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Affective, Coping, and Physiological Response Patterns to Bodily-Injury and Social-Evaluative Imagery: The Impact of Fear Type, Stimulus Content, and Fainting History

Sandra G. Schwartz

A Thesis

in

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of

Psychology

Presented in Partial Fulfillment of the Requirements
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ABSTRACT

Affective, Coping, and Physiological Response Patterns to Bodily-Injury and Social-Evaluative Imagery: The Impact of Fear Type, Stimulus Content, and Fainting History

Sandra G. Schwartz, Ph.D.
Concordia University, 1988

Parasympathetic activation (e. g., bradycardia and low blood pressure) is part of the response pattern when subjects with bodily-injury fear come into contact with bodily-injury stimuli (e. g., blood). This parasympathetic activation can lead to fainting if large decreases in blood pressure prevent sufficient oxygen from reaching the brain. In contrast, a more uniform pattern of sympathetic activation occurs when subjects with social-evaluative fear encounter social-evaluative stimuli (e. g., public speaking). Since bodily-injury and social-evaluative stimuli can also elicit similar response patterns in nonfearful individuals, the present study explored the degree to which responding to these stimuli is due to the fear type of the individual, the content of the fear stimulus, or their interaction (fear relevance). It also compared responding of bodily-injury subjects with and without a history of fainting.

Bodily-injury, social-evaluative, and control subjects were administered six counterbalanced imagery scenes depicting bodily-injury, social-evaluative, and neutral content. Dependent measures included changes in anxiety,

arousal, skin conductance (level and responses), respiration rate, heart rate, heart rate variability, and an estimate of respiratory sinus arrhythmia between baseline and imagery periods, as well as process coping indices.

There were three main patterns of findings. First, for subjective measures of anxiety, arousal, and emotion-focused coping, subjects showed greatest responding to their fear-relevant imagery. Second, for most physiological measures, the content of the imagery scenes determined responding for all groups. Increased skin conductance to all fear scenes suggests sympathetic activation to both fear contents. However, for heart rate and respiratory sinus arrhythmia, there were indications of sympathetic activation (heart rate increases and respiratory sinus arrhythmia decreases) to social-evaluative content, but parasympathetic activation (heart rate decreases and respiratory sinus arrhythmia increases) to bodily-injury content. Third, only those bodily-injury subjects with a history of fainting showed increased heart rate variability to bodily-injury scenes, suggesting parasympathetic activation which might predispose them to faint. These findings suggest an overlapping set of effects associated with individual fear characteristics, content of fear-evoking presentations, and fainting history.

DEDICATED TO THE MEMORY OF

MY CHERISHED SON

DAVID ALTON SCHWARTZ

1972-1985

Acknowledgements

I wish to thank Dr. Danny Kaloupek, my thesis advisor, for his many years of guidance over the course of this and previous research. He has endeavored to develop my research capacities to their fullest. I have learned a great deal from his broad knowledge of the overlapping fields of human fear, coping, and psychophysiology, and have been influenced by his keen spirit of enquiry. I would also like to thank Dr. Peter Seraganian for teaching me a clear, elegant approach to experimental issues. He has continually provided me with support and direction, especially during the preparation of this final report. I greatly appreciate his encouragement of my professional development in many areas of psychology. Additionally, I thank Dr. Campbell Perry for all his time and effort on my behalf. Appreciation is also extended to Perry Adler who helped carry out parts of this project. Finally, my deepest gratitude goes to my family whose emotional support has sustained me throughout the years of study.

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General Overview

Phobias are characterized by persistent and irrational fear of as well as an intense desire to avoid the feared object or situation (Diagnostic and Statistical Manual of Mental Disorders [Third Edition, Revised; DSM-III-R]; American Psychiatric Association, 1987). The DSM-III-R identifies three major types of phobias: Agoraphobia, Social Phobia, and Simple Phobia. Agoraphobia is the fear of being in situations (e. g., outside the home alone) from which escape might be difficult. Social Phobia is the fear of situations in which the person is exposed to possible evaluation by others. Simple Phobia, a residual category, is a fear of a circumscribed stimulus object or situation. Common simple phobic stimuli involve animals, closed spaces, heights, air travel, blood, and physical injury.

It has been well established that high subjective levels of anxiety coupled with either behavioral avoidance or a desire to avoid the feared situation are characteristic response features of all phobias. Relatively less is known about the physiological response patterns of phobics during exposure to feared situations. Physiologically, most phobics show sympathetic arousal, which can involve increased heart rate, blood pressure, and skin conductance, during exposure to their specific fear-evoking stimuli. This is evident for agoraphobics (Mavissakalian & Michelson, 1982), social phobics (Beidel, Turner, & Dancu, 1985; Lang, Levin, Miller, & Kozak, 1983), and simple phobics (Thyer &

Curtis, 1984).

The prinicpal exception to this pattern of increased sympathetic arousal is shown by a unique group of simple phobics who fear injections, blood, illness, and other situations connected with bodily injury. These individuals show a paradoxical physiological response pattern that appears to be more parasympathetically dominated during exposure to bodily-injury stimuli. That is, they show decreases rather than increases in heart rate and blood pressure which can lead to fainting if the blood pressure drops low enough such that the brain does not receive sufficient oxygen (Connolly, Hallam, & Marks, 1976).

Physiological responding is also affected by the nature of the fearful stimulus content, often irrespective of subjects' fear type. For example, most individuals react to social-evaluative situations such as public speaking with marked sympathetic arousal (Knight & Borden, 1979; Schwartz & Kaloupek, 1987), but to bodily-injury stimuli such as violent films with cardiac deceleration (Carruthers & Taggart, 1973).

Since social-evaluative (SE) and bodily-injury (BI) phobics appear to show distinct physiological response patterns when exposed to their particular feared stimuli, and since SE and BI stimulus contents can evoke similar physiological responses in phobic and normal individuals, bringing these two fears under laboratory examination might disentangle pertinent issues. That is, are the differences in reactivity due to fear type of the individual responder,

content of the fear stimulus, or an interaction such that phobics might be expressing an exaggeration of a response pattern that is relatively prevalent in the general population? In addition, what effect, if any, does fainting history of BI subjects have on their responding?

This introduction will first distinguish between SE and BI fear types in terms of how they are different in presentation, factor-analytically, and, most importantly, in physiological response patterns during exposure to feared stimulus content. Since most studies have not assessed one of the DSM-III-R criteria for "phobia" that requires the fear and/or avoidance to significantly interfere with an individual's normal functioning, terms such as "fear type" or "highly fearful", rather than "phobic", will be used. Second, it will explore the topic of SE and BI fear contents in order to gain some perspective on how SE and BI stimuli themselves tend to evoke particular response patterns even in nonfearful individuals. Third, it will briefly discuss coping in terms of maladaptive coping strategies which may be associated with fainting. A tendency to focus more on BI than on SE fear type and content is due to the uniqueness of the physiological pattern associated with BI fear. Lastly, it will outline the rationale and design for the present study, including the reason for using imagery as the stimulus vehicle and certain measures as dependent variables.

Social-evaluative and Bodily-injury Fear Types

Distinctions in Terms of Presentation

Social-evaluative (SE) fear refers to a general class of fear reactions that are evoked by threats to interpersonal functioning. The critical feature is the fear of being negatively evaluated in social interaction and performance situations (Beidel et al., 1985; Watson & Friend, 1969). Although there are no accurate empirical statistics on the prevalence of this fear type in its extreme form, it has been estimated that between 20-41% of the population experience some degree of performance anxiety or discomfort in social situations (Beidel et al., 1985). Empirical studies have estimated the age of onset to be approximately between 16 and 20 years old (Liebowitz, Gorman, Fyer, & Klein, 1985; Öst, 1987).

Bodily-injury (BI) fear refers to a general class of fear reactions that are evoked by threats to physical integrity. Fears of blood, injections, injury, and illness have attracted relatively little attention in the psychological literature on fear. The prevalence rate for the extreme forms of such fears in the general adult population has been estimated at 3.1% (Agras, Sylvester, & Oliveau, 1969) and 4.5% for females (Costello, 1982). Although statistics are not available, BI fears are thought to be much more prevalent in their less extreme forms (Yule & Fernando, 1980). For example, Lapouse and Monk (1959) found that the fear of blood was present in 35% of a sample

of 482 children aged 6-12 years, as reported by their mothers. The average age of onset has been estimated to be approximately 9 years old (Öst, 1987).

Distinctions in Response Profiles on Fear Inventories

Factor-analytic studies of fear inventories consistently suggest that BI and SE themes characterize two primary fear subtypes. A pivotal study on the classification of children's fears (Miller, Barrett, Hampe, & Noble, 1972) showed the emergence of three clusters--fear of physical injury, fear of psychic distress such as embarrassment and social ineptness, and fear of natural and supernatural dangers such as lightning and ghosts. Similar factors have been reported by other investigators (Russell, 1967; Scherer & Nakamura, 1968). Although fears of natural and supernatural dangers generally diminish rapidly during childhood, the bodily-injury and social-evaluative fears often continue through most of the life span (Miller et al., 1972). Thus, it is not surprising that these two factors continue to emerge in studies of adults' fears. Although specifics vary, these two basic fear types generally appear in either large single factors or clusters of smaller factors (e. g., Braun & Reynolds, 1969; Hallam & Hafner, 1978; Kaloupek, Peterson, & Levis, 1981).

Distinctions in Physiological Response to Feared Content

Social-evaluative fear type. There are few laboratory studies on physiological arousal patterns in highly fearful

SE individuals. Borkovec, Stone, O'Brien, & Kaloupek (1974) found that heart rate was significantly higher in heterosocially-anxious males than non-heterosocially-anxious males during a social interaction with a member of the opposite sex. Schwartz & Kaloupek (1987) reported increased heart rate in speech anxious subjects during both an in vivo and an imaginal speech. Beidel et al. (1985) found that males and females with high scores on the Fear of Negative Evaluation scale (FNE; Watson & Friend, 1969) had significantly higher systolic blood pressure and heart rate increases over baseline values during an interaction task with an opposite-sex confederate and significantly higher systolic blood pressure increases during an impromptu speech task than did subjects with low FNE scores. Thus, although meager, some evidence suggests that highly fearful SE individuals generally react with increased sympathetic arousal to SE stimulus content. This pattern of sympathetic activity is what is typically found when most individuals are exposed to their feared situations. The principal exception is the somewhat aberrant pattern observed for highly fearful BI individuals during exposure to BI fear content.

Bodily-injury fear type. There appears to be a unique and seemingly paradoxical physiological response pattern with signs of increased parasympathetic activity when highly fearful BI individuals are confronted with BI stimulus content. Instead of the sympathetic increases in heart rate and blood pressure that usually accompany fear, BI

individuals often show bradycardia, decreased blood pressure, and even fainting when exposed to BI fear stimuli (Cohn, Kron, & Brady, 1976; Graham, Kabler, & Lunsford, 1961; Öst, Sterner, & Lindahl, 1984; Thyer, Himle, & Curtis, 1985; Wardle & Jarvis, 1981). Fainting, which can occur when the heart rate and blood pressure drop too low such that the brain does not receive sufficient oxygen, may be a diphasic response pattern with heart rate and blood pressure showing an initial increase followed by a rapid drop (Graham et al., 1961; Öst et al., 1984; Wardle & Jarvis, 1981). Several single-subject studies of BI subjects (Cohn et al., 1976; Curtis & Thyer, 1983; Wardle & Jarvis, 1981) and a large group study by Öst et al. (1984) seem to support this diphasic response hypothesis of vasovagal fainting even though the triggering mechanisms are unknown. However, fainting has also been reported to occur without prior sympathetic arousal (Ruetz, Johnson, Callahan, Meade, & Smith, 1967). Although the bradycardia is generally assumed to be vagally mediated (Graham et al., 1961), no studies on BI fear or fainting appear to have examined more subtle indicators of parasympathetic control such as levels of respiratory sinus arrhythmia (Grossman & Svebak, 1987; Katona & Jih, 1975; Porges, McCabe, & Yongue, 1982).

It is estimated that between 80 and 100% of BI fearful individuals have either reported fainting or have been observed to faint when exposed to BI stimuli (Öst et al., 1984; Thyer et al., 1985; Connolly et al., 1976). In

contrast, fainting is extremely rare for other fear groups. For example, only 1 of 59 other fearful patients reported fainting in their fear-relevant circumstances (Connolly et al., 1976). It is unlikely that fainting in BI situations involving blood withdrawal is caused by excessive blood loss, since it often occurs immediately following needle insertion (Graham et al., 1961; Wardle & Jarvis, 1981). Thus the fainting appears to be associated with BI fearful individuals coming into contact with BI fear stimuli.

Social-evaluative and Bodily-injury Stimulus Content

SE and BI fear contents tend to evoke certain response patterns, regardless of one's fear type. The following section explores the response patterns to SE and BI stimuli observed in subjects who were not selected with regard to their fear type. The data show that SE situations often evoke predominantly sympathetic activation not only for SE subjects but also for subjects without SE fear. BI situations or stimuli, on the other hand, evoke greater parasympathetic activation, not only for BI subjects but also for subjects without BI fear.

Social-evaluative Fear Content

SE stimuli often evoke increases in sympathetic arousal even among individuals who report little or no SE fear. For example, Beidel et al. (1985) found no difference in heart rate increases between subjects with high and low FNE scores during a speech. Similarly, Knight and Borden (1979) failed

to distinguish between the heart rate responses of speech anxious and normal subjects during a speech performance. In addition, normal subjects have been found to show increases in heart rate, skin conductance, and epinephrine to a series of psychosocial stressors with a large social-evaluative component (Sinyor, Schwartz, Peronnet, Brisson, & Seraganian, 1983). Thus limited evidence suggests that stimuli with social-evaluative content tend to evoke a predominantly sympathetic pattern of responding. It must be noted, however, that task demands required in many of these social-evaluative situations are probably responsible for some of the evoked sympathetic arousal (Obrist et al., 1978).

Bodily-injury Fear Content

Bradycardia to BI cues has been reported even among normal individuals with little or no BI fear (Carruthers & Taggart, 1973; Taggart, Hedworth-Whitty, Carruthers, & Gordon, 1976). This parasympathetic pattern has been found in response to slides of mutilated human beings (Harvey & Hirschman, 1980; Katkin, 1985; Klorman, Wiesenfeld, & Austin, 1975; Levis & Smith, 1987), films of violence (Carruthers & Taggart, 1973), dental procedures (Taggart et al., 1976), and surgical procedures (Curtis & Thyer, 1983; Öst et al., 1984).

Bradycardia in response to BI stimuli can lead to fainting among subjects unscreened for BI fear. In a sample of 378 male and female university students, approximately 13% reported having fainted or almost fainted at the sight of blood or injuries (Kleinknecht, 1987). Other studies

report that between 4 and 16% of blood donors faint or show early signs of fainting (e. g., pallor, sweating) in voluntary blood donation situations (Graham, 1961; Ruetz et al., 1967). Since these individuals are presumably not phobic (or else they would not be voluntarily giving blood), these findings suggest that normal individuals sometimes show parasympathetic activity extreme enough to result in fainting when they are exposed to BI content. Thus fainting experienced by BI individuals may not represent a unique physiological pattern but rather one that appears with relative frequency in the general population.

The Question of Coping

The view of coping ascribed to here is the cognitive-behavioral model advocated by Lazarus and his colleagues (Lazarus & Folkman, 1984). Certain features of this model warrant comment. First, coping is viewed as the manner in which individuals attempt to deal with psychologically threatening or challenging situations. Second, these situations can range from minor hassles to major life events. Third, coping involves assessment or subjective appraisal of the threat value of situations, as well as actually dealing with those situations. In terms of these three features, phobics or highly fearful individuals unrealistically and excessively appraise the threat value of their fear-relevant stimuli. Because of faulty appraisal and high anxiety levels when anticipating and/or facing aspects

of the feared situation, coping is likely to be ineffective. There is speculation, for example, that maladaptive coping (e. g., using an active behavioral rather than a passive strategy) may be a factor associated with distress and/or fainting in BI situations such as blood donation or blood sampling which do not allow the individual to escape or take effective counteraction (Kaloupek & Stoupakis, 1985; Vingerhoets, 1984). There are almost no data on coping strategies associated with either BI fear type or BI fear content. However Kaloupek and Stoupakis (1985) found that both behavioral and emotion-focused coping were associated with greater distress in a blood donation situation. Coping is obviously an area that needs to be examined in connection with both BI and SE fear types and fear contents since maladaptive coping may interact with affective and physiological responding.

