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Effects of Cognitive Set on the Physiological, Subjective, and Behavioral Responses to Fearful Stimuli

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The Effects of Cognitive Set on the Physiological, Subjective, and Behavioral Responses to Fearful Stimuli

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Table of Contents

List of Tables

List of Figures

Abstract

THE EFFECTS OF COGNITIVE SET ON THE PHYSIOLOGICAL, SUBJECTIVE, AND BEHAVIORAL RESPONSES TO FEARFUL STIMULI

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This research investigated the effects of cognitive set on the physiological, subjective, and motoric responses of fearful and non-fearful subjects exposed to specific fear stimuli. High, moderate, and low mutilation fear subjects were given instructions designed to persuade them that they were or were not afraid of mutilation stimuli. The extent to which instructions differentially affected subjects in the three fear groups and produced differential effects on responses in the three modalities was examined. The degree to which the physiological, self-report, and behavioral channels responded concordantly was also investigated.

A series of hypotheses were derived which generally indicated that high-fear instructions would produce significantly greater physiological, self-report, and behavioral indices of anxiety than low-fear instructions. It was also predicted that these effects would be greatest for subjects in the moderate-fear group, and that the subjective and motoric response systems would exhibit greater differential change due to instructions than the physiological channel. In addition, high mutilation fear subjects were predicted to show greater concordance between response systems than the moderate- or low-fear groups.

Subjects were 48 female undergraduate students enrolled at Virginia Commonwealth University who were selected from a pool of 168 females who answered the Mutilation Questionnaire (Klorman, Weerts, Hastings, Melamed, & Lang, 1974). Sixteen subjects were assigned to each of the three fear groups on the basis of their total MQ scores, with 8 subjects in each of the six combined fear-instructional conditions. Following the administration of either high- or low-fear instructions, each subject was exposed to 5 neutral and 5 fearful slides. Each slide was presented for a 10-second duration with a 120-second interval between slides.

Dependent measures consisted of skin conductance responses (SCR), heart rate responses (HRR), and subjective distress ratings (SUDS) for each slide, total scores on a posttest administration of the MQ, and a behavioral avoidance Test (BAT) in seconds of latency to respond.

Results indicated that instruction had the predicted effects on the SCR's produced by all three fear groups to neutral stimuli, and on the level of heart rate exhibited by high mutilation fear subjects to both fearful and neutral slides. With the exception of the SUDS ratings of the moderate-fear group, the predicted instructional effects were obtained on both self-report measures for all three groups. The BAT measure failed to produce any significant instructional effects. The results did not support the hypotheses predicting greater instructional effects for moderately fearful subjects and no significant differences were obtained in the degree of concordance between dependent measures for the three fear groups.

Results are discussed with regard to the effects of cognitive set on the various components of the anxiety response and the relationship between arousal level and effectiveness of the instructional manipulation. Issues of clinical relevance, such as the treatment of phobias, were also discussed with regard to the results of the present study.

Methodological problems in the present study and suggestions for future research are also discussed.

CHAPTER I

Introduction

Review of Literature

The concept of "anxiety" is pervasive throughout much of the psychological literature and has been investigated and defined by numerous theorists of varying backgrounds and orientations. While there is an apparent lack of agreement as to the specific nature of this construct, a particularly prevalent view is that anxiety is characterized by subjective feelings of tension and apprehension that are accompanied by physiological arousal and avoidance or escape from the stressful stimulus or situation. According to this definition, anxiety is viewed as a multidimensional construct, involving three separate but interacting response channels: the motoric, the cognitive, and the physiologic (Bernstein, 1973; Borkovec, Weerts, & Bernstein, 1977; Lang, 1968; Malmo, 1957; Rachman, 1974; Van Egeren, 1971). As it is employed in the present study, the concept of anxiety is similar to that of Speilberger's state of anxiety, which he defines as a transitory emotional state that varies in intensity and fluctuates over time (Speilberger, 1972). State anxiety is distinguished from trait anxiety "in terms of individual differences in the frequency that anxiety states are manifested over time" (Speilberger, 1972, p. 10). In the present study, therefore, anxiety will be defined as a relatively high degree of arousal as reflected by two physiological measures (heart rate and electrodermal response), subjective self-reports of anxiety, and behavioral avoidance of specific stimuli. For purposes of conceptual organization and clarity, the terms "anxiety" and "fear" will be used synonymously in this study. Though there is some disagreement over the equating of these two terms (Izard, 1972), several investigators have felt their synonymous use to be appropriate (Levitt, 1967; Martin, 1961; Speilberger, 1966; Wolpe, 1958).

The arousal model of anxiety is taken from Duffy's (1962, 1972) work in which she employs the terms "arousal" and "activation" to refer to variations in the individual's level of physiological and behavioral excitation. According to Duffy, behavior exhibits variation in only two basic respects: the direction of the behavior and the intensity or arousal level at which this action occurs. While the former dimension is considered to be essentially dichotomous (approach-withdrawal), the latter dimension is thought to occur on a continuum, from a low point in deep sleep or coma to a high point in extreme excitement. The level of arousal or activation, then, is defined as "the extent of release of potential energy stored in the tissues of the organism" (Duffy, 1962, p. 17). According to this model, all behavioral, subjective, and physiological components of anxiety are the result of a high degree of central nervous system activation.

Though Duffy (1962) does not explicitly hypothesize that various emotional states can be distinquished on the basis of differences in physiological activity, she does propose that the patterning of activation will differ depending upon the demands of the situation, the intensity of the stimulus, and the individual's perception and interpretation of these variables. Other investigators have provided some evidence that certain emotional states are accompanied by particular patterns of physiological activity. In an early study, Ax (1953) examined 14 physiological variables in subjects exposed to fear- and anger-inducing situations, and found significant differences between the conditions on seven measures. The anger condition resulted in greater increases in diastolic blood pressure, muscle potentials, and number of skin conductance responses, and greater decreases in heart rate than the fear condition, which produced greater increases in skin conductance levels, respiration rate, and number of muscle action potentials. Ax interpreted the pattern of physiological activity in the fear condition as being consistent with that produced by the hormone epinephrine, and the pattern produced by the anger condition as being similar to a combined epinephrine-norepinephrine effect. Though the evidence is by no means conclusive, similar results that tend to support this differentiation have been reported elsewhere (Schachter, 1957; Sternbach, 1960; Wolf & Wolf, 1947).

The role of cognitive processes is somewhat obscure in traditional activation theory. Duffy (1962) does, however, emphasize the dependence of arousal upon the individual's interpretation of the particular stimulus situation "in the light of his past experiences and present circumstances" (p. 50), which seems to imply a cognitive component. The work of Schachter and his colleagues (Schachter, 1964; Schachter & Singer, 1962; Schachter & Wheeler, 1962) merges the more general theory of activation with a cognitive mediational model by demonstrating the interaction of physiological arousal and cognitive set in determining the unique character of an emotional response:

> "Granted a general pattern of sympathetic excitation as characteristic of emotional states, granted that there may be some differences in pattern from state to state, it is

> suggested that one labels, interprets, and identifies this stirred up state in terms of the characteristics of the precipitating situation and one's apperceptive mass. This suggests, then, that an emotional state may be considered a function of a state of physiological arousal and of a cognition appropriate to this state of arousal. The cognition, in a sense, exerts a steering function. Cognitions arising from the immediate situation as interpreted by past experiences provide the framework within which one understands and labels his feelings. It is the cognition which determines whether the state of physiological arousal will be labeled as 'anger', 'joy', 'fear', or whatever." (Schachter & Singer, 1962, p. 380)

Schachter's (1964) two-factor theory of emotion (i.e., arousal and cognition) is parallel to, and combines easily with, Duffy's (1962) two-component theory of activation (i.e., intensity and valence).

The remaining component of anxiety to be dealt with in the present study, the motoric, is seen as being the overt behavior that follows from a state of physiological arousal and the process of cognitive labeling.

Effects of "Anxiety-Arousing" Stimuli

Several studies have shown that individuals respond differently to anxiety-arousing, or fearful, stimuli as opposed to nonfearful stimuli. Lazarus, Speisman, Mordkoff, and Davison (1962) employed benign and fearful motion picture films as stimuli and found that subjects responded differently on physiological and self-report measures to the contents of the two films. The fearful film, entitled "Subincision", depicted a series of operations performed with a piece of flint on the penis and scrotum of several aboriginal boys and, as such, relates to the commonly reported fear of mutilation (Klorman, Weerts, Hastings, Melamed, & Hart, 1974; Manosevitz & Lanyon, 1965).

The benign film showed a day in the life of a corn farmer and his family. The fearful film produced significant increases in heart rate and skin conductance, as well as increases in self-reported anxiety, tension, and negative affect, while the control film appeared to relax the subjects below their usual levels. In addition, skin conductance was observed to rise and fall with the nature of the events portrayed in the fearful film. That is, the peaks in skin conductance occurred at the exact points in the film where the subincision operations were performed and the valleys coincided with relatively neutral events. In a similar study, Kaiser and Roessler (1970) examined the number and amplitude of galvanic skin responses (GSR) while subjects rested and while they viewed a bland and a fearful film. The fearful film was a shop safety film that depicted a series of three woodmill accidents and the bland film showed several tropical underwater scenes. The greatest number and amplitude of GSR's were produced during the fearful film and paralleled variations in the content of the film, with both the number and amplitude of GSR's increasing significantly during the accident scenes. Additionally, a direct relationship was obtained between the GSR measures and scores on the Multiple Affect Adjective Check List (Zuckerman, Lubin, Vogel, & Valerius, 1964). Geer and Klein (1969) showed 40 female subjects photographs of either dead bodies or live individuals and, in order to assess the effects of independent threat or stress upon responding to fearful and nonfearful stimuli, half the subjects expected but never received electrical shock. The results showed that the photographs of dead bodies produced significantly larger and more frequent GSR's than the photographs of live individuals, and this effect appeared to be enhanced by the threat of shock. The photographs of dead bodies also tended to elicit greater cardiac reactivity and this was especially true under conditions of shock-threat. There was no evidence that general arousal, as indexed by either basal levels of GSR or heart rate, was effected by the threat of shock, but rather independent threat tended to increase the reactivity to all stimuli.

These studies seem to demonstrate that the presentation of fearful stimuli is accompanied by increases in autonomic activity, as well as by corresponding changes on various self-report measures, and are consistent with Duffy's (1972) conceptualization of anxiety as a generalized increase in arousal or activation. Duffy's (1962) model also suggests that this arousal will vary depending upon the individual's interpretation of the stimulus. Accordingly, a number of studies have shown that individuals respond differently to a particular fearful stimulus depending upon their degree of self-reported fear of that stimulus. Geer (1966) reported a study in which 32 female subjects were classified as either high-fear of low-fear of spiders on the basis of their responses on the Fear Survey Schedule (Geer, 1965). In the experimental condition, half the subjects from each fear group were shown pictures of a spider, while subjects in the control condition were shown pictures of a snake, an irrelevant fear for these subjects (i.e., responding "none" to the snake item on the FSS). Subjects were told that a "series of animal pictures" would be flashed on a screen and, for the first seven trials, all subjects were shown pictures of "neutral" animals (e.g., horse, turtle) in order to permit partial habituation of responses to the presentation of pictures. The test stimuli were presented during the next three trials. Using the response to the last neutral stimulus as a baseline, high-fear subjects in the experimental condition yielded GSR's of greater amplitude and duration than all other groups when first shown the picture of a spider on Trial 8. This increase in GSR responding for high-fear experimental subjects was maintained for the remaining two trials relative to subjects in the control condition. Similarly, Wilson (1967) compared GSR responding to a set of tachistoscopically presented color slides for 10 subjects reporting an intense fear of spiders and 10 subjects reporting no such fear. Eight spider and eight landscape pictures were presented in alternating order twice for each subject, with each picture being shown for a 1 - sec. duration at 15 - sec. intervals. Although responses to the landscapes did not differ for the two groups, GSR's to the spider pictures were much larger for the fearful subjects and perfect discrimination between the groups was obtained by employing the index, ratio of response to spider pictures over response to landscape pictures. Employing an additional set of fearful stimuli, Prigatano and Johnson (1974) exposed 11 spider phobic subjects and 11 nonphobics to three different classes of slides: fearful (spiders), generally fearful (surgery), and neutral (seascapes). The results indicated that the spider phobics showed significantly greater vasoconstriction, faster heart rate, and greater heart rate variability during the presentation of the spider slides than did the nonphobic subjects, and that this increase in responding was restricted to the specific fear stimuli (i.e., spiders). Hare (1973) conducted a study in which 10 females who feared spiders and 10 females who did not were shown a series of 24 neutral (landscape scenes and common objects) and 6 spider slides. The subjects were selected on the basis of their responses to a "fear inventory" and a rating of their fear of spiders on a Likert-type rating scale. Heart rate data indicated that, while both groups gave relatively small responses to the neutral stimuli, they differed significantly in their responses to the spider stimuli, with the fearful subjects exhibiting heart rate acceleration and the nonfearful subjects deceleration. Palmar and dorsal skin conductance responses to the spider stimuli were generally larger than those given to the neutral stimuli, and tended to be larger and more resistant to habituation in the fearful group. The responses of subjects during a post-experiment interview indicated that the subjects in the fearful group were tense, apprehensive, and afraid during the presentation of the spider stimuli, and some reported having used various techniques (e.g., denial, rationalization) to reduce the impact of the slides. The nonfearful subjects, on the other hand, tended to report only a mild interest in and curiosity about the spider stimuli. Finally, Klorman, Wiesenfeld, and Austin (1975) classified 32 female subjects as either high- or low-fear of mutilation on the basis of their responses on the Mutilation Questionnaire (Klorman et al., 1974) and exposed each subject to a series of six slides from each of three categories: neutral, incongruous, and mutilation. The neutral and incongruous slides were employed as controls for novelty and consisted of persons in typical and unusual poses, respectively. The mutilation slides depicted victims of burns and accidents. Following the presentation of all eighteen slides, the series was repeated and the subjects rated each slide for its aversiveness immediately after its offset. The results showed that the high-fear subjects responded to the mutilation slides with cardiac acceleration, while the low-fear subjects responded with cardiac deceleration. Although both groups reacted to the incongruous stimuli with heartrate deceleration as predicted, they unexpectedly responded with cardiac acceleration during the presentation of the neutral stimuli. The high-fear group also emitted electrodermal responses of greater amplitude and duration during the mutilation slides than during the other slide types and, in both respects, exceeded the low-fear group. While both groups judged the mutilation slides as being more disturbing than either the neutral or incongruous slides, the high-fear group reported greater differential distress to the mutilation slides than to the other two slide types.

Though each of the above studies employed visual stimuli, similar differential effects have also been reported for fearful and nonfearful imagined stimuli (Grossberg & Wilson, 1968; May, 1977a; May, 1977b; May & Johnson, 1973; Schwartz, 1971).

The studies reviewed thus far are rather consistent in demonstrating that exposure to fearful stimuli produces a state of anxiety with its associated increases in physiological responding and self-reported feelings of tension and apprehension. More importantly, however, these effects appear to be somewhat specific to the particular stimulus employed and are therefore dependent to a large degree upon the individual's prior learning history and experience with the stimulus. In other words, the capacity of a given stimulus to elicit anxiety depends upon the importance and meaning that the stimulus has for the individual and the interpretations he makes regarding its presence. This suggests the importance that cognitive factors, or more specifically the cognition, "I am afraid of this stimulus", have in the precipitation and expression of anxiety.

Effects of Cognitive Variables

According to Schachter's (1964) two-factor theory, anxiety is the product of two interacting processes: 1) a state of physiological arousal, and 2) the cognitive evaluation and labeling of this arousal as "anxiety". Since both factors are considered necessary for the individual to experience anxiety, modification of either should alter the person's affective experience. One approach is to attenuate or eliminate the physiological arousal by means of various contercondi-tioning procedures (e.g., systematic desensitization) in order to reduce the degree of felt anxiety (Wolpe, 1969). A second approach is to modify the cognitive component such that the physiological arousal is "relabeled" as something other than anxiety (Ellis, 1977; Meichenbaum, 1977). Though ample evidence exists supporting the effectiveness of both procedures, a number of authors have emphasized the cognitive component of anxiety and investigated the effects that result from its modification.

The crucial role of cognitive variables in determining the nature of an emotional response was demonstrated in an early study by Schachter and Singer (1962). An experiment was designed to test three hypotheses relating to the interaction of cognitive factors with a state of physiological arousal: 1) when an individual experiences a state of physiological arousal for which he has no immediate explanation, he will cognitively label the arousal in terms of the situation he is in and the cognitions available to him; 2) when an individual experiences a state of physiological arousal for which he has a completely appropriate explanation, he will not attempt to label his feelings in terms of the alternative cognitions available; and 3) in a particular situation, an individual will not label his feelings as emotion unless he experiences a state of physiological arousal. To test these hypotheses, subjects were told they were participating in a study designed to assess the effects of a new vitamin on their vision, but were actually given injections of either epinephrine or a saline solution. The subjects receiving epinephrine were then divided into three groups according to the instructions they received as to the effects of the drug. One group was told the actual side effects of the drug, the second group was told nothing about the side effects, and the third group was misinformed as to what side effects to expect. Following the injection and the appropriate instructions, the subjects were left alone in the room with a confederate who exhibited one of two preplanned modes of behavior - euphoria or anger. Observations of the subjects' behavior during the time they were with the confederate and post-experimental self-reports of mood and physical state were employed as measures of arousal and emotionality. The results clearly supported the first two hypotheses. During the euphoria condition, subjects not informed or misinformed about the effects of the drug behaved more euphorically and indicated greater self-reports of euphoria than subjects in the informed group. Similarly, noninformed subjects in the anger condition displayed significantly more anger than either the informed or the placebo subjects. The evidence supporting the third hypothesis, however, was "consistent but tentative" (p. 396). Some subjects in the noninformed and misinformed groups showed no evidence of increased emotionality, while others who had not received epinephrine at all (placebo group) exhibited signs of euphoria and anger. Though Schachter and Singer's (1962) study has been criticized in terms of its methodological and conceptual approrpiateness (Lang, 1971; Lazarus, 1968), the implication that a competing cognitive set can override physiological arousal in determining emotional behavior is nevertheless significant.

Systematic desensitization, as a procedure for reducing or eliminating anxiety, focuses primarily on the physiological component of increased sympathetic arousal. Several authors, however, have considered the procedure to be largely a cognitive process in which the individual infers that he is no longer afraid by observing himself failing to signal anxiety to hierarchy items (Valins & Ray, 1967; Wilkins, 1971). Two studies by Valins and Ray (1967), in which cognitions were induced concerning physiological reactions to fearful stimuli, seem to lend support to this position. In the first study, 42 female and 14 male subjects (not selected for their fearfulness) were shown ten slides of snakes and ten slides of the word "shock". In the experimental condition, subjects received bogus heart rate feedback indicating that their heart rate increased to the shock slides, but not to the pictures of the snakes. Subjects in the control condition heard the same sounds as the experimental subjects, but were told the sounds were meaningless. Additionally, all subjects received a mild electrical shock to the fingers during the presentation of the shock slides. In a subsequent behavioral avoidance test involving a live snake, the experimental subjects were observed to exhibit somewhat more approach behavior than the controls, but this difference proved to be nonsignificant. After eliminating subjects with previous experience with snakes from both groups, however, the authors found a significant difference between the approach behavior of the experimental and control conditions. The procedure during the second experiment was identical to that of the first, except that subjects were selected on the basis of an expressed fear of snakes and a live snake was employed as a stimulus rather than the snake slides. Additionally, if the subject refused to touch the snake during the behavioral avoidance test, the experimenter offered a monetary incentive in order to assess the amount of pressure required for the subject to touch or pick up the snake. The results showed that the subjects in the experimental condition were more likely to hold the snake and required less pressure to touch the snake than subjects in the control condition. Thus, subjects who were led to believe that the snake stimuli did not affect them internally, and that their fear was therefore unjustified, showed significantly greater approach behavior than subjects who were given no information about their internal reactions.

The influence of cognitive variables has also been demonstrated in studies dealing with the effects of subject expectancy on therapeutic outcome. Marcia, Rubin, and Efran (1969) exposed 44 snake and spider phobic subjects to either a form of systematic desensitization, a technique called T-scope therapy, which embodies the expectancy-manipulating features of systematic desensitization without the technical aspects of the procedure, T-scope therapy presented as an incomplete and probably ineffective form of treatment, or no treatment. Following treatment, there were no significant differences on self-report, runway, or interview measures between the systematic desensitization and high-expectancy T-scope therapy groups, and both procedures were significantly more effective than either the low-expectancy T-scope therapy or the no-treatment control. The latter two conditions did not differ in their overall effectiveness. Rappaport (1972) evaluated the effects of manipulated cognitive expectancy on avoidance behavior within an experimental paradigm that simulated systematic desensitization. Seventy-two female subjects who had expressed a moderate fear of spiders on the Fear Survey Schedule (Geer, 1965) were divided among four expectancy conditions, ranging from a set to improve to a set that fear would increase. Two measures of electrodermal activity (galvanic skin response and basal skin resistance) were continuously recorded while each subject was exposed to a preserved tarantula. The results indicated that both overt avoidance behavior and two verbal indices of anxiety were differentially affected by the expectancy manipulation. However, no relationship was obtained between avoidance behavior and the two physiological measures. Borkovec (1972) reported a study in which 50 female subjects, selected on the basis of their responses to the snake item of the Fear Survey Schedule (Geer, 1965) indicating a high fear of snakes, were randomly assigned to one of four conditions: 1) desensitization, 2) implosion, 3) avoidance response, or 4) no treatment. Half the subjects in each condition received instructions designed to establish a positive expectancy for improvement, while the other half received instructions designed to avoid establishing such an expectancy. After four sessions with the respective procedure, each subject participated in a behavioral avoidance test employing a live snake as the target object. Both systematic desensitization and implosion resulted in reduced pulse rates during the test, and the expectancy manipulation strongly affected overt behavioral measures of anxiety and, to a lesser degree, subjective self-report measures. Beiman (1976) assigned 48 female subjects who had reported "much fear", "very much fear", or "terror" to at least three items of the Fear Survey Schedule (Geer, 1965) to one of four experimental conditions. Half the subjects received abbreviated relaxation training, while the other half received an inert placebo pill ("tranquilizer") and undertook a target detection task. In order to evaluate the effects of expectancy set, half the subjects in each group received instructions designed to lead to an expectancy of response decrease to the fearful stimuli following treatment and the other half received instructions designed to produce an expectancy of response increase. Each subject visualized the scenes most frightening to her prior to training and, following training, visualized the scene that had produced the largest physiological response. The results for phasic heart rate and muscle tension measures indicated that subjects who were told they would have a minimal emotional response following training exhibited a significantly greater reduction in response than subjects told their emotional response would increase.

