THE EFFECTS OF EGO THREAT, PHYSICAL THREAT AND EGO-PHYSICAL THREAT ON STATE ANXIETY

DONALD CECIL FREEMAN


CENTRE FOR NFLD. STUDIES
JAN 22 1981
MEMORIAL UNIVERSITY
OF NEWFOUNDLAND

NOTICE

The quality of this microfiche is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us a poor photocopy.

Previously copyrighted materials (journal articles, published tests, etc.) are not filmed.

Reproduction in full or in part of this film is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30. Please read the authorization forms which accompany this thesis.

THIS DISSERTATION
HAS BEEN MICROFILMED
EXACTLY AS RECEIVED

AVIS

La qualité de cette microfiche dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de mauvaise qualité.

Les documents qui font déjà l'objet d'un droit d'auteur (articles de revue, examens publiés, etc.) ne sont pas microfilmés.

La reproduction, même partielle, de ce microfilm est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30. Veuillez prendre connaissance des formules d'autorisation qui accompagnent cette thèse.

LA THÈSE A ÉTÉ
MICROFILMÉE TELLE QUE
NOUS L'AVONS REÇUE

THE EFFECTS OF EGO THREAT, PHYSICAL THREAT AND EGO-PHYSICAL THREAT ON STATE ANXIETY

by

© Donald C. Freeman, B.A.

A Thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science

Department of Psychology
Memorial University of Newfoundland

October 1978

St. John's Newfoundland

ABSTRACT

The main purpose of the present study was to investigate the effects of ego threat, physical threat, and the combination of ego and physical threat on state anxiety (A-State) arousal for persons who differ in trait anxiety (A-Trait). Subjects were categorized as low or high A-Trait on the basis of extreme scores on the State-Trait Anxiety Inventory - Trait Scale. The measure of A-State was the State-Trait Anxiety Inventory - State Scale. Differential instructions were used to produce ego threat, physical threat, ego-physical threat and no threat (Control) conditions.

The experimental procedure consisted of a Rest Period, a Performance Period in which a memory task was administered, a Feedback Period, a Test Period in which the memory task was readministered and a second Feedback Period. Upon completion of the Performance Period, subjects were randomly assigned to the experimental conditions. A-State measures were obtained after the Rest Period and the second Feedback Period.

On the basis of Spielberger's (1972b) Trait State Anxiety Theory, it was hypothesized that high and low A-Trait subjects would manifest increases in A-State in response to the

ego and physical threats. It was also expected that increases in A-State as a function of ego threat would be greater for high A-Trait than low A-Trait individuals, but no differentiation as a function of physical threat would occur.

In all experimental conditions, scores increased from the Rest to the Test Period. These increases were significantly greater in the ego and physical threat inducing conditions than in the no threat (Control) condition.

Expectations that High and Low A-Trait subjects would manifest differential responses in A-State as a function of ego threat but not physical threat were only partly met. While High A-Trait subjects responded with significantly greater increases in A-State in all conditions having a direct ego threat arising from failure feedback, in the one condition which consisted of anticipation or potential for ego threat (shame) tied to the physical threat, there was no significant difference between the groups in A-State response. Also, unexpectedly, differential A-State responses for the High and Low A-Trait subjects were found in the condition consisting of only physical threat.

Several explanations for the results of the present study were suggested and recommendations for future research were made.

DEDICATION

TO WENDY

whose name should also appear on the degree

ACKNOWLEDGEMENTS

I wish to extend my appreciation to the members of my thesis committee, Dr. T.E. Hannah, Dr. C.F. Preston and M. Grant, who gave so much of their time and knowledge to assist me in this endeavour.

Thanks are also expressed to Dr. J. Strawbridge for his assistance and instruction in computer programs used for the analysis of the data. I am grateful to Dr. G.R. Skanes without whose support, understanding and patience this thesis could not have been completed.

Further thanks are due to Dr. Preston who provided me with a rewarding opportunity and learning experience in being his Teaching Assistant. The Preston family will always be remembered by my wife and I for exemplifying the expression "the doors of Newfoundland are always open".

I must also thank Betty Ann Emery, Millie Freeman and Marie Samson who produced typed copy from my illegible notes.

I am grateful to my wife, Wendy, who gave me so much support and accepted so many changes in her life so that I could pursue my education. Finally I would like to

thank my parents who first opened the door to learning for me and gave so much through their labour, encouragement and faith to ensure that door always remained open.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

Anxiety is a dominant and prominent problem of our twentieth century society. The pervasive influence of anxiety is manifested in the themes of our literature, art, science and religion as well as in the many facets of day-to-day life. The popular concern with anxiety is reflected in the behavioural and medical sciences, where anxiety is a central and major concept of almost all dynamic theories of personality and psychopathology. In The Meaning of Anxiety, May (1977) traces the cultural and historical events which have transformed the covert anxiety of the seventeenth and eighteenth centuries into the overt anxiety characteristic of the latter half of the twentieth century. May underscores the rise of anxiety as a mid-twentieth century phenomenon by pointing out that as recently as the first half of this century only two publications in book form, one each by Freud (1926/1964) and Kierkegaard (1849/1944), attempted to present an objective picture of anxiety. In contrast the last two decades have seen increased empirical interest in anxiety as demonstrated by the rapid increase in the number of investigations and publications in the area. Spielberger (1972a) and May (1977) estimate that more than 5,000 articles and books on anxiety have been published since 1950. Unfortunately, this increase in research has not lead to a merging of anxiety theories.

Most researchers of anxiety phenomena acknowledge that considerable confusion surrounds the question of what anxiety is, and that clarification of the topic is needed. Much of the semantic confusion and equivocal research findings arise from the frequent and varied uses made of the term anxiety. As Fischer (1970) points out, since theorists start with divergent definitions of anxiety it is to be expected that they will develop different theories of anxiety occurrence. The result is "as many conceptions of anxiety as there are theories of man" (p. 135) and a failure, as yet, to develop a widely acceptable and comprehensive theory.

Theories of Anxiety

There are a great number of anxiety theories which represent many different approaches and different emphases. May reviews nine theories in addition to biological, cultural and philosophical theories, while Fischer discusses eight approaches to anxiety. Within any psychological perspective several theoretical views on anxiety can be found. Fischer points out that within the range of psychoanalytic theories of anxiety are the theories of Freud, Jung, Adler, Rank, Horney, Fromm, Sullivan, Hartmann, Rapaport, White, and Jacobson; and this list still is not exhaustive. In this section the theories of Freud, Mowrer, Goldstein, and May will be presented as examples of psychoanalytic, learning,

holistic, and existential conceptual approaches to anxiety.

Freud (1917/1963) saw anxiety as a central problem, the solution of which would "throw a flood of light upon our whole mental existence" (Vol. XVI, p. 393). He made the first attempt to systematically deal with anxiety from a psychological viewpoint. Freud's theory changed with time. Initially he saw anxiety as a direct manifestation of unemployed libido. When sexual instincts were damned up due to continual frustration, their energies were diverted and converted until they erupted into consciousness as an anxiety state. Anxiety was regarded by Freud as "something felt", or a particular unpleasant affective state. Such anxiety states had three attributes: "1) a specific character of unpleasure, 2) acts of discharge, and 3) perceptions of those acts" (1926/1959, Vol. XX, pp. 132-133). The distinguishing attribute between anxiety and other unpleasant feelings was "acts of discharge" or "definite physical sensations, which can be referred to particular organs of the body" (1926/1959, Vol. XX, p. 132), such as palpitations of the heart.

Over the period of his works and writings Freud altered his theory of anxiety and came to consider anxiety as a response to danger situations. Anxiety was classed into three types, such as: 1) realistic anxiety, 2) moral anxiety, and 3) neurotic anxiety. The distinctions among these three types of anxiety arise from the origin of the threat which

initiates anxiety, rather than any difference in the experiential quality of the anxiety state. Realistic anxiety "is anxiety about a known danger" (1926/1959, Vol. XX, p. 165) present in the external world. Neurotic anxiety arises from the perception of danger from the id impulses. Realistic anxiety and neurotic anxiety may have similar characteristics as in the case where the source of neurotic anxiety is also a known and real danger. In such cases the distinguishing factor is the excessive anxiety in relation to the known danger - characteristic of neurotic anxiety rather than realistic anxiety - resulting from the attachment of unknown instinctual dangers to the known danger. Moral anxiety is experienced by the ego as shame or guilt and arises from the punitiveness of the superego, in particular the conscience. Within this framework anxiety was held by Freud to serve a signal function which alerted the individual to the presence of internal and/or external danger which could overwhelm him. "Anxiety is therefore on the one hand an expectation of a trauma, and on the other hand a repetition of it in a mitigated form" (1926/1959, Vol. XX, p. 166). This repetition allows the ego, which previously experienced the trauma passively, to reproduce it actively in a weakened version, offering a chance to try to control the course of the situation.

Mowrer (1950) structures Freud's signal theory into the framework of learning theory. Anxiety is a conditioned form of pain reaction. Neutral stimuli, which are contiguous to "traumatic" stimuli, acquire the capacity to elicit an anxiety reaction through classical conditioning. The characteristics of an anxiety reaction are: 1) a state of heightened tension (or attention) and a more or less specific readiness for (expectation of) a pending traumatic stimulus, and 2) a form of discomfort. In a later conceptualization Mowrer viewed anxiety as arising from acts one committed and wished he had not (guilt anxiety) rather than the result of acts one wished to commit but could not (impulse anxiety). This view of anxiety appears to be a combination of moral anxiety and early Freudian theory. Mowrer replaces Freud's concept of sexual tension accumulation with unrelieved moral forces and guilt or shame which build up and erupt into the conscious as anxiety.

Goldstein (1939) emphasized the danger aspect of anxiety producing situations. The central features of Goldstein's conceptualization of anxiety are: 1) anxiety arises only in the context of an organism-environment relationship and is not merely a question of intrapsychic dynamics, 2) the organism experiences a sense of danger due to the threat from an inadequate environment to its self-actualization possibilities , and 3) the state of experienced danger leads

to improper evaluation of the environment which presents the organism with the imminent possibility of nothingness or nonbeing. Thus anxiety is not present in all situations but only when an individual cannot cope with the demands (catastrophic situations) of an environment. To arouse anxiety an experience must be seen as threatening the existence of both the physical and psychological being. Goldstein emphasizes the phenomenological aspects of anxiety although he feels phenomenological and physiological events are only different aspects of a unitary process. Unlike learning theorists who equate anxiety with fear, or Freudians by whom anxiety is reduced to unrealistic fear, Goldstein sees anxiety as distinct from fear. In contrast to fear, anxiety is: 1) temporal rather than spatial, 2) an emotion dealing with nothing definite rather than an emotion causally connected with events in the external word, and 3) without reference to an object but "deals with nothingness. It is the inner experience of being faced with nothingness" (p. 92).

May's (1977) theory represents a logical extension of Goldstein's theory. May defines anxiety as "the apprehension cued off by a threat to some value which the individual holds essential to his existence as a personality" (p. 205). This threat is more than a peripheral external danger, but rather a threat to some value which an individual holds as essential to his security as a personality. Characteristic

of anxiety are "feelings of uncertainty and helplessness in the face of danger" (p. 205). May's distinction between normal and neurotic anxiety is on somewhat the same basis as Freud's distinction between realistic and neurotic anxiety. In normal (or realistic) anxiety the level of anxiety is appropriate to the objective threat of the situation in contrast to the excessive response of neurotic anxiety. May also states that normal anxiety, unlike neurotic anxiety, 1) does not involve mechanisms of intrapsychic conflict such as repression, and 2) does not require neurotic defense mechanisms, but can be dealt with constructively. May points out that neurotic anxiety, as an over-response to an objective threat, is displayed by many persons who seem to have an excessive vulnerability to situational threats in general. Such a pattern of anxiety response would indicate that the understanding of neurotic anxiety requires the probing of individual personality structures which predispose a person to excessive vulnerability.

The theorists reviewed above generally agree that anxiety has both phenomenological and physiological aspects and occurs when a situation is interpreted as a source of danger or is associated with danger. Just what situations and conditions lead to anxiety vary in emphasis depending on the orientation of the theorist. The term anxiety is most commonly used to refer to an emotional state in response to a threatening situation, but anxiety can also denote a

personality trait. This distinction between anxiety as an emotional state and as the disposition to manifest anxiety because of individual differences is not made by the theorists reviewed here. Some indication of the role of individual differences is implied in Freud's and May's definitions of neurotic anxiety, but it is still confounded with anxiety as an emotional state. Evidence of different types of anxiety first emerged from factor analytic studies by Cattell and Scheier (1958, 1961). The concepts revealed from these factor analytic studies have been further developed and refined by Spielberger (1966, 1972b) and are discussed in the following section.

