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BLOOD/INJURY AND SNAKE PHOBIAS: COGNITIVE,
BEHAVIORAL, AND PHYSIOLOGICAL
CHARACTERISTICS

BY
MARTIN EDWARD FRANKLIN

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF
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IN
PSYCHOLOGY

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Abstract

Blood/injury phobia is a simple phobia unique in its association with fainting, underlying physiological processes, and potentially dire consequences for sufferers due to avoidance of medical attention. Laboratory studies of blood/injury phobics (e.g, Ost et al., 1984) have demonstrated a diphasic physiological response (immediate increases in heart rate and blood pressure above previously recorded baseline levels followed by significant decreases below baseline) when patients view videotapes of thoracic surgery. Little is known about the physiological responses to blood/injury stimuli of college students reporting fear of blood. It is important to examine the cognitive, behavioral, and physiological characteristics of moderately fearful subjects who are not in treatment for blood/injury fears in order to evaluate the potential usefulness of analogue research in the study of this unusual phobia. Analogue samples are frequently used in the study of other phobias (e.g., snake phobia), and the apparently high frequency of blood/injury fears in the general population suggests that such studies may be conducted efficiently in university settings.

60 subjects (20 Blood Fear, 20 Snake Fear, and 20 Nonfearful Comparison) were selected from a larger sample based on Fear Survey Schedule III scores (FSS; Wolpe & Lang, 1977). Subjects then completed self report measures of fear,

depression, and anxiety sensitivity as well as Behavioral Avoidance Tests (BAT) for snakes and blood. Next, subjects viewed 3 videotapes: 1) Thoracic Surgery; 2) Snakes; 3) Neutral Travel Scenes. Subjects' heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), and finger pulse volume (FPV) were recorded throughout videotape viewing, and subjects reported their subjective anxiety and feelings of lightheadedness following each videotape.

Results indicated significant group differences in expected directions on specific fear questionnaires, SUDS following viewing of fearful videotapes, and Behavioral Avoidance. On physiological measures, the Snake Fear Group demonstrated significantly greater HR and DBP changes from baseline during the Snake Videotape than either of the other groups. The Blood Fear Group demonstrated significantly greater changes from baseline during the Thoracic Surgery Videotape only on FPV. The utility of analogue research in the study of blood/injury phobia and suggestions for improvement of subject selection techniques will be discussed.

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Marlene Jane Gawarkiewicz has taken this roller coaster ride with me through poverty, long hours, and preoccupation. I want her to know that I love her and look forward to a few free weekends in the not too distant future. Finally, I wish to thank my parents, Domnick and Kay Franklin, without whose help my education would never have been possible.

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Statement of the Problem

Simple phobia, the persistent fear of a circumscribed stimulus (object or situation) that interferes with functioning and is recognized as excessive by the sufferer, is among the most common psychiatric illnesses in the general population (American Psychiatric Association, 1987). Specific fears of a variety of objects or situations occurred in almost 50% of the respondents of a probability sample (Agras, Sylvester, & Oliveau, 1969), although this percentage dropped to 7.7% when more stringent criteria for phobia were applied. Since the mid 1970s, anxiety-related abnormalities have been recognized as a major public health problem (Turner & Michelson, 1984). The current research was an investigation of blood/injury and snake phobias, two of the most prevalent simple phobias (Agras, Sylvester, & Oliveau, 1969). Prevalence of these specific fears is generally estimated at 2% -5% of most general populations (Klorman, Weerts, Hastings, Melamed, & Lang, 1974), although some studies have found rates of blood/injury phobia as high as 15% (e.g., Kleinknecht, 1987).

One of the primary tasks of this investigation was to compare the physiological responses of subjects high on self report measures of blood/injury fear to the physiological response patterns of nonfearful comparison subjects. Recent investigations of the physiology of blood/injury phobia (Ost,

Sterner, & Lindahl, 1984; Ost, Lindahl, Sterner, & Jerremalm, 1984; Ost, Sterner, & Fellinius, 1989) have demonstrated a diphasic physiological response characterized by rapid increases in heart rate and blood pressure upon exposure to a film of thoracic surgery, followed by a marked decrease in both of these physiological measures significantly below previously recorded baseline data. Behaviorally, this pattern is frequently manifested as an initial increase in agitation followed by vasovagal syncope, or fainting (Kleinknecht, 1987). In the current investigation, it was predicted that the physiological response pattern of subjects high on self report measures of snake fear who are exposed to a film of snakes would differ significantly from high blood/injury fear subjects' responses when these individuals view thoracic surgery videotapes. Nonfearful comparison subjects' responses were expected to differ from the responses of both groups. It was hypothesized that subjects high on snake fear would show an initial increase in heart rate and blood pressure similar to that shown by high blood/injury fear subjects, but these measures in the former group would remain elevated rather than exhibiting the characteristic drop below baseline expected for high blood/injury fear subjects.

A second goal of this investigation was to measure the cognitive/self report, behavioral, and physiological responses of blood/injury and snake fearful subjects so that the relationship among these response channels can be clarified.

Measurement of responses in each channel is known as Triple Response Measurement. In spite of the theoretical importance of Triple Response Measurement as explained by theorists such as Lang (1968,1979), few studies actually collect data from each response channel (Himadi, Boice, and Barlow, 1985). In this study, several self report measures were utilized, and subjects' scores on these instruments were correlated with behavioral and physiological data in order to assess the strength of the relationships among the various measures. It was believed that there would be significant correlations between behavioral and physiological data, as well as several of the questionnaire measures. Several physiological, behavioral, and self report measures were entered into multiple regression equations to determine their differential utility in predicting fear group membership based on FSS scores. Results of this line of inquiry may help researchers to select measures for use in phobia research.

Justification for and Significance of the Study

Blood/Injury and Snake Phobias: Similarities and Differences

Blood/injury and snake phobias are both classified in the DSM-III-R as simple phobias, although the confusion about this diagnostic category has led many researchers to believe that simple phobia is anything but simple. Barlow described simple phobia as at once the most familiar and the most enigmatic of

the anxiety disorders (Barlow, 1988, p. 475). In general, simple phobia is thought to develop in response to a true or false alarm temporally associated with what then becomes the phobic stimulus. For example, a child who is bitten by a particular dog associates the pain and fear of that attack with potential attacks by other dogs. Soon, the child will develop anxiety symptoms in the presence of a number of different dogs. Avoidance behavior in the presence of other dogs results in symptom decreases, and the child then learns to avoid dogs in order to avoid the experience of fear and the potential of being bitten again. It is clear that simple phobics exaggerate the probability of potential harm associated with encounters with the feared stimulus, and avoidance behavior serves to minimize the chance that the phobic patient will seek out or be able to process disconfirming information about potential harm.

Although this model seems to apply readily to the acquisition and maintenance of many simple phobic responses, data on retrospective recollections of direct conditioning experiences has raised interesting questions about mode of fear acquisition. Research conducted by Ost (1985) demonstrated that only 48% of animal phobics and 45% of blood/injury phobics could recall a direct conditioning experience such as the one cited in the above example. Other means of acquisition studied by Ost included modeling (e.g., watching a parent's fearful response to a spider) and

instruction/information (e.g., reading about a horrifying plane crash). In Ost's retrospective study, 10% of animal phobics and 14% of blood/injury phobics could not recall any means of fear acquisition. This lack of recall for a specific conditioning experience for more than half of the snake and blood/injury phobics in this study represents the lowest percentages found in this study. At least 58% of interviewed social phobics, claustrophobics, agoraphobics, and dental phobics reported that they remembered a direct conditioning experience that they believed led to the development of their anxiety disorder (Ost, 1985). Obviously, retrospective data such as these must be interpreted cautiously, but these results suggest that blood/injury and snake phobics report fewer direct conditioning experiences than other anxiety disordered individuals.

Besides membership in the same diagnostic category and sufferers' lower rates of recollection of direct conditioning experiences that led directly to the development of phobia, blood/injury and snake phobics also may share similarly early ages of onset. Another study by Ost (1987) examined the age of onset of a variety of specific anxiety disorders in patients who sought treatment for these disorders. Simple phobics in general had the earliest ages of onset compared to social phobics and agoraphobics. Social phobics typically experienced their first symptoms during adolescence, and agoraphobics had a typical age of onset in their early 20s.

This contrasts with the age of onset for simple phobias, with animal phobia's mean age of onset being age 7 and blood/injury phobia's mean age of onset being age 9 (Ost, 1987). Interestingly, age of onset and recollection of a direct conditioning experience may be related, as such memories would be of experiences further into the past. Nevertheless, according to these investigations, blood/injury and snake phobias are both thought to have earlier ages of onset and result in fewer recollections of direct conditioning experiences.

Another area in which blood/injury and snake phobias are similar is in the degree to which exposure based therapies are employed as the primary mode of therapy. The vast majority of blood/injury and snake phobia treatment studies in the literature have employed some form of exposure, either in vivo or imaginal flooding (Foa & Kozak, 1985). Cognitive therapies alone, such as those currently in use for treatment of panic disorder (e.g., Clark, 1988), are rarely used and are thought to lack the central element of what makes many anxiety disorder treatments effective: activation of the phobic's fear structure (Foa & Kozak, 1985). Very little serious investigation on possible benefits of drugs in the treatment of simple phobia exists, probably as a result of the near-unanimity of opinion among biological and psychological clinicians and investigators on the appropriateness of exposure-based procedures for simple phobia (Barlow, 1988,

p.490).

The degree of consensus about treatment of choice for simple phobias does not suggest that simple phobia is so well understood that treatments are always successful, or that we can describe a specific treatment for any given anxiety disorder and predict with a high degree of accuracy that an individual patient will show a favorable response (Turner & Michelson, 1984). In the case of simple phobia, it is widely assumed that there is total consensus about the etiology, nature, and treatment of this disorder, yet this view is not wholly supported by clinical outcome research (e.g., Chambless & Woody, 1990). In fact, these assumptions may impede research progress towards the understanding of simple phobia in the same way that progress in mapping the solar system was impaired by the universal assumption of geocentrism.

Although these assumptions about simple phobia partially explain the enigma that it is one of the most prevalent yet least investigated psychiatric disorders, another important issue has served to hold back investigation of simple phobia: simple phobics simply do not seek treatment for this disorder. Barlow notes that only 3% of a clinical sample at the Stress and Anxiety Disorders Clinic at the State University of New York at Albany had a primary diagnosis of simple phobia (Barlow, 1988), and this has been the experience of other clinic directors as well. At the Medical College of Pennsylvania/Eastern Pennsylvania Psychiatric Institute's

Outpatient Behavior Therapy Clinic, over 100 patients were seen by staff clinicians over a one year period beginning in Fall 1991. Of this sample, only two patients received treatment for simple phobia, and neither of these patients were blood/injury or snake phobic (J. E. Herbert, personal communication, July 1992). Thus, the lack of treatment seeking by blood/injury and snake phobics is another shared element of these two disorders. However, the reasons for blood/injury and snake phobics to avoid seeking treatment may be quite different and represent the first major area of divergence that will be discussed.

If it is true that blood/injury and snake phobias are among the most common and yet least treated psychiatric disorders, how can this phenomenon be understood? It seems likely that different explanations may apply for each disorder, and the differences may help to underscore why further investigation of these phobias is warranted. In the case of snake fears, the most likely hypothesis for why sufferers do not seek treatment is that the phobic response and avoidance has little impact on the person's daily functioning. In fact, a person who has an intense anxiety response to snakes and avoids places where snakes might be will not meet diagnostic criteria for snake phobia unless this pattern has a demonstrably negative effect on the sufferer's life (DSM III-R, 1987). Thus, the snake fearful person who lives in a major city where snakes are very rare may never

have to confront their fears in a way that it could impact their functioning. It is only when this person moves to rural Arizona or takes a position in the reptile house at the local zoo where the effects on functioning might become measurable. Many snake phobics live quite well with their fear, and therefore do not feel sufficiently motivated to undertake rigorous exposure-based treatment to overcome their phobia. Additionally, because snake fear is such a common experience in the general population, the person may have their fears and avoidance behavior reinforced by similarly fearful people. This serves to further reduce the likelihood of seeking treatment.

Explanations of treatment avoidance that center on the lack of impact that the phobia has on the sufferer do not seem to fit the clinical picture for blood/injury phobics. As stated earlier, the characteristic response of blood/injury phobics upon exposure to the feared stimulus is vasovagal syncope, or fainting. It is commonly reported that these patients faint when having blood drawn or while having other medical or dental procedures done, but relatively little is known about the extent to which this phobia results in or is associated with avoidance of medical treatment (Kleinknecht & Lenz, 1989). In some cases, avoidance of medical attention is potentially life threatening (Marks, 1988). Some percentage of blood/injury phobics avoid urgent medical procedures that could save their lives: those who become

diabetic eschew insulin injections, and those who develop cancer may shun surgery; some women avoid pregnancy and childbirth because of the association with blood and medical procedures; some sufferers are deterred from embarking on otherwise attractive careers as doctors, nurses, or teachers (Marks, 1988). Further investigation of avoidance behavior associated with blood/injury phobia has demonstrated significant avoidance of blood tests, visiting hospitals, or going to the dentist (Fava, Grandi, & Canestrari, 1989). Kleinknecht and Lenz reported that in a sample of 633 college students, prediction of fainting in a medical situation was a strong predictor of medical avoidance (Kleinknecht & Lenz, 1989). Taken together, the aforementioned studies of medical avoidance in blood/injury phobics clearly demonstrates that the disorder has a significant if not well documented impact on the lives and health of sufferers. The potential danger of avoidance by this group is probably unparalleled in all but the most extremely avoidant and well generalized snake phobics.

Given that there seems to be little argument about the serious impact of blood/injury phobia on the lives of sufferers, what other phenomenon could explain why these patients do not as a rule seek treatment for their disorder? One explanation is similar to that posed when considering this issue in snake phobics: there are many similarly fearful people who may reinforce the phobic's desire to avoid.

However, this seems less likely with blood/injury phobia because while many may empathize with the sufferer's fear, the consequences of avoidance may be so potentially severe that blood/injury phobics will not receive as much support for their avoidant behavior. It seems reasonable that friends and family would not press a snake phobic to join them at the reptile house, but they probably would be less likely to dismiss the blood/injury phobic's avoidance of important medical procedures. Another explanation for the lack of treatment seeking by blood/injury phobics may be the lack of information about effective treatments for blood/injury phobia. A patient recently evaluated for treatment of blood injury phobia at the Medical College of Pennsylvania/EPPI's Center for the Treatment and Study of Anxiety reported that she has experienced fainting symptoms in the presence of blood/injury stimuli since childhood and significant avoidance of medical attention as an adult, but was never made aware that treatment for this problem was possible until a chance meeting with a behavior therapist in a laundromat. It is likely that many sufferers have not been informed about effective short term treatment options, given that serious investigation of blood injury phobia has occurred only in the past decade.

Regardless of the reasons for the lack of blood/injury and snake phobics in treatment clinics, the impact of their absence is that there is a paucity of controlled treatment

outcome studies and investigations of psychopathology with patient samples. With some exceptions (e.g., Ost et al., 1984), much of the existing research in these areas has been conducted using analogue samples. Despite limits to the generalizability of findings from anxious analogue subjects to clinical patients, analogue research has generally been viewed as an acceptable avenue to pursue in attempting to understand anxiety responses. The current investigation utilized an analogue sample of college students, and further discussion of this issue will be addressed in the next section.

The most striking difference between blood/injury and snake phobias is in the characteristic physiological response of blood/injury phobics frequently reported clinically and demonstrated with clinical samples in the laboratories of Ost and colleagues. Blood/injury phobia's unique diphasic physiological response is an intriguing and mysterious phobic reaction, as it is the only anxiety-eliciting stimulus that has been shown to result in vasovagal syncope (Barlow, 1988, p.495). Research conducted by Ost and colleagues over the past decade has reliably demonstrated this response in patient populations, and new treatments for the disorder that directly address this unique physiological response have been further developed and studied. Originally reported by Kozak and Montgomery (1981), the procedure known as applied tension has been shown to result in increased heart rates and decreased

self report of fear in patients with blood/injury phobia (e.g., Ost & Sterner, 1987; Ost, Sterner, & Fellenius, 1989). Further discussion of the psychophysiology of blood/injury phobia is warranted, as questions about possible differences between blood/injury fearful analogue subjects and other groups of analogue subjects represent one of the principal issues addressed in the current investigation.

Psychopathology Research and Analogue Samples

The current study investigated self report, behavioral, and physiological responses of college students to stimuli that they endorsed as either fearful (e.g., Blood Fear Group, Snake Fear Group) or nonfearful (e.g., Nonfearful comparison Group) on a general fear survey. Although the responses of these groups are considered important in their own right, the issues raised in this research are most relevant for phobic patients. Thus, the current investigation fits the description of analogue research, which is generally defined as the use of laboratory-based experiments with nonclinical populations (human or animal) designed to ultimately address issues related to patient populations. The relevance of analogue research has been debated frequently over the past three decades. The controversy over analogue research with animal samples has focused on both ethical concerns and questions about the generalizability of findings, whereas the debate over analogue research with human samples has centered on generalizability of findings in psychopathology studies

using nonclinical college samples to address clinical issues.

Critics of analogue research with human subjects have questioned the strength of the analogy on two central levels: 1) Mild reactions seen in analogue subjects are both quantitatively and qualitatively distinct from psychopathology in patient populations; and 2) College students earning research credit for participation are different in many other ways from phobic patients seeking treatment for debilitating conditions. The primary concern of these critics is that the results of experiments using analogue samples are not relevant to the targeted populations, and cannot generate useful answers to clinical questions. In sum, the generality of particular conclusions from experimental analogues to real-life contexts must be a function of the degree to which the variables studied in the laboratory share the essential characteristics of the variables in clinical contexts (Bernstein & Paul, 1971), and critics of analogue research are generally skeptical of the overlap between the laboratory-based analogue study and the hospital or clinic.

Advocates of analogue research acknowledge that while there are some necessary logical hurdles to overcome, the advantages of properly conducted analogue research are too compelling to contraindicate the use of such studies. These researchers believe that such studies represent the most efficient use of limited resources, and are advantageous in the following ways: 1) They are less expensive than elaborate

clinical trials; 2) Data is collected more rapidly; 3) Data collection is more convenient; 4) There is no commitment beyond the research itself; and 5) Researchers are likely to conduct more innovative studies as a result of the aforementioned advantages. In a recent review of the depression literature, Vrendenburg, Flett, and Krames (1993) compared the results of studies with student and clinical samples. They found generally similar results across populations, and cite several methodological benefits for investigating hypotheses about depression using analogue samples of college students such as a decreased likelihood of other diagnoses, greater homogeneity of predictable life stressors such as exams, decreased likelihood of previous treatment for depression, and homogeneity of social setting (Vrendenburg, Flett, & Krames, 1993). Many of the same arguments can be made in support of the use of analogue college samples in the study of anxiety and phobia, particularly if methodological caveats such as those proposed by Bernstein and Paul (1971) are adopted.

Another reason the use of an analogue sample was seen as particularly relevant in the current research is because clinical investigations of the psychophysiology of blood /injury phobia conducted by Ost and colleagues with patient populations did not use control groups or mildly fearful subjects. Thus, questions about the relationship between clinically relevant blood/injury phobia and milder fears of

such stimuli reported by many in the general population cannot be answered adequately. Is blood/injury phobia, as asserted by Marks (1988), an exaggeration of a more common mild response to blood, or is the physiological and behavioral pattern demonstrated by blood/injury phobic patients unique? The current research allowed for an investigation of a wider range of the blood/injury response continuum, and such knowledge broadens our understanding of the extreme end of fearful responses that Ost and colleagues have investigated in patient populations.