These studies, along with similar results reported elsewhere (Agras, Leitenberg, & Barlow, 1968; Oliveau, Agras, Leitenberg, Moore, & Wright, 1969), appear to support the contention that cognitive manipulation plays an important role in modifying anxiety, even with procedures such as systematic desensitization that have the attenuation of physiological arousal as their focus. This seems to suggest that by receiving physiological feedback indicating an absence of arousal to a particular stimulus or by being part of a procedure specifically designed to eliminate anxiety, the individual's cognition, "I am afraid of this stimulus" is converted to, "because my heart beat says I am not afraid (because I have received an effective form of therapy), I am no longer afraid of this stimulus".

Additional studies have demonstrated that behavioral, self-report, and physiological indices of anxiety can be modified to a significant degree through expectancy and suggestion manipulations alone. Borkovec (1973a) employed repeated behavioral avoidance tests with intervening suggestions for improvement and found significant increases in approach behavior and reductions in pulse rate over testings for snake fearful subjects. In a study designed to assess the effects of situational and instructional cues on speech anxious subjects, Blom and Craighead (1974) found that telling a subject the study was concerned with testing his level of fear during a spontaneous speech produced more behavioral and self-reported anxiety than telling him the object of the study was to determine the effects of simulated relaxation training, even though no such training was ever administered.

A subject's responsivity to an anxiety-arousing or fearful stimulus may also be modified by manipulating his beliefs about certain aspects of the stimulus itself, such as its nature, intensity, and time of onset. Jenks and Deane (1963) obtained base-level measurements of cardiac activity while 60 male subjects watched the sequence of numbers 1 - 12 appear on a memory drum. Half the subjects were told to expect a shock and half were told to expect an extremely loud tone during the numbers 8, 9, or 10 on some of the trials. Only half the subjects actually received a shock or a tone, while the other half received no stimulus. All subjects showed an acceleration in heart rate during the numbers 1 - 6 and deceleration during the numbers 8 - 10. The amplitude of the change in heart rate was not dependent upon whether or not the stimulus was actually received, but the shock-anticipation group showed greater acceleration than the tone group, with the amount of deceleration being the same for both groups. Sternbach (1965) asked 12 subjects to estimate the strength of a series of shocks under two different conditions. In the first, "60 cps" condition, the subjects were given instructions to assign numerical values to a series of shocks of different current strengths. In the second, "75 cps" condition, the same subjects had the same task and received the same stimuli, but were told that a "75 cps" current was now being used which might produce some unpleasant sensations and maybe some damage. The results indicated that the subjects' estimation of the intensity of the shocks was modified to a significant degree by the instructions. Epstein and Clarke (1970) investigated the influence of two variables upon reactions to a fearful stimulus. One variable was the subject's expectancy of the intensity of the stimulus that would be delivered, manipulated by providing information designed to produce an overestimate, underestimate, or essentially correct estimate of the stimulus intensity. The other variable was the subject's experience in confronting the stimulus as established by the number of trials during which he had received the stimulus. Thirty male subjects were divided into three groups according to instructions designed to produce a different estimate of the intensity of a noxious sound delivered on the tenth count of a 20-point count-up. The tenth tone on each trial was 400 Hz., 107 db., with the other 19 stimuli being 400 Hz., 60 db. The results showed that the mean heart rate was greatest for the high-threat group (overestimate), next for the medium-threat group (correct estimate), and that the low-threat group (underestimate) was only slightly below the medium-threat group. The high-threat group also exhibited the greatest reaction to the impact of the critical stimulus, particularly on Trial 1. With the presentation of the first stimulus, all three groups displayed a rise in skin conductance and arranged themselves in descending order from high- to low-threat groups. An analysis of the impact effect for skin conductance (i.e., a comparison of stimuli 9 and 10 on Trial 1), revealed significant group differences for the poststimulus and change scores, with the groups again ordering themselves from high- to low-threat. Subjective ratings of intensity showed significant differences only on Trial 1. The high-threat group rated the stimulus as least intense and the low-threat group rated it as most intense. These results appear to indicate a direct relationship between the subject's expectancy of the intensity of a stimulus and the degree of physiological arousal produced prior to and during the time that stimulus is presented. Furthermore, since the groups ordered themselves in the opposite direction on the self-report measure, it seems as though subjective ratings were influenced by the contrast between the expected and actual stimulus, while the more immediate physiological reaction was determined by expectancy alone. The major effects of experience on both physiological measures were to reduce arousal, particularly for the high-threat group, and to make the groups more alike.

Similar to Schachter (1964), Lazarus (1967, 1968) has emphasized the importance of cognitive factors in determining the nature of an emotional response. More specifically, Lazarus' cognitive-appraisal theory (Lazarus, 1968) suggests that anxiety is a function of the individual's perception and appraisal of the specific stimulus properties of a situation in terms of its personal relevance and significance for him. In agreement with Duffy (1962), cognitive-appraisal theory considers the physiological component of anxiety to be a rather unidimensional phenomenon, but also proposes that this state may be either increased or decreased by cognitive responses. In this respect, Schachter's (1964) two-factor theory may be regarded as a special case of cognitive-appraisal theory, especially applicable when situational cues are particularly vague and ill-defined, or when the individual's learning history is such that it makes rapid evaluation of the situation difficult (Woolfolk, 1976).

Though the previous three studies reviewed (Jenks & Deane, 1963;

Sternbach, 1965; Epstein & Clarke, 1970) provide support for a cognitive-appraisal interpretation of anxiety, in that responding was influenced by cognitive or instructional set, there are difficulties associated with interpreting the results solely in terms of psychological processes. As Lazarus et al. (1962) have pointed out, when physical stimuli such as shocks or sounds are employed as anxiety-arousing or fearful stimuli, "there is a complete confounding of the physical and psychological reasons for whatever effects are noted" (p. 1). In order to circumvent this problem, Lazarus and his colleagues conducted a series of studies in which they manipulated the cognitive appraisal of fearful stimuli that did not involve a physical assault upon the subject. Speisman, Lazarus, Mordkoff, and Davison (1964) employed the silent film "Subincision" as a fearful stimulus and created three different sound tracks in order to compare their impact with that of the silent version. One of the sound tracks, called the trauma track, pointed out the fearful aspects of the film, while the other two were designed to encourage defensive interpretations of the film so as to reduce anxiety. These tracks consisted of either denial and reaction formation statements about the film, which denied the harmful aspects of the subincision ritual and emphasized the positive aspects of the ceremony, or intellectualization statements which presented a scientific attitude toward the ritual. In order to increase the generalizability of the results and to examine the possible interactions between subject type and sound track, subjects from two populations, 42 airline executives and 56 undergraduates, were employed. Half the airline executives were presented with the denial and reaction formation sound track and half with the intellectualization sound track, while the students were equally divided among the four experimental groups (i.e., silent, trauma, denial and reaction formation, and intellectualization). Heart rate and skin conductance were continuously recorded throughout the film, and the Nowlis Adjective Check List of Mood (Nowlis & Nowlis, 1956) and a self-rating of tension were obtained following the completion of the film. The results indicated that the trauma track produced increases in physiological activity, particularly with respect to the skin conductance measure, while the defensive sound tracks reduced evidences of an anxiety response. The effectiveness of the defensive sound tracks in reducing anxiety interacted with the two subject groups, such that the intellectualization track was more effective with the student group and the denial and reaction formation track was more effective with the airline executives. Although neither self-report measure showed much evidence of differences between the experimental conditions, the pattern was generally one of greater anxiety during the trauma track. Overall, anxiety was greatest in the trauma condition, next in the silent condition, and significantly less in the defensive sound track conditions. In a subsequent study, Lazarus and Alfert (1964) attempted to separate out the effects of an introductory statement designed to alter the subject's beliefs or expectations about the events portrayed in the "Subincision" film from a commentary which runs along with the film. Sixty-nine male subjects were randomly assigned to one of three experimental conditions: 1) the silent version of the "Subincision" film; 2) the presentation of the film with both an introduction and a commentary containing denial and reaction formation statements; or 3) a silent presentation of the film in which the defensive statements were presented only as an introduction. Heart rate and skin conductance were continuously recorded throughout the film and self-report measures, including the Nowlis Adjective Check List of Mood and tension ratings, were obtained at the end of the film. The results showed significant differences among the three groups on the heart rate measure, with the silent condition producing the highest mean heart rate and the denial-introduction condition the lowest. Although three of the Nowlis mood variables (pleasantness, concentration, depression) differentiated the three experimental conditions, the tension ratings obtained at the end of the experiment did not. Lazarus, Opton, Nomikos, and Rankin (1965) later conducted another study designed to test the generality of the principle that manipulation of beliefs about fearful stimuli can reduce or eliminate subsequent anxiety to those stimuli. A different film, entitled "It Didn't Have to Happen", was employed and depicted a series of three woodmill accidents. Sixty-nine subjects were randomly assigned to one of three experimental conditions, with an equal number of males and females in each condition. The three experimental conditions included an intellectualization-introduction condition, a denial-introduction condition, and a control condition. All subjects heard a tape-recorded summary of the events portrayed in the film prior to its onset, but only the control condition introduction suggested no particular mode of defensive coping with the contents of the film. For all three accident scenes, and for both heart rate and skin resistance measures, the least reaction was obtained for subjects in the intellectualization-introduction condition and the largest reactions were produced by the control condition subjects, with the scores for the denial-introduction condition being intermediate.

These studies appear to demonstrate, then, that providing information designed to influence a subject's beliefs or expectations about a particular fearful stimulus can significantly affect his subsequent responding to that stimulus and that the same stimulus varies in its capacity to produce anxiety "depending upon the nature of the cognitive appraisal the person makes regarding its significance for him" (Speisman et al., 1964, p. 367). Thus, if the individual is encouraged to intellectualize or deny the frightening aspects of the stimulus, the anxiety response will be attenuated. On the other hand, if he is "cognitively set" to be afraid, the presentation of fearful stimuli will tend to elicit anxiety. A similar example of the effects of cognitive appraisal has been reported by Mangelsdorff and Zuckerman (1975). Subjects were shown slides of an automobile accident, two male students conversing, and a scene from the Vietnam My Lai massacre. Half the subjects were told the massacre was a massacre of civilians by the Viet Cong and the other half were told the scene was a massacre of civilians by Americans. Skin conductance change scores significantly discriminated the three slide types, with the accident scene producing a larger response than the massacre scene which, in turn, produced a larger response than the neutral scene. More importantly, however, the massacre scene produced different responses depending upon which "label" was assigned to it. When subjects believed the scene was a Viet Cong massacre of civilians, they reported significantly more agitation than when the same scene was presented as a massacre of civilians by Americans. Additionally, the Viet Cong label produced a decrease in heart rate, while the American label resulted in heart rate acceleration.

Present Study

The literature reviewed above appears to indicate that cognitive manipulations, in the form of information or verbal sets provided a subject, can significantly modify indices of anxiety when the subject is subsequently presented with fearful stimuli. In terms of the present investigation, however, these studies seem to be lacking in several respects. The studies reviewed concerning the effects of cognitive appraisal, though demonstrating the capacity of verbal sets to modify anxiety, have tended to employ generally fearful stimuli with subjects who were not selected on the basis of their degree of fear. On the other hand, investigations of expectancy effects on therapeutic outcome measures have used specific fear stimuli with fearful subjects, but have confounded the effects of cognitive manipulations with those of the various therapeutic interventions. In addition, none of the studies reviewed have addressed the issue of the generalizability of cognitive effects on anxiety by using subjects differing in their degree of expressed fear. It may be, however, that these effects differ substantially depending upon the severity of an individual's anxiety and the relative involvement of the three response modalities in maintaining the fear behavior. Borkovec (1973b), for example, has suggested that the effects of expectancy variables on therapeutic outcome are likely to be less for highly fearful subjects than for subjects expressing a more moderate level of fear, presumably due to the greater maintaining role of physiological cues in the former group. The purpose of the present experiment, therefore, is to examine how cognitive manipulations, in the form of information or verbal sets, differentially affect subjects of differing fear levels when they are subsequently presented with specific fear stimuli.

There appears to be two basic ways in which these manipulations may be performed. One procedure is to provide the subject with information pertaining to the nature of the stimulus to be presented, such as its intensity, content or meaning. In this case, a subject's appraisal of a particular fearful stimulus is manipulated by providing information designed to influence his beliefs or expectations about the stimulus itself. A second procedure is to provide information that will influence the subject's beliefs or expectations about how he will respond to the presentation of a fearful stimlus. In other words, the subject is fully aware of the nature of the stimulus but believes he will respond in either a fearful or nonfearful way whenever the stimulus is presented. A number of the studies reviewed above seem to suggest that a subject's belief that he is no longer afraid of a particular stimulus is an important component in the success of various methods used to modify fearful or anxious responding. For this reason, the latter procedure appears to be somewhat more relevant to the therapy process and will therefore be employed in the present study.

As mentioned previously, anxiety is defined in the present study as a high degree of arousal as reflected by two physiological measures, in addition to a behavioral avoidance test and subjective self-report. There appears to be ample evidence supporting the use of the physiological measures chosen. With regard to heart rate, Hare (1973) and Klorman et al. (1975) reported that high-fear subjects responded to fearful stimuli with a pattern of cardiac acceleration that was indicative of a defensive reaction. A defensive response is distinguished from an orienting response which occurs in the presence of novel stimuli, involves cardiac deceleration, and habituates more rapidly than a defensive response (Graham & Clifton, 1966; Sokolov, 1963). Similarly, Gunn, Woolf, Block, and Person (1972) found that subjects typically exhibit cardiac acceleration in response to the presentation of fearful stimuli.

The electrodermal response has long been one of the most popular indicators of autonomic arousal (Duffy, 1972) and has frequently been employed as a measure of anxiety and fear. Lazarus et al. (1972) found that skin conductance increased during the presentation of a fearful film and that this measure also fluctuated with variations in the content of the film, such that the peaks occurred during the most fearful scenes and the valleys coincided with the more benign scenes. Hare (1973) and Klorman et al. (1975) reported that fearful subjects gave electrodermal responses of greater amplitude and duration while viewing stimuli that were specific to their fears than nonfearful subjects shown the same stimuli.

After reviewing the literature on physiological measures of anxiety, Martin (1961) concluded that the available research provides "little ground for optimism that these variables will correlate very highly, if at all" (p. 243). He pointed out, however, that few studies have addressed the issue of concordance between physiological variables by obtaining measures under clearly fear- or anxiety-arousing situations. Several authors (Duffy, 1972; Lang, 1971) have noted that the typically low correlations between physiological variables are due to the use of inappropriate methods of treating the data, particularly the use of intercorrelations based upon groups of subjects. Poor inter-subject correlations are attributable, in part, to the fact that individuals exhibit different baseline or tonic levels of responding which results in varying absolute response levels. A more appropriate method, therefore, is to correlate physiological responses within individual subjects. A number of studies (Lazarus, Speisman, & Mordkoff, 1963; Schnore, 1959) have reported high positive correlations between physiological response systems when intracorrelational methods were employed.

Though anxiety is generally regarded as a multiple-system response (motoric, verbal-cognitive, physiologic), correlations among the three channels are usually reported as being rather low (Borkovec, Stone, O'Brian, & Kaloupek, 1974; Lang & Lazovic, 1963; Martin, 1961). Lang (1971) has suggested that the three response systems are at least partially autonomous, with each modality subject to separate shaping by the environment and capable of changing independently, such that they may fail to respond simultaneously or to the same degree to a given stimulus. Recently, several investigators (Hodgson & Rachman, 1974; Kallman & Feuerstein, 1977; Sartory, Rachman & Grey, 1977) have reported a high degree of correspondence among subjective, avoidance, and physiological indices of anxiety. Hodgson and Rachman (1974) have suggested that the degree of concordance between response systems is likely to be considerably higher during strong emotional arousal. This is in agreement with Lang (1971) who maintains that "mild feeling states may involve no more than the verbal report, and we might find little specific activity in the autonomic or behavioral sphere . . . the verbal behavior of a human being is capable of reflecting gradations of affect to which the cruder autonomic system may be completely insensitive" (p. 108). Kallman and Feuerstein (1977) have suggested that the low correlations between subjective and physiological measures is due to the situational specificity of biological responses and the failure to obtain self-reports of anxiety in a "psychobiologically relevant environment". Accordingly, Mordkoff (1964) reported a study in which self-report was obtained over the course of a fearful film in a manner analogous to the continuous recording of physiological responses. Employing intra-individual correlational methods, a substantial relationship was obtained between physiological response and subjective self-report.

The commonly reported fear of tissue damage and bodily injury, or "mutilation anxiety", served as the basis for both subject selection and the type of stimuli presented. Klorman et al. (1974) have presented psychometric data on an internally consistent, 30-item, true or false self-report questionnaire which is designed to measure the verbal-cognitive or subjective component of mutilation anxiety (see Appendix A for a copy of the questionnaire). Due to the high incidence of "mutilation phobics" in the general population, the Mutilation Questionnaire has been recommended for use in analogue fear research (Klorman et al., 1974).

The present study attempted to answer several questions:

1. Could a cognitive manipulation, in the form of information provided a subject regarding his level of fear toward a particular stimulus, influence physiological, verbal, and motoric measures of anxiety when the stimulus is subsequently presented?

2. Could such a manipulation increase physiological, verbal, and motoric measures of anxiety in normally nonfearful subjects, as well as decrease or attenuate these measures in fearful subjects?

3. What is the range of fear levels over which this manipulation is effective in influencing these measures of anxiety? That is, could the appropriate cognitions attenuate the measures in highly fearful subjects to the same degree as in moderately fearful subjects? Similarly, could the appropriate cognitions increase measures of anxiety to the same degree in nonfearful subjects as in moderately fearful subjects?

4. Would the three response systems reflecting anxiety change in a differential way as a result of the cognitive manipulation and level of fear?

The answers to the above questions are seen as having several implications of clinical relevance. First, an affirmative answer to questions one and two would further implicate the role of cognitive factors in the maintenance and modification of anxiety, and would provide support for the contention that a subject's belief that he is or is not afraid is a critical component of the anxiety response. Furthermore, this holds an additional implication for other analogue fear research in which subjects are aware they are "supposed to be" afraid or unafraid. Secondly, obtaining differential results among subjects varying in their degree of fear would suggest the necessity of utilizing different therapeutic procedures (e.g., systematic desensitization) depending upon the individual's level of anxiety. Thirdly, a failure to find concordant changes across the three response systems would implicate the importance of individual assessment in treating anxiety and the need for a multiple systems treatment methodology.

From the proceeding review of the literature, it was possible to derive the following hypotheses which were tested:

I. Among high and moderate mutilation fear subjects, a cognitive manipulation, in the form of information designed to persuade a subject that he is not afraid of a specific fearful stimulus, would result in significantly smaller physiological, self-report, and behavioral indices of anxiety upon subsequent presentation of the stimulus than information designed to persuade a subject that he is afraid. A univariate analysis of variance was performed on the data in each of the three response modalities to compare means for high and moderate mutilation fear groups receiving the two types of cognitive manipulation.

II. The effectiveness of the former type of cognitive manipulation for reducing physiological, self-report, and behavioral indices of anxiety relative to the latter type of manipulation would be significantly greater for moderately fearful subjects than for highly fearful subjects, such that a greater disparity would be produced between moderate-fear subjects receiving the two kinds of information across all three response modalities. A univariate analysis of variance was performed on the data in each of the three response modalities to compare means for high and moderate mutilation fear groups receiving the two types of cognitive manipulation.

III. Among low and moderate fear of mutilation subjects, a cognitive manipulation, in the form of information designed to persuade a subject that he is afraid of a specific fearful stimulus, would result in significantly greater physiological, self-report, and behavioral indices of anxiety upon subsequent presentation of the stimulus than information designed to persuade a subject that he is not afraid. A univariate analysis of variance was performed on the data in each of the three response modalities to compare means for low and moderate mutilation fear groups receiving the two types of cognitive manipulation.

IV. The effectiveness of the former type of cognitive manipulation for increasing physiological, self-report, and behavioral indices of anxiety relative to the latter type of manipulation would be significantly greater for moderately fearful subjects than for low-fear subjects, such that a greater disparity would be produced between moderate-fear subjects receiving the two kinds of information across all three response modalities. A univariate analysis of variance was performed on the data in each of the three response modalities to compare means for low and moderate mutilation fear groups receiving the two types of cognitive manipulation.

V. Physiological, self-report, and behavioral measures of anxiety would be differentially affected by the cognitive manipulation, such that the self-report and behavioral indices would exhibit more change in the predicted direction than the physiological measures. A univariate analysis of variance was performed on the data in each of the three response modalities to compare means for the three fear groups receiving the two types of cognitive manipulation.

VI. Concordance between physiological, self-report, and behavioral measures of anxiety would be greater for highly fearful subjects than for either moderate or low mutilation fear subjects, regardless of the cognitive manipulation. Pearson product-moment correlation coefficients were computed for the five dependent variables comprising the three response channels. Correlations were computed for high-, moderate-, and low-fear subjects viewing both fearful and neutral stimuli.

CHAPTER II

Method

Subjects

Forty-eight (48) female subjects were chosen from undergraduate psychology courses at Virginia Commonwealth University. Subjects were selected on the basis of their total scores on the Mutilation Questionnaire and classified as either high-, moderate-, or low-fear of mutilation as follows: the MQ was administered to 168 females at VCU during the Fall Semester, 1979. High mutilation fear subjects were defined as those scoring in the upper 15% of the distribution; moderate-fear subjects were chosen from those scoring in the median 15% of the distribution; and low mutilation fear was defined as those subjects scoring in the lower 15% of the distribution. Sixteen subjects from each fear group were selected on the basis of their willingness to participate in the study. The mean MQ score for all subjects given the MQ was 9.99 with a standard deviation of 5.45. This distribution was comparable to that of the normative data for the MQ reported by Klorman et al. (1974), which yielded a mean of 10.66 and a standard deviation of 5.88. The range of scores for the low mutilation fear group was 1 to 5 with a mean of 3.6. Scores for the moderate-fear group ranged from 9 to 11 with a mean of 9.9. The high mutilation fear group scores ranged from 17 to 27 with a mean of 19.9.

Experimenter

The experimenter was a 25-year-old male of average height and weight who conducted himself in a pleasant, business-like manner and presented himself as a psychology graduate student doing research.