State - Trait Anxiety Theory

Much of the confusion in theory and research on anxiety results from the indiscriminate use of the term anxiety to refer to two quite different types of concepts (Spielberger, 1966). Past research into anxiety has often failed to distinguish both operationally and conceptually between, 1) anxiety "as a transitory emotional state or condition of the human organism that varies in intensity and fluctuates over time" (Spielberger, 1972b, p. 39), and 2) anxiety as a relatively stable and permanent personality disposition or trait (Spielberger, 1966, 1972b). The two distinct uses of the term anxiety are illustrated by Spielberger (1966). In

considering the statement "Mr. Smith is anxious" two distinctly different interpretations can be made in that Mr. Smith is either, 1) anxious "now", or 2) an "anxious person". In the case of the first interpretation, at this moment, the validity of the statement can be verified by making suitable measurements as to whether or not Mr. Smith is undergoing (experiencing) a particular state with specific properties. In the case of the second interpretation, the same measurements would indicate that Smith's level of anxiety is chronically higher than the level of other persons.

The factor analytic studies of Cattell and Scheier (1958, 1961) first indicated two different types of anxiety. These researchers identified two distinct anxiety factors which they labeled, on the basis of the variables which loaded on them, as state anxiety and trait anxiety. The state anxiety factor was interpreted as measuring a transitory state or condition which varied over time in contrast to the trait anxiety factor which assessed a relatively stable and permanent personality characteristic. Among the characterological variables which loaded on the trait anxiety factor were "ergic tension", "ego-weakness", "guilt-proneness", "suspiciousness" and "tendency to embarrassment" (1961, pp. 57, 182). The state anxiety factor loaded with a set of variables that covaried over measurement intervals, thus indicating a transitory condition or state of the organism which shifted over

time. The state anxiety factor, in contrast to the trait anxiety factor, loaded heavily with various physiological indices such as heart rate and systolic blood pressure.

Further evidence for two conceptually different types of anxiety is presented by Johnson (1968) in his study of the effects of interview stress, relaxation training and passage of time on state and trait anxiety. Using the Taylor (1953) Manifest Anxiety Scale and the Zuckerman (1960) Affect Adjective Check List - General Form, Johnson found that trait anxiety measures stayed constant over time and were not affected by relaxation or stress. In contrast, measures of state anxiety, using systolic blood pressure, heart rate, and a modified Affect Adjective Check List - Today Form, decreased during the relaxation condition but increased during the stressful interview.

Research into trait anxiety indicates that it reflects individual differences in the potential to manifest anxiety states in situations of varying stress or, in other words, a person's anxiety-proneness. Spielberger (1966) compares the relationship between state anxiety (A-State) and trait anxiety (A-Trait) to that of kinetic and potential energy. A-State, like kinetic energy, refers to an ongoing activity of particular magnitude and A-Trait, like potential energy, denotes a latent potential for an action or a reaction to occur if triggered by an appropriate stimulus. Spielberger (1966,

1972b) in conceptualizing A-State as a transitory condition of the human organism which varies in intensity and over time, defines this condition as "characterized by subjective, consciously perceived feelings of tension and apprehension, and activation of the autonomic nervous system" (1972b, p. 39). The concept of A-Trait as a relatively stable personality trait implies individual "differences in the disposition to perceive a wide range of stimulus situations as dangerous and threatening, and in the tendency to respond to such threats with A-State reactions" (1972b, p. 39). Spielberger (1972b) points out that A-Trait may be considered to reflect individual differences in the intensity and frequency with which A-States have been experienced in the past and the probability that A-States will occur in the future. Individuals high in A-Trait tend to perceive more situations as dangerous and tend to respond to these situations with A-States of greater intensity than individuals low in A-Trait.

Hodges (1967, 1968), Hodges and Spielberger (1966, 1969) and others have found that individuals differing in A-Trait may exhibit differential responses in A-State. Hodges and Spielberger (1969) examined the relationships between measures of state and trait anxiety and performance on the Wechsler (1955) Adult Intelligence Scale digit span subtest. No differences in performance were found between persons

measuring high or low in A-Trait, but the performance of persons with high A-State was significantly poorer than persons reporting low A-State. Thus data from this study indicates a relationship between performance and A-State but not A-Trait. Hodges (1967) using situations structured to present a threat to self-esteem and a threat of physical pain, found variations in A-State responses between persons having different A-Trait levels, over situations differing in types of stress. Faced with a threat to self-esteem, high A-Trait subjects reported more A-State responses than low A-Trait persons, indicating that the anxiety-producing effects of stress or stimuli of a degradation nature are related to an individual's level of A-Trait. In contrast, Hodges also found that in a situation with threat of physical pain the reported A-State responses did not differ significantly regardless of the subject's level of A-Trait. In another study, Hodges and Spielberger (1966) found evidence that perception of physical dangers does not vary in degree of threat for persons of either low or high A-Trait. While significant increases, both in self-report and physiological measures resulted from the threat of shock, there was no relationship between the magnitude of changes in A-State and level of A-Trait measured by the Taylor Manifest Anxiety Scale. A similar lack of relationship between A-Trait and magnitude of A-State change was found by Lazarus and Opton

(1966) and Lushene (1970) in observations of individuals' A-State increases due to viewing a stressful movie illustrating physically painful accidents.

Spielberger (1972b) offers an explanation for the above findings. Since it is assumed that residuals of past experience determine individual differences in A-Trait, Spielberger speculates that childhood experiences, especially the parent-child punishment relationship, influence an individual's A-Trait level. A parent-child relationship which involved excessive criticism and negative appraisals by the parent would weaken the child's self-confidence and lower his self-esteem. The residual of such past experience would result in an individual highly predisposed to anxiety proneness (high A-Trait), with self-depreciating attitudes and a 'fear of failure' characteristic of high A-Trait individuals rather than of low A-Trait persons. For these reasons any ego-involving situation would be perceived as more threatening by high A-Trait persons than by low A-Trait persons. Since a situation of physical pain would not threaten self-esteem, it would not result in differential arousal of A-State between high and low A-Trait individuals. However, due to conflicting evidence in this area, Spielberger cautions against generalizing that high A-Trait persons do not perceive physical danger as more threatening than low A-Trait persons.

In proposing a State-Trait Theory of Anxiety, Spielberger (1972b) outlines the process of anxiety in order to clarify the relationship between state and trait anxiety. The arousal of anxiety states involves a series of temporally ordered events triggered by an external or internal stimulus cognitively appraised by the individual as threatening. The cognitive appraisal of stimuli as threatening or not depends on the objective danger in the situation and psychological factors such as the individual's A-Trait level, aptitude, abilities and past experiences. If a situation is appraised as threatening it will evoke an A-State reaction, with the intensity and duration determined by the intensity and persistence of the stress or stimuli, and the individual's ability to deal with the threat. Depending on the individual's past experience with similar circumstances and his aptitude, effective coping actions and/or defense mechanisms will be utilized to counter the threat and thus reduce the level of anxiety. This coping behaviour in turn, provides feedback for the reappraisal of the situation and, depending on its success or failure, a lowering or raising of the level of A-State.

In the process of anxiety, A-Trait plays a role in determining how an individual appraises a situation. While a high A-Trait person, compared to a low A-Trait person, perceives a greater range of situations as dangerous and threatening, intensely stressful situations need not always be

threatening. In the case where the high A-Trait person has the necessary skills and experience for coping with the intensely stressful situation, that situation will not be perceived as threatening. In contrast, a situation perceived by most persons as non-threatening may, because of personal traumatic significance, be seen as quite threatening by a low A-Trait person. While useful information concerning the probability of arousal of high levels of A-State may be provided by knowledge of A-Trait level, only actual measurement of A-State in a particular situation can evaluate the impact of that situation on A-State intensity (Spielberger, Lushene and McAdoo, 1971).

The Measurement of Anxiety States

The previous discussion outlines the importance of differentiating two types of anxiety - A-State and A-Trait. A-State has been defined as a transitory condition which may fluctuate over time and vary in intensity, whereas A-Trait implies individual differences in disposition to manifest A-States. Failure to discriminate which type of anxiety was being measured explains much of the inconsistency in findings in the area of anxiety research. Future research requiring measurement of anxiety, or fluctuations in anxiety, may prove more meaningful and fruitful if differentiation is made between A-Trait and A-State and if, prior to conducting studies, it is decided upon which of

the two, if not both, interest will be focused.

Most research into anxiety as a transitory state (A-State) has sought to identify the properties of anxiety states and the situations which give rise to them. Introspective reports have enjoyed the most widely accepted usage as basis for inferring A-State. Basowitz, Persky, Korchin and Grinker (1955) define anxiety as "the conscious and reportable experience of intense dread and foreboding, conceptualized as internally derived and unrelated to external threat" (p. 3). Thus by conventional usage if one reports that he feels "anxious" then he is anxious. Krause (1961) concluded that of the six different types of evidence conventionally used to infer A-State, some combination of introspective reports in conjunction with physiological-behavioural signs is required to unambiguously define the presence of anxiety states in humans. Krause states that the delineation of stress or stimuli on grounds other than the anxiety response itself is difficult since the anxiety-producing potential of a particular stress or stimulus depends on an individual's past experience or conditioning to that stimulus. Notwithstanding this problem Krause (1961), Basowitz et al. (1955), and Mandler and Watson (1966) suggest it is necessary to separate stimuli with little potential to evoke anxiety from those which have anxiety-producing potential. In contrast, Martin (1961) argues that response

patterns independent of the external or internal stimuli best define anxiety states.

In the past two decades much of the progress in measurement of personality characteristics has involved measurement of personality traits rather than psychological states (Spielberger, 1972b). In most anxiety research, measurement tools, such as the Taylor Manifest Anxiety Scale, which tap A-Trait have been employed. Research focusing on anxiety as a transitory emotional state has utilized physiological measures such as blood pressure and the galvanic skin response (Auerbach, 1971). However, over the past decade promising self-report measures of emotional states, including anxiety, have been developed.

While it is recognized that verbal self-report scales are vulnerable to falsification, their use to measure emotional states is based on the 'inventory premise', or the assumption that people, if sufficiently motivated, are capable of and willing to report accurately information concerning their feelings and behaviour (Wilde, 1972). Hildreth (1946) developed the first comprehensive battery of self-report scales for the measurement of feelings. The Hildreth Feeling and Attitude Battery was derived by classifying a large number of phrases, typifying moods and attitudes, into six categories using a modified Thurstone technique to produce a set of scales which assessed various moods and affect states.

The "Personal Feelings Scales" developed by Wessman and Ricks (1966) were among the first self-report measures to include a state anxiety (Tranquility versus Anxiety) scale. The subject indicated "how calm or troubled you feel" by checking one item on a single, ten item scale. The Wessman and Ricks scales are, as the Hildreth scales, cumulative scales with items ordered in ascending intensities of a specific feelings state. Unfortunately, only limited validity information on this anxiety scale is reported since Wessman and Ricks' main interest was the elation-depression dimension of the scales.

Nowlis and Green (cited in Nowlis, 1965) used factor analysis to derive scales for measuring twelve different mood dimensions, one of which was an anxiety dimension. Subjects rated themselves on a four point mood-intensity dimension scale in response to sentences beginning with "I feel" and ending in various adjectives. Initially the anxiety factor had loadings of several adjectives but only three, "clutched-up", "fearful" and "jittery", yielded consistent findings. Unfortunately, basing the anxiety scale on three items limits considerably the range and reliability of this state anxiety measure.

Scheier and Cattell (1960) developed the IPAT 8-Parallel Form Anxiety Battery (8-PF) for the repeated measurement of changes in anxiety over time. This battery has

eight forms, each consisting of subtests for which high loadings on an A-State factor were demonstrated by factor analysis. While many of the variables which load on this factor also have high loadings on an A-Trait factor, the patterns of the loadings are different. For this reason Cattell (1966) considers a single personality questionnaire can be used to assess both state and trait anxiety. The author assumes that a single response to a scale item may reflect both trait and state characteristics and that these characteristics can be determined simultaneously by differential weighting of the response according to the scale item's contribution to the state and trait factors. Spielberger (1972b) notes that four subtests of the 8-PF Anxiety Battery appear to reflect behavioural dispositions indicative of A-Trait rather than A-State and are in fact derived from an A-Trait measure, the Objective-Analytic (O-A) Anxiety Battery (Cattell and Scheier, 1960). Another subtest measure requires reporting of frequency of past experiences rather than the reporting of intensity of present experiences. For these reasons the 8-PF Anxiety Battery appears more relevant to A-Trait than to A-State. Also the validity data reported for the 8-PF Anxiety Battery as a measure of A-State tends to be limited.

