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Components of State Anxiety for Varying Levels and Dimensions of Trait Anxiety

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Components of State Anxiety for Varying Levels and Dimensions of Trait Anxiety

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Recent research has provided support for a multidimensional view of trait anxiety to supplant the former unidimensional approach. Unidimensional measures of general trait anxiety have been found to be inadequate as predictors of state anxiety reactions across a wide variety of situations. As such, they are poor measures of general trait anxiety. The present investigation was conducted to examine the possible utility of a single anxiety trait score, summed from the subscales of the Stimulus - Response Inventory of General Trait Anxiety (S-R GTA), a multidimensional measure of trait anxiety, in supplementing the ability of individual subscale scores to predict state anxiety responses to trait-congruent situations. It was hypothesized that subjects who scored at the same level on a particular subscale would differ in their responses to trait-congruent stress because of differences in general trait anxiety as measured by the total score on the S-R GTA. A second purpose of this study was to examine the possibility that different dimensions of trait anxiety might differentially affect variables that have been commonly associated with state anxiety arousal. Some researchers have suggested that state anxiety

reactions may differ in quality according to the situations that arouse them.

Thirty-two subjects were placed in four groups according to their scores on the social evaluation (SE) and physical danger (PD) subscales of the S-R GTA. A high general anxiety group was comprised of volunteers who scored high on both subscales. A low general anxiety group was comprised of volunteers who scored low on both subscales. Two groups reporting moderate levels of general anxiety were comprised of volunteers who scored low on one subscale while scoring high on the other. The subjects were exposed to two stressing situations, one involving social evaluation (a purported test of intelligence) and another which involved physical danger (threat of electric shock). The experimental design was a 4 (groups) by 2 (situations) latin square with repeated measures. Measures of self-reported state anxiety, heart rate, skin conductance, self-reported physiological arousal, performance on a simple task, self-efficacy and self-evaluation were obtained for each situation.

The increments in self-reported state anxiety to the stressing conditions paralleled the expectations based on the respective subscale scores on the S-R GTA.

Subjects who reported similar levels of trait anxiety to either dimension, regardless of their levels of general anxiety, did not differ in their respective increases in state anxiety to stress. In a discriminant analysis of responses in all of the dependent variables to social evaluation stress and physical danger stress, 46 of the 64 observations were correctly classified. Subjects reported lower levels of self-efficacy to the task involving physical danger, but evaluated their performance as much better than on the task involving social evaluation. The subjects also self-reported higher levels of physiological arousal to the physical danger task, but did not experience greater increases in heart rate or skin conductance.

The results provide additional support for the multidimensional view of trait anxiety and argue against the use of a total score on the S-R GTA as a measure of general trait anxiety. The total score did not enhance the ability of the subscale scores to predict state anxiety responses to trait-congruent situations. The results also provide support for the view that the dimensions of trait anxiety differentially arouse the various components of state anxiety. Theoretical and practical implications of the results were discussed and suggestions for future inquiry were offered.

INTRODUCTION

Anxiety in Psychology

Anxiety is probably the most frequently encountered concept in psychology. Everyone has experienced anxiety as a normal, expectable consequence of living. It is found to be a central explanatory concept in almost all of the contemporary theories of personality (Spielberger, 1966) and has occupied a central position in formulations of the acquisition, stability, and change of human behavior for some 50 years (McRaynolds, 1968). As popularly understood, the experience of anxiety has a negative connotation and is something to be avoided. Under normal conditions, however, anxiety can be found to serve some very useful functions which can foster adaptive behavior in difficult or dangerous situations. It can be a signal of danger or threat, serving the function of an "early warning system" to encourage the individual to be more aware and perceptive of the environment. Under some circumstances it can serve to facilitate the learning of difficult activities and facilitate subsequent performance. It is clear that in many cases, anxiety can have very positive and beneficial effects (Suinn, 1970).

It is also clear, however, that the negative connotations associated with the anxiety construct are not undeserved. Anxiety is considered by most theorists to be the cornerstone of all psychopathology. It occupies a

core conceptual role in such widely divergent theoretical approaches to pathogenesis as psychoanalysis and learning theory (Klein, Zitrin, and Woerner, 1978). The most important symptoms of mental illness are usually considered to be the result of maladaptive maneuvers to cope with the uncomfortable effects of the pressure of anxiety. Davison and Neale (1978) stated that "there is, perhaps, no other single topic in abnormal psychology that is so important and controversial as anxiety. This emotional state is considered a symptom of almost all psychopathology and in the neurotic states in particular" (p. 112). There is no doubt that anxiety as an emotional problem has long been one of the key concepts in psychiatry and psychology (Klein, Zitrin, and Woerner, 1978).

Anxiety is important not only as a key factor in the development of pathology but also in the evidence of its prevalence in the general population. Frequent references are made to this being the "age of anxiety." It has been estimated that approximately 60% of the patients entering a physician's office are actually suffering from emotional difficulties of which anxiety is a major factory (Ray, 1974). Anxiety, along with depression constitutes the vast majority of psychiatric problems (estimated to by 87%) seen by general practitioners (Schweltzer and

Adams, 1979). In a survey of all diagnoses made in the offices of general practitioners, anxiety was found to be the fifth most common diagnosis. Added testament to the prevalence of anxiety in the general population is the widespread use and abuse of drugs which are intended to ameliorate emotional problems. The number of prescriptions filled for the anti-anxiety drug Valium reached nearly 62 million in the year 1975 (Cooper, 1977). In 1976, Valium was implicated in 54,400 reported emergency room visits nationwide. An estimated 880 Valium-related deaths occurred during this period of time. It is estimated that, in the general population, an estimated 42% of all women and 27% of all men use this drug. It is apparent that anxiety is a very common problem in the general population that merits considerable attention.

References to the experience of and the deleterious effects of anxiety can be found in the writings of the Greeks and Romans. As far back as 1755, medical practitioners were experimenting with tranquilizing drugs such as rauwolfia, and noting their beneficial effects in counteracting the symptoms of anxiety (Shader and Greenblatt, 1979). It wasn't until about 100 years ago, however, that physicians began systematically diagnosing and treating anxiety under the label of neurasthenia. It was Sigmund Freud who, beginning in the 1890's began

emphasizing anxiety as an extremely important psychological concept which can be implicated in most mental disorders. He eventually came to regard anxiety as the fundamental problem in all neurotic symptom formation and viewed the goal of understanding the nature of anxiety as an essential step in the development of a comprehensive theory of human behavior. His explanation of this concept was continually modified over a period of 50 years as he carried out a quest for the appropriate abstract ideas through which to express the quintessential nature of anxiety (Spielberger, 1972). Despite his efforts, Freud was not successful in specifically identifying the unique identifying characteristics of what he called anxiety. Due to the impact that his theorizing has had on the fields of psychiatry and psychology, however, anxiety has remained a central and very important concept.

It has been only in recent times, however, that the experience of anxiety has been investigated experimentally in humans. Until the 1950's, few experimental investigations had been conducted due to several factors, the most important being a lack of appropriate instruments for assessing anxiety and the ethical problems associated with the induction of anxiety in the laboratory (Spielberger, 1972). Since 1950, more than 2,500 articles and books have been indexed in the Psychological Abstracts under the heading of

anxiety and an estimated 4,000 have appeared in the medical journals. Such an explosion of interest was fostered in large part by the development of the Taylor Manifest Anxiety Scale (Taylor, 1951) as a self report instrument to gauge anxiety. Since that time several well known instruments have come into use to enoourage basic research. Cattell and Scheier (1961) reported that at least 120 specific measurement instruments of anxiety had been developed as of 1961. A more recent review by Borkovec (1977) references 191 different rating instruments. This evidence along with the recent explosion of interest in the experimental investigation of this area, the centrality of the anxiety concept in most theories of psychopathology, and the evidence of widespread use and abuse of anti-anxiety compounds in society today all provide convincing testament to the continuing importance of anxiety in normal and abnormal human behavior.

Problems in Defining Anxiety

Given the wide acceptance of anxiety as a very important construct in explaining normal and abnormal behavior, one would expect that its definition would be generally agreed upon. Despite decades of study, the scientific understanding of anxiety is very incomplete (Schweitzer and Adams, 1979). Anxiety is a word that is employed to

describe many phenomena such as a motivator (anxious to please), a personality trait (an anxious person), and an emotional disorder (anxiety reaction), among many others. Over the years, widely varying theoretical approaches have developed definitions of this word. These have included several psychoanalytic variations of the term, as well as humanistic explanations (Rogers, 1951), existential explanations (May, 1950), factor analytic approaches (Cattell, 1966), and different learning theory approaches (Pavlov, 1927; Mowrer, 1939). These and several other approaches are outlined by Epstein (1972). More often than not, the construct of anxiety has been couched in relatively vague terms. Thus, in assessing its contributions in explaining various aspects of behavior, psychology and psychiatry were traditionally faced with the task of measuring and modifying an all too often vague, ill defined, and metaphorical variable that, over time, was reified into a "thing" assumed to occupy a place of vital importance in the understanding of human behavior (Borkovec, Weerts, and Bernstein, 1977). Thus, while most investigators and clinicians would agree that "being anxious" or "having anxiety" is usually unpleasant and to be avoided if possible, there is really no single universally accepted definition of anxiety available (Bernstein, 1976).

Due to the definitional vagueness of the term, the assessment of anxiety is a job that may be second in difficulty only to the definition of depression (Zung, 1979). Many professionals would argue that the proper assessment of such a construct is essential prior to remediative efforts. Since 1952, when Taylor devised the Manifest Anxiety Scale to quantify the construct and make it amenable to experimental investigation, the many additional measures of anxiety noted above have been designed to measure different qualities of this construct. These have ranged from very general measures to rate individual predispositions of experience anxiety in a wide variety of situations to scales which seek to gauge very situationally specific anxiety. While so many scales have been developed and found to be useful in generating research, most have had very little impact on the assessment and treatment of anxiety in the clinic.

The considerable difficulty encountered in accurately defining and measuring anxiety has led to confusion in the area of treatment as well. Despite the widespread agreement among professionals in mental health that anxiety is very important in the development of pathology, few therapeutic techniques have been developed to deal specifically with it. This is due, to a large extent, to the inability of professionals concerned with this area

to make explicit the nature of anxiety and its contributions to the development of psychopathology. Thus no consistent treatment approach to the problems of anxiety has been developed until recently.

Emotions and Anxiety

Despite the considerable ambiguity surrounding the definition of anxiety, most would agree that anxiety is "something felt," an unpleasant affective state for the human organism (Spielberger, 1972) which is characterized by feelings of tension and apprehension along with heightened sympathetic nervous system activity. Some (Izard, 1972; Lazarus, 1966) posit that an understanding of emotions and their components is the key to understanding anxiety. Certainly the research in the area of emotions has suffered from many of the same problems encountered in the investigation of anxiety.

The experimental investigation of emotion has a much longer history than that of anxiety and can be traced to the work of William James in the 1890's (Bindra, 1970). In his work, James (1890) linked the subjective experience of emotions, such as anxiety, as well as fear and anger, to the subjective perception of bodily changes manifest in the subsystems of the autonomic nervous system (ANS). He contended that such bodily reactions follow the perception of a threatening situation in a relatively automatic fashion. An important

implication of this approach is that differing emotions must be produced by qualitatively different patterns for levels of autonomic arousal. To James, then, the arousal of the ANS and its perception was central to the experience of emotion.

