# THE ROLE OF DISGUST IN BLOOD-INJECTION-INJURY PHOBIA EXAMINED THROUGH THE USE OF IMPLICIT ASSOCIATION TESTS

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# CHAPTER 1

# INTRODUCTION

A specific phobia is characterized by "clinically significant anxiety provoked by exposure to a specific feared object or situation, often leading to avoidance behavior" (American Psychiatric Association, 2000, p. 429). The fear must be persistent and excessive or unreasonable. The fear is cued by either the "presence or anticipation of a specific object or situation" (American Psychiatric Association, 2000, p. 449). Upon exposure to the feared situation or object, an immediate anxiety response is provoked, such as a panic attack, rather than a delayed response. Such phobic situations or objects are avoided or endured with intense distress.

Additionally, such fears must interfere significantly with an individual's daily life or functioning, or the person must express significant distress over having the phobia. These criteria combine to make up the necessary features for a diagnosis of a specific phobia (APA, 2000). Additionally, research indicates that specific phobias are more likely to be present in an individual when a family member has a specific phobia, suggesting a genetic component to such fears (APA, 2000).

Blood-injection-injury phobia is a subtype of specific phobia characterized by marked fear cued by seeing blood or an injury, whether on oneself or on another individual, receiving an injection, or having to endure any other type of invasive medical procedure (APA, 2000). Similar to other specific phobias, sufferers exhibit intense and irrational fears of situations involving blood, injections, injury, or mutilation (Olatunji et al., 2008; Page, 1994; Schienle et al., 2005).

Since the fear must impair the individual's functioning in order to be considered a specific phobia, it is important to note that many blood-injection-injury phobics (BIIP) will even avoid potentially life-saving medical procedures because of their specific phobia, which can have detrimental effects on physical health (APA, 2000). BIIP are also less likely to seek help than individuals with other specific phobias, due to their avoidance of medical settings (APA, 2000).

A differentiating quality of BIIP from individuals with other specific phobias is the occurrence of fainting in the presence of BII stimuli or in situations where the stimuli may be present (APA, 2000). This "emotional fainting" is referred to as vasovagal syncope, a characteristic of BII Phobia (Page, 1994; Schienle et al., 2005). Physiologically, vasovagal syncope occurs due to an initial increase in both heart rate and blood pressure followed by a rapid decrease in both measures (APA, 2000; Page, 1994; Schienle et al., 2005). Research indicates that the majority of BII phobics report experiencing vasovagal syncope at least once throughout their lives (Page, 1994; Schienle et al., 2005). Additionally, the tendency to faint has been shown to be more highly heritable than fear (Page, 1994). A study examining the role of genetics in BII phobia found that there is slightly greater heritability of the phobia in females than in males (Kendler et al., 2002). In addition, studies have shown that of individuals with BII phobia, females are more likely to report fainting in the presence of BII stimuli than are males (Kleinknecht, 1987).

In terms of behavioral approaches, conditioning has been suggested as a possible contributing factor in the development of BII phobia (Fyer, 1998; Mineka & Zinbarg, 1996). Conditioning Theory posits that an individual can develop a specific phobia to a neutral situation or object when they experience anxiety during the encounter with the situation or object (Barlow, 2002). This theory is based on the model of classical conditioning proposed by Watson in the 1920s (Fyer, 1998). In Conditioning Theory, the individual learns to associate the situation or object with the anxiety and thus avoids the situations they believe produce such anxiety. This fear and avoidance behavior is characteristic of a specific phobia.

However, Conditioning Theory, while demonstrating face validity, has been shown to lack certain consistencies between phobias conditioned in a laboratory and phobias developed in the real world. For instance, Fyer (1998) claims that one such flaw is that when individuals with a specific phobia are interviewed, they often cannot recall a specific conditioning event, perhaps indicating that such an event did not occur; or at the very least, they cannot remember such an event. Additionally, even when the definition of a specific conditioning event was expanded to include learning through observation or verbal report, individuals with a specific phobia were not able to recall such an event. Of course it is possible that individuals do not remember such an event due to repression or simple forgetting, especially if the event occurred early in childhood. Contrasting data, however, makes it difficult to be sure that conditioning theory is not accurate. Ost (1991) found that when asked, the majority (52%) of individuals with BII phobia attributed the onset of their symptoms to conditioning experiences, such as fainting while receiving an injection and 24% attributed their phobia to vicarious experiences.

