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TEST ANXIETY AND RESPONSE TO EVALUATION STRESS.(U)

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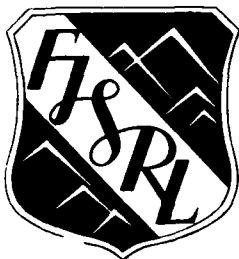
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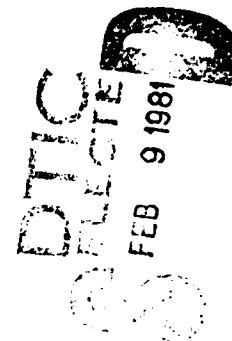


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TEST ANXIETY
AND RESPONSE TO EVALUATION STRESS

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PROJECT 2303



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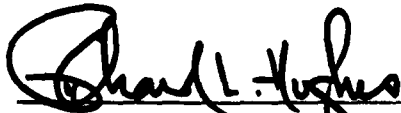
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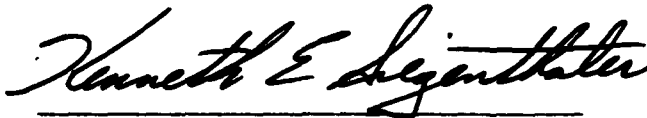


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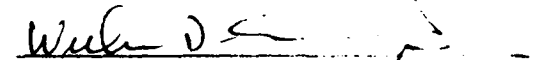


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ABSTRACT

TEST ANXIETY AND RESPONSE TO EVALUATION STRESS

Electromyographic measures of frontalis muscle tension were collected from high and low-test-anxious subjects while they were performing a challenging tracking task. Self-report measures of subjective tension, actual tracking scores, and estimates of relative success on the tracking task were also collected. Subjects performed the tracking task following instructions designed to maximize or minimize evaluative apprehension. There were no statistically significant differences between high and low-test-anxious subjects on either the physiological or the performance measures. However, there were significant differences on the two other measures, suggesting a primary role of cognitive factors in test anxiety. High-test-anxious subjects described themselves as more tense, and they more harshly evaluated their own performances. In addition, there was some evidence that they were more prone than low-test-anxious subjects to construe situations as evaluative.

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TEST ANXIETY AND RESPONSE TO EVALUATION STRESS

Richard L. Hughes and Dickie A. Harris

Test anxiety has frequently been conceptualized in terms of two components. These are a worry or cognitive component and an emotionality or physiological component (e.g. Liebert & Morris 1967). Until recently most treatments of test anxiety have emphasized reducing emotionality. Relaxation training of one kind or another was the major component of treatments of test anxiety, reflecting the common view that lowering physiological arousal was the crucial therapeutic step. These treatments nearly always resulted in reduced test anxiety (e.g. Cornish & Dilley, 1973; Deffenbacher 1976) and so it seemed natural to conclude that the treatments were, in fact, reducing emotional arousal.

As researchers examined dependent variables besides test anxiety, however, a more complicated picture emerged. The effectiveness of relaxation treatments in reducing test anxiety often was not matched by comparable improvement in posttreatment test performance (Spielberger, Anton & Bedell, 1976). In fact, emotional arousal itself did not appear so directly related to test anxiety as had been presumed.

In one study Hughes (1979) measured the frontalis muscle tension of high and low test-anxious subjects during the imaginal visualization of participation in academic testing situations. There were no differences in mean muscular tension between the groups. Furthermore, the actual levels in both groups suggested a state of relaxation rather than muscular tension. In another study, Holroyd, Westbrook, Wolf & Badhorn (1978) studied physiological response during testing situations and found no differences between high and low test-anxious subjects during testing situations on many autonomic indices including electrodermal activity and heart rate. These findings are inconsistent with the view that test anxiety is caused by physiological overarousal.

The present study was designed to further explore the relationship between test anxiety and physiological response. It improves on the

Hughes (1979) study by assessing physiological response in an actual evaluation situation rather than an imagined one. It compliments the Holroyd et al study by assessing electromyographic (EMG) response. Muscle tension has played such a central role in conceptualizations of test anxiety and its treatments that it should be directly assessed in testing settings.