Identification of Physiological Responses for Blood/Injury Phobia

Despite the prevalence of blood/injury fears, the unique psychophysiological reaction associated with the condition, and the potentially devastating consequences of avoidance, there is a relative paucity of information that pertains to this clinical syndrome (Thyer, Himle, & Curtis, 1985). Several aspects of the unique psychophysiological response pattern of blood/injury patients studied by Ost and colleagues have yet to be investigated, and the methodology of this study focused on answering several empirical questions about this pattern. First, the diphasic physiological response that is considered characteristic of blood/injury phobia has only been identified in the research done by Ost and colleagues (e.g., Ost, Sterner, & Lindahl, 1984; Ost, Sterner, & Fellenius, 1989). One goal of the current study was to determine whether

the results of Ost, Sterner, and Lindahl (1984) with clinical patients receiving treatment for the disorder could be replicated in a college sample of blood/injury fearful subjects. This underlying physiological pattern is considered to be the principle focus of applied tension (Ost & Sterner, 1987), and further empirical demonstration of this phenomenon is important in the development of effective treatment protocols.

The exclusivity of the diphasic physiological response to blood/injury phobia was also addressed in the current research, and the results of this line of inquiry will also have important treatment ramifications. It is frequently reported that the diphasic physiological response and associated vasovagal syncope (fainting) often seen in case studies of blood/injury phobia is a phenomena that is specific to this phobia (Connolly, Hallam, & Marks, 1976; Ost, Sterner, & Lindahl, 1984; Thyer, Himle, & Curtis, 1985; Kleinknecht, 1987; Barlow, 1988; Kleinknecht, 1988; Marks, 1988; Kleinknecht & Lenz, 1989). Physiological recording of subjects reporting fear of dogs (e.g., DiNardo, Guzy, & Bak, 1988), spiders (e.g., Prigatano & Johnson, 1974), and snakes (e.g., Sartory, MacDonald, & Gray, 1990) have not demonstrated this response pattern, but these studies did not compare the physiological response patterns of blood/injury fearful subjects when exposed to blood/injury stimuli to the physiological response patterns of other phobics confronting

their particular fears within the same sample. The current research allowed for such a comparison. Further empirical demonstration of the supposed qualitative differences in these patterns will help to validate treatment approaches that specifically focus on the underlying physiology assumed to be central to these anxiety disorders. In addition, the current research exposed subjects who demonstrated self reported fear of blood/injury stimuli to filmed images of snakes as well as thoracic surgery. Similarly, subjects high on self report indices of snake fear viewed filmed images of thoracic surgery in addition to videotapes of snakes. Researchers have suggested that blood/injury phobics' characteristic diphasic physiological response occurs only when exposed to blood/injury stimuli, and that nonanxious subjects will not show this response to blood/injury stimuli (e.g., Marks, 1988). Comparison of the two high-fear groups (blood/injury and snake) when exposed to both types of stimuli will provide data to address the question of the exclusivity of the diphasic physiological response by blood/injury fearful subjects to blood/injury stimuli.

Physiological responses of nonfearful comparison subjects presented with films of blood/injury stimuli were also measured in the current investigation. In the seminal study of the physiology of blood/injury phobia, Ost, Sterner, & Lindahl (1984) measured the heart rate and blood pressure of 18 patients who met DSM III criteria for simple phobia.

However, no control group was employed in this investigation and, subsequently, no published studies of which this author is aware have attempted to measure the heart rate and blood pressure of nonanxious controls presented with blood/injury stimuli. Thus, it remains unclear as to whether the diphasic physiological response of blood/injury phobics is an extreme case of normal responsivity to such stimuli experienced by nonanxious control subjects or whether this response is qualitatively distinct. Such information may be critical in designing appropriate treatment regimens based on physiological assessment, and the design of the current research attempted to answer this empirical question.

Another treatment-related goal of this research was to empirically investigate the relationship between blood/injury fear and vasovagal syncope. It is commonly believed that there is a close relationship between fear of blood/injury stimuli and fainting, and several research studies have demonstrated that between 78% and 80% of the patients presenting for treatment of this disorder report faintness, dizziness, or total loss of consciousness as a primary symptom (Ost, Sterner, & Lindahl, 1984; Thyer, Himle, & Curtis, 1985). However, there is some evidence to suggest that not all blood/injury phobics experience fainting and that not all people who faint when exposed to blood/injury stimuli are fearful (Kleinknecht, 1987; Kleinknecht, 1988), or are avoidant of medical attention (Kleinknecht & Lenz, 1989). In

the current research, information about lightheadedness was gathered immediately following each stimulus presentation. Given differences in setting and sample between this study (research laboratory, analogue sample) and the studies by Ost et al. (1984, 1987, & 1989) and Thyer et al. (1985) (treatment hospitals, clinical samples), it is possible that the relationship between fear and fainting may be different. Empirical demonstration of the existence of blood/injury fearful subjects who do not show the expected symptoms of faintness will have an impact on the development of appropriate treatment strategies for those who experience fear and avoidance without fainting, as these patients would be inappropriate for applied tension. Physiological measures used in this study will be discussed in the method section.

Interrelationships among Cognitive/Self Report, Behavioral, and Physiological Responses

Another important goal of this study is to examine the interrelationship among cognitive/self report, behavioral, and physiological responses to feared stimuli. This multitrait-multimethod approach to psychological measurement was established as a goal by Campbell and Fiske (1959), and is known among anxiety disorder researchers as Triple Response Measurement (TRM). Measurement of responses in each of the cognitive/self report, behavioral, and physiological channels is considered important because, according to Lang (1979), each of these systems performs unique organismic functions and

therefore are only loosely associated. Low correspondence among the three measures has commonly been reported (Himadi, Boice, & Barlow, 1985). In Lang's view, this does not necessarily mean that there is a problem with either the construct or the measures. Instead, this observation should lead researchers to recognize that different indices of fear might show different rates of response to treatment procedures (Rachman & Hodgson, 1974). The reported discrepancies among cognitive/self report, behavioral, and physiological fear indices are considered manifestations of the phenomenon itself rather than a reflection of inadequate measurement (Rachman, 1984). High correlations among the three response channels should not be expected and demonstration of consistency is not the goal of TRM according to this theoretical position (Himadi, Boice, & Barlow, 1985). Some theorists (e.g., Vermilyea, Boice, & Barlow, 1984; Foa & Kozak, 1986; Craske, Sanderson, & Barlow, 1987) are investigating the possibility that response desynchrony may be an important predictor of treatment outcome for agoraphobia, in that patients whose cognitive/self report, behavioral, and physiological data are inconsistent early in treatment tend to do worse in therapy outcome studies. However, studies using data from all three response channels remain relatively rare (Himadi, Boice, & Barlow, 1985). Very low relationships between channels may also suggest measurement error problems (Lick, Sushinsky, & Malow, 1977). Studies by Klieger (1987) and Klieger and

Franklin (1991) have demonstrated the lack of significant relationship between self reported fear as measured with the Fear Survey Schedule and behavioral fear measured by a Behavioral Avoidance Test. These authors attribute much of the inconsistency to invalid self report selection criteria. The use of paper and pencil measures as fear-level selection procedures has been criticized because the wording is often too far removed on a stimulus dimension of arousal from a picture or in vivo exposure to the feared situation (Levis & Peterson, 1990). Methodological factors that could account for low correlations between measures of cognitive/self report, behavioral, and physiological components of anxiety must also be taken into account when interpreting desynchronous responses in anxiety measurement (Lick, Sushinsky, & Malow, 1977). Little actual research has been directed at determining why the lack of synchrony occurs, and questions of whether or not synchronous responses should be expected are as yet unanswered (Turner & Michelson, 1984). The degree of interrelationship among self report measures, behavioral avoidance, and physiological measurements during exposure to Blood/Injury and Snake Stimuli was examined in this study. This information may help to clarify the nature of the relationship between each anxiety response channel.

Validation of Avoidance Tests for Blood/Injury Fear

Another important research goal of the current investigation is to validate a Behavioral Avoidance Test (BAT)

for blood/injury stimuli. Typically, laboratory observation of overt behavior has been conducted only with stimuli that are easily tested using Behavioral Avoidance Tests such as rats (e.g., Geer, 1965), snakes (e.g., Klieger, 1987), dogs (e.g., DiNardo, Guzy, & Bak, 1988) or insects (e.g., Fazio, 1969). Consequently, those stimuli that do not lend themselves to such approach tests remain underresearched (Levis & Peterson, 1990). Attempts have been made to create a realistic approach test for blood/injury stimuli (e.g., Klieger & Franklin, 1991), and the test used in this research can be validated via comparison with both self report and physiological measures of blood/injury fear. Avoidance tests for both snakes and blood used in this study are based on principles derived in laboratory research on behavioral avoidance (e.g., Bernstein & Paul, 1971; Bernstein & Nietzel, 1973; Bernstein & Nietzel, 1974; Bernstein, 1974; Lick, Sushinsky, & Malow, 1977; Nietzel & Bernstein, 1981; Kern, 1983). A blood filled syringe served as the stimulus for the blood/injury avoidance test, and a 2 ft. green ribbon snake was used in the snake avoidance test. Subjects were not asked to touch either of these stimuli as part of their avoidance tests, the experimenter was present, and instructions were "high demand". It is believed that these procedures controlled for demand characteristics that are thought to influence Behavioral Avoidance Test scores.

Anxiety Sensitivity as a Predictor of Phobic Behavior

Data was gathered to assess a recently proposed hypothesis of anxiety in which anxiety sensitivity, or excessive worry and irrational belief about the consequences of anxiety, is believed to predispose certain individuals to the development of anxiety disorders (Reiss, Peterson, Gursky, & McNally, 1986). Subjects completed the Anxiety Sensitivity Index (ASI, Reiss et al., 1986), and scores on this instrument were correlated with behavioral, relevant physiological, and other self report measures to determine whether excessive concern about the consequences of anxiety is predictive of anxiety responding in each of the three response channels. Previous research with this instrument has validated its usefulness as a measure of sensitivity to anxiety as opposed to anxiety frequency or severity (McNally & Lorenz, 1987).

Finger Pulse Volume

Finger pulse volume (FPV) is a measure of peripheral blood flow that is thought to be useful in the study of anxiety. The relationship between peripheral blood flow and anxiety is best articulated by Bloom, Houston, & Burish (1976). Contemporary psychophysiological theory suggests that stress induces vasoconstriction in the peripheral blood vessels, decreasing the amount of blood flowing to the periphery of the body and increasing blood flow to the musculature to prepare the organism for action (Mathews & Lader, 1971). Bloom et al. (1976) suggest that since anxiety is an obvious and potent stressor, decreased peripheral blood

flow should also be an indicant of anxiety. In their study of the effects of anxiety on peripheral blood flow as measured by finger pulse volume, Bloom et al. (1976) found that subjects in a threatening condition (warning of impending electric shock) exhibited significantly lower FPV than subjects in a control condition. They conclude that FPV is responsive to changes in anxiety and that certain bodily changes (e.g., cold hands, pale demeanor) may be indicative of anxiety.

Bloom and Trautt (1977) conducted another experiment to explore the utility of FPV as a measure of anxiety. In this study, Bloom and Trautt (1977) exposed subjects to threatening (warning of impending shock) and nonthreatening (no mention of shock) conditions while measuring FPV, heart rate, and self report of anxiety. Results indicated that FPV was more responsive to the threat manipulation immediately following instruction but that it returned to baseline more quickly than heart rate. Intercorrelations among the measures were generally small and nonsignificant, and the authors conclude that this is partially a function of demand characteristics of the experiment: subjects were told to remain calm and this may have influenced self report of anxiety. They also suggest that this experiment provides further evidence for the usefulness of FPV in anxiety research, and that perhaps patients should be specifically instructed to focus on phenomenological experiences of decreased FPV (e.g., cold

hands), which occurs early in the anxiety response, when being given instructions for a treatment intervention that emphasizes early awareness of anxiety cues such as cued relaxation (Bloom & Trautt, 1977).

Frederickson and Ohman (1979) conducted an experiment with subjects conditioned to fear relevant (snakes and spiders) and fear irrelevant (flowers and mushrooms) slide stimuli by an electric shock unconditioned stimulus. Again, their results suggest that FPV is a sensitive measure of anxiety, as FPV demonstrated reliable acquisition and superior resistance to extinction for fear relevant slides when compared to skin conductance measures.

Smith, Houston, and Zurawski (1984) evaluated FPV as a measure of social-evaluative threat instead of threat of physical harm, which predominates in FPV research. Subjects were interviewed in either high or low stress conditions. In the high stress interview, subjects were told that the interview was concerned with physiological correlates of verbal intelligence, and that verbal intelligence would be monitored throughout the procedure. Subjects in the low stress interview condition received no instruction about verbal intelligence monitoring. FPV was found to be sensitive to threat manipulation yet not highly correlated with State Anxiety during the interview period. Smith et al. warn that FPV should be used in conjunction with other measures of anxiety, as other research has also found FPV to be responsive

to orienting and anger.

More recent studies have used FPV as a measure of anxiety. Goldwater (1987) assigned subjects to a high arousal (standing) and a low arousal (sitting) condition while measuring SC and FPV. It was discovered that subjects in the high arousal condition showed significantly greater FPV decreases from baseline than subjects in the low arousal condition, and that the correlation between FPV and SC was not significant. Additionally, Puigcerver, Martinez, Garcia, and Gomez (1989) measured physiological variables (FPV, HR, and SC) and subjective anxiety in speech anxious and nonanxious subjects prior to, during, and following an impromptu speech. None of the physiological measures differentiated between the two groups, as both groups demonstrated subjective and physiological arousal prior to giving the speech. Self report measures of anxiety were found to differentiate best between the two groups.

Finger Pulse Volume was used in the current study because there is no published study of which this author is aware that has measured peripheral blood flow in blood phobics. The aforementioned studies suggest that FPV may be a particularly sensitive measure of social-evaluative anxiety and anxiety induced by threat of physical harm, but the effects of viewing videotapes of feared stimuli on FPV in blood fearful subjects is unknown. Therefore, FPV was measured and will be discussed in greater detail in the Method section.

Hypotheses

Group Differences in Fear Behavior

Based on the logic of the group structure, it was expected that each fear group (Blood, Snake, and Nonfearful Comparison) would show changes in physiological responses from baseline while observing a stimulus videotape specific to their fear, and they would not show such changes when presented with stimulus videotapes not specific to their fear or when presented with neutral videotapes. Therefore, it was hypothesized that 1) The Blood Fear Group would differ significantly from the Snake Fear Group and the Nonfearful Comparison Group on changes from baseline physiological responses (heart rate, systolic blood pressure, diastolic blood pressure, finger pulse volume) during the Blood Stimulus but would not differ during Neutral Stimuli. Similarly, 2) The Snake Fear Group would differ significantly from the Blood Fear Group and the Nonfearful Comparison Group on changes from baseline physiological responses (heart rate, systolic blood pressure, diastolic blood pressure, finger pulse volume) during the Snake Stimulus but would not differ during Neutral Stimuli.

Each of the three groups were expected to differ on subjective ratings following films. Subjects rated their anxiety using the Subjective Units of Distress scale, and also rated their feelings of Lightheadedness following each films.

It was expected that 3) The Blood Fear Group would have significantly higher SUDs ratings following the Blood Stimulus than the other groups, and the Snake Fear Group would have significantly higher SUDs ratings following the Snake Stimulus than the other groups. Also, it was hypothesized that 4) The Blood Fear Group would have significantly higher LH ratings following the Blood Stimulus than the other groups, and the Snake Fear Group would show no such differences in LH from the other groups in response to the Snake Stimulus.

Each of the Fear Groups were also expected to differ significantly on the Behavioral Avoidance Tests. It was hypothesized that 5) The Blood Fear Group would show greater avoidance of the blood filled syringe than the other groups, and the Snake Fear Group would show greater avoidance of the snake than the other groups.

Additionally, group differences were expected on specific fear questionnaires, but not on general measures of psychopathology. It was hypothesized that 6) The Blood Fear Group would have higher scores on the MQ than either the Snake Fear Group or the Nonfearful Comparison Group, which would not differ from one another; and 7) The Snake Fear Group would have higher scores on the SNAQ than either the Blood Fear Group or the Nonfearful Comparison Group, which would not differ from one another. No group differences were expected on the BDI, STAI-S, STAI-T, and on Total FSS scores.

Physiological Differences for Blood Fear Group to Thoracic

Surgery Videotape

Previous research with blood/injury phobics (e.g., Ost et al., 1984) has shown a diphasic physiological response to videotaped presentations of thoracic surgery. These subjects showed initial increases in heart rate and blood pressure above previously recorded baseline levels, followed by marked drops significantly below these baseline recordings. It was hypothesized that similar physiological patterns would emerge in this investigation: 8) Blood Fear Group subjects would show increases in heart rate, blood pressure, and digital vasoconstriction above baseline recordings when initially presented with the thoracic surgery videotape that would be followed by decreases below these previously recorded baseline measures.

Relationships Among Response Channels

Correlations between cognitive/self report, behavioral, and physiological data were calculated, and it was expected that 9) Different questionnaires would yield different degrees of relationship with other response channel measures.

Anxiety Sensitivity as a Predictor of Overt Behavior and Physiological Responsivity to Fear Videotape Presentation

Anxiety sensitivity was believed to be a significant predictor of behavioral and physiological measures of fear. Specifically, it was predicted that 10) ASI scores would be significantly associated with changes from baseline physiological measures during presentation of Fear Stimuli,

and with BAT scores.

Method

Overview

This study was conducted in two phases. In Phase I, female students from classes at the University of Rhode Island were told that the experimenter was interested in the prevalence of various fears in college students, and that those students interested in participating should complete the FSS. A total of 149 female volunteers completed the FSS III and returned it to the experimenter. Of this sample, 72 participants were contacted by telephone and asked if they were interested in participating in a laboratory assessment of fear that would involve actually approaching and later viewing videotapes of two of the items from the FSS they completed in Phase I of the study. Participants were told that they would not find out which items would be involved until they read the consent form that would be provided to them in the laboratory if they were interested in participating. Nine subjects (6 Nonfearful, 2 Blood Fear, 1 Snake Fear) declined the invitation during the telephone interview, 2 subjects (2 Nonfearful) broke scheduled laboratory appointments and did not reschedule, and 61 subjects kept their scheduled appointments. Of the 61 subjects who kept scheduled appointments, 1 subject declined

to participate upon reading that the experiment involved snakes. A total of 60 subjects participated in all Phases of the study: 20 subjects who reported fear (a 3 or 4 on the FSS III item) of human blood, 20 subjects who reported fear of snakes, and 20 subjects who reported no fear of both items (a 0 on the FSS III item). Upon arrival at the laboratory for Phase II, subjects were asked to complete a packet of questionnaires pertaining to general anxiety, specific fears, and depression. Next, subjects' permission was obtained to participate in Behavioral Avoidance Tests for both blood and snakes. Next, subjects were asked to view films of thoracic surgery and images of snakes, as well as neutral travel scenes. Subjects were monitored physiologically during this period, and were asked to rate their subjective levels of anxiety from 0 to 100 after viewing each film. They also rated their feelings of lightheadedness on a 1 to 7 point Likert scale. Following the last procedure, subjects were fully debriefed.

Subjects

In Phase I, subjects were 149 female undergraduate students enrolled in classes at the University of Rhode Island. Of these participants, 73 female undergraduates were selected on the basis of FSS III scores to participate in Phase II. Nine subjects declined to participate during the telephone interview, 2 subjects did not keep scheduled appointments to participate, and one subject declined to

participate upon reading Consent Form B. The mean age of the 60 subjects who participated in all Phases of the study was 19.2. Subjects received research credit for their participation in each Phase of the research.

