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THE EFFECTS OF TEST ANXIETY, FEEDBACK AND TASK DIFFICULTY ON STATE-ANXIETY

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Abstract

Based on Spielberger's (1972) conceptualization of test anxiety as a personality trait, the present research attempted to determine the differential effects of feedback and task difficulty conditions on state anxiety for subjects who differ in test anxiety. Measures of A-state were obtained for 64 Puerto Rican students with high and low test anxiety scores while they performed either a difficult or an easy memory task under failure or success feedback conditions. Test anxiety and feedback had an interactive effect on state anxiety; yet, contrary to trait-state theory, high-theory, high test anxious ifested higher levels of A-state in both the failure and the success condition. No interaction effect was found between state anxiety and task difficulty. Furthermore, the triple interaction between test anxiety, feedback, and task difficulty could not be obtained.

Spielberger et al., (1975, 1978) have proposed a conceptualization of test anxiety within the trait-state theory of anxiety. Within this context, test anxiety is viewed as a "situational-specific" form of trait anxiety.

Trait-state theory (Spielberger, 1966, 1972) proposes a distinction between anxiety as a transitory emotional state (A-state) which fluctuates in response to stress and as a relatively stable personality trait (A-trait) which reflects individual differences in anxiety prones.

Its basic propositions concern the arousal of anxiety states. Spielberger has specified that in situations that are appraised by the subject as threatening, an A-state reaction will take place with high levels of A-state being experienced as unpleasant. Two important classes of stressors have been identified that have different implications for the arousal of A-state reactions in individuals differing in A-trait: situations which represent a threat to self-esteem and situations characterized by physycal danger.

According to Spielberger, high A-trait subjects appear to interpret situations in which their personal adequacy is evaluated as more threatening than do low A-trait subjects. Thus differential increases in A-state are expected for subjects who differ in A-trait when exposed to psychological stress. On the other hand, situations characterized by physical danger are not expected to produce differential increases in A-state for subjects who differ in A-trait.

Within trait-state theory, test anxiety is conceptualized as reflecting differences among individuals to react to examination situations with elevations in state anxiety (A-state). It is assumed that although an examination is stressful to almost any student, it is his perception of a particular test as personally threatening that will determine the magnitude of his A-state response.

Within its framework, high test-anxious students are assumed to perceive evaluations as more threatening than low test-anxious students; in those instances, they are expected to respond with greater elevations in A-state than low test-anxious students (Spielberger, 1972).

In a review of the available literature a number of studies were found which dealt with the assumed relationship of threat and no-threat to self-esteem on A-state levels for subjects who differ in trait anxiety. Their findings have been consistent with these assumptions of trait-state theory (Hodges, 1966; Lushene, 1970; Spielberger, O'Neill & Hansen, 1971; Millimet & Gardner, 1973; Waid et al., 1978).

In Puerto Rico, Azpeitia (1971) and Nazario (1973) in an attempt to validate trait-state theory cross-culturally investigated the effects of failure and no-failure feedback on A-state of female undergraduate Puerto Rican students who differed in trait anxiety. Both researchers found that while subjects in failure condition manifested a greater increase in A-state than subjects in the success condition, A-state levels for high A-trait subjects remained high and stable throughout the experimental procedures. This last result is not consistent with trait-state theory's assumption concerning the relationship between ego threat and levels of A-state for subjects who differ in A-trait.

Working also with Puerto Rican subjects, Rivera-Santiago (1973) studied the effects of physical and ego threat on A-state for high school students who differed in A-trait. The results obtained indicated fluctuations in A-state scores in response to the threat conditions. In the physical threat condition, both high and low A-trait subjects responded with great elevation in A-state, but only in the ego threat conditions did high A-trait subjects responded with greater elevations in A-state than low A-trait subjects. A-trait scores remained relatively stable over periods, thus giving evidence of the stability of the A-trait measurements.

Martínez-Urrutia & Spielberger (1973) studied the relationship between state and trait anxiety and intelligence in Puerto Rican psychiatric patients. Patients with high A-trait scores showed higher A-state intensity while performing on the EIWA than low A-trait patients. A-state levels of high A-trait patients tended to increase during performance on the EIWA, while A-state for low A-trait patients remained relatively constant.

On the light of these cross-cultural studies, it is evident the inconsistency of the results obtained. While Martínez-Urrutia & Spielberger's (1973) and Rivera-Santiago (1973) research provided evidence in favor of trait-state anxiety theory, Azpeitia's (1971) and Nazario's (1973) research failed to validate important aspects of the theory.