Apparatus

The experiment was conducted in the Psychophysiology Laboratory located in two adjoining, temperature controlled rooms on the third floor of the Psychological Services Center at 800 West Franklin Street.

Physiological measures were recorded on a five-channel Grass Model 7-D polygraph as follows:

Heart rate was recorded via a Grass Model 7PGC preamplifier interfaced with a Grass Model 7DA driver amplifier. Beat-by-beat heart rate was obtained through a Grass plug-in Tachograph 7P4 and recorded on a separate channel of the polygraph. Two silver plate EKG electrodes were attached in the Standard III position on the left arm and left leg and secured with perforated rubber straps. To insure proper conductance, each electrode site was thoroughly cleaned with alcohol and an electrolyte of Grass EC-2 conductive paste was rubbed into the skin as well as onto the surface of the electrodes.

Electrodermal responses were recorded through a Grass Model 7P1 low-level DC-coupled preamplifier interfaced with a Grass Model 7DA driver amplifier. A pair of Beckman silver/silver chloride cup electrodes 2 cm^2 in area were attached to the volar surface of the left palm and referenced to a site on the dorsal side of the third phalange of the left index finger. Each electrode was interfaced with an electrolyte of 50% normal saline solution in paste form applied to an acetone-cleaned skin surface as well as to the electrode. The electrodes were secured by adhesive tape.

Materials

A Kodak Carousal projector was used to project the stimulus slides onto a 2' X 3' projection screen placed approximately four feet in front of the subject. Each slide was presented for a 10-second duration followed by a 120-second intertrial or recovery period. The slide presentations and the intertrial intervals were timed by the experimenter using a stopwatch.

A total of 10 slides were used in the experiment, 5 of which were neutral and 5 of which were of mutilation scenes. The neutral slides were composed of plain colors and geometric forms. The 5 mutilation slides included scenes of open wounds, accidents, blood, and other items extracted from the Mutilation Questionnaire. The slides were obtained through the Farrell Instruments Company and included the following specific content: M1 - overturned car, M2 - closeup of a razor blade cut on the forearm, M3 - sutures on the chest of an autopsy patient, M4 - woman with a bleeding wound on the leg, and M5 - cross section of a brain tumor. An additional mutilation slide, depicting a drug addict giving himself an injection, was employed as part of the behavioral avoidance test.

Procedure

Subjects were randomly scheduled for the experiment and the experimenter was blind as to which group, high-fear, moderate-fear, or low-fear, a specific subject belonged so as to reduce experimenter expectancy effects (Rosenthal, 1966). This was accomplished by use of a graduate assistant who scored the Mutilation Questionnaire for each subject, compiled a distribution, and assigned each subject to the appropriate fear group. Within each fear group, subjects were randomly assigned to one of two instructional groups, high-fear instructions or low-fear instructions. The experimenter was then provided with the name and phone number of each subject in order to schedule the experimental sessions and informed as to which instructions to administer to a particular subject. Subjects were selected and assigned to groups such that there were 16 females in each of the three fear groups, with 8 subjects in each of the six combined fear-instructional conditions.

Prior to the onset of the experiment, each subject was asked to complete a preliminary questionnaire (Appendix B) and sign a consent form explaining the nature of the study, the physiological measures involved, and the subject's freedom to withdraw from the experiment at any time (Appendix C). If a subject answered in the affirmative to any question on the preliminary questionniare, she was excluded from participation in the study and was debriefed and released.

Upon completion of the above forms, each subject was seated comfortably in a padded lounge chair and the first behavioral avoidance test was administered. Each subject received the following instructions:

> Before beginning the experiment, I would like to determine your reaction to a particular type of picture. The picture will be shown on the screen in front of you and I would like you to look at it for just as long as you feel comfortable viewing it. Please look directly at the screen for the whole time the picture is on. If, for any reason, you should find the slide unpleasant to look at or begin to feel uncomfortable viewing it, you may press the button on the right arm of the chair and the slide will terminate. Remember, the button is there for you to use should you desire to turn the slide off.

Following a period of 60-seconds, a slide depicting a drug addict giving himself an injection was presented for a total duration of not longer than 90-seconds. The experimenter activated a stopwatch at the onset of the slide and ceased timing when the subject pressed the button to terminate the slide. Latency to respond in hundredths of a second constituted the behavioral avoidance test. If a subject failed to push the button within 90-seconds, the slide was automatically terminated by the experimenter.

At the end of the behavioral avoidance test, each subject received either high-fear of low-fear instructions and the electrodes were attached. Subjects then sat quietly for a 15-minute adaptation period, which included a 5-minute nonstimulus period followed by the presentation of the neutral stimuli. Each neutral slide was shown for a 10-second duration at two-minute intervals. The adaptation period was to allow sufficient time for the subject to become acclimated to the experimental setting and the electrodes, and to "settle down" physiologically, before beginning the experimental session. The presentation of the neutral slides was designed to permit partial habituation of the "orienting response" to the presentation of stimuli (Geer, 1966). The 5 mutilation slides were presented after the end of the 15-minute adaptation period, with the presentation times and intertrial intervals being identical to those for the neutral slides.

Each of the 10 slides were assigned a number so that the experimenter could record responses for each specific slide across subjects. The order of slide presentation was completely randomized for both neutral and mutilation slides so as to control for possible carry-over effects and habituation to the fearful stimuli.

Following the presentation of both neutral and mutilation slides, the electrodes were removed and the second behavioral avoidance test administered. The stimulus presented and the procedure employed were identical to that of the first test, except that subjects were given the following instructions:

> I would now like to determine your reaction to another picture of the same type you have been viewing, but using the procedure we employed at the beginning of the experiment. Please look directly at the slide when it appears on the screen and continue to look at it for just as long as you feel comfortable. As before, if you find the slide unpleasant to look at or begin to feel uncomfortable viewing it, you may press the button and the slide will terminate.

After completion of the second behavioral avoidance test, subjects were given a copy of the Mutilation Questionnaire to complete.

At the conclusion of the experimental session, each subject was debriefed and asked to raise any questions concerning the experimental procedure. In accordance with the guidelines established by the American Psychological Association (APA, 1973), all subjects were fully informed as to the deception involved in this study during the debriefing period. Due to the nature of the instructional manipulation, however, subjects were asked to refrain from discussing the experiment with other students. In addition, an inquiry was made at this time regarding any residual side effects experienced as a result of the stimulus presentations. Although no such effects were expected, any subject reporting significant discomfort was offered follow-up attention by the experimenter at the Psychological Services Center. No subjects reported distress following the experiment or requested follow-up attention.

In order to insure accurate physiological recordings, subjects were asked to take no drugs on the day of the experimental session. In addition, coffee, other caffeinated drinks, or stimulants of any kind were prohibited for two hours prior to the experiment and cigarettes for one hour prior to the experiment.

Temperature was maintained at a constant 72°F. in the experimental room.

Instructions. All subjects were told that a series of slides depicting injuries, wounds, colors, and geometric forms would be presented on the projection screen. The instructional manipulation involved providing subjects with different information regarding their degree of fear of these specific stimuli. Half the subjects in each fear group were told they were selected for participation in the study because they had expressed no particular fear of these stimuli on a questionnaire administered earlier in the semester. This condition constituted the low-fear instructions. The other subjects received high-fear instructions and were told they were selected because they had expressed a great deal of fear of these type of stimuli. Though this necessarily involved a degree of deception (i.e., telling fearful subjects they were not afraid and telling nonfearful subjects they were afraid), providing subjects with information pertaining to the content of the slides prior to the experiment should have mitigated any unnecessary discomfort and afforded subjects the opportunity to withdraw from the experiment should they have been unwilling to view the slides.

Each subject was told to keep her eyes open and look directly at each slide when it was presented on the screen. Immediately after the termination of each slide, the subject was instructed to rate aloud, on a scale from 1 to 10, the subjective units of distress (SUDS) evoked by the stimulus. The experimenter was not present in the experimental room during the session in order to reduce any possible demand characteristics of the experimenter's presence. The subject's rating of each slide was recorded by the experimenter in the adjacent room. (Specific instructions to subjects are in Appendix D.)

CHAPTER III

Results

For purposes of clarity, each of the five dependent variables will be presented separately. Discussion of the specific dependent measures will be followed by an examination of the intercorrelations between dependent variables.

Skin Conductance

Skin resistance levels (SRL) were sampled from the physiological record at each point immediately preceding stimulus onset and peak skin resistance responses (SRR) were obtained during the interval of each stimulus presentation. SRR's were counted only if the response started within 1-5 seconds after stimulus onset and showed the characteristic slope and eventual return to baseline of an SRR. A reciprocal transformation of skin resistance values was performed creating skin conductance scores as suggested by Venables and Martin (1968). The difference between the prestimulus level of skin conductance and maximum conductance reached during stimulus presentation served as the basis for analysis of the skin conductance response (SCR) to each stimulus.

A repeated measures analysis of variance was performed on the skin conductance scores using a 2 x 3 x 2 x 5 x 2 ANOVA on the Instruction (high-fear, low-fear) x Fear Condition (high-fear, moderate-fear, low-fear) x Stimulus (neutral stimuli, fearful stimuli) x Slide (5 neutral slides, 5 fearful slides) x Repeated Measures (prestimulus level, maximum response) factors.

The ANOVA yielded significant main effects for both the Stimulus factor ($F [1,798] = 35.21, p < .01$) and the Repeated Measures factor ($F [1,798] = 183.95, p < .01$). Significant interaction effects were obtained for the Instruction x Stimulus ($F [1,798] = 20.64, p < .01$), Fear Condition x Stimulus ($F [2,798] = 14.81, p < .01$), and Fear Condition x Repeated Measures ($F [2,798] = 3.42, p < .05$) interactions. Results of the repeated measures ANOVA are presented in Table 1.

The significant main effect for the Stimulus factor indicated that subjects showed differential levels of skin conductance during the presentation of neutral and fearful slides, with higher overall levels of skin conductance occurring during the fearful stimuli. A Duncan's Multiple Range Test conducted on the significant Instruction x Stimulus interaction effect revealed that low-fear instruction subjects exhibited significantly higher levels of skin conductance during the presentation of fearful slides than during the presentation of neutral slides. Subjects receiving high-fear instructions showed similar levels of skin conductance during both neutral and fearful slides, and, in both instances, did not differ significantly from low-fear instruction subjects viewing neutral slides. Table 2 presents the results of the Duncan's Multiple Range Test and Figure 1 graphically represents the Instruction x Stimulus interaction. With regard to the significant Fear Condition x Stimulus interaction effect, a Duncan's Multiple Range Test indicated that both the moderate- and high-fear groups exhibited significantly higher levels of skin conductance during the fearful slides than during neutral slides, while low-fear subjects displayed similar levels during the presentation

Table 1

Analysis of Variance for Skin Conductance

Source	df	SS	MS	F
Between	47	.272		
Instruction	1	.001	.001	.15
Fear Condition	2	.003	.001	.21
Inst x FCon	2	.006	.003	.49
Error	42	.262	.006	
Within	912	.02		
Repeated Measures	1	.003	.003	183.95**
Inst x RMeas	1	.00003	.00003	1.47
FCon x RMeas	2	.0001	.0001	3.42*
Inst x FCon x RMeas	2	.00005	.00002	1.36
Stimulus	1	.0006	.0006	35.21**
Inst x Stim	1	.0004	.0004	20.64**
FCon x Stim	2	.0005	.0003	14.81**
Inst x FCon x Stim	2	.00005	.00003	1.51
RMeas x Stim	1	.000002	.000002	.11
Inst x RMeas x Stim	1	.00002	.00002	1.31
FCon x RMeas x Stim	2	.00001	.000005	.30
Inst x FCon x RMeas x Stim	2	.00001	.000005	.29
Slide	4	.00002	.000004	.23
Inst x Slide	4	.00004	.00001	.61
[a]FCon x Slide	8	.0004	.00005	2.73**
Inst x FCon x Slide	8	.0001	.00002	.94
RMeas x Slide	4	.00004	.000009	.50
Inst x RMeas x Slide	4	.00001	.000003	.20
FCon x RMeas x Slide	8	.00002	.000002	.12
Inst x FCon x RMeas x Slide	8	.00003	.000004	.22
Stim x Slide	4	.00001	.000003	.17
Inst x Stim x Slide	4	.00003	.000006	.36
FCon x Stim x Slide	8	.0002	.00002	1.08
Inst x FCon x Stim x Slide	8	.00006	.000007	.43
RMeas x Stim x Slide	4	.00003	.000006	.37
Inst x RMeas x Stim x Slide	4	.00001	.000003	.20
FCon x RMeas x Stim x Slide	8	.00002	.000002	.13
Inst x FCon x RMeas x Stim x Slide	8	.00001	.000002	.09
Error	798	.014	.00002	
Total	959	.292		

*$p < .05$
**$p < .01$

[a]Though the Slide factor was included as part of the data analysis to represent individual fearful and neutral slides, the numbering system utilized to identify each slide was found to be inadequate for distinguishing the two slide types. For this reason, the significant Fear Condition x Slide interaction was not included in the results.

Table 2

Duncan's Multiple Range Test for Skin Conductance Scores

Instruction x Stimulus

Grouping	Mean	N	Instruction x Stimulus
A	.035	240	Low-Fear Inst x Fearful Slides
B	.032	240	Low-Fear Inst x Neutral Slides
B	.032	240	High-Fear Inst x Fearful Slides
B	.031	240	High-Fear Inst x Neutral Slides

Note. Means with the same grouping letter are not significantly different, alpha level = .05.

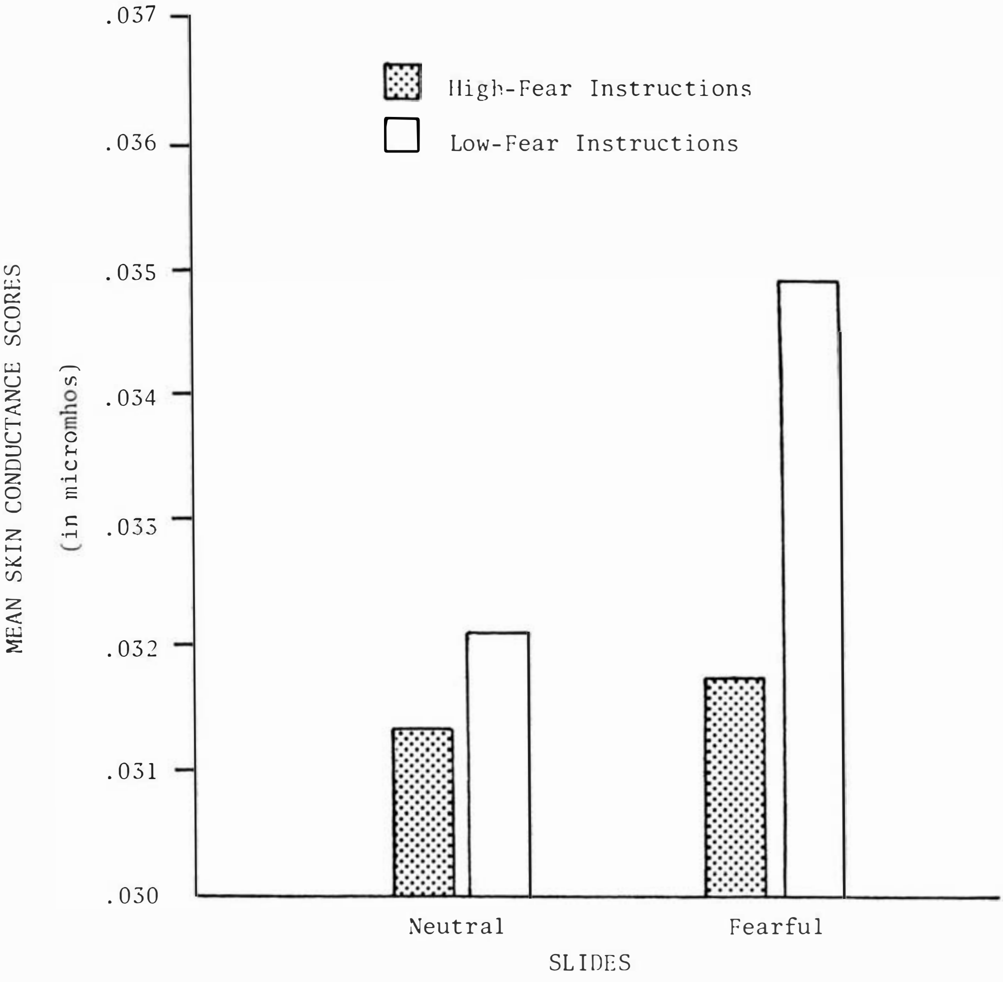

Figure 1. Skin conductance scores for high- and low-fear instruction subjects exposed to fearful and neutral slides.

of both slide types. The combined skin conductance scores during the neutral slides were greatest for the moderate-fear group, followed by the low-fear and then high-fear groups. The moderate-fear group also showed the highest levels of skin conductance during presentation of the fearful slides, while levels for the low- and high-fear groups were not significantly different (Table 3). The fear condition group means for skin conductance are presented graphically in Figure 2.

The significant main effect for the Repeated Measures factor reflected the difference between prestimulus skin conductance level and the peak response obtained during stimulus presentation, with the latter value being significantly higher. This effect indicated a significant SCR for all levels of Instruction, Fear Condition, Stimulus, and Slide. Though the significant Fear Condition x Repeated Measures interaction effect implied differential SCR's for the three fear groups, a Duncan's Multiple Range Test revealed significant differences in prestimulus or baseline values that precluded direct interpretation of the interaction. To control for individual variation in baseline amplitude, a difference, or change, score was computed by subtracting the prestimulus skin conductance level from the peak response reached during stimulus presentation (Hare, 1972).

A univariate analysis of variance was conducted on the SCR change scores using a 2 x 3 x 2 x 5 ANOVA on the Instruction x Fear Condition x Stimulus x Slide factors. As can be seen in Table 4, the ANOVA failed to yield a significant main effect for the Fear Condition factor (F [2,42] = .91, $p > .05$) indicating that similar SCR's were produced by each of the three fear groups and that the significant Fear

Table 3

Duncan's Multiple Range Test for Skin Conductance Scores

Fear Condition x Stimulus

Grouping	Mean	N	Fear Condition x Stimulus
A	.035	160	Mod-Fear x Fearful Slides
B	.034	160	Mod-Fear x Neutral Slides
C	.032	160	High-Fear x Fearful Slides
C	.032	160	Low-Fear x Neutral Slides
C	.032	160	Low-Fear x Fearful Slides
D	.029	160	High-Fear x Neutral Slides

Note. Means with the same grouping letter are not significantly different, alpha level = .05.

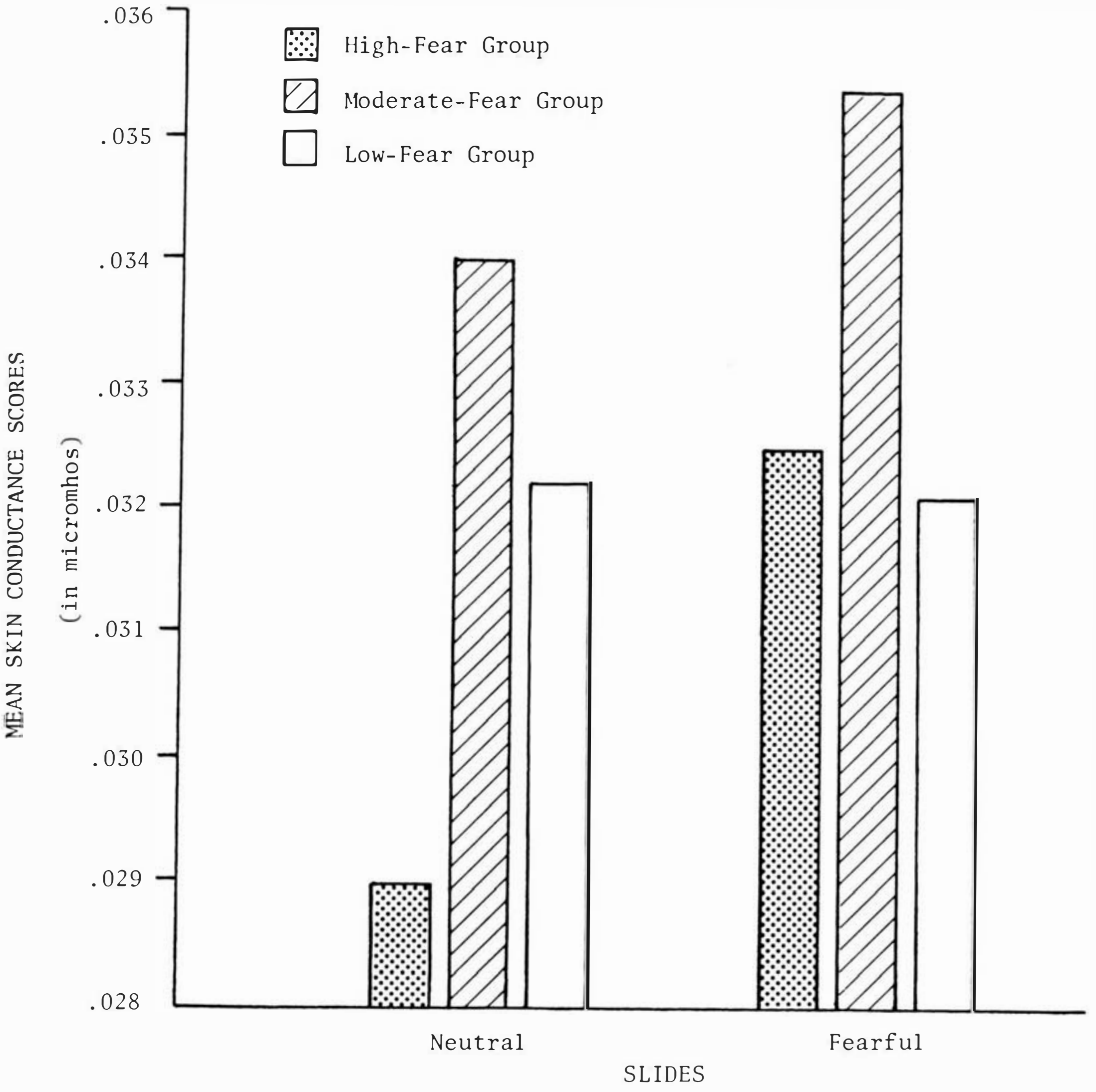

Figure 2. Skin conductance scores for high, moderate, and low mutilation fear groups exposed to fearful and neutral slides.