A second limitation of Conditioning Theory, according to Fyer (1998), is that a small number of nonrandomly distributed stimuli account for the majority human phobias (Fyer, 1998). For instance, heights, spiders, blood, enclosed spaces, and flying are very common phobias. If conditioning were the cause of all acquired fears, there should not be a specific set of stimuli that account for the phobias—there should be a random set of phobic stimuli based on conditioning events in each individual's unique experience. For example, there are significantly more individuals with a phobia of spiders than a phobia of electricity, even though many people have had negative experiences with shocks. Since the stimuli are not randomly distributed, it is likely that the phobic stimuli all possess some trait that contributes to their phobic qualities. Seligman's Preparedness Theory seeks to address this phenomenon and will be addressed following the conclusion of the behavioral etiology of BII phobia (Seligman, 1971).

Third, many individuals encounter aversive stimuli each day and have negative experiences with such stimuli, yet they do not develop a phobia from such encounters, so acquiring a fear from conditioning may be too simplistic of an explanation. Finally, specific phobias are easier to extinguish in a laboratory setting where they were conditioned than in the real world; this is due to the fact that conditioning a fear in the lab is controlled and can be extinguished in exactly the same way it was conditioned, whereas many factors can go into conditioning a phobia in the real world, so multiple contributing factors make it more difficult to extinguish.

From an evolutionary and learning perspective, Seligman's Preparedness Theory addresses why a small and nonrandomly distributed set of stimuli make up most specific phobias. Seligman proposes that certain associations are learned more readily than others because they are adaptive and related to survival (Seligman, 1971). For instance, it is easier to acquire a fear of heights or spiders, because both are potentially dangerous and life threatening, than to acquire a fear of rabbits. Seligman posits that, from an evolutionary standpoint, it is beneficial for survival that dangerous situations and objects are the easiest fears to acquire.

This indicates that there is more involved in the acquisition of a specific phobia than merely conditioning. In addition to the evolutionary component, this might be due, in part, to the cognitive component of a specific phobia. That is, phobics are engaging in faulty information-processing which cannot be corrected by only behavioral treatment.

## Cognitive-Behavioral Models of Anxiety

A cognitive model suggests that schemas, or mental structures, that represent certain aspects of the world, influence information processing. In order for psychopathology to occur, there must be some type of faulty information processing (Beck & Clark, 1997; Salkovskis & Rachman, 1997). The cognitive model has often been applied to both depression (Salkovskis & Rachman, 1997) and anxiety (Beck & Clark, 1997; Salkovskis & Rachman, 1997; Teachman & Woody, 2003). Cognitive models of anxiety are commonly used to understand the processes that underlie anxiety and anxiety responses (Salkovskis & Rachman, 1997; Teachman & Woody, 2003).

Relative to anxiety, cognitive theory suggests that maladaptive schemas influence information processing making an individual more attuned to potentially threatening cues, more likely to interpret ambiguous cues as threatening, and more likely to recall cues relevant to their cognitive fear schema (Beck & Clark, 1997; Teachman et al., 2001).

Through the active selection of particular cues to interpret, an individual preoccupied with a particular phobia will be more likely to search out and notice potentially threatening cues in the environment (Salkovskis & Rachman, 1997; Teachman et al., 2001). Individuals with a specific phobia are likely to have cognitions that contain maladaptive beliefs. Such beliefs typically focus on physical or psychological threats that result from the feared stimuli (Salkovskis & Rachman, 1997). Such fear schemas continually reinforce anxiety, and symptoms cannot easily be ameliorated without a change in the fear schema (Teachman & Woody, 2003).

The main assumption of the Cognitive Model is that faulty cognitions mediate both affect and behavior (Salkovskis & Rachman, 1997). A related assumption is that cognitive change is necessary and essential to produce meaningful therapeutic change (Salkovskis & Rachman, 1997), indicating that an individual with a specific phobia cannot experience improvement in symptoms while maintaining schemas that continually reinforce anxiety (Teachman & Woody, 2003), which can occur in the context of behavioral interventions because the maladaptive schemas are not addressed.