The Present Study

There is a need to attempt to explore the degree to which different response patterns to SE and BI content are due to the fear type of the individual, the content of the fear stimulus, or some interaction between the two such that response patterns are intensified when the fear type of the individual and the content of the fear stimulus match. In the case of BI fear, for example, do BI subjects display an intensified version of a reaction pattern to BI stimuli which, to some extent, exists in the normal population? By

exposing BI subjects, SE subjects, and control subjects who fear neither BI nor SE stimuli to fear-relevant, fear-irrelevant, and neutral stimuli, some headway on these fundamental issues might be gained. In addition, by comparing the response patterns of BI subjects with and without a history of fainting, some clues might be found which could help account for why some BI subjects faint and others do not.

The Use of Imagery

Since most people are able to respond subjectively and physiologically to emotionally-arousing imaginal situations (Lang, 1979), imagery can be a useful vehicle for inducing emotional fear states. Additionally, several studies have shown that emphasizing cognitive, behavioral, and physiological response elements in the imagery scripts results in greater physiological arousal than relying on stimulus elements (Anderson & Borkovec, 1980; Bauer & Craighead, 1979; Lang, Kozak, Miller, Levin, & McLean, 1980; Lang et al., 1983). Imagery is especially effective in situations than cannot easily and repeatedly be duplicated in the laboratory (e. g., Lang et al., 1983). For these reasons, imagery scripts which included stimulus, cognitive, and response information were used in this study as the fear-evoking stimuli.

The Question of Dependent Variables

Since subjective reports of anxiety are usually the best discriminators between phobic and neutral images

(e. g., Marks & Huson, 1973), subjectively-rated anxiety and arousal were assessed. Because certain behavioral (e. g., direct action) and emotion-focused coping strategies have been associated with distress in blood donation situations (Kaloupek & Stoupakis, 1985), coping was assessed in terms of focus (emotion-focused, problem-focused, unfocused) and method (cognitive, behavioral, avoidant) in accordance with procedures developed by Kaloupek, White, & Wong (1984).

Physiological measures of skin conductance (level and frequency) and heart rate were assessed because they have repeatedly and consistently been found to be reliable indicators of fear. For example, imagining fearful scenes typically produces increases in heart rate and skin conductance (e. g., Connolly, 1979; Grossberg & Wilson, 1968; Marks & Huson, 1973). In addition, skin conductance and heart rate have been shown to increase progressively as subjects imagine increasingly fearful scenes (Lang, Melamed, & Hart, 1970; Van Egeren, Feather, & Hein, 1971).

Measures of vagal activity. The parasympathetic (vagal) and sympathetic branches of the autonomic nervous system interact to influence heart rate. In general, sympathetic activation increases heart rate, while parasympathetic activation produces decreases in heart rate. Each of these two controls can be selectively reduced or eliminated via pharmacological or surgical manipulations in order to examine the effects of the other kind of control (Akselrod et al., 1981; Fouad, Tarazi, Ferrario, Fighaly, & Alicandri,

1984; Katona & Jih, 1975). The drastic nature of these manipulations, however, has led to the development of several noninvasive measures to quantitatively assess parasympathetic control. Such noninvasive methodology is especially important for examining the physiological reaction pattern to BI fear stimuli, because these stimuli often elicit parasympathetically-mediated responding.

Although HR deceleration suggests increased parasympathetic (vagal) activity on the heart, it is a confounded measure of vagal activity. The quantification of heart rate variability, i. e., the change in sequential beat-to-beat intervals over time, has therefore long been used as a more accurate estimate of vagal tone, since the primary neural contribution to HR variability is through the vagus (Chess, Tam, & Calaresu, 1975). However, since heart rate variability is also influenced by other neural and extra-neural contributions to heart rate activity, it may not be the optimal measure of vagal mediation of the heart (Porges, 1984). Respiratory influence on heart rate is primarily mediated through the vagus. Therefore, the interaction between respiration and heart rate should provide better information to estimate cardiac vagal tone. Several researchers have tried to develop indices which estimate the influence of the vagus on the heart by quantifying the specific component of heart rate variability which is associated with respiration.

HR generally increases during inspiration and decreases with expiration. This rhythmic increase and decrease in HR

associated with breathing is termed respiratory sinus arrhythmia (RSA). RSA thus represents that component of heart rate variability associated with respiration. Since RSA is predominantly mediated by vagal efferents, the magnitude of RSA may therefore be used as a noninvasive means for measuring parasympathetically mediated heart rate control (Eckberg, 1983; Fouad et al., 1984; Grossman & Svebak, 1987; Katona & Jih, 1975; Porges et al., 1982). Evidence for the validity of using RSA as an index of vagal tone is provided by the high correlations (typically over .90) between changes in the magnitude of RSA and parasympathetic changes in HR induced by pharmacological manipulations, surgical procedures, and vagal neuropathological disease (see Grossman & Svebak, 1987).

There are several methods for quantifying RSA. The method used for the present study is similar to that used by Grossman & Svebak (1987). It is a time-domain procedure in which heart rate fluctuations occurring in phase with the respiratory cycle are tracked on a breath-by-breath basis. Since heart rate typically increases from expiration to inspiration, the difference between the slowest expiration-related HR and the fastest inspiration-related HR is calculated for each breath and the differences are averaged over the number of respiratory cycles for one-minute periods. Heart rate variability, using the mean successive absolute difference method, was also assessed as a measure of vagal tone. Respiration rate was assessed mainly to calculate RSA.

The present study explored the affective, coping, and physiological responding of BI, SE, and control subjects to imagery presentations with BI, SE, and neutral content. As an additional refinement, BI subjects were divided into two groups based on the presence or absence of previous fainting in response to BI cues. All subjects were administered six two-minute imagery scenes, in counterbalanced order, depicting BI content (receiving an injection; viewing surgery), SE content (interviewing for a job; speaking in public), and neutral content (a walk in the country; viewing fireworks). Dependent subjective measures included changes in anxiety and arousal between baseline and imagery periods, as well as measures of process coping and imagery quality, all collected at the ends of each scene. Dependent physiological measures included changes in skin conductance level (SCL) and responses (SCR), respiration rate, heart rate (HR), HR variability, and an estimate of RSA between baseline and imagery scenes.

Subjects were expected to report feeling most anxious and aroused to their fear-relevant imagery. In addition, based on Sarason's (1984) work showing that high anxiety interferes with task-focused thinking, subjects were expected to endorse more emotion-focused coping during their fear-relevant imagery. Although previous research suggested that heart rate would increase for all subjects during SE content and decrease during BI content, there was, in general, much uncertainty concerning the outcome for the physiological measures. The study, therefore, essentially

attempted to explore the degree to which physiological responding to SE and BI fearful material was due to the fear type of the individual, the content of the fear stimulus, their interaction, and subjects' fainting history.

METHOD

Subjects

A table with signs posted beside it was set up in the lobby of one of the main buildings of Concordia University. The signs solicited 350 males and 350 females from the university community to complete a battery of questionnaires in exchange for a chance to win one of two $100 and three $50 cash prizes. The experimenter provided interested individuals who approached the table with information about the procedure. If they agreed to participate, they signed a consent form and then immediately sat down at the table to complete the questionnaires. The battery included the Mutilation Questionnaire (MQ; Klorman et al., 1974), the Fear of Negative Evaluation Scale (FNE; Watson & Friend, 1969), and a General Information Sheet dealing with previous episodes of emotion-related fainting and/or dizziness, health problems, and medication use (Appendix A). An additional form requested subjects to indicate whether they wished to be contacted to participate in future studies.

From this initial screening sample, within-sex distributions on the MQ and FNE were used to select potential subjects for the experiment proper according to the criteria listed below. The compliance rate for those individuals who were contacted was over 80%. The final sample contained 12 male and 12 female subjects, 18-48 years (M = 26), in each of the following categories:

(1) The first category of subjects had high scores on the MQ, low to moderate scores on the FNE, and a history of fainting. This group is designated as "BI-Faint".

(2) The second category of subjects had high scores on the MQ, low to moderate scores on the FNE, and no history of fainting. This group is designated as "BI-No faint".

(3) The third category of subjects had high scores on the FNE, low to moderate scores on the MQ, and no history of fainting. This group is designated as "SE".

(4) The fourth category of subjects had low scores on the MQ, low scores on the FNE, and no history of fainting. This group is designated as "Low-fear".

An attempt was made to include subjects who scored high on their fear-relevant questionnaire and not high on their fear-irrelevant questionnaire in order to ensure distinctness of the groups in terms of reported levels of BI and SE fear.

BI subjects had mean MQ scores above the 85th percentile and mean FNE scores below the 40th percentile. SE subjects had mean FNE scores above the 85th percentile and mean MQ scores below the 30th percentile. Low-fear subjects had mean MQ and mean FNE scores below the 15th percentile. All subjects selected reported no major health problems or use of medication. Subjects received $10 for their participation.

The BI-Faint group had a mean MQ score of 18.8 (minimum = 15; maximum = 25) and a mean FNE score of 8.4 (minimum = 1; maximum = 15). The BI-No faint group had a mean MQ score

of 16.8 (minimum = 13; maximum = 24) and a mean FNE score of 11.2 (minimum = 4; maximum =21). The SE group had a mean MQ score of 5.1 (minimum = 2; maximum = 9) and a mean FNE score of 24.1 (minimum = 20; maximum =29). The Low-fear group had a mean MQ score of 3,5 (minimum = 2; maximum = 5) and a mean FNE score of 3.0 (minimum = 1; maximum =6).

Apparatus and Stimuli

The experiment was conducted in two adjoining temperature and humidity regulated rooms with a one-way mirror in the common wall of the two rooms. The experimental room contained a reclining armchair, headphones, a microphone, an intercom, and connectors for the physiological transducers. The control room contained a Coulbourn Model S16-17 recorder interfaced to an IBM-PC, a Lafayette Instruments (Model 76101) polygraph, and two tape recorders.

Heart rate (HR) was recorded using Medi-Trace silver-silver chloride ECG electrodes that were placed on the subject's outer calves at the base of the gastrocnemius muscle and below the left collarbone. The signal was processed through a Coulbourn Model S75-01 high gain bioamplifier and Model S77-26 cardiotachometer. Skin conductance was recorded via Beckman standard silver-silver chloride electrodes (#650951; 16 mm diameter), filled with Unibase creme (Parke-Davis) that had been prepared following the recommendations of Fowles et al. (1981). The electrodes

were attached by adhesive collars at adjacent sites on the hypothenar eminence of the non-dominant hand. The signal was processed by a Coulbourn Model S71-22 constant voltage (0.5 V.) skin conductance coupler. Respiration was recorded using a bead thermistor (Yellow Springs Instruments #44033) positioned in an outlet hole of a plastic face mask. The signal was processed by a Coulbourn Model S71-30 temperature coupler.

The analog outputs from the Coulbourn tachometer, skin conductance coupler, and temperature coupler were fed directly into a Coulbourn Lablinc A-D converter which was interfaced with the IBM-PC. A Coulbourn "Labtech Notebook" software package permitted menu-driven sampling of these analog outputs at predetermined intervals. In order to check that the physiological measures were being properly recorded, all physiological data was graphically displayed on-line on the IBM-PC monitor. In addition, a permanent record of HR was generated on the polygraph.

Six 2 1/2-min imagery scenes, two representing neutral content (walking in the country, viewing fireworks from a balcony), two representing BI fear content (receiving an injection, viewing an operation), and two representing SE fear content (going for a job interview, watching a student deliver a speech) were developed (Appendix D). For the purpose of providing greater diversity of stimulus material (and hence greater generalizability), the first scene from each content area involved events which happened directly to the subjects, while the second involved the subjects viewing

the events. The scenes were audiotaped by a female radio announcer.

The content of the emotionally neutral scenes described mild activities such as walking and watching fireworks from a distance. The content of the fear scenes was a less intense version of material that might be used during imaginal exposure procedures such as Flooding or Implosive Therapy. It described situations in which subjects were confronted with either BI- or SE-related fear cues from the first three categories described by Levis and Hare (1977). The content of both neutral and fear scenes included, in alternating fashion, sentences concerned with stimuli (e. g., seeing the surgeon making an incision), cognitions (e. g., thinking about them doing that to you), and responses (e. g., feeling anxious and queasy).

Design

The study was a 4 (Group) x 2 (Sex) x 3 (Content) x 2 (Imagery Scene) design with group and sex as between-group factors, and content and imagery scene as within-subject factors. The four groups were BI-Faint, BI-No faint, SE, and Low-fear. The content factor included neutral, BI, and SE content. Each content area was represented by two imagery scenes. Thus, each subject received six counterbalanced imagery scenes, two representing each of the three content areas.

Procedure

The experiment was conducted on an individual basis by a female and a male experimenter, each of whom tested half the female and half the male subjects in each group. Potential subjects, whose names were obtained from the original screening sample, were telephoned and provided basic introductory information in accordance with a standardized contact statement (Appendix B). They were informed that they would receive $2 if they chose not to participate after receiving more details about the study and $10 if they agreed to participate, regardless of whether they completed all procedures. Interested individuals were scheduled for laboratory appointments and asked to refrain from drinking alcoholic or caffeine-containing beverages for two hours prior to their appointment.

Upon arrival at the laboratory, subjects were provided a consent form (Appendix B) which summarized the procedure. It explained that all information gathered would remain confidential and that they were free to withdraw from the experiment at any point without forfeiting payment. It also contained three questions to confirm subjects' comprehension of the information provided. Two forms were then administered to screen for gross errors in subject classification. First, a Research Participant Form (Appendix B) reassessed health problems, medication use, and prior episodes and/or evidence suggestive of emotion-related fainting. Second, a shortened version of Marks and Mathews

(1979) Fear Questionnaire (Appendix B), which includes three factors for blood-injury phobia, social anxiety, and agoraphobia, was used to verify that subjects were placed in the appropriate fear group. Subjects next completed the Absorption Scale of the Tellegen Differential Personality Questionnaire (DPQ:Ab; Tellegen & Atkinson, 1974) to assess their potential for becoming involved in the imagery scenes (Appendix B).

After subjects had been seated in the semi-reclined arm chair with heart rate, skin conductance, and respiration transducers attached, they were handed a clipboard holding a packet of rating sheets (Appendix C). The sheet administered following the baseline period contained three 100-mm scales that assessed perceived anxiety, physiological arousal, and discomfort. Those administered following the imagery scenes contained an additional two 100-mm scales that assessed vividness (or clarity) of the imagery scene and the degree of involvement in the scene. Subjects were provided with instructions for completing these sheets. It was emphasized that "physiological arousal" could consist of feelings of increased heart rate, rapid breathing, muscular tension, stomach sensations, etc., experienced either singly or in various combinations. Subjects were to rate their physiological arousal with reference to the system or systems that seemed most prominent to them. Subjects were then informed that, following each imagery scene, they would be asked to verbalize any thoughts that they had experienced

during the scene. These were recorded for later transcription and coding into coping categories.

Headphones were then attached through which subsequent recorded instructions and imagery scenes were communicated (Appendix D). A 10-min baseline period followed, during which subjects were instructed to relax with their eyes open. Subjects then rated the anxiety, physiological arousal, and discomfort that they had experienced during the last minute of the baseline period. Detailed instructions, and a 30-sec practice scene of neutral imagery were presented next. This was followed by practice with verbalizing their thoughts and the self-rating measures.