Table 4

Analysis of Variance for Skin Conductance Change Scores

Source	df	SS	MS	F
Between	47	.006		
Instruction	1	.00005	.00005	.39
Fear Condition	2	.0002	.0001	.91*
Inst x FCon	2	.0001	.00005	.36
Error	42	.006	.0001	
Within	432	.003		
Stimulus	1	.000004	.000004	.62
Inst x Stim	1	.00005	.00005	7.41***
FCon x Stim	2	.00002	.00001	1.72
Inst x FCon x Stim	2	.00002	.00001	1.65
[a]Slide	4	.00007	.00002	2.84**
Inst x Slide	4	.00003	.000007	1.10
FCon x Slide	8	.00003	.000004	.68
Inst x FCon x Slide	8	.00006	.000008	1.25
Stim x Slide	4	.00005	.00001	2.08
Inst x Stim x Slide	4	.00003	.000007	1.10
FCon x Stim x Slide	8	.00004	.000005	.74
Inst x FCon x Stim x Slide	8	.00003	.000003	.51
Error	378	.002	.000006	
Total	479	.009		

*$p > .05$
**$p < .05$
***$p < .01$

[a]Though the Slide factor was included as part of the data analysis to represent individual fearful and neutral slides, the numbering system utilized to identify each slide was found to be inadequate for distinguishing the two slide types. For this reason, the significant Slide main effect was not included in the results.

Condition x Repeated Measures interaction was due to differences between the groups in baseline values. The change score analysis did, however, reveal a significant Instruction x Stimulus Interaction effect (F [1,378] = 7.41, $p < .01$). A Duncan's Multiple Range Test indicated that subjects receiving low-fear instructions responded differentially to fearful and neutral slides on the SCR, with the fearful slides evoking the greater SCR change scores. Subjects given high-fear instructions, however, responded with similar SCR's to both the neutral and fearful slides. SCR change scores also differentiated between the instructional conditions during presentation of the neutral slides, with high-fear instruction subjects producing greater SCR's than low-fear instruction subjects. Change scores during the fearful slides were not significantly different from the two instructional conditions. Results of the Duncan's Multiple Range Test are presented in Table 5 and are graphically represented in Figure 3.

Table 5

Duncan's Multiple Range Test for Skin Conductance Change Scores

Instruction x Stimulus

Grouping	Mean	N	Instruction x Stimulus
A	.004	120	High-Fear Inst x Neutral Slides
A	.004	120	High-Fear Inst x Fearful Slides
A	.004	120	Low-Fear Inst x Fearful Slides
B	.003	120	Low-Fear Inst x Neutral Slides

Note. Means with the same grouping letter are not significantly different, alpha level = .05.

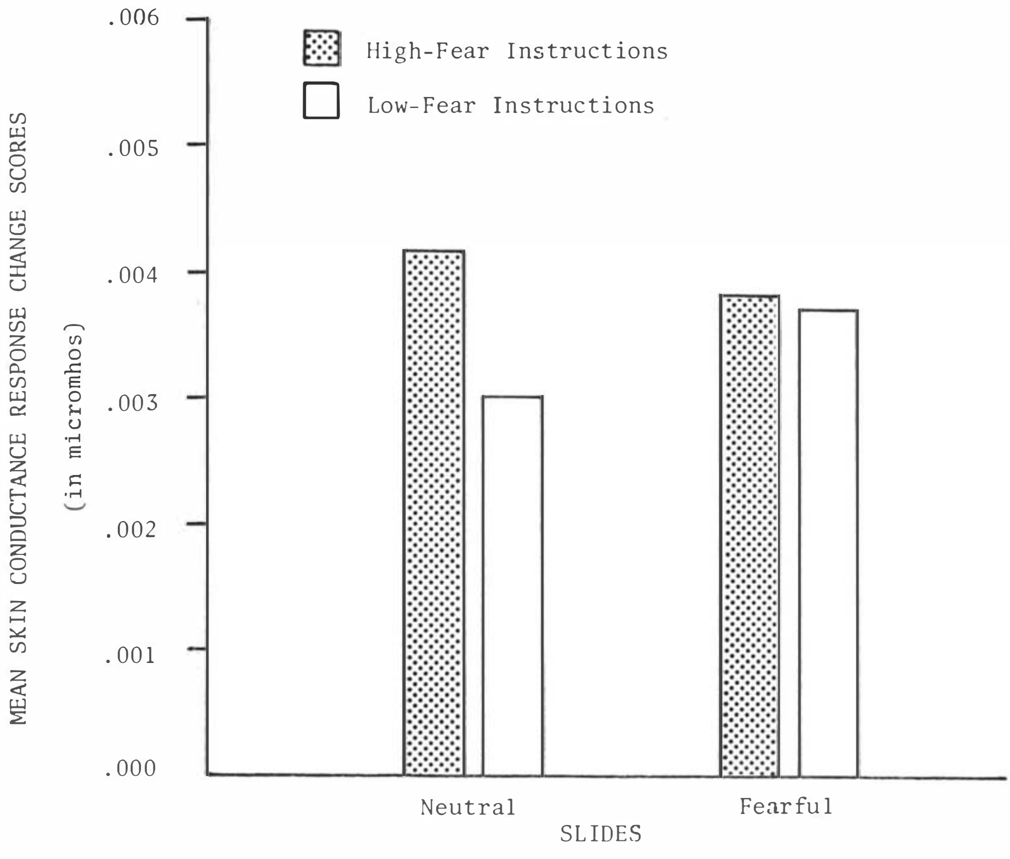

Figure 3. Skin conductance response change scores for high- and low-fear instruction subjects exposed to fearful and neutral slides.

Heart Rate

Heart rate in beats per minute was sampled from the cardiotachograph every 5 seconds for 30 seconds prior to stimulus onset and 30 seconds after stimulus offset. Beat-by-beat heart rate was also obtained for the 10 second interval of each stimulus presentation. A mean heart rate score was calculated for both the prestimulus and post-stimulus intervals, and for the interval of stimulus presentation. Differences between mean heart rate scores served as the basis for determining the heart rate response (HRR) to each stimulus.

A repeated measures analysis of variance was conducted on the mean heart rate scores using a 2 x 3 x 2 x 5 x 3 ANOVA on the Instruction x Fear Condition x Stimulus x Slide x Repeated Measures (prestimulus, stimulus, and poststimulus intervals) factors. As shown in Table 6, the ANOVA revealed a significant Stimulus main effect (F [1,1218] = 42.18, $p < .01$), as well as a significant Repeated Measures main effect (F [2,1218] = 21.06, $p < .01$). Significant interaction effects were obtained for the Instruction x Stimulus (F [1,1218] = 4.93, $p < .05$), Fear Condition x Stimulus (F [2,1218] = 3.46, $p < .05$), Instruction x Fear Condition x Stimulus (F [2,1218] = 5.21, $p < .01$), and Fear Condition x Repeated Measures (F [4,1218] - 4.77, $p < .01$) interactions.

The significant main effect for the Stimulus factor indicated that subjects exhibited differential levels of heart rate to neutral and fearful slides, with higher overall levels of heart rate occurring during the presentation of neutral stimuli. A Duncan's Multiple Range Test performed on the significant Instruction x Stimulus interaction effect revealed that both low- and high-fear instruction subjects displayed significantly higher levels of heart rate during presentation

Table 6

Analysis of Variance for Heart Rate

Source	df	SS	MS	F
Between	47	240290.10		
Instruction	1	5740.34	5740.34	1.08
Fear Condition	2	241.87	120.93	.02
Inst x FCon	2	11028.09	5514.04	1.04
Error	42	223279.80	5316.19	
Within	1392	24995.21		
Repeated Measures	2	726.53	363.26	21.06**
Inst x RMeas	2	11.50	5.75	.33
FCon x RMeas	4	329.12	82.28	4.77**
Inst x FCon x RMeas	4	20.21	5.05	.29
Stimulus	1	727.64	727.64	42.18**
Inst x Stim	1	85.05	85.05	4.93**
FCon x Stim	2	119.43	59.71	3.46*
Inst x FCon x Stim	2	179.79	89.90	5.21**
RMeas x Stim	2	45.38	22.69	1.32
Inst x RMeas x Stim	2	8.21	4.11	.24
FCon x RMeas x Stim	4	40.39	10.10	.59
Inst x FCon x RMeas x Stim	4	64.25	16.06	.93
[a]Slide	4	193.60	48.40	2.81*
Inst x Slide	4	116.04	29.01	1.68
FCon x Slide	8	115.25	14.41	.84
Inst x FCon x Slide	8	232.81	29.10	1.69
RMeas x Slide	8	129.05	16.13	.94
Inst x RMeas x Slide	8	28.21	3.53	.20
FCon x RMeas x Slide	16	66.65	4.17	.24
Inst x FCon x RMeas x Slide	16	107.06	6.69	.39
Stim x Slide	4	93.84	23.46	1.36
Inst x Stim x Slide	4	49.14	12.28	.71
FCon x Stim x Slide	8	63.94	7.99	.46
Inst x FCon x Stim x Slide	8	116.83	14.60	.85
RMeas x Stim x Slide	8	50.63	6.33	.37
Inst x RMeas x Stim x Slide	8	44.89	5.61	.33
FCon x RMeas x Stim x Slide	16	50.27	3.14	.18
Inst x FCon x RMeas x Stim x Slide	16	169.09	10.57	.67
Error	1218	21010.38	17.25	
Total	1439	265285.31		

*$p < .05$
**$p < .01$

[a]Though the Slide factor was included as part of the data analysis to represent individual fearful and neutral slides, the numbering system utilized to identify each slide was found to be inadequate for distinguishing the two slide types. For this reason, the significant Slide main effect was not included in the results.

of neutral slides than during fearful slides. Low-fear instruction subjects showed higher levels of heart rate during the presentation of both slide types than subjects receiving high-fear instructions (Table 7). Figure 4 graphically represents the Instruction x Stimulus interaction. With regard to the significant Fear Condition x Stimulus interaction effect, a Duncan's Multiple Range Test indicated that all three fear groups showed levels of heart rate that were significantly higher during presentation of neutral slides than during fearful slides. Moderate-fear subjects exhibited the highest combined mean heart rate scores during the neutral slides, while low- and high-fear subjects did not differ significantly from one another. All three fear groups displayed similar levels of heart rate during presentation of the fearful slides as shown in Table 8. The Fear Condition x Stimulus interaction is graphically represented in Figure 5. A Duncan's Multiple Range Test conducted on the significant Instruction x Fear Condition x Stimulus interaction effect showed that each of the combined fear-instructional conditions exhibited significantly higher overall levels of heart rate during presentation of the neutral slides than during fearful slides, with the exception of high-fear subjects receiving high-fear instructions and low-fear subjects given low-fear instructions. These two conditions displayed similar heart rate levels during both neutral and fearful slides. Differences between instructional conditions indicated that low- and moderate-fear subjects given low-fear instructions showed significantly higher levels of heart rate than subjects receiving high-fear instructions during both neutral and fearful slides. The reverse order was obtained for the high-fear group, in which subjects receiving high-fear instructions

Table 7

Duncan's Multiple Range Test for Heart Rate Means

Instruction x Stimulus

Grouping	Mean	N	Instruction x Stimulus
A	87.98	360	Low-Fear Inst x Neutral Slides
B	87.05	360	Low-Fear Inst x Fearful Slides
C	84.47	360	High-Fear Inst x Neutral Slides
D	82.57	360	High-Fear Inst x Fearful Slides

Note. Means with the same grouping letter are not significantly different, alpha level = .05.

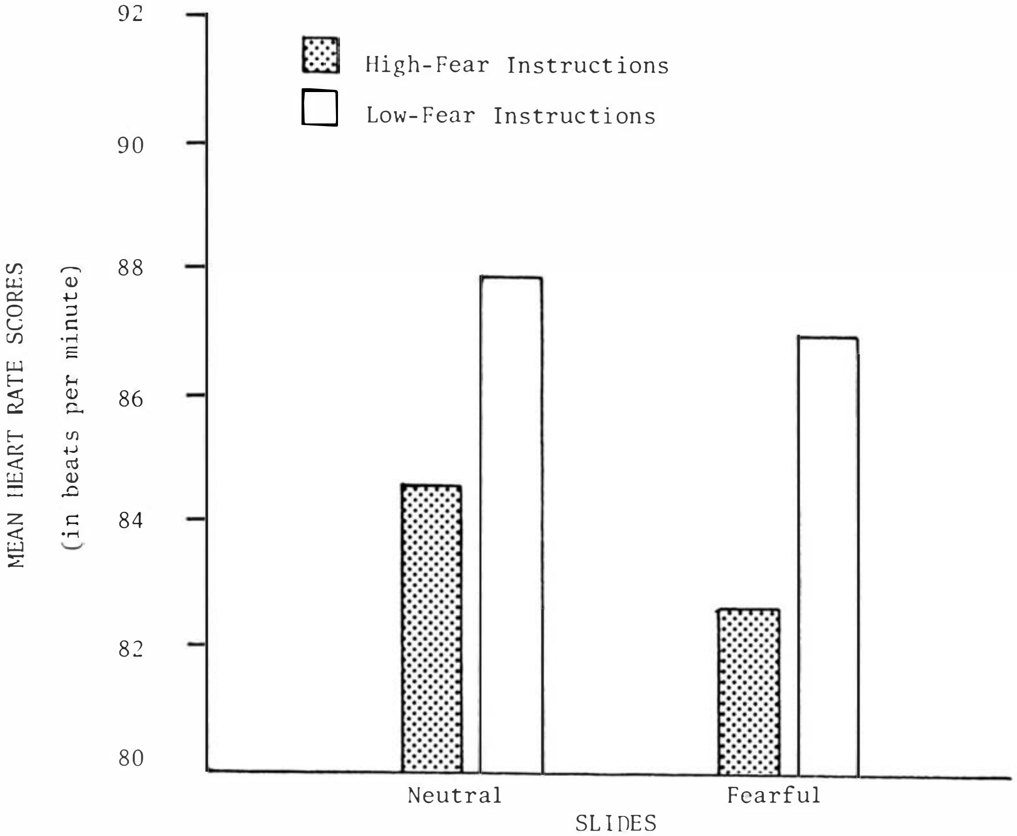

Figure 4. Heart rate means for high- and low-fear instruction subjects exposed to fearful and neutral slides.

Table 8

Duncan's Multiple Range Test for Heart Rate Means

Fear Condition x Stimulus

Grouping	Mean	N	Fear Condition x Stimulus
A	87.15	240	Mod-Fear x Neutral Slides
B	85.99	240	Low-Fear x Neutral Slides
B,C	85.55	240	High-Fear x Neutral Slides
C,D	85.00	240	Low-Fear x Fearful Slides
C,D	84.91	240	Mod-Fear x Fearful Slides
D	84.51	240	High-Fear x Fearful Slides

Note. Means with the same grouping letter are not significantly different, alpha level = .05.

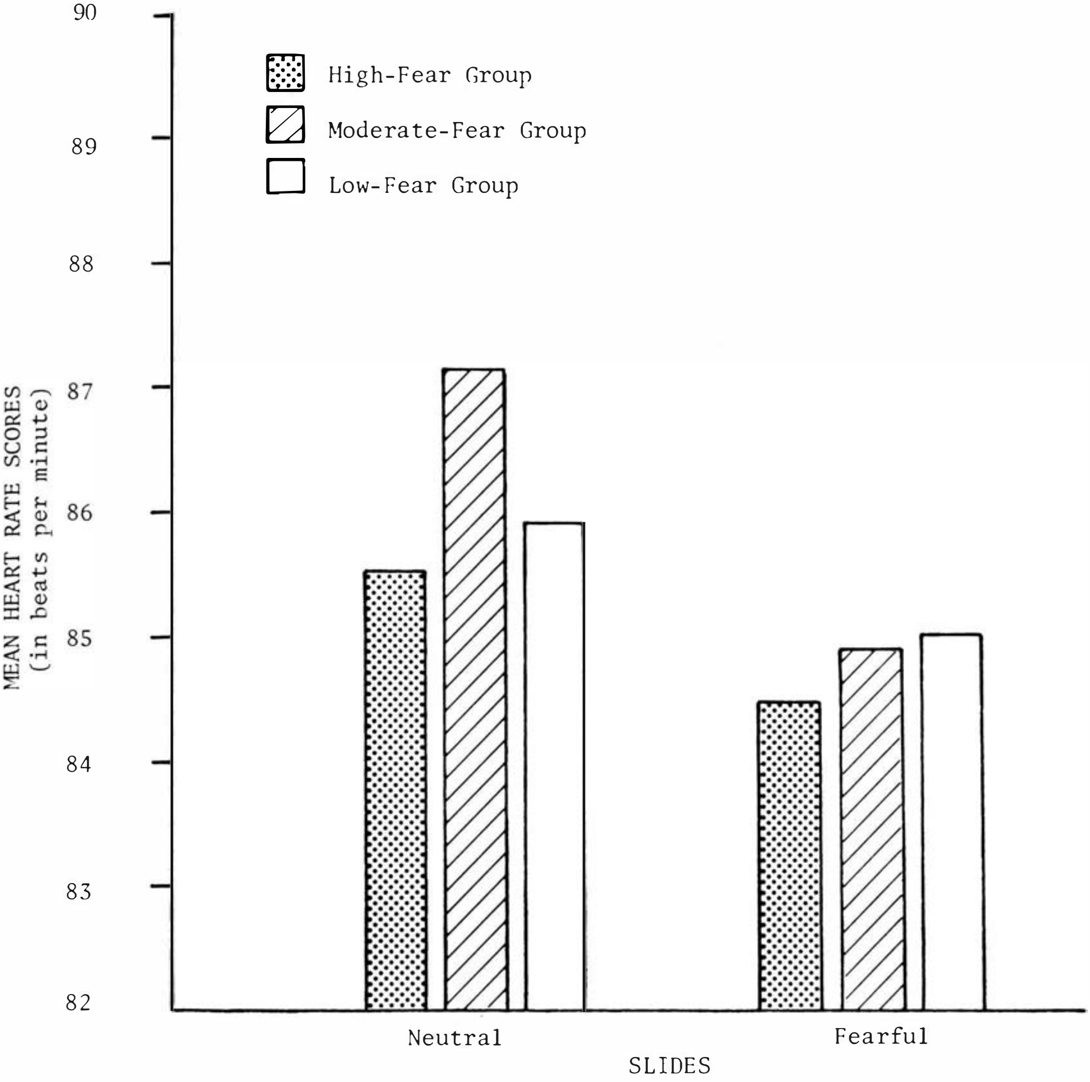

Figure 5. Heart rate means for high, moderate, and low mutilation fear groups exposed to fearful and neutral slides.

showed significantly higher levels of heart rate than low-fear instruction subjects. Further, differences between fear groups were modified depending upon the instructional condition. Under high-fear instructions, the groups ordered themselves from high-, moderate-, to low-fear, with high mutilation fear subjects exhibiting the highest overall heart rate. This order was identical and significant for subjects viewing both neutral and fearful slides. Under low-fear instructions, however, the groups were ordered in the opposite direction, with low-fear subjects displaying the highest levels of mean heart rate. Though differences between groups were significant for subjects viewing fearful slides, the low- and moderate-fear groups were not significantly different during the presentation of neutral slides. Table 9 presents the results of the Duncan's Multiple Range Test and Figure 6 graphically represents the Instruction x Fear Condition x Stimulus Interaction.

The significant main effect for the Repeated Measures factor reflected differences in mean heart rate across the three sampling intervals. A Duncan's Multiple Range Test revealed that the post-stimulus mean heart rate scores were significantly higher than both the prestimulus scores and the mean heart rate obtained during the interval of stimulus presentation, neither of which differed significantly from one another as can be seen in Table 10. This effect indicated a significant HRR for all levels of Instruction, Fear Condition, Stimulus, and Slide. With regard to the significant Fear Condition x Repeated Measures interaction, a Duncan's Multiple Range Test indicated that the low- and moderate-fear groups showed a significant HRR to both neutral and fearful slides, with the moderate-

Table 9

Duncan's Multiple Range Test for Heart Rate Means

Instruction x Fear Condition x Stimulus

Grouping	Mean	N	Inst x FCon x Stimulus
A	90.49	120	Low Inst x Low-Fear x Fearful Slides
A	90.20	120	Low Inst x Low-Fear x Neutral Slides
A	89.73	120	Low Inst x Mod-Fear x Neutral Slides
B	88.10	120	Low Inst x Mod-Fear x Fearful Slides
B,C	87.08	120	High Inst x High-Fear x Neutral Slides
C	86.47	120	High Inst x High-Fear x Fearful Slides
D	84.57	120	High Inst x Mod-Fear x Neutral Slides
D	84.02	120	Low Inst x High-Fear x Neutral Slides
E	82.54	120	Low Inst x High-Fear x Fearful Slides
E	81.77	120	High Inst x Low-Fear x Neutral Slides
E	81.73	120	High Inst x Mod-Fear x Fearful Slides
F	79.50	120	High Inst x Low-Fear x Fearful Slides

Note. Means with the same grouping letter are not significantly different, alpha level = .05.

