

The Continuum of Response to Blood/Injury Stimuli

as Demonstrated by Autonomic Reactivity

and Affect

by

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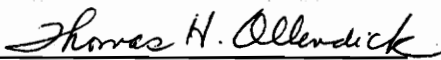
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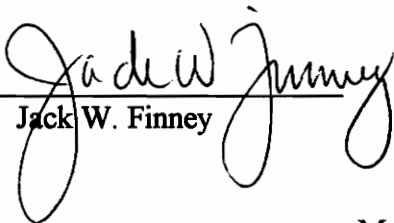
IN

PSYCHOLOGY


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ABSTRACT

The purpose of this study was to examine the physiological and affective aspects of the reaction to blood/ injury (B/I) phobia in a normal population with varying levels of B/I fear. From a screening sample ($n = 412$), ninety subjects (age 18-20) were selected and assigned to groups ($n = 30$) on the basis of level of fear and avoidance of B/I stimuli as measured by the Fear Questionnaire (Marks & Matthews, 1979). Heart rate (HR) and skin temperature (ST) were measured to establish a baseline and while the subjects watched a graphic surgery video. The subjects also described their emotional state before and after the video by rating affectively laden adjectives from three classes (neutral, fear, disgust). After the video, each subject's fainting history and experience with B/I stimuli were gathered through use of an interview. The same information was collected from the subjects' parents through a mailed questionnaire. HR and ST changed significantly across the duration of the procedure, yet no differences were found according to fear group. HR

and ST were noted to change in a pattern indicative of fear (Ekman, 1983) after a description of the video was read to the subjects at the end of baseline. Prior to the video, the neutral adjectives were rated highest by all groups, while after the video the high fear group rated the disgust adjectives highest. The primary conclusion of the study is that fear is experienced in anticipation of B/I stimuli, while disgust is experienced during exposure.

It was also found that people high in B/I fear as compared to people lower in B/I fear report the following: more anxiety sensitivity; more general anxiety; more social anxiety; more discomfort when others are distressed; more direct, negative experiences, including fainting and feeling faint, with B/I stimuli; and more first degree relatives with similar experiences.

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Literature Review

A phobia as defined in the Diagnostic and Statistical Manual, Third Edition Revised (American Psychiatric Association (APA), 1987) is a persistent fear of a circumscribed object or situation causing significant interference in a person's life that is unrelated to other anxiety disorders. Most epidemiological surveys of phobias find animal phobias to be the most common with fear of heights, fear of air travel, and fear of closed spaces also being prevalent (Agras, Sylvester, & Oliveau, 1969; Marks & Gelder, 1966; Ollendick, Matson, & Helsel, 1985). One other fear and phobia which is usually included in a list of common fears is a fear of blood and injury. Agras et al. found injury/illness phobia to be the most common phobia, occurring at a rate of 42% in an adult population of one thousand. When examining it as a common fear, in contrast to as a phobia, fear of injury dropped behind fears of snakes, heights, and flying in prevalence but still ranked among the top group of fears, occurring at a rate of 18.2%. More recent data show 13-14.5% of adults have a negative reaction when exposed to a blood stimulus (Kleinknecht, 1987; Kleinknecht, 1988). Furthermore, women report fear of blood more frequently than men (Yule & Fernando, 1980), yet when asked to report a history of negative reaction to blood stimuli, there appears to be no distinction between genders (Kleinknecht, 1987). Physiological data, however, support a two to one majority for the autonomic nervous

system of females being more reactive, more likely to faint, than males (Balaji, Oslizlok, Allen, McKay, & Gillette, 1994).

Blood/Injury (B/I) phobia is made distinct from other simple phobias by the reaction of the autonomic nervous system when a person is exposed to a blood and injury stimulus. Other phobic stimuli produce a physiological response which is characterized by a general arousal of the sympathetic nervous system. This arousal includes an increase in heart rate, respiration, and perspiration along with alterations in vascular, renal, metabolic, and endocrine functions in preparation for flight or fight. Whereas other phobias produce this type of response, after an initial transitory increase in physiological function, B/I phobia may go on to produce a secondary slowing of body functions, particularly heart rate, resulting in near or complete loss of consciousness. The tendency for people to feel faint or to actually faint in response to blood stimuli has been documented repeatedly (Kaloupek, Scott, & Khatami, 1985; Kleinknecht, 1987; Lumley & Melamed, 1992; Öst, Sterner, & Lindahl, 1984). It is this reaction that causes some researchers to question if B/I phobia should be considered a phobia since the diagnostic criteria (American Psychiatric Association, 1987) for simple phobia include "exposure...provokes an immediate anxiety response" (Curtis & Thyer, 1983; Himle, Crystal, Curtis, & Fluent, 1991). Other researchers question whether the emotion experienced during exposure to a blood stimulus is actually fear (Kleinknecht & Thorndike, 1990; Lumley & Melamed, 1992).

Because of its questionable affective response and its unique physiological response, B/I phobia warrants closer examination. The following review surveys what is known regarding the acquisition and family correspondence of B/I phobia, as well as the emotions, cognitions and physiology that accompany it.

Acquisition

Perhaps the most well known theory of fear acquisition is that put forth by Rachman (1978). He proposes three specific pathways for the development of fear: direct conditioning, modeling, and instruction or information. According to Rachman's theory, the more direct a person's experience with the stimulus, the more severe the fear; hence, someone having an intense fear provoking experience with a particular stimulus should become conditioned to be phobic of that stimulus. Several studies have explored retrospectively if this is indeed the case for a variety of phobias including B/I phobia. For example, Ollendick and King (1991) demonstrated that the most common pathways for the development of most common childhood fears were modeling and instructional/informational. However, 36% of the children did report direct experiences. It should be noted that these children were not diagnosed as phobic, although based on Rachman's theory those children with the direct experience could be hypothesized to be more fearful than those children whose fears were acquired through observational or instructional pathways.

A surprisingly similar distribution of the pathways was found with blood and dental phobics. Öst and Hugdahl (1985) reported that 46% of blood phobics and 69% of dental

phobics ascribed their phobias to a direct conditioning experience. In this sample, however, approximately half of the phobics attributed their phobia to indirect pathways. Previously Öst and colleagues had obtained similar results with claustrophobics (Öst & Hugdahl, 1981) and agoraphobics (Öst & Hugdahl, 1983). These findings are only partially supportive of Rachman's theory, as only about half of the phobic subjects reported a direct conditioning experience. In later work, Öst (1990) found more adherence to the direct conditioning pathway in clinical than non-clinical populations.

A possible explanation for the discrepancy of predicted amount of fear based on the pathway and the actual findings of the studies is to take into account a subject having experience with more than one pathway. In other words, those subjects who have more experience with the phobic stimulus could be predicted to have more severe fears. Mode of presentation and intensity may also contribute to fear development. For example, one person may hear a story about an accident with injury, while another may watch the news and not only hear about the accident but also see a film of it. Although both would be classified along the informational pathway, there would be a difference in the amount of information to which each individual has been exposed. Neither of these people would be predicted to develop B/I phobia from these incidents alone. However, if both were then to witness an accident with injury, on the basis of multiple pathways of greater intensity, it would be hypothesized that the latter person would be at greater risk for developing a fear of blood or injury than the former. This prediction has support from data that indicate that those who retrospectively attribute their fear primarily to the informational pathway have

the earliest age of onset, nine years; following in order are modeling, 10 years, and direct conditioning at 14 years (Öst, 1987). In other words, the younger someone is when exposed to a potential fear stimulus, the more likely that person is to encounter repeated negative experiences with the same stimulus. Marks and Gelder (1966) confirm these ages of onset in their work as well. Adults who do not follow this pattern and ascribe the onset of their fears to a time beyond childhood are thought to have had an intervening traumatic experience with the phobic stimulus. This traumatic experience serves to renew or strengthen the subsiding fear as well as prevent recall of experiencing a lesser fear, most likely resulting from a more remote pathway to that stimulus earlier in life (Öst, 1987). Hence, the cumulative effect of exposure to the different pathways may remain valid over numerous years.

In addition to the experiential factors addressed by Rachman's theory, there are several other factors which may contribute to the development of a phobia (Kleinknecht, 1982; Murray & Foote, 1979). Among these are the subjective affect that is aroused and the physiological response evidenced when the fear stimulus is encountered. For B/I phobia, the physiology is of particular interest because of its unique quality. Accounting for these physiological factors may improve the predictability of fear over that based on the pathway analysis alone. One means of examining this additional factor is to study the high rate of correspondence found among first degree relatives of B/I phobics.

Family History and Correspondence

Of the phobias that have been examined for family correspondence, B/I phobia has a rate that is *three to six* times higher than that of other phobias (Marks, 1987). One of the first studies to demonstrate such findings was that of Lapouse and Monk (1959). They showed that 62% of their sample were concordant on B/I phobia using a comparison of child and parental reports. More recently, in two different studies, Öst and colleagues (Öst & Hugdahl, 1985; Öst, Fellenius, & Sterner, 1991) found B/I phobia at rates of 68% and 61% among biological relatives of B/I phobics as compared with 29% of the relatives of injection phobics, a phobia closely related to B/I phobia. Kleinknecht and Lenz (1989) also found that 66% of their sample who fainted had a parent who also fainted to a blood stimulus. Interestingly, only 22% of those subjects reported they were aware of their parents' fainting history. Some use such statistics to support claims of a high rate of heritability of B/I phobia. In other words, if a child who is B/I phobic is unaware of a parent's fear, that child could not have learned the fear response from the parent; therefore, the fear must be inherited. Such an interpretation appears to go beyond the data. As Rachman proposes in his theory of acquisition, there does appear to be some learning in the development of all phobias. The question lies in what raises the family correspondence of B/I phobia to a level nearly double the highest rates of correspondence for other phobias. The most logical place to look for an answer is in the other unique facet of B/I phobia: the physiological response. Exploring the causes of this response may lead us to a better understanding of the high correspondence within families.

Physiology of Blood/Injury Phobia

Some authors have attempted to explain the development of the unique physiological response from an evolutionary perspective. In his review of the current B/I phobia literature, Marks (1988) examined the similarity of a B/I phobic response to that of "playing dead" (tonic immobility) in animals (Connolly, Hallam, & Marks, 1976). Thus it takes on the role of an adaptive response, decreasing the chance of further harm or death in an attack. Another review points to the similarities of the B/I response to the defense mechanisms of insects as well (Krizek, 1989). These theories suggest an adaptive response that produces deception to allow for escape. If an animal was not able to prevent injury through this response, the slowed heart rate and low blood pressure would reduce blood loss, thus increasing chance of survival (Krizek, 1989; Tien, 1989). However, all members of a species do not respond to the same extent. Among humans there are some who exhibit a more typical response of heightened arousal. It is this individual variability which compromises the evolutionary explanation. To increase our current understanding of the B/I phenomenon, we must examine its physiological properties on an individual level.

One perspective from which to make this examination is that of the relationship of stress and syncope (fainting). Engel (1978), one of the earliest authors to address the relation of stress to syncope, related psychological trauma to syncope resulting from a vasovagal response which in rare cases can cause sudden death. In the course of his discussion, the terms "vasovagal" and "vasodepressor" were used interchangeably. Recent

research (Balaji et al., 1993; Oslizlok, Allen, Griffin, & Gillette, 1992) has differentiated syncope into three distinct categories. The syncope of interest in the study of B/I phobia is a form of neurally mediated syncope known as vasodepressor syncope. Balaji and colleagues suggest that changes in the autonomic nervous system (ANS), not the electrical conduction system of the heart, are implicated in the vasodepressor faint. Patients who suffer from this usually benign syndrome known as Vasodepressor Syncope (VDS), an over sensitivity of the ANS characterized by the faint of the same name, report symptoms such as muscle weakening, nausea, pallor and dizziness. These symptoms are identical to the sensations reported by B/I phobics. Sensitivity of the ANS is most commonly noted during the adolescent years with a two to one preponderance in females (Balaji, Oslizlok, Allen, McKay, & Gillette, 1993). However, the reaction can occur at any age.

Studies have recently examined the relationship proposed by Engel (1978). One study found panic patients more likely to have significantly lower heart rates to orthostatic challenge (i.e., tilt table testing) than a control group (Stein, Tancer, & Uhde, 1992). It should be noted that a pre-syncopal episode can be induced in some panic patients more easily than non-panic controls, but vasodepressor syncope has never been documented as a naturally occurring symptom of panic disorder. A second study using ambulatory monitoring found a decrease in R-R (time between the peak of two cardiac complexes) variance in panic patients (Yeragani et al., 1990). Finally, a study examining adolescents diagnosed with VDS found an increased prevalence of anxiety symptoms among these patients (Childress, Rock, Oslizlok, Allen, & Sallee, 1993). These studies are examining

the relationship between anxiety and the bradycardic response of the ANS, which is seen most clearly as the reaction found in B/I phobia. This relationship has not been found to occur with other anxiety disorders to the same extreme as in B/I phobia.

There have been some cases where fainting has been documented in social phobics (Connolly, Hallam, & Marks, 1976; Kleinknecht & Lenz, 1989). This faint, however, differs in physiology. It is called an hysterical faint and results from a sudden and dramatic increase in heart rate (Marks, 1988). Interestingly, nearly every study that has examined the physiologic reaction of blood phobics has shown a slight, brief increase in heart rate and blood pressure prior to the characteristic drop. It could be argued that this increase is the result of anticipatory anxiety as the subjects of these studies all know they are about to be exposed to a stimulus. Klorman and colleagues (1977) investigated this increased cardiac response and concluded that it, in fact, was due to anticipatory anxiety. Studies involving orthostatic testing have also found this biphasic response pattern (Balaji et al., 1994).

In testing a variety of phobic subjects including B/I phobics, Öst (1987) found that all subjects had some decrease in heart rate in response to blood stimuli. Hence, it is not the case that B/I phobics are unique in their type of response, only in the degree to which they respond in this manner (Marks, 1988). In fact it has been suggested that the autonomic sensitivity which predisposes people to VDS is normally distributed throughout the population (Connolly et al., 1976). Only one study to date has specifically investigated the mechanics of this reaction (Fredrikson, Danielssons, Iremark, & Sundin, 1987).

Fredrikson and colleagues (1987) reported that B/I phobics may have sensitized beta adrenergic receptors which increase the tendency for B/I phobics to faint. As these sensitized receptors can then be stimulated more easily, the vascular system dilates causing a drop in systemic resistance and lowering blood pressure which can eventually progress to syncope. Though such a drop in blood pressure should cause a homeostatic increase in heart rate via the baroreceptors, a pronounced decrease in heart rate has been documented across numerous studies particularly by Öst and colleagues. Fredrikson explains this discrepancy by citing studies (Sleight, Fox, Lopez & Brooks, 1978, cited in Fredrikson, Danielssons, Iremark, & Sundin, 1987) which show that the response of the baroreceptors may be depressed during times of stress, which exposure to a phobic stimulus may constitute. One implication of this finding is that neither the parasympathetic nor the sympathetic subdivisions of the ANS is solely responsible for the syncope of a blood phobic. In contrast, a "typical" anxiety response (i.e., heightened arousal) is known to be the result of the sympathetic nervous system alone.

To obtain a more global assessment of the ANS response to anxiety, other physiological measurements in addition to heart rate and blood pressure have been obtained. Skin temperature has often been used in combination with heart rate for this purpose. When a person is fearful, blood is redirected to the large muscles of the body in preparation for a flight or fight response resulting in a cutaneous cooling and a drop in skin temperature, while the heart rate increases (Kandel, Schwartz & Jessell, 1991). This decrease in skin temperature has been found to be true even for minor cognitive stressors,

such as performing mathematical operations and the Stroop task (Jamieson, 1987).

Decreases in skin temperature have also been found in situations other than those which produce fear. When disgust or sadness is experienced by a person, skin temperature has been shown to drop (Ekman, 1983), again as a result of the blood moving subcutaneously.

However, the reason for the movement of the blood subcutaneously is less well understood than in the case of fear, and unlike fear heart rate will decrease. In contrast, skin temperature has been shown to increase during the experience of anger, happiness and surprise. Anger can be differentiated from surprise and happiness by determining if the heart rate increases as in the case of anger or decreases as with surprise or happiness. Using heart rate and skin temperature together, Ekman has been able to make reliable discriminations between these affective states.

Despite work with skin temperature to investigate other forms of stress provoking or anxiety producing situation, the use of skin temperature does not yet appear to have been applied to the study of B/I phobia. Questions regarding the affect experienced during exposure to a blood stimulus may be elucidated through such an application.

Affect

Until this point in the review, the typical affective reaction to a B/I stimulus has been described as fear. Though never confirmed, it has been assumed that the affect experienced while actually viewing a B/I stimulus is fear, rather than some other emotion.

Recently this notion has been questioned by Lumley and Melamed (1992). Using Ekman's scoring system of facial expression, they suggest that disgust, not fear,

characterized the expression on the faces of subjects watching surgery films used in B/I studies (Lumley & Melamed, 1992).

Another aspect of affect considered to be involved in B/I phobia is the extent to which a person identifies with the person who is injured. That is to say, a person who is blood phobic could be hypothesized to be an empathetic person. This intuitive conclusion is not supported by the data, however. In their investigation of the affect associated with B/I phobia, Lumley and Melamed (1992) found little correlation between B/I physiological response and empathy as measured by the Interpersonal Reactivity Index (Davis, 1980).

B/I phobics have consistently scored high on measures of fear and anxiety such as the Fear Survey Schedule-II and III (Kleinknecht & Thondike, 1990; Öst & Sterner, 1987). Though the Mutilation Questionnaire (MQ; Klorman, Hastings, Weerts, Melamed, & Lang, 1974), an instrument derived from fear schedules and purported to measure B/I fear, is often used to identify subjects according to severity of B/I fear, two studies that compared groups determined by the MQ on physiological measures did not support the MQ's ability to delineate B/I fear severity as measured by cardiac response (Klorman, Weissberg, & Wiesenfeld, 1977; Lumley & Melamed, 1992). It has been suggested that the report of fear at the thought of a B/I stimulus may be fear of fainting or having a severe reaction, especially in front of others, rather than a fear of the stimulus per se (Kleinknecht & Thondike, 1990; Öst, 1992). Hence, perhaps these questionnaires may be tapping a more social or anticipatory phobia, rather than a fear of blood. This possibility is supported by several studies which have shown the severity of the response to blood

stimuli, whether self-reported or measured physiologically, to be moderately related to a person's fear of anxiety or fear of fear (Kleinknecht, 1987; Lumley & Melamed, 1992; Öst, 1992) as measured by the Anxiety Sensitivity Index (Reiss, Peterson, Gursky, & McNally, 1986).