Only a few scales have been developed to measure the phenomenological aspects of state anxiety. The two main

scales used to measure A-State and supported by validity data are the Affect Adjective Check List (Zuckerman, 1960) and the State-Trait Anxiety Inventory (Spielberger, Gorsuch, and Lushene, 1970). Both of these self-report measures also have scales for measuring A-Trait.

Zuckerman's Affect Adjective Check List consists of 21 adjectives which describe the range of feelings of an anxiety dimension rather than the mood-intensity as in scales described previously. Since the individual, by checking the appropriate adjective, can describe how he feels at any specific period, the adjective list can be used to measure either A-State or A-Trait, depending on the instructions given. A-State is measured using the Today Form of the Affect Adjective Check List which directs the subject to check adjectives descriptive of "how you feel now", while A-Trait measurement utilizes the Affect Adjective Check List - General Form with instructions for the subject to check adjectives describing "how you generally feel". While relatively low correlations (between .40 and .60) are found between the Affect Adjective Check List - General Form and other A-Trait measures such as the Taylor Manifest Anxiety Scale and the IPAT 8-PF, there is impressive evidence for the validity of the Affect Adjective Check List - Today Form as a measure of A-State (Spielberger et al, 1970., Table 6, p. 10).

The State-Trait Anxiety Inventory (Spielberger et al., 1970) which was developed as a reliable and relatively brief self-report measure of both A-State and A-Trait consists of separate 20-item scales measuring the two anxiety concepts. The A-Trait scale of the State-Trait Anxiety Inventory is accompanied by instructions for the subject to indicate on each item scale "how you generally feel" in terms of frequency of occurrence, while the A-State scale requires the person to indicate, in terms of intensity of feelings, "how you feel right now, that is, at this moment". For research the State-Trait Anxiety Inventory - A-State Scale can also be administered with instructions for the individual to respond according to how he felt at some particular previous time period, such as at the beginning and at the end of a long task. Spielberger et al. (1970) state that most people can respond without difficulty to the State-Trait Anxiety Inventory - A-State items according to how they felt in a specific situation or at a particular time, "provided the feelings were recently experienced and the person is motivated to cooperate" (p. 4).

Evidence for the validity of the State-Trait Anxiety Inventory scales is reviewed in Spielberger et al. (1970). Research has revealed the State-Trait Anxiety Inventory - A-State Scale to be a sensitive instrument in measuring the level of transitory anxiety experienced by individuals in

situations of varying stress, while the A-Trait scale has been found to remain relatively stable for given individuals across situations. In evaluating the State-Trait Anxiety Inventory (STAI) and the Affect Adjective Check List (AACL), Cumming (1968) suggests that "the AACL appears to be a more crude measure of affective state and also more vulnerable to social desirability effects" (p. 73) than the State-Trait Anxiety Inventory. Levitt (1967) states that "the STAI is the most carefully developed instrument, from both theoretical and methodological standpoints, of those presently in use" (p. 71). It is the State-Trait Anxiety Inventory which will be employed to measure anxiety in the present study.

Ego Threat, Physical Threat and State Anxiety

Experimental investigations of anxiety have utilized two classes of stressors, psychological stressors and physical stressors, to induce A-States (McAdoo, 1970). Evidence for the conceptualization of distinct classes of stressors is presented in Basowitz et al. (1955). On the basis of extensive studies of soldiers undergoing paratroop training, these researchers report two distinct types of anxiety which they term harm anxiety and shame anxiety. Basowitz et al further state that "the distinction between the two different loci of anxiety is primarily a conceptual one. For the experiencer himself there may be only the unitary state of emotional distress" (pp. 272-273). It may be considered

that psychological stressors (threat of failure) give rise to shame anxiety, while physical stressors (threat of injury or death) induce harm anxiety.

Stressors can pose either an implied or a direct threat to an individual and thus the subsequent effects can result either from the anticipation of or the impact (confrontation with) of the stimulus conditions. Physical stress, such as electrical shock, can involve either anticipation of pain which will likely be A-State arousing or the direct impact of the stressor which results in pain. Psychological stress can also be implied or direct. Anticipation of the stimulus condition can be induced by "ego-involving instructions" such as "this test is an intelligence (or personality evaluation) test", where the direct impact of the stimuli is experienced through failure feedback on a task. The remainder of this section will review studies conducted to evaluate the effects of the two types of stressors on A-State for persons who differ in A-Trait and the relationship between state and trait anxiety under stressful conditions.

Up to the middle of the last decade most investigators of anxiety phenomena were concerned with either A-State or A-Trait rather than the relationship between the two (Spielberger, 1966). In the last few years more direct experimental evidence regarding the effects of stress on A-State for persons who differ on A-Trait has emerged from studies initially utilizing physiological measures and more

recently, with the development of introspective questionnaires, through the use of self-report measures.

The bulk of the evidence, although sometimes contradictory, indicates that physical stress (i.e., anticipation of pain) increases A-State although such increments are not related to an individual's A-Trait level. Katkin (1965, 1966), using measures of nonspecific skin response and the skin resistance level, found that physical threat resulted in increased A-State levels, but such changes were not related to the subject's level of A-Trait. Hodges (1967, 1968) and Hodges and Spielberger (1966) report similar results using both physiological (heart rate) and self-report (Affect Adjective Check List) measures of A-State.

In the Hodges and Spielberger (1966) study no differential increases in A-State were found for persons who differed in levels of A-Trait in response to threat of shock. However, subjects who reported greater fear of shock on a Fear of Shock Questionnaire, two months prior to the experiment, showed greater increases in A-State from threat of shock than subjects with low Fear of Shock Questionnaire scores. Fear of Shock Questionnaire scores correlated significantly with changes in heart rate and Affect Adjective Check List - Today scores produced by threat of shock (r = .43 and .49 respectively) but virtually zero correlations were found between A-Trait and both Fear of Shock Questionnaire

scores and changes in heart rate (r = .09 and .05 respectively).

Malmo, Shagass, Davis, Cleghorn, Graham and Goodman (1948) present evidence which, contradicting the findings of the above studies, indicates that there is a differential responding in increments of A-State by high A-Trait and low A-Trait individuals. This study found that neurotic patients showed a significantly higher frequency of galvanic skin response oscillations than normal controls during an anticipatory period preceding painful thermal stimulation. However McAdoo (1970) argues that, since each subject had been reassured individually concerning the safeness of procedures, the controls and patients may have reacted differently to the interpersonal aspects of the situation. In addition, McAdoo (1970) proposes that the patients may have construed the presentation of painful stimuli as a form of punishment and thus their more intense reactions compared to the controls may have been due to "their perception of the significance of the painful stimuli; rather than the anticipation of pain" (p. 16).

Several investigators (Haselhorst; Note 2; Auerbach, 1971, 1973; Spielberger, Auerbach, Wadsworth, Dunn, and Taulbee, 1973) have studied the relationship of A-State changes to A-Trait level in clinical settings with surgery patients. Haselhorst (Note 2) using the State-Trait Anxiety Inventory to

measure the A-State level of patients at four different periods, found that high and low A-Trait groups (split at the median) did not respond to the physical threat of surgery with differential increases in A-State level. A-State scores obtained prior to surgery, when it would be expected that physical threat would be foremost in the patients' minds, showed the lowest correlation with A-Trait scores; while A-State scores taken during the convalescent period after surgery, when threat to self-esteem through helplessness was most likely greatest, were most highly correlated with A-Trait scores. Auerbach (1971, 1973) studied the effects of surgery-induced stress on state-trait anxiety and in turn the relationship between state-trait anxiety and adjustment to surgery. In both studies the magnitude of change in A-State level was found to be unrelated to the patient's A-Trait level. While high A-Trait patients responded with higher levels of A-State than low A-Trait patients, both before and after surgery, the increment before and decrement after surgery were identical for both groups. Spielberger et al. (1973) found that while A-State levels varied over periods of surgery, A-Trait levels remained approximately the same. This study produced findings similar to Auerbach's, with high A-Trait patients exhibiting higher levels of A-State than low A-Trait patients in both pre and post-surgery periods, but both groups showing almost identical declines

in A-State scores from pre-surgery to post-surgery periods. The findings of both the experimental and clinical studies above are interpreted as indicating that the anticipation of physical harm induces elevations in anxiety as an emotional state, but that individuals suffering in A-Trait level do not differ in their perception of the degree of danger posed by the physical threat.

In contrast to the findings of no relationship between A-State and A-Trait levels under physical threat, several researchers have found that stimulus conditions posing a threat to self-esteem, either direct or implied, will lead to differential levels of A-State for persons differing in A-Trait level. However, the findings of early studies using physiological measures have produced contradictory evidence concerning the effects of ego threat on the state-trait relationship.

Several studies have used heart rate and skin conductance level as the indicants of A-State to study the effects of various kinds of ego threat on persons differing in A-Trait as evaluated by various tests presumed to measure A-Trait. Silverman (1957) found no relationship between the magnitude of change in skin conductance level and scores on the Taylor Manifest Anxiety Scale for subjects threatened with electrical shock if they performed poorly on simple arithmetic problems. Raphelson (1957) found that,

while a subgroup he considered to be anxious (low need for achievement, high test anxiety scores) showed the greatest increase in skin conductance level from a non-stressful condition to one involving ego-orienting instructions on a complex perceptual motor task, the change in skin conductance level did not relate significantly to Taylor Manifest Anxiety Scale scores. Ishiguro (1965) gave failure feedback to groups of high anxious and low anxious subjects performing a serial learning task and found the percentage change in skin conductance level equivalent for both groups. Similarly, Dykman, Ackerman, Galbrecht and Reese (1963) found that criticism of subjects' performances failed to produce differential heart rate changes as a function of Taylor Manifest Anxiety Scale scores.

Contrary to the above findings other researchers have found a relationship between physiological measures of A-State and A-Trait scores. Higher Taylor Manifest Anxiety Scale and Test Anxiety scores were found to correspond with increased heart rate responses to questions (Dykman, Reese, Galbrecht and Thomasson, 1959), a matching test (Judson and Gelber, 1965), and anagram problems (Harleston, Smith and Avery, 1965). Kissel and Lettig (1965) found that high Test Anxiety Questionnaire scores corresponded more with higher skin conductance levels than low Test Anxiety Questionnaire scores under conditions of induced failure

due to an insoluble problems task. Several researchers (Harleston et al., 1965; Hodges and Spielberger, 1969) have also found a negative correlation between A-State level (increased heart rate and Affect Adjective Check List scores) and performance on a task.

Several investigators have used self-report measures to demonstrate differential A-State responses as a function of A-Trait level under ego threat conditions. Auerbach (Note 1) found that subjects working on a word completion task experienced significantly greater increments in A-State under a condition of failure feedback than under either success or no feedback conditions. The failure feedback conditions evoked the greatest increases in A-State levels amongst high A-Trait subjects as well as the greatest difference between A-State levels for high and low A-Trait groups. McAdoo (1970) studying the effects of strong failure feedback, mild failure feedback and success feedback about performance on a memory task found that subjects' A-State levels increased from a rest to a performance period with the magnitude of increase greater for high A-Trait subjects than for low A-Trait subjects. O'Neil (1969) found that high A-Trait undergraduates responded to negative feedback, about performance on a computer-assisted learning task, with greater initial increments in A-State than low A-Trait students.

Some studies have examined the relative effects of both physical threat and ego threat on level of A-State for individuals who differ in A-Trait level. Lamb (1969), using a Speech Anxiety Test scale as a measure of A-Trait, found that high A-Trait subjects showed greater increases in State-Trait Anxiety Inventory - A-State scores from a pre-speech rest period to a period in which they gave a two minute speech (ego threat) than did subjects with low A-Trait scores. In contrast when required to blow up a balloon until it burst (physical threat), high and low A-Trait subjects responded with elevated but undifferentiated State-Trait Anxiety Inventory - A-State scores.