Subjects were then tested on their physiological and subjective responses to the six audiotaped imagery scenes. The six scenes were presented to subjects in two blocks. Each block contained one scene from each of the three content areas. Block 1, which included scenes describing events which happened directly to subjects, contained the first neutral (walk), BI (injection) and SE (job interview) scenes; block 2, which included scenes in which the subjects viewed events, contained the second neutral (fireworks), BI (operation), and SE (speech) scenes. Within each block, the neutral scene was always presented first, followed by the two fear scenes in counterbalanced fashion. In addition, the two blocks themselves were counterbalanced. This method of counterbalancing, performed separately for the 12 males and 12 females in each of the four groups, resulted in four scene orders. The first and fourth scenes presented in the

series were always emotionally neutral in content. Subjects receiving a BI scene second and an SE scene third always received an SE scene fifth and a BI scene sixth, and vice versa.

The presentation of each of the six imagery scenes included the following: (1) a 2 1/2-min rest period (with subjects' eyes open); (2) a 2 1/2-min period during which the scene was delivered to and imagined by the subjects (with their eyes closed); (3) a 30-sec period during which subjects verbalized their thoughts from the preceding imagery scene, and (4) an untimed period (maximum 1 min) during which subjects rated their responses to the imagery scene. After all imagery testing was completed and headphones and transducers had been removed, subjects were provided information about the purpose of the experiment and the reason for their selection.

Measures

Five preliminary measures were administered prior to the imagery testing. The MQ and FNE were the screening measures upon which group designations were based. The blood-injury and social anxiety factors from the Marks and Mathews Fear Questionnaire were used to check for gross errors in subject classification. The Absorption scale assessed subjects' ability to become absorbed in events.

All the remaining affective, coping, and physiological measures were assessed during the imagery testing procedure.

The three affective measures were self-reported anxiety, physiological arousal, and discomfort. There were six coping indices, three concerned with the focus of coping (emotion, problem, unfocused) and three concerned with the method of coping (cognitive, behavioral, avoidant). The six physiological measures were skin conductance level, skin conductance response frequency, respiration rate, heart rate, heart rate variability, and an estimate of respiratory sinus arrhythmia.

Preliminary Measures

The MQ (Klorman et al., 1974), administered during questionnaire screening prior to the laboratory session, contains 30 true-false items relating to fears of blood, injury, and medical procedures. Scores could range from 0 to 30, with higher scores indicating greater fear. The FNE (Watson & Friend, 1969), also administered during questionnaire screening, contains 30 true-false items relating to fear of negative social evaluation. Scores could range from 0 to 30, with higher scores reflecting greater fear.

Items 2-16 from The Fear Questionnaire (Marks & Mathews, 1979), administered prior to the imagery testing, required individuals to rate on 9-point scales how much they would avoid 15 activities. These items represent a fear survey schedule comprising three phobia factors (blood-injury phobia, social anxiety, and agoraphobia), each represented by five items. Scores on each factor could range

from 0 to 40, with higher scores indicating greater fear in terms of avoidance.

The Absorption Scale of the Tellegen DPQ (Tellegen & Atkinson, 1974), administered prior to the imagery testing, consists of 34 true-false items that tap everyday experiences that are believed to be related to the appreciation and involvement in fantasy, new experiences, and other "absorbing" events. All true answers to the questionnaire are summed, yielding a range of possible scores from 0 to 34 with higher scores indicating greater absorption.

Dependent Measures Assessed During the Imagery Testing

Affective Measures. Three 100-mm scales, presented as horizontal lines anchored with "none" and "extreme" at either end, were administered following the baseline period and each imagery scene to assess perceived anxiety, physiological arousal, and discomfort during the last minute of the baseline and during each imagery scene. An additional two 100-mm scales, administered following the imagery scenes, assessed vividness (or clarity) of each imagery scene and degree of involvement in the scene. Subjects were instructed to draw a vertical line through each scale at the point that best described their responses. Scores were obtained by measuring the distance (in mm) between the beginning of the line and the vertical line drawn by the subject.

Coping Measures. Quantification of coping followed procedures developed by Kaloupek et al. (1984). Each

recorded 30-sec verbal sample obtained following each imagery scene was first transcribed verbatim. These samples were then classified according to focus (emotion, problem, or unfocused) and method (cognitive, behavioral, or avoidant) of coping by a set of three trained raters who were blind to group classification of subjects. The judgments of the three raters were then compared to determine the level of agreement. If at least two raters agreed on a particular classification, it was adopted. If there was complete disagreement as to classification, the three raters discussed the sample and arrived at a consensus. The classification of coping responses with regard to focus resulted in 62% with total agreement, 37% with two agreements, and 1% with no initial agreement. The classification with regard to method resulted in 48% with total agreement, 47% with two agreements, and 5% with no initial agreement. Thus 99% and 95% of the respective classifications for focus and method of coping were based on initial scoring.

Physiological Measures. All physiological measures are based on 1-min periods. They were assessed for the last minute of the baseline period and for the first and last minutes of each 2 1/2-min imagery scene. The values obtained for the first and last minutes of each scene were averaged. Skin conductance level (SCL) was the average of 12 minimum conductance values from consecutive 5-sec segments. Skin conductance response (SCR) frequency was the number of upward deviations in values which occurred at a rate of at

least 0.1 micromhos per sec with a peak value achieved within a maximum of 5 sec. Respiration rate was the number of complete respiratory cycles. It was calculated by tracking successive peak (end of expiration) and trough (end of inspiration) points and adding one half cycle to this value in recognition that the first identified peak or trough cannot be counted as a full cycle.

Heart rate (HR) was the number of heart beats recorded in each period. HR variability was calculated in terms of the mean successive absolute difference between cardiotach values sampled at 1-sec intervals (i. e., every fifth sample). Higher values generally indicate greater parasympathetic activation. To further examine parasympathetic influences on the heart, a noninvasive estimate of respiratory sinus arrhythmia (RSA), similar to that used by Grossman and Svebak (1987), was based on the difference between the fastest HR during each inspiratory cycle and the slowest HR during each expiratory cycle. This difference was calculated in msec for consistency with the existing literature. Higher values indicate greater parasympathetic activation.

Data Reduction

A Coulbourn "Labtech Notebook" menu-driven software program sampled the output of the A-D Coulbourn Lablinc converter at 5 Hz (5 samples per sec) and stored the data in disk files. Separate files were created for HR, skin

conductance, and respiration data for each of the minute intervals sampled. The stored data were later scored off-line using four Lotus 1-2-3 worksheets specifically designed for this experiment. The first worksheet scored SCL and SCR using data imported from the skin conductance files. The second scored respiration rate using data imported from the respiration files. The third scored HR and HR variability using data imported from the HR files. The last worksheet scored RSA using data imported from both respiration and HR files. The scored values were printed out and then entered into a mainframe computer on which the data were subsequently analyzed using BMDP statistical software.

RESULTS

The following overall strategy was used for the data analysis. Since group designations had been based on subjects' relative scores on the MQ and FNE screening measures, it was important to verify that the groups were distinct. Separate one-way ANOVAs were therefore first conducted on these measures. Distinctness of the groups in terms of MQ and FNE scores was an important prerequisite to adequately explore the extent to which different response patterns to BI and SE stimuli were due to the fear type of the individual, the content of the fear stimulus, or some interaction between them. Separate one-way ANOVAs were also conducted on the blood-injury phobia and social anxiety factor scores (Marks & Mathews, 1979) to further substantiate the distinctness of the groups in terms of BI and SE fear. On the other hand, since the nature of the experiment required subjects to become absorbed in imagery tasks, it was important to verify that the groups were similar in their absorption capacities. A one-way ANOVA was therefore conducted on the absorption scale measure. Similar absorption scores for the groups would suggest that any differential response patterns found were not attributable to differences in subjects' capacity for becoming absorbed in the imagery tasks.

The main analysis focused upon measures that were associated with the presentation of the six imagery scenes. First, separate 4 x 2 x 3 x 2 (Group x Sex x Content x

Imagery Scene) ANOVAs with repeated measures on the last two factors were conducted on the imagery measures of vividness and involvement which were assessed at the ends of each scene presentation. Second, the same four-factor ANOVAs were conducted on the affective measures of anxiety, arousal, and discomfort, also assessed at the ends of each scene presentation. Third, chi-square analyses were applied to the coping variables for each scene to assess group differences in coping. Fourth, 4 x 2 x 3 x 2 (Group x Sex x Content x Imagery Scene) ANOVAs with repeated measures on the last two factors were conducted on the physiological measures of SCL, SCR, respiration rate, HR, HR variability, and RSA. All ANOVAs for the imagery, affective, and physiological measures had the repeated measures content factor with three levels (Neutral, BI, and SE content). Therefore, the significance values for the content main effects and any interactions involving content were modified by applying the Greenhouse-Geisser correction (Greenhouse & Geisser, 1959; Vasey & Thayer, 1987).

Preliminary Screening and Absorption Measures

Separate one-way ANOVAs were conducted on the MQ and FNE screening variables to verify that the fear groups were distinct in terms of reported levels of BI and SE fear. Both analyses revealed significant group differences with $F(3, 92)$ values of 152.68 for the MQ and 119.36 for the FNE (both $p < .001$). Follow-up Scheffé tests on the MQ measure indicated that both the BI-Faint ($M = 18.8$) and the BI-No

faint (M = 16.8) groups had higher scores than did either the SE (M = 5.1) or Low-fear (M = 3.5) groups ($p < .01$). Follow-up Scheffé tests on the FNE measure indicated that the SE group (M = 24.1) had higher scores than did the BI-Faint (M = 8.4), BI-No faint (M = 11.2), and Low-fear (M = 3.0) groups ($p < .01$). A nonsignificant Pearson product-moment correlation between the MQ and FNE scores, $r(94) = -.11$, $p = .30$ provided further support for the independence of the two fear types in the present sample.

Separate one-way ANOVAs were also conducted on the blood-injury phobia and social anxiety factor scores from Marks and Mathews Fear Questionnaire (1979). Both analyses similarly revealed significant group differences with $F(3, 92)$ values of 13.39 for the blood-injury phobia factor and 8.91 for the social anxiety factor. Follow-up Scheffé tests on the blood-injury phobia factor indicated that the BI-Faint group (M = 16.5) had higher scores than did the BI-No faint (M = 12.0), SE (M = 8.8), and Low-fear (M = 6.3) groups. The BI-No faint group had higher scores than did the Low-fear group ($p < .01$). Follow-up Scheffé tests on the social anxiety factor indicated that the SE group (M = 11.4) had higher scores than did either the BI-Faint (M = 7.4) or Low-fear (M = 5.0) groups ($p < .05$), but not the BI-No faint group (M = 10.1). The finding that these two measures did not distinguish between the groups to the same extent as did the MQ and FNE measures is attributable to the fact that subjects were assigned to groups on the basis of their relative MQ and FNE scores. Significant Pearson product-

moment correlations between the MQ and blood-injury phobia factor scores, $r(94) = .57$, $p < .01$, and between the FNE and social anxiety factor scores, $r(94) = .45$, $p < .01$ suggest that the MQ and blood-injury scores are measuring both overlapping and distinct components of the BI fear construct, with a similar phenomenon occurring for the SE fear construct.

A one-way ANOVA was conducted on the preliminary absorption scale measure to check whether the groups were comparable in their capacity to become absorbed in events. No significant group differences emerged from this analysis. The mean absorption scale score for the whole sample was 18.6 out of a possible maximum of 34.

Main Analysis

Imagery Measures

Separate 4 x 2 x 3 x 2 (Group x Sex x Content x Imagery Scene) ANOVAs were conducted on the imagery vividness and involvement measures which were assessed on rating scales which ranged from "1" to "100". ANOVA on imagery vividness yielded no significant main effects or interactions. The mean vividness rating for all groups for all imagery scenes was 62. ANOVA on imagery involvement yielded a significant content effect, $F(2, 176) = 4.18$, $p < .05$. Follow-up Scheffé tests indicated that subjects reported feeling more involved in the neutral scenes ($M = 57.8$) than they did in either the BI ($M = 52.1$) or SE ($M = 52.9$) fear scenes ($p < .05$). The

lack of between-group differences for the imagery measures suggests that any differences in affective, coping, and physiological response patterns were not attributable to group differences in imagery vividness or involvement.

Affective Measures

The results from the analyses on the discomfort measure essentially paralleled those seen for the anxiety and arousal measures and will therefore not be presented. Separate 4 x 2 (Group x Sex) ANOVAs conducted on the anxiety and arousal measures for the baseline period revealed no significant main or interaction effects. The mean baseline scores for the whole sample were 13.4 for anxiety and 10.8 for arousal. Separate 4 x 2 x 3 x 2 (Group x Sex x Content x Imagery Scene) ANOVAs were conducted on the anxiety and arousal change scores derived by subtracting baseline values from the values obtained for each imagery scene. Both analyses revealed content effects with $F(2, 176)$ equal to 53.49 for anxiety and 30.35 for arousal (both $p < .001$) and Content x Group interactions with $F(6, 176)$ equal to 3.89 for anxiety and 3.50 for arousal (both $p < .01$).

Figure 1 presents histograms of the group mean change scores, collapsed across sex and imagery scene, for anxiety (upper panel) and arousal (lower panel) for the neutral, BI, and SE contents. In these histograms, the change scores are represented along the vertical axes and the four fear groups, each with three rectangles depicting neutral, BI, and SE content, are represented along the horizontal axes.

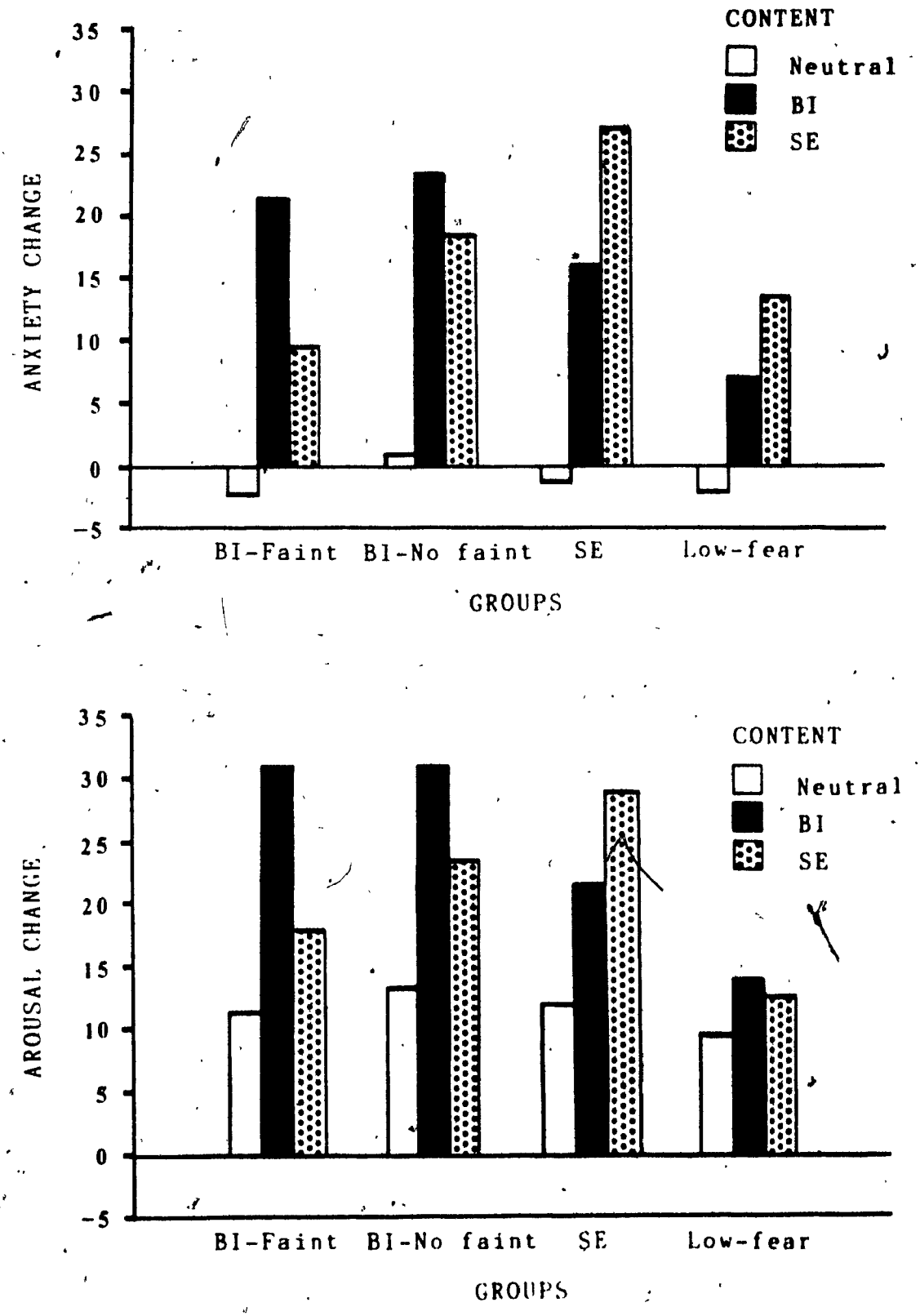

Figure 1. Mean anxiety (upper panel) and arousal (lower panel) change scores, collapsed across sex and imagery scene, for the four groups for neutral, BI, and SE content.