In relation to specific phobias, the fear schema is typically the active maladaptive cognitive schema. Beck and Emery (1985) propose that a sense of vulnerability, a sense the individual has that they are subject to harm from external dangers, is primary in individuals with a specific phobia and other anxiety disorders in general. Due to these concerns about potential danger, a person with specific phobia would interpret a stimulus in a biased manner and therefore falsely interpret benign stimuli as threatening or at the least overestimate danger and harm.

What is common to both a behavioral and cognitive model of specific phobia is that fear is the primary underlying factor in the development of the disorder. However, it has recently been postulated that disgust schemas may play the bigger role in the development and maintenance of BII phobia (Olatunji et al., 2008; Olatunji et al., 2007; Schniele et al., 2005; Tolin, 1999).

Etiology of Specific Phobia: Fear Versus Disgust

Fear has been postulated to be an entirely distinct emotion from disgust. Fear is believed to be associated with sympathetic arousal such as increased heart rate, increased blood pressure, accelerated respiration, and sweating, while disgust is associated with parasympathetic activation, characterized by decreased heart rate, reduced skin temperature, and reduced salivation (Tolin, 1999). Fear functions to facilitate escape from potentially harmful stimuli, while disgust serves to prevent contact with or oral incorporation of an undesirable stimulus (Tolin, 1999). Additionally, different facial expressions are associated with each emotion (Schienle et al., 2005; Tolin, 1999).

Disgust is a fundamental emotion that has been defined as "revulsion at the prospect of (oral) incorporation of an offensive object" (Page, 1994), and such disgust sensitivity can protect omnivores from the risk of poisoning because of the fear of contamination (Schienle et al., 2005). For this reason, the emotion of disgust is often considered adaptive. Two types of disgust have been examined in the BII literature: animal reminder disgust and core disgust. Animal reminder disgust is disgust associated with blood, injuries, bodily punctures and mutilations, while core disgust is disgust associated specifically with small animals, such as a spider or snake, food, and body products, such as feces or urine (Olatunji et al., 2008). In relation to BII phobia, animal reminder disgust is the most commonly examined type because it relates to blood and injuries.

Gerlach et al. (2006) investigated the role of disgust and fear in BII phobics through both self-report and physiological measures. Participants underwent venipuncture, or blood drawn through a needle on the arm, and were asked to self-report their level of anxiety, disgust, and embarrassment. Heart rate and respiration were taken during the procedure. Results indicated that fear emerged as the dominant emotion in response to venipuncture, as indicated by increased respiration and heart rate. In addition, participants self-reported increased levels of anxiety when exposed to venipuncture. However, individuals also self-reported increased levels of disgust when exposed to such stimuli. In terms of their physiological responses, fear emerged as the dominant emotion in this set of phobic participants. No evidence of the physiological experience of disgust emerged based on the respiration rate and heart rate of participants.

Olatunji et al. (2007) compared responses between a group of BIIP and non-phobic individuals (NP) after exposure to BII-related pictorial stimuli that contained images of blood, mutilation, and injections. The results revealed that BII phobics reported significantly more contamination fears, that is, fears of being dirtied or contaminated by the stimuli presented, than NP participants, even when anxiety was controlled for. These contamination fears, although considered fears, also relate to disgust. The emotion of disgust functions to prevent contact with an undesirable stimulus (Tolin, 1999), or to prevent contamination from an undesirable stimulus; thus, fear of contamination plays a similar role to disgust. Additionally BIIP self-report significantly more fear on all affective dimensions than NP participants to BII-related stimuli, exemplifying the important role of fear in this particular specific phobia. BIIP also self-reported significantly more disgust than NP participants.

Empirical Evidence of the Influence of Disgust

The role of disgust in BII phobia has been examined in recent research. A study conducted by Koch et al. (2002) required participants to engage in Behavioral Avoidance Tasks (BAT) after being exposed to a variety of stimuli, which included a cockroach, a worm, bloody gauze, and a severed deer leg—the first two being core disgust and the second two being animal reminder disgust elicitors. Results indicated that when directly comparing the fear and disgust responses among BII phobics, disgust emerged as the dominant emotional reaction across each of the BII stimuli because higher reported disgust correlated most strongly with avoidance on the BAT. Additionally, NP participants demonstrated less behavioral avoidance than BIIP overall.