Materials

Fear Survey Schedule III (FSS III). This instrument was originally developed for the specific purpose of assessing change in phobic behavior and generalized anxiety in experimental studies of systematic desensitization (Lang & Lazovik, 1963). Items were selected for Wolpe and Lang's scale based upon the judgement of clinicians asked to list the most prevalent fears encountered in therapy. Wolpe and Lang's FSS III (1964) was revised and extended for clinical use, with additional items included on the basis of clinical observations by behavior therapists. This version was expanded in 1969 to its present form of 108 items (Wolpe & Lang, 1977). FSS items are rated on a 5 point Likert scale, with 0 indicating "no fear" and 4 indicating "very much fear". Test-retest reliability of this instrument has been estimated at $r=.69$ with a ten week period between testing (Wolpe & Lang, 1977), although this correlation was calculated on a total score rather than for individual items. This version of the FSS was chosen because it is currently the most widely used fear schedule (Spielberger, 1982), as well as the most extensive.

State - Trait Anxiety Inventory (STAI). This instrument

was developed by Spielberger, Gorsuch, and Lushene (1970) to assess two theoretically distinct types of anxiety, that which is a function of immediate situational demands (state) and that which is considered to be a relatively stable personality feature (trait). This instrument has been used widely, and both forms were utilized in this research. STAI State and Trait forms both consist of 20 items rated on a 4 point Likert scale with 1 indicating "not at all" and 4 indicating "very much" in response to questions about feeling calm, upset, etc.. Spielberger, Gorsuch, Lushene, Vagg and Jacobs (1983) report the test-retest reliability of the Trait Anxiety scale as ranging from .73 to .85 for a variety of samples. State Anxiety test-retest reliability has ranged from .65 to .75 within those same samples.

Snake Anxiety Questionnaire (SNAQ). This instrument has been used as a measure of snake fear since its creation (Klorman et al., 1974). It is a 30 item true-false measure that asks specific questions about reactions to snakes. The test-retest reliability of the SNAQ over periods of approximately one week was $r=.783$ (Klorman et al., 1974). Its use as a selection device for phobia research has been questioned (Klieger, 1987), but it is one of the few instruments of its type that surveys self-reported avoidance of snakes.

Mutilation Questionnaire (MQ). This instrument was developed by Klorman et al. (1974) to provide information

about specific blood/injury fear reactivity. The MQ is also a 30 item true-false specific fear measure. Test-retest reliability of the MQ over a period of three weeks was $r=.81$ (Klorman et al., 1974). Most recently, the MQ was used by Kleinknecht and Lenz (1989) in a study of blood/injury fear in families.

Anxiety Sensitivity Index (ASI). This instrument was developed by Reiss et al. (1986) to assess beliefs about the potential negative consequences of experiencing anxiety symptoms. According to McNally and Lorenz (1987), anxiety sensitivity refers more specifically to the belief that anxiety has undesirable consequences apart from its immediate unpleasantness, and that this construct is different than anxiety frequency or anxiety severity. Subjects rate 16 anxiety related statements on a 5 point Likert scale with 0 indicating "very little" and 4 indicating "very much". Results of a psychometric assessment by Reiss et al. (1986) provides evidence for the test-retest reliability of the ASI ($r=.75$). Validity work in this same investigation was encouraging, providing evidence that the ASI measures a construct that current anxiety frequency and severity scales do not assess.

Beck Depression Inventory (BDI). Beck, Steer, and Garbin (1987) recently revised this 21 item measure of depressive symptomatology. For these 21 depressive symptoms, subjects are asked to choose from four symptom descriptions that range

from 0 (no symptom) to 3 (severe). The BDI has received considerable psychometric attention, and a review of 10 studies that address pretest and posttest administrations for varying time intervals for psychiatric patients ranged from $r=.48$ to $r=.86$ (Beck, Steer, & Garbin, 1987). The BDI is used with both clinical and nonclinical populations. It was used in this study because much research (e.g., Foa & Foa, 1982) has determined that considerable overlap exists between depression and anxiety.

Subjective Ratings of Anxiety. These ratings were made using Subjective Units of Distress (SUDs) measures (Wolpe, 1982) in which subjects were asked to rate their subjective anxiety levels from 0 ("no anxiety") to 100 ("the worst anxiety you have ever experienced"). In addition, subjects were asked to rate feelings of lightheadedness (LH) on a 7 point Likert scale with 1 meaning "no lightheadedness" to 7 "nearly passing out". Both ratings were taken immediately following videotape viewing.

Behavioral Avoidance Tests (BATs). These tests were used to assess avoidance of blood and snakes. The scales used in Klieger (1987) and Klieger and Franklin (1991) were closely approximated. The stimulus for the blood avoidance test was a syringe filled with human blood. A 2 ft. green ribbon snake served as the stimulus for the snake avoidance test. Recommendations provided by Bernstein and Paul (1971), Bernstein and Nietzel (1973, 1974), and Nietzel and Bernstein

(1981) about conducting Behavioral Avoidance Tests in research studies were heeded. The experimenter was present during the avoidance tests and did not ask subjects to touch or handle the feared objects. In addition, the experimenter used "high demand" instructions, in which subjects were instructed to approach the feared objects as closely as they possibly could rather than up to the point of minor discomfort. Subjects' behavior on these tasks was measured using a grid placed on the floor that demarks progress in 1 ft. increments. Detailed descriptions of these BATs are provided in the Appendix.

Physiological Measures. Finger pulse volume (Smith, Houston, & Zurawski, 1984) was measured using an infrared finger photometer placed on the index finger of the subject's right hand. Recordings were made on a Grass polygraph. Four FPV measures (90 seconds apart) were derived during each Stimulus period by averaging across five consecutive peaks. Heart rate and blood pressure were assessed every 90 seconds during the physiological recording session using a Spacelabs blood pressure monitor and occluding cuff. The cuff was placed around the subject's left arm. For data analysis, change scores were calculated for each of the physiological variables (HR, DBP, SBP, and FPV) by subtracting the average baseline score from the raw scores measured during each Stimulus period. This mean baseline score was calculated for each of the physiological variables by adding the four data points measured during the six minute baseline period and

dividing this total by four. Thus, a mean baseline score was calculated for HR, SBP, DBP, and FPV for each subject. Including four baseline recording data points per physiological variable, each subject had 24 data points (6 Stimulus periods x 4 points per Stimulus period) calculated for each of the four physiological variables (HR, DBP, SBP, and FPV), for a total of 96 physiological data points per subject.

Videotapes. Three videotapes were used in this study:

1) Neutral Stimulus, which is a montage of travel scenes that has been used as a neutral stimulus in previous research (e.g., Franklin, Morokoff, & Calderone, 1991); 2) Blood Fear Stimulus, which is a color film of open heart surgery that contains a large amount of blood; and 3) Snake Fear Stimulus, which is an edited version of the movie Raiders of the Lost Ark in which multiple snakes are shown.

Procedure

Female undergraduate students enrolled in classes at the University of Rhode Island were asked to participate in a research project that investigates the nature and prevalence of several specific fears. 149 students participated in Phase I of the study, in which they completed the FSS III and returned it to the experimenter. Before completing the FSS III, subjects completed Consent Form A (see Appendix) and were informed that a second phase of the study would be conducted. Those subjects who wished to be eligible for participation in

Phase II provided their names and telephone numbers. From the sample of 149 women, 73 participants were identified and then recruited by telephone to volunteer for participation in Phase II. Sixty three subjects scheduled a laboratory session in which they could participate in up to three additional studies. Sixty one subjects kept their scheduled appointments, and one subject declined to participate after reading Consent Form B. Subjects who agreed to participate in Phase II completed Consent Form B (20 Blood Fear, 20 Snake Fear, and 20 Nonfearful Comparison), then completed a questionnaire packet that measured general anxiety, specific fears of snakes and blood, depression, and their expectations about the consequences of anxiety. After completing the questionnaires, subjects completed Consent Form C, in which they were invited to participate in Behavioral Avoidance Tests for blood and snakes. Subjects were asked to approach a syringe filled with human blood and a 2 ft. green ribbon snake. These items were covered at first, and the subject was asked to view the covered item from 15 ft.. The researcher then removed the cover and asked the subject to approach the item as closely as they possibly could. Subjects were specifically instructed that they would not handle or touch either of the feared items, and the snake case would remain locked throughout the experiment.

After the Behavioral Avoidance Test, subjects were invited to participate further by viewing videotapes of blood,

snakes, and a montage of travel scenes. They completed Consent Form D, and were escorted to a room in the laboratory that contained a television monitor and a comfortable chair. A blood pressure cuff was placed around the subject's left arm, and a finger photometer for the measurement of digital vasoconstriction (finger pulse volume) were placed on the subject's right index finger. Subjects were monitored physiologically during a 6 minute baseline period, which was followed by presentation of a 6 minute Neutral Stimulus of travel scenes. Next, subjects viewed either the Blood Stimulus or the Snake Stimulus, each also lasting 6 minutes. Half of the subjects viewed the Snake Stimulus first, half viewed the Blood Stimulus first. Following the first Fear Stimulus, subjects viewed a second 6 minute Neutral Stimulus to return physiological measures to baseline levels. Then subjects viewed the Fear Stimulus that they did not see first, followed by a third 6 minute Neutral Stimulus. After each Stimulus viewing, subjects were asked to rate their SUDS and lightheadedness in response to the film they just viewed. Following the last Neutral Stimulus, subjects disconnected physiological recording equipment and were fully debriefed. Arrangements had been made to refer subjects who wished to seek therapy for their fears to the Counseling Center at the University of Rhode Island, but no subjects requested a referral after being informed of this option.

Results

Physiological Data Reduction

As described above, a total of 96 physiological data points were calculated for each subject in the experiment. For each of the four physiological dependent variables (HR, DBP, SBP, and FPV), three independent variables were of interest: Group, Stimulus, and Time. The first of these independent variables, Group, is a between subjects variable that has three levels: Snake Fear Group, Blood Fear Group, and Nonfearful Comparison Group. Group assignments were made using information provided from the initial subject screening procedure using the FSS III. The second independent variable, Stimulus, is a within subjects factor that refers to the films viewed in the laboratory by subjects, and this variable has five levels: Neutral 1, Blood, Neutral 2, Snake, and Neutral 3. The third independent variable, Time, is a within subjects factor with four levels: Time 1, Time 2, Time 3, and Time 4. These levels of time reflect the calculation of four data points per Stimulus period for each of the physiological variables measured in this study.

All data analyses on physiological variables were conducted using change scores that reflect baseline physiological recordings for each subject. Four data points per physiological variable were measured during a 6 minute baseline recording period prior to film viewing. For each

physiological variable, these baseline scores were averaged to produce a single baseline average score for HR, DBP, SBP, and FPV. Next, these baseline average values were subtracted from the raw data measured during film viewing (5 Stimulus periods x 4 Times per Stimulus), thus producing physiological change scores. These values were used in subsequent data analyses. A diagram of the physiological data reduction is provided in Table 1.

Film Presentation Order

Following a 6 minute baseline recording period, 5 Videotapes were presented in one of two orders: 1) Neutral 1, Snake, Neutral 2, Blood, Neutral 3; or 2) Neutral 1, Blood, Neutral 2, Snake, Neutral 3. The effects of order were examined for each of the four physiological dependent variables, and on each measure there were no significant effects involving the Order variable. Order was therefore collapsed for all subsequent analyses.

Heart Rate

Means and standard deviations of heart rate are provided in Table 2. To determine whether the three Groups differed in heart rate changes from baseline (see Hypotheses 1,2, and 8), a 3 (Group) by 5 (Stimulus) by 4 (Time) repeated measures ANOVA was conducted with repeated measures on the last two factors. Results indicated a significant main effect for Stimulus, $F(2,228) = 3.70$, $p < 0.001$, and a significant Group by Stimulus interaction, $F(8,228) = 4.88$, $p < 0.0001$. There was

no significant main effect for Group, and there was no significant effect for Time. In subsequent analyses, values for the four measurements taken within each Stimulus condition were averaged.

Simple effects of Group within each Stimulus were examined using oneway ANOVAs. Results indicated significant group differences for the Snake Stimulus, $F(2,57) = 7.13$, $p < 0.01$; and Neutral 3, $F(2,57) = 3.53$, $p < 0.05$. Results were not significant for Neutral 1, Neutral 2, and Blood.

Post hoc comparisons were conducted on HR changes from baseline during the Snake and Neutral 3 Stimuli using Scheffe's procedure. Within the Snake Stimulus, results indicated that the Snake Fear Group's Heart Rate Change Score (HRCS) ($X=4.763$) was significantly higher than the Blood Fear Group's HRCS ($X=.288$). Additionally, the Snake Fear Group's HRCS was significantly higher than the Nonfearful Comparison Group's HRCS ($X=-.037$). Results also indicated that HRCS for the Blood Fear Group and the Nonfearful Comparison Group were not significantly different.

Within the Neutral 3 Stimulus, results indicated that the Snake Fear Group's HRCS ($X=-2.712$) was significantly lower than the Blood Fear Group's HRCS ($X=.713$). However, the Snake Fear Group's HRCS was not significantly different than the Nonfearful Control Group's HRCS ($X=-.062$), and the Blood Fear Group and the Nonfearful Comparison Group did not differ from one another on HRCS.

Additional posthoc analyses were conducted to examine simple effects of Stimulus within the two Fearful groups (Snake and Blood). Planned comparisons were done within both Fear Groups, collapsing over Time. A mean Neutral Heart Rate change score was computed by averaging change scores across the three Neutral Stimuli, and this new Neutral Heart Rate change score was used in subsequent analyses.

Within the Snake Fear Group, the HRCS during the Snake Stimulus ($X=4.76$) was significantly higher than during the Blood Stimulus ($X=.21$), $F(1,19) = 8.95$, $p<0.01$. These subjects also had significantly higher HRCS during the Snake Stimulus than during the Neutral Stimuli, $F(1,19) = 7.10$, $p<0.05$. The HRCS during the Blood Stimulus was not significantly different than the HRCS during the Neutral Stimuli.

Within the Blood Fear group, the HRCS during the Blood Stimulus ($X=-.29$) was not significantly different than the Snake Stimulus ($X=.28$). The HRCS during the Blood Stimulus was also not significantly different than during the Neutral Stimuli. The HRCS during the Snake Stimulus was not significantly different than during the Neutral Stimuli.

Diastolic Blood Pressure

Means and standard deviations of diastolic blood pressure scores are provided in Table 3. To determine whether the three Groups differed in diastolic blood pressure (DBP) changes from baseline (see Hypotheses 1,2, and 8), a 3 (Group)

by 5 (Stimulus) by 4 (Time) repeated measures ANOVA was done, with repeated measures on the last two factors. Results indicated a significant main effect for Stimulus, $F(4,228) = 5.23$, $p < .001$, and a significant Group by Stimulus interaction, $F(8,228) = 2.33$, $p < 0.05$. There was no significant main effect for Group, and there was no significant effect for Time. In subsequent analyses, values for the four measurements taken within each Stimulus condition were averaged.

Simple effects of Group within each Stimulus were examined using oneway ANOVAs. Results indicated significant group differences for the Snake Stimulus, $F(2,57) = 4.99$, $p < 0.05$. There were no significant group differences for each of the other four Stimulus periods.

Post hoc comparisons were conducted on DBP changes from baseline within the Snake Stimulus period using Scheffe's procedure. Results indicated that the Snake Fear Group's DBPCS ($X=4.687$) was significantly higher than the Blood Fear Group's DBPCS ($X=-2.087$). However, the Snake Fear Group's DBPCS was not significantly different than the Nonfearful Comparison Group's ($X=-.475$). Results also indicated that the Blood Fear Group's DBPCS and the Nonfearful Comparison Group's DBPCS were not significantly different.

Additional posthoc analyses were conducted to examine simple effects of Stimulus within the two Fear groups (Snake and Blood). Planned pairwise comparisons were conducted within both Fear Groups, collapsing over Time. A mean Neutral

DBPCS was computed by averaging change scores across the three Neutral Stimuli, and this new Neutral Stimuli DBP change score was used in subsequent analyses.

Within the Snake Fear Group, the DBPCS during the Snake Stimulus ($X=4.69$) was significantly higher than during the Blood Stimulus ($X=-.65$), $F(1,19) = 49.62$, $p<0.0001$. These subjects also had significantly higher DBPCS during the Snake Stimulus than during the Neutral Stimuli, $F(1,19) = 29.21$, $p<0.0001$. The DBPCS during the Blood Stimulus was not significantly different than the DBPCS during the Neutral Stimuli.

Within the Blood Fear Group, the DBPCS during the Blood Stimulus ($X=-5.21$) was significantly lower than during the Snake Stimulus ($X=-2.09$), $F(1,19)=4.65$, $p<0.05$. However, the DBPCS during the Blood Stimulus was not significantly different than the DBPCS during Neutral Stimuli, although there was a trend in the expected direction, $F(1,19) = 4.65$, $p>.0.05$. The DBPCS during the Snake Stimulus was not significantly different than during the Neutral Stimuli.

Systolic Blood Pressure

Means and standard deviations of systolic blood pressure scores are provided in Table 4. To determine whether the three Groups differed in systolic blood pressure changes from baseline (see Hypotheses 1, 2, and 8), a 3 (Group) by 5 (Stimulus) by 4 (Time) repeated measures ANOVA was conducted with repeated measures on the last two factors. Results

indicated a significant main effect for Stimulus, $F(4,228) = 3.87$, $p < 0.01$. There was no significant main effect for Group, and no significant interactions. There was no significant effect for Time, and in subsequent analyses values for the four measurements taken within each Stimulus condition were averaged.

Post hoc pairwise comparisons were conducted on SBP changes from baseline to determine which of the five Stimulus conditions differed from one another. Results indicated that the SBPCS during the Snake Stimulus was significantly higher than the SBPCS during the Neutral Stimuli, $F(1,59) = 8.94$, $p < .01$. Results also showed that SBPCS during the Snake Stimulus was not significantly different than during the Blood Stimulus; SBPCS during the Blood Stimulus was not significantly different than during the Neutral Stimuli; and the Neutral Stimuli were not significantly different than each other.

Finger Pulse Volume

Means and standard deviations of finger pulse volume (FPV) scores are provided in Table 4. To determine whether the three Groups differed in FPV changes from baseline (see Hypotheses 1, 2, and 8), a 3 (Group) by 5 (Stimulus) by 4 (Time) repeated measures ANOVA was conducted with repeated measures on the last two factors. Results indicated a significant main effect for Stimulus, $F(4,228) = 6.43$, $p < .001$; and a significant Group by Stimulus interaction, $F(8,228) =$

4.26, $p < 0.001$. There was also a significant Stimulus by Time interaction, $F(12,684) = 1.89$, $p < 0.05$. There was no significant main effect for Group or for Time.

Simple effects of Group within each Stimulus (collapsing over time) were examined using oneway ANOVAs. Results indicated significant group differences for the Blood Stimulus, $F(2,57) = 3.66$, $p < 0.05$. There were no significant group differences for each of the other four Stimulus periods.

Post hoc comparisons were conducted on FPV changes from baseline during the Blood Stimulus using Scheffe's procedure. Results indicated that the Blood Fear Group's FPVCS ($X = -5.077$) was significantly lower than the Snake Fear Group's FPVCS ($X = .388$). However, the Blood Fear Group's FPVCS was not significantly different than the Nonfearful Comparison Group's ($X = -1.190$). Results also indicated that the Snake Fear Group's FPVCS and the Nonfearful Comparison Group's FPVCS were not significantly different.

Additional posthoc analyses were conducted to examine simple effects of Stimulus within the two Fearful groups (Snake and Blood). Planned pairwise comparisons were conducted within both Fear Groups, collapsing over Time. A mean FPV change score was computed by averaging change scores across the three Neutral Stimuli, and this new Neutral Stimuli FPV change score was used in subsequent analyses.