Follow-up Scheffé tests indicated that the effect of content was due to subjects reporting greater increases in anxiety and arousal to BI and SE fearful imagery than to nonfearful imagery ($p < .01$). The Content x Group interactions reflect the fact that the groups responded differently to BI and SE imagery content, with subjects showing their greatest responding to their fear-relevant imagery. Tests for simple effects revealed that both the BI-Faint and the BI-No faint groups, but not the SE group, reported greater increases in anxiety and arousal during BI fear content than did Low-fear subjects. In contrast, the SE group, but not the BI-Faint or BI-No faint groups, reported greater increases in anxiety and arousal during SE content than did Low-fear subjects. In addition, SE subjects reported greater increases in anxiety during SE content than did BI-Faint subjects ($p < .05$). Thus, greatest affective responding was observed when subject fear type and fear content matched.

Both ANOVAs also revealed significant imagery scene effects with $F(1, 88)$ equal to 6.89 for anxiety and 6.28 for arousal (both $p < .05$). Subjects reported feeling more anxious and aroused during scenes in which they were portrayed as observers watching events (Ms = 12.5 for anxiety and 20.6 for arousal) rather than during scenes in which they were portrayed as being active participants in events (Ms = 9.6 for anxiety and 16.9 for arousal).

Coping Measures

The classification of coping responses yielded, for

each subject, one endorsement for focus of coping (either emotion-focused, problem-focused, or unfocused) and one endorsement for method of coping (either cognitive, behavioral, or avoidant) for each scene. Because each of these discrete coping variables was expressed in terms of the number of individuals in each group who endorsed it, chi-square analyses were conducted to determine group differences for each coping variable. Since preliminary chi-square analyses revealed no appreciable differences in any coping variable between the two BI groups, they were collapsed into one group and chi-square analyses were then performed on the resulting 3 (Group: BI, SE, Low-fear) x 2 (Endorsement: yes, no) contingency tables. Data from 94 subjects for the neutral scenes and 95 subjects for the fear scenes were used due to tape-recorder malfunction. Significant overall chi-square analyses were followed up by 2 x 2 analyses to determine the source of the difference. In addition, if it appeared that important group differences were being masked by a marginally significant overall analysis, a 2 x 2 analysis was carried out on the groups in question. The results of the analyses on the focus of coping indices will be presented first, followed by the results of the analyses on the method of coping indices.

Focus of Coping. Emotion-focused coping was endorsed by 29% of subjects during neutral scenes, 44% of subjects during BI scenes, and 51% of subjects during SE scenes. Problem-focused coping was endorsed by 65% of subjects

during neutral scenes, 48% of subjects during BI scenes, and 45% of subjects during SE scenes. Unfocused coping was endorsed by 6% of subjects during neutral scenes, 8% of subjects during BI scenes, and 4% of subjects during SE scenes. Because there was meager endorsement of unfocused coping, with an average of 6% of the subjects endorsing this focus of coping across scenes, no analyses were conducted on this measure.

The most striking findings concerned the emotion-focused coping index during the fear scenes. No significant differences in this index emerged for either of the neutral scenes. Table 1 displays the 3 x 2 contingency tables which contain the percentages of subjects in each of the three groups who endorsed or did not endorse emotion-focused coping during the Injection, Operation, Speech, and Job Interview scenes. The overall analyses for both BI scenes were significant with $\chi^2(2, \underline{N} = 95)$ equal to 7.5 for the Injection scene and 8.0 for the Operation scene (both $\underline{p} < .05$). Follow-up 2 x 2 analyses revealed that BI subjects endorsed more emotion-focused coping during the Injection scene than did Low-fear subjects, $\chi^2(1, \underline{N} = 71) = 6.8$, $\underline{p} < .01$. BI subjects also endorsed more emotion-focused coping during the Operation scene than did both Low-fear subjects, $\chi^2(1, \underline{N} = 71) = 6.7$, $\underline{p} < .01$ and SE subjects, $\chi^2(1, \underline{N} = 71) = 3.7$, $\underline{p} = .05$. The overall analyses on the SE scenes were not significant. A 2 x 2 analysis on the Speech scene, however, revealed that SE subjects endorsed more emotion-focused

Table 1

Percent Endorsement of Emotion-Focused Coping for the Bodily-Injury and Social-Evaluative Scenes

BODILY-INJURY SCENES

Injection

ENDORSED	GROUP BI	SE	Low-fear
Yes	53 ★	33	21 ★
No	47	67	79

Operation

ENDORSED	GROUP BI	SE	Low-fear
Yes	62 ★ ●	37 ●	29 ★
No	38	63	71

SOCIAL-EVALUATIVE SCENES

Speech

ENDORSED	GROUP BI	SE	Low-fear
Yes	43 ●	67 ●	50
No	57	33	50

Job Interview

ENDORSED	GROUP BI	SE	Low-fear
Yes	49	67	46
No	51	33	54

Note. Stars (★) indicate significant differences between BI and Low-fear groups. Circles (●) indicate significant differences between BI and SE groups.

coping than did BI subjects, $\chi^2(1, N = 71) = 3.7,, p = .05$. There were no significant differences for the Job Interview scene. However, from visual inspection of the contingency table, the percentage of SE subjects endorsing emotion-focused coping was higher than that for the other two groups. Thus subjects tended to endorse emotion-focused coping when imagining their fear-relevant scene content to which they also reported being more anxious and aroused. This was most evident for BI subjects during exposure to BI imagery content. Because there were only a few endorsements of unfocused coping, the group differences for the problem-focused coping index were generally the converse seen for the emotion-focused index and will therefore not be presented.

Method of Coping. The cognitive method was endorsed by 30% of subjects during neutral scenes, 31% of subjects during BI scenes, and 34% of subjects during SE scenes. The behavioral method was endorsed by 63% of subjects during neutral scenes, 42% of subjects during BI scenes, and 51% of subjects during SE scenes. The avoidant method was endorsed by 7% of subjects during neutral scenes, 27% of subjects during BI scenes, and 15% of subjects during SE scenes. The only significant difference which emerged from the analyses on the method of coping variables concerned avoidant coping during the Fireworks scene. However, because there were only eight endorsements of avoidant coping during this scene, the data are uninterpretable and will therefore not be presented.

Although BI-Faint and BI-No faint subjects did not differ in any coping index, maladaptive coping may be involved in fainting during exposure to BI situations such as blood donation and injections where individuals are physically confined. Therefore, 2 (Group: BI-Faint, BI-No faint) x 2 (Endorsement: yes, no) chi-square analyses were performed on the coping variables, separately for males and for females, to investigate group differences in coping that could provide any clue as to why some BI individuals faint and others do not when exposed to BI situations. These analyses revealed that significantly more BI-Faint males (58%) than BI-No faint males (17%) endorsed a behavioral method of coping during the Injection scene, $\chi^2(1, \underline{N} = 24) = 4.4$, $\underline{p} < .05$. Although the imagery procedure was sufficiently mild and brief to prevent fainting, the Injection scene nonetheless described a real-life situation where fainting is common. This suggests that a behavioral strategy may be maladaptive in certain BI situations which require passivity. However, the finding that 42% of the entire sample endorsed behavioral coping during BI scenes suggests that BI-No faint rather than BI-Faint males are showing an aberrant pattern in terms of less frequent endorsement of behavioral coping during the Injection scene. It is therefore possible that employing a behavioral strategy in BI situations may only be maladaptive for subjects with high BI fear. There were no other differences in coping between BI-Faint and BI-No faint subjects, either for males or for females.

Physiological Measures

Due to equipment malfunction and/or recording artifact, certain subjects had to be eliminated from the data analysis. A subject was eliminated if there were no usable data for either the baseline period or for both minutes of any imagery scene. Data were thus unavailable for 1 subject (from the SE group) for SCL and SCR, 4 subjects (1 from the BI-Faint, 2 from the BI-No faint, and 1 from the SE groups) for respiration rate, 17 subjects (5 from the BI-Faint, 5 from the BI-No faint, 3 from the SE, and 4 from the Low-fear groups) for HR and HR variability, and 20 subjects (6 from the BI-Faint, 6 from the BI-No faint, 4 from the SE, and 4 from the Low-fear groups) for RSA. This left a total of 95 subjects for SCL and SCR, 92 subjects for respiration rate, 79 subjects for HR and HR variability, and 76 subjects for RSA.

For descriptive purposes and as an overview of the experimental design, the group means for one untransformed measure, HR, are presented in Figure 2. This figure sequentially shows the HR values for the baseline period and for the six imagery scenes, two representing neutral content (Walk, Fireworks), two representing BI content (Injection, Operation), and two representing SE content (Job Interview, Speech). This figure can serve as a reference for the interpretation of main effects and interactions.

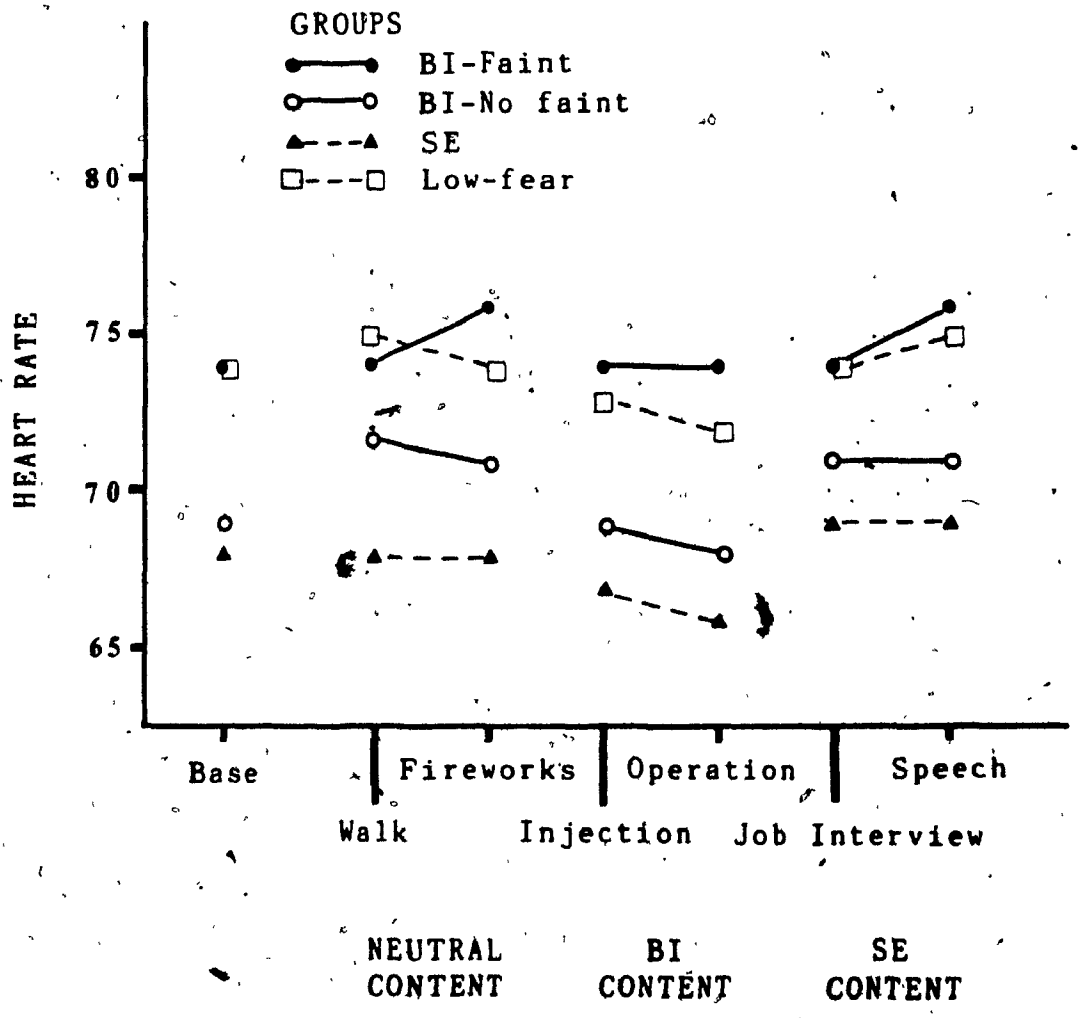

Figure 2. Mean untransformed HR scores for the four groups for the baseline period and for each of the six imagery scenes, two representing neutral content (Walk, Fireworks), two representing BI content (Injection, Operation), and two representing SE content (Job Interview, Speech).

Separate 4 x 2 (Group x Sex) ANOVAs were conducted on the SCL, SCR, respiration rate, HR, HR variability, and RSA measures for the baseline period. These analyses revealed only a significant effect of sex for SCL, $F(1, 87) = 4.37$, $p < .05$, with males showing greater values. The mean baseline scores for the whole sample were 1.5 micromhos for SCL, 0.7 responses for SCR, 13.2 cycles for respiration rate, 71.2 beats per minute for HR, 3.4 beats per minute for HR variability, and 147.8 msec for RSA. Separate 4 x 2 x 3 x 2 (Group x Sex x Content x Imagery Scene) ANOVAs were then conducted on the SCL, SCR, respiration rate, HR, HR variability, and RSA change scores derived by subtracting baseline values from the values obtained for each imagery scene.

The most striking findings for the physiological measures were not only the paucity of fear group differences for any imagery scene but also the importance for all groups of the content of the imagery in producing differential responding. Thus, unlike the findings for the affective and coping measures where subjects were most responsive to their fear-relevant imagery, there were only few differences as a function of fear relevance for the physiological measures.