The importance of autonomic patterning was later challenged by Cannon (1927), who noted that similar autonomic cues can result in the subjective experience of different emotions. Modifying the approach of James, Cannon emphasized activity in the central nervous system, particularly that involving the thalamus over the activity of the ANS. Despite this diminution of importance of peripheral processes in the overall experience of emotion, the ANS retained some status. Excitation of the sympathetic portion of the ANS, generally resulting in more rapid activityof its component processes and popularly identified as the "fight or flight" response, was seen as the common reaction to all emergency situations. Cannon suggested that the level of ANS arousal could be employed as a gauge of emotional arousal.

These approaches to the development and differentiation of emotions have each placed considerable emphasis on physiological processes. While the nature of the situation evoking these responses is implied as being important in the elicitation of such arousal, it is given

a relatively minor role in the overall evaluation of the emotional response. More recent work by Schachter and Singer (1962) has implicated both the situational component and cognitions as also being important in an emotional response. These authors noted that a generalized state of autonomic arousal would be interpreted as a particular type of emotion according to the characteristics of the immediate situation. If, for example, the arousal was experienced in a situational context suggesting joy or mirth, the emotional experience will be labeled thusly. According to Schachter (1964), the factors necessary for an emotional response are: 1) an undifferentiated state of physiological (autonomic) arousal; and 2) the presence of cognitive labels derived from the perception of the situational event which would define the state of arousal and associated behavior along emotional lines.

Further evidence of the importance of cognitive processes in emotionality is seen in the work of Richard Lazarus and his colleagues. Lazarus and Alfert (1964) demonstrated that the levels of autonomic reactivity manifest by subjects exposed to a stress inducing film involving industrial accidents could be reduced or magnified according to the instructional set presented during an introductory statement to the film. According

to the authors, the introductory set imposed by the instructions determined the subject's cognitive appraisal of the film's threat potential thereby either cognitively short-circuiting or intensifying the consequent arousal of the ANS. Further evidence of the importance of the cognitive appraisal of situations as a factor in physiological responsivity was offered by Lazarus, Opton, Nokimos, and Rankin (1965) and Koriat, Melkman, Averill, and Lazarus (1972). This approach to explaining emotionality, while emphasizing the importance of cognitions, differs from the approach of Schachter and Singer (1962) in that cognitions directly affected the physiological response levels whereas with Schachter and Singer the physiological reactivity was considered to be a constant while the environment was manipulated. The results from Lazarus' laboratory demonstrate that the same situation can result in widely varying degrees of autonomic arousal accoring to the individual's cognitive orientation to that situation.

Valins (1966, 1967) suggested an important qualification to the theories of emotion outlined above, particularly that of Schachter and Singer, when he reported that subject need not actually perceive their internal autonomic arousal in order to experience emotion It appears sufficient that subjects need only think that an internal change had taken place. If a subject is presented with false imformation about his internal

autonomic state he acts as if there was a genuine alteration in this state. This is important since it emphasizes that the subjects' cognition of their internal states may often be more important than the internal states themselves (Van Toller, 1979).

The research outlined above emphasizes the complexity of assessing an emotion and the importance of a multi-faceted approach in trying to accomplish such a task. A thorough examination of an emotion requires that not only the physiological arousal be accounted for but also the way that the individual labels the immediate situation and how the individual perceives (or misperceives) the level of autonomic arousal. Without taking all such factors into account, only an incomplete understanding of the nature of emotion can be achieved.

The conclusions outlined above appear to hold true for anxiety as well. The confusion, ambiguity, and inconsistency found in the study of anxiety is due, at least in part, to the very complexity of emotional phenomena (Lindsley, 1951). Due to this complexity, individual investigators have, as a rule, tended to select a portion of the total response for study. Popular areas for study have included the physiological indicants of anxiety, the behavioral manifestations of anxiety, and the cognitive-phenomenological aspects of anxiety. The concentration on

one of these channels to the relative neglect of the other two is a major reason for the limited success thus far in understanding, assessing, and treating anxiety.

Anxiety and Behavioral Therapy

The ambiguity of the anxiety construct and the difficulty in treating it is perhaps best exemplified by the psychoanalytic approach. The early explanations of anxiety were dominated by this perspective and its influence continues today. Unfortunately, this literature dealt mainly with factors important in the etiology of anxiety and provided little information to the treatment specialist of specific techniques that could be employed to alleviate the distress. In fact, very little empirical clinical data were presented in these psychoanalytic writings (Grinker, Miller, Sabshin, Nunn, and Nunnally, 1961). Even when these data were presented, it was primarily as catalysts for a discussion of various intrapsychic phenomena. Psychoanalysis was held to be the treatment of choice regardless of differences in the overt manifestations of the behavior. In itself, psychoanalytic theory in the area of anxiety is ambiguous, remote from observables, and offers few directly testable predictions (Seligman, Klein, and Miller, 1976). As a result, few attempts have been made to assess the efficacy of the psychoanalytic treatment of anxiety. The attempts which have been made have been discouraging and have only

occasionally proven successful in controlled evaluations (Davison and Neale, 1978).

The behavioral approach in psychology arose largely in protest of the ambiguity inherent in psychoanalytic and other approaches of the time. In constrast to the mentalistic approaches which preceded it, the behavioristic approach insisted that the data to be employed in describing a phenomenon be objective, observable, and quantifiable. The task of a therapist employing the behavioral principles was to describe the problem behavior in objective and quantifiable terms and devise treatment interventions to alter the specific problem behaviors.

Consistent with the emphasis of early behaviorists on the importance of attending only to observable behaviors, early behavioral formulations of anxiety defined the problem behavior as an inappropriate escape or avoidance response in the presense of a specific stimulus event. The logical treatment for this was to identify the stimulus events which provoked the undesirable behavior and to employ the principles of learning to extinguish that behavior. Several approaches have been developed along these lines including flooding, response prevention, and the simple reinforcement of approach behavior to the feared stimulus event. Flooding (Stampfl and Levis, 1967)

provides an example of a treatment which follows this model. As a behavioral treatment of anxiety, flooding seeks to disrupt the learned escape or avoidance response by simply preventing it from occurring, keeping the client in the presence of the feared stimulus until the likelihood of an avoidance response is greatly diminished. In the laboratory, research methods employing this approach are best exemplified by techniques such as behavioral avoidance tests which involve, as operational measures of anxiety, the minimum distance between the subject and a feared stimulus object, the time spent viewing a feared object, and other similar measures (Borkovec, Weerts, and Bernstein, 1977).

While the traditional focus of behaviorally oriented practitioners in the area of anxiety assessment and treatment has been on overt escape or avoidance behavior, others have pursued alternative paths while retaining the behavioral philosophy of employing only quantifiable variables in assessing a phenomenon. As noted previously, activity in the various channels of the autonomic nervous system has often been included as an integral component of theories of emotion and anxiety (Goldstein, 1968). The best example of anxiety viewed as a physiological or autonomic response is that of Wolpe (1968). This author conceptualized anxiety as a non-specific activation of

the sympathetic portion of the autonomic nervous system in the presence of certain environmental stimuli. Wolpe reasoned that a deep state of relaxation is the physiological opposite of an aroused, anxious state. The goal of behavioral treatment then, was to encourage a response antagonistic to anxiety, such as relaxation, to be made in the presence of the anxiety eliciting stimuli. In this manner, the bond between the stimulus and physiological response would be broken. His resulting method of imaginally presenting anxiety inducing stimuli while the client is in a state of deep relaxation has come to be known as "systematic desensitization" therapy and is probably the most commonly employed technique that is considered to be "behavioral." The success rates of clients undergoing this form of therapy has been reported to be much higher than that for clients who have been exposed to more traditional methods. Wolpe (1964) reported a success rate of 89% in 200 personal cases. Published rates of other therapists ranged from just above to just below this figure. These ranged from 75 to 90 percent. Such figures have often been criticized for being, in large part, uncontrolled studies employing criteria for improvement which most often are rated by the therapist who is conducting the treatment. Several well-controlled studies have been performed, however, which

appear to support the results outlined above (Lazarus, 1961; Lang and Lajovik, 1963; and Paul, 1966). These have found systematic desensitization therapy to be far superior to no therapy and other therapy procedures in the treatment of anxiety. An important qualification to this statement, of course, is that anxiety is defined simply as autonomic hyperarousal to a specific stimulus situation.

More recent innovations have been made in the treatment of anxiety defined as autonomic hyperarousal or excessive muscular tension. The area of biofeedback therapy has flourished in the last decade since research demonstrated that animals could achieve voluntary control over many physiological functions which were previously thought to be automatic and beyond such control (Gatchel and Price, 1979). Several studies have been conducted which demonstrate that humans can also achieve voluntary control over the visceral channels beyond that possible through control of muscle functioning (Miller and Dworkin, 1974; Lapides, Sweet, and Lewes, 1957). In the area of anxiety control, several physiological channels have been investigated to determine their potential for benefit through biofeedback training. These include several visceral channels as well as electromyographic biofeedback. Studies have been conducted to examine the potential

effects of electrodermal feedback, heart rate feedback, blood pressure feedback, and feedback of peripheral blood flow in moderating anxious responding (Otton and Noonberg, 1980). The overall results of this research can only be considered tentative since the majority of clinical studies lack appropriate controls. Some recent evidence indicates that feedback signals from several physiological channels integrated into a single signal may be more effective than a trained proficience in any single channel (Schwartz, 1975; Birbaumer, 1978). The point to be made here is that the majority of investigations of the potential of biofeedback treatments for anxiety have employed a behavioral approach which defines anxiety as situation specific hyperarousal of the somatic or autonomic nervous systems.

In summary, the behavioral approaches to the treatment of anxiety have been investigated more than any other therapy approach and have frequently demonstrated high levels of success (Millon, 1969). The relatively high success rate is primarily due to the specificity of treatment goals in behavioral therapy. With "anxiety" clearly defined, strategies to counteract it have been devised and investigated with great success. Some question remains, however, concerning the transfer of results when anxiety is defined so exactingly and limited to very specific

stimulus situations. Thus, the results of investigations of behavioral approaches to treatment have not received uncritical acceptance.

Anxiety and the Changing Face of Behavioral Therapy

As they were originally developed, behavioral therapeutic approaches concentrated only on directly observable events as data for assessing a problem to be changed. This was in direct contradiction to the relatively popular but vague approaches to the time which attributed anxiety to the operation of unobservable intrapsychic variables. Thus, anxiety, in the behavioral approach has been traditionally assessed through the direct observation of behavior under certain stimulus conditions. It has only been more recently that physiological measures have been accepted as behavioral indices of anxiety. In either case, behavior, as observed or recorded on paper, has been the legitimate data for assessment and change. More recently, a trend has developed within the area of behavior therapy to investigate such private events as cognitions while retaining the methodological rigor associated with the behavioral approach (Rathjen, Rathjen, and Heniker, 1978). Many feel that it is both possible and desirable to integrate the empirical work on social cognition and the techniques of behavior therapy while maintaining a firm

grounding in observable behavior. The result of this has been an explosion of interest in an area which has come to be labeled as "cognitive behaviorism." Authors such as Lazarus (1976), Bandura (1977), and particularly Mahoney (1974) have stated the opinion that behaviorists have placed an inordinate emphasis on motoric and environmental variables in assessing behavior to the neglect of cognitive factors. Numerous "cognitive-behavioral" approaches to therapy have been developed over the past decade. The interest in this area has been so great that many observers, such as Wilson (1978), have made the exclamation that the field has "gone cognitive."