Within the Snake Fear Group, the FPVCS during the Snake Stimulus ($X = -3.96$) was significantly lower than during the

Blood Stimulus ($X=.39$), $F(1,19) = 12.16$, $p<0.01$. These subjects also had significantly lower FPVCS during the Snake Stimulus than during Neutral Stimuli, $F(1,19) = 13.55$, $p<0.01$. The FPVCS during the Blood Stimulus was not significantly different than the FPVCS during the Neutral Stimuli.

Within the Blood Fear Group, the FPVCS during the Blood Stimulus ($X=-5.08$) was significantly lower than during the Snake Stimulus ($X=-.02$), $F(1,19) = 11.23$, $p<0.01$. The FPVCS during the Blood Stimulus was also significantly lower than during the Neutral Stimuli, $F(1,19) = 8.16$, $p>0.05$. The FPVCS during the Snake Stimulus was not significantly different than during the Neutral Stimuli.

As mentioned above, a significant Stimulus by Time interaction was found in the $3 \times 5 \times 4$ repeated measures ANOVA. Simple effects of Time within each Stimulus condition were examined using separate ANOVAs with repeated measures for each level of Stimulus, collapsing across Group. Results indicated significant differences for Neutral 1, $F(3,177) = 2.83$, $p<0.05$; and for Neutral 2, $F(3,177) = 3.32$, $p<0.05$. There were no significant differences for Snake Stimulus, Blood Stimulus, and Neutral 3.

Post hoc comparisons were conducted to determine which of the four Time measures were significantly different within Neutral 1 and Neutral 2 Stimuli. Within Neutral 1, results showed that FPVCS was significantly lower at Time 3 ($X=-1.19$) than at Time 2 ($X=1.54$), $F(1,59)=6.96$, $p<0.05$. Results were

not significant for Time 1 ($X=.158$) versus Time 2; Time 1 versus Time 3; Time 1 versus Time 4 ($X=.173$); Time 2 versus Time 4 ($X=.173$); and Time 3 versus Time 4.

Within Neutral 2, results showed that FPVCS was significantly lower at Time 1 ($X=-1.32$) than at Time 2 ($X=.151$), $F(1,59) = 4.42$, $p<0.05$; FPV at Time 1 was significantly lower than at Time 4 ($X=.598$), $F(1,59) = 8.56$, $p<0.01$; and FPV was significantly lower at Time 3 ($X=-.706$) than at Time 4, $F(1,59) = 4.13$, $p<0.05$. Results were not significant for Time 1 versus Time 3; Time 2 versus Time 3; and Time 2 versus Time 4.

Subjective Units of Distress

Means and standard deviations of SUDS ratings are provided in Table 6. To determine whether the three Groups differed in SUDs ratings following videotape viewing (see Hypothesis 3), a 3 (Group) by 5 (Stimulus) repeated measures ANOVA was conducted with repeated measures on the second factor. Results indicated a significant main effect for Group, $F(2,57) = 19.32$, $p<0.001$, a significant main effect for Stimulus, $F(4,228) = 55.02$, $p<0.001$, and a significant Group by Stimulus interaction, $F(8,228)=19.46$, $p <0.001$.

Simple effects of Group within each Stimulus were examined using oneway ANOVAs. As expected, results indicated significant group differences on SUDs ratings following the Snake Stimulus, $F(2,57) = 27.14$, $p<0.001$; and the Blood

Stimulus, $F(2,57) = 12.45$, $p < 0.001$. There were no significant group differences following the three Neutral Stimuli.

Post hoc comparisons were conducted on SUDs ratings following the Snake Stimulus and the Blood Stimulus using Scheffe's procedure. Following the Snake Stimulus, the Snake Fear Group ($X=40.95$) was significantly more distressed than the Blood Fear Group ($X=15.60$) and the Nonfearful Comparison Group ($X=2.55$), which did not significantly differ from each other. Post hoc comparisons of SUDs ratings following the Blood Stimulus indicated that the Blood Fear Group ($X=31.20$) was significantly more distressed than the Snake Fear Group ($X=15.55$) and the Nonfearful Comparison Group ($X=3.90$), which also did not differ significantly from each other.

Additional posthoc analyses were conducted to examine simple effects of Stimulus within both fearful groups (Snake and Blood). Planned paired comparisons were done within each of the Fearful Groups. A mean Neutral SUDs score was computed by averaging the SUDs ratings for Neutral 1, Neutral 2, and Neutral 3, and this new SUDs rating was used in subsequent comparisons.

Within the Snake Fear Group, subjects reported significantly more distress following the Snake Stimulus than they did following the Blood Stimulus, $F(1,19) = 25.55$, $p < 0.001$. These subjects also reported significantly more distress following the Snake Stimulus than they reported following the Neutral Stimuli, $F(1,19) = 59.41$, $p < 0.001$. In

addition, subjects reported significantly more distress following the Blood Stimulus than they reported following the Neutral Stimuli, $F(1,19) = 41.56, p < 0.001$.

Within the Blood Fear Group, subjects reported significantly more distress following the Blood Stimulus than they did following the Snake Stimulus, $F(1,19) = 5.85, p < 0.05$. These subjects also reported significantly more distress following the Blood Stimulus than they did following the Neutral Stimuli, $F(1,19) = 26.28, p < 0.001$. In addition, subjects reported significantly more distress following the Snake Stimulus than they did following the Neutral Stimuli, $F(1,19) = 19.07, p < 0.001$.

Lightheadedness

Means and standard deviations of Lightheadedness (LH) ratings are provided in Table 7. To determine whether the three Groups differed in Lightheadedness ratings following videotape viewing (see Hypothesis 4), a 3 (Group) by 5 (Stimulus) repeated measures ANOVA was conducted with repeated measures on the second factor. Results indicated a significant main effect for Group, $F(2,57) = 5.35, p < 0.01$; a significant main effect for Stimulus, $F(4,228) = 21.10, p < 0.001$; and a significant Group by Stimulus interaction, $F(8,228) = 6.38, p < 0.001$.

Simple effects of Group within each Stimulus were examined using oneway ANOVAs. As expected, results indicated significant group differences on Lightheadedness ratings

following the Blood Stimulus, $F(2,57) = 6.99$, $p < 0.01$. Unexpectedly, results also indicated significant group differences following the Snake Stimulus, $F(2,57) = 4.09$, $p < 0.05$. There were no significant group differences following the three Neutral Stimuli.

Post hoc comparisons were conducted on Lightheadedness ratings following the Blood Stimulus and the Snake Stimulus using Scheffe's procedure. Following the Blood Stimulus, results indicated that the Blood Fear Group ($X = 2.35$) was significantly more lightheaded than the Nonfearful Comparison Group ($X = 1.15$). However, the Blood Fear Group was not significantly different than Snake Group ($X = 1.60$). The Snake Fear Group was not significantly different than the Nonfearful Control Group. Following the Snake Stimulus, the Snake Fear Group ($X = 1.55$) was significantly more lightheaded than the Nonfearful Comparison Group ($X = 1.05$). However, the Snake Fear Group was not significantly different than the Blood Fear Group ($X = 1.25$). The Blood Fear Group and the Nonfearful Comparison Group were also not significantly different.

Additional posthoc analyses were conducted to examine simple effects of Stimulus within each Fearful Group (Snake and Blood). Planned paired comparisons were done within each of the Fear Groups. A mean Neutral Lightheadedness rating was computed by averaging the Lightheadedness ratings following Neutral 1, Neutral 2, and Neutral 3, and this new Lightheadedness rating was used in subsequent comparisons.

Within the Snake Fear Group, Lightheadedness ratings following the Snake Stimulus were not significantly different than those following the Blood Stimulus. Additionally, these subjects did report that they were significantly more Lightheaded following the Snake Stimulus than they were following the Neutral Stimuli, $F(1,19) = 13.57$, $p < 0.01$. However, subjects also reported significantly more Lightheadedness following the Blood Stimulus than following the Neutral Stimuli, $F(1,19) = 10.50$, $p < 0.01$.

Within the Blood Fear Group, subjects reported that they were significantly more lightheaded following the Blood Stimulus than following the Snake Stimulus, $F(1,19) = 11.00$, $p < 0.01$. These subjects also reported that they were significantly more lightheaded following The Blood Stimulus than following the Neutral Stimuli, $F(1,19) = 16.00$, $p < 0.001$. Lightheadedness following the Snake Stimulus was not significantly different than ratings following the Neutral Stimuli.

Behavioral Avoidance Tests

Means and standard deviations of Behavioral Avoidance Test (BATs) scores are provided in Table 8. Two separate univariate ANOVAs were conducted on Snake BAT and Blood BAT scores across groups (Blood Fear Group, Snake Fear Group, and Nonfearful Comparison Group). As expected (see Hypothesis 5), results indicated significant group differences on both the Snake BAT, $F(2,57) = 13.76$, $p < 0.001$; and the Blood BAT,

$F(2,57) = 9.03, p < 0.001$.

Post hoc comparisons were conducted using Scheffe's Procedure. As expected on the Snake BAT, results showed that the Snake Fear Group ($X=3.70$) was significantly more avoidant than both the Blood Fear Group ($X=1.15$) and the Nonfearful Comparison Group ($X=1.00$), indicating that the Snake Fear Group avoided the 2 ft. green ribbon snake more than these other groups. The Blood Fear Group was not significantly different than the Nonfearful Control Group. Also as expected on the Blood BAT, the Blood Fear Group ($X=3.40$) was significantly more avoidant than both the Snake Fear Group ($X=1.10$) and the Nonfearful Comparison Group ($X=1.00$), which did not differ from one another. These results indicate that the Blood Fear Group avoided the blood filled syringe more than either of the other groups.

Questionnaire Data

Means and standard deviations of SNAQ, MQ, BDI, STAI-S, ASI, STAI-T and total FSS scores are presented in Table 9. A oneway MANOVA compared responses on these questionnaires across groups (Blood Fear Group, Snake Fear Group, and Nonfearful Comparison Group) to determine whether groups differed on these measures (see Hypotheses 6 and 7). The overall MANOVA was significant, $F(14,104) = 15.91, p < 0.001$. Results of univariate ANOVAs revealed significant group differences on the SNAQ, $F(2,57) = 62.65, p < 0.001$; MQ, $F(2,57) = 42.15, p < 0.001$; ASI, $F(2,57) = 8.89, p < 0.001$, STAI-S,

$F(2,57) = 4.77$, $p < 0.05$; and Total FSS, $F(2,57) = 9.41$, $p < 0.001$. There were no significant differences on the BDI and STAI-T.

Post hoc comparisons were conducted on questionnaires with significant group differences using Scheffe's procedure. As expected on the SNAQ, results indicated that the Snake Fear Group ($X=19.05$) was significantly more fearful than both the Blood Fear Group ($X=9.00$) and the Nonfearful Comparison Group ($X=5.05$). Unexpectedly, the Blood Fear Group was also significantly more fearful than the Nonfearful Comparison Group. As expected on the MQ, the Blood Fear Group ($X=17.70$) was significantly more fearful than both the Snake Fear Group ($X=9.70$) and the Nonfearful Comparison Group ($X=7.20$), which did not differ from one another. As mentioned above, there were significant group differences on several questionnaire measures that were not expected to yield such results. On the ASI, both the Snake Fear Group ($X=16.40$) and Blood Fear Group ($X=18.80$) reported significantly more distress about the negative consequences of anxiety than the Nonfearful Control Group ($X=9.05$), and were not significantly different than each other. On the STAI-S, the Snake Fear Group ($X=42.55$) reported significantly more state anxiety than the Nonfearful Comparison Group ($X=35.05$) but their scores were not significantly different than the Blood Fear Group ($X=37.65$). The Blood Fear Group and the Nonfearful Comparison Group were not significantly different than each other. On Total FSS

scores, the Blood Fear Group ($X=105.85$) had significantly higher Total FSS scores than the Nonfearful Comparison Group ($X=63.10$), but they were not significantly different than the Snake Fear Group ($X=82.10$). The Snake Fear Group was not significantly different than the Nonanxious Control Group.

Correlations Among Triple Response Measures

Correlations among Questionnaires, Behavioral Avoidance Tests, selected physiological variables, and SUDs and Lightheadedness ratings following Fear Stimulus Presentation are presented in Table 10 (see Hypothesis 9). As can be seen in this Table, there are significant correlations among many of the measures. Specific values of significance are also presented in Table 9.

Anxiety Sensitivity Index

Correlations of the ASI with other questionnaire measures, Behavioral Avoidance Test scores, and specific physiological measures during Fear Stimulus presentations are also provided in Table 10. As hypothesized (see Hypothesis 10), significant relationships between ASI scores and other fear measures emerged.

Discussion

This study examined cognitive/self report, behavioral, and physiological measures of fear in a sample of college women who identified themselves as either fearful or

nonfearful of snakes and human blood. Several hypotheses were made regarding differences among the three groups on physiological measures, behavioral avoidance, and self reported fear and lightheadedness in response to viewing videotapes in the laboratory. In this section, I will attempt to elaborate on hypothesized group differences first, then proceed to discuss correlational data. Next, I will try to examine the implications of this study for future research in this area.

In considering the results of this study and the implications of the findings, it is important to highlight the most relevant questions that have been posed. These can be summarized into several categories: 1) Are the Blood Fear Group and the Snake Fear Group significantly different in their physiological responses to their feared stimuli as well as to other stimuli?; 2) Are the Blood Fear Group and the Nonfearful Comparison Group significantly different in their physiological responses to the Thoracic Surgery videotape?; and 3) How are the self report, behavioral, and physiological measures used in this study interrelated? Each of these questions have important implications about the study of fear in the laboratory using mildly anxious analogue subjects, and they will be considered in greater detail before being discussed in terms of the findings reported previously in the Results section.

Differences between the physiological responses of the

Blood Fear and Snake Fear Groups are important because of the underlying premise for this study: Blood/Injury fear is a unique phobia characterized by a diphasic physiological response and vasovagal syncope. Previous studies have shown the diphasic response to thoracic surgery videotapes with blood/injury phobia patients, and this response has not been reported in laboratory investigations of other phobias. This study investigates a wider range of the response continuum by using analogue patients, and the key question is whether this unique response emerges when investigating nonclinical samples. As the results of this study are discussed, it will be clear that there is mixed support for these basic physiological differences between fear groups. As expected, the Snake Fear Group shows greater heart rate and blood pressure elevations when watching the Snake Stimulus compared to the Blood Fear Group and the Nonfearful Comparison Group. However, the Blood Fear Group shows only significantly lower finger pulse volume (increased vasoconstriction) when viewing the Blood Stimulus when compared to the other groups. Closer examination of the pattern of response suggests a general tendency to respond with decreased heart rate and blood pressure to all Stimuli, although these results are not consistently significant. These results will be examined in turn as each result is discussed in detail.

The second important issue addressed in this study is the comparison of physiological responses of the Blood Fear Group

with a Nonfearful Comparison Group. This question is of particular relevance because of the gaps in knowledge about the reactions of nonfearful subjects to blood/injury stimuli. Previous investigators conducted crucial research into the physiological responses of blood phobic patients, but did not address the rest of the continuum by omitting the use of control groups. This study compared a blood fearful sample with a group who did not report fear of blood, and the results clearly show that the nonfearful sample did not respond with physiological change while viewing thoracic surgery videotapes. As mentioned above, the analogue sample of fearful college students showed some of the expected physiological responses to the thoracic surgery videotape, but they did not closely resemble responses expected in clinical samples. There appeared to be a general propensity towards blood/injury phobic-like responding and clear differences in response to the thoracic surgery videotape compared to their own responses to other stimuli, but on the whole the evidence is equivocal for the detection of important differences between the Blood Fear Group and the Nonfearful Comparison Group in this study. These results will be discussed in greater detail below.

The third relevant question involves the interrelationship between self report, behavioral, and physiological measures used in this study. One of the principal strengths of this study is the measurement of

responses in each of the three channels, as previous researchers have lamented the lack of such studies in the literature. Examination of the interrelationships of measures across and within response channels showed some significant relationships that would be expected (e.g., significant correlations between behavioral avoidance and self rated fear of either blood or snakes using specific fear questionnaires), as well as the emergence of significant relationships that might not be expected (e.g., state anxiety with self reported snake fear). Further discussion of these results will show that several of the significant relationships found in this study have important implications for future research. Among the most interesting results of this line of inquiry were the significant relationships between anxiety sensitivity and self reported lightheadedness following film viewing, as well as the significant relationship between anxiety sensitivity and heart rate during fear videotapes. These will be discussed below.

Turning to the physiological data, several hypotheses were posed regarding expected group differences in physiological arousal during viewing of videotapes of snakes and thoracic surgery (see Hypotheses 1 and 2). Results of tests of Hypotheses 1 and 2 partially support hypothesized group differences during viewing of feared stimuli. On heart rate, there were group differences during the Snake Stimulus and during Neutral 3. The hypothesis of group differences

during the Blood Stimulus was clearly not supported. As expected, further examination of the differences during the Snake Stimulus shows that the Snake Fear Group was significantly higher than both of the other groups, which did not significantly differ from one another. Thus, the group identified by a single item on the FSS was in fact different on heart rate, which lends support to the splitting of groups in this manner for snake fearful subjects. This same method did not work for Blood/Injury fearful subjects with regard to heart rate, which may be a result of the generality of the feared stimulus. Blood/Injury fear may stem from a number of different concerns such as fear of fainting, fear of AIDs, fear of pain, hypochondriasis, or other such fears, thus leading to a wider range of endorsers for an item such as "human blood".

On the Neutral 3 Stimulus, the Snake Fear Group was significantly lower than the Blood Fear Group. All other group comparisons were not significant. This suggests a rebound effect, given that it was the Snake Fear Group that showed significant elevations in heart rate when they viewed the Snake Stimulus. Further evidence for this rebound effect may be provided by comparing the responses of the 10 Snake Fear subjects who viewed the Snake Stimulus immediately prior to Neutral 3 (Snake Stimulus presentation 4th) to those 10 Snake Fear subjects who did not view the Snake Fear Stimulus immediately prior to Neutral 3 (Snake Stimulus presentation

2nd). Although the effect of Order was not significant, inspection of the means shows that the group of Snake Fear subjects who viewed the Snake Stimulus immediately prior to Neutral 3 had a mean heart rate change score of -3.9 during Neutral 3, whereas the group of Snake Fear subjects who saw the Snake Fear Stimulus second had a mean heart rate change score of -1.5. This suggests a stronger rebound effect during Neutral 3 for subjects who had just viewed the Snake Fear Stimulus. They may also have been experiencing relief that the Snake Stimulus had already been shown, and that they knew from the consent forms that they were viewing the last videotape during Neutral 3. Revealing this specific information prior to videotape viewing may have been a mistake in the experiment's design. In allowing subjects to know in advance the exact number of films they would view, the Snake Fear Group may have discerned that had encountered their last snake and could now relax. The rebound effect is also interesting in terms of the behavior of true snake phobics outside the laboratory - they experience autonomic arousal in the presence of feared stimuli that dissipates rapidly when they leave the situation. Perhaps this demonstration in the laboratory is an analogue of the effects of avoidance on fearful subjects. The goal of exposure based treatments is to keep clients in the presence of the feared stimuli until their tonic arousal decreases, thus allowing for the learning of an important lesson - physiological arousal diminishes even

in the presence of snakes if you remain in the situation. Such an explanation is consistent with laboratory results obtained in this study with snake fearful college women.

On measures of systolic blood pressure, the only significant finding was an overall group difference in which the Snake Fear Group was significantly higher than either of the other groups overall. This is consistent with their own report of greater State Anxiety, which is possibly related to the issue of having specific fears about what they might encounter in the laboratory prior to the experiment that blood fear subjects may not have considered in relation to their fears. This possibility will be addressed in more detail in the discussion of group differences on questionnaire data.