The finding which emerged most consistently was that the content of the fear imagery produced differential responding. Significant content effects were found for SCR, $F(2, 174) = 7.30$, $p < .01$, HR, $F(2, 142) = 30.17$, $p < .001$, and RSA, $F(2, 136) = 4.38$, $p < .05$. Figure 3 presents histograms of the mean change scores, collapsed across

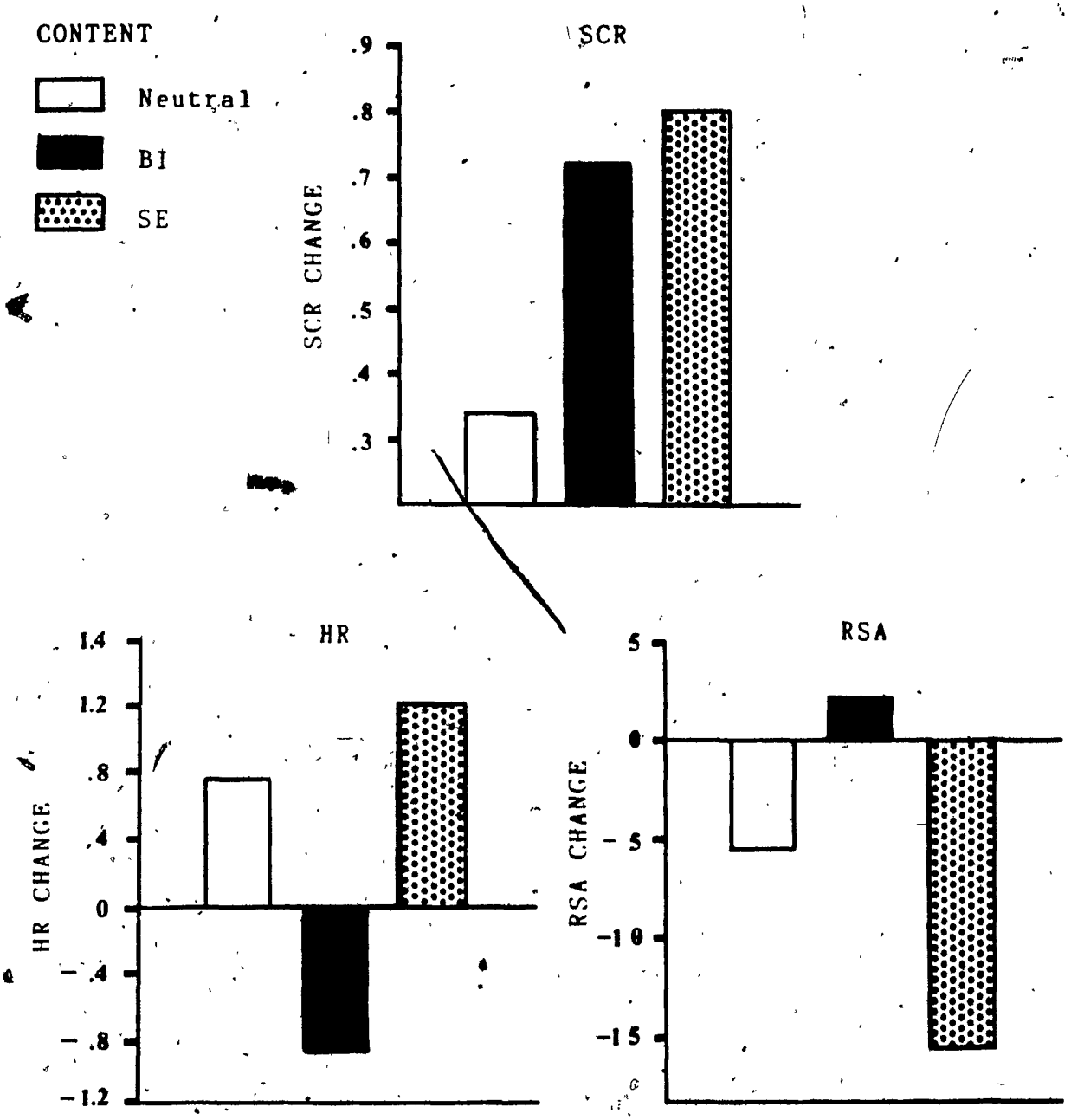

Figure 3. Mean SCR, HR, and RSA change scores, collapsed across group, sex, and imagery scene, for neutral, BI, and SE content.

group, sex, and imagery scene, for SCR, HR, and RSA during neutral, BI, and SE imagery content. In these histograms, the change scores are represented along the vertical axes and the three rectangles depicting neutral, BI, and SE content are represented along the horizontal axes. Follow-up Scheffé tests on the SCR measure indicated that the effect of content was due to subjects showing greater increases during both BI and SE fear scenes than during neutral scenes ($p < .01$). However, no significant difference was found between BI and SE content. The same pattern occurred for SCL, but the effect of content failed to reach significance ($p < .10$). This pattern suggests a sympathetic influence on the skin conductance measures during both BI and SE fear content. A superimposed Content x Imagery Scene interaction for SCR, $F(2, 174) = 5.02$, $p < .01$ showed that SCR increased most to the BI Injection scene ($M = .9$) and to the SE Speech scene ($M = 1.0$).

A different pattern was evident for both the HR and RSA measures. Subjects showed decreases in HR below baseline values during BI fear scenes, but increases during neutral and SE scenes. Follow-up Scheffé tests indicated that heart rate values were significantly lower during BI scenes than during both neutral and SE scenes ($p < .01$) but that there was no appreciable difference between neutral and SE content. A superimposed Content x Imagery Scene interaction, $F(2, 142) = 3.86$, $p < .05$ showed that HR increased most during the SE Speech scene ($M = 1.5$) and decreased most

during the BI Operation scene (M = -1.1). Subjects also showed increases in RSA above baseline values during BI fear scenes but decreases during neutral and SE scenes. Follow-up Scheffé tests indicated that RSA values were significantly higher during BI scenes than during SE scenes ($p < .01$). There were no appreciable RSA differences, however, between neutral and either BI or SE content. These findings of decreased HR and increased RSA during BI content suggest that there is an increase in parasympathetic influence on the heart during exposure to BI content.

Although no significant group effect emerged from any of the analyses performed on the physiological measures, there were three interactions, two for HR variability and one for RSA, involving the group factor. ANOVA on HR variability yielded a significant Content x Group interaction, $F(6, 142) = 2.70$, $p < .05$. Figure 4 presents a histogram of this interaction, with the group mean change scores, collapsed across sex and imagery scene, for the neutral, BI, and SE contents. The change scores are represented along the vertical axis and the four fear groups, each with three rectangles depicting neutral, BI, and SE content, are represented along the horizontal axis. Although none of the follow-up between-group comparisons of the interaction reached the .05 level of significance, inspection of the histogram shows very different response patterns which may have implications for understanding why some BI individuals faint and others do not faint during exposure to BI content.

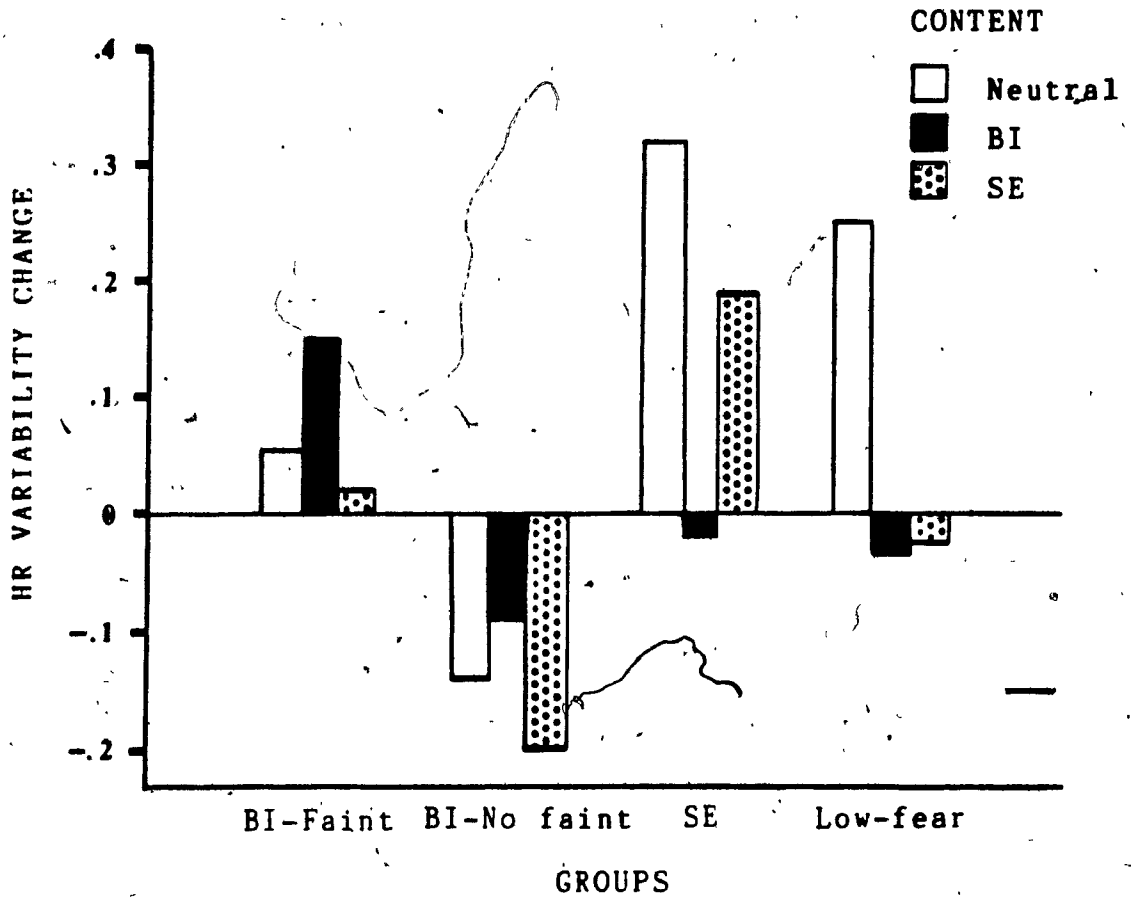

Figure 4. Mean HR variability change scores, collapsed across sex and imagery scene, for the four groups for neutal, BI, and SE content.

It can be seen from the histogram that only the BI-Faint group showed an increase in HR variability to BI fear content, while all the other groups showed decreases. The BI-No faint group, in particular, showed the largest decrease. Furthermore, the BI-No faint group was the only group which showed consistent HR variability decreases during exposure to all three imagery contents, suggesting a general response style of decreased HR variability to imaginal situations. The increase in HR variability for BI-Faint subjects during exposure to BI content suggests increased parasympathetic influence on the heart which could conceivably contribute to fainting, provided that these findings have relevance for in vivo BI situations. On the other hand, the decrease in HR variability for BI-No faint subjects to BI and other contents suggests decreased parasympathetic influence which might play a role in protecting them from fainting.

A significant Imagery Scene x Group x Sex interaction, $F(3, 71) = 3.12$, $p < .05$ also emerged from ANOVA on HR variability. In order to determine the source of this interaction, separate 4 x 2 (Group x Imagery Scene) ANOVAs were performed for males and females. ANOVA for males yielded an Imagery Scene x Group interaction, $F(3, 38) = 3.40$, $p < .05$. This interaction was due to slightly greater increases in HR variability for BI-Faint and SE males during scenes in which they observed events than during scenes in which they participated in events, while the opposite pattern was evident for BI-No faint and Low-fear males. None of the

follow-up comparisons reached signficance.

ANOVA on the RSA measure yielded a significant Content x Group x Sex interaction, $F(6, 136) = 2.88$, $p < .05$. Follow-up 4 x 3 (Group x Content) ANOVAs, conducted for males and females, revealed a Content x Group interaction for females, $F(6, 64) = 2.81$, $p < .05$. However, both the overall interaction and that for females were essentially meaningless since the largest between-group differences, none of which were significant, involved SE content for males and neutral content for females. No meaningful group patterns could be discerned. The content of the scenes, as previously illustrated in Figure 3, was the most evident feature influencing responding for the RSA measure.

Respiration rate was not differentially affected by either the fear group of the individual, the content of the imagery, or their interaction. A significant effect of imagery scene, $F(1, 84) = 4.05$, $p < .05$, however, showed that there were greater increases in respiration rate during scenes in which subjects were portrayed as active participants ($M = .90$) than during scenes in which they were portrayed as observers watching events ($M = .55$).

DISCUSSION

This study attempted to explore the degree to which affective, coping, and physiological response patterns of BI and SE subjects to BI and SE fear cues are due to the fear type of the individual, the content of the fear stimulus, or their interaction (fear relevance). If an individual's fear type is critical, a given group of fearful subjects should display similar response patterns across many stressful situations including BI and SE imagery scenes. If responding is due to the content of the fear stimulus, most individuals, regardless of their fear type, should show similar reactions to a given fear stimulus. If there is an interaction such that reactivity is greater when fear type of the individual and content of the fear stimulus match, highly fearful subjects should show greater reactivity to their fear-relevant stimuli than nonfearful subjects who might show similar but reduced reactions to these stimuli. This study also explored whether BI subjects with and without a history of fainting displayed any differences in affective, coping, or physiological responding which might help understand why some BI subjects faint and others do not when exposed to BI stimuli.

Since analyses on the MQ and FNE screening measures showed the groups as distinct in terms of BI and SE fear, examining whether responding was due to the fear type of the individual, content of the fear stimulus, or their

interaction does not appear to be confounded by subjects having overlapping BI and SE fears. The analyses on the blood-injury phobia and social anxiety factors from Marks and Mathews (1979) Fear Questionnaire, although significant, showed the groups as somewhat less distinct. It should be noted, however, that the items on Marks and Mathews Fear Questionnaire are rated in terms of avoidance rather than anxiety or fear.

Since all groups reported similar preliminary absorption capacities and similar imagery vividness and involvement during the imagery testing, group differences in responding are probably not attributable to group differences in imagery. Similar imagery scores during all fear scenes for all groups likewise suggest that differences in responding to BI and SE fear contents are not attributable to differences in imagery evoked by those contents. Thus, distinctness of the groups in terms of BI and SE fear in conjunction with similar imagery scores between groups and between fear contents allowed differential response patterns to be summarized with greater confidence.

The fear type of an individual had little influence on responding across imagery contents. However, both the interaction between fear type and fear content (i. e., fear relevance) and the effect of content alone appeared to affect responding. In addition, there was limited support for differential responding between BI-Faint and BI-No faint subjects.

First, for the affective measures of anxiety and arousal and for the emotion-focused coping index, responding was greater when subject fear type and scene content matched. For example, both BI groups, but not the SE group, had higher anxiety and arousal ratings during BI fear scenes than did Low-fear subjects. In contrast, SE subjects, but not BI subjects, had higher anxiety and arousal ratings during SE fear scenes than did Low-fear subjects. However, the finding that all groups reported some anxiety and arousal to stimuli that they did not rate as fearful on the MQ or FNE suggests that affective responding to fear-relevant and fear-irrelevant stimuli is a matter of degree and not an all or none phenomenon.

The index of emotion-focused coping showed a similar outcome. In particular, BI subjects endorsed more emotion-focused coping during both BI scenes than did SE and Low-fear subjects. To a lesser extent, SE subjects tended to endorse more emotion-focused coping during the SE scenes. The finding that subjects reported more anxiety and arousal to their fear-relevant stimuli is not surprising since they were selected on the basis of reported fear to their fear-relevant stimuli. The greater endorsement of emotion-focused coping to fear-relevant stimuli suggests that individuals focus more on their distressing feelings and less on the problem at hand when they feel anxious. This interpretation is consistent with findings by Sarason (1984) that anxiety interferes with task-focused thinking. The lack of

significant correlations between anxiety and emotion-focused coping for any group during any imagery scene suggests that the emotion-focused coping findings are not merely redundant with the anxiety ratings.

Second, for the physiological measures of SCL, SCR, HR, and RSA, the most striking finding was the importance for all groups of the content of the fear imagery in producing differential responding. This contrasts with findings for the affective and emotion-focused coping measures for which subjects showed greater responding to their fear-relevant imagery. However, this contrast is consistent with findings in the literature that subjective reports of anxiety are usually better discriminators between phobic and nonphobic imagery than are physiological indices (see Marks & Huson, 1973). There are at least three explanations for why the physiological measures do not reflect some of the more subtle interactions shown by the subjective measures. First, subjects were screened and classified into groups on the basis of their self-reported fear rather than on the basis of any preliminary assessment of their physiological responding to feared situations. Second, it is likely that the task demands of the different kinds of imagery content had an impact on the physiological systems of most individuals (see Obrist et al., 1978). Third, individuals may be biologically predisposed to react to certain stimuli with certain physiological response patterns (e. g., Seligman, 1971). Subjects showed greater increases in SCR

and SCL during both BI and SE fear scenes than during neutral scenes, suggesting a sympathetic influence on the skin conductance measures during both BI and SE fear contents. A different pattern was evident for the HR and RSA measures, with indications of subjects showing sympathetic activation to SE content, but parasympathetic activation to BI content. Subjects showed HR decreases during BI scenes, but HR increases during both neutral and SE scenes. They also showed RSA increases during BI fear scenes, but RSA decreases during both neutral and SE scenes. These HR and RSA patterns suggest greater parasympathetic influence for all groups during BI content than during SE content.

Third, although individual fear type did not affect responding for any measure across contents, there are suggestions within the BI fear type of differential responding associated with fainting history. The reason for including BI subjects with and without a history of fainting was to search for differences in physiological and/or coping responses which might explain why some BI subjects faint and others do not during exposure to BI fear cues. In connection with this endeavor, the BI-faint group was the only group that showed increased HR variability to BI fear content, while all other groups showed decreases. BI-No faint subjects not only showed the largest decrease in HR variability of all groups to BI content but were also the only group that showed consistent HR variability decreases during all three imagery contents. The increase in HR

variability for BI-Faint subjects to BI content suggests parasympathetic influence on the heart which could be a factor predisposing them to faint. On the other hand, the decreased HR variability to both BI and other contents for BI-No faint subjects suggests decreased parasympathetic influence on the heart which may help prevent them from fainting.