The inclusion of cognitive variables into a behavioral analysis and treatment approach was a result of what many felt to be excessive limitations placed on behaviorists through the exclusive attention paid to overt motoric behavior. As a result of the neglect of cognitions and over-reliance on the traditional principles of reinforcement and punishment on behavior, its applications have been limited to populations with limited or impaired cognitive capacities such as young children, retarded persons, and institutionalized adults. Thus, the majority of problems tackled in behavioral therapy has involved lesscomplex behaviors in situations in which considerable external control can be brought to bear on

the behavior such as in the classroom or institution (Wilson, 1978).

"Three - Systems" Approaches to Anxiety and Emotions

Problems such as those outlined above have contributed not only to the formation and popularity of the "cognitive-behavioral" movement but also to a movement to include cognitive, along with physiological and overt motoric variables in carrying out a complete behavioral assessment of behavior. It has become commonly recognized that responses across these different modalities may not correlate very highly or may not correlate at all (Cone, 1979). This point is very important for complex constructs such as anxiety and depression in which some of the modalities, but not necessarily all are involved in the disorder. For example, Borkovec, Weerts, and Bernstein (1977) reviewed intercorrelations among self report, overt behaviors, and physiological measures of anxiety from five studies where such data were available. The measures from the different modalities produced few significant positive intercorrelations. The process of labeling an individual as anxious, then, may depend on several factors including that individual's pattern of response along the cognitive, physiological and motoric response modalities and which of the modalities is assessed along with the social/situational, cognitive and

other potential factors that are operative (Borkovec, Weerts, and Bernstein, 1977).

The importance of an assessment of all three response modalities is particularly highlighted in light of the evidence that the modalities may not correlate well with one another (Lang, 1968; Bernstein, 1976). For example, this evidence suggests that an individual may show a very strong "anxiety" reaction in one or two modalities but may show no response in the third. A second person, on the other hand, may evince a strong reaction in that third channel, but show no response in the other two. This becomes especially important when the type of behavioral intervention is considered. Techniques of relaxation may be inappropriate to remediate the difficulties of a client who self reports anxiety but demonstrates no physiological response in the reported stimulus situations. Such an intervention would not impact the appropriate modality. Davison and Schwartz (1976) have produced graphic evidence that such a case may occur in assessing anxiety. These authors expressly differentiate between cognitive and somatic anxiety components and emphasize that different behavioral approaches to anxiety reduction differentially impact these components. A scale has been developed (Schwartz, Davison, and Goldman, 1978) to measure the relative

tendencies of individuals to respond with cognitive and somatic aspects of anxiety. In their experimental work, the results have been consistent with their expectations. Some individuals tended to respond with cognitive anxiety items with few physiological items while others responded physiologically but not cognitively. The authors suggested that a cognitive approach to anxiety reduction is most appropriate in combatting the anxiety configuration of clients who score high on the cognitive scale of their test while scoring low on physiological manifestations of anxiety. Relaxation or biofeedback training would be inappropriate in such a case.

The demonstration of such striking multidimensionality and complexity makes the accurate assessment of anxiety a very difficult task. Due to the elusiveness of the anxiety construct, some behaviorally oriented theorists have strongly suggested that it, along with other complex constructs such as depression, should be abandoned to obviate the potential misunderstanding inherent in the term (Bandura, 1969; Ulman and Frasner, 1973). Despite these objections, the term "anxiety" has endured and remains as one of the most familiar terms employed in the explanation of normal and abnormal human behavior. The survival of this term is underscored by the prevalence of chapters in behaviorally oriented texts which

make use of the term (Ciminero, Calhoun, and Adams, 1977; Craighead, Kazdin, and Mahoney, 1976).

The emergence of the tri-modal paradigm of behavioral assessment has widened the scope of the bahaviorally oriented therapist in approaching the problem of anxiety. Whereas systematic desensitization was once the automatic choice of behaviorists faced with the problem of anxiety, several alternatives have become popular such as rational restructuring (Ellis, 1979). The proper use of one or several of these techniques depends to a large extent on an accurate assessment of the problem.

Anxiety in Personality Research

The research outliined above underscores the complexity involved in attempting to define and measure anxiety. At various times it has been conceptualized as a response, as a stimulus, as a personality trait, as a motive and as a drive (Sledletsky and Endler, 1974). A major advance toward clearing this conceptual confusion was made when Spielberger (1966) made the distinction between state anxiety (A-state) and trait anxiety (A-trait) (Endler and Edwards, 1978). Spielberger (1972) defines state anxiety as an emotional reaction which consists of unpleasant, consciously-perceived feelings of tension and apprehension, with associated activation or arousal of the autonomic nervous system. Trait anxiety,

on the other hand, is a measure of a person's degree of "anxiety-proneness," that is, the differences between individuals in the probability that anxiety states will be manifest under circumstances involving varying degrees of stress. Spielberger, Gorsuch and Lushene (1970) introduced measures of each of these aspects of anxiety to aid in research.

This distinction addressed a major controversy within the area of anxiety research and in the area of psychology in general. Many researchers have questioned whether traits are useful concepts to guide psychological research. Traits are commonly defined as general and enduring predispositions to respond to situations in a stereotyped fashion (Allport, 1937). There has been considerable disagreement, however, concerning the types, numbers and structure of the different traits that are purported to be important in understanding and explaining human behavior. The considerable confusion attendant to this disagreement has encouraged many to look for better ways to explain and predict human behavior.

Many researchers have argued against the cross-situational stability of personality traits. Mischel (1969), for example, has claimed that there is very little evidence to support the view that there is any such thing as a trait and contends that that behavior is determined primarily by the situations that people encounter

and how they perceive those situations. The measurement of anxiety, in such an approach, would require the specification of discrete situations to which anxiety might occur. An example of an anxiety measure from this perspective is the Stimulus-Response Inventory of Ousness (Endler, Hunt and Rosenstein, 1962). This measurement instrument asks the respondent to provide self-reports of severity of several symptoms of anxiety when confronted with specific situations such as "you are about to give an oral report before an audience" and "you are about to receive an injection that will hurt." Another example would be one of the several "fear survey schedules" which specify certain stimulus objects (spiders, snakes) and asks the respondent to indicate how fearful they are around that object.

Both the trait-oriented and situation-oriented approaches have attracted large numbers of adherents and each has generated considerable controversy. Much of the literature which has addressed this issue has been concerned with supporting one side of this issue. More recently, a movement has gained popularity which seeks to integrate these approaches into a third which acknowledges the importance of both. This approach stresses that both individual differences and situational factors are important in determining behavior and sets as a major task for the psychologist the goal of answering

...e question: "How do these factors interact in determining how behavior is manifest?"

The Spielberger (1966) model of anxiety, in making the state-trait distinction, deals with the interaction of person and situation factors in determining anxiety. The state-trait model of anxiety requires the effects of both person and situational variables to produce a state anxiety response. In this model, there would be no differences in high trait anxious and low trait anxious individuals under neutral or non-stress conditions. Under situations of stress, however, the high trait anxious individual would be expected to manifest higher levels of state anxiety than would a low trait anxious individual. The empirical research, however, has supported Spielberger's (1966) approach in some, but not all conditions (Endler and Edwards, 1978). The expected results have been obtained under ego-threatening conditions such as fear of failure or negative feedback. In such situations, high trait anxious individuals have been found to evince greater increases in state anxiety than low trait-anxious individuals. However, for some other situations, such as situations involving physical danger (e.g. electric shock), the predicted differences do not occur (Endler and Edwards, 1978). Thus, only partial support has been found for Spielberger's (1966)

theory.

The failure of the trait anxiety measure based on Spielberger's work to predict state anxiety responses to certain types of situations encouraged Endler (1975) to propose a multidimensional interactional model of anxiety. In this model, trait anxiety is considered to be tied to certain situational domains, each independent from the other. Endler (1975) originally proposed three domains: interpersonal anxiety, physical danger, and ambiguous situations. At about the same time in Europe, Magnusson and Ekehammer (1975) came to a similar conclusion concerning the nature of trait anxiety and identified three domains of trait anxiety: threat of punishment, anticipation anxiety and inanimate threat. These theorists argue that without the specification of general situational parameters, the predictive capability of a trait anxiety instrument must suffer, as demonstrated by the failure of such instruments to predict responses to situations involving physical danger. Endler and Okada (1975) argue that "general trait" measures of anxiety, such as the trait measure developed by Spielberger, Gorsuch and Lushene (1970) or the Manifest Anxiety Scale (Taylor, 1953) are measures which measure only the social evaluative facet of trait anxiety. The empirical research appears to support this (Endler and Okada, 1975;

Kendall, 1978).

Endler and Okada (1975) factor analyzed the 150 or so situations included in the Stimulus-Response Inventory of Anxiousness (Endler, Hunt and Rosenstein, 1962) to identify their situational domains. This provided the basis for the Stimulus-Response Inventory of General Trait Anxiety (S-R GTA) which is presented by its developers as a multi-dimensional measure of trait anxiety. This instrument specifies the domain of interest in achieving an estimate of trait anxiety. Endler's (1975) multi-dimensional model of anxiety predicts that, in order to predict adequately a state anxiety reaction, the nature of the situational stress expected to arouse the anxiety must be congruent with the measure of trait anxiety. Thus, it would be predicted that interpersonal evaluation trait levels would interact with an interpersonal evaluation situation but not a physical danger situation. Similarly, trait levels on the physical danger trait anxiety scale would be expected to interact with a physical danger threat situation but not with interpersonal evaluation threat. This has been supported by empirical research (Endler and Okada, 1975; Kendall, 1978). Kendall (1978), for example, exposed subjects who self-reported high levels of trait anxiety on Spielberger's (1966) measure of general trait anxiety to both social evaluation and physical danger situations

and compared the ability of this instrument to predict state anxiety reactions with the subscales of the S-R GTA. He found that levels on the respective subscales of the S-R GTA accurately predicted the magnitude of state anxiety increases to the stimulus situations. Individuals who self-reported high levels of trait anxiety to social evaluation situations evinced greater increases in state anxiety to the social evaluation situation. High trait levels on the physical harm subscale predicted greater state anxiety reaction to the physical harm situation. Scores on the general trait anxiety measure accurately predicted state anxiety reactions to the social evaluation situation but failed to accurately predict such reaction to the stimulus situation involving the possibility of physical harm. From his results, Kendall (1978) concluded that Spielberger's measure of general trait anxiety loads to a large extent on the domain of social evaluation anxiety but fails to impact other domains such as physical harm anxiety. This and other similar reports have relied exclusively on self-reports of state anxiety, however, and have failed to go beyond the self-report to investigate such factors as physiological arousal, cognitive self-statements and the effect that these have on actual performance.

Some authors have cautioned against adopting the multidimensional model of trait anxiety to the exclusion of the older unidimensional approach. Lazzerini, Cox and Mackay (1979) argue that while there is evidence for situational dimensions of trait anxiety, evidence can also be mustered for the retention of unidimensional trait anxiety as a useful concept. They note that in their own research, subjects have been found to account for as much as 50 percent of the variance on questionnaires of self-reported anxiety. This suggests that a total anxiety trait score, summed across the different scale scores on a measure such as the S-R GTA, may have some utility in predicting state anxiety responses. One may expect differences, for example, between individuals who score at identical levels on a situationally-tied trait measure on the basis of different "general" anxiety scores. Such a speculation has not yet been tested.