Using Ekman's criteria, Lumley and Melamed (1992) have raised an interesting question as to the affect associated with the stimulus, and similarly the physiologic response. With regards to the MQ, this questionable affect provides a potential explanation for the lack of congruence between scores on the MQ and physiological measures as it is uncertain what emotion is actually being tapped. The instrument's instructions do not clearly specify that the subject feel fear about each item and many may report reacting with disgust rather than fear to the items on the MQ. The question of the associated affect becomes even more important when Ekman's (1983) work examining the relationship of the ANS to emotion is examined. In this study, Ekman examined six emotions, two of which were fear and disgust. The ANS response measured when the subjects' expression was disgust is extremely similar to the response which has been documented in B/I phobics. If it is not fear which is experienced, validity would be added to the arguments of those who propose that the reaction to a B/I stimulus should not be classified as a phobia (Curtis & Thyer, 1983; Himle, Crystal, Curtis, & Fluent, 1991).

The Current Study

Fear of B/I stimuli and B/I phobia are common phenomena. Although B/I phobia has some aspects that liken it to other phobias, it has several associated features including the

decrease in physiological arousal, the questionable affect and the high rate of correspondence among first degree relatives, which make it quite different from other phobias. Much is known about B/I phobics, yet many of these associated features have not been explored in a sample with varying degrees of B/I fear.

The present study will attempt to address some of the issues and questions raised in the literature by obtaining physiological, affective, and cognitive measurements of reaction to B/I stimuli on a wider range of subjects than B/I phobics alone who have been examined in previous research. B/I phobia is a phenomenon which needs to be understood so it may be prevented from developing fully. Its presence in a person may keep that person from a particular career (Marks, 1987) or more importantly from seeking medical (Kleinknecht & Lenz, 1989) or dental (Öst & Hugdahl, 1985) care when it is needed. Clarifying the difference between an anticipatory fear and a disgust reaction may have implications for treatment of the phenomenon as well.

Methods

Subjects

Subjects were 412 student volunteers (164 males, 248 females) who were between 18-20 years of age ($M = 19.75$, $SD = .97$) and recruited from introductory and upper level psychology courses at a large southeastern university. The group was composed of 87% Caucasian, 8% Asian, 4% Afro American, and 1% Hispanic. The majority of subjects were sophomores. The complete distribution of class was as follows: 33% freshmen, 40% sophomores, 22% juniors, and 5% seniors. Psychology (20%), biology (10%) and

university studies (undeclared, 13.3%) were the most frequent majors of the subjects with 50% in the College of Arts and Sciences. These percentages describe the group of subjects who participated in the initial screening.

A subset of those subjects were invited to participate in the second phase of the study on the basis of their scores on the B/I subscale of the Fear Questionnaire (Marks & Matthews, 1979). The subjects were assigned to one of three groups ($n = 30$ per group; 15 males, 15 females). As the expected gender difference was found on the B/I subscale, males and females were selected separately based on means and standard deviations for each gender (See Table 1). Subjects in the first group, low fear, were drawn randomly from those subjects ($n=46$, 11.2%) who scored one standard deviation or more below the mean for the subscale (raw score range: males 0-1, females 0-2). The second group of subjects, intermediates, was drawn from those individuals ($n=299$, 72.6%) scoring between half a standard deviation below and half a standard deviation above the mean on this same subscale (raw score range: males 7-9, females 9-11). Subjects for the final group, high fear, were selected from those individuals ($n=67$, 16.3%) scoring at least one standard deviation above the mean (raw score range: males 16-29, females 20-32) (Table 2). Of the students who were invited to participate in the second portion of the experiment, 10 (9 female, 1 male) declined participation. Three of the declining subjects were in the low fear group, three, including the one male, in the intermediate group, and four in the high fear group. At the time of invitation, the subjects were unaware of the intent of the study, an examination of blood phobia; therefore avoiding exposure to the

surgery film was not a likely reason for declining to participate. All cited as their reason for not participating a combination of not having the time or already having earned the maximum number of extra credit points (compensation offered for participation) allowed by their class instructor. It should be noted that several of the subjects who did participate in the second phase also indicated they had earned the maximum allowable number of points.

Of the 90 subjects who participated in the second phase of the experiment, five subjects (2 low fear males, 1 intermediate male, 1 intermediate female and 1 high fear female) ended the video early. Because early termination of the video provided incomplete data for these subjects, they were not included in the data analysis.

One male subject from the intermediate group was excluded from participation halfway through collection of baseline data because of the discovery of a previously unknown arrhythmia. He was given a referral to Virginia Tech Student Health Services.

There were no significant differences in demographic variables of those selected for the second phase from those subjects who participated in the initial screening. Additional demographic information allowing calculation of socioeconomic status (SES) was collected from the 90 students who participated in the second phase. Using Hollingshead's (1975) Four Factor Index of Social Status, the SES for these subjects ranged from one family with an SES of 3 (neither parent's educational level was beyond seventh grade, mother was a homemaker, father unemployed) to the scale's maximum of 66 (several

families where both parents were physicians or university professors) with an average of 50.38 ($SD = 13.45$).

Materials

Questionnaires

1. Medical History and General Information Form (Appendix B). Each subject was asked to place checks beside items in a list of medical problems which they currently have or have had in the past. Included in this list were hypertension (high blood pressure), heart trouble, arrhythmias, and use of a pacemaker. Any subject endorsing these items was excluded from the study. This form also asked the subject for demographic information such as age, race, gender, major, year in school.
2. Fear Questionnaire (FQ, Appendix C, Marks & Matthews, 1979). This 15-item scale using a nine point likert scale was designed to assess the amount of avoidance of common high fear events. From this scale three subscales: agoraphobia (test-retest reliability, $r = .89$), blood injury phobia ($r = .96$), and social phobia ($r = .82$) can be derived. Internal reliabilities and item/subscore correlations are all above .50. Previous data on the B/I subscale collected from B/I high fears who were entering treatment had a mean of 19.6 ($SD = 8.29$) (Öst, Fellenius & Sterner, 1991). Data from a nonclinical sample has not been reported.
3. Anxiety Sensitivity Index (ASI, Appendix D, Reiss, Peterson, Gursky, & McNally, 1986). This 16-item scale with a five point likert was designed to assess one's fear of anxiety or fear symptoms. No significant age differences exist for the scale. However,

a gender difference was found for a normal population with females typically scoring higher than males. In a clinical population of anxiety disorders, the gender difference was not found. Interitem correlations average between .35 to .42, while test-retest reliability has been shown to be .74.

4. Mutilation Questionnaire (MQ, Appendix E, Klorman, Weerts, Hastings, Melamed, & Lang, 1974). This 30-item, true-false questionnaire was designed to measure fear and avoidance of B/I related stimuli. The distribution of scores tends to be positively skewed and leptokurtic. Gender differences exist with females scoring higher than males. Internal consistency is .85 for females and .81 for males. For females, correlations with the Taylor Manifest Anxiety Scale (TMAS) has been found to be non-significant; while for males, the correlations were found to be nearly double those of the females with correlations for two of the three subscales (Insecurity & Autonomic Activity) of the TMAS being significant. The authors of the scale attribute this gender difference to a response set in the males.

The MQ has been used previously with both normal and clinical samples. In a sample of 803 university undergraduate students, means for males and females were found to be 8.45 (SD = 4.84) and 11.62 (SD = 5.73) respectively (Kleinknecht & Thorndike, 1990). An earlier survey by Kleinknecht (1987) of the same type of sample showed similar results for males (M = 8.44, SD = 4.53) and females (M = 10.92, SD = 5.44). In several studies, Öst surveyed B/I high fears who were seeking

treatment with the MQ and found the means to be 21.0 (SD = 4.30) (1990), 20.4 (SD = 3.26) (1991) and 19.9 (SD = 4.2) (1992).

5. State-Trait Anxiety Inventory (STAI, Appendix F, Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). Only the trait anxiety scale of the measure was used. It is a 20-item scale with a four point likert scale measuring anxiety which the subject feels "in general". Test-retest reliability ranges from .73 to .86 for college students. Alpha coefficient for the trait scale is .90. Other measures of trait anxiety and anxious personality correlate well (.50-.80) with the STAI trait anxiety form.
6. Interpersonal Reactivity Index (IRI, Appendix G, Davis, 1980). This 28-item scale allows a subject to rate each item on a five point likert scale which measures empathy. The measure has four subscales, personal distress (the amount of discomfort and unease when witnessing others experiencing negative events), perspective taking (taking other's point of view), fantasy (transposing oneself onto the feelings and actions of fictitious characters), and empathetic concern (experiencing feelings of compassion for others). The alpha values for the four subscales range from .70 to .78, with empathetic concern being the lowest and personal distress the highest. Test-retest reliability at one month across the four scales ranges from .61 on the perspective taking scale to .81 on the fantasy scale. Gender differences were found between the means on all scales. Intercorrelations between the scales (male/female) show that fantasy ($r = .30/.31$) and perspective taking ($r = .33/.30$) are most related to

empathetic concern, while perspective taking is negatively related to personal distress ($r = -.16/- .29$).

7. Adjective Checklist (Appendix J). Adjectives were selected from a pool drawn from the Multiple Affect Adjective Checklist (MAACL, Zuckerman & Lubin, 1965) by judges who rated the appropriateness of each word for each of three categories (fear, disgust, neutral). Additional disgust oriented words were added to the MAACL pool to increase the number of selections possible in this category as only two such words were included on the MAACL. Those four adjectives with the highest rating for each category were retained for the final list. Subjects rated how well each adjective described their current emotional state on a likert scale from 0 (does not describe at all) to 8 (perfectly describes).
8. Anxiety Disorders Interview Schedule - Revised (ADIS, Appendix M, DiNardo & Barlow, 1988). This interview is a detailed assessment of anxiety disorders in adults which follows the diagnostic criteria recommended in DSM-III-R (APA, 1987). Although the criteria for all anxiety disorders are covered by the interview, only the social and simple phobias sections were administered in the present study. In each of these sections the subject was asked to rate on a four point likert scale the amount of fear and avoidance they feel towards a number of potentially phobic objects and situations. For those objects or situations the subject rated with at least a moderate amount of fear and avoidance, the subject was then asked to rate how bothersome and how interfering that fear was. Each subject was rated on each object or situation as

“no diagnosis” if less than a moderate amount of fear and avoidance was endorsed, as “subclinical” if at least a moderate amount of fear and avoidance was endorsed but no impairment was endorsed, or as “clinical” if at least a moderate amount of fear and avoidance was endorsed and the subject rated life as significantly impaired by the fear.

9. Blood/Injury History Interview (Appendix N). This interview is a modification of the interview used by Kleinknecht and Lenz (1989) in their family correspondence study. The interview assessed previous experience with blood stimuli as related to Rachman's three pathways, fainting history of the subject, subject's knowledge of family members experience with and reaction to blood stimuli, desire for treatment and, for females only, reaction to menstrual blood. A section was added at the beginning of the interview to collect educational and occupational information on the subject's parent(s) for the purpose of calculating socioeconomic status (SES). The interview lasted approximately 20 minutes.
10. Parent Blood/Injury History Questionnaire (Appendix R). A questionnaire derived from the interview administered to the subjects was used in a mailed survey with each of the subjects' parents for whom permission was given to contact. If a subject agreed to have his/her parents contacted, a letter to the subject's parents and a consent form were signed by the subject. These forms are located in Appendices P and Q respectively. The content of the interview remained unchanged with the exception of the SES related questions being omitted. However, small changes were made in the

presentation of the questions to facilitate parents answering the questions in a self-report format.

Physiological Measures

Heart rate (HR) was measured by placing Ferris Trace-It Pregelled Disposable Electrodes (Ag/AgCl with saline gel) on the subject's right wrist at the site of the radial pulse and left ankle at the site of the pedal pulse. This configuration of electrodes (lead II) gives an electrocardiogram (ECG) reading of vector two. Prior to electrode placement, the skin was cleansed and abraded using Brevisol. The tachometer on a 7P4 preamplifier of a Grass Model 7D Polygraph measured the interbeat interval (IBI) and converted the IBI to a tracing of beats per minute (BPM). BPM was then averaged manually across 10 second intervals. Nine undergraduate research assistants were trained to score the tracings. Interrater reliability was calculated across the nine raters by having three tracings scored by each rater scored a second time by a different rater. The method used for scoring was found to be highly reliable, with a reliability coefficient of .98 ($p < .001$).

Skin temperature (ST) was also recorded using a digital thermometer (Yellow Springs Instrument Company Inc., Model 49TA). A thermistor was placed on the volar surface of the middle phalange of the middle finger of the left hand (Harrison, 1990; Jamieson, 1987). Temperature was recorded every minute during the procedure. A data collection sheet can be found in Appendix J.

Blood Stimuli

The video, a silent, gender neutral, surgical film, 10 minutes in length, was taken from the 30 minute film of thoracic operations used by Öst and colleagues in their studies of blood phobia (e.g., Öst, Sterner, & Lindahl, 1984). This 10 minute section of Öst's film included the two aversive segments used by Lumley and Melamed (1992). Lumley described these two scenes as follows:

Incision showed a scalpel incising the abdomen several times, and other sharp instruments cutting muscle tissue. *Tubes* showed a sharp tool puncturing two holes in the abdomen and plastic drainage tubes being pulled through the holes. (pp. 426-427).

The scene which Lumley named *Tubes* was described by a majority of subjects and pilot subjects as being the most graphic. This scene began at 4 minutes, 50 seconds into the film and ended at 5 minutes, 40 seconds. The scene called *Incision* began at 5 minutes, 45 seconds and ended at six minutes, and 45 seconds.

The video was shown using a RCA videocassette recorder, model VR 273A, on a 27 inch NEC Model CM-2791 monitor. The monitor was placed 1.5 meters in front of the seated subject with the center of the screen at average eye level, .7 meters.

Procedure

This study was conducted in two phases. The first phase was a group screening session during which the subjects were asked to complete the six self-report questionnaires (history form, FQ, ASI, MQ, STAI trait form, and IRI) described above. There were 12 of these group sessions, lasting approximately 30-45 minutes each, held

over a three-week period. The group sessions were led by two trained undergraduate research assistants who used the script found in Appendix H to conduct the sessions.

The second phase of the procedure consisted of individual sessions conducted by the author. For this phase, subjects were randomly drawn from the divisions of the B/I fear score as described earlier. There was an average of just over 1 month ($M = 35$ days, $SD = 14$ days) between each subject's screening date and the date of that subject's physiological testing. This second phase was conducted at Virginia Tech's Psychological Services Center.

Upon arrival for the second phase of the experiment, the subjects completed the necessary forms to receive three extra credit points for their class. The second informed consent form (Appendix I) was explained to the subjects in such a way as to include a detailed explanation of the equipment and procedure. During this explanation, they first learned of the surgical nature of the film they would be watching. After the subject was comfortable with the procedure and equipment, the subject was asked to recline in the chair in which they were seated, and the electrodes and thermistor were placed.

Baseline data were collected for 15 minutes while the subject rested comfortably without talking or emitting gross motor movement. A script describing the instructions given to the subject during this phase of the experiment can be found in Appendix L.

Immediately subsequent to collection of physiological baseline data, the subject was asked to complete the adjective checklist (Appendix J) to establish an emotional baseline

state. Collection of heart rate and skin temperature data was discontinued while the subject completed this checklist.

Physiologic monitoring resumed as the video's content of blood and surgery was explained in detail. Although the subject was already aware of the surgical content of the video, this measurement allowed the recording of anticipatory reactions to the description of the video's content. The importance of this part of the experiment was explained to the subject, and encouragement was given to not avert the eyes from the screen (Öst, Sterner, & Fellenius, 1989). The subject was familiarized with the remote control and told the video could be stopped at any time if discomfort was experienced. An explicit statement of willingness to continue was required from the subject before the experiment continued. If the subject had no questions and was in fact willing to continue, the subject was instructed to press the play button of the remote control to begin the video. The video began with four minutes of blank tape to capture any continued anticipatory response. The start of the film itself was indicated on the ECG tracing by the examiner using the time/event marker on the polygraph.

Immediately after the end of the video or upon its termination, the subject was asked to complete the adjective checklist a second time regarding emotions experienced while watching the video. After completing the adjective checklist, a manipulation check was done by asking the subject, "What stands out most in your mind about the video?". If the subject's response was related to blood or injury, the response was recorded as positive. If it was related to anything else and blood/injury cues were not reported (e.g., "Is the

patient human?” and “What procedure are they doing?”), it was recorded as negative. Over two-thirds ($n = 61$, 67.8%) of the subjects responded affirmatively to the manipulation check. Of the remaining 29 subjects, 16 were male (6 low fear, 6 intermediates and 4 high fear) and 13 were female (9 low fear, 4 intermediates). As expected, the chi-square between group membership and response to the manipulation check was significant with the majority of responses being positive for all groups [$\chi^2 (2, N = 90) = 9.26, p < .01$] and for females alone [$\chi^2 (2, n = 45) = 13.20, p < .001$]. However, the chi-square for males was not significant indicating that that the blood/injury cues may not have been as salient to the males.

After the manipulation check, the subject was asked to indicate on a 10 point scale, 1 (no, definitely not) to 10 (yes, very much so) if they felt faint, lightheaded, or nauseous during the video. Five subjects rated their feeling of faintness as six or above on this scale. Four of these five subjects also ended the video early. The fifth subject who ended the video early rated his feeling of faintness as a three. This corresponds to his report that he was not bothered physically by the video; he simply disliked watching it. One subject who rated her feeling of faintness as an 8 evidenced no significant physiological changes.

Following these questions, the electrodes were removed and the subject was interviewed using the simple and social phobia portions of the ADIS-R (Appendix M) and the Blood/Injury History Interview (Appendix N). From the ADIS-R, it was determined if the subject met diagnostic criteria for social phobia or any simple phobia including B/I phobia at either a clinical or a subclinical level (moderate fear and some avoidance are

present, but subject does not feel life is impaired by the fear). Each subject was rated as to no diagnosis, subclinical level of fear, or clinical phobia. Those meeting criteria for a phobia were offered a referral to the Psychological Services Center for treatment ($n = 10$).

After completion of the Blood/Injury History Interview, permission was requested to send the Parent Blood/Injury Questionnaire (Appendix R) to the subject's parent(s). If permission was granted, the subject was asked to sign a consent form (Appendix O) and a letter (Appendix P). The letter was sent to the subject's parents with the questionnaire and the parent's informed consent form (Appendix Q). One questionnaire and two consent forms (one for the parent to keep and one to be signed and returned with the questionnaire) were provided per parent. Parents who had not returned the questionnaires in the specified amount of time were sent another set of the forms and a reminder letter (Appendix S). Of the 90 subjects, four refused permission to have the questionnaires sent to their parents. Two refused because their parents did not understand English. One refused because his parents lived outside of the country, and the last did not wish to give permission to send anything without first asking his parents. The parents of five subjects did not respond despite the reminder letter. One subject's parents responded indicating that they did not wish to participate. Of the 86 sets of parents who were sent questionnaires, 80 (88.8%) responded. Sixty-five (81.25%) of these 80 subjects had more than one parental figure complete a questionnaire. Both biological parents completed the questionnaires for 62 (77.5%) of the 80.

The procedure ended with any remaining questions being answered and the purpose of the experiment being explained. As noted above, any subject who was B/I phobic and desired treatment was given a referral to the Psychological Services Center.

