00	1.30
Pre-TMAS	5.60	10.67	17.11	7.50	8.67	15.42	10.90
	6.00	3.00	12.00	10.00	6.00	17.00	23.00
Post-TMAS	8.1	9.58	17.00	5.70	10.56	16.42	11.26
	12.0	12.00	15.00	7.00	3.00	15.00	27.00
Pre-Exam	45.00	50.08	50.89	46.70	47.44	51.25	48.68
	23.00	28.00	13.00	36.00	22.00	13.00	36.00
Post-Exam	76.30	75.83	77.11	76.20	76.56	76.33	76.35
	21.00	23.00	15.00	24.00	20.00	19.00	25.00
Gain	31.30	25.75	26.22	29.50	29.11	25.08	27.68
	32.00	23.00	16.00	36.00	18.00	16.00	36.00
Per Cent Gain	74.11	54.08	52.22	69.60	63.33	49.50	60.00
	134.00	79.00	33.00	149.00	63.00	33.00	149.00

*The first line across refers to means.

**The second line across refers to ranges.

APPENDIX D

EXTRA CORRELATIONS AND SIGNIFICANCE LEVELS

	<u>Group*</u>							
	<u>I-L</u> (N = 11)		<u>I-M</u> (N = 11)		<u>I-H</u> (N = 9)		<u>Total</u> (N = 31)	
Pre- and Post-TMAS	.81	1%	.26	NS	.50	NS	.75	1%
Pre- and Post-Exam	.17	NS	.57	at 5%	.38	NS	.44	at 1%
IQ and GPA	.20	NS	.76	1%	.78	1%	.38	5%
IQ and Pre-TMAS	.29	NS	-.07	NS	.19	NS	.09	NS
IQ and Post-TMAS	.25	NS	-.02	NS	.55	NS	.22	NS
GPA and Pre-TMAS	.04	NS	-.08	NS	.19	NS	.05	NS
GPA and Post-TMAS	.06	NS	-.02	NS	.29	NS	.07	NS

*These correlations were performed on Group I data as originally divided into high, medium, and low anxiety groups before it was discovered that the TMAS for one of the subjects had been incorrectly scored. The data for this subject was later moved from the low anxiety group to the medium anxiety group, hence the difference in N for this presentation.

APPENDIX E

LIST OF "DISTRACTIBILITY" ITEMS FROM THE TMAS

1. I work under a great deal of strain.
2. I cannot keep my mind on one thing.
3. I worry over money and business.
4. I worry quite a bit over possible troubles.
5. I have nightmares every few nights.
6. At times I have lost sleep over worry.
7. My sleep is restless and disturbed.
8. I often find myself worrying about something.
9. I wish I could be as happy as others seem to be.
10. I am usually calm and not easily upset.
11. I feel anxiety about something or someone almost all the time.
12. It makes me nervous to have to wait.
13. I have periods of such great restlessness that I cannot sit long in a chair.
14. Sometimes I become so excited that I find it hard to get to sleep.
15. I have sometimes felt that difficulties were piling up so high that I could not overcome them.
16. I must admit that I have at times been worried beyond reason over something that really did not matter.
17. I find it hard to keep my mind on a task or job.
18. I am inclined to take things hard.
19. Life is a strain for me much of the time.
20. I sometimes feel that I am about to go to pieces.

APPENDIX E (Cont.)

LIST OF "SOMATIC" ITEMS FROM THE TMAS

1. I do not tire quickly.
2. I am often sick to my stomach.
3. I have very few headaches.
4. I frequently notice my hand shakes when I try to do something.
5. I blush as often as others.
6. I have diarrhea (the runs) once a month or more.
7. I practically never blush.
8. My hands and feet are usually warm enough.
9. I sweat very easily even on cool days.
10. When embarrassed I often break out in a sweat which is very annoying.
11. I am almost never bothered by pains over the heart or in my chest.
12. I feel hungry most of the time.
13. Often my bowels don't move for several days at a time.
14. I have a great deal of stomach trouble.

APPENDIX F

VARIATIONS IN ANXIETY LEVEL DIVISIONS USED BY RESEARCHERS

Auble & Britton (1): HA - 22 or above; \bar{X} = 27.2
 LA - 10 or below; \bar{X} = 7.5

Benton, et al (5): HA - 22 or above
 LA - 8 or below

Bitterman & Kniffin (8): HA - 26-44
 (had large N) LA - 1-8

Castaneda (12): HA - 19-34
 LA - 2-12

Cowen, et al (13): HA - 27 and above (90%ile)
 MA - 12-14 (43-56%iles)
 LA - 6 and below (20%ile)

Goodstein & Farber (22): LA - 0-5
 MA - 16-20
 HA - 26-40

Grice (23): HA - 27-49
 LA - 0-6

Himelstein (25): LA - 7 or less (20%ile)
 MA - 8-20
 HA - 21 and above (80%ile)

Hunt & Schroder (28): LA - 2-8
 HA - 28 and above

Kerrick (30): HA - 25-37
 LA - 3-11

Korchin, et al (31): LA - 10 or less; \bar{X} = 6.5
 HA - 20 and above; \bar{X} = 25.4

Matarazzo, et al (34): LA - 1-18
 MA - 19-33
 HA - 34-50

Saltz & Hoehn (42): HA - 22 or above
 LA - 8 or below

APPENDIX F (Cont.)

Sarason (44): HA - 27-44
LA - 2-8

Sarason (45): HA - 24 and above
MA - 14-18
LA - below 9

Wenar (54): HA - upper 20% TMAS scores*
LA - lower 20% TMAS scores

*It will be noted that some of these experimenters used cut-off points based on percentiles from Taylor's original study, but the large majority of the divisions seems to have been dependent on the size of the sample of subjects and the range of TMAS scores received in each individual investigation.