On measures of diastolic blood pressure, there were significant group differences only during the Snake Stimulus and these were partially in the hypothesized direction. The Snake Fear Group did have significantly higher DBPCS than the Blood Fear Group, but they were not significantly higher than the Nonfearful Comparison Group. Interestingly, the Blood Fear Group showed a 2 point drop in DBP from baseline, whereas the Snake Fear Group showed a 4 point increase, and these changes together account for the significant difference. It is unclear why the Blood Fear Group responded to this feared stimuli and yet there were no significant differences in their response to the Blood Stimulus. Careful examination of their responses suggests that they did show a decrease in DBP (-

5.21) in response to the Blood Stimuli, but the reason there were no group differences is that the other two groups also showed a slight decrease in DBP, thus making detection of difference more difficult. If there were more subjects in each group, the same differences in means might have been significant, thus suggesting that power was a greater problem than lack of physiological reactivity, at least with regard to changes in diastolic blood pressure from baseline. Further discussion of within subjects patterns later will help to make this point more clear.

The most difficult of the physiological results to interpret were the between subjects analyses conducted on finger pulse volume change scores. There were group differences in reaction to the Blood Stimulus but not to the Snake Stimulus, and the differences were again partially supportive of predictions. The Blood Fear Group was significantly lower (thus experiencing increased vasoconstriction) than the Snake Fear Group but not lower than the Nonfearful Comparison Group, and the latter two groups were not significantly different. This finding is interesting in that it suggests some increased vasoconstriction for the Blood Fear Group, and this finding has not been previously reported. Given that the Blood Fear Group was not significantly different than the other Groups on other physiological measures in this study (although for DBPCS there was a trend towards significance), it is possible that

increased vasoconstriction is another physiological reaction to be expected in Blood Fearful subjects in the laboratory. However, results of within subjects tests on FPVCS suggest that this finding should be interpreted with caution.

More confusion arises when examining the significant Stimulus by Time interaction for FPV, which was the only significant finding involving the Time variable found in this experiment. Results indicated that there were differences at Time for Neutral 1 and Neutral 2. Further probing showed that for Neutral 1, Time 2 was significantly higher than Time 3 and that all other comparisons were not significant. However, the pattern for Neutral 2 was quite different. Time 1 was significantly lower than Times 2 and 3, and Time 3 was also significantly lower than Time 4. It must be recalled that all 60 subjects are used for these analyses, thus increasing power. What these results may raise is the issue of vasoconstriction as a nonspecific measure of arousal, which was originally suggested by Smith et al. (1984). Given that FPV has been shown to be responsive to feelings of anger and orienting subjects towards a particular task (concentration), one possibility is that some parts of the Neutral videotapes are more interesting to subjects than others, and that anxiety is not the cause of these relatively minor changes (<2 mm) in FPV. Another possibility is that subjects were anxious during the Neutral Stimuli, but there is no corroboration for this hypothesis in looking at other measures such as self reported

distress (SUDs) during Neutral videotapes.

Patterns of change from baseline on the physiological measures were also examined within the two Fear Groups. On measures of HR, the Blood Fear Groups showed no differences, whereas the Snake Fear Group had significantly higher HRCS during the Snake Stimulus than during any other Stimuli. This finding is consistent with results of between subjects tests that showed no significant differences on HRCS in the Blood Fear Group compared to the other groups following the Blood Stimulus. This is the single most surprising result of the study, and the reasons why this took place are confusing given the differences found on FPVCS and the trend towards significance on DBPCS. One possible explanation lies in the heterogeneity of any group formed on the basis of a response to a single question about fear of human blood. Within this group, one might expect some of the fearful fainters described by Kleinknecht (1988). However, there may be other members of this group who do not show the typical diphasic response and fear of fainting, but report fear of human blood for other reasons. One such reason would be fear of AIDS, which is increasingly becoming a more common theme for obsessive compulsives and generalized anxiety disorder patients. If these concerns and other fears that revolve around human blood (e.g., fear of pain, illness, disgust, reminders of past traumatic events) are associated with increased physiological arousal as measured with recording of heart rate, then these

two subgroups might essentially cancel each other out at the group mean level. Examination of individual subject data shows that there are Blood Fear Group subjects who indeed show increased heart rate changes from baseline, and this may help to explain why the expected pattern of decreased heart rate is not replicated at the group level. The two principle differences between recruiting methods in Ost's clinic and this study involve severity and specificity. Ost's blood/injury phobic patients' lives are so impaired by fear that they are compelled to seek treatment, and they are specifically asked about the nature of their physiological responses prior to participation in the experiment. Subjects in the present study were college students responding to a single item on a questionnaire, and they are not seeking treatment for any disorder by participating in this study. These disparities may serve as a partial explanation as to why the expected within subjects pattern of heart rate changes is not replicated in this sample.

On DBPCS, there is some evidence to suggest that the Blood Fear Group experienced mean decreases from baseline. The Blood Fear Group's DBPCS are lower in response to the Blood Stimulus than they are to the Snake Stimulus, but not to the Neutral Stimuli. Interestingly, DBPCS in response to all Stimuli were negative for the Blood Fear Group, suggesting a slight general tendency to respond with decreased physiological arousal to all Stimuli. The Snake Fear Group

showed the expected higher DBPCS in response to the Snake Stimulus when compared to all other Stimuli. Again, this evidence confirms the hypothesis that subjects who report Snake Fear have greater physiological arousal to Snake Stimuli than they do to other nonfearful stimuli.

Within subjects patterns on FPV for the Blood and Snake Fear Groups also reflect changes from baseline. The Blood Fear Group showed significantly lower FPV in response to the Blood Stimulus than they did to all other Stimuli, and the Snake Fear Group showed significantly lower FPV in response to the Snake Stimuli than they did in response to all other Stimuli. These results are all in the expected direction.

Group differences on subjective ratings collected immediately following the viewing of videotapes were also in the expected direction (see Hypotheses 3 and 4). There were significant group differences on both SUDs and LH ratings following only the Snake and Blood Stimuli. Further examination of SUDs data shows that the Snake Fear Group reported significantly greater distress following the Snake Stimulus than either of the other groups. This same pattern was also seen with the Blood Stimulus: the Blood Fear Group was significantly more distressed following viewing of the Blood Stimulus than either of the other groups. These data confirm that the films chosen were sufficiently fearful to generate expected group differences in subjective distress. One would certainly expect that people who reported fear of

snakes and blood on a single item questionnaire would also report anxiety in response to viewing graphic examples from the feared stimulus category that they endorsed.

Results from the investigation of group differences in lightheadedness are more confusing. It was hypothesized that only the Blood Fear Group would report increased sensations of lightheadedness in response to the Blood Stimulus, and this was only partially confirmed. The Blood Fear Group did report more LH than the Nonfearful Comparison Group following the Blood Stimulus, but not significantly more than subjects in the Snake Fear Group. It was hypothesized that the Blood Fear Group would report significantly more LH than both groups. Also, the Snake Fear Group reported significantly more LH following the Snake Stimulus than the Nonfearful Comparison Group, but not more than the Blood Fear Group. Taken together, these results suggest that either the phenomenon of LH is more prevalent in phobias other than blood/injury phobia or that the Fear Groups were using LH as a more general measure of arousal than intended. There is some evidence to suggest that the subjective feeling of LH is unrelated to actual fainting, as many panic patients report fear of passing out even as their heart rates and blood pressure increase, making such an outcome nearly impossible. Hyperventilation is known to induce feelings of LH, and it is possible that the Fear Groups were both acutely aware of their physical sensations during the experiment, which is supported by their

significantly higher scores on the ASI than the Nonfearful Comparison Group. Another possibility is that the virtual absence of LH in the Nonfearful Comparison Group to any of the Stimuli resulted in an unrealistic test of group differences, as any variance in the Fear Groups would likely result in significant group differences. Perhaps if a clearer explanation of LH could have been provided by the experimenter, expected group differences would have emerged. At this juncture, however, it is safest to assume that the LH measure used in this study may be a general arousal measure. Why the Fear Groups responded with increased LH to the Fear Stimulus they did not endorse is either a result of the effects of outliers on group means or further evidence of the relationship between anxiety sensitivity and self report of physiological changes. Again, the more conservative interpretation of this data is that the relatively low LH scores even in the Fear Groups are only significant in comparison to a group that denies virtually any LH following every videotape.

More needs to be said about within subjects patterns of self ratings following each videotape in this experiment to paint a more complete picture of the meaning of this study. Results of repeated measures analyses of SUDs ratings show that as expected, the Blood Fear Group was more distressed following the Blood Stimulus than they were following any other Stimuli. Interestingly, they also reported

significantly more distress following the Snake Stimulus than following Neutral Stimuli. Two possible explanation come to mind in response to these unexpected differences: 1) Hungry snakes usually bite, draw blood, and produce injury; or 2) Indiana Jones is a "thriller" in the physiological sense, filled with manipulations (e.g., snakes falling from the ceiling) designed specifically to induce surprise, fear, and disgust. It is not possible to partial out the effect of either of these factors, but it is not surprising that there was some effect on SUDs ratings. In attempting to deal with the potential problem of a floor effect (no subjects finding the snake film arousing), it is possible that the chosen Stimuli was more provocative than necessary to elicit anxiety responses in snake fearful subjects alone.

The same pattern emerged in the Snake Fearful Group. They reported higher SUDs in response to the Snake Stimulus than in response to any other Stimuli, and they also reported more distress following the Blood Stimulus than they did following the Neutral Stimuli. These findings were in the expected direction, although the fact that the Blood Stimulus was more distressing than Neutral Stimuli comes as a small surprise. However, the Blood Stimulus depicts two open heart surgeries in extremely graphic detail, and it is not beyond understanding that this videotape would be more distressing than a travel montage even in a group that reported no fear of human blood on a single questionnaire item. Reporting no

fear of blood on a questionnaire item and distress in witnessing open heart surgery are not equivalent in terms of intensity, so the inconsistency is not greatly alarming.

As expected, the Blood Fear Group reported significantly higher LH ratings following the Blood Stimulus than they did following either of the other Stimuli. Further, the Snake Stimulus and the Neutral Stimuli were not significantly different.

Within the Snake Fear Group, the LH patterns were different. Given that no LH differences were expected in this group, the reported results raise questions about what is actually being measured or about the original expectation of no differences. The Snake Fear Group reported significantly higher LH ratings in response to both Snake and Blood Stimuli than they did in response to Neutral Stimuli. Perhaps subjects used the LH ratings as a general arousal/anxiety measure, or the concept of lightheadedness is in itself a little fuzzy. As mentioned previously, it is common for people to report feelings of lightheadedness when physically aroused because lightheadedness is frequently a byproduct of hyperventilation. However, this does not mean that the person is actually on the verge of passing out. Another issue to be examined is the restricted range used to measure lightheadedness used in this study. In retrospect, it would have been more instructive to use the same 0 - 100 rating scale that subjects utilized for SUDs ratings, thereby

allowing for more variance and direct comparison of SUDs and LH data. It is possible that subjects used the same metric when rating both, and that the conceptual distinction was blurred by subjects when they completed their ratings.

Other results that merits discussion are the analyses of group differences on questionnaire measures. Although less critical than the differences in physiological measures, several interesting patterns emerge when examining the results of group differences on questionnaire measures (see Hypotheses 7 and 8), which affords a different view of the entire puzzle. There were no group differences on BDI and STAI-T, which suggests that general anxiety and depression levels are roughly equivalent among the groups and do not serve as viable explanations for group differences on other measures. As expected, the groups did differ on the specific fear questionnaires, the SNAQ and the MQ. A careful view of these differences shows that on the SNAQ, the expected differences between the Snake Fear Group and the other two groups are found. However, the Blood Group also had significantly higher SNAQ scores than the Nonfearful Comparison Group. Given that the Blood Group was selected in part due to a nonfearful response to the snake item on the FSS, this difference was puzzling at first. A possible reason for the difference is that one consequence of a hostile confrontation with a snake is bleeding, and watching snakes dine on other animals may also be difficult for people who have identified themselves

as fearful of blood and injury. There are also questions on the SNAQ that inquire about dissection, touching dead snakes with sticks, and watching snakes on television (which often involves a segment on eating behavior) that may have been endorsed by the Blood Fear Group due to these items' overlap with blood and injury concerns. Data provided by Klorman et al. (1974) indicate that the mean SNAQ score for college students is 7.9, and the 9.0 SNAQ score for the Blood Fear Group is perhaps slightly higher than expected for reasons cited above.

Group differences on the MQ were also in the expected direction, as scores for Blood Fear subjects were significantly higher than either of the other two groups. In this case, there was no difference between the Snake Fear Group and the Nonanxious Comparison Group. Taken together, these results confirm that screening with a single specific fear item is a valid way to differentiate between subjects on cognitive/self report measures of that specific fear.

Unexpected group differences emerged on the STAI-S and Total FSS scores, and these differences merit attention. On the STAI-S, the Snake Fear Group scored significantly higher than the Nonfearful Comparison Group. Their scores were also greater than the Blood Fear Group, but this difference was not significant. As mentioned previously, one explanation is that the Snake Fear Group was experiencing greater fear of physical threat than the other groups, and that they may have had an

exaggerated idea in mind when they arrived at the laboratory about the kind of snake they would encounter. Subjects were not told on the telephone which of the feared objects from the FSS they would encounter in Part II of the experiment, but it was reported by several members of this group that they anticipated physical contact with a live snake. None of the subjects in the Blood Fear Group reported that they "knew" what was coming. However, the relative difficulty this experimenter encountered in creating a BAT for blood/injury fear when compared to snake fear also may clarify the possible reasons for differences in state anxiety: a person who fears snakes can readily imagine what sort of approach test could be administered, whereas someone who fears blood/injury/illness stimuli may have more difficulty imagining a concrete representation of their fear that could be ethically tested in a laboratory. Unfortunately, it is difficult to evaluate this trend because the question of subjects' predictions of which feared stimuli they would encounter in the avoidance tests was not posed or analyzed systematically.

An examination of group differences in Total FSS scores indicated that the Blood Fear Group was significantly more fearful than the Nonanxious Comparison Group, and there was a trend towards significant difference even with the Snake Fear Group. These results are inconsistent with a lack of difference on trait anxiety and is also inconsistent with data

that suggests little difference among simple phobics in general anxiety levels. A parsimonious explanation of why the Blood Fear Group had higher Total FSS scores is that the FSS asks multiple questions about blood/injury/illness fears. In fact, these items have been shown to be related in such a way as to form a separate factor on the FSS III. Thus, a subject who endorses a fear of human blood might also endorse fear of hospitals, doctors, needles, watching surgery, and other such items. If this were the case, the scores for this group would be elevated without reflecting differences in general anxiety levels or in number of separate fears.

Results of Behavioral Avoidance Tests are also in the predicted direction (see Hypothesis 5). Subjects in the Snake Fear Group were more avoidant of the snake than either of the other groups, and subjects in the Blood Fear Group were more avoidant of the blood-filled syringe than either of the other groups. However, the issue of conducting avoidance tests with nonfearful subjects must be addressed. Group differences on avoidance tests may be a result of the total absence of avoidance in nonfearful groups, thus any variance in the fearful groups will result in significant group differences (Klieger & Franklin, 1991). Similar problems arose in this study. Subjects showed virtually no avoidance on the BAT unless the test was specific to their fear, and these group differences on BAT data are therefore a questionable measure of fear. Many subjects in the fear groups are able to

approach the feared objects to the same degree that nonfearful subjects do, and outliers in the fear groups inflate the group mean. One solution is to use Fisher's Exact Test after creating categorical variables of "High Behavioral Fear" and "Low Behavioral Fear". While this method may yield a more realistic assessment of the validity of the BAT in distinguishing mild avoidance from phobic avoidance, a larger issue clouds the entire picture. It has been said by a number of behavioral theorists (e.g., Foa & Kozak, 1986) that activation of the "fear network" is imperative in bringing about fear responses in each of the response channels, to which patients subsequently experience habituation. It is possible if not likely that some of the subjects in this experiment would have demonstrated more avoidance if a BAT selected from their own personal list of unrealistic fears was employed. This is not to suggest that having patients drink a vial of untested blood or wrestle with a 25 ft. boa constrictor is a better way to test behavioral avoidance. However, if a subject who fears snakes has particular difficulty approaching larger snakes or different colored snakes is asked to participated in an avoidance test with identical instructions to the BAT used in this study (e.g., no handling required), it is likely that they will show more avoidance. Feedback from study participants following this experiment (e.g., "I was expecting a much larger snake") has made it clear that general avoidance tests designed to

activate the fear network of a large group of subjects are very problematic and perhaps should be abandoned as outcome measures in research studies. Other paradigms, such as the slide paradigms of Levis and Peterson (1990), are more adaptable and are therefore easier to tailor to a subject's particular fears. Obviously this would cause problems of a different sort such as comparing across tailored BATs, but the possibilities of increased consistency with the particular fears of individuals may be too compelling to avoid any longer.

Examination of the intercorrelations among cognitive and behavioral measures provided in Table 9 shows significant positive correlations among many of the questionnaires (see Hypotheses 9 and 10). ASI scores were significantly correlated with SNAQ, MQ, BDI, STAI-S, STAI-T, and Total FSS scores, although the two strongest correlations were between ASI and MQ, and ASI and STAI-T. Further, ASI scores were not significantly correlated with Behavioral Avoidance Test scores or SUDs ratings following videotape viewing of Snake and Blood Stimuli. These relationships suggest that in this sample, the ASI may be measuring more general psychopathology, as previous studies (e.g., McNally & Lorenz, 1987) have found lower correlations between ASI scores and other anxiety and depression measures.

As expected, SNAQ scores were not significantly correlated with MQ scores. However, SNAQ scores were

significantly correlated with state anxiety as measured with the STAI-S. MQ scores were not related to STAI-S scores, which suggests that those subjects high on Snake Fear were more anxious at the time of the experiment than were subjects high on the MQ. SNAQ scores were also significantly correlated with scores on the Snake BAT, as well as SUDs and LH ratings following viewing of the Snake videotape. As expected, SNAQ scores were not significantly related to Total FSS scores.

As mentioned above, the MQ was significantly related to ASI scores. It was also related to Trait Anxiety as measured by the STAI-T, Total FSS scores, and SUDs and LH ratings following viewing of the Blood Stimulus.

BDI scores were significantly correlated with the ASI, both forms of the STAI, and Total FSS scores. It was not significantly related to any of the specific fear measures. This is consistent with findings from many previous studies that suggest much overlap between measures of depression and general anxiety, but little between depression and simple phobia.

STAI-S and STAI-T were significantly correlated ($r=.4342$), but this value was lower than the median correlation ($r=.65$) found between these measures in multiple samples of college students (Spielberger et al., 1983). Interestingly, Spielberger et al. (1983) predict lower correlations between state and trait anxiety measures under

conditions of physical threat than under conditions of social-evaluative threat. Taken in conjunction with results of tests of group mean differences during this experiment, it may suggest that subjects perceived themselves to be in a physically threatening situation during the experiment. Given that the Snake Group scored higher on STAI-S than either of the other groups, it is possible that they may have been more likely as a group to perceive physical threat during the experiment. In considering the typical feared consequences of snake phobics (bites) and blood phobics (fainting), this may make a good deal of sense. Those in the Snake Fear Group may have wondered if the snake would get loose or whether they would be required to handle a snake, in spite of the experimenter's assurances to the contrary. Additionally, subjects in the Snake Fear Group frequently commented after the BAT that the stimulus presented to them, a 2 ft. green ribbon snake, was smaller and less menacing than what they had envisioned. In fact, several subjects in this group conceded that the feared stimulus was "cute". Given that the questionnaires were completed prior to viewing the snake, subjects may have exaggerated the degree of danger involved, which could certainly have influenced state anxiety scores.