Hypotheses

Screening Questionnaires

1. The groups will be significantly different on the STAI, MQ, ASI, the agoraphobia and social phobia subscales of the FQ, and all the subscales of the IRI with the high fear group having the highest means on these scales.
2. Females will score significantly higher on the STAI, MQ, ASI, the agoraphobia and social phobia subscales of the FQ and all subscales of the IRI than males.

ADIS

The group divisions will be congruent with the diagnostic groupings based on the ADIS. In other words, the low fear group will not meet criteria for B/I phobia (no diagnosis), the intermediate fear group will endorse some fear but will not report significant interference in their lives because of this fear (subclinical), and the high fear group will meet criteria for B/I phobia (clinical).

Physiological Measures

Heart Rate

1. Heart Rate (HR) will change significantly for all groups across the three phases.
2. The change across phase will be moderated by group with no group differences at baseline, the high fear group having the highest heart rate during anticipation, and the lowest heart rate during video. The low fear group will have the lowest heart rate during anticipation and the highest heart rate during the video. The intermediate group will fall between the other two groups in both phases.

3. The change across phases will also be moderated by gender. There will be no differences between gender at baseline. Regardless of group, females will have a higher HR during anticipation than males and a lower HR during the video than males.

Skin Temperature

1. Skin Temperature (ST) will change significantly across all three phases.
2. Females will have significantly lower ST during all three phases. This gender effect will moderate the change across phases.
3. The change across phase will be moderated by group with no group differences at baseline. For both anticipation and video the high fear group will have the lowest ST, while the low fear group will have the highest. Again it is predicted that the intermediate fear group will fall between the other groups.

Affect and Adjectives

1. The neutral class of adjectives will be rated highest, greater than disgust or fear, by all three groups at baseline.
2. The disgust class of adjectives will be rated highest by all three groups at video. However, there will also be significant group differences in the rating of the disgust adjective class. The high fear group will have the highest mean rating, the low fear group will have the lowest mean rating and the intermediate group will again fall between the other two groups.

3. Females will rate both fear and disgust adjectives higher than males at both baseline and video such that the magnitude of the difference between the genders will increase from baseline to video.

RESULTS

Screening Questionnaires

The descriptive statistics and reliabilities with indications of significant gender differences for the questionnaires for the entire screening sample ($n = 412$) can be found in Table 1. The means and standard deviations of the questionnaire data for the 90 subjects selected from that sample for the second phase can be found in Table 2. These data were compared across group membership using two separate, two-way MANOVAs (Group X Gender). The first MANOVA was performed on the anxiety related instruments, specifically the STAI, MQ, ASI and the agoraphobia and social phobia subscales of the FQ. Significant group [$F(10, 160) = 9.62, p < .0001$] and gender [$F(5, 80) = 3.35, p < .0001$] effects were found. Univariate analyses indicated all five measures were significant for group effects. With the exception of the agoraphobia subscale of the FQ, the high fear group had significantly higher means than the other two groups using the Student-Newman Keuls test. In the case of the agoraphobia subscale, the high fear group was significantly different from the low fear group but not the intermediate group. These findings support the prediction that the high fear group would endorse significantly more fear and anxiety symptoms.

Univariate analyses of the gender effect indicated that females and males differed significantly on the MQ and the agoraphobia subscale of the FQ, with females having the higher means. Although it was predicted that this gender effect would be found across all instruments, at least some studies (e.g., Spielberger et al., 1983) have not found females to

be consistently higher than males on the STAI. The lack of significance on the ASI is more surprising, as consistent gender differences have been found on this instrument (Reiss, Peterson, Gursky, & McNally, 1986).

The second two-way MANOVA was performed on the subscales of the IRI. Significance was found for the group effect [$F(8, 162) = 2.64, p < .009$], though not for the gender effect. Univariate analyses of this effect showed that the three fear groups differed significantly only on the Personal Distress scale. Post hoc analysis using the Student-Newman Keuls test indicated that the low fear group had a significantly lower mean than both the intermediate and high fear groups. Both of the other studies comparing groups based either on B/I fear (Lumley & Melamed, 1992) or on fainting in response to B/I stimuli (Kleinknecht, 1988) have also found only a significant difference on this same subscale.

ADIS

The diagnostic categories of the ADIS were compared with the fear groups determined by the B/I subscale of the Fear Questionnaire using Fischer's Exact Test. The congruence of the fear groups with the ADIS DSM-III-R categories was significant [$p < .000001$] (See Table 3). Fischer's Exact test was used as a number of cells contained less than five subjects. Correspondence of the instruments was highest for the low fear/no diagnosis cell; 29 of the 30 low fear subjects did not meet diagnostic criteria. Only 4 of the 30 in the high fear group endorsed no diagnostic criteria for B/I phobia, while 8 met all criteria for the diagnosis. The majority of the high fear group fell into the subclinical

diagnostic category, expressing a fear of blood and injury but not feeling that their lives were significantly impaired by the fear. The intermediate group was almost evenly split between no diagnosis ($n = 15$) and subclinical diagnosis ($n = 13$). Only two members of the intermediate group met criteria for B/I phobia.

Of the other phobias included on simple phobia section of the ADIS (Heights, Air travel, Animals, Enclosed Spaces, Driving, Social) only the diagnostic category of Social Phobia yielded a significant relationship with the fear groups using Fischer's Exact Test [$p < .016$] (See Table 4). This finding appears to support the contention that at least a portion of the fear experienced in B/I fear may be related to a fear of embarrassing oneself in front of others by having a reaction to blood.

Physiological Measures

Heart Rate

Figure 1 displays the means of each ten second interval by group and gender across the full duration of the three phases, while Table 5 displays group and gender means for each phase. No significant differences were found between groups or gender, in the four-way repeated measures ANOVA (Group X Gender X Phase X Time); contrary to our predictions, no significant interactions were found involving the group or gender factors. However, a main effect was found for each of the within factors [Phase: $F(2, 158) = 25.49, p < .0001$; Time: $F(23, 1817) = 5.32, p < .0001$]. For the phase main effect, the anticipation phase was found to differ significantly from both of the other phases [Baseline: $F(1, 79) = 37.35, p < .0001$; Video: $F(1, 79) = 39.95, p < .0001$] using linear

contrasts. No significant differences were found between baseline and video in this analysis. Additionally, an interaction was found for phase with time [$F(46, 3624) = 8.49, p < .0001$]; however, none of the predicted interactions with group including the two-way interaction phase x group or the three-way interaction phase x time x group were significant.

Although neither of these interactions were significant as predicted, inspection of Figure 1 suggests potential findings worthy of further inquiry. To explore these graphically suggested differences and to better understand the differing reactions of the fear groups at these varying time intervals rather than across the entire phase, a two-way ANOVA (Group x Gender) was performed at each of the 10 second intervals used in the analysis. There was no main effect for gender or interaction of gender and group at any of the intervals. No group main effect was found for any of the baseline intervals. However, during the anticipation phase particularly from the third to the fourth minute, a trend existed in the direction of group difference. This trend during this minute may be related to the slight increase in HR of the low fear group (See Figure 1). In the video phase, again there was a trend for group differences for a brief period of two time intervals, from 5'50" to 6', which was the start of the *Incision* scene. This trend would imply that unlike the *Tubes* scene to which all the groups appeared to react similarly, the *Incision* scene had somewhat differential effects on the groups, although not significantly so.

Skin Temperature

The analysis for skin temperature was a four-way repeated measures ANOVA [Group X Gender X Phase X Time]. The expected main effect for gender was found [$F(1, 79) = 11.89, p < .0009$]. As with HR, a main effect for phase was found [$F(2, 158) = 36.78, p < .0001$], although no main effect was found for time, indicating that ST varied less within phase than HR. Examination of the graphs of each measure (Figure 1 & Figure 2) demonstrate this as well. Linear contrasts between the phases show that all the phases differ significantly from each other at the .0001 level. The interaction of phase and gender was also significant [$F(2, 158) = 5.67, p < .006$], supporting the hypothesis that males would react differentially from females across the groups. To further understand this difference, a one-way repeated measures ANOVA was performed on gender within each phase. Females had a significantly lower ST than males during all three phases [Baseline: $F(1, 88) = 8.47, p < .0046$; Anticipation: $F(1, 88) = 13.84, p < .0004$; Video: $F(1, 83) = 15.99, p < .0001$]. Means and standard deviations by group gender and phase can be seen in Table 6. It should be noted that females dropped in skin temperature continuously from baseline to video a total of 1.27 degrees Celsius, while males dropped .82 degrees from baseline to anticipation, then rose .26 from anticipation to video. These changes contribute to the phase by gender interaction.

Adjectives and Affect

The affective response as measured by the rating of adjectives before and after the video, was analyzed using a four-way repeated measures ANOVA [Gender x Group x

Adjective class (neutral, disgust, fear) x Phase]. Means of each adjective class by group, gender and phase are graphically represented in

Figure 3. A significant main effect was found for gender [$F(1, 84) = 3.73, p < .051$], but not for group. Both within factors were found to have a significant main effect, Phase [$F(1, 84) = 8.45, p < .0047$] and Adjective class [$F(2, 168) = 402.30, p < .0001$].

The above main effects were qualified by the significance of several interactions from this analysis. Three of the five two-way interactions were significant: Phase x Group [$F(2, 84) = 5.53, p < .006$], Adjective Class x Group [$F(4, 168) = 14.53, p < .0001$], and Adjective Class x Phase [$F(2, 168) = 131.61, p < .0001$]. Three of the four three-way interactions were significant: Adjective Class x Group x Gender [$F(4, 168) = 2.83, p < .046$], Phase x Adjective Class x Gender [$F(2, 168) = 6.04, p < .010$], and Phase x Adjective Class x Group [$F(4, 168) = 8.94, p < .0001$]. The four-way interaction of these factors was also significant [$F(4, 168) = 3.13, p < .037$]. Further analyses were performed to clarify the interactions relevant to the current hypotheses.

To explore the adjective class main effect, linear contrasts were performed. All adjective classes were significantly different from one another at the .001 level. Given the significance of these linear contrasts and the phase by adjective class interaction, linear contrasts were performed on adjective class within each phase. At baseline, all the adjective classes were significantly different from one another. The mean of the neutral class of adjectives ($M=26.64, SD=5.45$) was higher than both the fear class ($M=1.00$,

SD=2.61) and the disgust class ($M=.26$, $SD=1.09$) at baseline. This finding supports the prediction that the neutral class of adjectives would be rated highest at baseline. At video, all adjective classes were also significantly different from one another at the .001 level. However, contrary to prediction the neutral class of adjectives continued to have the highest mean ($M=17.03$, $SD=9.19$). The means of the fear and disgust classes were 3.94 ($SD=5.67$) and 9.92 ($SD=10.18$) respectively. Also the disgust class went from having the lowest mean to the second highest, surpassing the fear class. These results are illustrated in Figure 4.

The large standard deviations of the adjective classes and the phase by adjective class by group interaction suggests that the rating of adjective class was moderated by group as well.

Figure 5 illustrates that the high fear group was the only group to rate the disgust adjectives higher than the neutral adjectives, as predicted. It was also predicted that a significant difference would exist between the groups for their rating of the disgust class of adjectives at video. Significance was found at the .00001 level with all groups being significantly different from each other using the Student-Newman Keuls test. Another finding of interest was that all groups rated the disgust adjectives higher than the fear adjectives after viewing the video.

The final set of analyses performed on the adjective data explored the phase by gender by adjective class interaction and the prediction that females would endorse more negative affect than males across phases. Contrary to prediction, female and male means

were approximately equal for both disgust (Female: $\underline{M} = .133$, $\underline{SD} = .63$, Males: $\underline{M} = .38$, $\underline{SD} = 1.4$) and fear (Females: $\underline{M} = 1.00$, $\underline{SD} = 3.18$ Males: $\underline{M} = 1.00$, $\underline{SD} = 1.9$) at baseline. Females had higher means than males for both disgust (Females: $\underline{M} = 12.09$, $\underline{SD} = 11.53$, Males: $\underline{M} = 7.76$, $\underline{SD} = 7.76$) and fear (Females: $\underline{M} = 4.55$, $\underline{SD} = 6.38$, Males: $\underline{M} = 3.33$, $\underline{SD} = 4.86$) after viewing the video, though only disgust was significantly higher [$F(1, 88) = 4.22$, $p < .043$].

Exploratory Analyses

Although predictions were not made based on the B/I history interview, the following data are presented in the interest of completing the characterization of B/I fear and its associated features.

B/I History Interview

Acquisition

Of the 90 subjects interviewed, eight (8.9%) reported at least one lifetime experience of fully losing consciousness in response to a B/I stimulus. An additional 15 (16.67%) subjects reported feeling as if they were about to faint when exposed to a B/I stimulus on an average of 3 occasions per person. These 23 subjects were distributed across the fear groups as follows: 3 (10.0%) were members of the low fear group, 7 (23.3%) were members of the intermediate group and 13 (43.3%) were members of the high fear group. Thus, nearly half of the high fear group had had some fainting experience in response to B/I phobia.

Twenty-one of these 23 subjects reported some degree of negative reaction to B/I stimuli by marking the self classification line at or above “A Little” (See page 1 of Appendix N). An additional nine subjects reported a negative reaction to the sight of B/I stimuli, but reported no history of fainting to B/I stimuli. Twenty-seven other subjects reported more than “A Little” negative reaction to the sight of blood; however, they were either unable to remember or to attribute the learning of that reaction to a specific event stating that the reaction had developed gradually over time.

The 30 subjects reporting more than “A Little” reaction to the sight of blood and reporting an event for the onset of that reaction were classified according to Rachman’s three pathways by either the event during which they experienced their first faint or the event to which they attributed their fear onset, depending on which occurred at a younger age. With the exception of four subjects, the event was the same for both the first faint and fear onset. The mean age of fear onset for these 30 subjects was 9.4 years ($SD = 3.82$). Eighteen (60%) were classified on the direct conditioning pathway, eight (27%) on the vicarious/modeling pathway and four (13%) on the informational pathway. Those classified on the direct conditioning pathway had the youngest age of onset at 8.5 ($SD = 3.5$), while those on the vicarious/modeling pathway had the next youngest age of onset at 10.5 ($SD = 4.1$), and finally those on the informational pathway had the latest age of onset at 11.7 ($SD = 4.7$).

Fear group membership was compared to pathway classification using a chi-square statistic. There was a nonsignificant trend in the direction of higher fear having more

direct experiences. Also members of the high fear group reported more specific events to which they attributed their fear. Table 7 shows the distribution of pathways across the groups.

Family Correspondence

A total of 14 subjects reported having at least one first degree relative that had fainted at the sight of blood. Eight reported having a parent faint and six reported a sibling. These subjects were distributed across the three groups with four from the low fear group, four from the intermediate group and six from the high fear group. One high fear group subject reported having two first degree relatives, both parents, faint at the sight of blood. Unfortunately, there were insufficient cells of the appropriate size to compute a statistic on the correspondence of groups to fainting first degree relatives. From the parent reports, 32 mothers and 25 fathers reported at least one first degree relative of the subject who had fainted. See Table 8 for the distribution from each of the three reporters of relatives across groups. In contrast to the subjects' report, 23 mothers (29.5%) and 22 fathers (35.5%) reported fainting or feeling faint at the sight of blood. Only six (6.67%) of all subjects knew that their parents had once fainted at the sight of blood.

Four (17.4%) of the 23 subjects who reported fainting themselves reported having at least one first degree relative faint. In three cases, it was a parent (1 mother, 2 fathers) who fainted and in the fourth case a younger sister. Of these 23 subjects only the mothers

of five subjects (21.7%) and the fathers of two of those same five were aware of their child's experience with fainting at the sight of blood or injury.

Miscellaneous

One aspect of the reaction to B/I stimuli which has not been explored in the literature is the reaction of females to menstrual blood. Data were collected from both the female subjects and the female parents on this topic. Only 1 intermediate female and 2 high fear females (6.67%) reported having a negative reaction to their menstrual blood. None of these three indicated that such a reaction occurred on a regular basis. A total of six females (13.3%; 3 low fear, 2 intermediate and 1 high fear) report having a negative reaction to their menstrual blood the first time they menstruated. Only one subject, a high fear group member, reported a negative reaction to both menarche and subsequent periods. This subject is also the only subject reporting a reaction to menstrual blood whose mother also reported a reaction. It should be noted that "negative reaction" was qualified as the lightheaded, nauseous sensation that had been used throughout the interview in reference to reaction to other B/I stimuli.

Eighty-two women responded to the parent questionnaire. Of these 82 women, 10 women (8.2%) reported having a negative reaction to the sight of their own menstrual blood. Nine of these ten reported having similar reactions the first time they menstruated. A total of sixteen women reported having a negative reaction the first time they menstruated. One woman who reported being extremely blood phobic indicated that she felt lightheaded nearly every time she saw her menstrual blood. The higher percentage of

female parents over subjects who reported a negative reaction at menarche may be related to education. Several women who responded positively wrote in the margin next to this question that they had no knowledge about menstruation. Further research should explore systematically the relationship between and whether a woman was aware of what menstruation was at the time of menarche or if she feared the blood was an indication of injury, and her recollection of her affective and physiological reaction to the blood.

Discussion

This study attempted to explore a variety of aspects of B/I fear. As expected, the instrument used for subject selection corresponded well with other measures of fear, anxiety, and diagnostic criteria of B/I phobia. There was less correspondence with the measure of empathy, however. Further, large variations in heart rate within the fear groups resulted in standard deviations which obscured group differences in responding. However, there were changes in both physiological measures, heart rate and skin temperature, across the three phases of the experiment indicating that hearing a description of the surgery video and actually watching it had some effect on the subjects. Perhaps the most interesting finding of this study is that fear appears to be experienced in anticipation of exposure to B/I stimuli while disgust was experienced during exposure. It is this finding which suggests the most possibilities for future research. The findings and their implications are considered in the discussion that follows.

Self-Reports and Interviews

The purpose of administering other self-report instruments in addition to the FQ, which was used for subject selection, was to characterize in more detail those subjects who were selected for the second phase of the experiment. It has been shown that subjects who report one particular phobia are likely to have at least slightly elevated levels of fear to other potentially phobic stimuli (Connolly, Hallam, & Marks, 1976; Öst, 1987) and to have elevated levels of anxiety sensitivity (Kleinknecht, 1988; Lumley & Melamed, 1992). The MQ has also been used to discriminate between different levels of B/I fear (Kleinknecht & Thorndike, 1990; Öst, 1992). Supporting these previous findings, the current groups selected on the basis of B/I fear were also able to be differentiated on social fears as measured by the social fear subscale of the FQ, anxiety sensitivity as measured by the ASI, and reaction to B/I stimuli as measured by the MQ with the high fear group having the highest mean in each case.

To gain an understanding of the relation of the B/I fear to a more general form of anxiety, the STAI - Trait form was also administered. The B/I fear groups were differentiated by the amount of anxiety they generally feel again with the high fear group having the highest mean. Although the relationship of anxiety sensitivity to B/I phobia is well documented, the relationship to more general anxiety is less so. Most likely, it is the physiological component of anxiety which results in the positive relationship to B/I fear. People who are high in B/I fear may simply be more aware of internal, negative, physical

reactions to B/I stimuli. This hypothesis has gained some support from studies examining physiological correlates of B/I fear (Fredrikson, Danielssons, Iremark & Sundin, 1987).