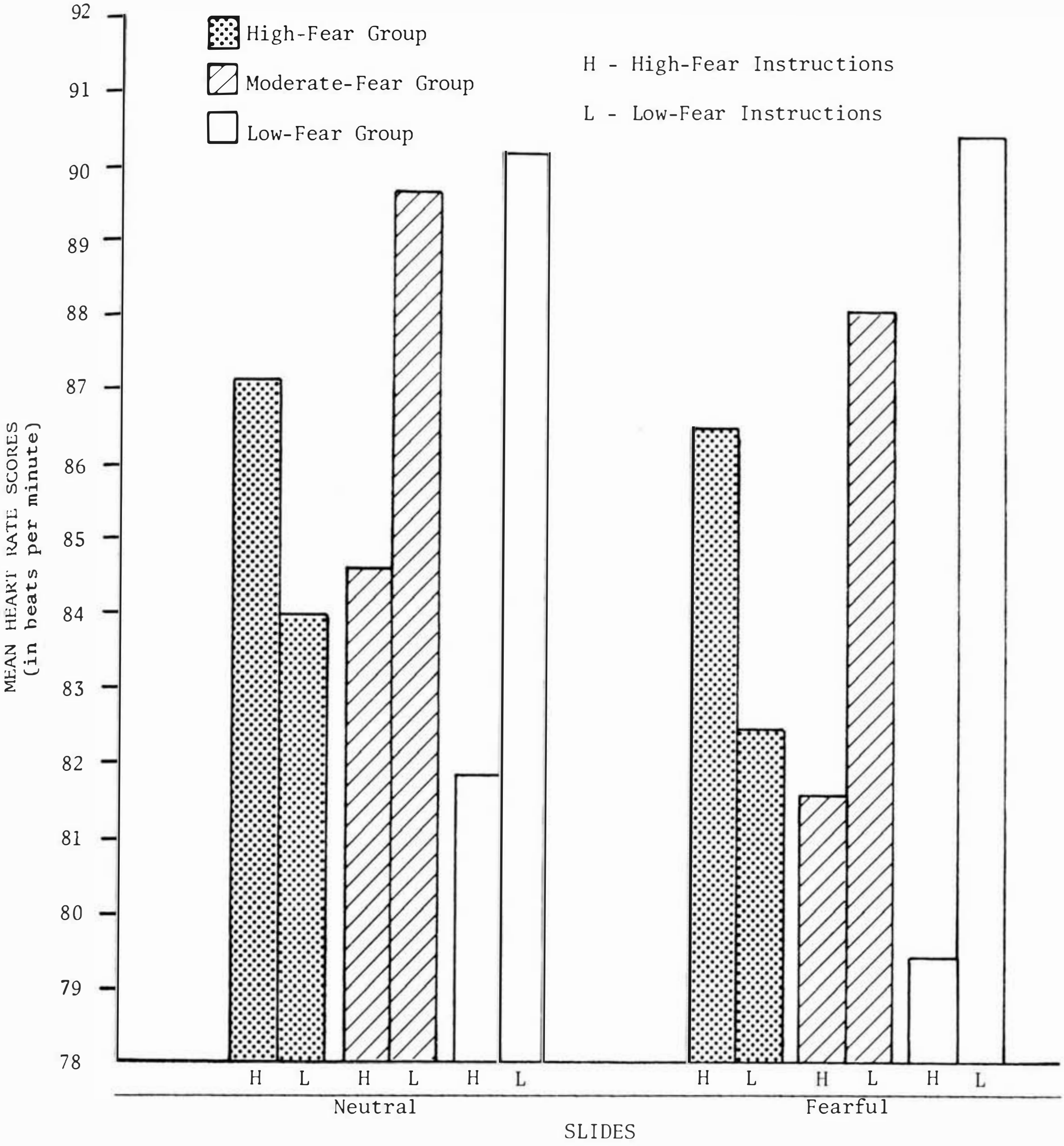

Figure 6. Heart rate means for high, moderate, and low mutilation fear groups exposed to fearful and neutral slides under conditions of high- and low-fear instructions.

Table 10

Duncan's Multiple Range Test for Heart Rate Means

Repeated Measures Main Effect

Grouping	Mean	N	Interval
A	86.52	480	Poststimulus
B	85.05	480	Stimulus
B	84.98	480	Prestimulus

Note. Means with the same grouping letter are not significantly different, alpha level = .05.

fear group exhibiting a significantly greater response. The HRR for high-fear subjects, however, was not significant (Table 11). The mean heart rate scores for each fear condition are presented in the graph of Figure 7.

Table 11

Duncan's Multiple Range Test for Heart Rate Means

Fear Condition x Repeated Measures

Grouping	Mean	N	Fear Condition x Interval
A	87.90	160	Mod-Fear x Postimulus
B	86.25	160	Low-Fear x Poststimulus
B,C	85.41	160	High-Fear x Poststimulus
B,C	85.37	160	Low-Fear x Stimulus
C	85.19	160	Mod-Fear x Stimulus
C	85.08	160	High-Fear x Prestimulus
C	85.00	160	Mod-Fear x Prestimulus
C	84.86	160	Low-Fear x Prestimulus
C	84.60	160	High-Fear x Stimulus

Note. Means with the same grouping letter are not significantly different, alpha level = .05.

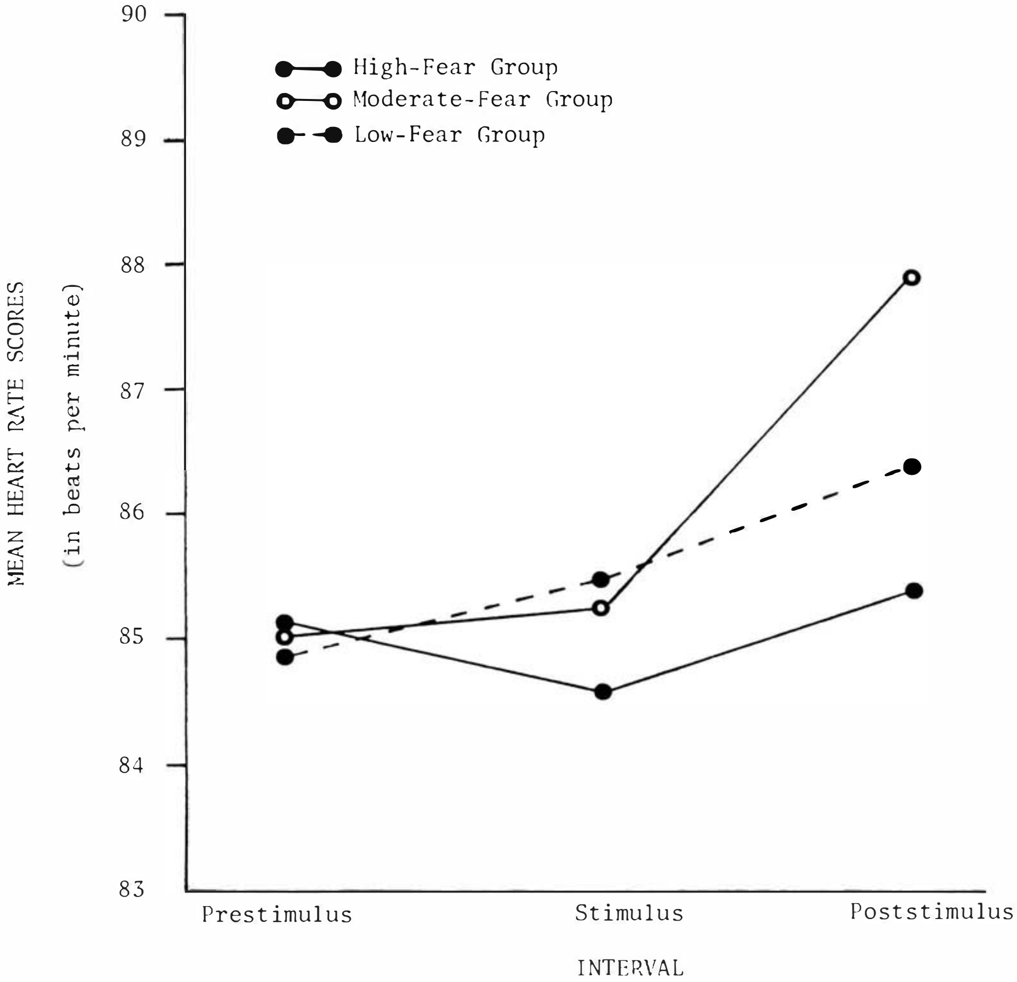

Figure 7. Heart rate means indicating heart rate response for high, moderate, and low mutilation fear groups.

Mutilation Questionnaire

Each subject was administered the Mutilation Questionnaire (MQ) on two separate occasions. The first administration prior to participation in the experiment served as the basis for subject selection and assignment to the appropriate fear condition. The second administration of the MQ followed presentation of the slides and completion of the second behavioral avoidance test.

A repeated measures analysis of variance was performed on the two sets of MQ scores using a 2 x 3 x 2 ANOVA on the Instruction x Fear Condition x Repeated Measures (pretest, posttest) factors. The ANOVA yielded significant main effects for both the Instruction factor (F [1,42] = 22.52, $p < .01$) and the Fear Condition factor (F [2, 42] = 108.00, $p < .01$). Additionally, significant interaction effects were obtained for the Instruction x Fear Condition (F [2,42] = 4.67, $p < .05$), Instruction x Repeated Measures (F [1,42] = 14.02, $p < .01$), and Fear Condition x Repeated Measures (F [2,42] = 10.28, $p < .01$) interactions. Table 12 presents the results of the repeated measures ANOVA.

The significant main effect for the Fear Condition factor indicated that the three fear groups consistently ordered themselves from high- to low-fear in the mean scores obtained on the MQ, with high mutilation fear subjects showing the highest mean MQ scores. Further, the significant Instruction main effect revealed that subjects receiving high-fear instructions obtained significantly higher mean MQ scores than subjects given low-fear instructions. A Duncan's Multiple Range Test conducted on the significant Instruction x Fear Condition interaction effect showed that low- and high-fear subjects receiving high-

Table 12

Analysis of Variance for Mutilation Questionnaire

Source	df	SS	MS	F
Between	47	3517.95		
Instruction	1	273.37	273.37	22.52*
Fear Condition	2	2621.58	1310.79	108.00**
Inst x FCon	2	113.25	56.62	4.67*
Error	42	509.75	12.14	
Within	48	853.00		
Repeated Measures	1	16.67	16.67	1.56
Inst x RMeas	1	150.00	150.00	14.02**
FCon x RMeas	2	220.08	110.04	10.28**
Inst x FCon x RMeas	2	16.75	8.37	.78
Error	42	449.50	10.70	
Total	95	4370.95		

*$p < .05$
**$p < .01$

fear instructions scored significantly higher on the combined administrations of the MQ than subjects given low-fear instructions. While the same pattern was also obtained for moderate-fear subjects, the difference between instructional conditions was not significant (Table 13). The Instruction x Fear Condition interaction is graphically represented in Figure 8.

The Fear Condition x Repeated Measures and Instruction x Repeated Measures interaction effects indicated significant changes from pretest to posttest in the mean MQ scores obtained for the fear groups and instructional conditions, respectively. A Duncan's Multiple Range Test performed on the Fear Condition x Repeated Measures interaction effect revealed that high mutilation fear subjects displayed a significant decrease in mean MQ scores on the posttest, while low-fear subjects showed a significant increase. Moderate-fear subjects showed only a nonsignificant decrease in mean MQ scores from pretest to posttest as shown in Table 14. The Fear Condition x Repeated Measures interaction is presented in the graph of Figure 9. With regard to the significant Instruction x Repeated Measures interaction effect, a Duncan's Multiple Range Test indicated that mean MQ scores for the two instructional conditions did not differ significantly prior to subjects' participation in the experiment. On the posttest, however, the group means were significantly different, with high-fear instruction subjects showing an increase and low-fear instruction subjects exhibiting a significant decrease in mean MQ scores. Results of the Duncan's Multiple Range Test are presented in Table 15 and are represented graphically in Figure 10.

Table 13

Duncan's Multiple Range Test for Mutilation Questionnaire

Instruction x Fear Condition

Grouping	Mean	N	Instruction x Fear Condition
A	20.69	16	High Inst x High Fear
B	14.44	16	Low Inst x High-Fear
C	10.25	16	High Inst x Mod-Fear
C	9.25	16	Low Inst x Mod-Fear
D	6.31	16	High Inst x Low-Fear
E	3.44	16	Low Inst x Low-Fear

Note. Means with the same grouping letter are not significantly different, alpha level = .05.

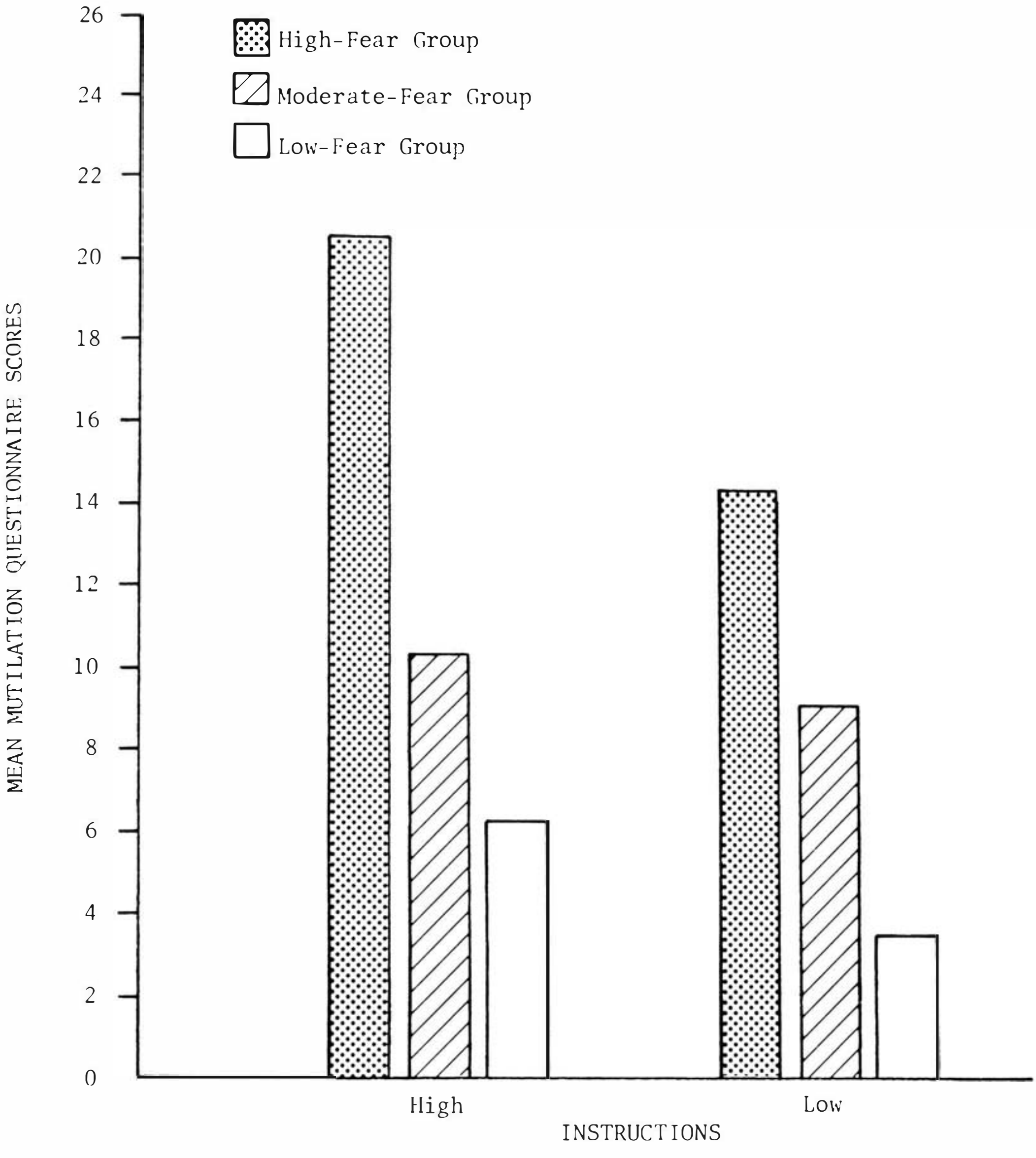

Figure 8. Mean MQ scores for high, moderate, and low mutilation fear groups under conditions of high- and low-fear instructions.

Table 14

Duncan's Multiple Range Test for Mutilation Questionnaire

Fear Condition x Repeated Measures

Grouping	Mean	N	Fear Condition x Repeated Measures
A	19.94	16	High-Fear x Pretest
B	15.19	16	High-Fear x Posttest
C	9.94	16	Mod-Fear x Pretest
C	9.56	16	Mod-Fear x Posttest
D	6.19	16	Low-Fear x Posttest
E	3.56	16	Low-Fear x Pretest

Note. Means with the same grouping letter are not significantly different, alpha level = .05.

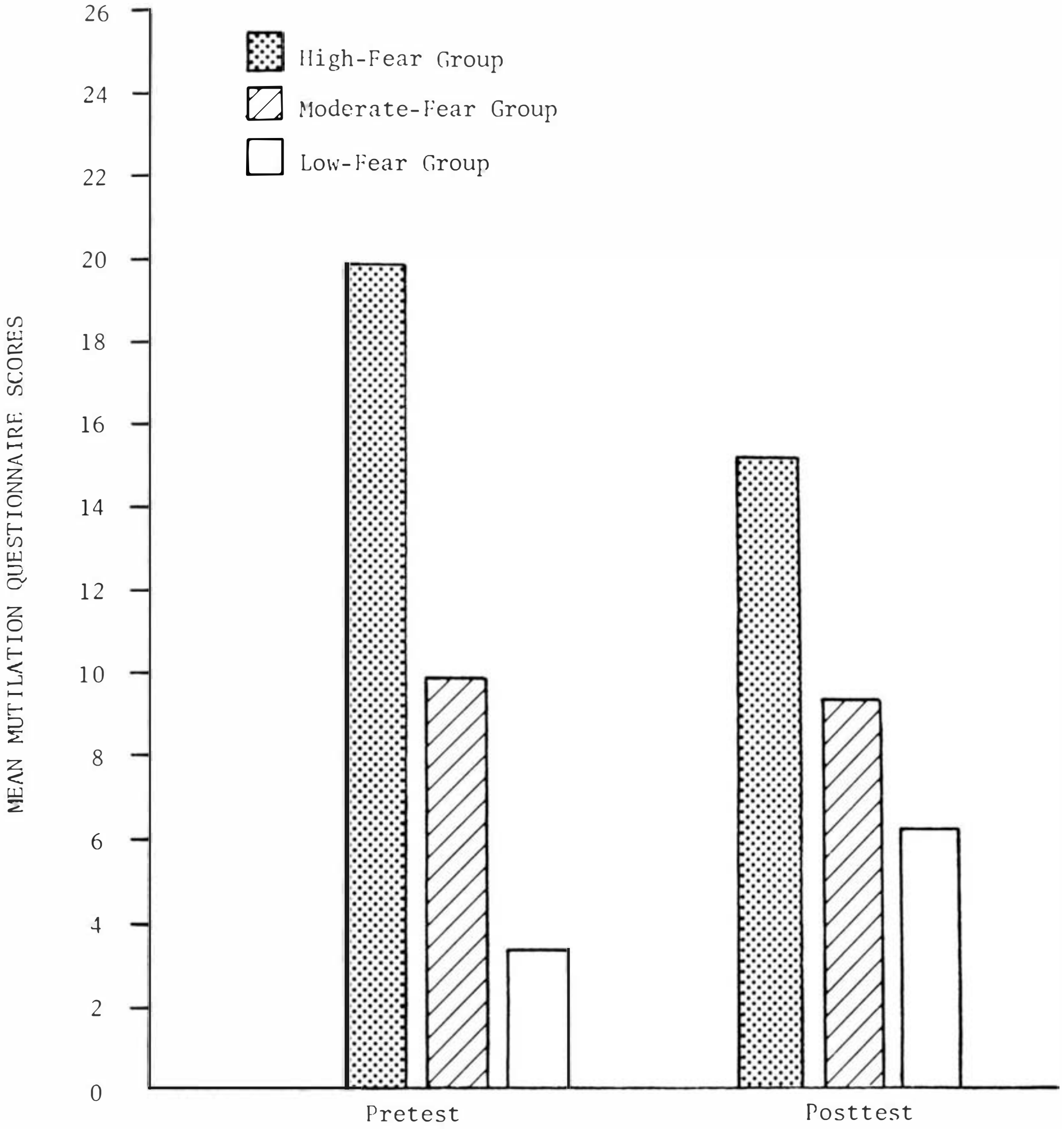

Figure 9. Pretest and posttest mean MQ scores for high, moderate, and low mutilation fear groups.

Table 15

Duncan's Multiple Range Test for Mutilation Questionnaire

Instruction x Repeated Measures

Grouping	Mean	N	Instruction x Repeated Measures
A	13.25	24	High-Fear Inst x Posttest
A,B	11.58	24	High-Fear Inst x Pretest
B	10.71	24	Low-Fear Inst x Pretest
C	7.37	24	Low-Fear Inst x Posttest

Note. Means with the same grouping letter are not significantly different, alpha level = .05.

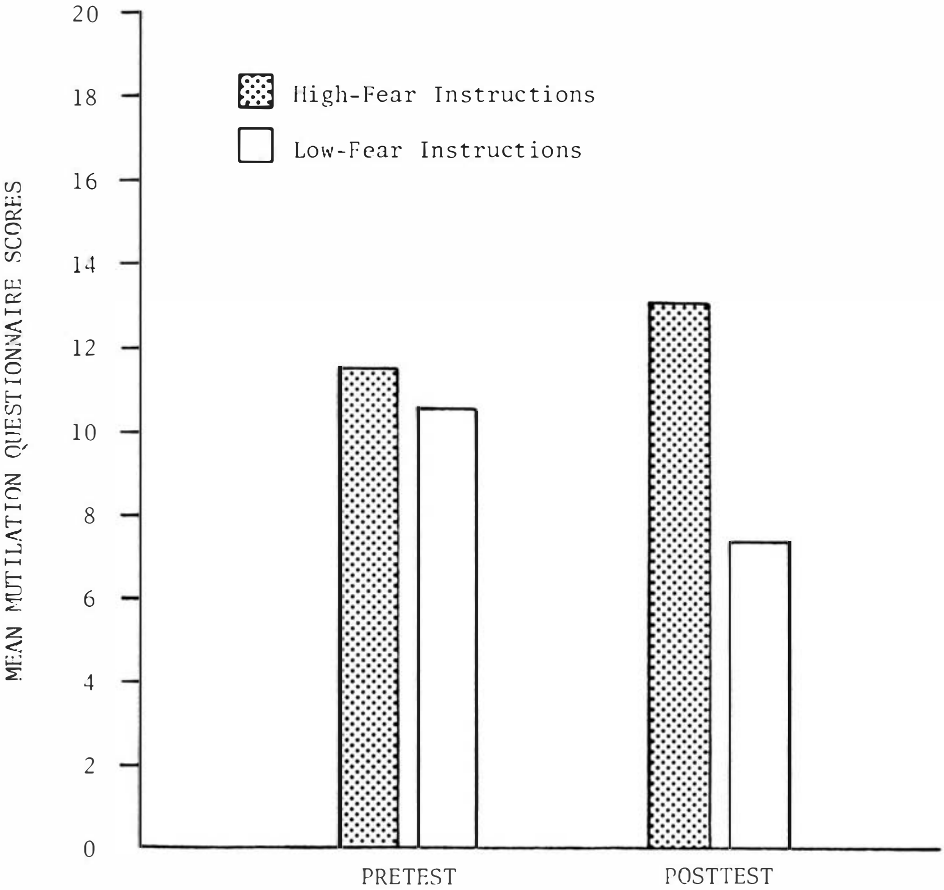

Figure 10. Pretest and posttest mean MQ scores for high- and low-fear instruction subjects.