The interaction between traits and situations becomes more complex when the complexity of a state anxiety response is also considered. The evidence supporting the existence of several components of anxiety has already been mentioned. Endler and Edwards (1978) have suggested that the different facets of state and trait anxiety may interact. In such a case, the nature of anxiety that is manifest to an interpersonal evaluation

situation may be qualitatively different from the anxiety which is manifest in the presence of physical danger. Sarason (1975), for example, has predicted that in interpersonal evaluation situations the high anxious person focuses on self-evaluation and worry and that such cognitive events have a more negative effect on performance than physiological arousal. Anxiety in the presence of physical danger may be characterized by strong physiological responses but relatively minor responses in the cognitive channels. Such speculations have not yet been tested since the research conducted thus far has almost exclusively employed self reports of state anxiety levels as the lone dependent variable.

Summary

Despite the widespread acceptance of anxiety as a major explanatory concept in theories of normal and abnormal behavior, it remains a poorly understood construct. In the past two decades, however, some important advances have been made to increase our understanding of this complex phenomenon. A major advance was made when Spielberger (1966; 1977), working within the general area of individual differences in personality, encouraged researchers to acknowledge the distinction between trait anxiety and state anxiety. From within this same general area of research, Endler (Endler and Okada, 1975;

Endler and Edwards, 1975) and Magnusson (Magnusson and Ekehammer, 1975) have produced evidence that trait anxiety may best be viewed as multidimensional rather than unidimensional in nature. The multidimensional view advocates that the tendency to react to situations with state anxiety can be differentially tied to situations with certain general characteristics.

While the suggestions of Endler and Magnusson have received some empirical support (Endler and Okada, 1975; Kendall, 1978), they have not received uncritical acceptance. Lazzerini, Cox and Mackay (1979), for example, have argued that the statistics employed to demonstrate multidimensionality in trait anxiety have been inadequate. They advocated the retention of a general, unidimensional anxiety trait construct in psychology.

The unidimensional and multidimensional approaches have different implications for assessment and therapy. Spielberger's unidimensional approach stresses individual differences between people that can be aroused by any stressing situation. Endler's multidimensional approach requires that the general nature of the stressing situations must be identified if therapy is to efficiently proceed.

The topic of anxiety becomes much more complex when approached from a multidimensionality of state anxiety perspective. Research, motivated by the work of Lang (1968), has demonstrated that state anxiety is comprised of several variables which can be generally classified into three systems (cognitive/verbal; physiological; and motoric) (Hughdhal, 1981). While there is little concensus concerning the exact nature and number of variables which represent each system, research has identified several variables which differentiate between individuals reporting high and low levels of state anxiety. These include cognitive/verbal variables such as self-efficacy (Bandura, 1977), self-evaluation of behavior (Kaplan, 1979), self-reported physiological arousal (Mandler, 1958), and cognitive concern about performance adequacy while carrying out a task (Sarason, 1975). Heart rate and skin conductance are physiological variables which have been found to differentiate between high and low levels of self-reported state anxiety (Spielberger, 1977). The self-reported level of anxiety has also been found to affect the adequacy of performance on a task (Murray, 1971). This has frequently been employed as a motoric index of anxiety (Borkovec, Weerts and Bernstein, 1977). While each of these variables, considered alone, has been found to discriminate between

high and low levels of state anxiety, it has been demonstrated that they do not necessarily covary with one another (Hughdahl, 1981). As a result, the advocates of the "three-systems" model of anxiety stress that the experience of anxiety in one person may differ qualitatively from the experience of anxiety in another person. Thus, for the purpose of assessment and therapy, they urge that the component response profile of an individual must be assessed prior to devising a treatment approach specifically designed to impact that response profile. In general, authors in this area caution that the anxiety response profile within the same person may change according to the stimulus which arouses it. Some have even cautioned that the response profile of an individual to a particular stimulus may change from presentation to presentation (Hughdahl, 1981).

Those researchers involved in the development of the "three-systems" approach to anxiety and emotions have emphasized the uniqueness of a person's component response profile. They have ignored the possibility of consistency in the response profile across people due to the nature of the situation to which those people are responding. They have also ignored the possibility of consistency in a particular individual's response profile regardless of the nature of situations to which that person is exposed.

As such, they have largely ignored the area of trait anxiety. In a similar manner, the personologists who have been involved in research investigating the possible multidimensionality of trait anxiety have ignored the multidimensionality of state anxiety. Although some suggestions have been made that the different facets of trait anxiety may differentially impact the components of state anxiety, no research has yet been conducted to investigate this possibility (Endler and Edwards, 1978; Sarason, 1975). Advocates of the unidimensional approach to trait anxiety have not addressed the multidimensionality of state anxiety, under the apparent assumption that all occurences of state anxiety are alike.

A study designed to investigate the possible interaction between trait and state anxiety could provide information concerning the relative utility of the unidimensional and multidimensional approaches to trait anxiety and whether these affect how state anxiety is manifest. The results could also provide some guidelines for how the assessment and therapy of anxiety should be conducted. For example, the results of such a study would provide some indication as to whether the component response profile of state anxiety across subjects is consistent regardless of the situation, whether the response profiles of subjects differ regardless of the situation,

or whether consistent response profiles can be found across subjects according to the situations which elicit them. The nature of the results would provide information to address such assessment and treatment issues as whether anxiety in different people can be treated in a stereotyped manner regardless of the nature of the situation which elicits it, whether anxiety must be treated differentially according to the situations which elicit it, and whether the experience of state anxiety is so unique across individuals and situations that no assumptions can be made concerning the nature of the response profile until an individualized assessment has been conducted. Answers to these questions would provide guidelines in planning assessment and treatment strategies for practitioners concerned with symptomatic treatment.

The Present Investigation

The present investigation seeks to go beyond the self-report channel to provide data bearing on the relative merit of the unidimensional and multidimensional approaches to trait anxiety. It will also seek to provide some indication of how trait anxiety interacts with situations to produce state anxiety. In particular, the ability of the Stimulus-Response Inventory of General Trait Anxiety to identify situational domains of trait anxiety and its potential as a measure of general trait anxiety

was examined. Also, this study sought to examine several dependent variables which are considered to comprise or covary with state anxiety to ascertain possible differences that can be attributed to the situational factor.

All subjects who participated in this investigation were required to engage in stressfull tasks administered under conditions of interpersonal evaluation (test of intelligence) and physical danger (threat of shock). The subjects were placed into four groups based on scores attained on the interpersonal evaluation and physical danger subscales of the S-R GTA as well as a general anxiety score based on the sum of these two scales. High and low general anxiety groups were comprised of subjects scoring consistently high or low across both of the scales. Two additional groups evincing moderate levels of general anxiety, were comprised of individuals who score high on one scale while scoring low on the other scale.

The tasks presented in this study were chosen to require a response by the subject that could be evaluated and which involved some degree of concentration and thinking to formulate a response. As the subjects performed each task, their responses in several dependent variable areas were monitored to provide a basis for the assessment of differences in response which can be attributed

to group membership or to the nature of the situation that the subject encounters.

The range of behavior that can be monitored was restricted due to the necessity that all subjects remain seated and as still as possible to achieve adequate physiological recordings. The actual performance of each subject on the tasks was recorded to provide an index of ability to perform while under stress. Several variables were monitored which have been identified by various authors as comprising the cognitive/self-report modality. These included a subjective estimate of self-reports of state anxiety levels while at rest and while performing each of the tasks. In addition, heart rate and skin conductance levels were monitored as indicants of the physiological channel.

Previous research which has investigated the possible multidimensionality of trait anxiety has relied almost exclusively on self-reports of state anxiety responses. This study provided an opportunity to go beyond the self-report to scrutinize other variables considered to be important in an anxiety response.

From the research reviewed above, the following hypotheses were stated and tested in the present investigation:

Hypothesis 1 - The groups participating in the study will not differ in their respective levels of self-reported state anxiety under conditions of rest.

Hypothesis 2 - The groups will not differ in their respective levels of heart rate and skin conductance under resting conditions.

Hypothesis 3 - The experimental conditions involving a test of intelligence and threat of shock will result in significant increases of self-reported state anxiety levels over resting levels for all subjects.

Hypothesis 4 - The groups will respond to the experimental conditions with increases in self-reported state anxiety that parallel their respective scale scores on the S-R GTA. General anxiety groups will contribute to a significant group effect. A significant group by situation effect will be revealed which involves the groups reporting moderate levels of general anxiety.

Hypothesis 4-A - The increases in self-reported state anxiety evinced by the groups to the experimental conditions will be paralleled by responses in the different dependent variables.

Hypothesis 5 - Subjects who report high levels of trait anxiety to interpersonal evaluation situations will react to that situation with greater increases in self-reported state anxiety levels than subjects who report low levels of trait anxiety to that situation. This association will also be evident in the physical harm condition.

Hypothesis 5-A - The relation between trait levels for each condition and state anxiety responses will be paralleled in the other dependent variables.

Hypothesis 6 - Subjects who report high or low levels of general anxiety, as defined by the total of scale scores on the S-R GTA, will evince more extreme levels of increase in self-reported state anxiety than subjects who report moderate levels of general anxiety. This will be true for each situation considered singly.

Hypothesis 6-A - Subjects reporting high or low levels of general anxiety will evince more extreme scores on the additional dependent variables than will the subjects who report moderate levels of general anxiety.

Hypothesis 7 - The situations of interpersonal evaluation and threat of physical harm will differentially affect the dependent variables included in this study. State anxiety to the interpersonal evaluation condition will be characterized primarily by cognitive concerns of performance adequacy (low self-efficacy, low self-evaluation and high cognitive worry) while physical harm anxiety will be characterized primarily by physiological arousal (high heart rate, high skin conductance).

Method

Subjects

The present investigation employed a total of 32 subjects selected from a list of students enrolled in introductory psychology courses at Virginia Commonwealth University. They participated to gain extra credit for that course. The participants were divided into four groups according to their scores on the fear of physical danger and fear of evaluation scales of the Stimulus - Response Inventory of General Trait Anxiousness (S-R GTA) developed by Endler and Okada (1975) designed to measure levels of anxiety in response to general classes of situations. These four groups of eight subjects each were formed according to the following criteria:

1. A high general anxiety group was comprised of subjects who exceeded the sixtieth percentile on both scales of the S-R GTA.
2. A high fear of physical danger group was formed of subjects who exceeded the sixtieth percentile on the fear of physical danger scale while not exceeding the fortieth percentile on the fear of evaluation scale.
3. A high fear of evaluation group was comprised of individuals who exceeded the sixtieth percentile

on the fear of evaluation scale while not exceeding the fortieth percentile on the fear of physical danger scale.

4. A low general anxiety group was formed of subjects who did not exceed the fortieth percentile on either scale of the S-R GTA.

The S-R GTA scales consists of general classes of situations to which the subject self-reports a customary reaction on a scale of 1 to 5 ("very much" to "not at all") along 15 items encompassing the construct of anxiety. It is included in appendix 1.

In addition to these criteria for group inclusion, the following criteria applied to all subjects who took part in the study:

1. All participants were white, female, and between 18 to 25 years of age.
2. They were free from any known longstanding physical illness such as hypertension and had not been taking medication which would bias the physiological data.
3. They were willing to allow the recording of several physiological channels during the experimental procedure and agreed to abide by several dietary conditions outlined in a consent form to assure the accuracy of the physiological recordings.