Unlike the other self-report measures, all the groups did not differ significantly on the agoraphobia subscale of the FQ. This study is not the first to demonstrate a lack of a clear relationship between agoraphobia and B/I fear. There have been varying results across studies which have attempted to relate B/I fear to agoraphobia. The lack of consistent findings on the correspondence of other phobias, including B/I phobia, to agoraphobia suggest that some aspect of agoraphobia is qualitatively different from these phobias. Such studies indicate that agoraphobics tend to be generally more anxious than B/I phobics (Connolly, Hallam & Marks, 1976; Öst, 1987). Given the nature of the phobic stimulus in each case, such a difference may not be surprising.

The situational aspects of both agoraphobia and social phobia may lead one to predict that they would have similar correlations with B/I phobia. In fact, quite the opposite is true. The fear groups were not only significantly different on the social phobia subscale of the FQ, they also had a significant correspondence with the ADIS diagnostic categories for social phobia. Besides B/I phobia, social phobia was the only phobia assessed by the ADIS to have significant correspondence between its diagnostic categories and the fear groups (See Table 3 & Table 4). In addition to the possible sensitivity to negative internal sensations mentioned earlier, this significant relationship with social fears suggests that B/I phobics are also fearful of negative social repercussions, such as embarrassment, if they have a noticeable reaction to B/I stimuli. When the subjects were asked as part of the

history interview if having a negative reaction to the sight of blood or injury would be worse if alone or with others, the responses were evenly divided between the two categories for all three groups indicating that social cues may be as salient as the internal cues of a negative B/I response.

It is not difficult to conceive that people who are concerned with what others think of their behavior and who have a reaction to seeing others bloodied and injured may possess a higher degree of empathy than most other people. Using the IRI, this supposition was tested and for the most part, not supported. Of the four subscales of the IRI (empathic concern, fantasy, perspective taking and personal distress), only the personal distress subscale was significantly different across the fear groups. As noted earlier, this is the third time this finding has been replicated (Kleinknecht, 1987; Lumley & Melamed, 1992).

Based on the significance on this scale and the higher mean of the high fear group, it seems that high B/I fear people are not necessarily more empathic overall, but may experience a greater amount of discomfort when watching someone else have a negative experience. This sense of discomfort is not to be confused with seeing the event from the other person's point of view or feeling sorry for that person. Each of these concepts would be measured by the perspective taking and the empathetic concern subscales respectively. The personal distress scale is tapping primarily the degree of unease felt during observation of others experiencing negative events occurring. Given the debate over the affect experienced when observing a B/I stimulus, the idea of discomfort being experienced may add to the arguments against the sensation of fear during B/I exposure.

Further exploration of this relationship could be done by comparing a high B/I fear group who report being bothered exclusively by their own blood to a group of high B/I fear who report being bothered by others' blood but not their own. (Note: Based on the current results a majority are equally bothered by both, though the dichotomy existed.) It would be predicted that the latter group would score significantly higher on the personal distress subscale.

In addition to these surveys of cognitive and affective constructs which have been demonstrated to be associated with B/I fear, subject and family fainting history also appeared to be differentiated by level of B/I fear. More high fear subjects had had occasion to faint when exposed to B/I stimuli. Similarly, a higher proportion of the high fear subjects had parents who had fainted at the sight of blood at least once in a lifetime.

Based on the prevalence of fainting among the parents, it might be assumed that a great deal of modeling had occurred over the course of the subjects' lives even if the subjects reported they were unaware of their parents' history. However, the majority of the high fear subjects reported a direct conditioning experience. This is not to say that the parents' behavior did not provide the subjects a model for their own behavior when they encountered a direct conditioning experience. This distribution of fear acquisition pathways and fainting experience across the three levels of fear suggests that the development of a fear or phobia is more complex than the three pathways proposed by Rachman (1978). In his discussion of fear acquisition, Rachman acknowledges this oversimplification, though suggests that there is still a utility to describing distinct pathways.

The correspondence of high fear group membership to the direct conditioning pathway certainly supports that utility.

Adding to the complexity of understanding the acquisition of fear is the age of onset for the current subjects as grouped by pathway. Those subjects with a direct conditioning experience had the youngest age of onset while those on the informational pathway had the oldest. The rank order of the pathways by age of onset is exactly reversed from the data reported by Öst (1987) and Marks & Gelder (1966). However, this finding supports the hypothesis made in the previous literature that adults who ascribe the onset of their fear beyond childhood have had an intervening traumatic experience with the phobic stimulus which serves to block recall of fear prior to the trauma. If earlier events relating to fear cannot be recalled this may have the effect of raising the age of onset for the direct experience pathway. The data from both these studies (Öst, 1987; Marks & Gelder, 1966) was based on retrospective reports of adults in their mid-thirties who are approximately twice the age of the current sample. The younger age of the current subjects is the most likely reason for the difference of these results from earlier research, suggesting the younger the age of the subjects from whom fear acquisition information is collected, the more accurate it is likely to be.

Although age of onset and pathway data are not yet available from the parent data, some parents reported an interesting phenomenon for their first faint. Several parents reported experiencing their first faint as a result of seeing their child injured. In most cases the faint was delayed until after the child was out of danger. Although these reports were

anecdotal and insufficient in number for any statistical analyses, there may be a relation worth exploring between this type of delayed faint and the type of discomfort tapped by the personal distress scale. What makes this relationship interesting is that these people had never fainted before and were most likely experiencing discomfort to an extent which is unlike any they had experienced previously upon seeing their child injured. Further research is needed to uncover the mechanism of delaying this faint which is usually initiated immediately upon exposure to B/I stimuli. If this mechanism could be understood, it may have implications for treatment of B/I phobia.

Physiological Response

The above description of the response to exposure to B/I stimuli from the subject history interviews was dichotomized into faint versus no faint. However, a primary purpose of this study was to examine the continuum of physiological response to B/I phobia across subjects and over an extended period of time. The response of all subjects varied from baseline to video as demonstrated by the main effect of phase found for both heart rate and skin temperature. Heart rate also varied considerably within each phase as demonstrated by the phase by time interaction. However, none of this variance was attributable to fear group membership for either physiological measure. The standard deviations of each group's mean heart rate and skin temperature indicate that the extent of individual variability is so great that there may not be a typical response to B/I stimuli even within groups selected on the basis of self-reported fear of B/I stimuli.

In addition to the extreme individual variability, an anomaly exists in the heart rate data which deserves comment. This anomaly is the consistently higher heart rate of the low fear group (See Figure 1). One possible explanation is that the intermediate and high fear groups have already dropped in heart rate while the low fear group remained consistent. The stimulus for this drop may have been the revelation of the nature of the film in the reading of the consent form prior to baseline. One study has documented fainting by B/I phobics in response to simply hearing descriptions of B/I stimuli (Thyer, Himle & Curtis, 1985). This study may have been limited by the unknown effects of the revelation of the nature of the video prior to baseline. Previous studies which have studied nonclinical populations have not revealed the nature of the stimuli until just prior to its presentation (Klorman, Weissberg, Wiesenfield, 1977; Lumley & Melamed, 1992). However, it should be noted that there continued to be variations in heart rate over time while the difference between the groups persisted. It does not seem probable that a reaction to a statement approximately five minutes prior to the start of baseline could be responsible for such a persistent difference, unless such a prolonged physiological response was occasioned by more trait like physiologic differences between the groups. It is has been shown that the baseline physiology of agoraphobics differs from nonphobics (Holden & Barlow, 1986). B/I phobics may potentially be another diagnostic group that has a physiologic baseline difference from other people. The degree of this difference could be related to level of B/I fear.

In the skin temperature data, after a downward trend in the first two minutes of exposure, the skin temperature began to slowly rise for all groups. Most likely this rise was indicative of a return to baseline. However, as the temperature continued to rise, it may be the result of a gentle tensing of the muscles in response to a negative experience. Muscular tension will cause an increase in skin temperature as a result of increasing blood pressure. In fact, tension is so effective in increasing blood pressure that it serves as the basis for Öst's treatment of B/I phobia, applied tension (Öst & Sterner, 1987). Future researchers using physiological measures of B/I phobia may wish to employ a measure of muscular tension in order to control for any changes in the dependent measures caused by such tension.

In addition to the hypotheses made on the basis of the fear groups, hypotheses were also made on the basis of gender as a means of comparing the current sample against the physiologic differences known to exist between males and females. Autonomic testing has shown females to be more likely to faint than males (Balaji et al., 1994), although the only gender difference found in the current physiological data was the expected difference on skin temperature. This difference was expected as it is known females are consistently lower by one to two degrees on this measure (Kandel, Schwartz & Jessell, 1991).

Affect

The question of the affect experienced during B/I exposure was addressed by the rating of the adjectives before and after viewing the video. The subjects were not asked to rate the adjectives during the anticipation phase, though the physiological response during

the early moments of the phase appeared to indicate they were experiencing fear. Almost immediately subsequent to the reading of the graphic description of the video, all subjects evidenced a dramatic increase in heart rate and a drop in skin temperature (See Figure 1 & Figure 2). According to Ekman's (1983) work correlating autonomic reactivity to emotions, this physiological reaction is indicative of fear. Although questions exist as to what emotion is experienced during actual exposure to B/I stimuli (Curtis & Thyer, 1983; Himle, Crystal, Curtis, & Fluent, 1991), no one has contested findings that indicate fear is experienced in anticipation of exposure to B/I stimuli (Klorman, Weissberg, & Wiesenfeld, 1977). The current data continue to support this assertion. Also in support of anticipatory fear is the finding of the current study that members of the high fear group rated themselves as being significantly more sensitive to fear and anxiety cues on the ASI. Previous research with similar findings has suggested that B/I phobics are not necessarily afraid of exposure to B/I stimuli, rather they are fearful of experiencing the negative physiological symptoms such as nausea and fainting that occur when they are exposed to such stimuli (Lumley & Melamed, 1992).

Alternatively, the physiological response evidenced at the start of anticipation could also be described as a defensive response. The defensive response is a human reflex characterized by several physiological changes including an increase in heart rate and a drop in skin temperature which immediately follows the occurrence of a threatening stimulus (Sturgis & Gramling, 1988). The physiology which characterizes the defensive response is quite similar to that which Ekman (1983) found to be associated with the

emotion of fear. Initial research into the defensive response did not examine this potential links with emotions as animals were the subjects of this work. As the reactions of humans, phobics in particular, are studied, the link between the physiology and the reported affect will become an important area of inquiry. Based on the results of numerous studies including the present one, it can be concluded that the affect experienced by humans when the defensive response occurs is most likely fear (See also Fredrikson, 1981).

It was predicted that disgust would be the primary affect experienced during the video and, therefore, that class of adjectives would be rated the highest by all groups. Except for the high fear group, the neutral class of adjectives was rated the highest. This finding implies that although the subjects may have had some affective response to the video, which was most likely disgust given the increase from baseline to video in the rating of that class of adjectives, the majority were still sufficiently comfortable to rate the neutral class of adjectives higher. All three groups rated the fear adjectives lowest indicating that fear did not have a strong presence in what they were experiencing. Also supporting a lack of fear being experienced during exposure is the lack of a fear-like physiological response. The physiological pattern which was documented cannot be clearly described as that response (decreased heart rate, decreased skin temperature) which Ekman correlated with the facial expression of disgust, yet it clearly was not the response (increased heart rate, decreased skin temperature) associated with fear either.

The current physiological data do not support the physiology typically associated with a fainting response and commonly found in clinical B/I phobics, which Ekman (1983)

has associated with the emotion of disgust. Other than through Ekman's work, the link between the affect and the general physiology which is experienced during exposure to B/I stimuli is not as easily made as that between the defensive response and fear. Klorman et al. (1977) described the physiology experienced in a typical B/I phobic response as a prolonged orienting response which follows a defensive response. As with the defensive response, the orienting response is characterized by many physiological changes which immediately follows any change in the environment (Sturgis & Gramling, 1988). One difference between the two responses is that whereas the defensive response evidences an increase in heart rate, the orienting response evidences a decrease. Although the physiology of an orienting response is similar to the reaction which occurs in B/I phobics during exposure, one important difference exists. The orienting response is characterized by peripheral vasoconstriction, whereas the vasodepressor response of B/I phobics is by definition a dilation of the peripheral vasculature. The idea of the B/I phobic response being a prolonged orienting response also appears to be counterintuitive to the rapid habituation which has been shown to occur with this response (Sokolov, 1963). Future research should further explore the relationship of the typical B/I response to other well documented reflexes. In addition to exploring similarities to the orienting response, more attention should be given to the similarities hypothesized to tonic immobility. As Ekman has been able to link this physiology to a particular affect, the next step is to make a similar connection to basic physiologic reflexes.

Another more general indication of the experience of disgust may be found in the personal distress subscale of the IRI. The connection between these two concepts is made by the high fear group significantly endorsing both. Although discomfort occurs with the experience of many negative emotions, it is a more encompassing part of the experience of disgust as compared to fear, for example.

Conclusion

The current study has attempted to describe the phenomenon of B/I phobia across various facets. As a result, the following description of those who are high in B/I fear has been constructed. They report more anxiety sensitivity, more general anxiety, and more social anxiety. High B/I fear subjects are not necessarily as empathic as may be intuitively suggested, but they do experience more discomfort when others are distressed. Most people, including those with high B/I fears, do react in anticipation of and during exposure to B/I stimuli. This response does not appear to be moderated by the amount of self-reported B/I fear and avoidance. Those high in B/I fear have had more direct, negative experiences, including fainting and feeling faint, with B/I stimuli, and have more first degree relatives with similar experiences. Finally, people at all levels of B/I fear appear to experience fear in anticipation of B/I stimuli, but not in response to actual exposure to such stimuli. Rather the affect experienced at that time appears to be disgust, particularly for those high in B/I fear.

In fact, one of the limitations of this study may have been the use of a measure of B/I fear to select subjects. The data clearly show that fear is experienced by most people in

anticipation of B/I stimuli. However, if it is disgust which is experienced during actual exposure, a measure of fear may not be appropriate for predicting a physiological effect which is commonly associated with disgust. If an instrument such as the personal distress scale can be shown to be associated with disgust, it may be a better instrument to use to select subjects for studies on B/I fear.

Another limitation of the study was the group differences at baseline which may have resulted from the revelation of the nature of the video prior to the collection of baseline data. This information was required to be given to the subjects by the human subjects committee of the university at which this study was conducted. It is possible that trait like physiologic differences may exist between groups of people with different levels of B/I fear. Future research which is designed to study the existence of such a difference should weigh carefully the potential negative effect of such information on baseline data against the subjects' right to be informed full prior to the commencement of a study.

An alternate method of exploring the relationship of autonomic response to self-reports would be to reverse the procedure used here and categorize subjects based on the degree of physiologic response, then compare the self-report data across these response categories. In other words, if some characteristic physiological patterns could be identified, then history and self reports could be assessed across subjects grouped by pattern of responding. Approaching the question from this direction would be a likely means of reducing the variability in the response.

Trying to capture the response over an extended period of time, rather than using averages of five seconds or a minute, reduced the chance of finding an effect over that period of time. In spite of the large individual variability of physiological response, particularly in heart rate, the graph of the heart rate means (Figure 1) suggests that the variability over time may fall into a discernible pattern. What comes before and after an aversive stimuli may be just as important to the physiologic response as the stimulus itself. Graphically this study appears to have demonstrated such changes over time. These changes are also highly individualized as evidenced by the size of the standard deviations. Future research examining the physiological response to B/I stimuli should address means of reducing this variation. Possibilities for doing so include using a selection measure which taps disgust or using the physiological measure for selection. In addition to providing specific questions for further research in this area, the current study has broadened the scope of understanding of blood/injury fear by studying a wide variety of factors related to this phenomenon over a range of subjects. B/I phobia is a unique phenomenon among the other phobias and is in need of continued research to further our understanding of why it is unique.

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Table 1. Descriptive statistics and alphas on questionnaires of screening sample.

	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SEM</i>	Min/Max	Skew/ <i>SE</i>	Kurtosis/ <i>SE</i>	α
Fear Questionnaire								
<i>Social Fear^a</i>								
M	164	9.18	5.33	.42	0/28	.91/.19	1.15/.38	.62
F	248	11.07	5.77	.37	0/29	.48/.16	-.02/.31	.63
T	412	10.32	5.67	.28	0/29	.64/.12	.25/.24	.63
<i>Agoraphobia^a</i>								
M	164	3.10	3.30	.26	0/16	1.45/.19	2.30/.38	.63
F	248	5.87	4.85	.31	0/25	1.24/.16	1.82/.31	.66
T	412	4.77	4.50	.22	0/25	1.41/.12	2.47/.24	.67
<i>Blood/Injury Fear^a</i>								
M	164	8.02	6.68	.52	0/36	1.47/.19	3.02/.38	.79
F	248	10.38	7.46	.47	0/37	1.07/.16	.95/.31	.79
T	412	9.44	7.24	.36	0/37	1.20/.12	1.50/.24	.79
<i>Total Fear Score^a</i>								
M	164	20.30	12.08	.94	0/64	.99/.19	.87/.38	.81
F	248	27.31	14.17	.90	0/73	.63/.15	.27/.31	.82
T	412	24.52	13.80	.68	0/73	.77/.12	.41/.24	.82
Mutilation Questionnaire^{a,b}								
M	162	7.44	4.66	.37	0/25	1.36/.19	2.20/.38	.81
F	247	10.24	5.95	.38	0/30	.70/.16	.33/.31	.86
T	409	9.13	5.64	.28	0/30	.94/.12	.76/.24	.85
Anxiety Sensitivity Index								
M	164	16.45	8.27	.65	3/43	1.00/.19	.93/.38	.85
F	248	17.68	8.30	.53	1/52	.67/.16	.96/.31	.84
T	412	17.19	8.30	.41	1/52	.79/.12	.86/.24	.84
State-Trait Anxiety Inventory - Trait Form								
M	164	38.24	9.94	.78	20/69	.60/.19	.08/.38	.92
F	248	39.15	9.73	.62	21/73	.63/.16	.46/.31	.91
T	412	38.79	9.82	.48	20/73	.61/.12	.28/.24	.92

Table 1
Continued

	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SEM</i>	Min/Max	Skew/ <i>SE</i>	Kurtosis/ <i>SE</i>	α
Interpersonal Reactivity Index								
<i>Fantasy</i>								
M	164	11.98	4.08	.32	3/24	.17/.19	-.05/.38	.41
F	248	11.32	4.19	.27	1/22	-.059/.16	-.60/.31	.49
T	412	11.59	4.15	.21	1/24	.02/.12	-.37/.24	.45
<i>Perspective Taking</i>								
M	164	14.68	3.63	.28	4/23	-.11/.19	-.38/.38	.41
F	248	15.09	4.11	.26	5/24	-.23/.16	-.77/.31	.58
T	412	14.93	3.93	.19	4/24	-.17/.12	-.65/.24	.52
<i>Empathetic Concern</i>								
M	164	14.11	3.15	.25	7/23	.13/.19	.17/.38	.30
F	248	15.44	3.16	.20	7/23	-.27/.16	-.42/.31	.45
T	412	14.92	3.22	.16	7/23	-.11/.12	-.34/.24	.37
<i>Personal Distress</i>								
M	164	10.24	3.06	.24	3/21	.40/.19	.80/.38	.30
F	248	10.92	3.28	.21	2/24	.37/.16	.58/.31	.33
T	412	10.65	3.21	.16	2/24	.39/.12	.64/.24	.29

Note: M=Males, F=Females, T=Total Sample

^a significant gender differences, $p < .01$.