Certainly one of the most interesting findings among the correlational data was the relationship between anxiety sensitivity and heart rate during the feared stimuli. Anxiety sensitivity is a measure of physiological hypervigilance and

discomfort with changes in bodily sensations. More specifically, several questions directly refer to discomfort with changes in heart beat. The significant positive relationship between scores on the ASI and heart rate while viewing the feared stimuli suggests that these subjects are indeed aware of and uncomfortable with changes in their heart rate. Even more interestingly, the relationship between anxiety sensitivity and physiological response during the feared stimuli was not significant for any of the other physiological measures. It is possible that the link between phobic anxiety and hypervigilance to physical discomfort needs to be explored further. One potential confound in this relationship is the potential presence of panic disordered individuals in the sample. No diagnostic screen for other Axis I disorders was used, and it remains possible that some of the subjects high in anxiety sensitivity were also showing greater heart rate changes during feared stimuli. Research investigating the presence of a potentially interesting subset of simple phobics, those who also have panic disorder, would help to clarify this relationship and may also provide further information about the nature of fear.

On the whole, the results of this experiment partially support hypotheses about group differences in self report, behavioral, and physiological measures of anxiety in groups who identify themselves as fearful or nonfearful. Additionally, hypothesized patterns of fear within fearful

groups were also partially supported. These results suggest that there is partial empirical support for separation of groups according to single item FSS scores, but that the newly formed groups may not closely resemble treatment groups who probably differ on both severity and specificity of physiological response. Thus, the separation of the nonfearful from the fearful may be successfully completed using these screening procedures, but the separation of the phobic from the fearful may require more specific questionnaire measures which at least in part target specific physiological symptoms that are more likely to be experienced only by severely fearful subjects. There were several surprises in the findings, such as higher state anxiety but not trait anxiety in the Snake Fear Group, and the absence of significant findings for the Blood Fear Group on heart rate measures. What this may suggest is that a new measure of self reported physiological symptoms in response to Blood/Injury Stimuli can be used to further differentiate blood injury fearful college students into subgroups of fainters and nonfainters, and that assignment to groups via this measure may increase consistency on the physiological specificity dimension with patients studied by Ost et al.. Additionally, a new measure of avoidance of medical attention is being developed by Kleinknecht and colleagues (R. A. Kleinknecht, November 1991, Personal Communication), and the use of this measure in analogue studies may help to make group assignments

on the severity dimension as well. Using such measures in tandem, four fearful subgroups can be identified: 1) Avoidant Fainters; 2) Avoidant Nonfainters; 3) Nonavoidant Fainters; and 4) Nonavoidant Nonfainters. Questions about psychopathology could be examined by comparing these groups of analogue subjects on self report, behavioral, and physiological measures of fear, and the results of such studies would be relevant in understanding the phenomenon of blood/injury phobia. It is clear from the results of the present study that one cannot assume that all blood injury fearful college students are prone to fainting in response to viewing a graphic presentation of Blood/Injury Stimuli.

As far as the use of these selection techniques to study snake fears, this study provides greater support for its validity than was seen for blood injury fear. Snake phobia is generally a straightforward category, and there is likely to be less heterogeneity in these groups than will be seen in the more multidimensional phenomenon of blood/injury fear. It is relevant to consider the issue of whether study of the presumably less fearful college students informs clinicians and researchers interested in patient populations, and as yet there is no generally satisfactory answer to this question. Demonstration of some physiological changes from baseline in these groups while watching their feared stimuli lends support to the use of analogue samples of snake fearful college students, but the brakes of caution must be applied when

researchers make claims based on the assumption of "near equivalence".

In reviewing the entire study, there are a number of problem areas that merit attention. First is the issue mentioned above of having no specific measure of medical avoidance and typical physiological response outside the laboratory for the Blood Fear Group. It would be interesting to look at the physiological data with these dimensions clearly identified, but this is now grist for a future mill. Another problem was the question of how accurately subjects could predict upon arrival at the laboratory what they would encounter, and how these predictions related to self report of fear severity, behavioral avoidance, and physiological arousal. If a specific question about what subjects believed they would see prior to the experiment were posed by the experimenter, it would be easier to address why there was increased state anxiety in the Snake Fear Group. The current explanation of why this was so is related to the tangible and therefore predictable nature of snake fear and the potential catastrophes subjects created in their minds (e.g., handling boa constrictors).

Ratings of the films by fearful and nonfearful subjects prior to their use as stimuli in the experiment would also have been preferable, as it may have been the case that one film was more arousing or provocative than the other, and this may have influenced the results. Originally, it was believed

that using extreme examples for both fear stimuli was preferable, but whether these films were actually extreme in the eyes of fearful subjects is unknown.

Another modification of the study that occurred in the shining glow of hindsight is videotaping subjects' reactions to the videotapes as they watched. One alarming possibility that cannot be ruled out is that some subjects (presumably the most fearful) may have averted their gaze or closed their eyes during the viewing, which might have affected physiological arousal. Although there were explicit instructions about keeping eyes opened and watching the videotape, there is no way to confirm whether all subjects complied with this request.

The issue of developing behavioral measures of fear remains problematic, and despite group differences on BATs, modifications of BATs may have provided more data about behavioral avoidance and behavioral approach in spite of fear. The principle concern is that the BAT chosen for Blood/Injury fear may have influenced the behavior of one subset of blood injury fearful subjects (e.g., those with fear of AIDS) more than others (e.g., those who fear fainting at the sight of their own blood and are not medically avoidant).

As mentioned in the introductory section, the concern over the generalizability of findings is always at issue when conducting research on clinically relevant topics using analogue samples. Given the lack of information about the

physiological responses of subjects other than blood/injury phobics to blood/injury stimuli, it is clear that the responses of nonfearful comparison groups and nonclinical samples of college students who endorse anxious responses on a general fear survey have merit in their own right. However, several factors limit the generalizability of findings and are worthy of mention.

Information gathered from this study suggests more heterogeneity of response in mildly blood fearful samples than is seen in the clinical samples of Ost and colleagues, but there is some support for a general tendency to show decreases in physiological responses that do not resemble the responses of snake fearful subjects. The purpose of this study was to examine a wider range of the response continuum to blood stimuli, not to suggest that the sample gathered in this study is remarkably similar to the patients that seek treatment for this condition. In that respect, the strength of that aspect of the analogy is not as critical an issue as it might be if the research was focused on treatment outcome rather than responses to a particular type of stimuli. In other ways, however, the analogy to more general populations is weakened by the use of only female subjects in this research. Recently, a great deal of attention has been focused on the underrepresentation of women in medical research studies, and the concerns this raises about the generalizability of findings from these studies. Similar concerns should be

raised about the generalizability of findings in the current research with a female sample to the population of males with blood/injury fears. The reasons for selection of an all female sample for this study had little to do with prevalence rates of blood injury phobia across genders. In fact, research conducted by Kleinknecht (1988) suggests that while more women than men report fear of blood/injury stimuli, more men than women experience fainting as their primary symptom when exposed to blood. Marks (1988) raised the potentially debilitating effect of blood/injury fears on women who would like to bear children, noting that in some cases women who would like to become pregnant and experience childbirth avoid this possibility as a direct result of their fears of blood and medical treatment. However, this also had less to do with the selection of an all female sample than the male : female ratio in Psychology classes at the University of Rhode Island. It is generally suggested that psychopathology researchers should analyze the results of their studies for each gender separately, as important sex differences might otherwise be obscured. The creation of a second between subjects factor of gender would require relatively equal numbers of men and women in the sample in order to conduct these analyses, and would double the number of subjects needed to detect the hypothesized differences that were investigated. Recruiting sixty male subjects for this experiment may have proven to be impossible given the paucity of males to choose from in the

University of Rhode Island classes that participated in the research. It was therefore decided that an all female sample should be studied, and that the limits to the generalizability of findings to the blood injury phobic population at large be acknowledged.

Another concern that affects much psychological research conducted in the laboratory is that of the effect of demand characteristics on subjects' behavior. Much attention has been paid to the potential for difficulty with demand characteristics in analogue fear research conducted in the laboratory, and appropriate precautions were taken where possible in the current research. In order to minimize the effects of demand on subjects' responses, subjects were not told during Phase I (general FSS screen) which specific fears the experimenter was interested in, nor were they informed on the telephone specifically why they had been chosen for participation in Phase II (laboratory studies). Upon reading Consent Form B, subjects became aware that the experimenter was interested in blood and snake fears. However, subjects were never specifically told what their earlier responses to the Fear Survey Schedule items were, although it is probable that they remembered at least the direction of their response to the blood and snake items. Precautions suggested by Kern (1983) were adhered to in the behavioral avoidance testing to maximize approach behavior. Subjects were told that they would view five videotapes during the video session, one

involving snakes and another involving thoracic surgery. They were not told the precise order of presentation, although they could decipher the order based on the information given if they chose to do so. It is unclear how well the precautions taken helped to minimize the effect of demand characteristics, and the possibility that subjects tried to remain consistent across self report and behavioral tests remains plausible. The question of whether physiological responding is not susceptible to the willful manipulation than can affect self report data remains unanswered, although it is generally accepted that such responses are more difficult to fake.

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Table 1

Diagram of Physiological Data Reduction Procedure for Heart Rate, Systolic Blood Pressure, Diastolic Blood Pressure, and Finger Pulse Volume.

- Within 6 Stimulus Conditions (Baseline, Neutral1, Snake, Neutral2, Blood, Neutral3), 4 data points (T1, T2, T3, T4) were measured for each of the 4 physiological variables (HR, SBP, DBP, FPV):

Baseline:	T1	T2	T3	T4
Neutral1:	T5	T6	T7	T8
Snake:	T9	T10	T11	T12
Neutral2:	T13	T14	T15	T16
Blood:	T17	T18	T19	T20
Neutral3:	T21	T22	T23	T24

- Physiological Change Scores were calculated for HR, SBP, DBP, and FPV in the following manner:

- 1) Baseline physiological measures were averaged $(T1+T2+T3+T4)/4$ for each subject.
- 2) This new mean baseline score was subtracted from all physiological variables measured during videotape viewing (e.g., T5 - mean baseline).

Table 2

Baseline Average Heart Rates and Heart Rate Change Scores (HRCS)
of Nonfearful Comparison, Snake Fear, and Blood Fear Groups

	Group			
	NC	Snake	Blood	Total
Baseline AVG	71.2(7.7)	75.0(10.3)	72.6(5.8)	72.96(8.15)
Change Scores (Raw Score - Baseline AVG)				
Stimulus/Time	NC	Snake	Blood	Total
Neutral 1/T1	-2.3(7.2)	-0.4(4.5)	0.9(6.1)	-0.56(6.1)
Neutral 1/T2	-1.5(5.3)	0.5(3.4)	2.5(7.7)	0.51(5.9)
Neutral 1/T3	-0.9(5.2)	0.2(4.5)	0.6(4.6)	-0.02(4.7)
Neutral 1/T4	-0.4(5.4)	0.3(4.7)	2.0(5.5)	0.62(5.2)
Snake/T1	-0.4(3.8)	3.8(4.5)	1.1(7.3)	1.51(5.6)
Snake/T2	-0.1(4.5)	3.5(5.7)	0.7(6.3)	1.39(5.7)
Snake/T3	0.7(5.3)	5.2(5.3)	-1.0(5.2)	1.65(5.8)
Snake/T4	-0.3(5.8)	6.3(6.2)	0.4(5.8)	2.12(6.6)
Neutral 2/T1	0.4(5.2)	-0.3(4.0)	1.3(6.6)	-0.47(5.3)
Neutral 2/T2	0.4(5.6)	-1.0(6.0)	0.5(7.6)	-0.02(6.4)
Neutral 2/T3	1.0(5.3)	0.1(4.9)	0.7(5.4)	0.57(5.1)
Neutral 2/T4	0.2(5.1)	-1.9(4.0)	-0.7(5.7)	-0.79(5.0)

Table 2

Continued

Stimulus/Time	NC	Snake	Blood	Total
Blood/T1	-0.2(5.5)	0.3(5.1)	-0.2(4.9)	-0.04(5.1)
Blood/T2	0.2(4.6)	0.2(5.8)	-0.3(6.3)	0.02(5.5)
Blood/T3	-0.4(5.1)	0.9(4.8)	-0.3(6.3)	0.05(5.3)
Blood/T4	-0.7(4.1)	-0.6(6.9)	-0.3(6.9)	-0.54(6.1)
Neutral 3/T1	-1.3(4.2)	-3.2(4.7)	0.5(4.1)	-1.36(4.5)
Neutral 3/T2	-0.4(3.4)	-2.6(7.6)	2.2(4.6)	-0.29(5.7)
Neutral 3/T3	0.2(4.6)	-2.1(5.9)	-1.0(5.8)	-0.96(5.4)
Neutral 3/T4	1.3(4.5)	-3.0(4.4)	1.2(5.9)	-0.14(5.3)

Table 3

Baseline Average Diastolic Blood Pressures and Diastolic Blood Pressure Change Scores (DBPCS) of Nonfearful Comparison, Snake Fear, and Blood Fear Groups

	Group			
	NC	Snake	Blood	Total
Baseline AVG	71.4(6.4)	71.2(7.8)	70.2(7.1)	70.9(7.1)
Change Scores (Raw Score - Baseline AVG)				
Stimulus/Time	NC	Snake	Blood	Total
Neutral 1/T1	0.9(5.0)	-1.9(6.0)	-2.9(7.2)	-1.28(6.2)
Neutral 1/T2	-0.6(7.7)	-1.4(7.1)	-0.5(5.4)	-0.82(6.7)
Neutral 1/T3	-0.7(7.0)	-2.1(5.9)	-4.4(6.3)	-2.42(6.5)
Neutral 1/T4	-1.6(8.1)	-0.7(6.8)	-0.2(5.1)	-0.85(6.4)
Snake/T1	-1.6(8.1)	3.2(5.7)	-1.3(7.9)	0.10(7.5)
Snake/T2	-1.2(9.0)	4.0(7.4)	-2.8(9.6)	0.16(9.1)
Snake/T3	0.8(11.2)	5.6(7.2)	-2.3(9.1)	1.35(8.7)
Snake/T4	0.1(11.3)	5.9(8.8)	-1.9(9.1)	1.36(10.2)
Neutral 2/T1	-2.2(8.6)	-0.1(5.2)	2.3(14.0)	0.02(9.9)
Neutral 2/T2	-2.1(7.1)	-0.2(5.9)	-3.8(9.0)	-2.00(7.4)
Neutral 2/T3	-3.4(6.3)	-0.2(7.0)	-2.6(9.4)	-2.06(7.7)
Neutral 2/T4	-0.1(7.5)	-0.9(8.1)	-4.1(9.3)	-1.67(8.3)

Table 3

Continued

Stimulus/Time	NC	Snake	Blood	Total
Blood/T1	-2.8(9.9)	-2.5(6.1)	-5.4(8.6)	-3.55(8.3)
Blood/T2	-1.3(7.9)	-0.3(7.7)	-3.5(12.6)	-1.68(9.6)
Blood/T3	-1.3(8.0)	-0.2(7.7)	-6.5(10.3)	-2.68(9.1)
Blood/T4	-4.2(7.6)	0.4(6.5)	-5.5(11.5)	-3.10(9.1)
Neutral 3/T1	-3.8(9.1)	-0.5(5.8)	-0.7(11.1)	-1.65(8.9)
Neutral 3/T2	-3.6(7.8)	-0.5(6.7)	-1.6(10.6)	-1.92(8.5)
Neutral 3/T3	-3.7(6.8)	-2.2(9.6)	-5.8(12.3)	-3.92(9.7)
Neutral 3/T4	-2.3(7.9)	-1.3(6.8)	-1.1(9.7)	-1.60(8.1)

Table 4

Baseline Average Systolic Blood Pressures and Systolic Blood Pressure Change Scores (SBPCS) of Nonfearful Comparison, Snake Fear, and Blood Fear Groups

	Group			
	NC	Snake	Blood	Total
Baseline AVG	122.7(9.5)	121.6(7.9)	119.4(11.2)	121.2(9.5)
Change Scores (Raw Score - Baseline AVG)				
Stimulus/Time	NC	Snake	Blood	Total
Neutral 1/T1	-0.7(7.5)	0.3(5.9)	-0.1(8.1)	-0.13(7.1)
Neutral 1/T2	-1.2(7.2)	0.1(4.7)	0.8(9.4)	-0.10(7.3)
Neutral 1/T3	-0.1(6.1)	-0.2(5.9)	1.1(6.3)	0.25(6.3)
Neutral 1/T4	-0.6(5.9)	0.3(6.3)	0.9(6.6)	0.22(6.2)
Snake/T1	0.8(5.2)	3.4(6.1)	0.2(10.1)	1.48(7.4)
Snake/T2	2.1(6.6)	3.3(7.6)	2.1(11.1)	2.51(8.5)
Snake/T3	1.8(7.1)	2.9(10.9)	2.7(11.3)	2.50(9.7)
Snake/T4	-0.4(7.9)	5.1(4.8)	2.2(11.2)	2.30(8.6)
Neutral 2/T1	-0.5(8.3)	0.6(4.8)	-1.6(9.3)	-0.51(7.7)
Neutral 2/T2	-3.3(6.2)	-1.1(8.1)	2.4(10.6)	-0.67(8.7)
Neutral 2/T3	-2.4(7.9)	-1.1(5.7)	0.6(11.6)	-0.98(8.7)
Neutral 2/T4	-0.8(7.6)	-1.2(8.1)	-0.1(11.2)	-0.68(9.0)

Table 4

Continued

Stimulus/Time	NC	Snake	Blood	Total
Blood/T1	-0.3(8.7)	-0.2(6.9)	1.6(9.7)	0.38(8.7)
Blood/T2	0.2(7.9)	1.3(6.4)	3.7(11.9)	1.73(9.0)
Blood/T3	-1.6(8.8)	1.4(7.9)	3.3(13.4)	1.06(10.4)
Blood/T4	-2.0(9.7)	-3.1(12.2)	0.7(17.1)	-1.46(13.2)
Neutral 3/T1	1.4(10.2)	1.1(6.9)	4.4(10.8)	2.32(9.4)
Neutral 3/T2	-0.2(9.9)	1.3(5.4)	5.0(12.2)	2.05(9.7)
Neutral 3/T3	-2.2(9.5)	-2.8(8.3)	3.4(7.8)	-0.55(8.9)
Neutral 3/T4	-0.8(7.2)	-0.6(5.7)	2.8(7.1)	0.47(8.3)

Table 5

Baseline Average Finger Pulse Volumes and Finger Pulse Volume Change Scores (FPVCS) of Nonfearful Comparison, Snake Fear, and Blood Fear Groups

	Group			
	NC	Snake	Blood	Total
Baseline AVG	23.7(17.2)	25.2(14.3)	23.1(17.3)	23.96(16.1)
Change Scores (Raw Score - Baseline AVG)				
Stimulus/Time	NC	Snake	Blood	Total
Neutral 1/T1	0.6(6.1)	-0.1(6.3)	0.1(6.9)	0.16(6.3)
Neutral 1/T2	1.3(5.3)	1.7(8.8)	1.5(8.4)	1.51(7.6)
Neutral 1/T3	-2.2(7.9)	-0.8(8.7)	-0.4(10.4)	-1.19(8.9)
Neutral 1/T4	-0.7(6.5)	0.9(5.4)	0.3(7.4)	0.17(6.4)
Snake/T1	-1.2(4.0)	-2.7(8.0)	0.6(5.1)	-1.1(6.0)
Snake/T2	-2.2(7.7)	-2.9(8.2)	-0.6(7.9)	-1.92(7.9)
Snake/T3	-1.2(6.9)	-5.1(7.3)	1.3(9.4)	-1.65(8.3)
Snake/T4	-1.3(7.2)	-5.1(7.1)	-1.5(9.9)	-2.63(8.2)
Neutral 2/T1	-2.5(7.2)	-2.4(10.1)	0.8(6.4)	-1.37(8.1)
Neutral 2/T2	-0.8(4.4)	0.9(8.8)	0.3(4.9)	0.15(6.3)
Neutral 2/T3	-1.5(6.1)	-0.2(10.0)	-0.4(7.2)	-0.71(7.8)
Neutral 2/T4	0.1(4.9)	0.6(9.0)	1.1(5.9)	0.59(6.7)