METHOD

Subjects

The Test Anxiety Inventory (TAI) (Spielberger, Gonzalez, Taylor, Algaze & Anton, 1977) was administered to 330 freshmen in an introductory psychology course at the Air Force Academy. The overall mean on the TAI was 35.6 (S.D. = 10.8). From this population subjects were recruited for high and low test anxiety groups if they obtained scores above 48 (high test anxiety) or below 29 (low test anxiety). The mean TAI for the high test anxiety group was 56.1; it was 23.3 for the low test anxiety group.

Procedure

Subjects were seated in a soundproof room which contained a chair, the critical tracking task, electrodes and a pre-amp for the EMG assessment, and a loudspeaker. The experimenter demonstrated the nature of the tracking task and then allowed the subject to practice it for several trials. Subjects were told to minimize extraneous head and facial movements during the experiment since that would interfere with the physiological measurements. After cleaning the subject's forehead with alcohol and attaching electrodes to the frontalis muscle group, the experimenter left the soundproof room. The experimenter immediately re-established communication with the subject via a two-way speaker system and directed the subject to relax while the equipment was readied for the experiment. Baseline EMG readings were obtained during this time (exactly four minutes). After this baseline period subjects were asked, "On a scale of one to ten, ten being as tense as you have ever felt, how do you feel right now?" The two male experimenters were always

blind to the subject's test anxiety condition.

At this point the experimenter read instructions which were designed to maximize or minimize evaluative apprehension. It was hypothesized that physiological differences between the high and low test anxiety groups may only emerge under conditions of evaluative apprehension. The instructions designed to maximize evaluative apprehension were very evaluative in tone and emphasized high performance. Subjects were told that performance on the tracking task correlated highly with important military and academic abilities and that future success in certain Academy endeavors could be predicted from performance on the task. In order to further enhance apprehension in this condition the instructors wore lab coats during their earlier interaction with the subjects in the sound-proof room. The instructions designed to minimize evaluative apprehension were casual in tone and deemphasized the subject's actual performance on the tracking task. Participation in the experiment was described as an equipment and procedure check-out during which the subjects could relax and enjoy themselves. Performance on the tracking task was not described as predictive of success in any other aspect of cadet activity or achievement. Similar manipulations have influenced dependent measures in previous studies.

The critical tracking task involved manipulation of a lever slightly up or down in order to control a horizontal line projected on a cathode ray tube. A computerized program randomly moved the horizontal line above or below the center of the screen and unless the subject corrected that drift the line would go off the screen ending that trial. The subject's task was to maintain the line as close to the center horizontal of the screen as possible. The task was made difficult - in fact ultimately impossible - by a feature of the program which speeded the line's random movement and made it less responsive to control as a function of the subject's task performance; the better the subject performed, the more difficult control became until, inevitably, the subject lost control and the trial ended. Few trials lasted more than

approximately thirty seconds. Success at this task reflects both duration of control of the line and the line's average deviation from the target. Since some trials were longer than others, subjects performed varying numbers of trials in order to assure that the evaluative task was performed continuously during the four minutes of physiological assessment. The critical tracking task is described more fully elsewhere (Jex, McDonnell & Phatak, 1960).

Immediately after the critical tracking task and physiological assessment phase was completed subjects were asked two further self-report questions. Subjects were again asked, "On a scale of one to ten, ten being as tense as you have ever felt, how do you feel right now?" The second question requested each subject's self-appraisal of his/her performance on the task. Note that this self-appraisal was determined in the absence of any comparative norms by which to judge one's performance. The specific question was, "On a scale of one to ten, ten being high and five being average, how would you rate your performance on this task relative to others?"