^bMQ $N=409$ due to 3 incomplete questionnaires.

Table 2. Means and standard deviations of questionnaires for fear groups.

	Low Fear Mean (SD)	Intermediate Mean (SD)	High Fear Mean (SD)	Total Mean (SD)
Fear Questionnaire				
<i>Social Fear</i>				
M	6.67 (4.38)	10.67 (5.49)	14.30 (6.48)	10.56 (6.17)
F	5.60 (4.01)	11.33 (4.91)	16.27 (6.94)	11.07 (7.05)
T	6.13 (4.79)	11.00 (5.13)	15.30 (6.68)	10.81 (6.60)
<i>Agoraphobia</i>				
M	2.27 (2.58)	3.13 (3.44)	5.13 (4.36)	3.51 (3.69)
F	1.93 (2.71)	7.87 (6.05)	7.87 (6.45)	5.89 (5.91)
T	2.10 (2.52)	5.50 (5.40)	6.50 (5.58)	4.70 (5.04)
<i>Blood Injury Fear</i>				
M	.333 (.488)	8.27 (.457)	22.33 (6.10)	10.30 (9.83)
F	.800 (.775)	10.40 (.507)	26.27 (6.28)	12.49 (11.2)
T	.567 (.679)	9.33 (1.18)	24.30 (6.41)	11.40 (10.5)
<i>Total Fear Score</i>				
M	9.27 (6.43)	22.07 (7.50)	41.80 (10.23)	24.38 (15.7)
F	8.33 (6.53)	29.60 (9.69)	50.40 (12.81)	29.44 (19.9)
T	8.80 (6.39)	25.83 (9.33)	46.10 (12.20)	26.91 (18.0)
Mutilation Questionnaire				
M	3.93 (2.15)	7.20 (3.90)	12.73 (6.36)	7.96 (5.72)
F	3.13 (1.88)	10.47 (4.81)	17.73 (7.09)	10.44 (7.80)
T	3.53 (2.03)	8.83 (4.61)	15.23 (7.09)	9.20 (6.91)
Anxiety Sensitivity Index				
M	13.60 (9.26)	16.80 (9.09)	21.07 (9.40)	17.16 (9.55)
F	12.67 (5.02)	14.20 (6.43)	22.93 (8.71)	16.60 (8.14)
T	13.13 (7.34)	15.50 (7.85)	22.00 (8.95)	16.88 (8.82)
State-Trait Anxiety Inventory - Trait Form				
M	35.80 (9.92)	40.00 (12.27)	45.20 (10.43)	40.33 (11.36)
F	33.27 (8.28)	37.20 (7.61)	42.93 (10.46)	37.80 (9.55)
T	34.53 (9.07)	38.60 (10.13)	44.07 (10.33)	39.07 (10.5)

Table 2
Continued

	Low Fear Mean (SD)	Intermediate Mean (SD)	High Fear Mean (SD)	Total Mean (SD)
Interpersonal Reactivity Index				
<i>Fantasy</i>				
M	14.00 (2.90)	13.80 (3.45)	11.67 (4.34)	13.16 (3.69)
F	10.47 (4.05)	10.93 (12.37)	14.07 (3.81)	11.82 (4.04)
T	12.23 (3.90)	12.37 (3.70)	12.87 (4.19)	12.49 (3.90)
<i>Perspective Taking</i>				
M	17.33 (2.74)	15.40 (3.14)	15.40 (3.89)	16.04 (3.34)
F	16.13 (4.34)	14.13 (4.96)	17.40 (2.38)	15.89 (4.18)
T	16.73 (3.62)	14.77 (4.12)	16.40 (3.33)	15.97 (3.76)
<i>Empathetic Concern</i>				
M	15.87 (3.29)	15.73 (3.08)	14.60 (3.25)	15.40 (3.19)
F	15.80 (3.51)	15.00 (2.78)	16.67 (2.72)	15.82 (3.03)
T	15.83 (3.34)	15.37 (2.91)	15.63 (3.12)	15.61 (3.10)
<i>Personal Distress</i>				
M	9.67 (3.33)	11.47 (3.11)	11.53 (3.04)	10.89 (3.21)
F	9.26 (2.37)	10.73 (3.20)	13.33 (3.22)	11.11 (3.35)
T	9.46 (2.85)	11.10 (3.12)	12.43 (3.21)	11.00 (3.27)

Table 3. Fear groups by ADIS B/I phobia diagnostic categories.

	No Diagnosis	Subclinical	Clinical	Totals
Low Fear	29 (32.2%)	1 (1.1%)	--	30 (33.3%)
Intermediate	15 (16.7%)	13 (14.4%)	2 (2.2%)	30 (33.3%)
High Fear	4 (4.4%)	18 (20%)	8 (8.9%)	30 (33.3%)
Total	48 (53.3%)	32 (35.6%)	10 (11.1%)	90 (100%)

Table 4. Other ADIS phobia diagnostic categories by fear group.

		Low Fear	Intermediate	High Fear	Total
Heights	N	28	23	20	71
	S	1	3	4	8
	C	1	4	6	11
Air Travel	N	30	29	27	86
	S	--	--	1	1
	C	--	1	2	3
Animals	N	23	21	21	65
	S	6	7	4	17
	C	1	2	5	8
Enclosed Spaces	N	29	28	23	80
	S	1	1	5	7
	C	--	1	2	3
Driving	N	30	29	28	87
	S	--	1	--	2
	C	--	--	1	1
Social ¹	N	25	20	14	59
	S	1	7	9	17
	C	4	3	7	14

N=No Diagnosis S=Subclinical C=Clinical

¹Fischer's Exact Test, $p < .016$

Table 5. Heart rate means by phase, group and gender.

	Baseline		Anticipation		Video	
	Male	Female	Male	Female	Male	Female
Low fear	75.11 (9.54)	76.07 (9.75)	78.68 (12.24)	78.27 (9.32)	74.83 (11.01)	76.14 (9.07)
Intermediate	70.35 (11.70)	73.02 (8.40)	72.44 (11.86)	75.53 (8.80)	71.94 (12.42)	73.89 (7.32)
High fear	69.72 (8.64)	72.45 (11.42)	71.09 (10.13)	74.29 (10.94)	69.37 (10.07)	71.59 (10.45)
Totals	71.73 (10.11)	73.85 (9.84)	74.07 (11.67)	76.03 (9.65)	71.92 (11.14)	78.93 (9.02)
	72.97 (9.98)		75.05 (10.69)		72.93 (10.11)	

Table 6. Skin temperature means by phase, group and gender.

	Baseline		Anticipation		Video	
	Male	Female	Male	Female	Male	Female
Low fear	32.76 (2.87)	30.04 (3.29)	31.95 (2.52)	28.96 (2.40)	32.02 (2.93)	27.93 (2.86)
Intermediate	32.28 (1.78)	30.21 (3.66)	31.24 (1.62)	30.08 (3.17)	31.64 (2.21)	29.97 (3.89)
High fear	32.61 (1.96)	31.06 (3.55)	31.99 (1.52)	30.52 (2.66)	32.28 (1.73)	30.68 (2.87)
Total	32.55 (2.21)	30.76 (3.46)	31.73 (1.92)	29.85 (2.78)	31.99 (2.27)	29.49 (3.37)
	31.66 (3.03)		30.79 (2.56)		30.72 (3.13)	

Table 7. Group by Rachman's pathways.

	Direct Conditioning	Modeling	Informational	Totals
Low Fear	1 (3%)	--	1 (3%)	2 (6%)
Intermediate	6 (20%)	1 (3%)	1 (3%)	8 (26%)
High Fear	11 (37%)	7 (24%)	2 (7%)	20 (68%)
Total	18 (60%)	8 (27%)	4 (13%)	

Table 8. Number of first degree relatives who faint by subject, mother & father report.

	Subject's Report ($\underline{n} = 14$)			
	M	F	B	S
Low Fear	1	1	2	--
Intermediate	--	1	1	2
High Fear	2	4	--	1

	Mother's Report ($\underline{n} = 32$)			
	M	F	B	S
Low Fear	5	2	1	1
Intermediate	9	1	--	--
High Fear	9	5	2	1

	Father's Report ($\underline{n} = 25$)			
	M	F	B	S
Low Fear	1	6	1	--
Intermediate	2	7	--	1
High Fear	--	9	--	1

NOTE: M = Mother F = Father B = Brother S= Sister

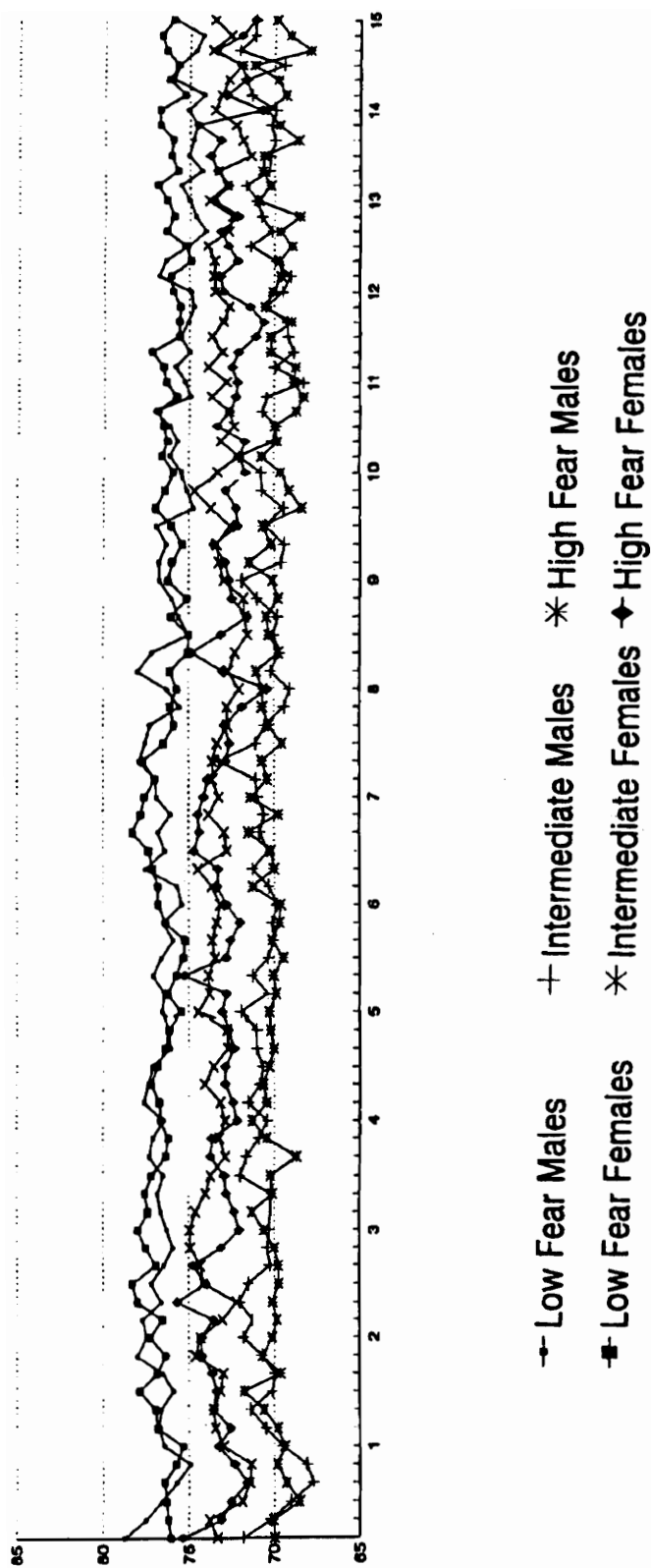
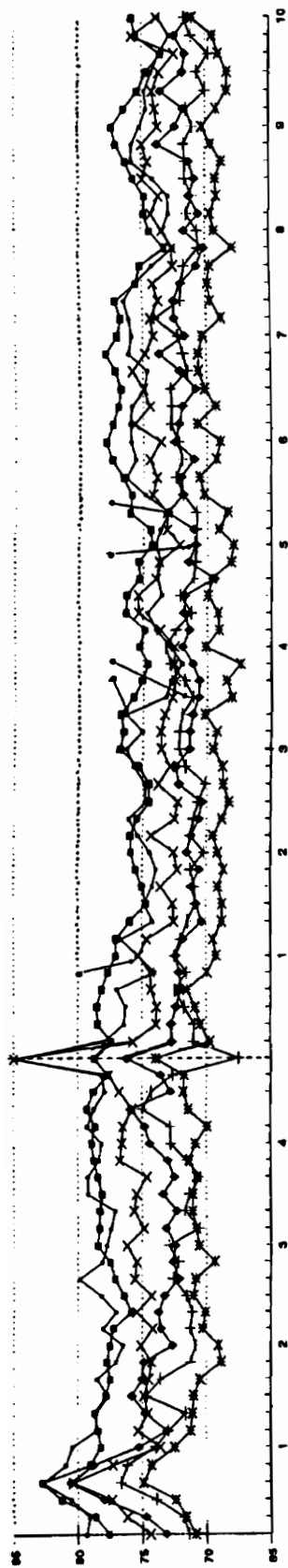


Figure 1. Heart rate in beats per minute (BPM) by 10 second averages: Baseline.



^{a,b,c,d,e} Subjects from groups indicated ended video at :55, 3:22, 3:30, 5:02, 5:23 respectively.

○ Low Fear Males + Intermediate Males * High Fear Males
 ■ Low Fear Females × Intermediate Females ◇ High Fear Females

Figure 1 continued. Anticipation and Video phases.

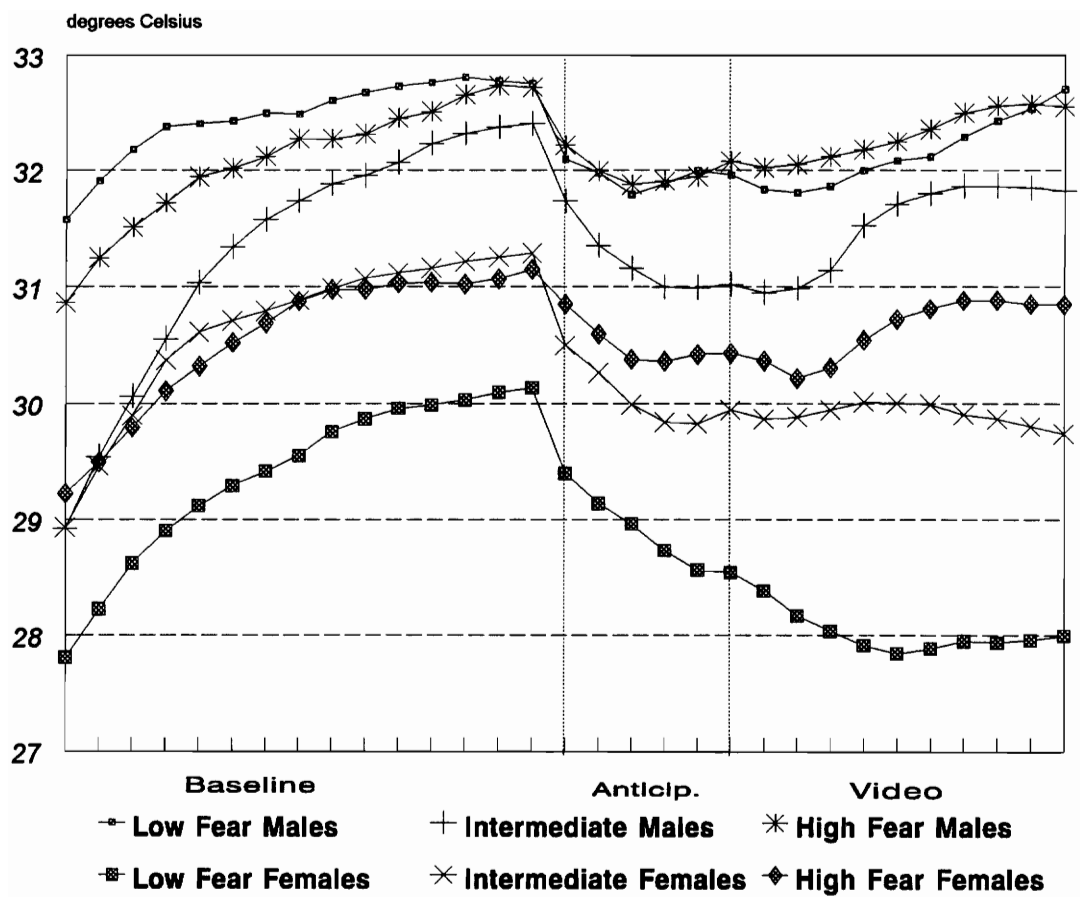


Figure 2. Ten second means of skin temperature across phases.

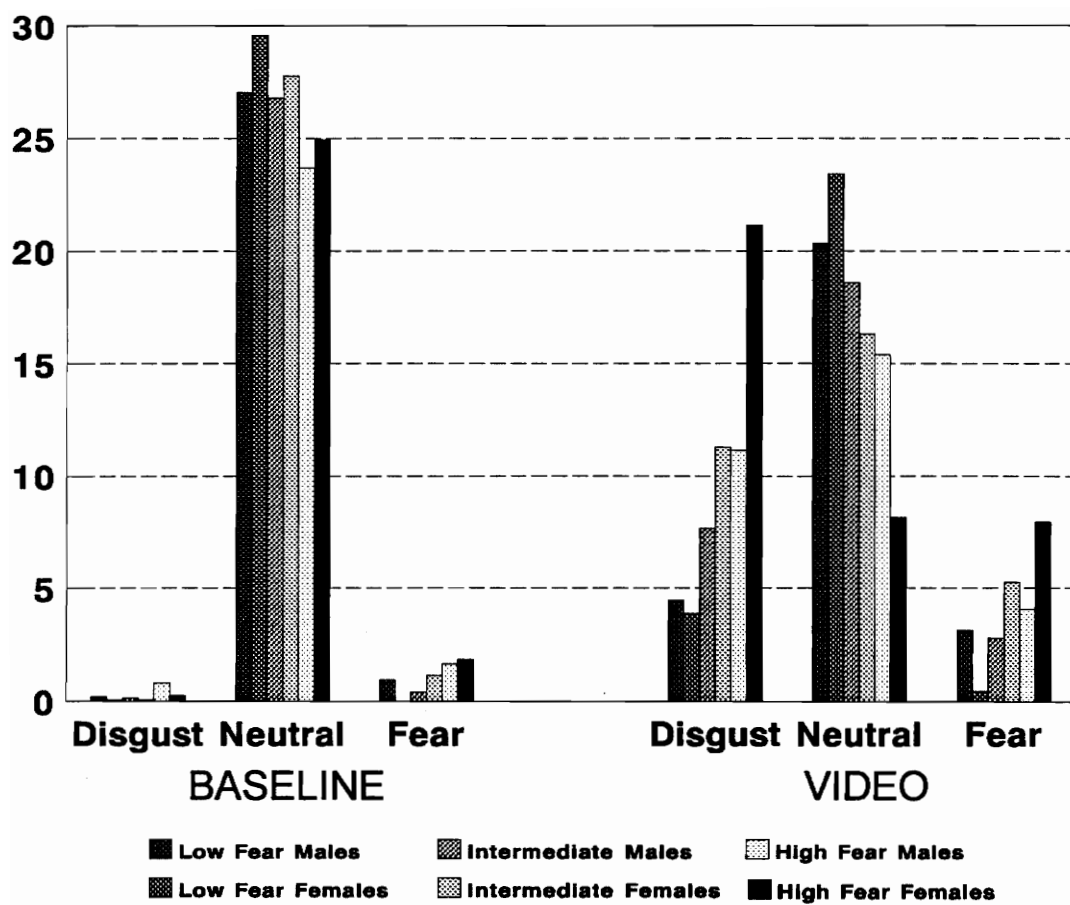


Figure 3. Means of adjective ratings by phase, group and gender.