Table 5

Continued

Stimulus/Time	NC	Snake	Blood	Total
Blood/T1	-0.3(6.2)	-0.6(8.9)	-5.5(8.7)	-2.12(8.2)
Blood/T2	-0.9(5.6)	0.2(9.1)	-4.9(8.4)	-1.85(8.0)
Blood/T3	-1.4(5.7)	1.6(6.8)	-4.2(7.5)	-1.31(7.0)
Blood/T4	-2.2(4.8)	0.3(6.9)	-5.8(7.9)	-2.56(7.0)
Neutral 3/T1	-4.0(8.5)	-2.2(11.1)	-2.7(8.1)	-2.97(9.2)
Neutral 3/T2	-3.7(6.3)	-2.7(10.5)	-2.5(6.9)	-2.96(9.0)
Neutral 3/T3	-4.3(7.8)	-2.7(9.9)	-2.7(8.6)	-3.24(8.7)
Neutral 3/T4	-2.8(9.1)	-2.1(9.8)	-2.9(8.5)	-2.59(0.1)

Table 6

Mean Subjective Units of Distress (SUDs) Ratings of Nonfearful
Comparison, Snake Fear, and Blood Fear Groups

Stimulus	Group			
	Nonfear. Compar.	Snake Fear	Blood Fear	Total Sample
Neutral 1	0(0)	0.55(2.5)	0.05(0.2)	0.20(1.4)
Snake	2.5(4.9)	40.9(23.8)	15.6(15.9)	19.7(23.0)
Neutral 2	0(0)	0.45(2.0)	0.10(0.3)	0.18(1.2)
Blood	3.9(5.9)	15.5(11.4)	31.2(27.2)	16.9(20.4)
Neutral 3	0(0)	0.25(0.1)	0.05(0.2)	0.10(0.7)

Table 7

Mean Lightheadedness (LH) Ratings of Nonfearful Comparison,
Snake Fear, and Blood Fear Groups

Stimulus	Group			
	Nonfear. Compar.	Snake Fear	Blood Fear	Total Sample
Neutral 1	1.0(0)	1.05(0.2)	1.0(0)	1.02(0.13)
Snake	1.05(0.2)	1.55(0.7)	1.25(0.6)	1.28(0.58)
Neutral 2	1.0(0)	1.05(0.2)	1.05(0.2)	1.03(0.18)
Blood	1.15(0.5)	1.60(0.8)	2.35(1.5)	1.70(1.12)
Neutral 3	1.0(0)	1.05(0.2)	1.0(0)	1.02(0.13)

Table 8

**Mean Behavioral Avoidance Test (BATs) Scores of Nonfearful
Comparison, Snake Fear, and Blood Fear Groups**

Group	Behavioral Avoidance Test*	
	Snake BAT	Blood BAT
Snake Fear	3.70(3.13)	1.10(0.31)
Blood Fear	1.15(0.49)	3.40(3.49)
Neutral 3	1.00(0)	1.00(0)
Totals	1.83(2.28)	1.95(2.19)

Table 9

Mean SNAQ, MQ, ASI, BDI, STAI-S, STAI-T, and Total FSS Scores of Nonfearful Comparison, Snake Fear, and Blood Fear Groups

Self Report Measure	Group			
	Nonfear. Compar.	Snake Fear	Blood Fear	Total Sample
SNAQ	5.05(2.7)	19.05(4.1)	9.00(5.1)	11.03(7.17)
MQ	7.20(2.9)	9.70(3.2)	17.70(4.8)	11.53(5.85)
ASI	9.05(4.6)	16.40(8.7)	18.80(8.7)	14.75(8.58)
STAI-S	35.05(7.2)	42.55(9.0)	37.65(7.1)	38.42(8.30)
STAI-T	36.95(6.9)	39.65(8.7)	43.5(10.0)	40.03(8.89)
Total FSS	63.1(16.0)	82.1(26.4)	105.8(44.4)	83.68(35.39)

Table 10
Intercorrelations Among Self Report, Behavioral And Physiological Measures of Fear

	STAI-S	STAI-T	BDI	ASI	MQ	SNAQ	FSS-T	SUDS-S	SUDS-B	LH-S	LH-B	BAT-S	BAT-B
STAI-S		.43 ^b	.48 ^b	.39 ^b	.20	.37 ^a	.40 ^b	.19	.01	.16	-.02	.15	.08
STAI-T			.70 ^b	.51 ^b	.45 ^b	.10	.37 ^a	.11	.22	.10	.08	-.01	.35 ^a
BDI				.36 ^a	.24	.21	.30 ^a	.20	.11	.25	.00	.13	.22
ASI					.52 ^b	.32 ^a	.41 ^b	.28	.29	.35 ^a	.30 ^a	.24	.27
MQ						.12	.52 ^b	.14	.58 ^b	.20	.43 ^b	-.12	.49 ^b
SNAQ							.23	.76 ^b	.22	.55 ^b	.16	.67 ^b	-.04
FSS-T								.19	.40 ^b	.21	.40 ^b	-.06	.42 ^b
SUDS-S									.23	.60 ^b	.06	.67 ^b	.02
SUDS-B										.27	.73 ^b	.06	.67 ^b
LH-S											.26	.40 ^b	.02
LH-B												.05	.45 ^b
BAT-S													-.08
BAT-B													

Table 10 continues.

Table 10. continued.

	HR-S	HR-B	SBP-S	SBP-B	DBP-S	DBP-B	FPV-S	FPV-B
STAI-S	.01	-.10	-.13	-.19	-.09	-.18	-.04	.09
STAI-T	-.17	-.25	-.16	.04	-.22	-.13	-.12	-.07
BDI	-.03	-.15	-.23	.04	-.25	-.15	-.12	-.11
ASI	-.05	-.21	.00	-.09	.05	-.05	-.13	-.06
MQ	-.10	-.02	-.05	.07	-.10	-.17	.19	-.21
SNAQ	.43 ^b	.04	.12	-.08	.37 ^a	.19	-.18	.20
FSS-T	-.07	-.19	-.03	-.04	-.12	-.21	.08	-.05
SUDS-S	.46 ^b	-.10	.06	-.14	.23	.05	-.21	.18
SUDS-B	-.07	-.14	.15	.22	-.03	-.11	.12	-.09
LH-S	.21	-.10	-.08	-.23	.11	.00	-.11	.12
LH-B	-.09	.01	.37 ^a	.37 ^a	.08	.12	.03	-.18
BAT-S	.21	.03	.09	-.06	.17	.08	-.30 ^a	.17
BAT-B	-.19	-.26	-.04	.00	-.13	-.16	.07	-.06
HR-S		.35 ^a	.23	-.01	.43 ^b	.21	-.08	.11
HR-B			.07	.24	.14	.20	.06	-.05
SBP-S				.64 ^b	.63 ^b	.55 ^b	.09	-.08
SBP-B					.19	.33	-.01	.03
DBP-S						.73 ^b	-.09	.17
DBP-B							-.12	.07
FPV-S								.49 ^b
FPV-B								

Note. N = 60, ^a = $p < .01$ level, ^b = $p < .001$.

CONSENT FORM A

I have been asked to take part in a research project described below. The researcher will explain the project to me in detail. I should feel free to ask questions. If I have more questions later, Marty Franklin, the person mainly responsible for this study, will discuss them with me. I must be 18 years of age or older to be eligible for participation.

I have been asked to take part in this study in which my fears of various objects and situations will be assessed. My responses on the Fear Survey Schedule, an instrument used to measure fear, will be recorded.

If I decide to participate in this study, I will be asked to answer all items as honestly as possible.

Although there is no direct benefit from participation, the researcher may learn more about fear and anxiety.

My part in this study is confidential. None of the forms will identify me by name. All records will be kept in a locked cabinet in Chafee 159.

If the study causes me to feel anxious by reading any of the items on the Fear Survey Schedule, steps have been taken to help me deal with this anxiety if it persists. An arrangement with the Counseling Center has been established if I feel I need therapy. I can also write or call the University's Director of Research, 70 Lower College Road, URI, Kingston, RI 02881, 792-2635.

The decision to take part in this study is up to me. If I decide to participate, I may quit at any time without penalty. I do not have to participate. Whatever I decide to do will not affect my grade for participating. If I wish to quit, I simply inform Marty Franklin (792-2561) of my decision.

If I am not satisfied with the way this study is performed, I may discuss my complaint with Marty Franklin or with the Director of Research, if I choose.

I AM 18 YEARS OF AGE OR OLDER. I HAVE READ THE INFORMED CONSENT FORM. MY QUESTIONS HAVE BEEN ANSWERED. MY SIGNATURE ON THIS FORM MEANS THAT I UNDERSTAND THE INFORMATION AND I AGREE TO PARTICIPATE IN THIS STUDY.

SIGNATURE OF PARTICIPANT

PRINTED NAME

CONSENT FORM B

I have been asked to take part in a research project described below. The researcher will explain the project to me in detail. I should feel free to ask questions. If I have more questions later, Marty Franklin, the person mainly responsible for this study, will discuss them with me. I must be 18 years of age or older to be eligible for participation.

If I decide to participate in this study, I will be asked to complete a questionnaire packet in which my anxiety, depression, phobia, and sensitivity to anxiety symptoms will be measured. Completion of the questionnaire packet will take approximately twenty minutes. After completing these questionnaires, I will then be invited to participate in a brief structured interview in which I will be asked questions about my fear of blood and snakes, if any.

Although there is no direct benefit from participation, the researcher may learn more about fear and anxiety.

My part in this study is confidential. None of the forms will identify me by name. All records will be kept in a locked cabinet in Chafee 159.

If the study causes me to feel anxious by reading about or hearing about fearful items or situations, steps have been taken to help me deal with this anxiety if it persists. An arrangement with the Counseling Center has been established if I feel I need therapy. I can also write or call the University's Director of Research, 70 Lower College Road, URI, Kingston, RI 02881, 792-2635.

The decision to take part in this study is up to me. If I decide to participate, I may quit at any time without penalty. I do not have to participate. Whatever I decide to do will not affect my grade for participating. If I wish to quit, I simply inform Marty Franklin (792-2561) of my decision.

If I am not satisfied with the way this study is performed, I may discuss my complaint with Marty Franklin or with the Director of Research, if I choose.

I AM 18 YEARS OF AGE OR OLDER. I HAVE READ THE INFORMED CONSENT FORM. MY QUESTIONS HAVE BEEN ANSWERED. MY SIGNATURE ON THIS FORM MEANS THAT I UNDERSTAND THE INFORMATION AND I AGREE TO PARTICIPATE IN THIS STUDY.

SIGNATURE OF PARTICIPANT

PRINTED NAME

CONSENT FORM C

I have been asked to take part in a research project described below. The researcher will explain the project to me in detail. I should feel free to ask questions. If I have more questions later, Marty Franklin, the person mainly responsible for this study, will discuss them with me. I must be 18 years of age or older to be eligible for participation.

If I decide to participate in this study, I will be asked to participate in a Behavioral Avoidance Test (BAT). On the BAT, I will be asked to approach a 2 ft. harmless green ribbon snake in a locked glass container as closely as I possibly can. Fear is measured on a 15 point scale. I will not be forced to do anything. If I am already fearful and anxious by reading this description, I will be given a score of 15 and not be asked to proceed further with the BAT. In summary, the goal of the BAT is to approach the snake up to the point where I feel definitely anxious, but no further. I will not be asked or permitted to touch the snake during the BAT.

Although there is no direct benefit from participation, the researcher may learn more about fear and anxiety.

My part in this study is confidential. None of the forms will identify me by name. All records will be kept in a locked cabinet in Chafee 159.

If the study causes me to feel anxious in the presence of the snake, steps have been taken to help me deal with this anxiety if it persists. An arrangement with the Counseling Center has been established if I feel I need therapy. I can also write or call the University's Director of Research, 70 Lower College Road, URI, Kingston, RI 02881, 792-2635.

The decision to take part in this study is up to me. If I decide to participate, I may quit at any time without penalty. I do not have to participate. Whatever I decide to do will not affect my grade for participating. If I wish to quit, I simply inform Marty Franklin (792-2561) of my decision.

If I am not satisfied with the way this study is performed, I may discuss my complaint with Marty Franklin or with the Director of Research, if I choose.

I AM 18 YEARS OF AGE OR OLDER. I HAVE READ THE INFORMED CONSENT FORM. MY QUESTIONS HAVE BEEN ANSWERED. MY SIGNATURE ON THIS FORM MEANS THAT I UNDERSTAND THE INFORMATION AND I AGREE TO PARTICIPATE IN THIS STUDY.

SIGNATURE OF PARTICIPANT

PRINTED NAME

CONSENT FORM C

I have been asked to take part in a research project described below. The researcher will explain the project to me in detail. I should feel free to ask questions. If I have more questions later, Marty Franklin, the person mainly responsible for this study, will discuss them with me. I must be 18 years of age or older to be eligible for participation.

If I decide to participate in this study, I will be asked to participate in a Behavioral Avoidance Test (BAT). On the BAT, I will be asked to approach a blood filled syringe as closely as I possibly can. Fear is measured on a 15 point scale. I will not be forced to do anything. If I am already fearful and anxious by reading this description, I will be given a score of 15 and not be asked to proceed further with the BAT. In summary, the goal of the BAT is to approach the syringe up to the point where I feel definitely anxious, but no further. I will not be asked or permitted to touch the syringe during the BAT.

Although there is no direct benefit from participation, the researcher may learn more about fear and anxiety.

My part in this study is confidential. None of the forms will identify me by name. All records will be kept in a locked cabinet in Chafee 159.

If the study causes me to feel anxious in the presence of blood, steps have been taken to help me deal with this anxiety if it persists. An arrangement with the Counseling Center has been established if I feel I need therapy. I can also write or call the University's Director of Research, 70 Lower College Road, URI, Kingston, RI 02881, 792-2635.

The decision to take part in this study is up to me. If I decide to participate, I may quit at any time without penalty. I do not have to participate. Whatever I decide to do will not affect my grade for participating. If I wish to quit, I simply inform Marty Franklin (792-2561) of my decision.

If I am not satisfied with the way this study is performed, I may discuss my complaint with Marty Franklin or with the Director of Research, if I choose.

I AM 18 YEARS OF AGE OR OLDER. I HAVE READ THE INFORMED CONSENT FORM. MY QUESTIONS HAVE BEEN ANSWERED. MY SIGNATURE ON THIS FORM MEANS THAT I UNDERSTAND THE INFORMATION AND I AGREE TO PARTICIPATE IN THIS STUDY.

SIGNATURE OF PARTICIPANT

PRINTED NAME

CONSENT FORM D

I have been asked to take part in a research project described below. The researcher will explain the project to me in detail. I should feel free to ask questions. If I have more questions later, Marty Franklin, the person mainly responsible for this study, will discuss them with me. I must be 18 years of age or older to be eligible for participation.

I have been asked to take part in this study of physiological and subjective reactions to videotapes of neutral content, snakes, and thoracic surgery. The purpose of this study is to learn more about reactions to these stimuli in women.

If I decide to participate in this study, I will be asked to watch three different videotapes while my physiological responses are recorded. One videotape will present neutral travel scenes, the second will present pictures of snakes, and the third will present a surgical procedure. My physical responses will be recorded using an inflatable cuff around my arm to record blood pressure, and a velcro band around my finger (finger photometer) to measure heart rate. I will be asked to rate my levels of distress and physical responses to the videotapes after viewing each one.

My participation in this study may involve the following risks or discomforts: I may become anxious or uncomfortable when I view the videotapes. However, it is believed that there is no risk to my health as a result of participating. Also, I may experience some discomfort during inflation of the blood pressure cuff.

Although there is no direct benefit from participation, the researcher may learn more about fear and anxiety.

My part in this study is confidential. None of the forms will identify me by name. All records will be kept in a locked cabinet in Chafee 159.

If the study causes me to feel anxious by viewing any of the videotapes, steps have been taken to help me deal with this anxiety if it persists. An arrangement with the Counseling Center has been established if I feel I need therapy. I can also write or call the University's Director of Research, 70 Lower College Road, URI, Kingston, RI 02881, 792-2635.

The decision to take part in this study is up to me. If I decide to participate, I may quit at any time without penalty. I do not have to participate. Whatever I decide to do will not affect my grade for participating. If I wish to quit, I simply inform Marty Franklin (792-2561) of my decision.

If I am not satisfied with the way this study is performed, I may discuss my complaint with Marty Franklin or with the Director of Research, if I choose.

I AM 18 YEARS OF AGE OR OLDER. I HAVE READ THE INFORMED CONSENT FORM. MY QUESTIONS HAVE BEEN ANSWERED. MY SIGNATURE ON THIS FORM MEANS THAT I UNDERSTAND THE INFORMATION AND I AGREE TO PARTICIPATE IN THIS STUDY.

SIGNATURE OF PARTICIPANT

PRINTED NAME

FEAR SURVEY SCHEDULE

by
Joseph Wolpe and
Peter J. Lang

NAME _____
OCCUPATION _____ AGE _____ SEX _____
ADDRESS _____

The items in this questionnaire refer to things and experiences that may cause fear or other, related unpleasant feelings. Read each item and decide how much you are disturbed by it. Then mark your booklet according to the following scale:

If going boating generally leads you to feel no fear, blacken in space (0) (not at all). If you would feel a little fear, check number (1) (a little). If you feel more afraid mark a higher number — (2) (a fair amount), (3) (much), or (4) (very much), depending on your response to the item. Remember to blacken in only one of the spaces after each. Answer all the items. Please work rapidly and do not spend too much time on any one statement.