In addition, BI-Faint males endorsed a more behavioral method of coping in response to the Injection scene than did BI-No faint males. However, the finding that 42% of all subjects in the sample endorsed behavioral coping during BI scenes suggests that behavioral coping in BI situations that require passivity may only be maladaptive and somehow associated with fainting for individuals with high BI fear. The finding that a behavioral method of coping was associated with greater distress in a blood donation situation (Kaloupek & Stoupakis, 1985) may provide some support for the general maladaptiveness of this strategy in injection and/or blood donation situations.

Thus the present study provides evidence that BI content evokes HR deceleration and RSA increases for all groups. It additionally shows that BI-Faint subjects are unique in reacting to BI content with increased HR variability. If one assumes that decreased HR, increased RSA, and increased HR variability all reflect aspects of parasympathetic activation, the results of this study suggest that responding to BI content can be both stimulus elicited (for HR and RSA) and due to BI-Faint subjects

responding in a unique way to BI content (for HR variability).

The question of what is causing this parasympathetic activation is perplexing. One problem is that HR, HR variability, and even RSA (the component of heart rate variability associated with respiration) have been interpreted in many ways, depending on the discipline and focus of the researcher. For example, HR variability has been viewed as a physiological parallel of attention (see Porges, 1984). However, the present study was not designed to address this issue. Furthermore, the equivalent image clarity and involvement scores both between groups and between fear contents suggest that all groups were equally attending to all fear scenes. Speculation on the meaning of the parasympathetc pattern will therefore be limited to issues which could have relevance for the questions this study attempted to address.

It is difficult to assess the extent to which fear contributed to the response patterns. For the purpose of simplifying this complex issue, only BI content will be considered. Since all groups showed similar HR decreases and RSA increases to BI content, it appears that the BI stimulus content determined the response pattern irrespective of subjects' fear type. Therefore, one might at first conclude that fear was not a major determinant of physiological responding. However, although BI subjects reported experiencing most anxiety to BI content, SE subjects (and to

a lesser degree Low-fear subjects) also reported feeling anxious during the BI scenes. Thus fear or anxiety could have been a determining factor which produced a common response pattern in all groups. The lack of significant correlations between changes in anxiety and changes in the RSA index for any group during the BI scenes does not clarify this issue.

However, while fear could be an explanatory factor for HR and RSA responding, it is clearly not affecting HR variability. Although both BI groups reported virtually identical amounts of anxiety and arousal during the BI scenes, only BI-Faint subjects showed HR variability increases, indicating parasympathetic activation, while BI-No faint subjects showed HR variability decreases. This very different pattern for subjects who reported equal fear and arousal to the scenes in question suggests that something other than fear is affecting responding to BI content. The lack of significant correlations between RSA and HR variability may explain why the response patterns are different for the two measures.

It is interesting to examine factors other than fear which could have affected responding. For example, it has repeatedly been observed that many subjects who faint at the sight of blood do not report fear, but rather feelings of squeamishness (see Beck & Emery, 1985). Katkin has also suggested that HR deceleration to slides of mutilated victims is consistent with a vagotonic response that might

be expected in response to disgusting stimuli (Katkin, 1985). Although the stimuli used by Katkin and his associates were visual, it is possible that subjects also reacted to the imagery scenes with disgust. However, as the present study did not assess disgust, this remains an area for future investigation. A follow-up study to test the "disgust" speculation would need to include, in addition to the groups in the present study, SE and Low-fear subjects who have little BI fear but who do faint in the presence of BI stimuli. Measures of disgust would also need to be developed.

One possibility which could explain the contrasting physiological response patterns (except for the respiration and HR variability measures) displayed by all subjects to SE and BI content is that human beings are biologically predisposed to selectively react to SE content with sympathetic activation and to BI content with parasympathetic activation. Consistent with this viewpoint, Graham (1961) regards fainting as an innate reaction to threat. These patterns may reflect two major evolutionary adaptive concerns to the human species, physical integrity and interpersonal functioning (see Heide & Borkovec, 1984; Seligman, 1971). For example, although the parasympathetic reaction pattern might be maladaptive during modern medical procedures, it could have an adaptive function serving to minimize blood loss in the case of severe injury.

An issue that needs to be addressed is whether the use of fear stimuli that were brief, relatively mild, auditory rather than visual, and imaginal rather than in vivo could have posed any limitations to the present study. These constraints on the method of stimulus presentation were employed because the lack of medical support made it important to ensure that subjects did not faint. Presentation of more intense, visual BI stimuli would probably have led to fainting for some BI-Faint subjects. For example, Öst et al. (1984) found that over 25% of a sample of blood phobics who watched a film of thoracic operations fainted or were on the verge of fainting, even though they could stop the film at any time. They showed a massive bradycardia and/or drop in blood pressure. Thus, greater parasympathetic responding by BI-Faint subjects, and hence differential reactivity between the groups, may have occurred in the present study if more intense, visual stimuli had been presented for a longer duration.

The finding that only BI-Faint subjects showed increased HR variability to the BI scenes lends credibility to the idea that a stronger presentation of BI material might have also accentuated their HR deceleration and RSA increases to these scenes. A similarly designed study using in vivo BI and SE cues within a hospital setting could thus be the next research endeavor. The major problem of getting BI phobics to participate in such a study might be overcome by offering potential subjects a treatment intervention for their phobia. Until recently, exposure treatments, generally

successful for other phobias, were relatively ineffective with BI phobics because they failed to take into account the parasympathetic response pattern which often culminated in fainting during the exposure procedure. Treatments have recently been developed which successfully combine exposure with muscle tensing manipulations which reverse the fall in blood pressure and thus prevent fainting during exposure to BI cues (Kozak & Miller, 1985; Öst & Sterner, 1987). Thus, by adding a treatment component, a future study could be designed which allows response patterns to emerge with greater intensity. This would provide a better opportunity to examine the effects of fear type, stimulus content, and their interaction on responding to BI and SE stimuli. It might also accentuate differences in responding between BI subjects with and without a history of fainting.

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Appendix A: Mutilation Questionnaire

Fear of Negative Evaluation Scale

General Information Sheet

Mutilation Questionnaire

Please read each statement and indicate whether it is True or False as it applies to you. Circle the letter that corresponds to your answer.

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 accidently 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..... T F

Fear of Negative Evaluation Scale

Please read each statement and indicate whether it is True or False as it applies to you. Circle the letter which corresponds to your answer.

1. I rarely worry about seeming foolish to others.. T F
2. I worry about what people will think of me even when I know it doesn't make any difference..... T F
3. I become tense and jittery if I know someone is sizing me up..... T F
4. I am unconcerned even if I know people are forming an unfavorable impression of me..... T F
5. I feel very upset when I commit some social error..... T F
6. The opinions that important people have of me cause me little concern..... T F
7. I am often afraid that I may look ridiculous or make a fool of myself..... T F
8. I react very little when other people disapprove of me..... T F
9. I am frequently afraid of other people noticing my shortcomings..... T F
10. The disapproval of others would have little effect on me..... T F
11. If someone is evaluating me I tend to expect the worst..... T F
12. I rarely worry about what kind of impression I am making on someone..... T F
13. I am afraid that others will not approve of me.. T F
14. I am afraid that people will find fault with me. T F
15. Other people's opinions of me do not bother me.. T F
16. I am not necessarily upset if I do not please someone..... T F
17. When I am talking to someone, I worry about what they may be thinking about me..... T F

18. I feel that you can't help making social errors sometimes, so why worry about it..... T F

19. I am usually worried about what kind of impression I make..... T F

20. I worry a lot about what my superiors think of me..... T F

21. If I know someone is judging me, it has little effect on me..... T F

22. I worry that others will think I am not worthwhile..... T F

23. I worry very little about what others may think of me..... T F

24. Sometimes I think I am too concerned with what other people think of me..... T F

25. I often worry that I will say or do the wrong things..... T F

26. I am often indifferent to the opinions others have of me..... T F

27. I am usually confident that others will have a favorable impression of me..... T F

28. I often worry that people who are important to me won't think very much of me..... T F

29. I brood about the opinions my friends have about me..... T F

30. I become tense and jittery if I know I am being judged by my superiors..... T F

General Information Sheet

1. Sex: Male / Female

   Age: _____ yr.

2. Do you have any chronic illnesses? Yes / No

   If you do, please explain briefly:_____

   _____

3. Do you take medications once a week or more? Yes / No

   If you do, please explain briefly:_____

   _____

4. Sometimes people become faint for emotional reasons in situations such as during injections, when hearing about or seeing physical injuries, or in confining public places. Have you ever felt faint (e. g., weak; dizzy) or become unconscious due to emotional reactions? Please indicate "yes" even if physical factors such as illness or heavy clothing added to the effect of emotion.

   (a) Weak or dizzy: Yes / No

   (b) Unconscious: Yes / No

   If you answered "yes" to either one or both of the options above:

   How many times has this happened to you?_____

   How many times during the past year?_____

   How long ago was the first time it happened?_____

   Please provide a brief description of the circumstances in which this happens:

   _____

   _____

Appendix B: Telephone Contact Statement

Consent Form

Research Participant Form

Fear Questionnaire

Differential Personality Questionnaire

Telephone Contact Statement

This is Sandy Schwartz speaking. I'm a PhD student in the Psychology Department at Concordia. Do you remember a questionnaire package that you filled out in the lobby a little while back? (pause) You indicated that you might be interested in participating in future paid research related to the questionnaires.

We're now in the process of conducting an experiment here at Concordia examining how people respond to different kinds of imagery. The experiment takes about two hours. I can't give you too many details over the phone, but what I can say at this point is that you will be listening to and imagining six imagery scenes and basically indicating how you react to them. When you come into the lab, you'll be provided with a form that describes the study in more detail. At that time you can decide whether you want to participate. If you do, we will be able to pay $10 for your help. Even if you decide not to participate, we'll give you $2 for coming to find out about the study.

Would you like to set up an appointment?

(If the student expresses interest) Do you have a pencil and paper? I'd like to arrange a time when you'll have a free two hours.

> Schedule the subject: Give the address and the lab number (and directions about how to get there). Also give lab phone number. Explain about the answering machine. For weekend subjects, be sure to explain about the guard and sign-in process. Repeat your name and the date and time of the appointment (make sure the person writes down the information). Ask subject to not drink alcoholic or caffeine-containing beverages for two hours prior to their appointment.

I may be calling you back to remind you about the session. Will that be all right?

Consent Form

In this experiment, we are interested in examining your physiological and subjective responses to a set of six imagery scenes that are each two and a half-minutes long. Descriptions of these scenes have been recorded on tape and will be presented to you over headphones. The content of the audiotaped scenes includes walking in the country, receiving a blood test and an injection, going for a job interview, watching a fireworks display from the balcony of your home, viewing an operation, and watching a fellow student deliver a speech. Some of these scenes may elicit some anxiety for some people.

Stick-on discs will be attached to your ankles, one shoulder, and the palm of one hand in order to record the physiological reactions of your heart and skin. A small temperature device will also be positioned in front of your nose and mouth to record your respiration. At the end of each scene, you will be asked to report on your thoughts and to rate your emotional reactions and the strength of your imagery. The entire procedure takes approximately 90 minutes.

All data gathered during the course of this study are confidential. Your identity is protected by a numerical coding system.

Your participation in the study is completely voluntary. If you decide to participate and later change your mind, you are free to withdraw from the study at any time without penalty. You will receive a $10 payment for your participation whether or not you complete the entire study.

Subject _____

Witness _____

Date _____

We also request that you answer the following questions to insure that you have an adequate understanding of the procedures described on this sheet.

1. What will you be hearing over the headphones? _____
   _____
2. What type of reactions will be measured? _____
   _____
3. When may you terminate the experiment if you consider it necessary? _____

Research Participant Form

All information provided on this questionnaire will be confidential and used only for research purposes.

age _____ sex _____ year of university _____
first language _____ If not English, are you completely fluent in English? yes ____ no _____

Please answer the following questions carefully

Have you had any medical or surgical problems during the last year? yes ____ no ____ Please specify _____

_____

Do you suffer from any chronic illness? yes ____ no ____
Please specify _____

Have you ever had heart trouble of any kind? yes ___ no ___
Please specify _____

Sometimes people become faint for emotional reasons in situations such as during injections, when hearing about or seeing physical injuries, or in confining public places. Have you ever felt faint (e.g., weak; dizzy) or become unconscious due to emotional reactions? Please indicate "yes" even if physical factors such as illness or heavy clothing added to the effect of emotion.

(a) weak or dizzy: yes ___ no ___

(b) unconscious: yes ___ no ___

Please provide a brief description of the circumstances in which this happens: _____

_____

Are you presently, or have you ever been treated for psychological or psychiatric reasons? yes ___ no ___ Please specify

_____

Have you ever taken tranquilizers or other psycho-active drugs? yes____ no ___ If yes, what drug _____, when _____, and for how long _____

Please list any medication that you are presently taking and the reason for taking it _____

Fear Questionnaire

Choose a number from the scale below to show how much you would avoid each of the situations listed below because of fear or other unpleasant feelings. Then write the number you chose in the box opposite each situation.

0	1	2	3	4	5	6	7	8
Would not avoid it	Slightly avoid it		Definitely avoid it		Markedly avoid it			Always avoid it

1. Injections or minor surgery.....[ ]
2. Eating or drinking with other people.....[ ]
3. Hospitals.....[ ]
4. Travelling alone by bus or train.....[ ]
5. Walking alone in busy streets.....[ ]
6. Being watched or stared at.....[ ]
7. Going into crowded shops.....[ ]
8. Talking to people in authority.....[ ]
9. Sight of blood.....[ ]
10. Being criticized.....[ ]
11. Going alone far from home.....[ ]
12. Thought of injury or illness.....[ ]
13. Speaking or acting to an audience.....[ ]
14. Large open spaces.....[ ]
15. Going to the dentist.....[ ]

Differential Personality Questionnaire

This questionnaire consists of a series of statements a person might use to describe his or her characteristics. Each statement is followed by two choices - True and False. Read the statement and decide which choice better describes you. Then circle your answer. Please answer every statement, even if you are not completely sure of the answer. Read each statement carefully, but don't spend too much time deciding on the answer.

1. Sometimes I feel and experience things as I did when I was a child..... T F

2. I can be greatly moved by eloquent or poetic language..... T F

3. While watching a movie, a television show, or a play, I may become so involved that I forget about myself and my surroundings and experience the story as if it were real and as if I were taking part in it..... T F

4. If I stare at a picture and then look away from it, I can sometimes "see" an image of the picture, almost as if I were still looking at it..... T F

5. Sometimes I feel as if my mind could envelop the whole world..... T F

6. I like to watch cloud shapes change in the sky.. T F

7. If I wish, I can imagine (or daydream) some things so vividly that they hold my attention as a good movie or story does..... T F

8. I think I really know what some people mean when they talk about mystical experiences..... T F

9. I sometimes "step outside" my usual self and experience an entirely different state of being..... T F

10. Textures - such as wool, sand, wood - sometimes remind me of colors or music..... T F

11. Sometimes I experience things as if they were doubly real..... T F

12. When I listen to music, I can get so caught up in it that I don't notice anything else..... T F

13. If I wish, I can imagine that my body is so heavy that I could not move it if I wanted to... T F

14. I can often somehow sense the presence of another person before I actually see or hear him or her..... T F

15. The crackle and flames of a wood fire stimulate my imagination..... T F

16. It is sometimes possible for me to be completely immersed in nature or in art and to feel as if my whole state of consciousness has somehow been temporarily altered..... T F

17. Different colors have distinctive and special meanings for me..... T F

18. I am able to wander off into my own thoughts while doing a routine task and actually forget that I am doing that task, and then find a few minutes later that I have completed it..... T F

19. I can sometimes recollect certain past experiences in my life with such clarity and vividness that it is like living them again or almost so..... T F

20. Things that might seem meaningless to others often make sense to me..... T F

21. While acting in a play, I think I could really feel the emotions of the character and "become" him or her for the time being, forgetting both myself and the audience..... T F

22. My thoughts often don't occur as words but as visual images..... T F

23. I often take delight in small things (like the five-pointed star shape that appears when you cut an apple across the core or the colors in soap bubbles)..... T F

24. When listening to organ music or other powerful music, I sometimes feel as if I am being lifted into the air..... T F

25. Sometimes I can change noise into music by the way I listen to it..... T F

26. Some of my most vivid memories are called up by scents and smells..... T F

27. Certain pieces of music remind me of pictures or moving patterns of color..... T F

28. I often know what someone is going to say before he or she says it..... T F

29. I often have "physical memories"; for example, after I've been swimming I may still feel as if I'm in the water..... T F

30. The sound of a voice can be so fascinating to me that I can just go on listening to it..... T F

31. At times I somehow feel the presence of someone who is not physically there..... T F

32. Sometimes thoughts and images come to me without the slightest effort on my part..... T F

33. I find that different odors have different colors..... T F

34. I can be deeply moved by a sunset..... T F

Appendix C: Rating Sheets

BASELINE

Draw a vertical line through each scale at the point that best describes your responses during the last minute of the preceding rest period.