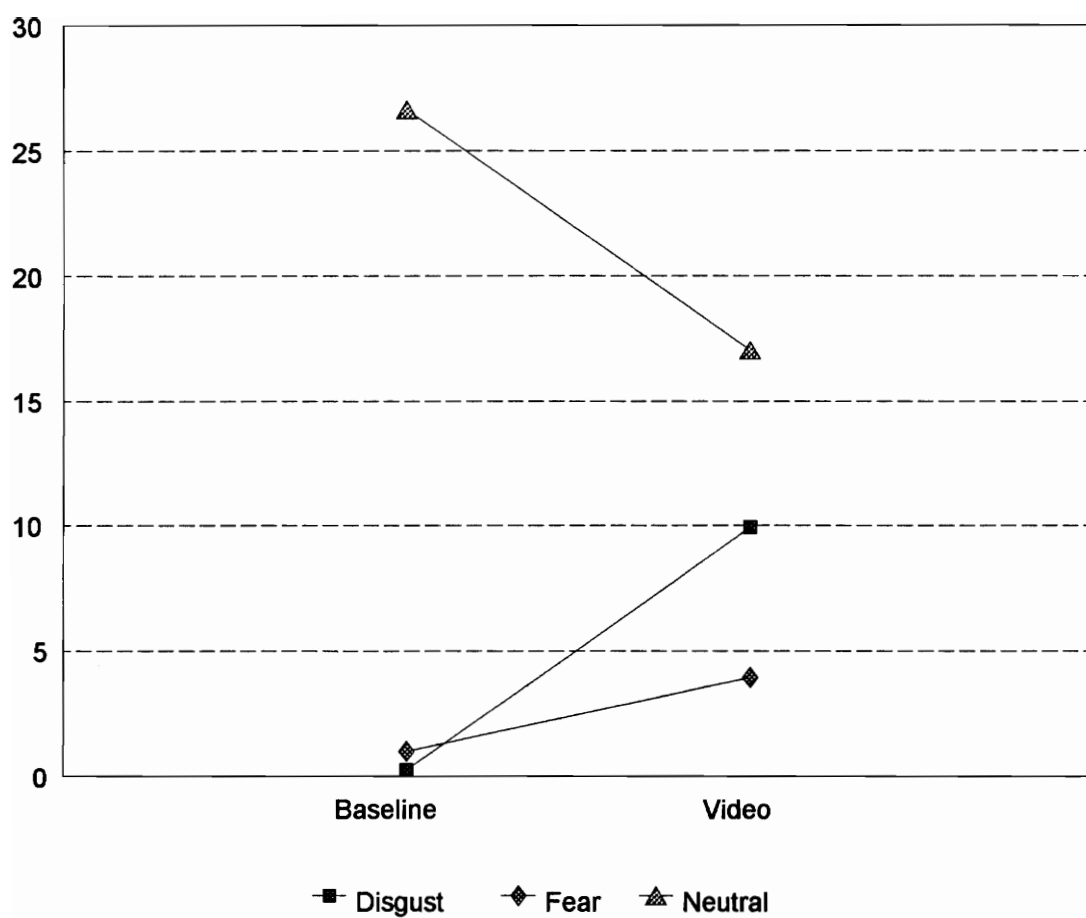


Figure 4. Adjective class ratings by phase.

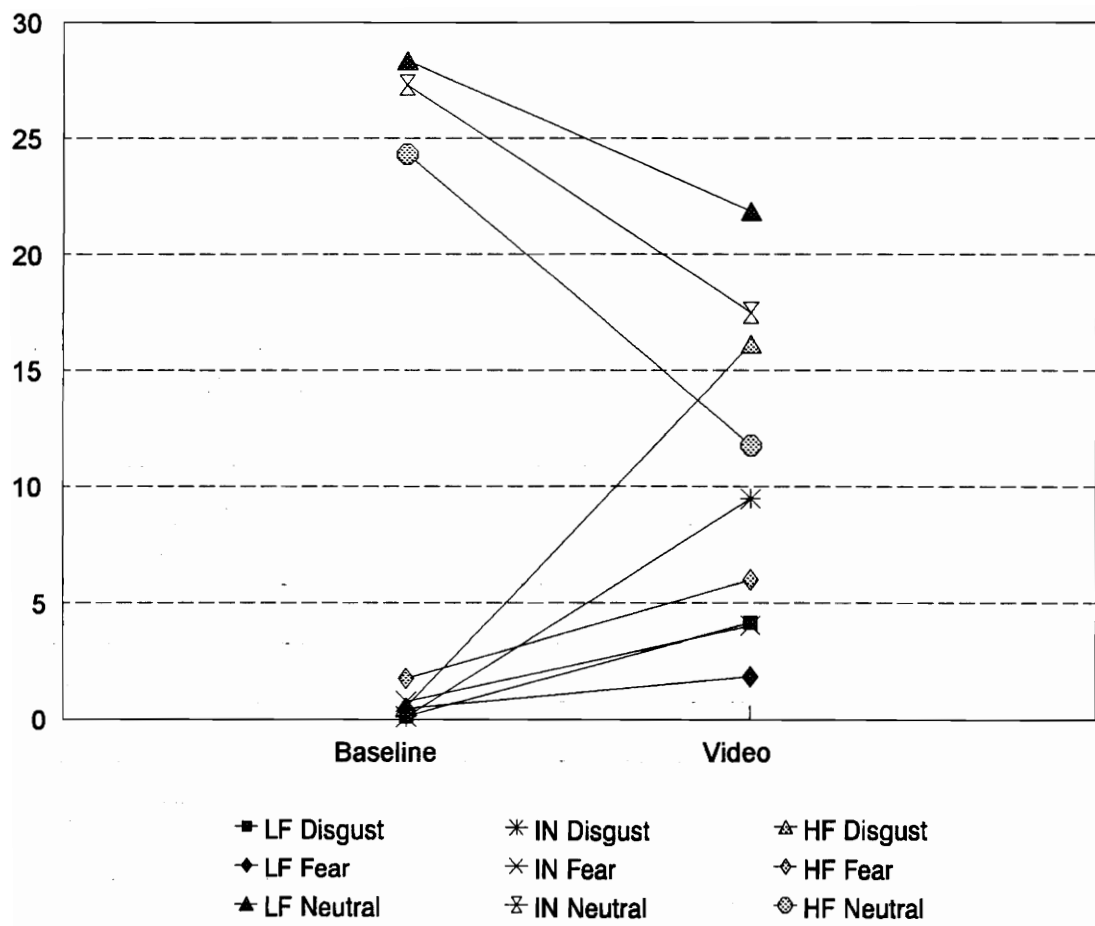


Figure 5. Adjective class ratings by phase and group.

APPENDICES

Appendix A
Consent Form A
Cardiac Response to Video Stimuli
Principal Investigator - Christina M. Rock, B.S.

I. THE PURPOSE OF THIS RESEARCH - You are invited to participate in the first part of this study on cardiac response to video stimuli. This part of the study involves experimentation for the purpose of selecting people to participate in the next part of the study.

II. PROCEDURES - The procedures to be used in this research include completion of 5 standard psychological questionnaires regarding your reaction to a wide variety of objects, situations and your feelings about yourself; and completion of a medical history form. A maximum of 2 hours will be required to complete all the forms. You may be contacted by phone in approximately one month for the purpose of inviting you to participate in the next part of the study.

The possible risks or discomfort to you as a participant may be slight discomfort resulting from your responses to the questionnaires. To minimize this discomfort strict confidentiality will be maintained as described in section IV of this form.

III. BENEFITS OF THIS PROJECT - Your participation in the project will provide the following information that may be helpful. The results of the questionnaires from both you and the other participants will provide a broad spectrum of information about people with and without the particular phenomenon of interest which may be helpful in the clinical treatment of people affected by such a phenomenon. No guarantee of benefits has been made to encourage you to participate.

You will receive a copy of this form for your records. At the end of the form you will find a phone number for contacting the principal investigator of this project. If you wish to receive information about the results of this study, please contact the principal investigator at this number in approximately six months.

IV. EXTENT OF ANONYMITY AND CONFIDENTIALITY - The results of this part of the study will be kept strictly confidential. At no time will the researchers release the results of the study to anyone other than individuals working on the project without your written consent. The information you provide will have your name removed and only a subject number will identify you during analyses and any written reports of the research. This consent form will be the only form with your name and personal information number, and it will be stored separately from the forms with your responses.

V. COMPENSATION - You may receive 2 points of extra credit for the psychology class in which you are enrolled. Alternative methods of receiving class credit, if you do not wish to participate, may be obtained from Mike Casey if you are an Introductory Psychology student, or from your professor if you are in another psychology course.

If as a result of your responses to these questionnaires, you or the investigator determine that you should seek counseling or medical treatment, the following is available:

Psychological Services Center 231-6914
University Counseling Center 231-6557

VI. FREEDOM TO WITHDRAW - You are free to withdraw from this study at any time without penalty. If you chose to withdraw, you will not be penalized by reduction in points or grade for your psychology course. There are alternative choices for receiving extra credit for the course evaluation.

VII. APPROVAL OF RESEARCH - This research project has been approved, as required, by the Institutional Review Board for projects involving human subjects at Virginia Polytechnic Institute and State University, and by the Human Subjects Committee of the Department of Psychology at Virginia Polytechnic Institute and State University.

VIII. SUBJECT'S RESPONSIBILITIES - I know of no reason I cannot participate in this study. I have the following responsibilities:
-Responding to the best of my knowledge to items on the questionnaires
-Listing all relevant medical conditions on the medical history form
-Inquiring of the proctor about medical conditions of which I am unsure.

IX. SUBJECT'S PERMISSION - I have read and understand the informed consent and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent for participation in this project. If I participate, I may withdraw at any time without penalty. I agree to abide by the rules of this project. Should I have any questions about this research or its conduct, I will contact:

Christina M. Rock, B.S.
Graduate Researcher
Office Phone: 231-6914

Thomas H. Ollendick, Ph.D.
Professor of Psychology
Office Phone: 231-6451

R. J. Harvey, Ph.D.
Chairperson, Human Subjects Committee
Office Phone: 231-4122

Ernest Stout, Ph.D.
Institutional Review Board
Office Phone: 231-9359

Signature Date

Print Name Clearly Student ID

Local Address

Local Phone

Appendix B Medical History Form

Please check yes (Y) to the right of each column if you have ever had or now have any of the following, check (N) if you have not ever had the following or check ? if you are not sure.

	Y	N	?
Irregular heart beat			
Arrhythmias or fibrillations			
Pacemaker			
Palpitations or pounding heart			
Heart murmurs			
Heart trouble			
Seizures			
Dizziness or fainting spells			
High blood pressure			
Low blood pressure			
Depression or excessive worry			
Panic or anxiety attacks			
Shortness of breath			

Please complete the following information.

Today's Date _____

Birth Date _____ Age _____ Gender _____

Race (Please write out) _____

Year in school _____ Major _____

Appendix C Fear Questionnaire

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

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

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

Appendix D Anxiety Sensitivity Index

Mark the box that best represents the extent to which you agree with the item. If any of the items concern something that is not part of your experience (e.g. "It scares me when I feel 'shaky'."), for someone who has never trembled or had the 'shakes'.), answer on the basis of how you think you might feel *if you had* such an experience.

	Very Little	Little	Some	Much	Very Much
1. It is important to me not to appear nervous.					
2. When I cannot keep my mind on task, I worry that I must be going crazy.					
3. It scares me when I feel "shaky" (trembling).					
4. It scares me when I 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 have a 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 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.					

Appendix E
Mutilation Questionnaire

Answer each of the following statements either True or False as you feel they generally apply to you. If the statement is true most of the time or mostly true for you, you should answer **true** by circling the T. If it is mostly false or false most of the time, mark it **false** by circling the F.

- T F 1. I could not remove the hook from a fish that was caught.
- T F 2. I would feel some revulsion looking at a preserved brain in a bottle.
- T F 3. If a badly injured person appears on TV, I turn my head away.
- T F 4. I dislike looking at picture of accidents or injuries in magazines.
- T F 5. I do not mind visiting a hospital and seeing ill or injured persons.
- T F 6. Medical odors make me tense and uncomfortable.
- T F 7. I would not go hunting because I could not stand the sight of a dead animal.
- T F 8. Watching a butcher at work would make me anxious.
- T F 9. A career as a doctor or nurse is very attractive to me.
- T F 10. I would feel faint if I saw someone with a wound in the eye.
- T F 11. Watching people use sharp power tools makes me nervous.
- T F 12. The prospect of getting an injection or seeing someone else get one bothers me quite a bit.
- T F 13. I feel sick and/or faint at the sight of blood.
- T F 14. I enjoy reading articles about modern medical techniques.
- T F 15. Injuries, accidents, blood, etc. bother me more than anything else.
- T F 16. Under no circumstance would I accept an invitation to watch a surgical operation.
- T F 17. When I see an accident, I feel tense.
- T F 18. It would not bother me to see a bad cut as long as it had been cleaned and stitched.
- T F 19. Using very sharp knives makes me nervous.
- T F 20. Not only do cuts and wounds upset me, but the sight of people with amputated limbs, large scars, or plastic surgery also bother me.
- T F 21. If instruments were available, it would be interesting to see the action of the internal organs in a living body.
- T F 22. I am frightened at the idea of someone drawing a blood sample from me.
- T F 23. I don't believe anyone could help a person with a bloody wound without feeling at least a little upset.
- T F 24. I am terrified by the idea of having surgery.

- T F 25. I am frightened by the thought that I might some day have to help a person badly hurt in a car wreck.
- T F 26. I shudder to think of accidentally cutting myself.
- T F 27. The sight of dried blood is repulsive.
- T F 28. Blood and gore upset me no more than the average person.
- T F 29. The sight of an open wound nauseates me.
- T F 30. I could never swab out a wound.

Appendix F
State-Trait Anxiety Inventory - Trait Form

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

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel pleasant.				
2. I feel nervous and restless.				
3. I feel satisfied with myself.				
4. I wish I could be as happy as others seem				
5. I feel like a failure.				
6. I feel rested.				
7. I am "calm, cool and collected".				
8. I feel that difficulties are piling up so that I cannot overcome them.				
9. I feel I worry too much over something that really doesn't matter.				
10 I feel happy.				
11 I have disturbing thoughts.				
12 I lack self confidence.				
13 I feel secure.				
14 I make decisions easily.				
15 I feel inadequate.				
16 I am content.				
17 Some unimportant thoughts run through my mind and bother me.				
18 I take disappointments so keenly that I can't put them out of my mind.				
19 I am a steady person.				
20 I get in a state of tension and turmoil as I think over my recent concerns and				

Appendix G

Interpersonal Reactivity Index

Using the key immediately below, check the number on the scale for each item which you feel best describes you in general. If you feel a statement does not describe you at all, check 0. If you feel the statement is a very accurate description of you, check 4.

0 = Does not describe me well

1 = Describes me a little

2 = Describes me somewhat well

3 = Describes me moderately well

4 = Describes me very well

	0	1	2	3	4
1. I daydream and fantasize, with regularity, about things that might happen to me.					
2. I often have tender, concerned feelings for people less fortunate than me.					
3. I sometimes find it difficult to see things from the "other guy's" point of view.					
4. Sometimes I don't feel very sorry for other people when they are having problems.					
5. I really get involved with the feelings of the characters in a novel.					
6. In emergency situations, I feel apprehensive and ill-at-ease.					
7. I am usually objective when I watch a movie or a play, and I don't often get completely caught up in it.					
8. I try to look at everybody's side of a disagreement before I make a decision.					
9. When I see someone being taken advantage of, I feel kind of protective toward them.					
10. I sometimes feel helpless when I am in the middle of a very emotional situation.					
11. I sometimes try to understand my friends better by imagining how things look from their perspective.					
12. Becoming extremely involved in a good book or movie is somewhat rare for me.					
13. When I see someone get hurt, I tend to remain calm.					

	0	1	2	3	4
14. Other people's misfortunes do not usually disturb me a great deal.					
15. If I am sure I'm right about something, I don't waste much time listening to other people's arguments.					
16. After seeing a play or movie, I have felt as though I were one of the characters.					
17. Being in a tense emotional situation scares me.					
18. When I see someone being treated unfairly, I sometimes don't feel very much pity for them.					
19. I am usually pretty effective in dealing with emergencies.					
20. I am often quite touched by things that I see happen.					
21. I believe that there are two sides to every question and try to look at them both.					
22. I would describe myself as a pretty soft-hearted person.					
23. When I watch a good movie, I can very easily put myself in the place of the leading character.					
24. I tend to lose control during emergencies.					
25. When I'm upset at someone, I usually try to "put myself in his shoes" for a while.					
26. When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me.					
27. When I see someone who badly needs help in an emergency, I go to pieces.					
28. Before criticizing somebody, I try to imagine how I would feel if I were in their place.					

Appendix H

Script for Questionnaire Session

At no point during this session should you mention anything about the actual topic of the study. If you get questions on that issue, check the section on probable questions for some responses. Write the study title, opscan directions and the date on the board.