	0	1	2	3	4
0. Not at all	☐	☐	☐	☐	☐
1. A little	☐	☐	☐	☐	☐
2. A fair amount ...	☐	☐	☐	☐	☐
3. Much	☐	☐	☐	☐	☐
4. Very much	☐	☐	☐	☐	☐

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	0	1	2	3	4
1. Noise of vacuum cleaners	■	■	■	■	■
2. Open wounds	■	■	■	■	■
3. Being alone	■	■	■	■	■
4. Loud voices	■	■	■	■	■
5. Dead people	■	■	■	■	■
6. Speaking in public	■	■	■	■	■
7. Crossing streets	■	■	■	■	■
8. People who seem insane	■	■	■	■	■
9. Being in a strange place	■	■	■	■	■
10. Falling	■	■	■	■	■
11. Automobiles	■	■	■	■	■
12. Being teased	■	■	■	■	■
13. Dentists	■	■	■	■	■
14. Thunder	■	■	■	■	■
15. Sirens	■	■	■	■	■
16. Failure	■	■	■	■	■
17. Entering a room where other people are already seated	■	■	■	■	■
18. High places on land	■	■	■	■	■
19. Looking down from high buildings	■	■	■	■	■
20. Worms	■	■	■	■	■
21. Imaginary creatures	■	■	■	■	■
22. Receiving injections	■	■	■	■	■
23. Strangers	■	■	■	■	■
24. Bats	■	■	■	■	■
25. Journeys by train	■	■	■	■	■
26. Feeling angry	■	■	■	■	■
27. People in authority	■	■	■	■	■

	0	1	2	3	4
28. Flying insects	■	■	■	■	■
29. Seeing other people infected	■	■	■	■	■
30. Sudden noises	■	■	■	■	■
31. Journeys by car	■	■	■	■	■
32. Dull weather	■	■	■	■	■
33. Crowds	■	■	■	■	■
34. Cats	■	■	■	■	■
35. One person bullying another	■	■	■	■	■
36. Tough looking people	■	■	■	■	■
37. Birds	■	■	■	■	■
38. Sight of deep water	■	■	■	■	■
39. Being watched working	■	■	■	■	■
40. Dead animals	■	■	■	■	■
41. Weapons	■	■	■	■	■
42. Dirt	■	■	■	■	■
43. Journeys by bus	■	■	■	■	■
44. Crawling insects	■	■	■	■	■
45. Seeing a fight	■	■	■	■	■
46. Ugly people	■	■	■	■	■
47. Fire	■	■	■	■	■
48. Sick people	■	■	■	■	■
49. Being criticized	■	■	■	■	■
50. Strange shapes	■	■	■	■	■
51. Being touched by others	■	■	■	■	■
52. Being in an elevator	■	■	■	■	■
53. Witnessing surgical operations	■	■	■	■	■
54. Angry people	■	■	■	■	■

	0	1	2	3	4
65. Mice or rats	⦿	⦿	⦿	⦿	⦿
66. Human blood	⦿	⦿	⦿	⦿	⦿
67. Animal blood	⦿	⦿	⦿	⦿	⦿
68. Parting from friends	⦿	⦿	⦿	⦿	⦿
69. Enclosed places	⦿	⦿	⦿	⦿	⦿
70. Prospects of a surgical operation	⦿	⦿	⦿	⦿	⦿
71. Feeling rejected by others	⦿	⦿	⦿	⦿	⦿
72. Journeys by airplane	⦿	⦿	⦿	⦿	⦿
73. Medical odors	⦿	⦿	⦿	⦿	⦿
74. Feeling disapproved of	⦿	⦿	⦿	⦿	⦿
75. Harmless snakes	⦿	⦿	⦿	⦿	⦿
76. Cemeteries	⦿	⦿	⦿	⦿	⦿
77. Being ignored	⦿	⦿	⦿	⦿	⦿
78. Darkness	⦿	⦿	⦿	⦿	⦿
79. Premature heart beats (missing a beat)	⦿	⦿	⦿	⦿	⦿
80. Nude men	⦿	⦿	⦿	⦿	⦿
81. Nude women	⦿	⦿	⦿	⦿	⦿
82. Lightning	⦿	⦿	⦿	⦿	⦿
83. Doctors	⦿	⦿	⦿	⦿	⦿
84. Crippled or deformed people	⦿	⦿	⦿	⦿	⦿
85. Making mistakes	⦿	⦿	⦿	⦿	⦿
86. Looking foolish	⦿	⦿	⦿	⦿	⦿
87. Losing control of yourself	⦿	⦿	⦿	⦿	⦿
88. Fainting	⦿	⦿	⦿	⦿	⦿
89. Becoming nauseous	⦿	⦿	⦿	⦿	⦿
90. Harmless spiders	⦿	⦿	⦿	⦿	⦿
91. Being responsible for decisions	⦿	⦿	⦿	⦿	⦿

	0	1	2	3	4
92. Sight of knives or sharp objects	⦿	⦿	⦿	⦿	⦿
93. Thoughts of being mentally ill	⦿	⦿	⦿	⦿	⦿
94. Taking written tests	⦿	⦿	⦿	⦿	⦿
95. Being with a member of the opposite sex	⦿	⦿	⦿	⦿	⦿
96. Large open spaces	⦿	⦿	⦿	⦿	⦿
97. Dogs	⦿	⦿	⦿	⦿	⦿
98. Germs	⦿	⦿	⦿	⦿	⦿
99. Being seen unclothed	⦿	⦿	⦿	⦿	⦿
100. Taking medicine	⦿	⦿	⦿	⦿	⦿
101. Becoming sexually aroused	⦿	⦿	⦿	⦿	⦿
102. Being punished by God	⦿	⦿	⦿	⦿	⦿
103. Ideas of possible homosexuality	⦿	⦿	⦿	⦿	⦿
104. Being dressed unsuitably (wearing wrong clothes for the occasion)	⦿	⦿	⦿	⦿	⦿
105. Ministers or priests	⦿	⦿	⦿	⦿	⦿
106. Hurting the feelings of others	⦿	⦿	⦿	⦿	⦿
107. Kissing	⦿	⦿	⦿	⦿	⦿
108. Undertakers	⦿	⦿	⦿	⦿	⦿
109. Police	⦿	⦿	⦿	⦿	⦿
110. Fish	⦿	⦿	⦿	⦿	⦿
111. Masturbation	⦿	⦿	⦿	⦿	⦿
112. Leaving home	⦿	⦿	⦿	⦿	⦿
113. Physical examinations	⦿	⦿	⦿	⦿	⦿
114. Marriage	⦿	⦿	⦿	⦿	⦿
115. Insecticides	⦿	⦿	⦿	⦿	⦿
116. Vomiting	⦿	⦿	⦿	⦿	⦿
117. Responsibility (being in charge)	⦿	⦿	⦿	⦿	⦿
118. Hospitals	⦿	⦿	⦿	⦿	⦿

SELF-EVALUATION QUESTIONNAIRE **STAI Y-1**

Client No. _____ Assessment Pt. _____ Date _____

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

	Not at all	Some- what so	Moder- ately	Very much so
1. I feel calm	(1)	(2)	(3)	(4)
2. I feel secure	(1)	(2)	(3)	(4)
3. I feel tense	(1)	(2)	(3)	(4)
4. I feel strained	(1)	(2)	(3)	(4)
5. I feel at ease	(1)	(2)	(3)	(4)
6. I feel upset	(1)	(2)	(3)	(4)
7. I am presently worrying over possible misfortunes	(1)	(2)	(3)	(4)
8. I feel satisfied	(1)	(2)	(3)	(4)
9. I feel frightened	(1)	(2)	(3)	(4)
10. I feel comfortable	(1)	(2)	(3)	(4)
11. I feel self-confident	(1)	(2)	(3)	(4)
12. I feel nervous	(1)	(2)	(3)	(4)
13. I am jittery	(1)	(2)	(3)	(4)
14. I feel indecisive	(1)	(2)	(3)	(4)
15. I am relaxed	(1)	(2)	(3)	(4)
16. I feel content	(1)	(2)	(3)	(4)
17. I am worried	(1)	(2)	(3)	(4)
18. I feel confused	(1)	(2)	(3)	(4)
19. I feel steady	(1)	(2)	(3)	(4)
20. I feel pleasant	(1)	(2)	(3)	(4)

SELF-EVALUATION QUESTIONNAIRE **STAI Y-2**

Client No. _____ Assessment Pt. _____ Date _____

DIRECTIONS: A number of statements which people used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you feel generally feel. There are not right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

	Not at all	Some- what so	Moder- ately	Very much so
21. I feel pleasant	(1)	(2)	(3)	(4)
22. I feel nervous and restless	(1)	(2)	(3)	(4)
23. I feel satisfied with myself	(1)	(2)	(3)	(4)
24. I wish I could be as happy as others seem to be	(1)	(2)	(3)	(4)
25. I feel like a failure	(1)	(2)	(3)	(4)
26. I feel rested	(1)	(2)	(3)	(4)
27. I am calm, cool, and collected	(1)	(2)	(3)	(4)
28. I feel that difficulties are piling up so that I cannot overcome them	(1)	(2)	(3)	(4)
29. I worry to much over something that really doesn't matter	(1)	(2)	(3)	(4)
30. I am happy	(1)	(2)	(3)	(4)
31. I have disturbing thoughts	(1)	(2)	(3)	(4)
32. I lack self-confidence	(1)	(2)	(3)	(4)
33. I feel secure	(1)	(2)	(3)	(4)
34. I make decisions easily	(1)	(2)	(3)	(4)
35. I feel inadequate	(1)	(2)	(3)	(4)
36. I am content	(1)	(2)	(3)	(4)
37. Some unimportant thought runs through my mind and bothers me	(1)	(2)	(3)	(4)
38. I take disappointments so keenly that I can't put them out of my mind	(1)	(2)	(3)	(4)
39. I am a steady person	(1)	(2)	(3)	(4)
40. I get in a state of tension or turmoil as I think over my recent concerns and interests	(1)	(2)	(3)	(4)

M. Q.

PLEASE PLACE AN "X" IN THE APPROPRIATE COLUMN

	True	False
1. I could not remove the hook from a fish that was caught.	---	---
2. I would feel some revulsion looking at a preserved brain in a bottle.	---	---
3. If a badly injured person appears on TV, I turn my head away.	---	---
4. I dislike looking at pictures of accidents or injuries in magazines.	---	---
5. I do not mind visiting a hospital and seeing ill or injured persons.	---	---
6. Medical odors make me tense and uncomfortable.	---	---
7. I would not go hunting because I could not stand the sight of a dead animal.	---	---
8. Watching a butcher at work would make me anxious.	---	---
9. A career as a doctor or nurse is very attractive to me.	---	---
10. I would feel faint if I saw someone with a wound in the eye.	---	---
11. Watching people use sharp power tools makes me nervous.	---	---
12. The prospect of getting an injection or seeing someone else get one bothers me very much.	---	---
13. I feel sick or faint at the sight of blood.	---	---
14. I enjoy reading articles about modern medical techniques.	---	---
15. Injuries, accidents, blood, etc., bother me more than anything else.	---	---
16. Under no circumstances would I accept an invitation to watch a surgical operation.	---	---
17. When I see an accident I feel tense.	---	---
18. It would not bother me to see a bad cut as long as it had been cleaned and stitched.	---	---
19. Using very sharp knives makes me nervous.	---	---
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.	---	---
21. If instruments were available, it would be interesting to see the action of the internal organs in a living body.	---	---
22. I am frightened at the idea of someone drawing a blood sample from me.	---	---
23. I don't believe anyone could help a person with a bloody wound without feeling at least a little upset.	---	---
24. I am terrified by the idea of having surgery.	---	---
25. I am frightened by the thought that I might some day have to help a person badly hurt in a car wreck.	---	---
26. I shudder when I think of accidentally cutting myself.	---	---
27. The sight of dried blood is repulsive.	---	---
28. Blood and gore upset me no more than the average person.	---	---
29. The sight of an open wound nauseates me.	---	---
30. I could never swab out a wound.	---	---

SNAQ

Name _____

Subject # _____

Please circle T (True) or F (False)

- T F 1. I avoid going to parks or on camping trips because there may be snakes about.
- T F 2. I would feel some anxiety holding a toy snake in my hand.
- T F 3. If a picture of a snake appears on the screen during a motion picture, I turn my head away.
- T F 4. I dislike looking at pictures of snakes in a magazine.
- T F 5. Although it may not be so, I think of snakes as slimy.
- T F 6. I enjoy watching snakes at the zoo.
- T F 7. I am terrified by the thought of touching a harmless snake.
- T F 8. If someone says that there are snakes anywhere about, I become alert and on edge.
- T F 9. I would not go swimming at the beach if snakes had ever been reported in the area.
- T F 10. I would feel uncomfortable wearing a snakeskin belt.
- T F 11. When I see a snake, I feel tense and restless.
- T F 12. I enjoy reading articles about snakes and other reptiles.
- T F 13. I feel sick when I see a snake.
- T F 14. Snakes are sometimes useful.
- T F 15. I shudder when I think of snakes.
- T F 16. I don't mind being near a non-poisonous snake if there is someone there in whom I have confidence.
- T F 17. Some snakes are very attractive to look at.
- T F 18. I don't believe anyone could hold a snake without some fear.
- T F 19. The way snakes move is repulsive.
- T F 20. It wouldn't bother me to touch a dead snake with a long stick.
- T F 21. If I came upon a snake in the woods I would probably run.
- T F 22. I'm more afraid of snakes than any other animal.
- T F 23. I would not want to travel "down south" or in tropical countries because of the greater prevalence of snakes.
- T F 24. I wouldn't take a course in biology if I thought you might have to dissect a snake.
- T F 25. I have no fear of non-poisonous snakes.
- T F 26. Not only am I afraid of snakes but worms and most reptiles make me feel anxious.
- T F 27. Snakes are very graceful animals.
- T F 28. I think that I'm no more afraid of snakes than the average person.
- T F 29. I would prefer not to finish a story if something about snakes was introduced into the plot.
- T F 30. Even if I was late for a very important appointment, the thought of snakes would stop me from taking a shortcut through an open field.

Anxiety Sensitivity Index

0 = Very Little 1 = A Little 2 = Some 3 = Much 4 = Very Much

	0	1	2	3	4
1. It is important to me not to appear nervous _	_	_	_	_	_
2. When I cannot keep my mind on a task, I worry that I might be going crazy _	_	_	_	_	_
3. It scares me when I feel 'shaky' (trembling) _	_	_	_	_	_
4. It scares me when I might feel faint _	_	_	_	_	_
5. It is important to me to stay in control of my emotions _	_	_	_	_	_
6. It scares me when my heart beats rapidly _	_	_	_	_	_
7. It embarrasses me when my stomach growls _	_	_	_	_	_
8. It scares me when I am nauseous _	_	_	_	_	_
9. When I notice that my heart is beating rapidly, I worry that I might be having heart attack. _	_	_	_	_	_
10. It scares me when I become short of breath _	_	_	_	_	_
11. When my stomach is upset, I worry that I might be seriously ill _	_	_	_	_	_
12. It scares me when I am unable to keep my mind on a task _	_	_	_	_	_
13. Other people notice when I feel shaky _	_	_	_	_	_
14. Unusual body sensations scare me _	_	_	_	_	_
15. When I am nervous, I worry that I might be mentally ill _	_	_	_	_	_
16. It scares me when I am nervous _	_	_	_	_	_

Beck Inventory

On this questionnaire are groups of statements. Please read each group of statements carefully. Then pick out the one statement in each group which best describes the way you have been feeling the PAST WEEK INCLUDING TODAY. Circle the number beside the statement you picked. If several statements in the group seem to apply equally well, circle each one. Be sure to read all the statements in each group before making your choice.

1. 0 - I do not feel sad
1 - I feel sad
2 - I am sad all the time and I can't snap out of it
3 - I am so sad or unhappy that I can't stand it
2. 0 - I am not particularly discouraged about the future
1 - I feel discouraged about the future
2 - I feel I have nothing to look forward to
3 - I feel that the future is hopeless and that things cannot improve
3. 0 - I do not feel like a failure
1 - I feel I have failed more than the average person
2 - As I look back on my life, all I can see is a lot of failures
3 - I feel I am a complete failure as a person
4. 0 - I get as much satisfaction out of things as I used to
1 - I don't enjoy things the way I used to
2 - I don't get real satisfaction out of anything anymore
3 - I am dissatisfied or bored with everything
5. 0 - I don't feel particularly guilty
1 - I feel guilty a good part of the time
2 - I feel quite guilty most of the time
3 - I feel guilty all of the time
6. 0 - I don't feel I am being punished
1 - I feel I may be punished
2 - I expect to be punished
3 - I feel I am being punished
7. 0 - I don't feel disappointed in myself
1 - I am disappointed in myself
2 - I am disgusted with myself
3 - I hate myself
8. 0 - I don't feel I am any worse than anybody else
1 - I am critical of myself for my weaknesses or mistakes
2 - I blame myself all the time for my faults
3 - I blame myself for everything bad that happens
9. 0 - I don't have any thoughts of killing myself
1 - I have thoughts of killing myself, but I would not carry them out
2 - I would like to kill myself
3 - I would kill myself if I had the chance

10. 0 - I don't cry any more than usual
1 - I cry more now than I used to
2 - I cry all the time now
3 - I used to be able to cry, but now I can't cry even though I want to
11. 0 - I am no more irritated now than I ever am
1 - I get annoyed or irritated more easily than I used to
2 - I feel irritated all the time now
3 - I don't get irritated at all by the things that used to irritate me
12. 0 - I have not lost interest in other people
1 - I am less interested in other people than I used to be
2 - I have lost most of my interest in other people
3 - I have lost all of my interest in other people
13. 0 - I make decisions about as well as I ever could
1 - I put off making decisions more than I used to
2 - I have greater difficulty in making decisions than before
3 - I can't make decisions at all anymore
14. 0 - I don't feel I look any worse than I used to
1 - I am worried that I am looking old or unattractive
2 - I feel that there are permanent changes in my appearance that make me look unattractive
3 - I believe that I look ugly
15. 0 - I can work about as well as before
1 - It takes an extra effort to get started at doing something
2 - I have to push myself very hard to do anything
3 - I can't do any work at all
16. 0 - I can sleep as well as usual
1 - I don't sleep as well as I used to
2 - I wake up one to two hours earlier than usual and find it hard to get back to sleep
3 - I wake up several hours earlier than I used to and cannot get back to sleep
17. 0 - I don't get more tired than usual
1 - I get tired more easily than I used to
2 - I get tired from doing almost anything
3 - I am too tired to do anything
18. 0 - My appetite is no worse than usual
1 - My appetite is not as good as it used to be
2 - My appetite is much worse now
3 - I have no appetite at all anymore

**Beck Inventory
(continued)**

19. 0 - I haven't lost much weight, if any, lately
1 - I have lost more than 5 pounds
2 - I have lost more than 10 pounds
3 - I have lost more than 15 pounds

I am purposely trying to lose weight by eating less YES ____ NO ____

20. 0 - I am no more worried about my health than usual
1 - I am worried about physical problems such as aches and pains;
or upset stomach; or constipation
2 - I am very worried about physical problems and it's hard to
think of much else
3 - I am so worried about my physical problems that I cannot
think about anything else
21. 0 - I have not noticed any recent change in my interest in sex
1 - I am less interested in sex than I used to be
2 - I am much less interested in sex now
3 - I have lost interest in sex completely

Item: Blood

<u>Level 15</u> Subject reads consent/ instructions; a vial of blood is covered on a table in another room.	<u>Level 14</u> Subject is asked to move to this room to view the covered vial of blood at 12 feet.	<u>Level 13</u> Vial is uncovered by experimenter and is viewed by subject at 12 feet.	<u>Level 12</u> Approach to the vial of blood in increments of 1 foot; subject views the uncovered vial of blood at 11 feet.	<u>Level 11</u> Uncovered vial is viewed at 10 feet.
<u>Level 10</u> Uncovered vial is viewed at 9 feet.	<u>Level 9</u> Uncovered vial is viewed at 8 feet.	<u>Level 8</u> Uncovered vial is viewed at 7 feet.	<u>Level 7</u> Uncovered vial is viewed at 6 feet.	<u>Level 6</u> Uncovered vial is viewed at 5 feet.
<u>Level 5</u> Uncovered vial is viewed at 4 feet.	<u>Level 4</u> Uncovered vial is viewed at 3 feet.	<u>Level 3</u> Uncovered vial is viewed at 2 feet.	<u>Level 2</u> Uncovered vial is viewed at 1 foot.	<u>Level 1</u> Uncovered vial is touched by subject and observed for 20 seconds.

Item: Snakes

Level 15
Subject reads consent/ instructions; snake is covered in case in another room.

Level 14
Subject is asked to move to this room to view the covered case at 12 feet.

Level 13
Case is uncovered by experimenter and is viewed by subject at 12 feet.

Level 12
Approach to the uncovered case in increments of 1 foot; uncovered case is viewed at 11 feet.

Level 11
Uncovered case is viewed at 10 feet.

Level 10
Uncovered case is viewed at 9 feet.

Level 9
Uncovered case is viewed at 8 feet.

Level 8
Uncovered case is viewed at 7 feet.

Level 7
Uncovered case is viewed at 6 feet.

Level 6
Uncovered case is viewed at 5 feet.

Level 5
Uncovered case is viewed at 4 feet.

Level 4
Uncovered case is viewed at 3 feet.

Level 3
Uncovered case is viewed at 2 feet.

Level 2
Uncovered case is viewed at 1 foot.

Level 1
Subject's touch case and observes the snake for 20 seconds.

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