Hodges (1967, 1968) used the State-Trait Anxiety Inventory to measure both A-State and A-Trait in an investigation of the effects of failure feedback, success feedback and anticipation of electrical shock on a memory task for undergraduate subjects. He found that high A-Trait subjects exposed to failure feedback (ego threat) responded with changes in A-State scores of greater magnitude from a rest to a stress period than did low A-Trait subjects. Threat of electric shock (physical threat) produced increased A-State levels unrelated to a subject's level of A-Trait. The success feedback served as a no threat condition.

As part of a study of trait-state anxiety and authoritarianism-rebelliousness, Shedletsky (1972) replicated Hodges' (1967) study. However, Shedletsky developed a more threatening physical threat condition by instructing subjects that they would receive strong electrical shock and that they were being video-taped in compliance with university regulations to protect students from experimental harm.

Shedletsky found that both ego (failure feedback) and physical (electric shock) threat induced increments in A-State, with physical threat creating a greater magnitude of A-State arousal than ego threat. Also, physical threat created a greater magnitude of A-State arousal in the high A-Trait group than the low A-Trait group, while ego threat didn't evoke any differentiation in magnitude of A-State arousal. Thus, contrary to Hodges, Shedletsky found differential A-State arousal, as measured by the State-Trait Anxiety Inventory, to be a function of a person's A-Trait level in response to a physical threat but not in response to an ego threat.

As a possible explanation for the contradiction, Shedletsky states that the physical threat condition, being considerably more threatening that Hodges' physical threat condition, may not only have generated anticipation of pain but also the expectation in the subjects that they would not be able to tolerate the electric shock (physical threat) and would have to withdraw from the experiment. Since this

withdrawal from the experiment would be seen by everyone viewing the video-tape, the physical threat condition could have been confounded by the subjects' fear of shame (ego-threat) should they show weakness in withdrawing from an experiment which others seemed to tolerate. The cummulative effect of the two factors present in such a dual threat may have made the condition extra threatening; leading to the higher A-State arousal in Shedletsky's physical threat condition, with the ego threat element of the condition inducing differential A-State responses between the groups. Also, Shedletsky suggests that the lack of differential A-State responses between high and low A-Trait groups in the ego threat condition may result from the failure feedback condition lacking sufficient intensity. McAdoo (1970) found that differential responding to ego threat occurred under strong failure feedback but not under mild failure feedback.

However, Shedletsky (1972) feels the more plausible reason for the conflicting results is that Hodges utilized, as an A-Trait measure, the Taylor (1953) Manifest Anxiety Scale which has high correlation with the State-Trait Anxiety Inventory - Trait Scale (r = 0.80 and 9.79), whereas his own A-Trait measure was a modified version of the S-R Inventory of Anxiousness (Ender, Hunt and Rosenstein, 1962; Ender, 1968, cited in Shedletsky, 1972; and Ender and Shedletsky, 1973).

Ender and Shedletsky (1973) contend that the S-R Inventory of Anxiousness as a multidimensional measure of trait anxiety which "sums anxiety responses across a variety of situations ... is ... a more representative and adequate measure of trait-anxiety" (p. 347) than unidimensional measures such as the State-Trait Anxiety Inventory-Trait Scale or the Taylor Manifest Anxiety Scale. Ender and Shedletsky propose that, contrary to a confounded physical threat variable, the more likely explanation for the conflict with Hodges' (1967) results "is that the [State-Trait Anxiety Inventory] trait scale is limited to measuring interpersonal (ego threat) situations, whereas the S-R Inventory of Anxiousness" (1973, p. 358) measures the interpersonal, physical danger and ambiguous threat aspects of situations. Shedletsky (1972) presents his findings as evidence that the relationships between trait and state anxiety are better represented by an Interaction Model of Anxiety (Ender and Hunt, 1966, 1968a, 1968b, 1969) than Spielberger's State-Trait Anxiety Theory.

Statement of the Problem

The purpose of the present study was to 1) investigate the effects of ego threat, physical threat, and the combination of ego and physical threat on A-State for persons who differ in A-Trait, 2) replicate Hodges' (1967) study, and 3) explore the conflicting findings in Shedletsky's (1972)

replication of Hodges' (1967) study. It was expected that a close replication of Hodges' (1967) conditions of ego threat and physical threat as well as the incorporation of a specific combined ego-physical threat condition would shed light on possible confounding variables in Shedletsky's study. Subjects were selected on the basis of extreme scores on the State-Trait Anxiety Inventory - Trait Scale.[1] The measure of A-State was the State-Trait Anxiety Inventory - State Scale. Differential instructions were used to produce ego threat, physical threat, ego-physical threat and no threat (control) conditions for subjects required to perform on a memory task.

The experimental procedure consisted of a Rest Period, a Performance Period in which a memory task was administered, a Feedback Period, a Test Period in which the memory task was readministered, and a second Feedback Period. On the basis of the Trait-State Anxiety Theory the following hypotheses were formulated in relation to changes in the A-State measure:

1) High and low A-Trait subjects would manifest increases in A-State in response to ego threat and physical threat.

2) Increases in A-State as a function of ego threat would be greater for high A-Trait than for low A-Trait individuals, but no differential response in A-State as a function of physical threat would occur.

METHOD

Subjects

The subjects in this study were 118 undergraduates (56 males and 62 females) enrolled at Memorial University of Newfoundland. The subjects were selected from a larger pool of students who completed the Trait Anxiety Scale of the State-Trait Anxiety Inventory as part of a battery of tests given in the Department of Psychology. Students who obtained scores in the bottom third of the larger pool's distribution of Trait Anxiety Scale scores were designated the Low Anxiety Group, while students obtaining scores in the top third were designated the High Anxiety Group. There were 61 Low Anxiety and 57 High Anxiety subjects. Students with scores falling in the Low Anxiety Group, but who obtained scores above the 90 percentile on the Marlowe-Crowne Social Desirability Scale (Crown and Marlowe, 1960) were excluded from the group.

Experimental Measures

The principle dependent variable in this study was the State-Trait Anxiety Inventory - State Anxiety Scale, a self-

report measure of A-State (Appendix A). The State-Trait Anxiety Inventory - Trait Anxiety Scale was used to select subjects who differed in A-Trait (Appendix B). Both scales of the State-Trait Anxiety Inventory are described below.

The State-Trait Anxiety Inventory was used to measure both state anxiety (A-State) and trait anxiety (A-Trait). The State-Trait Anxiety Inventory consists of two self-report scales, each consisting of twenty statements to which a person responds as to "how you generally feel" (A-Trait measure) and "how you feel right now, that is, at this moment" (A-State measure). The subjects are instructed to describe how they feel in the context of each scale item by marking one of four points ranging from "not at all" to "very much so" for the State Anxiety Scale form, and from "almost never" to "almost always" for the Trait Anxiety Scale form. The Trait Anxiety Scale includes such statements as "I lack self-confidence" and "I worry too much over something that really doesn't matter", while the State Anxiety Scale has statements such as "I feel jittery" and "I feel content". The State Anxiety Scale form is balanced to avoid acquiescence set with ten direct items and ten reversed items. The Trait Anxiety Scale form while not balanced, has thirteen directly scored items and seven reversed items. Spielberger et al (1970) computed alpha coefficents for the college and high school normative samples and obtained reliability coefficients for the Trait

Anxiety Scale ranging from 0.86 to 9.92, and for the State Anxiety Scale the range was from 0.83 to 0.92.

Experimental Design

The State-Trait Anxiety Inventory was administered as part of a battery of tests to a large sample of undergraduates. These students whose scores fell in the top third of the larger sample's distribution were designated High Trait Anxious (High A-Trait) while the students whose scores fell in the bottom third were designated Low Trait Anxious (Low A-Trait). Since the distribution of A-Trait scores did not allow for sufficient subjects of one sex, sex groups became as a post-hoc variable.

The High A-Trait and Low A-Trait subjects were ramdomly assigned to the six conditions of a 2x3 factorial design to form 12 groups (Figure 1). One factor of the design was two levels of Ego Threat - failure and success on a cognitive task. The second factor was three levels of Physical Threat - absence of threat of electrical shock, threat of electrical shock in private surroundings, and threat of electrical shock in public surroundings.

Procedure

Each subject was run individually with High A-Trait and Low A-Trait subjects undergoing identical treatments

LEVEL OF A-TRAIT	Type of Threat											
	Ego Threat						No Ego Threat					
	Physical Threat (Private)		Physical Threat (Public)		No Physical Threat		Physical Threat (Private)		Physical Threat (Public)		No Physical Threat	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
HIGH												
LOW												

Figure 1. Experimental design

within the six conditions. The experiment was conducted with the subjects seated in a small room, facing a one-way mirror closed off by a curtain. The experimenter was seated in the room behind a partition so that the experimenter and the subject could not see each other, but could hear each other. On a counter in front of the subject was apparatus for measuring Galvanic Skin Response and for randomly administering shock.

The experiment was divided into three parts, a Rest Period, a Performance Period, and a Test Period. The Rest and Performance Periods procedures were identical for all subjects regardless of experimental condition. Upon completion of the Performance Period, the Low A-Trait and High A-Trait subjects were randomly assigned to the six conditions of the 2 x 3 factorial design. The sets of instructions used for each condition are listed in Appendix C.

Upon arrival at the experimental room the subjects were told that the experiment was concerned with the relationship between performance on an intelligence test and various physiological measures. While the subjects relaxed electrodes of the Galvanic Skin Response apparatus were attached to the fingers of their non-dominant hand and their function was explained. The subjects were told

that the apparatus took several minutes to warm up and that they should relax and make themselves comfortable. The Galvanic Skin Response equipment was turned on and there was no further communication with the subjects.

In order to control for experimenter bias, the experimenter was blind to the subjects' A-Trait level throughout the entire experiment. This was achieved by having an assistant score the Trait Anxiety Scale forms, arrange subjects' appointments and randomly assign subjects to the experimental conditions. To control for possible experimenter bias during the Rest and Performance Periods, when all subjects were to receive identical treatments, the experimenter did not learn the subjects' assigned conditions until the completion of the Performance Period.

Rest Period

The Rest Period was of five minutes duration. At the end of five minutes the subjects were given the State Anxiety Scale form to complete. This self-report measure established the pre-experimental level of A-State.

Performance Period.

After completing the State Anxiety Scale form the subjects were given the Digits Backwards Test under standard

instructions (Wechsler, 1955, p. 41). Subjects were given digit series of increasing length until they reached their own limits, which were defined as the level at which they failed two successive series of digits. After establishing the subjects' limits they were given two more series, one digit less in length than their limit. Subjects were then given six more series at the same level. No A-State measures were taken in the Performance Period. The digit series used were identical to those used by Hodges (1967) and are shown in Appendix D.

Test Period

During this period subjects were run in the experimental condition to which they had been randomly assigned. The specific procedure for each of the six conditions was as follows:

No Threat Condition. The purpose of the Condition was to evaluate changes in A-State level in response to a situation involving neither ego threat nor physical threat. The subjects in this condition were given feedback at the beginning of the Test Period indicating that they did well on the performance task. The subjects were then asked to do another set of six series of digits (Test 1). After completing Test 1 the subjects were again told that they

were doing well and that another set of six series of digits (Test 2) would follow. Before continuing with Test 2 the subjects were given the State Anxiety Scale form to complete again, under the same instructions as in the Rest Period. This second administration of the self-report measure at this point in this condition and at the same point in the other conditions determined the post-experimental level of A-State. Upon completing the State Anxiety Scale form the subjects were told that, due to a failure in the Galvanic Skin Response apparatus, Test 2 had to be cancelled. A debriefing followed.

Physical Threat (Private) Condition. The purpose of this condition was to evaluate changes in level of A-State in a situation involving the possibility of physical pain due to shock (physical threat) in the absence of ego threat. In this condition subjects received identical treatment as in the No Threat Condition, with the addition of instructions to develop anticipation of pain as a physical threat. The subjects were told, at the beginning of Test 2, that the experimenter was interested in the effect of strong electrical shock on physiological measures. The experimenter instructed the subjects to expect one or more strong electrical shocks between series of digits in Test 2. Electrodes were then attached to the subjects' forearms but no shocks were actually given. The subjects were reminded that they

were doing well and that Test 2 with shocks would follow. Before going on with Test 2 the State Anxiety Scale form was administered to the subjects, after which the experiment was terminated in the same manner as in the previous condition.