Subjective Units of Distress

Each subject rated aloud to the experimenter her subjective rating of the amount of distress experienced while viewing each slide. The rating scale used ranged from 1 to 10, with 1 representing no distress and 10 representing maximal distress.

A univariate analysis of variance was conducted on the SUDS ratings using a 2 x 3 x 2 x 5 ANOVA on the Instruction x Fear Condition x Stimulus x Slide factors. As can be seen in Table 16, the ANOVA revealed a significant main effect for the Stimulus factor (F [1,378] = 598.02, $p < .01$), as well as significant interaction effects for the Instruction x Stimulus (F [1,378] = 26.12, $p < .01$), Fear Condition x Stimulus (F [2,378] = 15.27, $p < .01$), and Instruction x Fear Condition x Stimulus (F [2,378] = 12.53, $p < .01$) interactions. The significant main effect for the Stimulus factor indicated that the groups were able to differentiate between neutral and fearful slides, with the fearful slides evoking the highest subjective distress ratings. A Duncan's Multiple Range Test performed on the significant Fear Condition x Stimulus interaction effect indicated that the mean SUDS were greatest for the high-fear group viewing fearful slides and that the mean was significantly greater than the mean SUDS of both the low- and moderate-fear groups viewing fearful slides. The latter two groups were not significantly different in their rating of fearful slides. All three group means for subjects viewing fearful slides differed significantly from group means for subjects viewing neutral slides, none of which differed significantly from one another (Table 17). Figure 11 graphically represents the Fear Condition x Stimulus interaction. With regard to the significant Instruction x Stimulus interaction

Table 16

Analysis of Variance for Subjective Units of Distress

Source	df	SS	MS	F
Between	47	558.39		
Instruction	1	34.13	34.13	3.36
Fear Condition	2	38.38	19.19	1.89
Inst x FCon	2	59.00	29.50	2.90
Error	42	426.88	10.16	
Within	432	2600.60		
Stimulus	1	1190.70	1190.70	598.02**
Inst x Stim	1	52.01	52.01	26.12**
FCon x Stim	2	60.79	30.39	15.27**
Inst x FCon x Stim	2	49.88	24.94	12.53**
[a]Slide	4	211.10	52.78	26.51**
Inst x Slide	4	14.22	3.55	1.79
FCon x Slide	8	16.95	2.12	1.06
Inst x FCon x Slide	8	21.45	2.68	1.35
[a]Stim x Slide	4	181.32	45.33	22.77**
Inst x Stim x Slide	4	10.10	2.52	1.27
FCon x Stim x Slide	8	12.88	1.61	.81
Inst x FCon x Stim x Slide	8	26.58	3.32	1.67
Error	378	752.62	1.99	
Total	479	3158.99		

*$p < .05$
**$p < .01$

[a]Though the Slide factor was included as part of the data analysis to represent individual fearful and neutral slides, the numbering system utilized to identify each slide was found to be inadequate for distinguishing the two slide types. For this reason, the significant Slide main effect and Stimulus x Slide interaction were not included in the results.

Table 17

Duncan's Multiple Range Test for Subjective Units of Distress

Fear Condition x Stimulus

Grouping	Mean	N	Fear Condition x Stimulus
A	5.21	80	High-Fear x Fearful Slides
B	4.05	80	Low-Fear x Fearful Slides
B	3.72	80	Mod-Fear x Fearful Slides
C	1.24	80	Mod-Fear x Neutral Slides
C	1.22	80	Low-Fear x Neutral Slides
C	1.07	80	High-Fear x Neutral Slides

Note. Means with the same grouping letter are not significantly different, alpha level = .05.

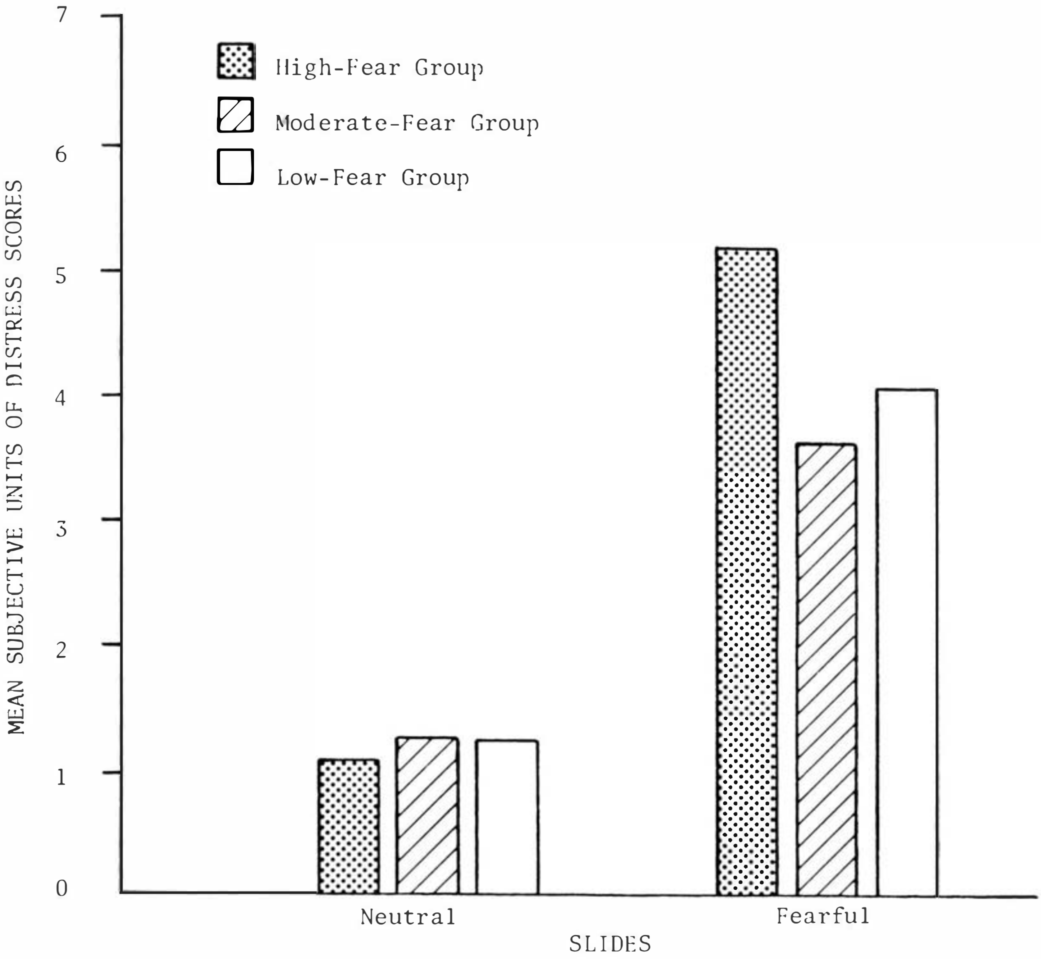

Figure 11. Subjective units of distress scores for high, moderate, and low mutilation fear groups exposed to fearful and neutral slides.

effect, a Duncan's Multiple Range Test revealed that the mean SUDS ratings were greatest for high-fear instruction subjects viewing fearful slides and that the mean was significantly different from the subjective distress ratings of low-fear instruction subjects viewing fearful slides. Both group means for subjects viewing fearful slides differed significantly from group means for subjects viewing neutral slides, neither of which differed significantly from one another as shown in Table 18. The Instruction x Stimulus interaction is represented in the graph of Figure 12. A Duncan's Multiple Range Test conducted on the significant Instruction x Fear Condition x Stimulus interaction effect indicated that the mean SUDS ratings of all six fear-instructional conditions were significantly greater for the fearful slides than for the neutral slides. During the presentation of fearful slides, low- and high-fear subjects given high-fear instructions reported significantly greater subjective distress ratings than subjects receiving low-fear instructions. Differences between instructional conditions were not significant for moderate-fear subjects viewing fearful slides or for subjects viewing neutral slides. Differences between the three fear groups in mean SUDS ratings were also modified depending upon the instructional condition. Under high-fear instructions, the mean SUDS were greatest for the high-fear group viewing fearful slides, followed by the low-fear and then moderate-fear groups. Group means for high-fear instruction subjects viewing neutral slides were not significantly different. Under conditions of low-fear instructions, group mean SUDS ratings did not differ significantly for either neutral or fearful slides. Results of the Duncan's

Table 18

Duncan's Multiple Range Test for Subjective Units of Distress

Instruction x Stimulus

Grouping	Mean	N	Instruction x Stimulus
A	4.92	120	High Inst x Fearful Slides
B	3.73	120	Low Inst x Fearful Slides
C	1.24	120	Low Inst x Neutral Slides
C	1.12	120	High Inst x Neutral Slides

Note. Means with the same grouping letter are not significantly different, alpha level = .05.

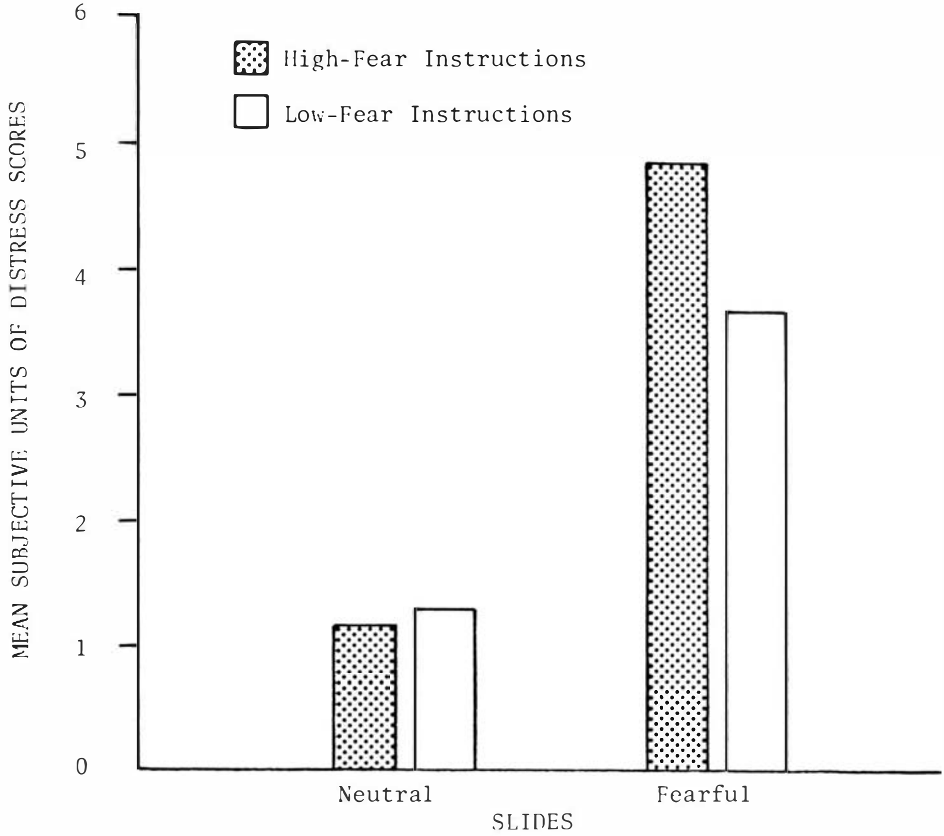

Figure 12. Subjective units of distress scores for high- and low-fear instruction subjects exposed to fearful and neutral slides.

Multiple Range Test are presented in Table 19 and are graphically represented in Figure 13.

Table 19

Duncan's Multiple Range Test for Subjective Units of Distress

Instruction x Fear Condition x Stimulus

Grouping	Mean	N	Inst x FCon x Stimulus
A	6.57	40	High Inst x High-Fear x Fearful Slides
B	4.75	40	High Inst x Low-Fear x Fearful Slides
C	4.00	40	Low Inst x Mod-Fear x Fearful Slides
C	3.85	40	Low Inst x High-Fear x Fearful Slides
C	3.45	40	High Inst x Mod-Fear x Fearful Slides
C	3.35	40	Low Inst x Low-Fear x Fearful Slides
D	1.35	40	Low Inst x Mod-Fear x Neutral Slides
D	1.25	40	Low Inst x Low-Fear x Neutral Slides
D	1.20	40	High Inst x Low-Fear x Neutral Slides
D	1.12	40	High Inst x Mod-Fear x Neutral Slides
D	1.12	40	Low Inst x High-Fear x Neutral Slides
D	1.02	40	High Inst x High-Fear x Neutral Slides

Note. Means with the same grouping letter are not significantly different, alpha level = .05.

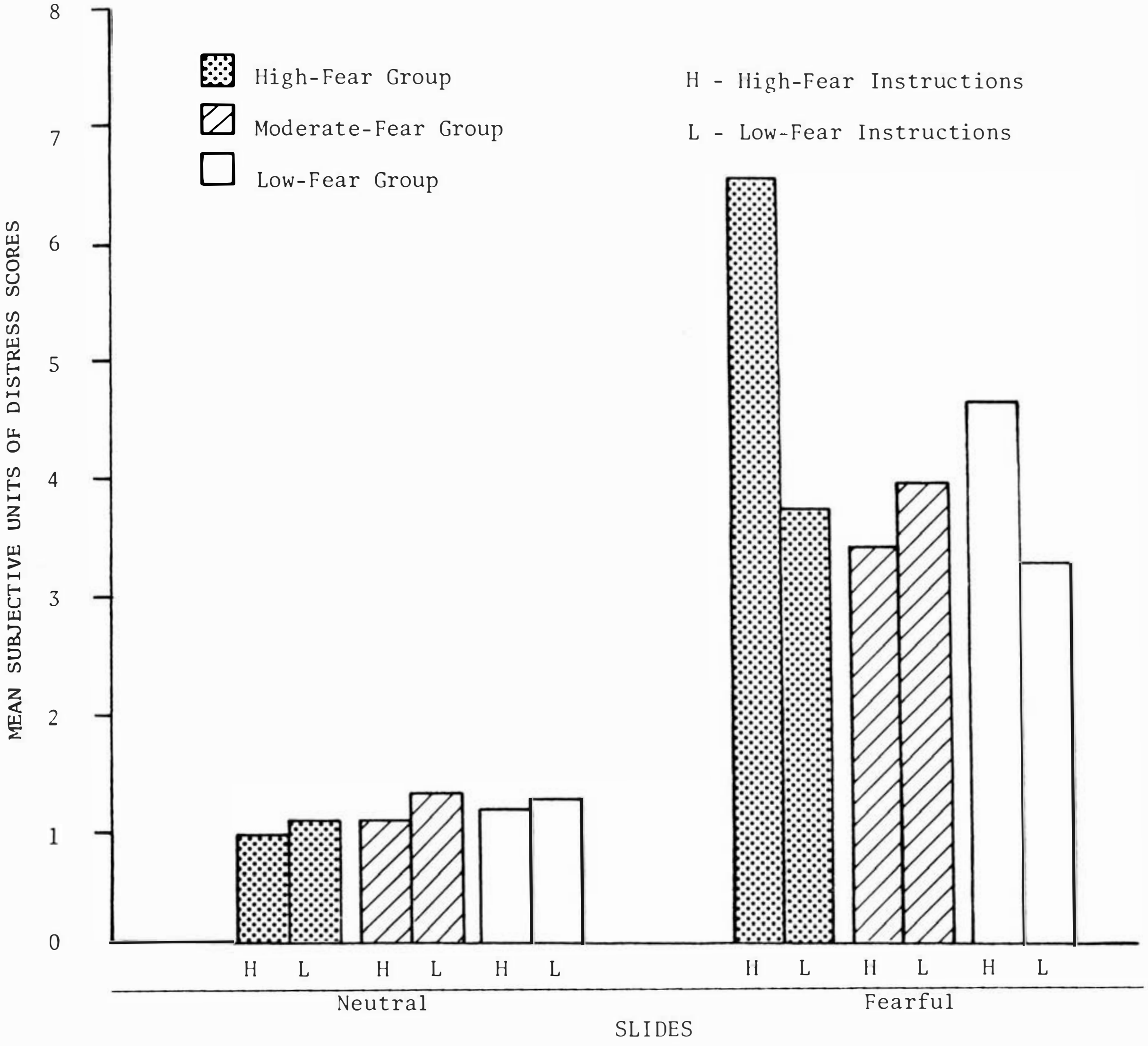

Figure 13. Subjective units of distress scores for high, moderate, and low mutilation fear groups exposed to fearful and neutral slides under conditions of high- and low-fear instructions.

Behavioral Avoidance Test

All subjects were administered a behavioral avoidance test (BAT) prior to and following the instructional manipulation. The identical fearful slide was employed in both cases and subjects' latency to terminate the slide in seconds was obtained.

A repeated measures analysis of variance was performed on the two sets of BAT scores using a 2 x 3 x 2 ANOVA on the Instruction x Fear Condition x Repeated Measures (pretest, postest) factors. No significant main effects or interaction effects were obtained on the BAT as can be seen in Table 20.

Table 20

Analysis of Variance for Behavioral Avoidance Test

Source	df	SS	MS	F
Between	47	73680.06		
Instruction	1	1793.06	1793.06	1.08
Fear Condition	2	311.20	155.60	.09
Inst x FCon	2	1797.05	898.52	.54
Error	42	69778.75	1661.40	
Within	48	23110.61		
Repeated Measures	1	1194.91	1194.91	2.86
Inst x RMeas	1	1626.50	1626.50	3.89
FCon x RMeas	2	844.57	422.28	1.01
Inst x FCon x RMeas	2	1877.67	932.83	2.24
Error	42	17566.96	418.26	
Total	95	96790.67		

$^{*}p < .05$
$^{**}p < .01$

Concordance of Dependent Variables

In order to examine the degree of concordance between the five dependent variables, Pearson Product-Moment Correlation coefficients were computed for each of the three fear groups for both fearful and neutral slides. Peak skin conductance responses, mean postimulus heart rates, and SUDS ratings to the respective stimuli, as well as scores obtained on the second administration of both the MQ and the BAT served as the basis for determining correlations between dependent measures.

The greatest concordance between dependent variables (with concordance being defined as correlations that are significant at the .05 level) was obtained for subjects in the moderate-fear group. This condition yielded two significant correlations out of a possible 10 for both the fearful and neutral slides. Tables 21 and 22 illustrate the correlations obtained. While an identical number of significant correlations was obtained with high mutilation fear subjects viewing fearful slides, the high-fear condition yielded only one such correlation for subjects viewing neutral slides as shown in Tables 23 and 24.

No significant correlations between dependent variables were obtained for the low-fear group regardless of whether they were exposed to fearful or neutral stimuli. The correlation matrices for the low-fear group are provided in Tables 25 and 26.

A Chi Square Test was performed on the Frequency of significant correlations for each fear group for both fearful and neutral slides to determine if concordance was significantly greater for any of the three fear conditions. As can be seen in Tables 27 and 28, the

Table 21

Pearson Product Moment Correlations for

Moderate-Fear Subjects Viewing Fearful Slides

N = 16

	SCR	HR	MQ	SUDS	BAT
SCR	1.00				
HR	.70*	1.00			
MQ	-.10	-.12	1.00		
SUDS	.20	.28	.66*	1.00	
BAT	.04	-.38	-.34	-.47	1.00

*$p < .05$

Table 22

Pearson Product Moment Correlations for

Moderate-Fear Subjects Viewing Neutral Slides

N = 16

	SCR	HR	MQ	SUDS	BAT
SCR	1.00				
HR	.65*	1.00			
MQ	-.02	.07	1.00		
SUDS	.34	.59*	.24	1.00	
BAT	.10	-.39	-.34	.01	1.00

*p $<$ .05

Table 23

Pearson Product Moment Correlations for

High-Fear Subjects Viewing Fearful Slides

N = 16

	SCR	HR	MQ	SUDS	BAT
SCR	1.00				
HR	.35	1.00			
MQ	.18	.32	1.00		
SUDS	.37	.51*	.83*	1.00	
BAT	-.02	.17	-.22	-.22	1.00

*$p < .05$

Table 24

Pearson Product Moment Correlations for

High-Fear Subjects Viewing Neutral Slides

N = 16

	SCR	HR	MQ	SUDS	BAT
SCR	1.00				
HR	.43	1.00			
MQ	.27	.22	1.00		
SUDS	-.04	-.22	-.08	1.00	
BAT	-.04	.18	-.22	-.62*	1.00

*$p < .05$

Table 25

Pearson Product Moment Correlations for

Low-Fear Subjects Viewing Fearful Slides

N = 16

	SCR	HR	MQ	SUDS	BAT
SCR	1.00				
HR	.46	1.00			
MQ	.05	.03	1.00		
SUDS	-.22	-.21	.27	1.00	
BAT	.03	.26	-.17	-.05	1.00

*$p < .05$

Table 26

Pearson Product Moment Correlations for

Low-Fear Subjects Viewing Neutral Slides

N = 16

	SCR	HR	MQ	SUDS	BAT
SCR	1.00				
HR	.42	1.00			
MQ	.09	-.02	1.00		
SUDS	.28	-.03	-.22	1.00	
BAT	-.09	.27	-.17	-.21	1.00

$^{*}p < .05$

Table 27

Chi Square Test of Significant Differences of

Frequencies of Correlations for Fear Condition

Groups Viewing Fearful Slides

	Fear Groups			
	High	Moderate	Low	Total
Number of Significant Correlations	2	2	0	4
Number of Nonsignificant Correlations	8	8	10	26
Total	10	10	10	30

Table 28

Chi Square Test of Significant Differences of Frequencies of Correlations for Fear Condition Groups Viewing Neutral Slides

	Fear Groups			
	High	Moderate	Low	Total
Number of Significant Correlations	1	2	0	3
Number of Nonsignificant Correlations	9	8	10	27
Total	10	10	10	30

frequency of significant correlations obtained for the three fear groups were not significantly different for either fearful (x^2 = 2.33, df = 2, p $>$ .05) or neutral (x^2 = 2.22, df = 2, p $>$ .05) stimuli.

CHAPTER IV

Discussion

The purpose of the present study was to determine how a cognitive manipulation, in the form of information regarding a subject's degree of fearfulness, differentially affects subjects of differing fear levels when they are subsequently exposed to specific fear stimuli. An attempt was made to demonstrate differential change within the physiological, subjective, and motoric response modalities, as well as differential concordance between dependent variables. Due to the amount of data to be discussed, Chapter IV will be organized according to the results obtained in the three response modalities as they pertain to Hypotheses I - IV. This will be followed by a discussion of Hypotheses V and VI, and implications of the present study for future research.