Other aspect of trait-state theory concerns the relationship between A-state level and task difficulty. The theory predicts that high A-state subjects will make fewer errors than low A-state subjects on an easy task and more errors on a more difficult task. The theory further specifies that differential levels of A-state must be produced for subjects differing in A-trait in order to adequately test the predicated interaction between A-state and type of task. The results of a series of studies testing the A-state task difficulty interaction have been inconsistent. O'Neill, Spielberger & Hansen (1969) found that high A-state subjects made fewer errors than low A-state subjects on an easy task, yet more errors than low A-state subjects on a difficult task supporting thus, trait-state theory's predictions. Spielberger, O'Neill and Hansen (1972), on the contrary, did not find a significant interaction between A-state and task difficulty using computer-assisted tasks. Similar results were obtained by Keeffer (1974) with 6th grade students. O'Neill (1972) and Glover & Cravens (1974), contrary to expectations, found that high A-state subjects made more errors than low A-state subjects on an easy task, while Reeves and May (1977) found that low A-state subjects made fewer errors than high A-state subjects on both, the easy and difficult tasks.

In a review of the available literature dealing directly with the hypothesized relationship of conditions of threat and no-threat to self-esteem on A-state anxiety level for sub-

jects who differ in test anxiety only a few studies could be found.

Gaudry (1977), in a series of four studies, evaluated the effects of experimentally induced experiences of success and failure on 9th graders and college students. He found that the failure condition produced greater elevations in A-state for subjects who were high in test anxiety than for subjects who were low.

Also, Tobias, Hedl & Towle (1974) found that high test-anxious students manifested higher levels of A-state than low test-anxious students during the administration of a difficult mathematical test.

No research has been done to validate trait-state theory's predictions related to test anxiety as a trait concept with Puerto Rican subjects. The present research attempted to experimentally determine the differential effects of stress conditions of failure and success on A-state for Puerto Rican students who differed in test anxiety. In addition to test anxiety and kind of stressor, task difficulty was also employed as an independent variable. Performing on an easy or a different task while expose to either a failure or success condition seems to constitute an important moderating variable in determining the effects of stressors on A-state.

It was hypothesized that high test-anxious students would manifest significantly higher levels of A-state on a failure feedback condition than low test-anxious students. Conversely, it was hypothesized that no differential increments in A-state would occur between high and low test-anxious students in the success feedback condition.

Method

Subjects

Subjects were 64 female high school students from a private school in San Juan, Puerto Rico. The students ranged in age from 13 to 17. They were selected on the bases of extreme scores (upper and lower quartiles) on the Spanish version of the Test Anxiety Inventory (TAI): the Inventario de Auto-Evaluación sobre Exámenes (IDASE).

Apparatus

For instruments were used four this research: the IDASE, the Digits Backwards Sub-test of the Wechsler Intelligence Scale for Children (Spanish edition), the A-state Scale of the STAI and a digits' backwards recall task.

The Spanish version of the TAI, the Inventario de Auto-Evaluación sobre Exámenes (IDASE), was used to determine the subjects anxiety proneness in test situations. The IDASE consists of 20 statements which require the subjects to describe how they *generally* feel regarding test situations. It asks subjects to indicate the frequency that they have experienced specific manifestations of anxiety in situations related with tests on the following four point scale: (1) almost never; (2) sometimes; (3) often; and (4) almost always.

The A-state Scale of the Spanish State-Trait Anxiety Inventory (Spanish STAI) was used to measure the students level of manifest anxiety. The Spanish STAI A-state scale consists of 20 statements which ask subjects to describe how they *feel at a particular moment in time*. For each A-state item, subjects rate themselves according to "how you feel at this moment" on the following four-point scale: (1) not at all; (2) somewhat; (3) moderately so; (4) very much so.

The essential qualities evaluated by the A-state Scale involve the intensity of a person's feeling of tension, nervousness, worry and apprehension.

To determine the subjects' performance limit on a digits' backwards task, the Digits Backwards Scale of the Digit Span subtest of the Spanish Wechsler Intelligence Scale for Children (WISC) was used. Performance on this scale made possible to set difficulty levels for each subject on the experimental task.

Lastly, a special digits' backwards task was presented before and immediately after the administration of the experimental treatments. For this task, numbers were selected via a random process from a table of random numbers. An informal instrument was thus devised by the author consisting of 112 series of numbers grouped according to the number of digits contained in them. Series were divided into 8 groups, each group containing 14 items: 2 practice items, 6 items that were to be given before and 6 items to be given immediately after the experimental treatments.

Experimental design and procedure

The independent variables in this study were: (a) level of test anxiety: high or low; (b) type of feedback: failure or success, and (c) level of task difficulty: hard or easy. The two levels of feedback and task difficulty yielded four experimental conditions: success-easy task, success-hard task, failure-easy task, failure-hard task. In each of the experimental conditions, half the students were high scores on test anxiety and half were low. The dependent variable used to measure changes in A-state was Spielberger et al.'s A-State Scale.

Three hundred ninety-two Puerto Rican high school female students were administered the IDASE approximately a month prior to the experiment. Of these, thirty-two students with the lowest scores (lower quartile) were selected for participation.