Setting

The experimental procedure was conducted in the therapy room of the psychophysiology laboratory of the Psychological Services Center of Virginia Commonwealth University. This room was designed to afford comfortable surroundings for psychotherapy sessions during which physiological measures are recorded and had been sound-proofed to minimize the influence of external sounds on subjects. It is also climate controlled and was maintained at a temperature of 72 $\pm$ 2 farenheit. A comfortable easy chair was provided for participants to sit in during recording sessions. The physiological recording apparatus is located in a second room adjacent to the room in which the subject will be seated. Cables for the physiograph were routed through holes in the wall designed for this purpose. During the experimental procedure itself, the therapy room was dimly lit.

Physiological Measures

Two measures of autonomic activity were monitored during the experimental procedure. These measures and procedures for recording them are outlined below:

1. Heart rate (HR) was monitored by a GRASS model 7P44B cardiotachograph. This provided a continuous beat-by-beat measure of variations in HR. The signal is accepted from EKG readings which were

monitored by a GRASS model 7P6C EKG pulse pre-amplifier. A brass electrode (2" x 1¼") was placed on the volar surface of the subject's non-dominant forearm and a corresponding electrode was placed over the tibia bone on the same sided calf. These electrodes were interfaced to the skin with GRASS EC2 electrode cream.

2. Skin conductance level (SCL), an exosomatic measure of electrodermal activity, was monitored through a GRASS model 7P1E low-level DC pre-amplifier. This was recorded by placement of a BECKMAN cup electrode of silver-silver chloride composition on the large finger of the non-dominant hand and a second electrode of the same type on the fleshy part of the palm of the same sided hand over the first metacarpal bone. A constant current of 10 microamperes was passed through these electrodes. They were interfaced to the skin with SPECTRA 360 electrode gel (.05% sodium chloride) and secured with adhesive tape.

All physiological readings were charted as pen deflections recorded on a GRASS model 7D polygraph. Prior to placing the electrodes on the skin surface, the site was cleaned with alcohol (70% isopropyl) with the exception

of the palm and fingertip. The electrodes were then secured tightly to minimize the possibility of movement artifact on the physiological recordings.

Procedure

The experimental procedure required each subject to perform two stress tasks in the laboratory environment while physiological and self-report measures are recorded. One stress task was administered with instructions to heighten ego involvement while the second was administered under conditions of possible shock. Threat of shock has been demonstrated to be a component of the fear of physical harm trait (Speilberger, 1977).

Having been found to score in the appropriate range on the scales of the S-R GTA, each potential subject was contacted by phone, informed of the general requirements of the study and told of the dietary restrictions outlined in appendix 2. If such conditions were agreeable to the subject an appointment was made for participation. Upon reporting for the experiment, the subject was escorted to the laboratory and familiarized with the environment. Each subject was then encouraged to look around and ask questions. A brief preview of the experimental procedure was then offered. The subject was shown the electrodes and told where they would be attached on the skin. After this, the subject was escorted to the

room housing the physiograph and offered a brief account of how it operates. The experimenter strove to answer all of the questions posed by the subject but refrained from providing specific information concerning the goals of the investigation and what will occur during the actual experimental procedure. The consent form was then offered for signing.

To begin the experimental procedure, the subject was requested to sit in the easy chair and relax while the various electrodes were attached. The subject was then informed of the deleterious effect of movement on the quality of physiological recordings and was asked to remain as motionless as possible during the procedure. Upon completion of electrode attachment the experimenter left the room and, from the adjoining room, read a standardized set of introductory instructions to the experiment as outlined in appendix 3. These instructions were communicated through an intercom system established for this purpose. The physiograph was then calibrated while the subject relaxed. An adaptation period lasted ten minutes beyond the point that the physiograph was fully calibrated to allow the subject to become acclimated to the experimental situation. Toward the end of this period the subject was asked to complete form X-1 of the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch

and Lushene, 1970). This form is designed to accurately reflect transitory fluctuations in anxiety to stimulus events. Thus, it is a measure of "state" anxiety. Reliability and validity data are available in the test manual (Spielberger, Gorsuch and Lushene, 1970). The laboratory tasks were then presented in a counterbalanced manner. These tasks are as follows:

1. Word Association - This task required the subject to name as many words as possible beginning with the letter "W." Most people are quite surprised and chagrined when they exhaust their fund of words well before the end of the one minute period. Performance on this task was measured asthe number of words given.
2. Backwards Serialization - This task required the subject to count backward by 3's from the number 100. No feedback was provided by the experimenter. The performance measure on this task will be the number of digits correctly spoken.

These tasks were presented in a counterbalanced manner. The word association task was administered under the "ego evaluative" instructional set while the "fear of physical harm" instructional set preceded the backward serialization task.

After a general introduction to each task, the subject was asked to predict her ability to carry out the task requirements in comparison to the rest of the subjects in the study. The task was then administered and lasted a total of one minute. After completion of the task, the subject was asked to complete the state anxiety portion of the STAI and provide a subjective estimate of her autonomic arousal during the task and rate her performance adequacy compared to others taking part in the study. A five minute rest period between each task was provided to allow the physiological measures to readjust to non-stressing conditions. During this period of time the subject was requested to simply sit back, with eyes closed, and relax as much as possible without falling asleep. The entire experimental session lasted approximately 1 hour. Upon completion, the subject was offered a debriefing and allowed to leave.

Physiological Data Reduction

Records of physiological activity were obtained during each of the task presentations. In addition, a one minute period of resting physiological activity was assessed prior to introduction of each task.

During each one minute segment of physiological activity a sample value was taken at 10 second intervals. Mean values for each period were represented by the average of

these six values. Readings of skin conductance were obtained through the transformation of resistance records to micromho units.

RESULTS

The "interpersonal evaluation" and "physical harm" scales of the Stimulus - Response Inventory of General Trait Anxiety were administered to 95 females who met other criteria for inclusion in this study. From the population data, cutoff scores for high and low anxiety were established at the 40th and 60th percentile for each scale. The criterion score for low anxiety was set at 43 or less for the interpersonal evaluation scale and 53 or less for the physical harm anxiety scale. For high anxiety, cut-off scores were established as 49 or above for the interpersonal evaluation scale and 60 or above for the physical harm anxiety scale. These were very close to cut-off scores established along the same criteria by Kendall (Note 1) five years earlier. The group means and standard deviations along with the population data are summarized in Table 1.

The scores for each scale and the total scores of both scales were analyzed with Duncan multiple range t-tests to assess differences in group composition. Since high and low anxiety groups for each scale were established according to mutually exclusive criteria, these groups differed significantly from each other. It was also established that while high and low general

TABLE 1

S-R GTA MEANS AND STANDARD DEVIATIONS

FOR GROUPS AND POPULATION

	Conditions		
	Interpersonal Evaluation (EV)	Physical Harm (PH)	Total
Group	Mean (SD)	Mean (SD)	Mean (SD)
Hi(EV) - Hi(PH) (N=8)	59 (7)	65 (3)	124 (8)
Hi(EV) - Lo(PH) (N=8)	54 (5)	46 (5)	101 (7)
Lo(EV) - Hi(PH) (N=8)	37 (4)	64 (4)	101 (6)
Lo(EV) - Lo(PH) (N=8)	33 (8)	42 (8)	75 (14)
Population (N=95)	46 (13)	56 (10)	102 (19)

anxiety groups (based on total scores) and groups which reported situationally-tied anxiety were found to differ significantly on total score values, they did not differ from groups reporting the same level of anxiety to the situations specified by each scale. Thus, while the "high interpersonal evaluation anxiety-high physical harm anxiety" group and the "high interpersonal evaluation - low physical harm anxiety" differed significantly on the total scores of the two scales and in their scores on the physical harm anxiety scale, they did not differ in their scores on the interpersonal evaluation scale. In a similar vein, the "low interpersonal evaluation anxiety-low physical harm anxiety" group were found to differ significantly in total scale scores and on the interpersonal evaluation scale scores but these groups did not differ on physical harm anxiety scale scores. Similar trends occurred when the "low interpersonal evaluation anxiety - high physical harm anxiety" group was compared to the two "general" anxiety groups.

Several variables were analyzed under resting conditions to ascertain possible group differences prior to the introduction of the stressing stimuli. One way analyses of variance were performed on each of these variables to assess this possibility. In each case, no differences were found in the relative group levels on

these variables. The resting levels of these variables for each of the groups are outlined in Table 2.

The variables which were assessed under resting conditions were then examined to assure that the introduction of the stressing situations had, indeed, resulted in increases in state anxiety, heart rate and skin conductance. the introduction of stress invariably resulted in increases in skin conductance, while, of the 64 total observations, only two failed to result in an increase in heart rate and four failed to result in an increase in self-reported state anxiety.

The data under condition of stress were then analyzed to assess the possible differential effect of the experimental manipulations on the different groups. Self-reported levels of state anxiety, as measured by the state anxiety scale (Spielberger, Lushene, and Gorsuch, 1967), were first analyzed singly because most of the previous research and the conclusions derived from such research have employed this instrument as the lone dependent variable. The increases in state anxiety for each group that were due to the introduction of the stressing conditions are outlined in Table 3. A summary table of the 4 (groups) X 2 (situations) repeated measures analysis of the complex latin square design is provided in Table 4. A significant main effect which was attributable to group membership resulted from this analysis $F(3,28) = 5.74$, $P < .005$.

TABLE 2

RESTING LEVELS OF HEART RATE, SKIN CONDUCTANCE AND STATE ANXIETY FOR GROUPS.

	Measure		
	State Anxiety	Heart Rate	Skin Conductance
Group	Mean (SD)	Mean (SD)	Mean (SD)
Hi(EV) - Hi(PH)	35 (6)	84 (11)	.05 (.04)
Hi(EV) - Lo(PH)	31 (6)	82 (9)	.05 (.03)
Lo(EV) - Hi(PH)	30 (6)	78 (10)	.06 (.05)
Lo(EV) - Lo(PH)	31 (5)	84 (13)	.08 (.02)

TABLE 3

STATE ANXIETY INCREASES BY

GROUP AND CONDITION

(SELF-REPORTED)

	Condition		
	Interpersonal Evaluation (EV)	Physical Harm (PH)	Total
Group	Mean (SD)	Mean (SD)	Mean(SD)
Hi(EV) - Hi(PH)	29 (8)	21 (12)	25 (11)
Hi(EV) - Lo(PH)	21 (10)	12 (5)	17 (9)
Lo(EV) - Hi(PH)	11 (8)	17 (12)	14 (10)
Lo(EV) - Lo(PH)	10 (6)	8 (8)	9 (7)
Total	18 (11)	14 (10)	

TABLE 4

SUMMARY TABLE OF ANOVA RESULTS

FOR STATE ANXIETY

(SELF-REPORTED)

Source	SS	df	MS	F	P
Subjects (Ss)	5382	31			
Groups (G)	2049	3	683	5.74	.005
Ss within G	3333	28	119		
Positions (P)	26	1	26	.44	
P X Ss	1837	31	59		
P X G	86	3	29	.46	
P X Ss within G	1751	28	63		
Situations (S)	179	1	179	4.12	0.05
S X G	535	3	178	4.14	.05
Residual	1037	24	43		
Total	7245	63			

This main effect was further studied by a Duncan multiple range t-test. This revealed that the increases in state anxiety were significantly greater for the "high interpersonal evaluation anxiety - high physical harm anxiety" group than other groups. While it was expected that the "low interpersonal evaluation anxiety - low physical harm anxiety" group would evince lower increases of state anxiety to stress than the other groups, the differences did not exceed the .05 level of probability. The analyses also revealed a significant group by situation interaction effect $F(3,24) = 4.14$, $P < .05$. An analysis of the relative increases in state anxiety levels evinced by the different groups revealed that the two groups which reported variation in anxiety proneness to the two situational parameters employed in this study did, indeed, evince this variation when exposed to the stressors in this study. This is presented graphically in Figure 1.