Olatunji et al. (2008) administered a BAT in which participants who were categorized as either BII-fearful or NP were exposed to a severed deer leg with fur and hoof intact, an animal reminder disgust elicitor, and a live tarantula, a core disgust elicitor. They were also asked to engage in a contaminated cookie task. The contaminated cookie task asks participants to touch with their finger, touch to their lips, and ultimately take a bite of a cookie that has been "contaminated" because it has come into contact with a particular object—in this case, a severed deer leg or live tarantula. Individuals that reported high levels of disgust, evidenced by high scores on the Disgust Emotion Scale (DES; Kleinknecht et al., 1997), were more likely to engage in behavioral avoidance of the stimuli than those who scored lower on the DES. Additionally, participants who were categorized as BII-fearful demonstrated higher levels of fainting responses than NP participants to the deer leg. This indicates that the emotion of disgust influences behavioral avoidance of certain disgust-eliciting objects. Such results bring into question the possibility that fear might not play the dominant role in the development of the specific phobia Blood-Injection-Injury subtype, as do several other studies (de Jong & Merckelbach, 1998; Olatunji, Lohr, Sawchuk, & Patten, 2007; Teachman & Saporito, 2008).

Other studies have also examined levels of self-reported disgust in relation to BII phobia (de Jong & Merckelbach, 1998; Olatunji, Lohr, Sawchuk, & Patten, 2007; Teachman & Saporito, 2008). Olatunji, Lohr, Sawchuk, and Patten (2007) had participants who were categorized as either BII phobic or NP, based on their scores from the *Injection Phobia Scale-Anxiety (IPS-A)*, complete the Disgust Emotion Scale (DES; Kleinknecht et al., 1997). Results demonstrated that BII-fearful individuals self-reported significantly higher levels of disgust than NP participants, indicating a correlation between self-reported levels of disgust and categorization as BII phobic; no fear measure was included.

Additionally, de Jong and Merckelbach (1998) found that the relationship between BII phobia and high disgust sensitivity was present and domain-specific. Regarding the domain specificity of disgust, BII phobia and fear was related to increased self-reported levels of animal-reminder disgust. Additionally, high levels of disgust sensitivity, as measured by the Disgust Questionnaire (DQ; de Jong & Merkelbach, 1997), were significantly correlated with high scores on the Blood-Injury Phobia

Questionnaire (BIQ; de Jong & Merkelbach, 1997), indicating a self-report relationship between BII phobia and disgust sensitivity.

Teachman and Saporito (2008) conducted a study that demonstrated that disgust cognitions are more frequent in BII phobic participants when they are exposed to a surgical video than in spider-phobic participants, though there was no direct comparison to fear that occurred in the study. The researchers employed a Disgust Cognitions Scale that was designed to assess both primary and secondary disgust cognitions, or appraisals—primary cognitions being those associated with threat of contamination as part of the disgust response and secondary cognitions being those associated with beliefs about the consequences the individual perceives can occur from contact with such stimuli. Participants were exposed to a surgery video, a cookie shaped like feces, a spider, and a task where they were asked to stand in front of a mirror and give an unplanned speech, which was a control task that was supposed to elicit some fear but minimal disgust. The data indicated that disgust cognitions are predictive of phobic responding, meaning that disgust cognitions correlate with questionnaire measures of phobic symptoms and self-reported subjective distress while interacting with phobic stimuli, across participants and tasks. Although both primary and secondary appraisal disgust cognitions predict behavioral avoidance and correlate with the respective specific phobia, primary appraisals appear to be the stronger predictor of behavioral avoidance (Teachman & Saporito, 2008).

Schienle and colleagues (2005) asked participants to engage in a conditioning experiment in which participants were exposed to picture pairs. The first picture was affectively neutral (and was considered the CS) and the second picture consisted of disgust-inducing, fear-inducing, pleasant, or neutral images (and were considered the UCS). While participants were exposed to these images, an electromyogram (EMG) was used to record facial expressions characteristic of disgust. The EMG demonstrated that participants with BII phobia learned disgust responses to the conditioned neutral stimulus faster than non-phobic controls, indicating that BII phobics are able to associate disgust with stimuli more easily than NPs.