Prior to the experiment, high and low test-anxious students were randomly divided into eight groups, four of these were comprised of high test-anxious students, the other four of low test-anxious students. All sixty-four students were asked to perform on either an easy or a difficult digit's recall task and were assigned either to a success or a failure feedback condition. Each student was test individually.

The experimental procedure was divided into four phases. In Phase I, students were asked to fill-out the IDASE and the A-state Scale of the Spanish STAI. This procedure served to verify the students' level of test anxiety and to determine A-state levels prior to the administration of the experimental treatments. In phase II, students were administered the Digits Backwards Scale of the Spanish WISC in order to determine their performance limit on the task: the number of digits where she failed in both trials; this procedure also allowed for the determination of difficulty levels for each student in the experimental digits' recall task.

The series of numbers given to students previously assigned to the easy-task condition contained the number of digits corresponding to two digits below their established limit. Students assigned to the hard-task condition were required to repeat backwards series of digits containing the same numbers of digits as their performance limit.

In Phase III, students received either failure or success feedback instructions concerning their performance on the experimental task. Feedback instructions were followed by the administration of another set of eight series of numbers the same length as those administered during Phase II.

In Phase IV, the A-state Scale of the Spanish STAI was readministered; this time with instructions that it should be answered according to how students felt *while performing* on the experimental task just completed.

Results

A three-factor design for independent groups (2x2x2) was used to assess the effects of test anxiety, feedback instructions and task difficulty on state anxiety. Means were obtained for each variable and analyzed through the use of a computer, model OMNI 800. Homogeneity of variance tests were performed by computer. No data was rejected. Data was analyzed at the University of Puerto Rico Computer Center. Programs utilized were Carroll AVA (Carroll, University of Puerto Rico) and Hazen CORR (Hazen, University of Puerto Rico). AVA was used for the 2x2x2 analysis of variance and CORR for the Pearson product-moment reliability correlations.

A significant Pearson product-moment correlation ($r(62) = .97, p < .001$) was obtained between the two administrations of the IDASE reflecting the stable nature of the test anxiety measure.

An analysis of variance for independent groups with test anxiety, kind of feedback and level of difficulty as factors yielded a significant test anxiety by kind of feedback interaction ($F(1,56) = 17.33, p < .01$). This analysis also evidenced significant main effects for test anxiety ($F(1,56) = 57.59, p < .01$) and kind of feedback ($F(1,56) = 42.73, p < .01$) which revealed that high test-anxious students manifested a greater increase in A-state during the experimental session than low test-anxious subjects. Students in the failure feedback condition showed a greater increase in A-state than students in the success feedback condition. None of the remaining F ratios was found to be significant. Subsequent individual comparisons of means (Wines, 1971) indicated significant differences between high and low test-anxious students in both the failure and success feedback conditions.

Discussion

In the present study, the A-state scores increased when subjects were required to perform on a memory task under conditions designed to produce different kinds of stress. The magnitude of the increase in A-state scores was significantly greater for high test-anxious than low test anxious students and for students in the failure condition than for students in the success condition.

Consistent with Spielberger's trait-state anxiety theory which proposes that threats to self-esteem such as failure situations evoke A-state responses of greater magnitude in high-anxious subjects than low-anxious subjects, high test-anxious students in the failure feedback condition responded with a greater elevation in A-state than low test-anxious students.

Moreover, and contrary to expectation, differential A-state levels were also manifested for high and low test-anxious students in the success condition.

There are ways of explaining this unexpected result under trait-state theory. First, it is reasonable to attribute changes in A-state in the success condition to the stress induced by the experimental task. The fact that the difficulty level of the performance task was

not constant across groups could be viewed as creating an additional stress factor which may have been responsible for the obtained results.

Another plausible way of explanation is to assume that high test-anxious subjects appraised both the failure and the success feedback as a threat to their self-esteem which then resulted in differential A-state levels.

According to trait-state theory and irrespective of the presence or absence of objective danger, a person who perceives an event as threatening will experience an increase in state anxiety. Even non-stressful situations may be appraised as threatening by subjects who for some reason perceive them as dangerous. In this respect, Spielberger (1966; 1978) has stated that it is not simply the nature of the stressor which determines the A-state response, but rather the degree to which the individual appraises the stressor as personally threatening.

In a review of the literature on paper and pencil anxiety scales, I. Sarason (1960) presented findings from a number of studies that gave evidence that high-anxious subjects are usually "more self-deprecatory, more self-preoccupied, and generally less content with themselves than subjects lower the distribution of anxiety scales" (p. 404).

More recently, Wine (1971) after an extensive review of the test anxiety literature concluded that high test-anxious subjects generally describe themselves in more negative terms than the low test-anxious subjects regardless of experimental conditions and that their self-focusing tendencies are usually activated by the pressures of the testing situation.

It seems plausible then, to assume that what had an impact in the activation of self-focusing tendencies and subsequent changes in A-state level of high test-anxious students participating in the experiment was not the nature of the feedback per se, but the fact their performance was being evaluated.

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