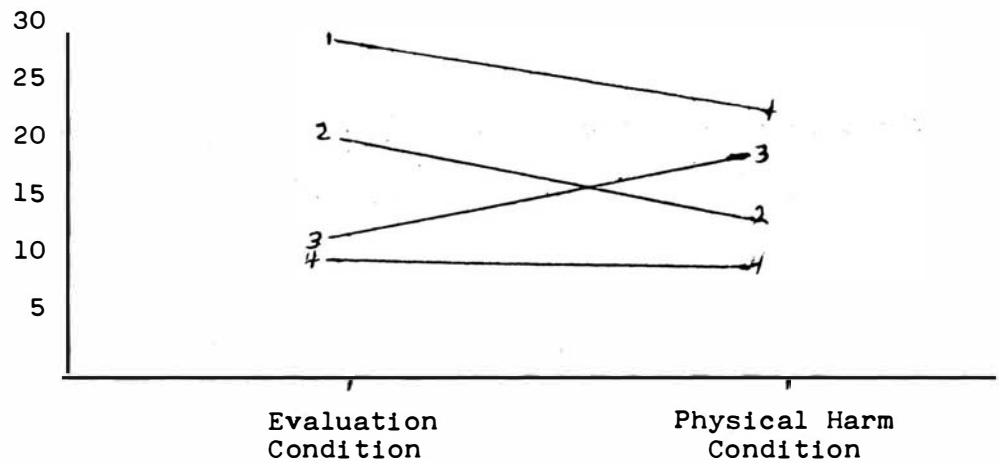
A significant main effect was also revealed attributable to the different situations employed to induce stress. The interpersonal evaluation situation aroused significantly higher increases in self-reported state anxiety than the physical harm condition. This was not expected since the trait levels reported by subjects were higher on the physical harm scale.

The other variables included in this study were also examined to obtain information about each of them.

FIGURE 1

INCREASES IN SELF-REPORTED STATE ANXIETY

BY GROUP AND CONDITION



1 = Hi(EV) - Hi (PH)
2 = Hi(EV) - Lo (PH)
3 = Lo(EV) - Hi (PH)
4 = Lo(EV) - Lo (PH)

Considered in a multivariate mode, a significant main effect for group membership was revealed $F(24, 59) = 2.81$, $P < .001$. No other significant effects resulted from the multivariate analysis. When each dependent variable was considered singly, only the skin conductance channel failed to show any evidence of a significant effect. A significant main effect attributable to group membership was found for heart rate $F(3,28) = 6.2$, $P < .005$, self-efficacy expectations $F(3,28) = 3.2$, $P < .05$, self-reported physiological arousal $F(3,28) = 3.42$, $P < .05$, cognitive worry/concern $F(3,28) = 8.16$, $P < .0005$, and level of performance $F(3,28) = 3.6$, $P < .05$. The only other variable, self-evaluation of performance, approached, but did not exceed the .05 level of probability $F(3,28 = 2.53$, $P = .07$. The significant main effects were then analyzed in more detail with Duncan multiple range t-tests. As expected, the "high general anxiety" group evinced significantly higher heart rate responses, greater cognitive/worry, and lower self-efficacy expectations than the other three groups. This group also evinced lower self-evaluations of performance than the other groups. The only anomaly in these analyses concerned the relative performances of groups on the assigned tasks. The "low interpersonal evaluation - high physical harm

anxiety" group performed significantly better on the tasks than the other three groups, who did not differ from each other.

A significant main effect attributable to situations was found for the expectations of self-efficacy and self-evaluations of performance. Lower expectations of performance but higher post-task evaluations of performance were reported to the "physical harm task" compared to the "interpersonal evaluation" task.

Significant group X situation interactions effects were revealed for level of performance and self-reported physiological arousal. The two groups which reported situational variance in trait anxiety on the S-R GTA self-reported higher levels of physiological arousal to trait-congruent situations. These groups also performed more poorly on those tasks which were administered under anxiety trait-congruent conditions.

A significant effect for sequence of stress presentation (positions) was revealed for the self-report of physiological arousal. Subjects reported experiencing higher levels of arousal to the task which was presented second in sequence.

The data were next analyzed to assure that subjects who self-reported high levels of trait anxiety to the general situations outlined in the S-R GTA experienced greater anxiety to the experimental manipulations employed

in this study. Because half the subjects reporting high trait anxiety to these situations changed (members of the high-specific anxiety groups) while the other half remained the same (members of the high general anxiety group), the data for the different situations were analyzed separately.

An analysis of the state anxiety scores of individuals who reported high and low trait anxiety to interpersonal evaluation situations revealed that the high trait-anxious individuals reported greater increments in state anxiety levels than those who reported low trait anxiety when confronted with the trait-congruent task $F(1,30) = 23.25$, $P < .0001$. The remaining variables, considered in the multivariate mode, also were significantly different in the two groups $F(8,23) = 5.53$, $P < .001$. Considered singly in univariate comparisons, self-efficacy expectations, self-evaluations of performance, self-report of physiological arousal, cognitive worry/concern during the task, and performance on the task itself each were significantly different in the two groups. The high trait-anxious subjects reported lower expectations concerning their performance on the impending task, did poorer on the task, evaluated themselves as having done poorer on the task, reported worrying more about how well they were doing on the task while they were carrying it out and

reported higher levels of physiological arousal during the task. Only the two physiological variables, heart rate and skin conductance, failed to differ in the groups. A summary of these results is presented in Table 5.

Since differences were expected between the "high general anxiety" subjects and the "high evaluation-specific" subjects as well as between the "low general anxiety" subjects and the "low evaluation-specific" subjects, each variable was further assessed with a Duncan multiple range t-test. It was expected that "general" anxiety subjects would evince responses which would be extreme relative to the other two groups. This was not the case for any of the variables, however.

The responses of individuals who reported high and low levels of trait anxiety to situations involving possible physical harm were also compared to assure that the high trait-anxious subjects differed from low trait-anxious subjects on the variables included in this study. In this situation, however, only self-reported state anxiety, heart rate and self-efficacy expectations were found to significantly differ between the two groups. These results are summarized in Table 6.

Duncan multiple range t-tests were then performed to assess possible differences between the "high general anxiety" and "high physical harm-specific" subjects and

TABLE 5

GROUP MEANS FOR INTERPERSONAL

EVALUATION CONDITION

Dependent Measure	Group	
	High Anxiety Mean (SD)	Low Anxiety Means (SD)
State Anxiety	25 (10)	11 (7) ***
Heart Rate	23 (13)	18 (11)
Skin Conductance	.05 (.03)	.05 (.03)
Self-efficacy	5.3 (1.0)	6.1 (.8) *
Self-evaluation	3.0 (1.0)	4.6 (1.1) ***
Self-reported physiological arousal	6.9 (1.4)	5.4 (1.5) **
Cognitive Worry/Concern	7.8 (1.2)	6.3 (1.6) **
Task Performance	11.5 (3.5)	16.7 (3.3) ***

*= .05 **= .01 ***= .001

TABLE 6

GROUP MEANS FOR PHYSICAL

HARM CONDITION

Dependent Measure	Group	
	High Anxiety	Low Anxiety
	Mean (SD)	Mean (SD)
State Anxiety	19 (12)	10 (7) **
Heart Rate	28 (12)	15 (8) ***
Skin Conductance	.06 (.04)	.05 (.03)
Self-efficacy	4.6 (1.2)	5.5 (.8) *
Self-evaluations	4.6 (1.9)	4.9 (1.9)
Self-reported physiological arousal	6.6 (1.2)	6.0 (1.5)
Cognitive Worry/Concern	7.0 (1.9)	5.9 (1.7)
Task Performance	16 (11)	17 (11)

* = .05 ** = .01 *** = .001

between the "low general anxiety" and "low physical harm-specific" subjects. It was expected the "high general anxiety" and "low general anxiety" subjects would evince more extreme scores on the different variables. While the relative levels of the groups were generally found to be in the expected direction, these expected differences did not exceed the .05 level of probability.

Discriminant Function Analyses

The analyses reported above suggest that there is little merit in the general anxiety vs. specific anxiety distinction in how anxiety is manifest in the variables included in this study. While the "general anxiety" groups generally evinced more extreme responses in the variables, these differences were not significant and may be attributable to slightly more extreme trait levels on the scales which were employed to select subjects in the first place. Because of this, later analyses were conducted with the "general vs specific" distinction dropped. Subjects were simply grouped according to high or low scores on the scales of the S-R GTA. Discriminant function analyses were then conducted to assess the contribution of the different variables in discriminating between high and low anxious subjects. Since the composition of the high and low anxiety groups changed between situations, a separate analysis was performed for each of

the situations.

For the interpersonal evaluation situation, the derived function attained a Wilk's lambda of .40 X (6) = 24.95, $\underline{P} < .0005$. The standardized canonical discriminant function coefficients along with the centroids for each group are presented in Table 7. This function was able to successfully classify 29 of the 32 observations in the evaluation situation. High-anxious subjects were discriminated from low-anxious subjects on the basis of poorer performance on tasks, higher heart rate responses, lower self-efficacy expectations and lower self-evaluations of performance on the tasks.

The derived discriminant function and group centroids for the physical harm tasks is outlined in Table 8. This function attained a lambda of .58 X (6) = 14.6, $\underline{P} < .02$ and successfully classified 24 of the 32 subjects. In this situation, high anxious subjects were discriminated from low anxious subjects on the basis of higher heart rate responses and lower expectations of self-efficacy.

Due to the considerable differences in make-up of these functions, a third discriminant function analysis was performed to specify the capability to discriminate between the quality of anxiety emitted to each of the stimulus situations, regardless of group membership. This

TABLE 7

DISCRIMINANT FUNCTION COEFFICIENTS

FOR HIGH VERSUS LOW ANXIETY IN

INTERPERSONAL EVALUATION CONDITION

Variable	Coefficient
Performance	.70
Heart Rate	-.54
Self-efficacy	.40
Self-evaluation	.40
Cognitive Worry/Concern	-.20
Self-reported physiological arousal	.10

Group Centroids: High = -1.19

Low = 1.19

TABLE 8

DISCRIMINANT FUNCTION COEFFICIENTS

FOR HIGH VERSUS LOW ANXIETY IN

PHYSICAL HARM CONDITION

Variable	Coefficient
Heart Rate	.85
Self-efficacy	-.52
Self-reported physiological arousal	.25
Self-evaluation	.10
Performance	-.08
Cognitive Worry/Concern	.03

Group Centroids: High = .82 Low = -.82

resulted in a discriminant function which attained a lambda of .73 X (6) = 18.2, $P < .01$ and successfully classified 46 of the 64 observations. The composition of this function is summarized in Table 9. This revealed that the reactions to the interpersonal evaluation condition, when compared with reactions to the physical harm condition, were characterized by lower self-evaluations of performance, lower levels of self-reported physiological arousal, higher self-efficacy expectations and greater cognitive worry/concern about performance while carrying out the task.