No studies have been conducted on BII phobia that examine schemas and other maladaptive cognitions through the use of an Implicit Association Test, a unique contribution of this study. The current study will directly test the cognitive model of anxiety, which no other study has done. The examination of schemata and maladaptive cognitions in a study examining the role of disgust in BII phobia would allow for a greater understanding of the cognitive processes which underlie BII phobia, or more specifically, the primary emotion which underlies BII phobia.

## Implicit Association Tests

Schemas are believed to exert an automatic influence on cognitive process, and consequently behavior. As described above, the principle schema in operation for BII phobics is traditionally thought to be the fear schema, though the current study will seek to identify whether the fear schema or disgust schema exerts the greater influence over automatic processes in BII phobics. Maladaptive schemas can be measured empirically using an Implicit Association Test (IAT). The IAT allows for the empirical measurement of the schema using reaction time tasks to measure associations.

The most important underlying assumption for the use of IATs is that processing speed, or response latency, is an indirect measure of the degree of association between two concepts. The response latency with which an individual links two concepts is thought to reflect how strongly associated the two concepts are in memory, or in other words, a reflection of the schema present in their memory (Teachman et al., 2001). That is, pairings of concepts that are closely related, or connected, should have fast reaction times when paired. Pairings that are not connected in memory should have slower reaction times, or response speeds, because the associations require the individual to override previous associations that have been reinforced and solidified over time.

The benefit of using an IAT is that it allows for a more objective exploration of schemas and the role specific schemas play in phobias. This would be a preferred method of schema investigation over having a participant engage in introspection, common in the use of self-report measures (Teachman & Woody, 2003). Additionally, the IAT has been shown to have good internal consistency, adequate stability, and is not easily fakable, even when participants are given the instruction to produce a particular response (Egloff & Schmukle, 2002).

A clear gap in the literature occurs for BII phobia and IATs. There has been no research conducted which examines the role that disgust and fear play in BII phobia through an IAT lens, a unique contribution of the current study. There are a variety of studies that support fear as the primary emotion in BIIP in addition to studies that demonstrate disgust as an important contributor to BIIP. However, there are no studies that directly compare the cognitions underlying such emotions, which this study did.

Hypotheses and Purpose of Current Study

The current study sought to identify the role of disgust in BII phobia through the use of an IAT. My prediction was that all participants would exhibit the fastest response latencies for the matched pairings of target and descriptor categories (i.e., "disgusting OR mutilation" and "afraid OR mutilation"). I hypothesized that BIIP participants would more quickly associate mutilation stimuli with the negative descriptor of disgust, rather than afraid. Non-phobics were expected to have no significant differences in response latencies between fear and disgust. I also predicted that BIIP individuals would more quickly associate mutilation stimuli with negative descriptors (afraid, disgusting) than non-phobics.

## CHAPTER 2

## METHODS

Participants

Participants in the study consisted of 24 BII fearful or phobic individuals and 21 non-phobic controls (9 males and 36 females). In the BIIP group, there was one male and 23 females. In the NP group, there were 8 males and 13 females. Participants were given the *Mutilation Questionnaire* (MQ), a common tool in assessing BII phobia, in order to categorize them into either the BII phobic or non-phobic group (Kleinknecht & Thorndike, 1990; Koch et al., 2002). Specifically, participants scoring nine or higher on the MQ were categorized as BII fearful or phobic and those scoring an eight or lower were categorized as NPs, a method employed by Koch at al. (2002) and Olatunji et al. (2008).

Measures

*Demographics Questionnaire*. The Demographics Questionnaire was created by the researcher to assess participant's sex, age, and ethnicity.

*Mutilation Questionnaire* (MQ; Kleinknecht & Thorndike, 1990). The MQ contains 30 true-false items, which are designed to determine one's level of fear and occurrence of fainting. Higher scores indicate increased BII symptomatology. Participants scoring a nine or higher on the MQ were classified as BII-fearful and those scoring an eight or lower were categorized as controls (Koch et al., 2002; Olatunji et al., 2008). The average score for BIIP was 23.09 (with a standard deviation of 3.76). Whereas, for NP it was 8.25 (with a standard deviation of 4.30; Schienle et al., 2005). The MQ has been shown to have internal consistency (K-R20) coefficients ranging from 0.75 to 0.85 (Kleinknecht & Thorndike, 1990). In the current study, the MQ had an internal consistency coefficient of 0.75. Additionally, internal consistency coefficients on each subscale were calculated by the researcher. For the Medical Procedures Subscale, the Cronbach's $\alpha$=0.70. For the Sharp Objects Subscale, the Cronbach's $\alpha$=0.52. For the Injection/Blood Draw Subscale, the Cronbach's $\alpha$=0.68. Finally, for the Injury/Mutilation Subscale, the Cronbach's $\alpha$=0.78. The Cronbach's alpha was calculated for each subscale, because it was important to the researcher to insure that the Injury/Mutilation Subscale had a strong, positive correlation with total scores on the MQ since mutilation images were used in the study. Sharp objects were not used in the study, so that subscale and particular items were not of as much interest, nor were the Medical Procedures and Injection/Blood Draw Subscales.