RESULTS

Mean scores on the various dependent measures are presented in Table 1. Frontalis tension is indicated in microvolts/minute. Two-way analysis of covariance (Test Anxiety and Experimental Group) with baseline EMG as the covariate revealed that mean frontalis tension was greater among the high-test-anxious subjects and also greater for subjects who heard the instructions designed to maximize evaluative apprehension. These differences were in the predicted directions in both cases. In neither case did these differences reach statistical significance, although the effect of test anxiety only barely missed conventional levels of significance, $F(1, 34) = 3.57$, $p = .067$. The effect of evaluative apprehension fell shorter of significance, $F(1, 34) = 2.11$, $p = .17$.

A clearer difference emerged in analyzing tension self-reports. Two-way analysis of covariance with the initial tension self-report as

the covariate revealed that high-test-anxious subjects reported significantly greater tension following the critical tracking task than did low-test-anxious subjects, $F(1, 34) = 18.7, p < .001$. Contrary to expectation, however, there was no interaction between variables. Thus, the manipulation of evaluative apprehension had little effect on either physiological or self-report measures.

Table 1
Cell and Marginal Means on Dependent Measures

<u>Measure</u>	<u>High Evaluative Apprehension</u>	<u>Low Evaluative Apprehension</u>	<u>Total Group</u>
Frontalis tension			
High test anxiety	5.11	4.08	4.62
Low test anxiety	4.67	3.64	4.20
Tension self-report			
High test anxiety	5.80	5.89	5.84
Low test anxiety	3.91	3.33	3.65
Tracking score			
High test anxiety	3.37	3.48	3.42
Low test anxiety	3.25	3.23	3.24
Performance self-appraisal			
High test anxiety	5.50	4.56	5.05
Low test anxiety	6.18	5.56	5.90

There were no significant differences between any groups in terms of performance on the critical tracking task. However, high-test-anxious subjects again construed their experience differently than did low-test-anxious subjects. Analysis of variance indicated that high-test-anxious subjects appraised their performance as relatively poorer than did low-test-anxious subjects, $F(1, 34) = 4.29, p < .05$.

This difference involved more than simply a bias on the part of high-test-anxious subjects toward harsher self-evaluation. There was some reality distortion as well. The harsher self-appraisal of

high-test-anxious subjects could be understood simply as a different evaluation standard typically adopted by that group. However, the correlation of actual tracking score with performance self-appraisal on the tracking task reveals an interesting difference. The correlation was positive and significant among low-test-anxious subjects, $r = .52$, $p < .02$, but for high-test-anxious subjects the correlation was weaker and statistically insignificant, $r = .20$, ns . The performance self-appraisal of high-test-anxious subjects was negatively biased and unrelated to actual task performance.

DISCUSSION

The results of this study are consistent with those of previous studies which indicate a primary role of cognitive factors in test anxiety. While high and low-test-anxious subjects did not differ significantly in actual muscle tension they clearly differed in how they construed their emotional state as well as their objective performance. High-test-anxious subjects described themselves as relatively more tense and they appraised their performance as relatively poorer than did their non-anxious counterparts.

It was surprising that the manipulation of evaluative apprehension did not have a greater effect. Holroyd et al (1978) noted the same effect and suggested that it was attributable to the process of recording physiological data. They suggested that attaching electrodes may be so stressful as to essentially wash out the effects of brief instructional sets.

The present authors prefer a different explanation. In the present study it seems more likely that the salience of the task washed out effects of the instructional sets. The critical tracking task is an intrinsically challenging and involving activity, and one which involves inevitable failures. The salience of the task appears to have made the task an evaluative one for high-test-anxious subjects despite instructions to the contrary. Since the task differentially affected high-test-anxious subjects this way, evaluative apprehension may involve a

"set" or proneness to construe situations as evaluative. It was precisely this motivating character of the critical tracking task which led to its choice for the experiment; it is involving and "real" in a way which many simulated or analogue tasks are not. In retrospect, it may have been too involving for the purposes of this study. It may have been too intrinsically challenging to be treated lightly. That would explain the significant difference in subjective tension between anxiety groups yet not between experimental groups. However, it still would not explain the absence of a difference in physiological arousal between anxiety groups. The investigation of physiological concomitants of psychological indices of stress continues to be a thorny and difficult task.

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