TABLE 9

DISCRIMINANT FUNCTION COEFFICIENT

FOR CONDITIONS

Variable	Coefficient
Self-evaluation	.81
Self-reported physiological arousal	.70
Self-efficacy	-.70
Cognitive Worry/Concern	-.63
Heart Rate	.12

Group Centroids: Interpersonal Evaluation = -.59 Physical Harm = .59

DISCUSSION

The discussion of results obtained in the present investigation will begin with a review of each of the hypotheses and how the data address each of these. The review will be followed by a general discussion of the significance of these findings, to provide cautions concerning replicability and generalization of the present data and to identify areas appropriate for further inquiry.

The first hypothesis, influenced and supported by the work of Spielberger (1966), stated that the different groups which participated in this study, despite differing in their respective levels of self-reported levels of trait anxiety (as measured by the sums of scale scores on the SR-GTA), would not differ from each other in their relative levels of self-reported state anxiety under resting conditions. The analyses of variance of those resting levels of state anxiety and the associated post-hoc tests revealed no significant differences between the groups. Hypothesis I, then, was accepted.

The second hypothesis stated that the physiological measures which were included in this study, heart rate and skin conductance, would not differ between the groups under resting conditions. This hypothesis was supported from the conclusions of Martin and Sroufe (1970)

and the work of Hodges (1976), although the work of Kelly (1980) would appear to indicate otherwise. Analyses of variance which were performed separately for heart rate and skin conductance failed to reveal any significant effect which was attributable to group membership. The second hypothesis, therefore, was accepted.

The third hypothesis predicted, on the basis of previous work by Hodges and Spielberger (1966) and Spielberger (1977) for the physical harm condition and by Hodges (1976) for the interpersonal evaluation condition, that the experimental manipulations of threat of shock and testing intelligence would result in significantly higher levels of self-reported state anxiety, heart rate and skin conductance when compared to resting levels. Consistent and significant increases were found for each of these variables which were attributable to the experimental manipulations. The third hypothesis then with some reservations and cautions to be discussed later, was accepted.

The fourth hypothesis, supported by the work of Endler and Okada (1975) as well as Kendall (1978), predicted that the different groups, defined by their respective levels of situationally-tied trait anxiety as measured by the S-R GTA, would evince increases in

self-reported state anxiety upon exposure to the experimental conditions that were consistent with their trait levels. An analysis of the increases in state anxiety levels confirmed that this did, in fact, occur. Subjects who reported high levels of trait anxiety to each of the situations included in this study showed significantly higher increases in state anxiety to these situations than subjects who reported low trait levels to the situations. A significant group by situation interaction effect was found, as expected, for those groups reporting varying levels of trait anxiety to each of the situations. The fourth hypothesis, then was accepted.

Ancillary to the fourth hypothesis were predictions that the other dependent variables included in this study would respond in a fashion which paralleled that of self-reported state anxiety. The close association of these variables with the experience of anxiety had been reported by Bandura (1977) for self-efficacy, Kaplan (1979) for self-evaluation, Sarason (1975) for cognitive worry, Spielberger (1977) for heart rate, Edelberg (1973) for skin conductance level and Mandler and Kremen (1958) for self-reported physiological arousal. The work of Murray (1971) suggested that high and low levels of anxiety would not significantly differ in their impact on performance. Analyses performed for each of these variables revealed

that while most showed evidence of a significant main effect due to group membership, only performance levels showed evidence of a group by situation interaction. This was contrary to the expectations for that variable. It must be concluded that the relation between these variables and the self-report of state anxiety requires further scrutiny.

The fifth hypothesis predicted that, on the basis of the past work of Endler and Okada (1975), Spielberger (1977) and Kendall (1978) the subjects who self-reported high levels of trait anxiety to the situations included in this study would evince greater increases in state anxiety levels to stress than subjects who reported low levels of trait anxiety to those situations. Analyses of variance which were conducted separately for each of the situations confirmed that subjects who self-reported high levels of trait anxiety on either of the scales of the S-R GTA self-reported greater increases in state anxiety when exposed to the experimental condition congruent with that scale. Hypothesis 5, then, was supported.

Ancillary to the fifth hypothesis was the expectation that the observed differences in self-reported state anxiety between high and trait anxious subjects to the situations would be paralleled in the other dependent vairables as well. Analyses conducted separately for each

of these variables in the interpersonal evaluation condition revealed that this was true for each variable except heart rate and skin conductance. Contrary to expectations, the task performance of the high anxious subjects was significantly poorer than that of the low anxious subjects. In analyses for the physical harm condition, however, only heart rate and self-efficacy expectations were significantly different. As expected, the task performance of individuals self-reporting high levels of anxiety did not differ from that of their low anxious counterparts.

The sixth hypothesis predicted that, on the basis of the work of Spielberger (1966), the individuals who reported generally high levels of trait anxiety (high levels of trait anxiety to both scales) or generally low levels of trait anxiety would report more extreme levels of state anxiety than individuals who reported situationally-tied trait anxiety. Duncan multiple range t-tests performed separtely for each situation failed to reveal significant differencesbetween the high general and high specific groups or between the low general and low specific groups under either of the situations. Comparisons subsequently performed singly for the remaining dependent variables also failed to reveal significant differences between these groups.

Due to these results, the null hypothesis was accepted. It was concluded that the general vs specific distinction does not make any difference in how state anxiety is manifest. Because of the failure to confirm the sixth hypothesis, the distinction between high or low general anxiety and high or low specific anxiety was dropped.

The seventh hypothesis, based on the work of Sarason (1975), predicted that the facets of state anxiety elicited in subjects would differ in the two experimental situations. It was expected that state anxiety to the interpersonal evaluation condition would load highly on the self-report variables (self-efficacy, self-evaluation, etc.) while state anxiety to the physical harm condition would load most highly on physiological arousal. The discriminant analyses performed to investigate the ability to separate high and low anxious subjects in the interpersonal evaluation condition revealed contributions from not only these self-report variables, but also in actual task performance and physiological arousal (as measured by heart rate). In the physical harm condition, heart rate and expectations of self-efficacy were primary contributors. The discriminant analysis which was performed to investigate the discriminability of responses to the two situations identified the cognitive/ self-report variables as major contributors. It appears

that interpersonal evaluation anxiety impacts on several response modalities. State anxiety to physical harm situations was discriminated from interpersonal evaluation anxiety less by the presence of a strong physiological response than by the absence of a strong response in many of the cognitive variables, with the notable exception of self-efficacy expectations.

Conclusions

It was expected that the results from this study might provide partial support for both the multidimensional and unidimensional approaches to trait anxiety, thereby fostering a movement toward an integration of these approaches. The failure to confirm hypotheses 6 and 6-A, however, along with the confirmation of hypotheses 1 through 5 provide substantial support only for the multidimensional approach to trait anxiety advocated by Endler and Okada (1975), which advocates the specification, to at least a general degree, of the situational parameters in assessing trait anxiety.

The results provide support for the use of the Stimulus-Response Inventory of General Trait Anxiety (Endler and Okada, 1975) as a more adequate assessment instrument than those which fail to specify situational parameters. They underscore the importance of obtaining scores on several dimensions of trait anxiety in attempt-

ing to predict state anxiety reactions to situational stress conditions. The results also caution against attempts to employ a total score on the S-R GTA, summed from the individual scale scores, as a measure ofgeneral trait anxiety without the recognition of scale score variance, as has occasionally been done in the past. (Nelson and Craighead, 1981).

The absence of differences between groups in self-reported state anxiety levels and physiological measures under resting conditions along with the observed differences in how the groups reacted to the stressing conditions underscores the importance of the interaction between person and situational variables in producing a state anxiety response. Past approaches have failed to include the crucial situational component.

The support found in the results for hypothesis 7 demonstrates the importance of viewing the experience of state anxiety as a multidimensional phenomenon as well. The associated and component variables of state anxiety differed between situations in this study. This provides evidence to support the contention expressed by Endler and Edwards (1978) that the facets of trait and state anxiety interact to some degree. Thus, as they suggest, in assessing therapy to reduce levels of trait anxiety, it may be necessary to specify the component of state

anxiety to which the therapeutic intervention was directed.

The failure of many of the dependent variables to differentiate between high and low levels of state anxiety under the physical harm condition may have been expected. Popular measures of trait anxiety which have been employed to establish these variables as being closely linked to anxiety have been critized as measuring only the ego-evaluative facet of trait anxiety. (Endler and Okada, 1975; Kendall, 1978). It has been demonstrated that many of these measures, such as the trait anxiety scale (Spielberger, Gorsuch, and Lushene, 1970) or the Taylor Manifest Anxiety Scale (Taylor, 1953) can predict state anxiety reactions to interpersonal evaluative situations but fail to predict state anxiety reactions to threat of physical harm conditions (Spielberger 1977; Kendall, 1978).

The present investigation represents the first attempt to go beyond the self-report to include other dependent variables considered to be associated with anxiety. This was also the first attempt to assess a general anxiety trait which was assessed by summing the scores on component dimensions. Past attempts at measuring the "general" anxiety trait failed to account for the possibility of variance attributable to the different dimensions of trait anxiety.

The results also support cautions against employing a single physiological measure as a general gauge of physiological arousal. While heart rate was involved in distinguishing several effects found in this study, the skin conductance variable did not distinguish between groups or conditions. While the relationship between heart rate and anxiety is not surprising in light of past research indicating a linear relationship between heart rate and self-report of state anxiety levels (Sartory, Grey, and Rachman, 1977; Grey, Sartory and Rachman, 1979), the absence of relation between skin conductance levels and state anxiety reports runs counter to many studies (in review by Lick and Katkin, 1977). Such studies have commonly involved the introduction of very specific fear stimuli which were presented suddenly to elicit a response. As such, the procedure employed in these studies and the current study were quite different. Unfortunately, it is difficult, in the procedure of this study, to identify the sudden response to the information of possible shock or an impending test of intelligence. For the procedures employed in this study skin conductance was the only variable that appeared to have no value at all in differentiating between either the groups or the situations employed in this study.

The present investigation included an important methodological change which contributed to higher increases

in state anxiety to the stimulus situations than reported in previous studies. Past studies have commonly presented a stressing stimulus and, after the presentation has finished, asked the subjects to rate anxiety they feel at that moment. This study asked participants to rate the anxiety that they experienced while under stress. This difference likely was the major contributor to the much higher increments in state anxiety reported by participants in this study than participants in previous studies.

The results of this study have several implications for practitioners concerned with the assessment and therapy of anxiety. The importance of these implications must be tempered somewhat by the nature of the groups which participated in this study. While many of the subjects reported high levels of trait anxiety, none had reported being disabled by excess anxiety or had sought treatment for anxiety. Thus, while many of these subjects experience high levels of state anxiety more frequently than other individuals, this anxiety may not be of clinical significance. Whith this caution in mind, the following implications are suggested. First, it is clear from the results that some sort of stressing situation is necessary to produce the obesrved differences in state anxiety levels. Thus, an eliciting stressful situation must be involved if the behaviors of interest

are to be measured and quantified. Second, it is apparent that the same person may vary considerbly from situation to situation in the tendency to react to stress with high levels of state anxiety. This suggests that some effort must be toward pinpointing personally significant stressing stimuli if the behaviors of interest are to be observed. This supports the approach to anxiety assessment advocated by Kallman and Feuerstein (1977) which emphasizes the importance of identifying specific situations which serve to elicit an anxiety response. Third, the results provide considerable support for the multidimensional perspective toward trait anxiety, indicating that situations which serve to elicit state anxiety can be grouped according to general characteristics which serve to make them stressing. Thus, it may not be necessary to spend time trying to specify the exact characteristics of anxiety-inducing situations. Instead, efforts can be directed simply toward first identifying the general characteristics of situations which serve to arouse high levels of state anxiety, then toward choosing a stimulus situation which is representative of that class to observe the behaviors of interest. In this respect, the results suggest an approach toward anxiety assessment which differs slightly from the approach advocated by Kallman and Deuerstein (1977). These authors emphasize the impor-

tance of identifying very specific characteristics of stimuli which serve to elicit anxiety. Fourth, it is also apparent that all occurences of anxiety cannot be considered alike. Thus, a standard symptomatic treatment cannot be offered for all cases of anxiety. It does appear, however, that the different dimensions of trait anxiety elicit stereotyped responses across individuals reacting to it. Thus, it may be possible to develop standard treatment packages to impact the response profiles of state anxiety that tend to be elicited by the different dimensions of trait anxiety.