Ego Threat Condition. The purpose of this condition was to evaluate changes in level of A-State due to a threat to self-esteem (ego threat) as a result of failure. At the beginning of the Test Period, subjects in this condition were given feedback indicating that their limits and performances were poor in comparison to most subjects. Test 1 was then administered, after which subjects were again told that they were doing poorly and that another test (Test 2) would follow. Before going on with Test 2 the State Anxiety Scale form was given for a second time. Upon completion of the State Anxiety Scale form the experiment ended as in the other conditions.

Ego-Physical (Private) Threat Condition. The purpose of this condition was to evaluate changes in A-State level in response to simultaneous threat to self-esteem (ego threat) from failure and threat of pain (physical threat) from electrical shock. The subjects in this condition received combined but identical treatments as in the Ego Threat Condition and the Physical Threat (Private) Condition (excluding good performance feedback). Before starting Test 1, the subjects were given failure feedback. Test 1

was administered and upon completion failure feedback was repeated and shock instructions were given. The subjects were told that Test 2 was to follow but first they were to complete a questionnaire. The State Anxiety Scale form was administered for the second time and the experiment was terminated as in the other conditions.

Physical (Public) Threat Condition. The purpose of this condition was to evaluate changes in A-State level arising from a physical threat which inherently presented a threat to self-esteem or ego (shame). In this condition a dual threat was introduced by leading the subjects to believe their ability to cope with physical pain was being evaluated. Thus the subjects not only faced the threat of physical pain from electric shock (physical threat) but also the threat of shame (ego threat) should they show weakness in tolerating the pain. The subjects received the same treatment as in the Physical (Private) Threat Condition with the addition of observer instructions. At the beginning of the Test Period the subjects were told that they did well on the performance task and then Test 1 was administered. After completing Test 1 the subjects were told that they were doing well, that Test 2 would follow, and were given shock instructions. The subjects were also told that three judges, trained in rating behavioural responses to shock, would be evaluating their

responses through the one-way mirror but would not be able to hear verbal responses. The curtain covering the one-way mirror was then opened and the subjects were asked to fill out the State Anxiety Scale form and, after the form was completed, the experiment was terminated as in the other conditions.

Ego-Physical (Public) Threat Condition. The purpose of this condition was to examine changes in A-State level resulting from simultaneous threat to self esteem (ego threat) from failure and threat of pain (physical threat) coupled with possible shame (ego threat) from inability to cope with electric shock. The subjects in this condition received combined but identical treatments as the subjects in the Ego Threat Condition and the Physical (Public) Threat Condition (excluding good performance feedback). Before starting Test 1, the subjects were given failure feedback. The experimenter presented Test 1 and upon completion the subjects were given failure feedback again, along with shock and observer instructions. Before proceeding with Test 2 the subjects were given the State Anxiety Scale form to complete, after which the experiment was concluded as in the other conditions.

Post Experimental Interview

At the completion of the Test Period any equipment was disconnected and a structured interview (Appendix E) was

conducted to determine the subjects' views concerning the purpose of the experiment. The subjects were asked if they had heard about or discussed the experiment with anyone prior to taking part in it. The subjects in any of the conditions with ego threat were told that the purpose of the experiment had been to study the effects of criticism and that actually they had performed the digit task quite well. All subjects were told of the importance that psychology subjects respond naturally, and were asked not to discuss the experiment with anyone until the end of the semester.

RESULTS AND DISCUSSION

As formulated in the Introduction, the following hypotheses, based on the Trait-State Anxiety Theory, were made:

(1) High and low A-Trait subjects would manifest increases in A-State in response to the ego threat and physical threat.

(2) Increases in A-State as a function of ego-threat would be greater for high A-Trait subjects than for low A-Trait subjects, but no differential response in A-State as a function of physical-threat would occur.

While the hypotheses were partially confirmed, conflicting results were found with regard to the increase in A-State both as a function of ego-threat and physical-threat.

The principal independent variables in this study were trait anxiety and psychological stress, while the main dependent variable was the psychological measure of A-State. The A-State measures were subjected to an analysis of variance in which psychological stress, A-Trait and sex groups (sex) were the between-subject variables and time periods (rest and test) were the within-subject variables. In this analysis, which is summarized in Table 1, of sixteen tests of the sex variables, no significant main effect or interactions were found, indicating that the findings were essentially the same for males

TABLE 1

SUMMARY OF ANALYSIS OF VARIANCE OF THE EFFECTS OF PSYCHOLOGICAL STRESS (EGO THREAT OR PHYSICAL THREAT), A-TRAIT LEVEL AND SEX ON A-STATE SCORES DURING REST AND TEST PERIODS.

Source of variance	df	MS	F	
A-Trait (TAS)	1	6119.73	39.51	***
Ego Threat (E)	1	1372.14	8.86	***
Physical Threat (P)	2	457.742	2.96	
Sex Group (Sex)	1	386.355	2.49	
TAS x E	1	325.992	2.10	
TAS x P	2	47.1367	.30	
TAS x Sex	1	57.0938	.37	
E x P	2	338.364	2.15	
E x Sex	1	496.783	3.21	
P x Sex	2	52.9751	.34	
TAS x E x P	2	64.3574	.42	
TAS x E x Sex	1	20.2695	.13	
TAS x P x Sex	2	254.350	1.64	
E x P x Sex	2	167.055	1.08	
TAS x E x P x Sex	2	315.723	2.04	
Error (b)	94	154.888		
Time Periods (T)	1	6256.30	221.33	***
TAS x T	1	583.141	20.63	***
E x T	1	452.039	15.99	***
P x T	2	370.029	13.09	***
TAS x E x T	1	100.730	3.56	*
TAS x P x T	2	32.3301	1.14	
E x P x T	2	34.9121	1.24	
Sex x T	1	100.074	3.54	
TAS x Sex x T	1	1.05859	.04	
E x Sex x T	1	28.8320	1.02	
TAS x E x P x T	2	30.7070	1.09	
TAS x E x Sex x T	1	63.7227	2.25	
P x Sex x T	2	18.6875	.66	
TAS x P x Sex x T	2	.871094	.03	
E x P x Sex x T	2	39.8086	1.41	

Source of variance	df	MS	F
A-Trait (TAS)	1	6119.73	39.51 ***
Ego Threat (E)	1	1372.14	8.86 ***
Physical Threat (P)	2	457.742	2.96
Sex Group (Sex)	1	386.355	2.49
TAS x E	1	325.992	2.10
TAS x P	2	47.1367	.30
TAS x Sex	1	57.0938	.37
E x P	2	333.364	2.15
E x Sex	1	496.783	3.21
P x Sex	2	52.9751	.34
TAS x E x P	2	64.3574	.42
TAS x E x Sex	1	20.2695	.13
TAS x P x Sex	2	254.350	1.64
E x P x Sex	2	167.055	1.08
TAS x E x P x Sex	2	315.723	2.04
Error (b)	94	154.888	
Time Periods (T)	1	6256.30	221.33 ***
TAS x T	1	583.141	20.63 ***
E x T	1	452.039	15.99 ***
P x T	2	370.029	13.09 ***
TAS x E x T	1	100.730	3.56 *
TAS x P x T	2	32.3301	1.14
E x P x T	2	34.9121	1.24
Sex x T	1	100.074	3.54
TAS x Sex x T	1	1.05859	.04
E x Sex x T	1	28.8320	1.02
TAS x E x P x T	2	30.7070	1.09
TAS x E x Sex x T	1	63.7227	2.25
P x Sex x T	2	18.6875	.66
TAS x P x Sex x T	2	.871094	.03
E x P x Sex x T	2	39.8086	1.41
TAS x E x P x Sex x T	2	26.1328	.92
Error (w)	94	28.2671	

* $p < .01$

*** $p < .001$

and females. Therefore data for the sex groups were combined for the presentation of these results.

The detailed results are presented below. First the general effects of experimental conditions on the A-State measure are outlined, followed by a description of the changes in the A-State as a function of A-Trait and experimental stress (Hypothesis 1 and 2).

EFFECTS OF EXPERIMENTAL CONDITIONS ON THE STATE ANXIETY MEASURE

The mean State Anxiety Scale scores and changes in A-State for subjects in the six experimental conditions, arising out of the two levels of ego threat and three levels of physical threat, for the Rest and Test periods are presented in Figure 2 and Table 2. It may be noted that subjects in all conditions reported increases in state anxiety as measured by the State Anxiety Scale from the Rest to the Test Period. Also it may be noted in Table 2 that subjects in the Ego-Physical (public) Threat condition responded with the greatest increase in State Anxiety Scale scores from Rest to Test Period and the No Threat subjects had the least increase, with the other levels of stress ranked between these two as shown.

As shown in the analysis of variance summarized in Table 1, the significant main effect for Time Periods, F (1, 94) = 221.33 $p < .001$, shows, as expected, a vari-

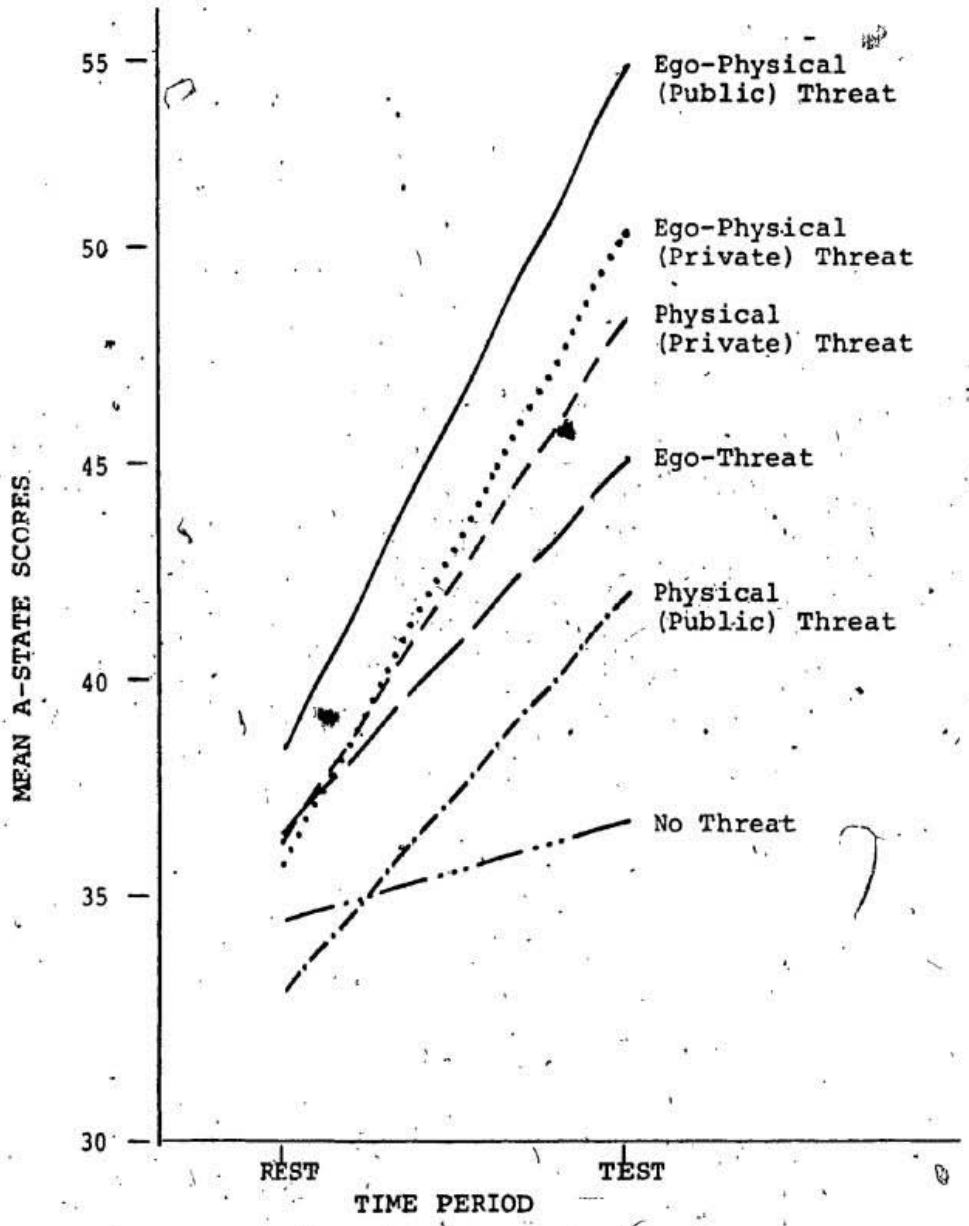

Figure 2. Mean A-State scores in experimental conditions for rest and test periods.