Make sure that everyone is in the right place. **This is the questionnaire session for "Cardiac Response to Video Stimuli".** Pause. **Is there anyone here who is not an Intro Psych student? Do any of you need something to show your professor you were here?** If there is, give them each an extra credit slip and have them fill in their names. Sign their slips in the session proctor spot while the Intro Psych students are filling out the opscans. Hand out two orange opscans per person. They need one for each extra credit point. Be careful to count the opscans exactly or the last person in a row may fill out more than his share. Don't give them the packets until they are done with the opscans as a group. **Does everyone have a number 2 pencil?** Pass out pencils to those who need them. **Write your name where it says name. Write your social security number in the boxes below ID number. Fill in the appropriate circle below each number. In seat number, write the number 101 and fill in the circles below. Write 1013-93 by course. Do not write Intro Psychology. Be sure to fill in the date. Form and group will be left blank. Fill out both opscans in the same way. Each is worth one extra credit point. After everyone is finished, have them pass them to the front. While they fill out the questionnaires, quickly go through the opscans to make sure they are filled out correctly. If the information is incorrect, they will not get their extra credit.**

Pass out the packets. **Check your packets. There should be six double-sided pages. The first two pages should be the same. Raise your hand if your packet is incomplete. Pause. Tear off the top sheet now. This is your copy of the consent form. Please put it somewhere so you may take it with you. Read with me as I go through the consent form.** Read the consent form to them. When your done reading, ask if anyone has any questions. If someone asks a question you can't answer, tell them you'll find out and get back to them. Then ask if they are willing to continue without that answer. If not, they can come to another session. I will call them to try to answer their question. **If you agree to everything in the consent form, USING A PEN, please sign and date the form. Below that please print your name, social security number, local address and phone. We need your address and phone to contact you if you are selected for the second part of the experiment. Pause. Go through and write your social security number in the blank provide at the top of each page. Pause. Please tear off the consent form and pass it forward. Pause When working on the questionnaires, try not to spend too much time on a single item. Answer all items on each page. Remember they are two sided. Raise your hand if you have any questions. Bring the packet to the front when you are finished. You may begin. Collect the consent forms.**

Remember to check the opscans while they are working. Check the consent forms also. If anything is missing or wrong on either, call the name and have them fix it. When they start coming up with the packets make sure every item is answered. This is very important, because if there are any blanks that will be an incomplete record. Incomplete records cannot be included in the data set. People may get backed up at the desk while you are doing this, but do it any way! If you know anyone at the session, assure them you are not reading their answers you are just checking to be sure they answered everything. Do you best to preserve confidentiality in this case.

Also check the medical history forms for marks under "?". If someone is unsure of a medical condition, try to clarify if they have any condition at all related to their heart. Mark "Y" for heart trouble. If you can't determine what they are talking about, have them write a note on the bottom of the form explaining it the best they can. If they are selected for phase II, I'll call them before they're run. Put the consent forms and packets in order by social security number when your done. Get the pencils back!

Many will have their experiment extra credit sheet with them. If you are presented with this form, fill in the appropriate info (experiment # is 1013-93) and initial. Don't forget to enter the data from this session. On your way back, stop by the fifth floor and pick up the sign-up sheet for this session. Go through the consent forms checking off the names on the sheet. If there are people who you have a consent form for, but they did not sign-up, don't worry about it. Any that signed up but did not show up, highlight. Put the sign-up sheets in my box when you are done. If you think we are low on opscans, pencils or forms, call me.

Probable Questions

What kind of video is it? What's the study actually about?

Because part of the second portion of the experiment is capturing your natural reaction to that subject, you will not be told until the beginning of that portion.

Is it a pornographic video? No the video is not sexual in nature. (This is the only explicit information you may give about the video.)

Who will get to do the next part? Subjects will be selected on the basis of these questionnaires.

How much extra credit do you get for the next part? Three points

What do you mean by _____? (Reads an item to you) Answer depending on what it means to you.

Any questions about the medical history form. Try to determine if they have any trouble with their heart at all. If so, mark "Y" for heart trouble. If you do not understand what they are talking about, get them to write a description of the problem on the form and I'll call them if their selected for the next part of the study.

Appendix I
Consent Form B
Cardiac Response to Video Stimuli
Principal Investigator - Christina M. Rock, B.S.

I. THE PURPOSE OF THIS RESEARCH - You are invited to participate in the second part of this study on cardiac response to video stimuli. This part of the study involves experimentation for the purpose of measuring your physical and emotional response to a surgical video.

II. PROCEDURES - The procedures to be used in this research include measuring your heart rate and skin temperature for a noncontinuous period of thirty minutes prior to and during the video; completing a form on which you will describe your emotional state before and after the video; and finally, after viewing the video an interview regarding the subject of the video will be administered to you. A maximum of 3 hours will be required to complete this part of the study.

Some people have experienced a physical reaction and emotional discomfort while viewing such a video. These are the only risks to you as a subject as a result of this procedure. In the event that your reaction to the video or any aspects of this study cause you to experience discomfort and/or indicate that you may benefit by psychological counseling, and if you wish to pursue such counseling, you will be given a referral as described in section V of this form.

III. BENEFITS OF THIS PROJECT - Your participation in the project will provide the following information that may be helpful. The results of the questionnaires and physiological measurements from both you and the other participants will provide a broad spectrum of information about people with and without the phenomenon of interest which may be helpful in the clinical treatment of those caused difficulty by such subject matter. No guarantee of benefits has been made to encourage you to participate.

You will receive a copy of this form for your records. At the end of the form you will find a phone number for contacting the principal investigator of this project. If you wish to receive information about the results of this study, please contact the principal investigator at this number in approximately six months.

IV. EXTENT OF ANONYMITY AND CONFIDENTIALITY - The results of this part of the study will be kept strictly confidential. At no time will the researchers release the results of the study to anyone other than individuals working on the project without your written consent. The information you provide will have your name removed and only a subject number will identify you during analyses and any written reports of the research. This consent form will be the only form with your name and personal information number, and it will be stored separately from the forms with your responses.

Your facial expression before and while watching the video will be videotaped. The tape will be erased after it has been scored. The tape will exist for no longer than one year from the date of filming. The tape as well as all other data collected during the experiment will remain confidential.

V. COMPENSATION - You may receive 3 points of extra credit for the psychology class in which you are enrolled. Alternative methods of receiving class credit, if you do not wish to participate, may be obtained from Mike Casey if you are an Introductory Psychology student, or from your professor if you are in another psychology course.

If as a result of your responses to these questionnaires, you or the investigator determine that you should seek counseling or medical treatment, the following is available:

Psychological Services Center 231-6914
University Counseling Center 231-6557

VI. FREEDOM TO WITHDRAW - You are free to withdraw from this study at any time without penalty. If you chose to withdraw, you will not be penalized by reduction in points or grade for your psychology course. There are alternative choices for receiving extra credit for the course evaluation.

VII. APPROVAL OF RESEARCH - This research project has been approved, as required, by the Institutional Review Board for projects involving human subjects at Virginia Polytechnic Institute and State University, and by the Human Subjects Committee of the Department of Psychology at Virginia Polytechnic Institute and State University.

VIII. SUBJECT'S RESPONSIBILITIES - I know of no reason I cannot participate in this study. I have the following responsibilities:

- Accurately reporting any relevant medical conditions which may have been omitted on the medical history form prior at the start of the experimental procedure
- Asking for the procedure to be stopped if I begin to experience extreme discomfort in reaction to the video

IX. SUBJECT'S PERMISSION - I have read and understand the informed consent and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent for participation in this project. If I participate, I may withdraw at any time without penalty. I agree to abide by the rules of this project. Should I have any questions about this research or its conduct, I will contact:

Christina M. Rock, B.S.
Graduate Researcher
Office Phone: 231-6914

R. J. Harvey, Ph.D.
Chairperson, Human Subjects Committee
Office Phone: 231-4122

Thomas H. Ollendick, Ph.D.
Professor of Psychology
Office Phone: 231-6451

Ernest Stout, Ph.D.
Institutional Review Board
Office Phone: 231-9359

Signature

Date

Print Name Clearly

Student ID

Appendix J Adjective Checklist

NOTE: All adjectives appeared on same side of one page when presented to subjects.

AFRAID

0	1	2	3	4	5	6	7	8
Does not describe		Slightly describes		Somewhat describes		Largely describes		Completely describes

CALM

0	1	2	3	4	5	6	7	8
Does not describe		Slightly describes		Somewhat describes		Largely describes		Completely describes

DISGUST

0	1	2	3	4	5	6	7	8
Does not describe		Slightly describes		Somewhat describes		Largely describes		Completely describes

FINE

0	1	2	3	4	5	6	7	8
Does not describe		Slightly describes		Somewhat describes		Largely describes		Completely describes

FRIGHTENED

0	1	2	3	4	5	6	7	8
Does not describe		Slightly describes		Somewhat describes		Largely describes		Completely describes

NAUSEA

0	1	2	3	4	5	6	7	8
Does not describe		Slightly describes		Somewhat describes		Largely describes		Completely describes

PANICKY

0	1	2	3	4	5	6	7	8
Does not describe		Slightly describes		Somewhat describes		Largely describes		Completely describes

RELAXED

0	1	2	3	4	5	6	7	8
Does not describe		Slightly describes		Somewhat describes		Largely describes		Completely describes

REPULSED

0	1	2	3	4	5	6	7	8
Does not describe		Slightly describes		Somewhat describes		Largely describes		Completely describes

REVOLTED

0	1	2	3	4	5	6	7	8
Does not describe		Slightly describes		Somewhat describes		Largely describes		Completely describes

STEADY

0	1	2	3	4	5	6	7	8
Does not describe		Slightly describes		Somewhat describes		Largely describes		Completely describes

TERRIFIED

0	1	2	3	4	5	6	7	8
Does not describe		Slightly describes		Somewhat describes		Largely describes		Completely describes

Appendix K Data Collection Sheet

	Base	Antic.	Video		Base	Video		Base
10 sec	_____	_____	_____	5-10s	_____	_____	10-10s	_____
20 sec	_____	_____	_____	5-20s	_____	_____	10-20s	_____
30 sec	_____	_____	_____	5-30s	_____	_____	10-30s	_____
40 sec	_____	_____	_____	5-40s	_____	_____	10-40s	_____
50 sec	_____	_____	_____	5-50s	_____	_____	10-50s	_____
1 min	_____	_____	_____	6 min	_____	_____	11 min	_____
1-10s	_____	_____	_____	6-10s	_____	_____	11-10s	_____
1-20s	_____	_____	_____	6-20s	_____	_____	11-20s	_____
1-30s	_____	_____	_____	6-30s	_____	_____	11-30s	_____
1-40s	_____	_____	_____	6-40s	_____	_____	11-40s	_____
1-50s	_____	_____	_____	6-50s	_____	_____	11-50s	_____
2 min	_____	_____	_____	7 min	_____	_____	12 min	_____
2-10s	_____	_____	_____	7-10s	_____	_____	12-10s	_____
2-20s	_____	_____	_____	7-20s	_____	_____	12-20s	_____
2-30s	_____	_____	_____	7-30s	_____	_____	12-30s	_____
2-40s	_____	_____	_____	7-40s	_____	_____	12-40s	_____
2-50s	_____	_____	_____	7-50s	_____	_____	12-50s	_____
3 min	_____	_____	_____	8 min	_____	_____	13 min	_____
3-10s	_____	_____	_____	8-10s	_____	_____	13-10s	_____
3-20s	_____	_____	_____	8-20s	_____	_____	13-20s	_____
3-30s	_____	_____	_____	8-30s	_____	_____	13-30s	_____
3-40s	_____	_____	_____	8-40s	_____	_____	13-40s	_____
3-50s	_____	_____	_____	8-50s	_____	_____	13-50s	_____
4 min	_____	_____	_____	9 min	_____	_____	14 min	_____
4-10s	_____	_____	_____	9-10s	_____	_____	14-10s	_____
4-20s	_____	_____	_____	9-20s	_____	_____	14-20s	_____
4-30s	_____	_____	_____	9-30s	_____	_____	14-30s	_____
4-40s	_____	_____	_____	9-40s	_____	_____	14-40s	_____
4-50s	_____	_____	_____	9-50s	_____	_____	14-50s	_____
5 min	_____	_____	_____	10 min	_____	_____	15 min	_____

Skin Temperature

	Baseline	Anticipation	Video
0 min	_____	_____	_____
1 min	_____	_____	_____
2 min	_____	_____	_____
3 min	_____	_____	_____
4 min	_____	_____	_____
5 min	_____		_____
6 min	_____		_____
7 min	_____		_____
8 min	_____		_____
9 min	_____		_____
10 min	_____		_____
11 min	_____		
12 min	_____		
13 min	_____		
14 min	_____		
15 min	_____		

What stands out most in your mind about the video? **POS** **NEG**

On a scale of 1 to 10, with 1 being not at all and 10 being very much so, did you feel faint or lightheaded at any time during the video?

Appendix L

Script for Part II

When a subject first arrives, have them complete forms to obtain 3 hours experimental extra credit. Go over the consent with the subject in detail including an explanation of the actual procedure. After the consent form has been signed, apply the electrodes and thermistor and adjust the camera to film the subject's face. Check the subject's signal for strength and clarity. Make adjustments as needed to obtain the optimal signal.

Do you have any questions? Make yourself comfortable and we will get started. This first part will take 15 minutes. Please try to move as little as possible and do not talk during the experiment. Ready? Baseline data collected

For each adjective printed in bold, I would like you to circle the number on the 0 to 8 scale for how well that adjective describes how you felt while you were sitting there. For example, if an adjective does not describe how you felt at all, circle the 0. If the adjective perfectly describes how you felt then circle the 8. Do you understand? Let me know when you are done. Reset watch

Get settled back in. Ready? Start camera. The video you are about to watch is a surgical film. It begins with the skin being pulled back and follows the procedure as deeper and deeper levels of tissue are cut. There is quite a bit of blood involved. Press marker, start watch and take temperature reading. Prior to the start of the surgery film there is a four minute lead-in of blank tape. After that, the video itself lasts ten minutes. Please watch the screen closely. This means do not close your eyes or look away from the screen during the video. If you feel uncomfortable or that you can no longer watch you may press the stop button on the remote control at your left hand. Do you see it? Do you have any questions? Are you willing to continue? Subjects who express concern at this point will be reminded they are not under any obligation to continue and they may leave the experiment without penalty. The experiment will not continue until subjects openly agree to continue.

Remember to try to limit your movement and not to talk during the video. You may press play now.

After the video has ended: I would like you to scale the adjectives as you did before for how you felt during the video. Stop camera.

I'm going to ask you two questions and then we are finished with this part of the experiment. First, what is it that stands out most in your mind about the video? Answers will be recorded in the appropriate spot on the data sheet On a scale of 1 to 10, with 1 being not at all and ten being very much so, did you feel faint or lightheaded at any point during the video? Again answers will be recorded on the data sheet.

Do you have any questions about what has happened so far? This study is examining how the physiological aspects of blood phobia manifest themselves in different people. Your participation in this study will help us better understand and treat the phenomenon of blood phobia. The final step will be an interview which will take approximately twenty minutes. Administer interview.

After interview We are also interested in how a reaction to blood runs in families. It is possible that your parents have had some experiences or know about experiences of other family members of which you are unaware, and therefore, unable to report in the interview. We would like your permission to send your parents a questionnaire based on the interview you have just completed to ask them about their own reactions. This is the form we will send them. (Show subject the questionnaire) We will enclose this letter advising them that you have given us permission to contact them. (Show them the letter) If you agree, you will sign the letter here (Indicate where) to let your parents know that you did agree. They will also be given the opportunity to agree to participate by signing this form. (Show parent consent form) During the interview you told us that you were raised by (Refer to family arrangement). We would like both your "mother" and "father" to complete the questionnaire. Everything you have done and said during this experiment is confidential and will not be passed on to your parents. May we send your parents the questionnaire?

SIMPLE PHOBIA

	<u>Fear</u>	<u>Avoid</u>
Heights	_____	_____
Air Travel.....	_____	_____
Certain Animals.....	_____	_____
Small enclosed spaces.....	_____	_____
Blood and injury: self.....	_____	_____
others.....	_____	_____
Driving.....	_____	_____
Other (write in)		

a. **How often does this situation come up?**

b. How often do you avoid _____ ?

c. How much does the fear interfere with your life? (card) _____

d. How bothered are you by your fear of _____?(card)

e. Do you think you are more fearful of _____ than you need to be or should be?
YES NO

List all phobias where criteria was met for either clinical or subclinical diagnosis and circle which level.

_____	Clinical	Subclinical	_____	Clinical	Subclinical
_____	Clinical	Subclinical	_____	Clinical	Subclinical

SOCIAL PHOBIA

1. a. In social situations where you might be observed or evaluated by others, do you feel fearful/anxious/nervous? YES NO
- b. Are you overly concerned that you may do and/or say something that might embarrass or humiliate yourself in front of others, or that others may think badly of you? YES NO
2. I'm going to describe some situations of this type and ask you how you feel in each situation using the rating card again.

	Fear	Avoid
a. Parties.....	_____	_____
b. Meetings.....	_____	_____
c. Eating in public.....	_____	_____
d. Using public restrooms.....	_____	_____
e. Talking in front of a group/formal speaking.....	_____	_____
f. Writing in public (signing checks, filling out forms) ..	_____	_____
g. Dating situations.....	_____	_____
h. Talking to persons in authority.....	_____	_____
i. Being assertive, e.g. Refusing unreasonable requests or Asking others to change behavior	_____	_____
j. Initiating a conversation.....	_____	_____
k. Maintaining a conversation.....	_____	_____
l. Other situations (write in)	_____	_____

For primary (of at least moderate severity) situation:

- a. How often does this situation come up?
- b. How often do you avoid _____ ?
- c. How does the fear interfere with your life? (card) _____
- d. How bothered are you by your fear of _____ ? (card) _____
- e. Do you think you are more fearful than you need to be or should be? YES NO

Criteria for Social Phobia? NO DX Subclinical Clinical

Appendix N
Blood/Injury Interview

I. INTRODUCTION - I would like to ask you some questions concerning your reaction to blood, injuries and the like. This information will help us better understand what these reactions are like and how they develop. We hope also that this information will show us how to best treat people for whom this is a significant problem. We will start with some background information.

Who do you live with when you are at home? (Circle one)

1=Both natural parents

5=N. father & step mother

2=Natural mother alone

6=Other relatives (e.g. grandparents, aunts)

3=Natural father alone

7=Adoptive parents

4=N. mother & step father

8=Foster parents

Do you have any brother or sisters? # brothers _____ # sisters _____

Mother's Occupation _____

Mother's Education _____

Father's Occupation _____

Father's Education _____

II. SELF CLASSIFICATION - With regard to your usual reaction to the sight of blood, where would you place yourself on this continuum? (Show line) Just place a vertical slash where you think you are.

None at All A Little A Fair Amount A Great Deal Extreme Reaction

NOTE: The format of this line has been changed to fit the format of the current manuscript. When presented to the subjects, it was 21 centimeters in length and ran the length of the page.

III. FAINTING HISTORY

1. How many times have you TOTALLY LOST CONSCIOUSNESS and fainted as a result of seeing blood on yourself or others, having blood drawn, or seeing injuries on yourself or others? # _____

If subject cannot state exact number, have them estimate using the following categories.

____ 1-5 ____ 6-10 ____ 11-20 ____ >50

2. **How many times have you FELT FAINT OR ALMOST LOST CONSCIOUSNESS as a result of seeing blood on yourself or others, having blood drawn or seeing injuries on yourself or others?**
Number ____

If subject cannot state exact number, have them estimate using the following categories.

____ 1-5, ____ 6-10, ____ 11-20, ____ >50

3. **Have you ever felt faint or actually fainted in circumstances other than those involving blood or injury?** (Do not include unconsciousness as a result of: a blow to the head, significant blood loss, severe illness.) **Yes No**

If YES, get a brief description of these incidents.