1. Anxiety

none extreme

2. Physiological Arousal

none extreme

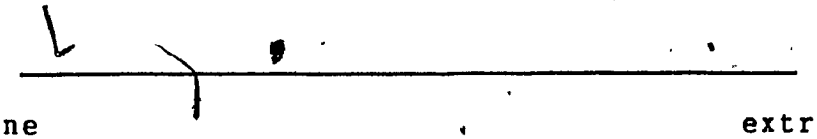
3. Discomfort

none extreme

WALK

Draw a vertical line through each scale at the point that best describes your responses during the preceding imagery scene.

1. Anxiety



none extreme

2. Physiological Arousal

none extreme

3. Discomfort

none extreme

4. Vividness or Clarity of the Imagery Scene

none extreme

5. Degree of Involvement in the Imagery Scene

none extreme

Appendix D: Transcript of Procedural Instructions

Transcript of Imagery Scenes

Procedural Instructions

The instructions from now on are taped. If the volume is either too high or too low, please let the experimenter know now. Your experimenter will be in the adjoining room at all times.

There will now be a 10-minute rest period. Please sit quietly and try to relax with your eyes open until further instructions are provided. (Stop tape for 10 minutes.)

The rest period is now over. With your free hand, please complete the three scales on the top rating sheet. This sheet should be labeled "BASELINE" in the upper right hand corner. Draw a vertical line through each scale at the point that best describes your responses during the last minute of the preceding rest period. (Stop tape until subject has finished.) Please flip this top sheet that you have just completed over so that it is now at the back of the pile. Leave the clipboard on your lap.

You will now be given instructions for the imagery procedure. General instructions will be given first. Specific instructions will be provided as we proceed. You will be listening to six tape-recorded scenes, each two and a half minutes in duration. We will proceed with each scene as follows. Before listening to the scene, you will rest for two and a half minutes. You will then listen to and imagine the two and a half minute imagery scene. It is important to try to imagine the scene as clearly as you can and as if it were actually happening to you at the time you hear it. Following the scene, you will be asked to answer, out loud, a question about your thoughts. You will be given up to 30 seconds in which to do this. Your answer will be recorded. You will then complete a rating sheet indicating your responses during the two and a half minute imagery scene. You need not worry about remembering all of this because you will be receiving exact instructions about what to do as we proceed.

In order to familiarize you with listening to the imagery scenes, reporting on your thoughts, and completing the rating sheets, we will have a practice run using a 30-second scene before we start the actual procedure. The practice scene will now begin. Please close your eyes and try to imagine the situation described as well as you can.

PRACTICE TAPE

When I say, "begin describing your thoughts," please describe, out loud, any thoughts that you had while listening to and imagining the preceding imagery scene. Please try to speak clearly. I will signal the end of the 30-second period by saying, "please stop now." If you are in the middle of a sentence, please finish your sentence, but do not start a new one. Please begin describing your

thoughts. (30 seconds blank) Please stop now. (10 seconds blank) Now please complete the five scales on the rating sheet labeled "PRACTICE" in the upper right-hand corner. Draw a vertical line through each scale at the point that best describes your responses during the preceding imagery scene. (Stop tape until subject has finished.) Please flip this sheet that you have just completed over so that it is now at the back of the pile. (5 seconds blank) If you have any questions about reporting on your thoughts, completing the rating sheets, or anything else, ask them out loud now and the experimenter will clarify them for you. (5 seconds blank) (Stop tape if necessary.)

We will now start the imagery procedure.

THE FOLLOWING INSTUCTIONS ARE GIVEN SIX TIMES, ONCE FOR EACH SCENE PRESENTATION (WITH APPROPRIATE CHANGES RELEVANT TO EACH SCENE). THERE ARE FOUR ORDERS OF SCENE PRESENTATION.

There will now be a two and a half minute rest period. Please sit quietly and relax with your eyes open. (Stop tape.) The imagery scene will now begin. This scene describes a walk in the country (or brief description appropriate to other scenes). Close your eyes and imagine the scene as well as you can.

WALK (OR ONE OF OTHER FIVE) SCENES

Please begin describing, out loud, any thoughts that you had while listening to and imagining the preceding imagery scene. (30 seconds blank) Please stop now. (10 seconds blank) Now please complete the five scales on the rating sheet labeled "WALK" (or word appropriate to other scenes) in the upper right hand corner. Draw a vertical line through each scale at the point that best describes your responses during the preceding imagery scene. (Stop tape until subject has finished.) Please flip this sheet that you have just completed over so that it is now at the back of the pile.

Imagery Scenes

Practice Scene

You're about to enter a small corner grocery store to buy a container of juice, some fruit, and bread. You think about how lucky you are to have such a handy little store nearby. You're feeling hungry and thirsty as you walk into the store. Inside the store, there is an array of all sorts of items arranged in three narrow and cluttered isles. You think to yourself that that's probably how the owners manage to fit so many items into such a small space. As you walk down the isles to pick up your purchases, you lightly touch some of the fruit and smell a small bouquet of flowers.

Neutral Scene 1--Walk

You're visiting some relatives at their summer house on a small lake surrounded by lush forestland. It's a warm sunny day, and you think about how nice it would be to take a walk and explore the area. You start walking at a brisk pace along the narrow road which goes around the lake. As you walk, you smell the fresh fragrant country air. You notice how most of the houses on the lake are immaculately kept, with flowers blooming on the ground and in baskets suspended from porchtops. You consider that you might someday be interested in either renting or buying a country house for use in the summer. As you keep on walking, thinking about the houses, you reach out every few minutes to pull some berries off low-hanging branches.

Looking out towards the center of the lake, you notice two small sailboats skimming the water. You think about how you prefer to be walking today, taking it easy, rather than trying to maneuver one of those sailboats. You enjoy the feeling of your leg muscles tensing and relaxing as you walk along at a smooth rhythmic pace.

You soon arrive at a beach where two children are in the process of building a sand castle. You wonder whether their parents own this beach or if it's public property. As you watch, you can't resist picking up a few small flat stones and throwing them out into the water to see if you can make them skip.

As you walk on, you soon spy a wooded path leading to a clearing a short distance in from the road. You think about how this might be a really interesting area to explore. As you trudge along this path, you need to bend and sidestep to get past branches that partially block the way. You notice that the path seems to follow a sparkling little stream. You think about how fresh this water must be coming right down from the mountain, and you bend down and splash your face and arms with some of the clear fresh liquid. You soon reach the clearing and notice hundreds of fairly short bushes full of large ripe blueberries. You realize that you have

unknowingly stumbled upon the blueberry fields you overheard your relatives talk about. You're feeling a bit hungry, so you bend down and pick a few handfuls of the sweet-tasting berries.

As you emerge back onto the road, you see your relatives' car just up ahead. You suppose that they must be returning from buying a few provisions from a nearby grocery store and you decide that it's time to end the walk. You start back to the house at a nice rhythmic pace feeling relaxed, alert, and refreshed.

Neutral Scene 2--Fireworks

You've heard that there's going to be a beautiful fireworks display tonight in a park some distance away from where you live. You think about it and decide that it would be fun to watch the display from your balcony instead of going to the park. You feel pleased about being able to watch from a comfortable vantage point.

Taking a glass of juice with you, you go out onto your balcony. You notice that it's a beautiful summer evening. The air is warm with just a hint of a breeze. Looking up at the sky, you realize that the display has not yet begun and think about how much you're looking forward to seeing the sky light up with glowing color. You settle back comfortably in your lawnchair. The sky is clear, dark, and full of twinkling stars. You wonder if you'll still be able to see them once the display begins. As a slight breeze goes by, you smell the sweet aroma from the flowers on the ledge of your balcony.

The show has just begun. From nearly total darkness, the sky suddenly lights up. You're wondering what kind of designs you'll be watching, and you're feeling happy and a bit excited about the upcoming show. You notice how relaxed your body feels. As you watch, three bright fireballs, one yellow, one red, one green, float up in gentle arcs to their peaks and then explode, spraying out hundreds of glimmering particles which gracefully float downward like gentle rain. You think about how beautiful and symmetrical the design was. The warm stillness of the evening wraps you like a light blanket and you feel comfortable and secure. Next, a blur of blue light shoots up much more quickly, exploding into an array of blue and white stars which seem to flicker for several seconds and then disappear. You think about how clever and intricate the designs can be, and you're curious about how they're made. You're also feeling quite thirsty now and you reach over to get your glass of juice off the table beside you. For the next display, you watch as the sky is suddenly filled with many beautiful fountain-like patterns of red, white, and blue. You think that this is truly the most beautiful of all the designs so far.

You get out of your chair and go over to the other end of your balcony to try to get a better view. Aside from being ablaze with color, the sky is now full of whizzing

sounds and muffled explosions. As the display goes on, you think about how lucky you are to have such a good view. As you stand there with your hand on the railing, you feel content watching the rest of the colorful show.

BI Scene 1--Injection

You're walking around barefoot on the grass when you suddenly feel a piercing pain in your foot. Looking down, you realize that you've stepped on a small rusty nail which is still partly in your foot. You're feeling anxious as you sit down on a chair and force yourself to pull out the nail. You watch as blood oozes out of the wound and trickles onto the grass. Almost immediately, you start to worry that you might have to receive a tetanus shot. Looking at the blood and thinking about the possibility of an injection makes you feel more anxious and a bit queasy.

A friend runs to call your doctor who says to bring you to his office immediately. During the drive to the doctor's office, you can't stop worrying about that tetanus shot that you just know he's going to give you. You feel all your muscles tense up at the thought of this injection.

You're now in the doctor's examining room. After disinfecting and bandaging your puncture wound, he tells you that his nurse will take a blood sample and then give you an injection. You wonder if you should have come; maybe you don't really need a tetanus shot. You begin to feel a little short of breath and you become aware of your heart beating in your chest.

The nurse applies a tourniquet to your arm, swabs an exposed vessel with alcohol, and then approaches with the needle to remove blood. You want to pull your arm away but you keep telling yourself that you'd better remain still for your own good. You're feeling panicky as she inserts the needle. You watch briefly as your blood enters the syringe. It seems like it's taking forever to fill up. You feel slightly queasy thinking about it. As she removes the needle, you see some of your blood trickling down your arm. The nurse quickly cleans it up and puts on a small bandage.

Now you really start worrying whether the injection will hurt more than the blood sample. You feel your muscles tensing up in anticipation. The nurse then takes a hypodermic needle and holds it up to the light. You think about running out of the room right now; you just want to get this over with quickly. As you sit there feeling shaky, you start to break out into a cold sweat. After rubbing your arm with alcohol, the nurse efficiently injects you, removes the needle, and then disinfects and bandages the area. You're feeling miserable and wondering if it was really necessary to put yourself through all of this just because of a tiny puncture wound. You sit there for awhile, feeling slighly sick and soaked with perspiration.

BI Scene 2--Operation

You're taking a course that requires you to view a surgical procedure and report on it. You've been scheduled to watch an abdominal operation today. You don't like the idea of watching an operation, especially this one, because you're scheduled to have a similar operation in two weeks. You start to feel anxious as you enter the hospital where the operation will take place.

The first thing that you notice is the pervasive mixture of hospital smells. It occurs to you that this is one of the things that bothers you most about hospitals. You're finding it somewhat difficult to breathe properly. Once on the floor where the operating rooms are located, the medical smells are much stronger. You think to yourself that everyone must find these smells aversive; already you're starting to feel slightly queasy from them. In one of the operating rooms, you notice that a hospital worker is in the process of mopping up a pool of partially dried blood under an operating table. You think about all the blood you will probably see during the operation and, at the thought of this, you feel more anxious and are aware of the tension in the muscles of your neck.

You enter the viewing room and sit down. Through a large glass window, the sterile, cold operating room looks like a big 3-D motion picture screen. You know that you must watch the whole procedure in order to adequately report on it. You're aware of your heart beating away in your chest and your stomach being upset in anticipation of the operation.

The patient is already lying anesthetized on the operating table. You can see a needle and tube in his arm and his abdomen all yellow with iodine. You think that that's probably how you'll look two weeks from now during your operation and the thought of it makes you feel slightly panicky.

The surgeon now puts a scalpel against the skin and makes an incision. You see a fine line of blood which then starts to spread out from the incision. You wonder how your incision will look. You feel a little sick thinking about it and you become aware that you're starting to sweat and feel a bit shaky. The surgeon then puts some clamps directly into the cut and pulls the skin apart, exposing the raw tissue underneath. You keep thinking about them doing that to you. You are feeling more anxious now, and queasy and weak. The nurse suctions out all the blood from the exposed tissue as the surgeon efficiently cuts away. You're finding this more and more unpleasant and objectionable; all you want to do is rush out of the viewing room--but you can't. A cold sweat covers your whole body now and you're feeling sick and weak.

SE Scene 1--Job Interview

You have an appointment for a job interview in half an hour. On your way to the interview, you keep wondering what they will ask you and whether you will be able to answer their questions in a manner that will make a good impression. You're feeling anxious and notice your body beginning to react even before you get to the interview office.

You arrive at the office and hear someone say "Come in." Inside, a man and woman, both impeccably dressed and possessing an air of self-confidence, are sitting behind a large table. You can't help but to compare your lack of self-confidence to their poise. This makes you feel more anxious and tense, but you force yourself to smile and introduce yourself. They stare at you coldly for a second or two and then ask you to sit down. The fact that they didn't return your smile makes you think that they formed an instant opinion that you're not suitable for the job. You feel your mustles tensing up and are aware of your heart beating in your chest as you anticipate their questions.

After introducing themselves in a formal manner, one of them then addresses you by the wrong name. You wonder whether to correct them or not. You think for a moment that they may be testing you, but you decide not to correct them because they may think that you're pushy. You're aware that your hands are starting to sweat and you brush them against your clothing to remove some of the perspiration.

There is now almost total silence as they calmly look in your file, occasionally glancing up at you. You feel like they're really sizing you up, judging both your actions and your clothing. You become tense and jittery thinking that they're scrutinizing you. Your stomach feels a little upset.

The silence quickly comes to a halt as they start and keep firing question after question at you. You begin to feel overwhelmed. You simply were not prepared for the intensity of their questionning. Your mind goes blank as you struggle to answer sensibly. Suddenly you realize that your hands are shaking and you're feeling a bit short of breath. Now it's really hard to think.

Both of them keep up the barrage of questions, asking something new as quickly as you finish your halting and jumbled answers. Then, you're caught off-guard as they ask whether you would allow the remainder of the interview to be recorded on videotape. You wonder why they would want to do that. You sit there, unable to answer, feeling humiliated and rejected.

SE Scene 2--Speech

You're sitting in a classroom watching one of your classmates give a presentation. It's hard to pay attention because you will be required to give your presentation after

he's finished. You feel anxious and tense as you anticipate your own speech.