Limitations of the present study

The conclusions drawn from this study must be viewed with some caution due to the multivariate nature of the subject matter and the manner in which the experiment was carried out. One crucial point examined in this study was the multivariate composition of state anxiety. Many of the dependent variables employed, however, (e.g. self-efficacy, self-evaluation, etc.) were defined and measured in very broad terms. Each of these variables can be found to be much more complex than presented in this study. A recent review by Hughdall (1981) discusses the difficulty in providing clear definitions of the variables employed in assessing an anxiety response. Further refinement in definition and measurement of these variables would aid in assessing the reliability of the

findings reported in this study.

A major limitation of the present study concerns the experimental manipulations employed to provoke stress. A major conclusion drawn from the results is that the nature of the eliciting situation is of crucial importance in assessing how state anxiety is manifest. A reconsideration of the experimental manipulations employed in this study reveals that state anxiety was aroused not only by the expectations which were provided by the experimenter (test of intelligence for the interpersonal evaluation condition and threat of shock for the physical harm condition) but also by the specific requirements of the task associated with each (word association for interpersonal evaluation and serial 3's - backwards for the physical harm condition). The observed differences in response to the conditions must be considered to be a function of both of these factors and not due to the expectancies alone. Further research, then, is required to more clearly establish the association between the conditions and components of state anxiety. Such research might employ a factorial design in which there is no need to alter the nature of the task due to the possibility of practice effects.

Another limitation specifically concerns the physical harm condition. While many expected differences were

noted to this condition, the magnitude of these differences may have been affected by a phrase included in the consent form which advised that no physical danger was involved in the physiological recording process. For some subjects, as little as 20 minutes separated the reading of the consent form and the introduction of the physical harm condition. While subjects were quizzed after the experiment to assure that they expected a shock, they were not asked if they believed that this might involve physical danger. Lack of such a belief might have affected the results to some degree.

Suggestions for further inquiry

Some suggestions for further study have been mentioned in previous sections. These have primarily concerned the further validation and consolidation of many of the findings reported herein. The following suggestions are made with the assumption that the results are valid.

The results of this investigation underscore the importance of viewing both trait and state anxiety as multidimensional phenomena. While an increasing amount of research is being undertaken to scrutinize the multidimensionality of trait anxiety, it is important to remember that such research remains in a nascent stage. There is no clear concensus concerning the exact number

or nature of the different dimensions. The two dimensions which were employed in this study were chosen due to the concensus of different writers who have conducted research in the area (Endler and Okada, 1975; Magnusson and Ekehammer, 1975; Spielberger, 1977) that they are separate and legitimate dimensions. Considerable disagreement remains, however, concerning the number and constitution of other dimensions. Magnusson and Ekehammer (1975) developed a classification system comprised of four dimensions (including "ego threat" and "threat of pain") through "a priori" reasoning. Their later research has been directed toward validating their "a priori" categories as separable from one another. Endler and Okada (1975) developed their classification system (which includes "interpersonal evaluation" and "physical danger" categories) through the factor analysis of an earlier instrument which contained over 150 very specific situations (Endler, Hunt and Rosenstein, 1962). The factor analyses originally yielded three separate anxiety factors, including the two included in this study, but later research has led to the inclusion of others. Spielberger (1977) came to the conclusion that interpersonal evaluation anxiety and physical harm anxiety are separate dimensions through research that was conducted to validate his own measurement instrument,

which purported to gauge general anxiety. This instrument predicted responses to evaluation situations but not to situations involving possible physical harm such as threat of shock. While these authors agree that trait anxiety is multidimensional, there is little concensus concerning the number and constitution of the dimensions. The results of this investigation identify this as a potentially fruitful area for further investigation.

A similar lack of concensus can be found in the literature concerning the multidimensionality of state anxiety. The behavioral literature advocates an assessment of self-report, physiological variables and motoric behavior in the appropriate situation. The empirical results of Endler and Magnusson (1975) along with the theoretical work of Morris (1967) and Sarason (1975) suggests two major components: cognitive worry and emotional arousal. Recently popular "three-systems" theories advocate cognitive, physiological and overt-behavioral components (Mandler, 1975; Hughdahl, 1981). The considerable difficulty involved in accurately defining the parameters of each of these dimensions is outlined by Hughdahl (1981). Considerable work remains to be done before a concensus can be achieved on this issue.

Despite the considerable gaps which remain to be bridged in this area of research, the present investigation indicated that this has considerable potential for predicting when anxiety will occur and how that anxiety will be manifest. Such information may have considerable import for devising effective techniques to deal with such anxiety. This can only be attained through further study.

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Appendix 1: Stimulus-Response Inventory
of General Trait Anxiety

This inventory represents a means of studying people's reactions to and attitudes towards various types of general situations. On the following pages are represented five general kinds of situations which most people have encountered. For each of these general kinds of situations certain common types of personal reactions and feelings are listed. Indicate the degree to which you would show these reactions and feelings in the situations presented at the top of each page by circling the appropriate number.

Here is an example:

"You are getting ready to start the day"

Feel	1	2	3	4	5
uncomfortable	not at all				very uncomfortable

If you feel very uncomfortable in this situation you would circle alternative 5; if you feel somewhat uncomfortable you would circle either alternative 2, 3, or 4 depending on the degree of discomfort; if in this situation you do not feel uncomfortable at all, you would circle alternative 1.

If you have no questions, please turn to the items on the following pages.

Name or Mass Testing Number _____

Sex _____ Race _____ Age _____

Telephone # _____

"YOU ARE IN SITUATIONS WHERE YOU ARE ABOUT TO OR MAY ENCOUNTER PHYSICAL DANGER"

(We are primarily interested in your reactions in general to those situations that involve dealing with potentially dangerous things or objects.)

Circle one of the five alternatives for each of the following 15 items.

1.	Seek experiences like this	Very much	1	2	3	4 5 Not at all
2.	Feel upset	Not at all	1	2	3	4 5 Very upset
3.	Perspire	Not at all	1	2	3	4 5 Very much
4.	Feel relaxed	Very relaxed	1	2	3	4 5 Not at all
5.	Have an "uneasy feeling"	Not at all	1	2	3	4 5 Very much
6.	Look forward to these situations	Very much	1	2	3	4 5 Not at all
7.	Get fluttering feeling in stomach	Not at all	1	2	3	4 5 Very much
8.	Feel comfortable	Very comfortable	1	2	3	4 5 Not at all
9.	Feel tense	Not at all	1	2	3	4 5 Very tense
10.	Enjoy these situations	Very much	1	2	3	4 5 Not at all
11.	Heart beats faster	Not at all	1	2	3	4 5 Much faster
12.	Feel secure	Very secure	1	2	3	4 5 Not at all
13.	Feel anxious	Not at all	1	2	3	4 5 Very anxious
14.	Feel self-confident	Very much	1	2	3	4 5 Not at all
15.	Feel nervous	Not at all	1	2	3	4 5 Very nervous

"YOU ARE IN SITUATIONS WHERE YOU ARE BEING EVALUATED BY OTHER PEOPLE"

(We are primarily interested in your reactions in general to those situations where you are being evaluated or observed by other people. This includes situations at work, school, in sports, social situations, etc.)

Circle one of the five alternatives for each of the following 15 items.

1.	Seek experience like this	Very much	1 2 3 4 5			Not at all
2.	Feel upset	Not at all	1 2 3 4 5			Very upset
3.	Perspire	Not at all	1 2 3 4 5			Very much
4.	Feel relaxed	Very relaxed	1 2 3 4 5			Not at all
5.	Have an "uneasy feeling"	Not at all	1 2 3 4 5			Very much
6.	Look forward to these situations	Very much	1 2 3 4 5			Not at all
7.	Get fluttering feeling in stomach	Not at all	1 2 3 4 5			Very much
8.	Feel comfortable	Very comfortable	1 2 3 4 5			Not at all
9.	Feel tense	Not at all	1 2 3 4 5			Very tense
10.	Enjoy these situations	Very much	1 2 3 4 5			Not at all
11.	Heart beats faster	Not at all	1 2 3 4 5			Much faster
12.	Feel secure	Very secure	1 2 3 4 5			Not at all
13.	Feel anxious	Not at all	1 2 3 4 5			Very anxious
14.	Feel self-confident	Very much	1 2 3 4 5			Not at all
15.	Feel nervous	Not at all	1 2 3 4 5			Very nervous

Appendix 2: Consent for Research Participation and Physiological Recording

Consent for Research Participation
and Physiological Recording

I agree to participate in a program of research which will investigate bodily changes that occur during the performance of mental tasks. I understand that electrodes will be attached to my skin and such bodily activity as heart rate and sweating will be monitored through these electrodes. The process of physiological recording has been explained to me and I understand that no physical danger exists from this. I will feel free to ask questions concerning these procedures as they occur to me in the future. I understand that all information derived from my participation in this project is confidential and will not be revealed to anyone without my written consent. I also understand that I may voluntarily withdraw from this project at any time if I so desire.

Participant's Signature _____

Investigator's Signature _____

Date _____

Appendix 3: Task Instructions

Instructions to Physical Pain Task

One goal of this investigation is to determine how well you can perform a task while under stress. In a moment I'll present you with a task that you'll have one minute to carry out. About one half of the subjects in the experiment will receive a moderate electric shock while performing this task. The task will involve counting backward by 3's beginning with a certain number. Before I give you that number I want you to estimate, using the scale in front of you, how well you think you'll do on this task compared to others in the experiment. Now, for the next minute, I want you to count backward by 3's from the number 100. Don't stop until I tell you to. Ready? Begin.

Now stop! Please fill out these forms before we continue. We'll move on to the next task which doesn't involve shock so let me remove these electrodes.

Instructions to Ego - Evaluation Task

One goal of this investigation is to study factors which affect performance on tasks related to intelligence. In a moment I'll present you with a task that will provide me with a quick estimate of your intelligence, so be sure to do your very best! This task will involve naming all the words that you can think of beginning with a certain letter. Before I give you that letter, I want you to estimate how well you think you'll do on this task compared to others in the experiment using the scale in front of you. (Pause) Now, for the next minute, I want you to name all of the words that you can think of beginning with the letter "W." I will record them and rate them later. Don't stop until I tell you. Ready? Begin.

Now stop! Please fill out these forms before we go on. Unfortunately, the tape recorder didn't work so I can't rate you on intelligence. I don't have enough time to do this part over again but I want to continue with the rest anyway. The next task will have nothing to do with intelligence but will provide an opportunity to study something else.

Appendix 4: State Anxiety Inventory

SELF-EVALUATION QUESTIONNAIRE

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

STAI FORM X-1

NAME _____ DATE _____

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

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

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