TABLE 2

MEAN A-STATE SCORES FOR REST AND TEST PERIODS AND MEAN INCREASE IN A-STATE SCORES FROM REST TO TEST PERIOD FOR THE EXPERIMENTAL CONDITIONS

CONDITION	REST	TEST	INCREASE
Ego-Physical (Public)	38.6	54.85	16.25
Ego-Physical (Private)	35.67	50.41	14.74
Physical (Private)	36.23	48.43	12.20
Ego	36.31	45.03	8.72
Physical (Public)	33.36	41.97	8.61
No-Threat	34.75	36.83	2.08

tion in State Anxiety Scale scores over time periods, while the significant Ego-Threat x Time Periods, F (1, 94) = 15.99, $p < .001$, and Physical-Threat x Time Periods, F (2, 94) = 13.09, $p < .001$, interactions indicate that this variation in A-State level from Rest to Test Period occurs under both types of threat. The significant main effect of Ego-Threat, F (1, 94) = 8.86, $p < .001$, reflects the variation in State Anxiety Scale scores over the two levels of ego threat. The lack of variation among the three levels of physical threat is indicated by the failure to find a significant main effect for Physical-Threat, F (2, 94) = 2.96, $p > .10$. The significant main effect found for A-Trait, F (1, 94) = 20.63, $p < .001$, indicates the difference between the High A-Trait and Low A-Trait groups arising for the selection of subjects from the two extremes of the range of A-Trait scores in the subject pool.

In order to clarify the effects of the experimental conditions over time periods, changes in A-State scores within and across conditions were evaluated by the Duncan test for difference between pairs of means (Winer, 1971, p. 196). The data for these analyses is presented in Table 2. The evaluation of the difference between mean A-State scores in the Rest and the Test periods within each condition found that subjects in all conditions, except the No-Threat Condition, manifested statistically significant increases in A-State

from Rest to Test period, ($p < .01$). An examination of the difference between the mean change in A-State scores in each stress condition and the mean change in A-State scores in the No-Threat Condition indicated that the magnitude of the A-State change in all stress conditions was significantly greater ($p < .01$) than in the No-Threat Condition.

Thus, A-State as measured by the State Anxiety Scale increased significantly in all conditions consisting of either ego or physical stress producing procedures. Since the performance task was the same in all conditions, it may be assumed that changes in the State Anxiety Scale scores were determined by the differential threat induced by the experimental procedures.

EFFECTS OF EXPERIMENTAL CONDITIONS ON MEASURES OF STATE ANXIETY FOR SUBJECTS WHO DIFFER IN TRAIT-ANXIETY

In the analysis of variance of A-State scores, presented in Table 1, a significant A-Trait x Time Periods interaction, F (1,94) = 20.63, $p < .001$) was found and this finding, combined with the previously reported significant main effect for Time Periods, indicates that the variation in A-State scores over time periods occurs as a function of A-Trait. As expected, the Ego Threat x A-Trait x Time Period interaction approached significance, although only at boderline values, F (1,94) = 3.56, $p < .10$. Also as expected no significant Physical Threat x A-Trait x Time Period inter-

action was found, F (2;94 = 1.14, $p > .10$. In order to clarify these findings, separate analyses were carried out for each experimental condition using the Duncan test for differences between means. The data for these analyses is presented in Table 3.

The examination of the difference between the mean State Anxiety Scale scores at Rest and Test Periods for subjects at both levels of A-Trait within each condition shows a significant increase in A-State from Rest to Test Period for both High A-Trait and Low A-Trait subjects in all conditions except the No-Threat Condition ($p < .05$). These findings support the prediction made in Hypothesis 1, that under conditions of induced stress both High A-Trait and Low A-Trait subjects would manifest increases in A-State in response to the ego and physical threats.

A further evaluation of the difference between the mean A-State increases for the two A-Trait levels within each condition indicated that the magnitude of the increase for High Anxiety subjects was significantly greater than for Low Anxiety subjects in all conditions ($p < .01$) except the Physical (public) Threat and No-Threat Conditions. These results indicate the predication made in Hypothesis 2, that the increases in A-State as a function of ego-threat would be greater for High A-Trait subjects than for Low A-Trait subjects, but no differential response in A-State as a function of physical-

TABLE 3

MEAN A-STATE SCORES FOR REST AND TEST PERIOD AND MEAN INCREASE IN A-STATE SCORES FROM REST TO TEST PERIOD FOR HIGH AND LOW A-TRAIT SUBJECTS IN EXPERIMENTAL CONDITIONS

CONDITIONS	A-TRAIT LEVEL	REST	TEST	INCREASE
Ego-Physical (Public)	HA	42.5	62.5	20.0
	LA	34.7	47.2	12.5
Ego-Physical (Private)	HA	38.67	58.0	19.33
	LA	32.67	42.83	10.16
Physical (Private)	HA	37.15	54.05	16.90
	LA	35.30	42.80	7.5
Physical (Public)	HA	38.1	47.27	9.17
	LA	28.63	36.68	8.05
Ego	HA	41.7	55.6	13.9
	LA	30.93	34.45	3.52
No Threat	HA	38.2	40.6	2.4
	LA	31.3	33.05	1.75

threat would occur, was only partially met. Although, as expected, High A-Trait subjects had stronger A-State responses than Low A-Trait subjects in conditions with direct ego-threat (failure feedback), the lack of differential responses to the indirect ego-threat (shame from failure to tolerate shock threat) in the Physical (public) Threat condition was contrary to expectations. Also the differential responses in A-State for subjects in the two A-Trait levels in the Physical (private) Threat which consisted of a pure physical-threat (threat of shock) was not predicted.

The fact that a differential A-State reaction was found in the three conditions having a direct ego-threat and was only lacking in the one condition involving anticipation or potential for ego-threat raises two possible explanations for these findings. Either 1) the anticipation of failure was not an intense enough ego-threat to cause a differential A-State reaction for High A-Trait and Low A-Trait subjects or 2) subjects in the Physical (public) Threat Condition did not perceive any ego-threat in the condition.

It is possible that the anticipation of failure may have presented only a mild ego-threat. McAdoo (1969) found that mild ego threats while evoking A-State reactions did not do so differentially for High and Low A-Trait subjects as with strong ego-threat. However the anticipation of failure, even as a mild ego threat could be expected to evoke some A-State

reaction in both groups and thus intensify the magnitude of the A-State increases in the Physical (public) Threat Condition as compared to the Ego-Threat and Physical-Threat Conditions. In fact as reflected in the magnitude of A-State change for subjects overall the Physical (public) Threat Condition approached being significantly less intense than the Physical (private) Threat Condition and was not dissimilar from the intensity of A-State reaction in the Ego-Threat Condition. Apparently the expected anticipation of failure, from inability to withstand the shocks, acted neither as a strong ego threat evoking differential A-State reactions nor as mild ego threat evoking similar A-State reactions for the two A-Trait groups.

It appears therefore that subjects in the Physical (public) Threat Condition did not anticipate the possibility of being unable to withstand the shocks. This assumption also received support from subjects' comments in the post-experimental interview. While the supposed presence of observers in this condition was intended to enhance the threat to self-esteem (ego-threat) by leading subjects to believe any inability to tolerate the shocks would be observed, in fact the presence of observers appeared to be used by the subjects to intellectualize away fear of failure. While all subjects accepted the idea that they were being observed, none expressed concern, and most were indifferent or found security in the presence of observers since they felt that the observers would

prevent the experimenter from harming them. It appears that the ego threat that was expected to arise out of the physical threat in this condition did not materialize. The intensity of the physical threat was actually reduced by the presence of observers and the most likely explanation for the lack of differential A-State reactions was that the subjects did not perceive any ego-threat in the condition.

The differential A-State responses for the High A-Trait and Low A-Trait subjects in the Physical (private) Threat Condition was also unexpected. The findings were similar to Shedletsky's study and contrary to the findings of Hodges. Shedletsky felt that the conflicting results between his and Hodges' study could arise due to 1) "the physical threat condition in his study containing elements of ego threat". (Ender and Shedletsky, 1973, p. 358) or 2) "the [State-Trait Anxiety Inventory] trait scale being limited to measuring interpersonal (ego threat) situations, whereas the S-R Inventory of Anxiousness is a multidimensional trait measure", (Ender and Shedletsky, 1973, p. 358). Shedletsky discounts a confounded physical threat variable and considers more likely that the conflicting findings between his and Hodges' study arise due to the State-Trait Anxiety Inventory - Trait Scale not discriminating as well between subjects in terms of the state anxiety associated with physical threat as compared to the better discrimination of the S-R Inventory of Anxiousness. However, if this was the reason for the conflict with Hodges'

findings and not a confounded physical threat, one would expect the present study to elicit a lack of differentiation between High and Low A-Trait subjects in a physical threat condition, similar to Hodges' study, and contrary to Shedletsky's study, since the present study made use of the State-Trait Anxiety Inventory - Trait Scale as the trait anxiety measure. Thus the present study should have similarly lacked the ability to discriminate differences in A-Trait levels "in terms of the state anxiety associated with physical threat" (Ender and Shedletsky, 1973, p. 358) as in Hodges' study. In fact the converse was true and we are therefore left with the possibility of a confounded physical threat condition in this study and in Shedletsky's study as the only explanation for the conflicting finding relating to Hodges' study.

The Physical (Private) Threat Condition in this study, while similar to Hodges' condition, may have more closely paralleled Shedletsky's and probably was more intense than Hodges' since, as with Shedletsky's study, subjects in the present study were aware of the possibility that they were being observed by other than the experimenter. Shedletsky, in order to heighten the intensity of the threat, told subjects that they were being video-taped. In the present study, subjects were aware that the experimental room was equipped with a two-way mirror. While use of the two-way mirror was discounted by the experimenter, and in fact the experimenter made a point of closing the curtain over the one exposed mirror in the presence of

the subjects, use of the mirrors at sometime during the experment may not have been discounted by the subjects. In fact in the present study many subjects mentioned in the post-experimental interview curiosity over why a room with a two-way mirror was being used even though they had been assured of its non-use. Thus the Physical (private) Threat Condition, as in Shedletsky's study, appeared to be more intense than in Hodges' study and may have, as Shedletsky speculated, introduced an ego threat element due to subjects concern with inability to tolerate shocks. This explanation is further supported by the fact that subjects in the "private" condition stated they "wondered" or were "concerned" about how strong the shocks would be and subjects in the "public or observer" conditions found security against harm by the experimenter. It would therefore appear that the conflicting findings in this study and Shedletsky's compared to Hodges' arise from a confounded physical threat. Further it appears that the subjects' perceptions of the Physical (private) Threat and Physical (public) Threat conditions were the reverse of the experimental design. A reversal of these two conditions would explain the conflicting data with regard to Hypothesis 2.

The results of this study while supporting Hypothesis 1 only partially support Hypothesis 2. Also the findings do not completely resolve the conflict arising from previous studies in this area by Hodges and Shedletsky. However,

while the hypotheses were only partially met and while the problem between the Hodges' and Shedletsky's studies was not fully resolved, the findings of this study do have implications with regard to the Hodges and Shedletsky conflict.

SUMMARY AND CONCLUSIONS

The purpose of the present study was to: 1) investigate the effects of ego threat, physical threat, and the combination of ego and physical threat on A-State for persons who differ in A-Trait, 2) replicate Hodges' (1967) study and 3) explore the conflicting findings in Shedletsky's (1972) replication of Hodges' (1967) study. It was expected that a close replication of Hodges' (1967) conditions of ego threat and physical threat as well as the incorporation of a specific combined ego-physical threat condition would shed light on possible confounding variables in Shedletsky's study. Subjects were selected on the basis of extreme scores on the State-Trait Anxiety Inventory-Trait Scale. The measure of A-State was the State-Trait Anxiety Inventory-State Scale. Differential instructions were used to produce ego threat, physical threat, ego-physical threat and no threat (control) conditions for subjects required to perform on a memory task.

The experimental procedure consisted of a Rest Period, a Performance Period in which the memory task was administered, a Feedback Period, a Test Period in which the memory task was re-administered and a second Feedback Period. On the basis of Trait-State Anxiety Theory, the following hypotheses were formulated in relation to changes in the A-State measure.

1) High and Low A-Trait subjects would manifest increases in A-State in response to the ego and physical threats.