Physiological Measures

Skin Conductance. Results of the analysis of the skin conductance response (SCR) data provided only partial support for Hypotheses I and III pertaining to the differential effects of high- and low-fear instructions on physiological indices of anxiety. Subjects receiving high-fear instructions produced significantly greater SCR changes than subjects given low-fear instructions when both were exposed to neutral stimuli. Contrary to expectations, however, both instructional conditions responded with similar SCR's to the presentation of fearful stimuli, a finding that is attributable in part to the tendency of high-fear instruction subjects to respond in an identical manner to the two slide types. Thus, while low-fear instruction subjects exhibited significantly greater SCR's to fearful slides than to neutral slides as expected, subjects given high-fear instructions showed similarly high SCR changes regardless of slide type. Further, for both neutral and fearful slides, high-fear instruction subjects produced SCR's that were not significantly different from those of low-fear instruction subjects viewing fearful slides.

These results are likely due to the specific nature of the instructions subjects received prior to viewing the slides. Though all subjects were informed they would be viewing both neutral ("colors and geometric forms") and fearful ("injuries and wounds") slides, they were not given information regarding the order of slide presentation (i.e., that neutral slides would precede fearful slides). Under such ambiguous conditions, it seems quite likely that subjects who were told they would be seeing disturbing stimuli (high-fear instructions) would respond with heightened reactivity to the initial presentation of any stimulus, regardless of its actual content. Though sharing the same degree of ambiguity with respect to the order of slide presentation, subjects receiving low-fear instructions had no such cognitive set or expectation regarding their fear toward the stimuli to be presented. As a result, these subjects may have been able to maintain a more neutral evaluative stance vis-à-vis the presentation of individual slides that allowed them to respond physiologically on the basis of actual slide content. It is clear, however, that in terms of differential responding, the effect of instructions broke down during exposure to fearful slides, with both groups producing nearly identical

SCR changes. Thus, while low-fear instructions had the effect of enabling subjects to respond more on the basis of objective slide content, they did not significantly attenuate SCR responses to discriminably fearful stimuli.

The consistency of response exhibited by high-fear instruction subjects was also evident in the levels of skin conductance produced during neutral and fearful stimuli. As with the SCR changes, subjects receiving low-fear instructions exhibited significantly higher levels of skin conductance to fearful slides than to neutral slides. High-fear instruction subjects, on the other hand, maintained similarly low levels of skin conductance during the presentation of both slide types. Informing subjects they would experience fear to the presentation of the slides, therefore, did not appear to produce an increase in the level of physiological arousal experienced by these subjects. Indeed, high-fear instruction subjects were characterized by a relatively low level of arousal throughout the experiment. Rather, high-fear instructions had the effect of increasing responsivity to the presentation of stimuli in general. This finding is similar to that reported by Geer and Klein (1969) who found that threat of shock increased physiological reactivity to both neutral and fearful stimuli, but did not increase the general arousal level of subjects. Conversely, subjects who were told they were not fearful reacted more on the basis of actual stimulus content, both in terms of arousal level and responsivity to stimulus presentation. The skin conductance results for the low-fear instruction group are consistent with previous research on skin conductance responses and levels to neutral and fearful stimuli (Kaiser & Roessler, 1970; Lazarus et al., 1962).

Analysis of the skin conductance data failed to provide the expected differentiation among the three fear conditions in terms of the amplitude of SCR's yielded to specific fear stimuli. These results are inconsistent with a number of prior studies that have found SCR responses to discriminate between high- and low-fear subjects (Geer, 1966; Grossberg & Wilson, 1968; Klorman et al., 1975). There are several possibilities that may account for the discrepant results obtained in the present study. First, although five separate fearful slides were utilized in an effort to sample varying types of mutilation material, the specific scenes depicted in the slides may not have been relevant to the particular fears experienced by individual subjects. It is doubtful, however, that this explanation can adequately account for the failure to obtain differential SCR responses for the three fear groups. The scenes depicted in the slides were extracted from the MQ and it is likely that fearful subjects endorsed at least some items on the questionnaire that were represented in the slide content. In addition, the slides depicted a broad range of content areas such as open wounds, blood, and accidents that are likely to be highly relevant for subjects endorsing a large number of items on the MQ. Further, both moderate- and high-fear subjects exhibited significantly higher levels of skin conductance to fearful slides than to neutral slides indicating that, in terms of general arousal, the two types of stimuli produced differential effects on fearful subjects. Secondly, the subjects comprising the moderate- and high-fear groups represented an analogue phobic population for whom physiological reactivity may not have been a predominant component of the anxiety response. For those subjects, fear may have been restricted primarily to the verbal-cognitive channel without the accompanying high degree of physiological arousal. Though this alternative seems plausible, the differential skin conductance levels exhibited by the moderate- and high-fear groups to the two slide types indicates that some degree of physiological arousal accompanied exposure to stimuli toward which subjects had previously expressed fear. Moreover, there was no evidence that low-fear subjects experienced differential arousal to fearful stimuli. Such evidence would be required to cast serious doubt on the definition of the three fear groups. A third consideration pertains to the significant differences obtained between the prestimulus or baseline skin conductance values for the three fear conditions. Amplitude of the SCR response is highly correlated with baseline skin conductance values, such that the amplitude of specific responses decreases as baseline values increase (Edelberg, 1972). The sizeable differences between the groups in prestimulus skin conductance values could have therefore mitigated the differential responsivity of the three fear conditions on the SCR. Finally, prior studies demonstrating differential SCR responses for fearful and nonfearful subjects have employed only two groups of subjects representing disparate populations in terms of assessed fear. This procedure serves to insure maximum differentiation between the groups on any dependent measures that are used. In the present study, however, an additional group of subjects representing an intermediate level of fear was included and may have resulted in an attenuation of differences in the observed responsivity of the three fear conditions. As Edelberg (1972) has pointed out, the assumption of a direct linear relationship between skin conductance and anxiety level is questionable. A number of studies (Burch & Greiner, 1958; McDonnell & Carpenter, 1960) have shown that the relationship instead more often resembles an inverted U-shaped function, with maximum responsivity occurring at intermediate levels of arousal. Examination of the mean SCR responses for the three fear groups in the present study seems to support this contention, as the moderate-fear group consistently produced the greatest SCR responses, followed by the high- and low-fear groups. This effect may have prevented the finding of the discrete linear differences between the fear groups on the SCR that are typically reported in studies utilizing only two groups of subjects.

It is impossible to determine with any degree of certainty which of the above factors or combination of factors contributed to the failure to obtain differences between the three fear groups on the SCR measure. It seems likely, however, that the baseline skin conductance values may have differentially affected the response potentialities of the three groups, while the nonlinear nature of the SCR-anxiety relationship served to diminish or distort any differences that were obtained. Additionally, it is quite likely that the two fearful groups included a large number of subjects for whom physiological reactivity was not an important component of the anxiety response.

While the skin conductance data provided partial support for Hypotheses I and III, the results failed to support the hypotheses predicting that the effects obtained would be significantly greater for moderate-fear subjects than for either high- or low-fear subjects (Hypotheses II and IV). These hypotheses were included to test the contention that factors such as cognitive set or expectancy variables exert a greater effect upon subjects experiencing moderate levels of anxiety, due to the presumably smaller degree of physiological arousal among these subjects (Borkovec, 1973b; Hodgson & Rachman, 1974). The predictions were also based on the assumption that moderate-fear subjects would be characterized by a mid-range level of responding that would permit greater flexibility for increasing or decreasing responsivity than either low- or high-fear subjects. As was evident in the present study, however, subjects differing in self-reported fear were not significantly different in terms of physiological reactivity as measured by the SCR, and moderate-fear subjects actually showed the highest overall levels of skin conductance activity. If the extent of physiological responsivity is a determining factor in the effectiveness of cognitive set or expectancy variables as has been suggested, then it is not surprising that the instructional conditions failed to exert differential effects on the three fear groups. Without differential levels of physiological reactivity, it is not possible to confirm or disconfirm predictions pertaining to the effects of instructional set on the physiological responses of subjects differing in their level of expressed fear. The present study, therefore, does not provide an adequate test of Hypotheses II and IV on the SCR measure. It demonstrates only that there was an effect produced by the instructional manipulation on the SCR responses to neutral stimuli and that this effect was similar across all three fear groups.

Heart Rate. The results for the heart rate data provided partial support for Hypothesis I pertaining to the effects of the instructional conditions on the physiological arousal of fearful subjects. Though no differences between instructional conditions were obtained on the heart rate response (HRR) measure, large differences in the level of heart rate were obtained across all three fear groups for both neutral and fearful stimuli. Instructions had the predicted effects, however, only for high-fear subjects viewing neutral and fearful slides. During presentation of both slide types, high-fear subjects receiving high-fear instructions exhibited significantly greater heart rate levels than subjects given low-fear instructions. Further, low-fear instructions had the effect of reducing the heart rate of high-fear subjects to a level similar to that of moderate-fear subjects receiving high-fear instructions. The differential effects of instructions on the heart rate levels of high-fear subjects parallel the SCR responses to neutral stimuli discussed earlier. These findings are also consistent with previous research on the effects of instructional or cognitive set on the physiological arousal of high-fear subjects (Beiman, 1976; Melamed, 1969). Paradoxically, instructions had precisely the opposite effect on the heart rate levels of the moderate- and low-fear groups. For these two groups, subjects given low-fear instructions displayed heart rate levels that were significantly greater than those of subjects given high-fear instructions. Though failing to support Hypotheses I and III, these results are similar to those obtained for skin conductance levels, in which high-fear instructions appeared to reduce the arousal level of subjects relative to low-fear instructions. There was no evidence, however, that high-fear instructions increased cardiac responsivity to stimuli for any of the three fear groups as was the case for SCR responses produced to neutral and fearful slides.

While instructions were found to have the predicted effects on the level of heart rate exhibited by high-fear subjects, the results obtained for the moderate- and low-fear groups were unexpected and are somewhat difficult to explain. The effect of low-fear instructions on the heart rate levels of these two groups was extremely large, both in comparison to high-fear subjects and to moderate- and low-fear subjects receiving high-fear instructions. Indeed, moderate- and low-fear subjects given low-fear instructions were found to exhibit the highest heart rate levels of any of the six combined fear-instructional conditions for both neutral and fearful slides. Though it is difficult to account for the apparent arousing effects produced by low-fear instructions in these two groups, several interrelated factors may have contributed to this finding. First, it is quite likely that a majority of subjects comprising the low- and moderate-fear groups did not perceive themselves as being generally fearful in terms of the stimuli used in the present study. Both groups endorsed relatively few items on the MQ (low-fear $\overline{x} = 3.6$; moderate-fear $\overline{x} = 9.9$) suggesting that, while moderate-fear subjects expressed more fear than the low-fear group, subjects in both groups may have considered themselves to be relatively nonfearful with respect to mutilation stimuli. Secondly, all subjects were shown a fearful slide as part of the behavioral avoidance test (BAT) prior to receiving either low- or high-fear instructions. The slide depicted a close-up view of a drug addict giving himself an injection and it is likely that subjects in each of the fear groups found the scene to be at least mildly unpleasant or disturbing. This suggestion is supported by the finding that 50% of the low-fear subjects terminated the slide, as compared to 31% of the moderate-fear and 37% of the high-fear subjects. Thus, a rather large number of subjects who had self-reported being relatively unafraid of this type of stimulus apparently found it to be quite disturbing upon actual presentation in the BAT. Under these conditions, the subsequent administration of low-fear instructions, in which subjects were told they were selected on the basis of their low level of fear, could have produced an arousing effect upon low- and moderate-fear subjects by pointing out the discrepancy between their self-reported fear on the MQ and their experiencing the BAT stimulus as unpleasant. These subjects may have realized they had underestimated their level of fear to mutilation stimuli and were actually much more fearful than they had indicated by their self-report. The administration of high-fear instructions, on the other hand, would not be expected to produce this same arousing effect, as the discrepancy between self-reported fear and experience during the BAT would be much less apparent. Further, this effect would necessarily be greatest for the low-fear group, as there would have been a greater discrepancy between self-report and experience for these subjects. This group did, in fact, exhibit the highest overall levels of heart rate to both neutral and fearful stimuli.

In terms of the theoretical assumptions and hypotheses underlying the present study, the finding of such sizeable increases in the arousal level of low- and moderate-fear subjects under conditions of low-fear instructions is extremely puzzling and may reflect the influence of any number of undelineated subject variables or nonspecific factors present in the experimental setting. It seems reasonable to suggest, however, that subjects in these groups may have underestimated their fear of mutilation stimuli on the MQ and subsequently experienced an unexpected degree of distress or anxiety when exposed to the BAT stimulus. Informing these subjects thay they were selected because of their lack of self-reported fear may have induced a dissonant-like condition that produced a state of arousal and resulted in the increased levels of heart rate. This same effect may have also contributed to the finding of greater skin conductance levels among subjects in the low-fear instruction condition relative to those receiving high-fear instructions.

As in the case of the skin conductance results, analysis of the heart rate data failed to yield the expected differentiation between the three fear groups or between fearful and neutral slides. A large number of prior studies have demonstrated that heart rate responses (HRR) reliably discriminate between both fearful and nonfearful subjects, and fearful and neutral stimuli (Geer & Klein, 1969; Grossberg & Wilson, 1968; Hare, 1973; Klorman et al., 1975; Prigatano & Johnson, 1974). In the present study, however, moderate-fear subjects produced the greatest HRR changes, followed by the low- and high-fear groups. Moreover, all three groups exhibited cardiac acceleration from baseline that is typically indicative of a defensive reaction to fearful or noxious stimuli. These responses were similar, and the order between groups maintained, across both neutral and fearful slides.

In interpreting these discrepant results, several factors must be considered. Perhaps the most apparent explanation for the failure to obtain differences between neutral and fearful slides on the heart rate measure is that the two slide types were not qualitatively different in terms of fearful content. As discussed previously, however, this explanation is unlikely due to the fact that the fearful slides were extracted from the MQ and sampled a broad range of content areas that were clearly relevant to a fear of mutilation material. Neutral slides, on the other hand, consisted exclusively of colors and geometric forms. Results of the skin conductance data, as well as the subjective ratings elicited by the two slide types, also indicate that the fearful slides were discriminably different in terms of producing greater physiological arousal and subjective distress. In addition, the same neutral and fearful slides have been found to produce significantly different HRR changes in at least two previous studies (Fracher, 1978; Goethe, 1980). While it was assumed that the two slide types would elicit differential cardiac responding from subjects expressing a fear of mutilation material, several studies have reported a similar failure to obtain differences in the HRR's produced to neutral and fearful stimuli (Hare, 1972; Klorman, 1974; Klorman et al., 1975). In each of these cases, as well as in the present study, subjects were required to provide a rating of their discomfort immediately following the presentation of each slide. As Hare (1972) has pointed out, this type of response requirement typically produces a pattern of cardiac acceleration that is "related to cognitive elaboration or to whatever processes are associated with having to make overt judgments on some aspect of the visual stimulus being attended to" (p. 425). In the current study, all three fear groups exhibited a pattern of cardiac acceleration to both neutral and fearful slides that may have resulted from their requirement to verbalize their level of discomfort, and that likely contributed to the failure to obtain a significant main effect for the Stimulus factor. Of further interest is the finding that all three fear groups displayed significantly greater heart rate levels during the neutral slides than during the fearful slides. Skin conductance levels, on the other hand, showed the opposite pattern and increased significantly for the moderate- and high-fear groups during exposure to fearful slides. While the lower levels of heart rate produced to fearful slides may reflect real differences in the arousing properties of the two slide types, they also likely reflect the greater tendency of heart rate to habituate more rapidly to fearful than to neutral stimuli (Grossberg & Wilson, 1968; Hodgson & Rachman, 1974).

It was expected that the results of the heart rate data would conform to previous observations of a direct linear relationship between heart rate and subjective fear level (Sartory et al., 1977). Though heart rate was expected to shift upward or downward depending on the instructional condition, it was nevertheless felt that the same general relationship between the three fear groups would be maintained. Despite these predictions, a direct linear relationship between heart rate and self-reported fear on the MQ was obtained only for heart rate levels under conditions of high-fear instructions. In this condition, the groups ordered themselves from high- to low-fear, with the high-fear group displaying the highest overall level of heart rate. This order was identical and significant for both neutral and fearful slides, and corresponds with the linear ordering by subjective fear level that is typically reported for heart rate measures. The opposite order was obtained under low-fear instructions, however, with low-fear subjects exhibiting the highest mean heart rate level, followed by the moderate- and high-fear groups. The ordering of fear groups in this condition primarily reflects the function-increasing effects of low-fear instructions on the heart rate levels of the low- and moderate-fear groups. The results for the HRR data also failed to conform to expectations regarding the relationship between fear groups. As noted previously, moderate-fear subjects produced the greatest HRR changes, followed by the low- and high-fear groups. These findings are consistent with those obtained for the skin conductance data, in which moderate-fear subjects showed the highest overall levels of skin conductance and tended to produce the greatest SCR changes.

The heart rate results for the three fear groups as with the results of the skin conductance measure, seriously question the role of physiological arousal in the analogue fear population used in the present study, particularly with respect to the high-fear group. With the exception of the level of heart rate exhibited under high-fear instructions, these subjects consistently displayed a relatively small degree of physiological activity, suggesting that this channel was not an important component of their anxiety response. Extremely high fear, as assessed by the self-report questionnaire in the present study, may have consisted primarily of verbal-cognitive responses and likely reflected response set or other nonspecific processes unrelated to actual fear of anxiety. Several additional factors, however, may have also contributed to the failure to obtain the expected linear relationship between HRR and subjective fear level. Klorman et al. (1975) have previously reported a failure to obtain differences in the HRR of high- and low-fear subjects when subjective ratings of stimuli were required. As noted above, requiring subjects to provide ratings has the effect of inducing a pattern of cardiac acceleration. In the present study, the response requirement may have produced differential effects on the HRR of the three fear groups that served to distort differences in cardiac responsivity to specific stimuli. In addition, instructions were found to have a pronounced effect on baseline heart rate values that differed substantially in direction and magnitude for the three groups. This shifting in baseline values may have differentially affected cardiac response capabilities in the groups and contributed to the failure to obtain the expected differences on the HRR.

While the heart rate data provided partial support for Hypothesis I, with the finding of differential effects of instructions on the heart rate levels of high-fear subjects, no support was obtained for Hypotheses II or IV. As discussed previously, the rationale for predicting that instructions would have the greatest effect on the moderate-fear group was that these subjects were expected to be characterized by a lower level of physiological arousal than high-fear subjects. In terms of the heart rate measure, however, the reverse was true and high-fear subjects typically exhibited the lowest levels of physiological activity. Thus, while the hypotheses as stated were not supported by the heart rate data, there is some support provided the notion that variables such as cognitive set have their greatest effect on subjects exhibiting relatively low levels of physiological arousal.

Self-Report Measures

Mutilation Questionnaire. The results for the MQ data supported

Hypotheses I and III in that subjects receiving high-fear instructions produced significantly higher scores on the posttest administration of the MQ than subjects given low-fear instructions. These results were similar for all three fear groups and consistent with previous research on the modification of self-reported anxiety by instructional set or expectancy manipulation (Blom & Craighead, 1974; Borkovec, 1972; Mangelsdorff & Zuckerman, 1975; Marcia et al., 1969; Rappaport, 1972).

The difference between the two instructional conditions on the posttest MQ reflects a greater tendency of subjects receiving low-fear instructions to reduce their self-reported fear than for high-fear instruction subjects to show an increase. While the mean MQ scores for the two conditions were not significantly different on the initial administration of the questionnaire, subjects receiving low-fear instructions showed a significant decrease in their total MQ scores on the posttest administration. High-fear instruction subjects, on the other hand, obtained similar scores on both administrations of the MQ. These differential effects indicate that telling subjects they were not fearful was a relatively effective means of reducing self-reported fear of mutilation stimuli. Informing subjects they were very fearful, however, did little to produce a greater degree of self-reported fear on the questionnaire measure. In terms of the procedure employed in the present study, a majority of subjects participated in the experiment within several weeks of completing the pretest administration of the MQ and likely remembered many of the items they had endorsed on the first questionnaire. Under these conditions, low-fear instructions may have been effective in reducing total MQ scores by encouraging subjects to reevaluate their self-reported fear to individual items. It is doubtful, however, that telling subjects they were very fearful of mutilation stimuli would have resulted in the endorsement of any additional items on the MQ.

While the relative ordering of the three fear groups was identical for both administrations of the MQ as expected, low-fear subjects showed an increase, and high-fear subjects a decrease, in mean MQ scores over testings. The mean MQ scores for the moderate-fear group, however, did not change significantly for the two test administrations. These findings further support suggestions made earlier regarding the BAT and heart rate results of the low- and high-fear groups. Despite the fact that low-fear subjects indicated a relative absence of fear on the pretest MQ, it is quite likely that many of these subjects found the mutilation content of the BAT stimulus and fearful slides to be at least mildly disturbing. The experience of being exposed to these stimuli may have prompted a reevaluation of their fear toward mutilation material and produced the increase in self-reported fear on the second MQ administration. Similarly, the extremely high pretest MQ scores obtained by high-fear subjects probably reflected processes unrelated to actual fear toward specific questionnaire items. Their subsequent exposure to mutilation stimuli may have likewise resulted in a reassessment of their fear that produced the reduction in scores on the posttest MQ. Moderate-fear subjects, on the other hand, may have initially portrayed their level of fear more accurately and were therefore less likely to engage in a reevaluation of this fear following exposure to mutilation stimuli.

The results for the MQ failed to provide support for Hypotheses

II and IV predicting that instructions would have the greatest effect on the self-reported anxiety of moderate-fear subjects. This failure most likely reflects the discrepancy in the physiological arousal patterns for the three fear groups discussed earlier. As noted, the prediction that moderate-fear subjects would be most affected by the cognitive manipulation was based on assumptions pertaining to their degree of physiological activity relative to the low- and high-fear groups. There was no indication, however, that moderate-fear subjects were less aroused or physiologically reactive than high-fear subjects and, in many respects, were actually characterized by the highest degree of physiological activity. Further, it appears that moderate-fear subjects may have been much more accurate in the assessment of their fear on the MQ than either the low- or high-fear groups. In this case, it is unlikely that these subjects would have been more easily persuaded by instructions concerning their level of fear toward mutilation stimuli.

Subjective Units of Distress. The analysis of the SUDS data provided partial support for Hypotheses I and III pertaining to the effects of instructions on self-report indices of anxiety. For both the low- and high-fear groups vewing fearful slides, subjects receiving high-fear instructions reported significantly greater mean subjective distress ratings than subjects given low-fear isntructions. Moderate-fear subjects, however, reported similar distress ratings regardless of the instructional condition. As expected, instructions did not significantly affect the SUDS ratings of neutral stimuli. The results obtained for the low- and high-fear groups parallel those obtained for the MQ data and are consistent with prior studies on the modification of self-reported anxiety in highly fearful subjects (Borkovec, 1972; Marcia et al., 1969). In addition, these findings also suggest that the self-report indices of nonfearful subjects can be altered significantly by the appropriate instructional set.