If subject did not report fainting or near faint in response to blood and the subject said 'not at all' in Section II, skip to Section V, MISCELLANEOUS INFORMATION.
If subject did not report near faint or faint episodes in questions 1 and 2 of this section, skip to question 5.

4. The goal of this question is to evaluate whether fainting was fear and/or trauma induced, direct or vicarious, physical and psychological circumstances surrounding the first event. Emphasize faint not fear here. **Could you describe in detail the first time you ever fainted [felt faint]?**

a. age _____ b. Loss of consciousness: full partial c. setting (home, doctor's office, accident, etc.)

d. Who was present?

e. Was injury involved? If yes, to whom and how badly?

f. Why did you not leave the situation?

g. Were you fearful of blood prior to this incident? **Yes No**

If yes, On a scale of 1 to 10 how fearful? ____

h. Have you been more fearful since this incident? **Yes No**

If subject reported no fear in section II, continue to Section IV.

5. The goal of this question is to determine when and how the subject's fear developed or at least the earliest time the subject remembers feeling fearful at the sight of blood. Emphasize fear not faint here. Questions you could use to begin this section: **How did you become fearful?**, **What caused you to become fearful?**, or **Describe the first time that you recall being fearful and or avoiding the sight of blood.**

If subject cannot recall a specific incident, **Did your fear develop gradually?** Yes No
(If the subject replies 'no', probe further for an incident.) **Why do you think you are fearful?**

- a. age _____ b. Loss of consciousness: full partial c. setting (home, doctor's office, accident, etc.)
d. Who was present?
e. Was injury involved? If yes, to whom and how badly?
f. Why didn't you leave the situation?

IV. TREATMENT

If a treatment were available that could eliminate or significantly reduce your reaction to blood or injuries, would you seek that treatment?

- ___ Yes, at all costs.
___ Yes, if it were not too costly or time consuming.
___ No, my problem is not bad enough to justify treatment.

V. MISCELLANEOUS INFORMATION

1. **Which would be emotionally worse having a negative reaction to the sight of blood alone or with others?** alone others
2. **Do you donate blood?** Yes No
3. **What thoughts go through your mind when you are exposed to the sight of blood?**

Next two questions for females only. Males go to section VI.

3. **We have been talking about having a negative reaction to the sight of blood. Have you ever had a reaction like that to your own menstrual blood?** Yes No

What about the first time you menstruated? Yes No

4. **Are your periods painful?** (Not simple discomfort) Yes No

VI. FAMILY HISTORY

1. **To the best of your knowledge, has anyone in your immediate family ever fainted at the sight or suggestion of blood or injury?** Yes No Don't Know

If Yes, **WHO?**

(indicate if adoptive (A), Step (S), half (1/2) and for siblings if older (O) or younger (Y))

2. **To your knowledge, has anyone in your extended family fainted at the sight of blood?**

Yes No Don't Know

If yes, list relationship and specify if maternal or paternal.

(i.e. grandmother (p), aunt (m), etc.). Check if relations listed are biological, if not indicate A or S.

3. **To your knowledge, has anyone in your immediate or extended family significantly avoided blood or injuries in a way that was noticeable to others whenever present?** Yes No

If yes, list relation as before.

Appendix O
Consent to Contact Parents

Name _____

I give my permission to contact my mother ____, my father ____, both ____, for the purpose of surveying their reactions to blood and injury.

Signature

Date

Mother's name: _____

My mother's phone number is: _____

Address: _____

Father's name: _____

(If different) My father's phone number is: _____

Address: _____

Appendix P

Letter to Parents

Dear Mr. and Mrs. _____,

Recently your son/daughter has participated in an experiment for extra credit in his/her psychology class. This experiment which is being conducted by the Department of Psychology at Virginia Tech is examining different aspects of the phenomenon known as blood/injury phobia. One of the questions being asked by the study is, if the fear or phobia of blood runs in families.

To assist us in answering that question, your son/daughter has given us permission to contact you. Enclosed is a questionnaire regarding your personal experience and the experience of other family members with the sight of blood and fainting. We are interested even in experiences of which you do not think your child was aware including those that may have occurred when you yourself were a child. Please read each question carefully and answer as it applies to you. There is a copy for both mother and father figures to respond to each question if both are available in your home. Should the parents in the home be other than biological parents, please indicate relation (e.g. other relative, step parent, adoptive parent, etc.) in the first question. You do not need to respond regarding other parental figures outside of your home. After completing the questionnaire, please return it to us in the enclosed envelope. However, if after reviewing the questionnaire, you decide not to participate, please check the appropriate box at the top of the first page, sign and return in the enclosed envelope.

Regardless of whether you decide to participate, please try to return the questionnaire to us within 10 days of receiving it. If you have questions about the questionnaire or the study itself please feel free to contact the primary investigator, Christina Rock, at (703) 231-6914. Any additional concerns you may have could also be addressed to people listed on the consent form. In case we do not receive the completed questionnaire or the blank questionnaire indicating you do not wish to participate within three weeks of the date of mailing, we will be contacting you by phone to insure you actually received this letter and questionnaire.

Any information you provide will be kept confidential as is the information your son/daughter has already provided. Whether or not you decide to participate by completing the questionnaire will not in any way influence your son/daughter's status or educational training at Virginia Tech.

Thank you for your consideration and we look forward to hearing from you.

Sincerely,

Christina M. Rock
Principal Investigator

Thomas H. Ollendick, Ph.D.
Professor of Psychology

I give my permission to contact my parents for the purpose of surveying their reactions to blood and injury.

Signature _____ Date _____

Appendix Q
Parent Consent Form

As noted in the letter, we would like you to take a moment and look through the questions which follow. Please note that all pages are **two-sided**. Again the purpose of these questions is to explore how reaction to blood and injury runs in families. Your son/daughter has already answered similar questions. As you looked through the questions, you probably noted that there are two copies of this form. Please tear off the top copy which is on the back of the letter for your records now. If you are willing to help use explore this issue, please check the first line below, sign and then precede to the questionnaire itself. If you do not wish to participate, check the second line and sign below. Please return the signed copy of this form and the questionnaire in the envelope provided regardless of your decision.

____ I wish to participate in this study on reaction to blood and injury.

____ I **DO NOT** wish to participate.

Signature

Date

Note: This project has been approved by the Human Subjects Research Committee of the Psychology Department and by the Institutional Review Board of Virginia Polytechnic Institute and State University. Any questions about the project should be directed to:

Christina M. Rock, B.S.
Graduate Researcher
Office Phone: 231-6914

Thomas H. Ollendick, Ph.D.
Professor of Psychology
Office Phone: 231-6451

R. J. Harvey, Ph.D.
Chair, Human Subjects Committee
Office Phone: 231-4122

Ernest Stout, Ph.D.
Institutional Review Board
Office Phone: 231-9359

Appendix R
Parent Questionnaire

1. To assist us in determining the nature of family members' contribution to the reaction to blood, please specify your relationship to the participating student by circling the appropriate word. If you are other than a biological parent, please specify the number of years you have resided in the same home as this student.

Biological Step # yrs? _____
Adoptive # yrs? _____

Other relative # yrs? _____
Nature of biological relationship

2. With regard to your usual reaction to the sight of blood, where would you place yourself on this continuum (line)? Just place a vertical slash where you think you are on the line.

None at All	A Little	A Fair Amount	A Great Deal	Extreme Reaction
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3. How many times have you TOTALLY LOST CONSCIOUSNESS and fainted as a result of: seeing blood on yourself or others, having blood drawn, or seeing injuries on yourself or others? **Number** ____

If you cannot state the exact number, please estimate using the following categories.

1-5 ____ 6-10 ____ 11-20 ____ >50 ____

4. How many times have you FELT FAINT OR ALMOST LOST CONSCIOUSNESS as a result of: seeing blood on yourself or others, having blood drawn, or seeing injuries on yourself or others?
Number ____

If you cannot state the exact number, please estimate using the following categories.

1-5 ____ 6-10 ____ 11-20 ____ >50 ____

5. Have you ever felt faint or actually fainted in circumstances other than those involving blood or injury?
(Do not include unconsciousness as a result of a blow to the head, significant blood loss, severe illness.)
Yes No If YES, please give a brief description of these incidents.

If you answered "None at All" to question 2 and "0" to questions 3 & 4, you may skip questions 6-7. Please continue with question 8.

6. Please describe in detail the first time you ever fainted [felt faint] seeing blood or injury? Be sure the following points are covered.

a. age _____ b. Loss of consciousness: (Circle) **full** **partial**

c. setting (home, doctor's office, accident, etc.)

d. Who was present?

e. Was injury involved? If yes, to whom and how badly?

f. Why didn't you leave the situation?

g. Include any other details you feel are important.

h. Were you fearful prior to this incident? **Yes** **No**

If yes, on a scale of 1 (no previous fear) to 10 (extremely fearful), how fearful?

i. Have you been more fearful since this incident? **Yes** **No**

If you answered "None at all" to question 2, you may skip question 7. Please continue with question 8.

7. Describe the first time that you recall being fearful and/or avoiding the sight of blood. Be sure the following points are covered. (Next page)

If you cannot remember a specific incident, did your fear just develop gradually? **Yes** **No** Describe further if you are able.

a. age _____ b. Loss of consciousness: **full** **partial**

c. setting (home, doctor's office, accident, etc.)

d. Who was present?

e. Was injury involved? If yes, to whom and how badly?

f. Why didn't you leave the situation?

g. Include any other details you feel are important.

8. If treatment were available that could eliminate or significantly reduce your reaction to blood or injuries, would you seek that treatment?

____ Yes, at all costs.

____ Yes, if it were not too costly or time consuming.

____ No, my problem is not bad enough to justify treatment.

9. Which would be emotionally worse: (Check one)

a negative reaction to the sight of blood **alone** _____

OR

a negative reaction to the sight of blood **in front of others** _____

10. How often do you donate blood? **Never** **Sometimes** **Every time you're eligible**

11. What thoughts go through your mind when you are exposed to the sight of blood?

Next two questions are for **FEMALES ONLY**. Males go to question 14.

12. Have you ever had a negative reaction to your own menstrual blood? **Yes No**

a) What about the first time you menstruated? **Yes No**

13. Are your periods painful? (Not just uncomfortable, but painful)

Yes No

14. To the best of your knowledge, has anyone in your immediate family (parents, siblings, children, spouse) ever fainted at the sight or suggestion of blood or injury? **Yes No**

If YES, WHO? (indicate if adoptive (A), Step (S), half (1/2) where appropriate and for siblings if older (O) or younger (Y))

15. To your knowledge, has anyone in you extended (e.g. cousins, aunts) family fainted at the sight of blood? **Yes No**

If YES, list relationship and specify if maternal (m) or paternal (p) (i.e. grandmother (p), aunt (m), etc.). Indicate A or S as above.

16. To your knowledge, has anyone in your immediate or extended family significantly avoided blood or injuries in a way that was noticeable to others whenever present? **Yes No**

If YES, list relation as before.

Appendix S
Reminder to Parents

Dear Parents,

About a month ago, you should have received a questionnaire which was a follow-up to an experiment in which your son or daughter participated for extra credit for a class. We had requested that you return that questionnaire whether or not you chose to complete it. As yet, we have not received your questionnaire. It may not have ever arrived at your home or perhaps it is lost in that pile on your dining room table. Whatever the reason, enclosed you will find another copy of the packet as well as an envelope in which to return it. Please follow the instructions described on the cover letter and the consent form. Although your son or daughter's signature does not appear on the blank at the bottom of the letter, it was on the original and we do have it on file as well giving permission to contact you.

Thank you for taking the time to read the packet. Please remember to return the packet whether or not you decide to participate.

Sincerely,

Christina M. Rock
Principal Investigator

Curriculum Vita

CHRISTINA M. ROCK

Personal Information

Birthdate: August 21, 1966

Birth Place: Chicago, IL

Citizenship: U.S.

Marital Status: Single

Business Address: Department of Psychology
Virginia Polytechnic Institute and State University
Blacksburg, VA 24061-0436
(703) 231-6914

Home Address: 711 1/2 Montgomery St.
Blacksburg, VA 24060
(703) 552-7586

Education

- 1992 - Present Doctoral Program in Clinical Psychology - Child Track
Virginia Polytechnic Institute and State University
Major Professor: Thomas H. Ollendick, Ph.D.
Thesis title: The continuum of response to blood/injury stimuli as demonstrated by autonomic reactivity and affect. Anticipated date of completion of Master's degree: May 1995; Anticipated date of completion of doctoral degree: May 1997
- July 1991 Bachelor of Science
College of Charleston, Charleston, SC
Major: Psychology
Bachelor's Essay title: Hyperactivity: A result of a lack of inhibition as demonstrated by a stop signal test
Project Advisors: David Gentry, Ph.D. and Timothy Daugherty, Ph.D.
- July 1991 Bachelor of Science
College of Charleston, Charleston, SC
Major: Biology with emphasis in Marine Biology

Supervised Clinical Experience

August 1992-Present

Graduate Clinician

Psychological Services Center and Child Study Center

Virginia Polytechnic Institute and State University

Blacksburg, VA

General Practicum

Outpatient based assessment and cognitive behavioral therapy with adult and child clients.

Pathology treated includes childhood depression, emotional and physical abuse, attention deficit hyperactivity disorder, and anxiety disorders. Skills training given in areas of parenting, relaxation, and social skills. Assessment experience includes use of the following instruments: WISC-III, WAIS-R, Wechsler Individual Achievement Test, Woodcock-Johnson Psychoeducational Batteries, MMPI-2, Rorschach (Exner System), several neuropsychological tests which tap visual motor skills and numerous self-report instruments.

Supervisors:

August 1993 - May 1994 Thomas H. Ollendick, Ph.D. and Ellie Sturgis, Ph.D.

August 1992 - May 1993 George Clum, Ph.D. and Russell Jones, Ph.D.

Neuropsychology Practicum

Assessed geriatric, adult and child clients with suspected brain dysfunction using a syndrome analysis approach. Experience was received with Luria's behavioral sample, Luria's Neuropsychological Interview, Denman Memory Scale, Wisconsin Card Sort, and numerous components of the Halstead-Reitan Battery.

Supervisor:

August 1994-Present David W. Harrison, Ph.D.

Assessment Center

Performed evaluations of children with referral questions regarding ADHD and/or anxiety. The battery used for interpretation includes the WISC-III, the WAIT, Parent and Child ADIS, Posner Visual Spatial Orienting Task, Connor's Continuous Performance Test, Behavioral Inhibition Task, tests of visual-motor coordination, and numerous self and parental reports.

Supervisor:

August 1994 - Present

January 1994 - May 1994 Thomas H. Ollendick, Ph.D.

June 1994 - August 1994

Graduate Counselor

Summer Day Treatment Program

Eggleston Children's Hospital, Emory University

Atlanta, GA

Primary duty was implementing a complex token economy treatment plan, originally designed by William Pelham, with a group of 12 severely ADHD children ages 5-10. Also responsible for supervising the four undergraduate counselors working with this group and maintenance of

patient records. In addition to working with the children, a parent group was run to instruct the parents on how to implement a similar program at home.

Supervisor: Ann Abramowitz, Ph.D.

August 1993 - December 1994

School Counselor

Montgomery County Schools

Montgomery County, VA

Middle school and high school students identified as seriously emotionally disturbed seen in individual therapy. Also acted as co-facilitator of an adventure/social skills group.

Supervisors:

August 1993 - June 1994 Thomas H. Ollendick, Ph.D. and Karen Wadowsky, Ed.S.

August 1994 - January 1995 Thomas H. Ollendick, Ph.D.

January 1992 - August 1992

Clinical Assistant

Youth Division Inpatient Unit

Medical University of South Carolina

Charleston, SC

Assessment of all new patients on the unit using a structured diagnostic interview (Diagnostic Interview Schedule for Children-Parent and Child forms).

Supervisor: Floyd R. Sallee, M.D., Ph.D.

Teaching Experience

September 1993 -

Study Skills

May 1993

SAT Prep

Junior and Senior High School Students

Upward Bound Program

Virginia Polytechnic Institute and State University

August 1992 -

Introductory Psychology Recitation Sections

May 1993

Freshman/Sophomore Level Course

Department of Psychology

Virginia Polytechnic Institute and State University

Research Experience

September 1993 - Present

Thesis in progress

The purpose of this study is to investigate the effect of blood/injury stimuli in the form of a surgery film on heart rate, skin temperature, reported affect and facial expression in order to tailor treatment programs to individual reactions.

Anticipated completion date: May 1995

October 1990 - August 1992

Research Assistant

Floyd R. Sallee, M.D., Ph.D.

Institute of Psychiatry

Medical University of South Carolina

Worked part time on impulsivity project in conjunction with bachelor's essay. After completing a degree in psychology became full time in June 1991 and worked on the following projects:

- Eating disorders in middle school children
- Eating disorders in diabetic children
- Effects of pimozide and haldol on Tourette's syndrome
- Comorbidity of ADHD and Tourette's syndrome
- Development of neonatal hair test for maternal cocaine use
- Anxiety symptomology in children with unexplained syncope

Publications and Presentations

Sallee, F. R., Sethuraman, G., & Rock, C. M. (1994). Effects of pimozide on cognition in children with Tourette Syndrome: Interaction with comorbid Attention Deficit Hyperactivity Disorder. Acta Psychiatrica Scandinavica, 90, 4-9.

Childress, A. C., Rock, C. M., Oslizlok, P. A., Allen, M., & Sallee, F. R. (October, 1992). Vasodepressor syncope and anxiety: Is there a relationship? Poster presented at the 39th annual meeting of the American Academy of Child and Adolescent Psychiatry.

Childress, A. C., Brewerton, T. D., & Rock, C. M. (May, 1992). Eating pathology in diabetic children. Poster presented at 145th annual meeting of the American Psychiatric Association.

Grants

Rock, C. M. The continuum of response to blood/injury stimuli as demonstrated by autonomic reactivity, affect and family history, \$300, Graduate Research Development Program, Graduate Student Assembly, Virginia Polytechnic Institute and State University, 1993.

Professional Affiliations (as a student member)

American Psychological Association (1992)

Division 5 (1994)

Division 12 (1993)

Section 1 (1995)

Association for the Advancement of Behavior Therapy (1992)

Psi Chi Psychology Honorary Society (1991)

Other Experience

November 1987 - U. S. Coast Guard Reserve
November 1993 Boat Crew

Duties: Search and rescue, federal law enforcement, and training of new boat crew members.

April 1991 - Floor Manager
July 1992 Louis's Charleston Grill
Charleston, SC

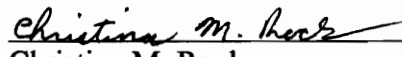
Duties: Scheduling, reservations, and supervising waiters & bus people during shifts.

August 1988 - Manager
September 1989 Domino's Pizza
Louisville, KY

Duties: Scheduling, hiring, training, payroll, bookkeeping, marketing, running shifts and ensuring customer satisfaction.

References

Available upon request.


Christina M. Rock