2) Increases in A-State as a function of ego threat would be greater for high A-Trait than for low A-Trait individuals, but no differential response in A-State as a function of physical threat would occur.

Upon completion of the Performance Period, the Low and High A-Trait subjects were randomly assigned to the six conditions of the 2 x 3 factorial design derived from the two levels of ego threat and three levels of physical threat. The A-State measures were initially obtained at the end of the Rest Period and again after the second Feedback Period.

For all experimental conditions, scores on the State Anxiety Scale of the State-Trait Anxiety Inventory increased from the Rest to the Test Period. The increases in A-State scores were significantly greater in the stress inducing conditions than in the experimental condition designed to be nonthreatening (No-Threat). Since the performance task was the same in all conditions, it was assumed that changes in the State Anxiety Scale scores were determined by the differential threat induced by the experimental procedures.

These findings, that A-State level increased in response to threat situations for both High and Low A-Trait subjects were consistent with Hypothesis 1 drawn from Spielberger's (1972b) Trait-State Anxiety Theory which predicts that threat will evoke A-State responses. However, expectations of Hypothesis 2, that High and Low A-Trait subjects would manifest differential responses in A-State as a function of ego threat but not physical threat, were only partly met.

High A-Trait and Low A-Trait subjects responded differentially in most of the Ego-Threat Conditions with High A-Trait subjects showing a magnitude of change in A-State level greater than the Low A-Trait subjects. However the implications of this differential response were weakened by the fact that, while High A-Trait subjects responded with greater increases in A-State in all conditions having a direct or overtly induced ego threat arising from failure feedback, in the Physical (public) Threat Condition which consisted of anticipation or potential for ego-threat (shame) tied to the physical threat no significant difference in A-State response was found for the High and Low A-Trait subjects.

The fact that a differential A-State reaction was found in the three conditions having a direct ego-threat, and was lacking only in the one condition involving anticipation or potential for ego-threat raised two possible explanations for

these findings. Either 1) the anticipation of failure was not an intense enough ego threat to cause a differential A-State reaction for High and Low A-Trait subjects, or 2) subjects in the Physical (public) Threat Condition did not perceive any ego-threat in the condition. It was argued that the latter point was the more likely explanation.

The differential A-State responses for the High and Low A-Trait subjects in the Physical (private) Threat Condition was also unexpected. As an explanation for these findings, it was argued that the physical threat variable was confounded in that it was sufficiently intense as to introduce an ego threat element due to the subjects' concern with inability to tolerate shocks.

Another purpose of this study was to investigate the conflicting findings between studies carried out by Hodges and Shedletsky. While the findings of this study were not fully as predicted, they seriously question Shedletsky's explanation that his results compared to Hodges' were due to the State-Trait Anxiety Trait Inventory-Trait Scale not discriminating as well between subjects in terms of the state anxiety associated with physical threat as compared to the better discrimination of the S-R Inventory of Anxiousness. Shedletsky did not feel his results could have arisen out of a confounded physical threat condition. However the present study found results conflicting with Hodges' and similar to

Shedletsky, but the present study made use of the State-Trait Anxiety Inventory - Trait Scale. These results imply that Shedletsky's data was due more to a confounded physical threat than limitations of the State-Trait Anxiety Inventory - Trait Scale.

As possibilities for further research the following suggestions are made:

1) Replication of Hodges' (1967) study using as the A-Trait measure both the State-Trait Anxiety Inventory and the S-R Inventory of Anxiousness. Exploring the differences between these A-Trait scales might help determine whether the relationship between A-Trait and various classes of threat is a function of the A-Trait measurement tool.

2) More focus should be made on clarifying those situations which are believed to evoke anxiety responses. Particular attention must be paid to ensure that the ego threat and physical threat situations are "pure".

3) Evaluation of the relationship between A-Trait and overt ego threat arising from direct failure feedback as compared to covert ego threat

arising from anticipation of possible failure in the future. This line of research could clarify the nature and intensity of these situations.

REFERENCE NOTES

1. Auerback, S. M. Anxiety and time estimation. Unpublished master's thesis, Florida State University, 1969.

2. Haselhorst, J. A. State-trait anxiety and the outcome of heart surgery. Unpublished master's thesis, University of Illinois, 1970.

REFERENCES

Auerbach, S. M. An investigation of the effects of surgery-induced stress on state and trait anxiety (Doctorial dissertation, Florida State University, 1971). Dissertation Abstracts International, 1972, 33, 434-B. (University Microfilms No. 72-13, 486).

Auerbach, S. M. Trait-state anxiety and adjustment to surgery. Journal of Consulting and Clinical Psychology, 1973, 40, 264-271.

Basowitz, H., Persky, H., Korchin, S. J., & Grinker, R. R. Anxiety and stress. New York: McGraw-Hill, 1955.

Cattell, R. B. Patterns of change: Measurement in relation to state-dimension, trait, lability and process concepts. In R. B. Cattell (Ed.), Handbook of multivariate experimental psychology. Chicago: Rand McNally, 1966.

Cattell, R. B., & Scheier, I. H. The nature of anxiety: A review of thirteen multivariate analyses comprising 814 variables. Psychological Reports, 1958, 4, 351-388.

Cattell, R. B., & Scheier, I.H. Stimuli related to stress, neuroticism, excitation, and anxiety response patterns. Journal of Abnormal and Social Psychology, 1960, 60, 195-204.

Cattell, R. B., & Scheier, I. H. The meaning and measurement of neuroticism and anxiety. New York: Ronald Press, 1961.

Crowne, D. P., & Marlowe, D. A new scale of social desirability independent of psychopathology. Journal of Consulting Psychology, 1960, 24, 349-354.

Cumming, W. G., Jr. The effects of stress and exposure to reduces environmental stimulation on suggestibility (Doctorial dissertation, Boston University, 1968). Dissertation Abstracts, 1969, 29, 2648-B. (University Microfilms No. 68-18, 139.

Dykman, R. A., Ackerman, Peggy T., Galbrecht, C. R., & Reese, W. F. Physiological reactivity to different stressors and methods of evaluation. Psychosomatic Medicine, 1963, 25, 37-59.

Dykman, R. A., Reese, W. G., Galbrecht, C. R., & Thomasson, Peggy J. Psychophysiological reaction to novel stimuli: Measurement, adaptation, and relationship of psychological and physiological variables in normal humans. Annals of the New York Academy of Science, 1959, 79, 45-107.

Endler, N. S., & Hunt, J. McV. Sources of behavioural variance as measured by the S-R Inventory of Anxiousness. Psychological Bulletin, 1966, 65, 336-346.

Endler, N. S., & Hunt, J. McV. S-R Inventories of Hostility and comparisons of the proportions of variance from persons, responses, and situations for hostility and anxiousness. Journal of Personality and Social Psychology, 1968, 9, 309-315. (a).

Endler, N. S., & Hunt, J. McV. Triple-interaction variance in the S-R Inventory of Anxiousness. Perceptual and Motor Skills, 1968, 27, 1098. (b).

Endler, N. S., & Hunt, J. McV. Generalizability of contributions from sources of variance in S-R Inventory of Anxiousness. Journal of Personality, 1969, 37, 1-34.

Endler, N. S., Hunt, J. McV., & Rosenstein, A. J. An S-R Inventory of Anxiousness. Psychological Monographs, 1962, 76, 17.

Endler, N. S., & Shedletsky, R. Trait versus state anxiety, authoritarianism and ego threat versus physical threat. Canadian Journal of Behavioural Science, 1973, 5, 347-361.

Fischer, W. F. Theories of anxiety. New York: Harper & Row, 1970.

Freud, S. Inhibitions, symptoms and anxiety. In J. Strachey, (Ed. and trans.), The complete psychological works of Sigmund Freud (Vol. XX). London: Hogarth Press 1959. (originally published, 1926).

Freud, S. Introductory lectures on psycho-analysis (Part III). In J. Strachey (Ed. and trans.), The complete psychological works of Sigmund Freud (Vol. XVI). London: Hogarth Press, 1973. (originally published, 1917.)

Freud, S. The problem of anxiety (H. A. Bunker, trans.). New York: Norton, 1964. (Originally published under the title Inhibitions, symptoms and anxiety. 1926.)

Goldstein, K. The organism. New York: American Book, 1939.

Harleston, B. W., Smith, M. G., & Avery, D. Test anxiety level, heart rate, and anagram problem solving. Journal of Personality and Social Psychology, 1965, 1, 551-557.

Hildreth, H. M. A Bettery of feeling and attitude scales for clinical use. Journal of Clinical Psychology, 1946, 2, 214-221.

Hodges, W. F. The effects of success, threat of shock and failure on anxiety (Doctorial dissertation, Vanderbilt University, 1967). Dissertation Abstracts, 1968, 28, 4296-B. (University Microfilms No. 68-5, 388).

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

Hodges, W. F., & Spielberger, C. D. The effects of threat of shock on heart rate for subjects who differ in manifest anxiety and fear of shock. Psychophysiology, 1966, 2(4), 287-294.

Hodges, W. F., & Spielberger, C. D. Digit span: An indicant of trait or state anxiety? Journal of Consulting and Clinical Psychology, 1969, 33, 430-434.

Ishiguro, S. Motivational instruction and galvanic skin response on memory, especially as related to manifest anxiety. Psychological Reports, 1975, 16, 786.

Johnson, D. T. Effects of interview stress on measures of state and trait anxiety. Journal of Abnormal Psychology, 1968, 73, 245-251.

Judson, A. J., & Gelber, G. Test anxiety, pulse rate and learning. Psychonomic Science, 1965, 3, 397-398.

Katkin, E. S. The relationship between manifest anxiety and two indices of autonomic response to stress. Journal of Personality and Social Psychology, 1965, 2, 324-333.

Katkin, E. S. The relationship between a measure of transitory anxiety and spontaneous autonomic activity. Journal of Abnormal Psychology, 1966, 71, 276-278.

Kierkegaard, S. The concept of dread (Walter Lowrie, trans.). Princeton, N.J.: Princeton University Press, 1944. (Originally published, 1849.)

Kissel, S., & Lettig, L. W. Test anxiety and skin conductance. Journal of Abnormal and Social Psychology, 1964, 69, 195-205.

Krause, M. S. The measurement of transitory anxiety. Psychological Review, 1961, 68, 178-189.

Lamb, D. E. The effects of public speaking on self-report, physiological, and behavioral measures of anxiety (Doctorial dissertation, Florida State University, 1969). Dissertation Abstracts International, 1970, 31, 2284-B. (University Microfilms No. 70-16,334).

Lazarus, R. S., & Opton, E. M. The study of psychological stress: A summary of theoretical formulations and experimental findings. In C. D. Spielberger (Ed.), Anxiety and behavior. New York: Academic Press, 1966.

Levitt, E. E. The psychology of anxiety. Indianapolis: Bobbs-Merrill, 1967.

Lushene, R. E. The effects of physical and psychological threat on the autonomic, motoric and ideational components of state anxiety (Doctorial dissertation, Florida State University, 1970). Dissertation Abstracts International, 1971, 31, 5630-B. (University Microfilms No. 71-7,059).

Malmo, R. B., Shagass, C., Davis, J. F., Cleghorn, R. A., Graham, B. F., & Goodman, A. J. Standardized pain stimulation as controlled stress in physiological studies of psychoneurosis. Science, 1948, 108, 509-511.

Mandler, G., & Watson, D. L. Anxiety and the interruption of behavior. In C. D. Spielberger (Ed.), Anxiety and behavior. New York: Academic Press, 1966.

Martin, B. The assessment of anxiety by physiological behavior measures. Psychological Bulletin, 1961, 58, 234-255.

May, R. The meaning of anxiety (Rev. ed.). New York: W. W. Norton, 1977.

McAdoo, W. G., Jr. The effects of success, mild failure, and strong failure feedback on A-state for subjects who differ in A-trait (Doctorial dissertation, Florida State University, 1970). Dissertation Abstracts International, 1971, 31, 6263-B. (University Microfilms No. 70-20,080).

Nowlis, V. Research with the mood adjective check list. In S. S. Tomkins & C. E. Izard (Eds.), Affect, cognition and personality. New York: Springer Publishing, 1965.

O'Neil, H. F., Jr. Effects of stress on state anxiety and performance in computer-assisted learning (Doctorial dissertation, Florida State University, 1969). Dissertation Abstracts International, 1970, 31, 1568-B. (University Microfilms No. 70-16,343).