Though differential ordering of the fear groups was expected for the SUDS ratings of fearful stimuli, significant differences between groups were obtained only under conditions of high-fear instructions. In this condition, high-fear subjects produced the highest subjective distress ratings, followed by the low- and moderate-fear groups. The finding of greater mean SUDS ratings for the low-fear group than for the moderate-fear group further suggests that low-fear subjects were actually more fearful than indicated by their initial MQ scores. As a result, they may have been particularly susceptible to instructions indicating they were very fearful of mutilation stimuli. Rather surprisingly, differences in the distress ratings of the three fear groups disappeared completely under conditions of low-fear instructions. While this finding is attributable in part to the higher than expected ratings of the low-fear group, it primarily reflects the large reductions in the SUDS ratings of high-fear subjects relative to those produced under high-fear instructions. As noted earlier, it is quite likely that high-fear subjects were somewhat less fearful of mutilation stimuli than suggested by their scores on the pretest administration of the MQ. For these subjects, high-fear instructions may have simply served to reinforce their initial assessment of their fear and resulted in their responding in a corresponding manner on the subjective distress ratings. Low-fear instructions, on the other hand, likely encouraged these subjects to reevaluate this assessment in light of their actual exposure to mutilation stimuli and produced ratings that perhaps more accurately reflected subjects' subjective experience during the fearful slides.

The mean SUDS ratings for the neutral slides were found to be similar for all three fear groups and were all significantly lower than those elicited by the fearful slides. These results provide additional confirmation that the two slide types were indeed discriminably different in terms of distressful or fearful content.

As with the questionnaire and physiological data, results of the SUDS ratings for the moderate-fear group failed to provide support for Hypotheses II and IV. These subjects appeared to be both more physiologically aroused and more accurate in the perception of their fear of mutilation stimuli than either the low- or high-fear groups. The combination of these factors could have prevented the finding of a significant instructional effect on the distress ratings of the moderate-fear group. These subjects did, however, respond in the predicted direction on the posttest administration of the MQ. Thus, for moderate-fear subjects, instructions had the effect of modifying self-reports of anticipated responding to fearful stimuli on a questionnaire measure, but had no apparent effect on the degree of subjective distress experienced during actual exposure to the stimuli.

Behavioral Measure

Behavioral Avoidance Test. As a means of assessing the behavioral component of the anxiety response, all subjects were administered a behavioral avoidance test (BAT) prior to and following the instructional manipulation. The identical fearful slide was used in both BAT's and each subject was instructed that she could push a termination button if she found the slide unpleasant or began to feel uncomfortable while viewing it. Subjects' latency to terminate the slide in hundredths of a second was obtained and provided a measure of behavioral avoidance to the fearful stimulus.

The results of the BAT data failed to support Hypotheses I and III in that the BAT did not differentiate between high- and low-fear instruction conditions. Consequently, Hypotheses II and IV, predicting greater differential effects for the moderate-fear group, were also not supported by the BAT data. Further, the BAT measure failed to discriminate between the three fear groups in terms of differential response latencies.

The failure of the BAT to differentiate between instructional conditions or fear groups appears attributable to a combination of several factors. First, subjects' exposure to the fearful stimulus during the BAT was relatively limited. The experimenter placed a ceiling on the duration of stimulus presentation rather than allowing subjects to do so by controlling stimulus onset and offset. It is quite likely that better results would have been obtained had the stimulus presentation interval been longer. Suarez, Adams, and McCutcheon (1976), for example, obtained highly significant BAT differences between high and low arousal groups by using a three-minute presentation of a fearful film. Secondly, the same fearful slide was used in both BAT's as a means of controlling for stimulus content. In addition to this repeated presentation, subjects also received exposure to the other five fearful slides prior to the administration of the second BAT. These factors suggest that some degree of habituation occurred to fearful slides in general, and to the BAT stimulus in particular, that may have superseded instructions and fear level as the determining factor in response latencies to the second BAT. Finally, low-fear subjects unexpectedly responded with relatively short reaction times to the first BAT administration, with 50% of this group terminating the slide prior to the 90-second limit. While this finding reflects the unanticipated fearfulness of low-fear subjects to mutilation stimuli, it likely prevented the finding of significant differences between the response latencies of the three fear groups.

Hypothesis V

Physiological, self-report, and behavioral measures of anxiety would be differentially affected by the cognitive manipulation, such that the self-report and behavioral indices would exhibit more change in the predicted direction than the physiological measures.

The results of the analyses for the three response modalities partially supported Hypothesis V in that the two self-report indices (MQ and SUDS ratings) were affected to a greater extent by instructions than either the heart rate or skin conductance measures. The BAT failed to yield any significant results and, in this respect, proved to be the least sensitive measure to the cognitive manipulation. It is quite likely, however, that the negative results for the BAT measure primarily reflect the methodological problems described earlier, as a number of previous studies have reported significant effects of instructions or expectancy variables on behavioral measures of anxiety

(Blom & Craighead, 1974; Borkovec, 1973a; Marcia et al., 1969; Rappaport, 1972; Valins & Ray, 1967).

With the exception of the SUDS ratings of the moderate-fear group, instructions had the predicted effects on the mean MQ scores and subjective distress ratings of all three fear groups. In each case, subjects receiving high-fear instructions produced significantly greater self-reports of anxiety than subjects given low-fear instructions. As expected, however, the results obtained for the physiological measures were much less consistent. Instructions had the predicted effects only on the SCR responses produced by all three fear groups to neutral stimuli, and on the heart rate levels of high-fear subjects viewing both neutral and fearful slides. There was also some evidence that high-fear instructions increased SCR responsivity to both neutral and fearful stimuli, but these results were not supported by the heart rate data. The failure to obtain the same instructional effects on each of the two self-report measures and on both physiological measures indicates that cognitive set may produce differential effects within, as well as between, response modalities. These results likely reflect the fact that each of these variables measures a different, though related, aspect of the anxiety response.

The finding of greater change for the two self-report measures suggests a greater susceptibility of this channel to the type of instructions used in the present study. It seems likely that the anxiety of the typical analogue fear population is often mediated primarily by verbal-cognitive responses. It is not surprising, therefore, that these responses would be most affected by verbal instructions intended to persuade subjects they are or are not afraid of a particular class of stimuli. As Borkovec (1973b) has pointed out, however, simple instructional manipulations will have less of an effect on the verbal-cognitive responses of subjects whose anxiety is mediated by a high degree of physiological arousal. This received some support in the current study, as moderate-fear subjects were found to exhibit the highest degree of physiological activity and failed to show differential changes due to instructions on the subjective distress ratings of fearful stimuli.

High-fear subjects were the only group to show similar instructional effects for both the physiological and self-report channels. The changes exhibited in the heart rate levels and subjective distress ratings of this group are consistent with prior research examining the effects of instructional and expectancy manipulations on the anxiety of highly fearful subjects (Beiman, 1976; Melamed, 1969). As was evident in the present study, however, these subjects were not characterized by a high degree of physiological reactivity to fearful stimuli and their anxiety was likely restricted primarily to verbal-cognitive responses. Further, the fact that these subjects perceived themselves to be extremely fearful despite the absence of physiological reactivity may have facilitated the differential arousal levels exhibited under the two instructional conditions.

Hypothesis VI

Concordance between physiological, self-report, and behavioral measures of anxiety would be greater for highly fearful subjects than for either moderate or low mutilation fear subjects, regardless of the cognitive manipulation.

The results of the correlational analyses failed to support Hypothesis VI in that no fear group produced a significantly greater number of correlations than any other group. High-fear subjects exposed to fearful slides resulted in two out of a possible 10 significant correlations as opposed to one out of 10 for high-fear subjects viewing neutral slides. Moderate-fear subjects produced two out of 10 significant correlations for both the neutral anf fearful slide conditions, while no significant correlations were obtained for the low-fear group.

These results do indicate, however, that concordance between response systems occurred only in subjects reporting a moderate or high degree of fear toward mutilation stimuli. Further, to the extent that concordance was attained with high-fear subjects it occurred to a greater extent under conditions of relatively high arousal as might have been present in high-fear subjects exposed to fearful stimuli. The trend in the present study, therefore, is in the direction of the observation of Hodgson and Rachman (1974) who suggested that "concordance between responses systems is likely to be high during strong emotional arousal" (p. 319). Though concordance was moderate in the present study, the arousal of the two fear groups was apparently likewise moderate due to the fact that they represented a nonclinical analogue population.

Significant correlations between the two self-report measures were obtained for both the moderate- and high-fear groups viewing fearful slides. For these subjects, subjective distress ratings produced during actual exposure to mutilation stimuli correlated significantly with self-reported fear on the posttest MQ. The only significant correlations obtained between the self-report and physiological measures was for the heart rate and SUDS ratings of high-fear subjects viewing fearful slides and moderate-fear subjects viewing neutral slides. This finding apparently reflects the tendency of self-reported anxiety to correlate more highly with heart rate than with skin conductance measures (Hodgson & Rachman, 1974). Moderate-fear subjects viewing both neutral and fearful slides resulted in the only significant correlations between the two physiological measures. It is quite likely that this finding is due to the generally greater physiological activity exhibited by this group over both slide types relative to the low- and high-fear groups. Due to the methodological problems in the BAT, it is difficult to address the issue of concordance between the motoric response and the other response channels under consideration. The only significant correlation obtained for the behavioral measure was the negative correlation between the BAT and subjective distress ratings for high-fear subjects viewing neutral stimuli.

Implications

The results of the present study clearly demonstrate the effectiveness of cognitive or instructional sets for modifying indices of anxiety among subjects expressing fear of specific stimuli. Further, these effects were shown to have some degree of generalizability in terms of modifying the anxiety of subjects differing in their level of expressed fear, as well as producing significant changes among subjects reporting no fear of mutilation stimuli. It appears, therefore, that providing a subject with information concerning his degree of fearfulness toward a particular class of stimuli can significantly modify responding when the subject is subsequently exposed to specific fear stimuli.

The effects produced by the cognitive manipulation in the current study, however, are subject to two important qualifications. First, the effectiveness of instructions in modifying anxiety among both fearful and nonfearful subjects was limited almost exclusively to the verbal-cognitive channel, with little or no influence exerted on the physiological and motoric response systems. As noted, the failure to obtain instructional effects on the BAT is most likely due to the specific procedure used, as alternative measures of behavioral avoidance have typically yielded significant instructional and expectancy effects (e.g., Blom & Craighead, 1974). While similar significant findings have also been reported for autonomic variables (Beiman, 1976; Melamed, 1969; Sternbach, 1965), these effects are apparently much less reliable and often produce nonsignificant results (Borkovec, 1972; Rappaport, 1972). As Lang (1971) has suggested, each of the three response systems are at least partially autonomous and capable of changing independently as a function of different environmental factors. It may be that both the verbal-cognitive and motoric channels are particularly susceptible to change from instructional manipulations such as that employed in the present study. In this case, it is quite likely that cognitive or instructional sets will generally exert their greatest effects on verbal and motoric behavior, with considerably less impact on the physiological component of the anxiety response. This suggestion, however, is an empirical question subject to future experimental validation. The second, related consideration with regard to the effects obtained in the current study pertains to the apparent interaction between arousal level and effectiveness of the cognitive manipulation. Though not conclusive, the evidence strongly suggests that instructional sets are likely to have less influence upon subjects exhibiting a high degree of physiological arousal. In the present study, moderate-fear subjects tended to display the highest levels of physiological activity and were the only group that failed to show instructional effects on the distress ratings of fearful stimuli. For these subjects, physiological arousal may have been the factor maintaining both verbal and motoric fear behavior, and most likely interfered with the modification of these latter components by simple instructional manipulation. Considered together, these findings seem to indicate that providing subjects with information regarding their level of fear toward specific stimuli primarily affects the verbal-cognitive, and possibly motoric, components of the anxiety response, and that these effects are likely to be greatest if physiological arousal is not extremely high.

Several issues of apparent clinical relevance have emerged from the present study. The findings presented above strongly implicate the importance of cognitive factors in the maintenance and modification of anxiety, and provide support for the contention that an individual's belief that he is or is not afraid is a critical component of the anxiety response. The influence exerted by these factors, however, may be restricted largely to the verbal-cognitive or motoric response channels, and show only limited ability to modify the physiological arousal that often characterized highly fearful or phobic individuals.

Moreover, the effectiveness of cognitive factors in modifying the former channels appears dependent to some extent on the absence of a high degree of physiological arousal. While these suggestions are in need of further investigation, they strongly implicate the importance of individual assessment in the treatment of anxiety as a means of determining the relative contributions of the three response modalities in the maintenance of the anxiety response. As Borkovec (1973b) has pointed out, it is reasonable to expect that individuals will vary widely in terms of which response system or systems play the primary functional role in the precipitation and maintenance of the anxiety response. By adopting a multisystem assessment approach that provides for measurement across all three modalities, the therapist may determine the most reactive response channel when the individual client is exposed to relevant fear stimuli. In this manner, the channel exhibiting the greatest responsivity would be the response system on which to begin the treatment intervention. For example, a client who exhibits marked autonomic changes, but shows little behavioral avoidance or reports low subjective distress, may respond most favorably to an intervention such as systematic desensitization that attempts to reduce the high degree of physiological arousal. Similarly, if a client is primarily reporting subjective distress without the accompanying physiological arousal, he may respond best to therapy designed to modify the cognitive component of anxiety such as that proposed by the cognitive-behavior therapy school. Techniques that focus on the shaping of appropriate motor responses or the training of behavioral skills may be the optimum treatment for a client who predominantly engages in phobic avoidance behavior. In any case, it would seem incumbent upon the therapist to assess each of the three response channels and adopt a multiple systems treatment methodology in which every response system involved could be modified by the most efficient and efficacious means available.

The results of the present study are also seen as having implications for future analogue fear research. With regard to subject selection procedures, the vast majority of analogue fear studies employ criteria for subject selection that focus only on self-report indices of anxiety or behavioral avoidance measures. Though considered of major importance in the definition of anxiety, physiological arousal or reactivity to specific fear stimuli is typically not assessed or controlled for in this type of research (Borkovec, 1973b). As was evident in the present study, however, a high degree of self-reported fear is not necessarily associated with similarly high levels of physiological arousal. If anxiety is to be regarded as a multisystem response, it would seem important to include selection criteria that tap all three response systems, both as a means of validating subjects' self-report and increasing consistency across studies in terms of the criteria defining fearful and nonfearful subjects. As Bernstein and Paul (1971) have stated, "it is incumbent upon E to employ as Ss only persons who can be shown to display significant and therefore clinically relevant increases in physiological arousal and cognitive distress (i.e., anxiety) as a result of the presence of the presumed eliciting stimulus object" (p. 228).

A second related implication pertains to the instructions that subjects often receive when participating in analogue fear studies.

As part of the procedure in these studies, subjects are frequently given instructions that communicate, directly or indirectly, that they were selected on the basis of their fear (or lack of fear) toward a particular class of stimuli. While providing this information is often based on ethical considerations, it seems apparent that these types of instructions can exert powerful, and often unpredictable, effects on subjects' responding when they are subsequently exposed to the fearful stimulus. These findings would suggest that caution be taken in the type of information subjects receive prior to their participation in studies examining responses to fear- or anxiety-evoking stimuli. These effects can also be reduced substantially by insuring that only truly phobic subjects are selected for analogue fear research (Bernstein, 1973).

A final consideration in the present study pertains to the specific effects produced by the cognitive manipulation. Wilkins (1973, 1978) has correctly cautioned against inferring internal cognitive events on the basis of verbal instructions designed to influence a subject's beliefs or expectancies. Accordingly, it is not possible in the current study to assume that the instructions used actually altered subjects' beliefs concerning their fear of mutilation stimuli. While the instructions were designed to influence these beliefs, it is not known, and indeed impossible to know, whether this intended effect was produced. This is especially true in light of the fact that no post-test validation check was made to determine the degree to which subjects actually believed the instructions they received. It is necessary, therefore, to attribute the effects obtained in the present study to the specific elements of the instructions themselves, rather than to the subjects' unobservable beliefs. Viewed in this manner, the cognitive manipulation may be regarded as a discriminative stimulus that set the occasion for subsequent verbal, motoric, and physiological responding (Borkovec, 1973b). In this respect, instructions likely served in a functional capacity similar to other cognitive techniques that have been found effective in modifying maladaptive responses, e.g., self-instructions (Meichenbaum, 1977).

Though not conclusive, the results of the present research provide additional support for the efficacy of cognitive or instructional sets in the modification of anxiety, as well as delineating several of the specific parameters of these effects and the conditions under which they are likely to occur. In attending to these results, clinicians and experimenters alike will be better able to evaluate the role of cognitive factors in the maintenance and modification of anxiety as it presents itself in both the therapeutic context and experimental setting.

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List of References

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APPENDIX A

Mutilation Questionnaire

APPENDIX A

MQ

Name: ______________________________ Sex: Male____ Female____

Directions: Please answer true (T) or false (F) to the following questions by circling the appropriate letter for each item. Simply answer each question as it usually applies to you.

T F 1. I could not remove the hook from a fish that was caught.

T F 2. I would feel some revulsion looking at a preserved brain in a bottle.

T F 3. If a badly injured person appears on TV, I turn my head away.

T F 4. I dislike looking at pictures of accidents or injuries in magazines.

T F 5. I do not mind visiting a hospital and seeing ill or injured persons.

T F 6. Medical odors make me tense and uncomfortable.

T F 7. I would not go hunting because I could not stand the sight of a dead animal.

T F 8. Watching a butcher at work would make me anxious.

T F 9. A career as a doctor or nurse is very attractive to me.

T F 10. I would feel faint if I saw someone with a wound in the eye.

T F 11. Watching people use sharp power tools makes me nervous.

T F 12. The prospect of getting an injection or seeing someone else get one bothers me quite a bit.

T F 13. I feel sick or faint at the sight of blood.

T F 14. I enjoy reading articles about modern medical techniques.

T F 15. Injuries, accidents, blood, etc., bother me more than anything else.

T F 16. Under no circumstances would I accept an invitation to watch a surgical operation.

T	F	17.	When I see an accident I feel tense.
T	F	18.	It would not bother me to see a bad cut as long as it had been cleaned and stitched
T	F	19.	Using very sharp knives makes me nervous.
T	F	20.	Not only do cuts and wounds upset me, but the sight of people with amputated limbs, large scars, or plastic surgery also bothers me.
T	F	21.	If instruments were available, it would be interesting to see the action of the internal organs in a living body.
T	F	22.	I am frightened at the idea of someone drawing a blood sample from me.
T	F	23.	I don't believe anyone could help a person with a bloody wound without feeling at least a little upset.
T	F	24.	I am terrified by the idea of having surgery.
T	F	25.	I am frightened by the thought that I might some day have to help a person badly hurt in a car wreck.
T	F	26.	I shudder when I think of accidentally cutting myself.
T	F	27.	The sight of dried blood is repulsive.
T	F	28.	Blood and gore upset me no more than the average person.
T	F	29.	The sight of an open wound nauseates me.
T	F	30.	I could never swab out a wound.

APPENDIX B

Preliminary Questionnaire

APPENDIX B

Preliminary Questionnaire

1. Have you ever been treated by a psychologist or psychiatrist?

2. Have you ever fainted or had distressing symptoms when frightened?

3. Do you have a history of heart disease?

APPENDIX C

Consent Form

APPENDIX C

Consent Form

The purpose of this study is to investigate several of the physiological responses to different types of pictures. In this experiment you will be shown a series of slides depicting injuries, wounds, colors, and geometric figures. You will be asked to report your reactions to the slides and allow the experimenter, Jerry Gilmore, to record certain physiological functions during the experimental session. Measures of your heart rate and sweat gland activity will be taken. None of the measures involve any pain or sensation.

The study will require about 1 1/2 hours of your time. If you agree to participate you may withdraw from the study at any time. When we have completed your phase of the experiment you will be informed about the details of the study. If you have any questions feel free to ask them now or save them until we are finished.

Please read the following paragraph carefully and sign your name below if you are in agreement:

I voluntarily consent to be a subject in the study being conducted by Jerry Gilmore under the direction of Dr. William Kallman. Mr. Gilmore has described the study to me and has given me the opportunity to ask questions. I understand that I may withdraw from the experiment at any time and my data will be deleted from the results at my request. I authorize Mr. Gilmore to record my heart rate and sweat gland activity during the experiment. I understand that all data collected will be held in the strictest confidence and any published results of the study will insure my anonymity.

Witness

Subject

Date

APPENDIX D

Instructions to Subjects

APPENDIX D

Instructions to Subjects

The purpose of this study is to investigate the physiological and psychological reactions that people have to certain types of pictures. During the experiment you will be seeing a series of slides that depict various kinds of injuries, wounds, colors, and geometric forms. You have been selected for participation in the study because you seem to regard these kinds of pictures as being more or less identical in the way they affect you. Your score on a questionnaire you completed earlier in the semester indicates that you have no particular fear of these types of pictures and you were among those reporting the least degree of fear to pictures like the one you just saw (i.e., during the behavioral avoidance test). In other words, pictures of this kind appear to have very little effect on you, or disturb you very little, as compared with most other people. (Subjects receiving high-fear instructions were told: You have been selected for participation in the study because you seem to regard these kinds of pictures as being different in the way they affect you. Your score on a questionnaire you completed earlier in the semester indicates that you have a particularly strong fear of these types of pictures and you were among those reporting the greatest degree of fear to pictures like the one you just saw. In other words, pictures of this kind appear to have a strong effect on you, or disturb you a great deal, as compared with most other people).

Throughout the study I will be recording your heart rate and sweat gland activity. The equipment here is perfectly safe and you will experience no sensation whatsoever from the equipment. After I hook you up to the physiological recording equipment, I would like you to sit quietly and look at each slide as it is projected on the screen in front of you. Please sit as still as possible throughout the slide presentation and look directly at the screen. After the termination of each slide, I would like you to rate aloud the degree of discomfort or anxiety you felt while looking at the slide. Use a scale from 1 to 10 to rate each slide, with 1 representing no discomfort and 10 representing a great deal of discomfort.

Please remember to keep as still as possible due to the sensitive nature of the recording equipment.

If you have no further questions we will begin.

Vita

[redacted]