The speaker is nervous and extremely disorganized as he reads from an extensive set of notes that flutter in his shaking hands. You hope you don't do such a poor job when your turn comes along, but you have doubts about your talk. His disorganized, jerky style begins to make you feel tense and agitated. Someone in the class asks him a question that he has difficulty answering. He also loses his place in his notes. You worry about what you'll do if someone interrupts you. You're starting to sweat and you feel your heart beating in your chest as you think about this.

You begin to observe your classmates. They appear to be annoyed and restless and many of them are talking amongst themselves, totally ignoring the speaker. You think about how horrible it must feel to have your own classmates reject you like this. You notice the muscles in the back of your neck tensing up at the thought that this might happen to you. Your palms get very sweaty.

It's now the professor's turn to comment. He says that he is extremely displeased with the whole presentation. The speaker is now visibly trembling and perspiring in response to this. You feel badly for the speaker because you put yourself into his place. You notice that your breathing has become more rapid and shallow just thinking that the professor might do this to you. The professor then comments on the dull style and complete lack of organization of the presentation. The speaker just stands there silently, looking very pale and strained. You can imagine how badly he must be feeling now. You notice that you are also feeling strained and that many of the muscles of your body have tensed up. The professor continues to berate this student by saying that he wouldn't be so nervous if he were better prepared. You agree with the professor, but you also realize that sometimes even good preparation isn't enough. You sit there, feeling very anxious about your upcoming speech, noticing that your stomach feels upset and that your clothes are damp with sweat.

Appendix E: ANOVA Summary Tables

Summary of One-Way

ANOVA on MQ Scores

Source	SS	df	MS	F	p
Group	4425.13	3	1475.04	152.68	.00
Error	888.83	92	9.66		

Summary of One-Way

ANOVA on FNE Scores

Source	SS	df	MS	F	p
Group	5751.58	3	1917.19	119.36	.00
Error	1477.75	92	16.06		

Summary of One-Way

ANOVA on Blood-Injury Phobia Factor Scores

Source	SS	df	MS	F	p
Group	1375.53	3	458.51	13.39	.00
Error	3150.21	92	34.24		

Summary of One-Way

ANOVA on Social Anxiety Factor Scores

Source	SS	df	MS	F	p
Group	579.53	3	193.18	8.91	.00
Error	1994.46	92	21.68		

Summary of One-Way

ANOVA on Absorption Scale Scores

Source	SS	df	MS	F	p
Group	134.21	3	44.74	1.03	.39
Error	4013.42	92	43.62		

Summary of Two-Way ANOVA on

Baseline Anxiety Scores

Source	SS	df	MS	F	p
Group	212.58	3	70.86	.38	.77
Sex	2.67	1	2.67	.01	.91
G x S	551.58	3	183.86	.98	.41
Error	16560.50	88	188.19		

Summary of Two-Way ANOVA on

Baseline Arousal Scores

Source	SS	df	MS	F	p
Group	78.38	3	26.13	.20	.89
Sex	51.04	1	51.04	.40	.53
G x S	162.54	3	54.18	.42	.74
Error	11291.00	88	128.31		

Summary of Two-Way ANOVA on

Baseline SCL Scores

Source	SS	df	MS	F	p
Group	18.64	3	6.21	.96	.41
Sex	28.19	1	28.19	4.37	.04
G x S	9.30	3	3.10	.48	.70
Error	560.95	87	6.45		

Summary of Two-Way ANOVA on

Baseline SCR Scores

Source	SS	df	MS	F	p
Group	1.20	3	.40	.19	.90
Sex	.94	1	.94	.45	.50
G x S	4.01	3	1.34	.65	.59
Error	180.31	87	2.07		

Summary of Two-Way ANOVA on

Baseline Respiration Rate Scores

Source	SS	df	MS	F	p
Group	38.10	3	12.70	.93	.43
Sex	8.77	1	8.77	.64	.43
G x S	6.86	3	2.29	.17	.92
Error	1151.62	84	13.71		

Summary of Two-Way ANOVA on

Baseline Heart Rate Scores

Source	SS	df	MS	F	p
Group	592.35	3	197.45	1.56	.21
Sex	121.77	1	121.77	.96	.33
G x S	58.84	3	19.61	.16	.93
Error	8980.93	71	126.49		

Summary of Two-Way ANOVA on

Baseline HR Variability Scores

Source	SS	df	MS	F	p
Group	3.80	3	1.27	.53	.66
Sex	7.73	1	7.73	3.25	.08
G x S	11.57	3	3.86	1.62	.19
Error	169.10	71	2.38		

Summary of Two-Way ANOVA on

Baseline RSA Scores

Source	SS	df	MS	F	p
Group	11442.28	3	3814.09	.33	.80
Sex	3802.04	1	3802.04	.33	.57
G x S	32271.54	3	10757.18	.93	.43
Error	784858.82	68	11542.04		

Summary of Four-Way Repeated Measures

ANOVA on Imagery Vividness Scores

Source	SS	df	MS	F	p	G-G p
Group	9142.50	3	3047.50	1.48	.23	
Sex	15.34	1	15.34	.01	.93	
G x S	15654.08	3	5218.03	2.53	.06	
Error	181684.31	88	2064.59			
Content	973.56	2	486.78	1.63	.20	.20
C x G	679.17	6	113.19	.38	.89	.89
C x S	85.72	2	42.86	.14	.87	.87
C x G x S	1163.44	6	193.91	.65	.69	.69
Error	52660.78	176	299.21			
Imagery Scene	50.17	1	50.17	.14	.71	
I x G	112.74	3	37.58	.11	.96	
I x S	144.00	1	144.00	.41	.52	
I x G x S	1862.33	3	620.78	1.77	.16	
Error	30905.08	88	351.19			
C x I	429.51	2	214.76	1.22	.30	.30
C x I x G	84.32	6	14.05	.08	.99	.99
C x I x S	111.13	2	55.56	.31	.73	.71
C x I x G x S	1299.38	6	216.56	1.23	.29	.30
Error	31080.33	176	176.59			

Summary of Four-Way Repeated Measures

ANOVA on Imagery Involvement Scores

Source	SS	df	MS	F	p	G-G p
Group	14123.35	3	4707.78	2.44	.07	
Sex	897.50	1	897.50	.46	.50	
G x S	13274.73	3	4424.91	2.29	.08	
Error	169897.07	88	1930.65			
Content	3635.45	2	1817.72	4.18	.02	.02
C x G	2302.33	6	383.72	.88	.51	.51
C x S	372.42	2	186.21	.43	.65	.65
C x G x S	3045.00	6	507.50	1.17	.33	.33
Error	76486.14	176	434.58			
Imagery Scene	159.39	1	159.39	.32	.58	
I x G	1003.56	3	334.52	.66	.58	
I x S	218.79	1	218.79	.43	.51	
I x G x S	1310.80	3	436.93	.87	.46	
Error	44393.96	88	504.48			
C x I	1176.32	2	588.16	1.93	.15	.15
C x I x G	1668.12	6	278.02	.91	.49	.49
C x I x S	38.05	2	19.02	.06	.94	.94
C x I x G x S	2198.09	6	366.35	1.20	.31	.31
Error	53611.42	176	304.61			

Summary of Four-Way Repeated Measures

ANOVA on Anxiety Change Scores

Source	SS	df	MS	F	p	G-G p
Group	6523.46	3	2174.49	1.58	.20	
Sex	3570.06	1	3570.06	2.60	.11	
G x S	3636.51	3	1212.17	.88	.45	
Error	120898.19	88	1373.84			
Content	43356.05	2	21678.02	53.49	.00	.00
C x G	9465.59	6	1577.60	3.89	.00	.00
C x S	1291.22	2	645.61	1.59	.21	.21
C x G x S	1462.09	6	243.68	.60	.73	.73
Error	71333.72	176	405.31			
Imagery Scene	1230.84	1	1230.84	6.89	.01	
I x G	624.84	3	208.28	1.17	.33	
I x S	20.25	1	20.25	.11	.74	
I x G x S	156.93	3	52.31	.29	.83	
Error	15713.47	88	178.56			
C x I	310.57	2	155.28	.85	.43	.42
C x I x G	972.21	6	162.04	.89	.51	.50
C x I x S	544.70	2	272.35	1.49	.23	.23
C x I x G x S	1067.91	6	177.99	.97	.44	.44
Error	32151.28	176	182.68			

Summary of Four-Way Repeated Measures

ANOVA on Arousal Change Scores

Source	SS	df	MS	F	p	G-G p
Group	10700.17	3	3566.72	2.08	.11	
Sex	6247.59	1	6247.59	3.65	.06	
G x S	7585.02	3	2528.34	1.48	.23	
Error	150669.93	88	1712.16			
Content	18147.50	2	9073.75	30.35	.00	.00
C x G	6275.26	6	1045.88	3.50	.00	.00
C x S	964.13	2	482.06	1.61	.20	.20
C x G x S	1375.41	6	229.24	.77	.60	.60
Error	52626.69	176	299.02			
Imagery Scene	1932.34	1	1932.34	6.28	.01	
I x G	985.16	3	328.39	1.07	.37	
I x S	9.77	1	9.77	.03	.86	
I x G x S	45.26	3	15.09	.05	.99	
Error	27057.65	88	307.47			
C x I	300.73	2	150.37	.80	.45	.44
C x I x G	974.09	6	162.35	.87	.52	.52
C x I x S	469.39	2	234.69	1.25	.29	.29
C x I x G x S	602.16	6	100.36	.54	.78	.77
Error	32953.97	176	187.24			

Summary of Four-Way Repeated Measures

ANOVA on SCL Change Scores

Source	SS	df	MS	F	p	G-G p
Group	6.87	3	2.29	.23	.88	
Sex	4.57	1	4.57	.45	.50	
G x S	11.60	3	3.87	.38	.77	
Error	885.54	87	10.18			
Content	1.84	2	.92	2.73	.07	.08
C x G	2.40	6	.40	1.19	.31	.32
C x S	.05	2	.03	.08	.93	.88
C x G x S	3.18	6	.53	1.58	.16	.18
Error	58.43	174	.34			
Imagery Scene	1.15	1	1.15	.88	.35	
I x G	3.93	3	1.31	1.00	.40	
I x S	.03	1	.03	.02	.88	
I x G x S	9.30	3	3.10	2.38	.08	
Error	113.42	87	1.30			
C x I	.95	2	.48	1.78	.17	.17
C x I x G	1.19	6	.20	.74	.62	.61
C x I x S	.17	2	.08	.31	.73	.73
C x I x G x S	1.19	6	.20	.74	.62	.62
Error	46.58	174	.27			

Summary of Four-Way Repeated Measures

ANOVA on SCR Change Scores

Source	SS	df	MS	F	p	G-G p
Group	12.50	3	4.17	.29	.84	
Sex	29.66	1	29.67	2.04	.16	
G x S	38.73	3	12.91	.89	.45	
Error	1268.07	87	14.58			
Content	22.96	2	11.48	7.30	.00	.00
C x G	12.04	6	2.01	1.28	.27	.27
C x S	3.57	2	1.78	1.14	.32	.32
C x G x S	6.79	6	1.13	.72	.63	.63
Error	273.49	174	1.57			
Imagery Scene	.21	1	.21	.09	.77	
I x G	7.98	3	2.66	1.07	.37	
I x S	.49	1	.49	.19	.66	
I x G x S	10.35	3	3.45	1.38	.25	
Error	217.00	87	2.49			
C x I	10.65	2	5.33	5.02	.008	.008
C x I x G	1.27	6	.21	.20	.98	.98
C x I x S	1.32	2	.66	.62	.54	.54
C x I x G x S	12.11	6	2.02	1.90	.08	.08
Error	184.64	174	1.06			

Summary of Four-Way Repeated Measures

ANOVA on Respiration Rate Change Scores

Source	SS	df	MS	F	p	G-G p
Group	83.86	3	27.95	.51	.68	
Sex	110.02	1	110.02	2.00	.16	
G x S	79.65	3	26.55	.48	.69	
Error	4616.69	84	54.96			
Content	9.08	2	4.54	1.62	.20	.20
C x G	15.73	6	2.62	.93	.47	.47
C x S	5.19	2	2.59	.92	.40	.40
C x G x S	35.41	6	5.90	2.10	.06	.06
Error	471.36	168	2.81			
Imagery Scene	17.45	1	17.45	4.05	.047	
I x G	10.55	3	3.52	.82	.49	
I x S	2.24	1	2.24	.52	.47	
I x G x S	9.00	3	3.00	.70	.56	
Error	362.15	84	4.31			
C x I	13.05	2	6.52	2.03	.13	.14
C x I x G	18.92	6	3.15	.98	.44	.44
C x I x S	.31	2	.15	.05	.95	.95
C x I x G x S	22.88	6	3.81	1.19	.38	.32
Error	539.73	168	3.21			

Summary of Four-Way Repeated Measures

ANOVA on Heart Rate Change Scores

Source	SS	df	MS	F	p	G-G p
Group	132.26	3	44.09	.33	.80	
Sex	34.52	1	34.52	.26	.61	
G x S	57.79	3	19.26	.15	.93	
Error	9352.97	71	131.73			
Content	341.99	2	170.99	30.17	.00	.00
C x G	55.25	6	9.21	1.62	.14	.15
C x S	3.38	2	1.69	.30	.74	.73
C x G x S	6.69	6	1.12	.20	.98	.97
Error	804.88	142	5.67			
Imagery Scene	.31	1	.31	.02	.90	
I x G	53.25	3	17.75	1.01	.39	
I x S	5.46	1	5.46	.31	.58	
I x G x S	4.81	3	1.60	.09	.96	
Error	1247.76	71	17.57			
C x I	40.71	2	20.36	3.86	.02	.03
C x I x G	24.17	6	4.03	.76	.60	.59
C x I x S	21.87	2	10.93	2.07	.13	.13
C x I x G x S	36.69	6	6.11	1.16	.33	.33
Error	748.71	142	5.27			

Summary of Four-Way Repeated Measures

ANOVA on HR Variability Change Scores

Source	SS	df	MS	F	p	G-G p
Group	7.12	3	2.37	.64	.59	
Sex	.18	1	.18	.05	.83	
G x S	6.75	3	2.25	.60	.61	
Error	264.70	71	3.73			
Content	1.73	2	.87	4.01	.02	.02
C x G	3.50	6	.58	2.70	.02	.02
C x S	.71	2	.35	1.64	.20	.20
C x G x S	1.89	6	.31	1.46	.20	.20
Error	30.70	142	.22			
Imagery Scene	.05	1	.05	.25	.62	
I x G	.78	3	.26	1.26	.29	
I x S	.03	1	.03	.13	.72	
I x G x S	1.92	3	.64	3.12	.03	
Error	14.56	71	.21			
C x I	.38	2	.19	.72	.49	.46
C x I x G	2.64	6	.44	1.65	.14	.16
C x I x S	.15	2	.07	.28	.76	.71
C x I x G x S	2.93	6	.49	1.83	.10	.12
Error	38.00	142	.27			

Summary of Four-Way Repeated Measures

ANOVA on RSA Change Scores

Source	SS	df	MS	F	p	G-G p
Group	19985.97	3	6661.99	.18	.91	
Sex	64711.73	1	64711.73	1.74	.19	
G x S	63410.54	3	21136.85	.57	.64	
Error	2528399.30	68	37182.34			
Content	24980.58	2	12490.29	4.38	.01	.02
C x G	25334.49	6	4222.41	1.48	.19	.20
C x S	618.23	2	309.11	.11	.90	.86
C x G x S	49308.54	6	8218.09	2.88	.01	.02
Error	387911.45	136	2852.29			
Imagery Scene	147.52	1	147.52	.03	.87	
I x G	8791.21	3	2930.40	.57	.63	
I x S	6094.69	1	6094.69	1.19	.28	
I x G x S	13812.17	3	4604.06	.90	.45	
Error	347361.54	68	5106.26			
C x I	158.64	2	79.32	.03	.97	.95
C x I x G	9079.89	6	1513.31	.55	.77	.73
C x I x S	2136.22	2	1068.11	.39	.68	.63
C x I x G x S	12547.66	6	2091.28	.76	.60	.57
Error	372699.59	136	2740.44			