Raphelson, A. C. The relationship among imaginative, direct verbal and physiological measures of anxiety in an achievement situation. Journal of Abnormal and Social Psychology, 1957, 54, 18-18.

Scheier, I. H., & Cattell, R. B. Handbook and test kit for the IPAT 8 Parallel form anxiety battery. Champaign, Illinois: Institute for Personality and Ability Testing, 1960.

Shedletsky, R. Trait versus state anxiety and authoritarianism - rebelliousness (Doctorial dissertation, York University, 1972). Canadian Theses on Microfilm, 12604. Ottawa: National Library of Canada, 1972.

Silverman, R. E. The manifest anxiety scale as a measure of drive. Journal of Abnormal and Social Psychology, 1957, 55, 94-97.

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

Spielberger, C. D. Current trends in theory and research on anxiety. In C. D. Spielberger (Ed.), Anxiety: Current trends in theory and research (Vol. 1). New York: Academic Press, 1972(a).

Spielberger, C. D. Anxiety as an emotional state. In C. D. Spielberger (Ed.), Anxiety: Current trends in theory and research (Vol. 1). New York: Academic Press, 1972(b).

Spielberger, C. D., Auerbach, S. M., Wadsworth, A. P., Dunn, T. M., & Taulbee, E. S. Emotional reactions to surgery. Journal of Consulting and Clinical Psychology, 1973, 40, 33-38.

Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. Manual for the state - trait anxiety inventory. Palo Alto, Calif: Consulting Psychologist Press, 1970.

Spielberger, C. D., Lushene, R. E., & McAdoo, W. G. Theory and measurement of anxiety state. In R. B. Cattell & R. M. Dreger (Eds.), Handbook of modern personality theory. Washington: Hemisphere Publishing, 1977.

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

Weshsler, D. Manual for the Wechsler adult intelligence scale. New York: Psychological Corp., 1955.

Wessman, A. E., & Ricks, D. F. Mood and personality. New York: Holt, Rinehart & Winston, 1966.

Wilde, G. J. S. Trait description and measurement by personality questionnaires. In R. B. Cattell & R. M. Dregor (Eds.), Handbook of modern personality theory. Washington: Hemisphere Publishing, 1977.

Winer, B. J. Statistical principles in experimental design (2nd ed.). New York: McGraw-Hill, 1971.

Zuckerman, M. The development of an affective adjective check list for the measurement of anxiety. Journal of Consulting Psychology, 1960, 24, 457-462.

FOOTNOTE

1. The State-Trait Anxiety Inventory-Trait Scale was solely used to select subjects rather than used jointly with the S-R Inventory of Anxiousness since 1) there was no published material for the modified version of the S-R Inventory of Anxiousness used by Shedletsky and no readily available scoring information and 2) publication of Shedletsky's research only became available immediately prior to the beginning of the present study and time did not permit the extensive correspondence which would have been necessary to acquire the unpublished material on the modified version of the S-R Inventory of Anxiousness. Also, for these reasons, combined with strong intuitive expectations that a media such as video-taping was ego-threatening, the intent of part of the present study was stated as exploring rather than attempting to resolve the conflict between Hodges' and Shedletsky's studies.

APPENDIX A

SELF-EVALUATION QUESTIONNAIRE

STAL FORM X-1

NAME: _____ DATE: _____

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

1 - NOT AT ALL 2 - SOMEWHAT 3 - MODERATELY SO
4 - VERY MUCH SO

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

...../contn'd

APPENDIX A - Continued

17.	I am worried	1	2	3	4
18.	I feel over-excited and "rattled"	1	2	3	4
19.	I feel joyful	1	2	3	4
20.	I feel pleasant	1	2	3	4

APPENDIX B

SELF-EVALUATION QUESTIONNAIRE

STAI FORM X-2

NAME: _____ DATE: _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

1 - ALMOST NEVER 2 - SOMETIMES 3 - OFTEN
4 - ALMOST ALWAYS

21.	I feel pleasant	1	2	3	4
22.	I tire quickly	1	2	3	4
23.	I feel like crying	1	2	3	4
24.	I wish I could be as happy as others seem to be	1	2	3	4
25.	I am losing out on things because I can't make up my mind soon enough	1	2	3	4
26.	I feel rested	1	2	3	4
27.	I am "calm, cool, and collected"	1	2	3	4
28.	I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
29.	I worry too much over something that really doesn't matter	1	2	3	4
30.	I am happy	1	2	3	4
31.	I am inclined to take things hard	1	2	3	4
32.	I lack self-confidence	1	2	3	4
33.	I feel secure	1	2	3	4
34.	I try to avoid facing a crisis or difficulty	1	2	3	4
35.	I feel blue	1	2	3	4

...../contn'd

APPENDIX B - Continued

36.	I am content	1	2	3	4
37.	Some unimportant thought runs through my mind and bothers me	1	2	3	4
38.	I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
39.	I am a steady person	1	2	3	4
40.	I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

APPENDIX C

INSTRUCTIONS

The subjects were brought into the experimental room and given the following instructions. The Galvanic Skin Response equipment was attached and its function explained.

> You will be taking part in an experiment to study the relationship between intelligence and physiological measures such as skin conductance. The equipment takes several minutes to warm up, so you can sit back, make yourself comfortable and relax.

Rest Period

At the end of five minutes, the subjects were given the State Anxiety Scale form of the State-Trait Anxiety Inventory and the following instructions:

> Read out loud the instructions on the form. Do you have any questions? Then fill out the form as quickly as possible according to how you feel right now.

Performance Period

After completing the State Anxiety Scale form, the subjects were given the following instructions:

> Now, as a measure of intelligence we are using the Digits Backwards Test from the Wechsler Adult Intelligence Scale. Please listen carefully to these instructions. (The standard instructions (Wechsler, 1955, p. 41) were then read.)

Following the defining of the subjects' limits on the Digits Backwards Test, the subjects were given two series of digits at the level of one digit less than their limit.

Test Period

Following completion of the Performance Period, the subjects were randomly assigned to an experimental condition and run in that condition. The instructions for each condition were as follows:

No Threat Condition. After completing the Performance Period the subjects in this condition were given the following instructions:

> You are doing very well, in fact better than most students. Now I am going to give you some more items just as easy as the previous ones.

Following these instructions the subjects were given the six series of digits which comprised Test 1. After completing Test 1, the subjects were given the State Anxiety Scale form and the following instructions:

> Again you did very well. Before we go on with the next set of digits, which will be just as easy as the previous ones, I would like you to fill out this form. Please read the instructions out loud and then fill out the form as quickly as possible according to how you feel right now.

After the State Anxiety Scale form was completed the following instructions were given and the subjects were debriefed.

> Unfortunately, I don't seem to be getting readings from the Galvanic Skin Response equipment. I have been having trouble with this equipment and it seems to be malfunctioning again. Without these readings there isn't much point in continuing the experiment, therefore, I'm afraid that we will have to terminate the experiment at this point.

Physical (Private) Threat Condition. Upon completion of the Performance Period, the subjects in this condition were given the same instructions as in the No Threat Condition and Test 1 was given.

After completing Test 1 the subjects were given the following instructions:

> You are still doing quite well and better than most students. Now we are interested in the effects of strong electric shock on skin conductance. I am going to give you some items just as easy as before but between some of the series of digits you will receive one or more strong electric shocks. Although the shocks may be quite strong, they will not harm you. You won't receive the shocks while you are saying the digits, only between the series. Now I'll attach these electrodes to your arm and allow the machine to warm up. While we are waiting you can fill out this form.

The subjects were then given the State Anxiety Scale form under the same instructions as were given with the form's second presentation in the No Threat Condition. After the State Anxiety Scale form was completed the experiment was terminated as in the No Threat Condition.

Ego Threat Condition. Upon completion of the Performance Period, the subjects were given the following instructions:

> I am quite surprised, you are doing much poorer than most students. Most students who have taken part in this experiment were able to answer more quickly and do longer series. It is important for the purpose of this experiment that you do as well as you can. I am going to give you some more digit series. Try to concentrate harder so that you can repeat the digits backwards as quickly as possible without errors.

After the series of digits in Test 1, the subjects were given the following instructions:

> You did about the same as last time. I really can't understand why you are having so much trouble and doing so much poorer than other students. We are going to have to do another set of digits and this time please concentrate harder and try to do better. While I am preparing the next series of digits, I want you to fill out this form.

The subjects were then given the instructions for the State Anxiety Scale form and for terminating the experiment as in the No Threat Condition.

Ego-Physical (Private) Threat Condition. Instructions in this condition were the same as those given in the Ego Threat Condition. In addition, after completing Test 1, the subjects were given the same shock instruction as in the Physical (Private) Threat Condition, but excluding any reference to good performance.

Physical (Public) Threat Condition. The instructions in this condition were the same as in the Physical (Private) Threat Condition, with the following additional instructions at the end of Test 1:

> Now, since the Psychology Department requires that any experiments using electric shock be carefully supervised, to be sure that no student is harmed, there will be three observers, trained in evaluating behavioural responses to pain, watching the next test from behind the one-way mirror. So that you will not be distracted from the digits task, you will not be able to see the judges, although they will be able to see you and

your reactions to the electric shocks. They will be able to see you but they will not be able to hear what is said in this room. Now, while the equipment is warming up, I would like you to fill out this questionnaire.

Ego-Physical (Public) Threat Condition. The instructions in this condition were the same as in the Ego-Physical (Private) Threat Condition with the additional of the observer instructions given in the Physical (Public) Threat Condition.

Post Experimental Instructions

At the end of the experiment the electrodes were removed and a structured interview was conducted to examine the subjects' views of the purpose of the experiment. A list of questions asked during the interview can be found in Appendix E. After the interview the subjects were debriefed, depending on the type of threat to which they had been exposed, as follows:

Ego Threat Conditions

Actually, rather than studying the relationship between intelligence and physiological measures, we were really interested in the effects of criticism. We were not interested in your performance and we were not measuring your I.Q. You actually did quite well. The average adult is able to do about four digits backwards. So you can see that you did fine.

Shock Threat Conditions

The subjects assigned to these conditions were not given any instructions at this time.

No Threat Condition

The subjects in this conditions were given no instructions at this time.

All Conditions

Subjects in all conditions were also told:

> In doing psychology experiments it is very important that the experiment be well controlled. As I told you before, that can only be done if all subjects come to their appointments knowing nothing about the experiment. For this reason I must ask you to give me your word that you will not discuss this experiment with anyone until after the end of the semester. I appreciate your cooperation. Do you have any questions?

APPENDIX D

DIGIT SERIES

PERFORMANCE PERIOD

528	1596	32497	173596	1756294	15362874	825714963
942	3694	63958	461378	1874629	26958174	419672583
925	8197	72495	628437	6194738	97136825	531694782
351	2874	59617	746893	2758139	75813426	538671429
716	4167	46537	612537	1635428	85217493	529143786
428	3852	54817	514738	2537916	86537129	357496128

TEST PERIOD

521	1897	17389	934268	5243791	97461382	372691486
764	9241	79438	195867	1985246	75863124	314759826
368	8673	92653	391476	9175863	67418352	293614875
534	8216	83249	625947	4973285	24896315	928174653
853	6841	26487	593715	7418356	92583146	749521683
725	6289	29379	583219	4139825	41297586	253948176

APPENDIX E

POST EXPERIMENTAL INTERVIEW

The following questions were asked of each subject:

1. While you were relaxing, waiting for the experiment to start, what did you think was the purpose of the experiment?

2. How did you feel when you were first told that:
   (a) you were doing poorly?
   (b) you were to receive shocks?
   (c) you were going to be watched by three observers?
   (d) You were doing better than most students?

3. Did you feel any concern or apprehension at that time?

4. How much concern or apprehension do you think you felt?

5. What did you think was the purpose of the experiment then?

6. What do you think was the purpose of the experiment now?

7. What were your general reactions to the experiment?

8. It is very important in psychology experiments that every subject enter the experiment knowing nothing about it. We realize that often subjects discuss experiments and sometimes a subject goes through an experiment knowing something about it. Even if the subject thinks what he knew in advance was trivial, we prefer if he tells us so that we can judge the importance of his prior knowledge. That way, as long as we know, no harm will be done to the experiment. So will you tell me if you discussed the experiment with anyone before you came or if you heard anything about the experiment? If so, please tell me what you heard. If you were told anything I only want to know what you were told. I am not interested in who told you.

9. Do you have any questions you would like to ask me?