*Disgust Scale* (DS; Haidt, McCauley, & Rozin, 1994). The Disgust Scale, a 32-item questionnaire that is a trait measure, was developed to measure the individual differences in sensitivity to disgust. Items represent several different categories of disgust including animals, body envelope violations, death, food, hygiene, sympathetic magic, and sex (Haidt et al., 1994; Olatunji et al., 2007). Cronbach's alpha for the DS in the present study was .83. The alpha was important to include because the measure contains several subscales, each targeting a variety of disgust elicitors, so observing that the alpha demonstrated a strong, positive correlation means that all the items are consistent in assessing a similar construct. One item of the DS that related to homosexuality was removed as required by the American University Institutional Review Board.

*Beck Depression Inventory—Second Edition* (BDI-II; Beck et al., 1996). The BDI-II contains 21 items that assess both affective and somatic symptoms for Major Depressive Disorder. When the BDI-II was examined in a population of college students, the Cronbach's alpha was .90 (Storch et al., 2004). Cronbach's alpha which was .74, indicating that the measure what reliable. This measure was included to exclude any participants that score as moderate to severely depressed according to the inventory since one of the symptoms of depression is psychomotor retardation. Slower response times of such participants would influence the data due to their depressive state instead of BII phobia or non-phobia. No participants were excluded from the study.

*Implicit Association Test* (Teachman et al., 2001). Consistent with the procedure of Teachman et al. (2001), two sets of opposing descriptive categories were used for the IAT: afraid-unafraid and disgusting-appealing. The current study used mutilation images from research conducted by Connolly et al. (2006). The images depict injuries to arms, legs, feet, and hands. No faces are contained in any of the images. The neutral stimuli, which consist of various flowers were selected from the International Affective Picture System (IAPS; Lang et al., 2008). Ten pictures were used for each of the two categories—mutilation and flowers.

Mutilation images were selected because they were used in a previous study by Connolly et al. (2006) and were balanced and pre-rated such that all stimuli elicited approximately equal amounts of fear and disgust among a random sample of students. Word stimuli were borrowed from a study conducted by Teachman et al. (2001). The

IAT task requires participants to classify words into superordinate categories. That is, participants are asked to categorize a word, such as "gross," as either "disgusting" or "appealing"—the latter two words being the superordinate categories.

Response latencies in milliseconds were recorded for each of the two trials. The two categories were: "afraid-unafraid" and "disgusting-appealing." Therefore, the measure of interest is the difference between response latency when matching categories (e.g., "mutilation and disgust") are paired versus response latency when non-matching categories are paired (e.g., "mutilation and appealing"; Teachman et al., 2001).

Procedure

Participants were recruited through undergraduate psychology classes at American University and a flier that was posted outside of the Psychology Department office. Those interested in participating in the study contacted the experimenter by calling or emailing the experimenter with the information provided on the poster or to the class. The experimenter then followed-up with each person to determine if they were eligible to participate in the study by asking them to complete an online version of the *Mutilation Questionnaire* in addition to an online version of the *Beck Depression Inventory-II*, which were both posted on the "Survey Monkey" website. The individual completed each survey by following the link that was provided to them by the researcher through email. The informed consent was posted online and participants were required to type in their name in order to participate and complete the survey. If an individual was deemed to qualify for the experiment based on their *Mutilation Questionnaire* scores and their *BDI-II* scores, they were be invited to the Anxiety Disorders Research Lab to participate.

Participants came to the lab to engage in the IAT anywhere from 2 days after completing the online questionnaires to 2 weeks after completing the questionnaires.

Once the participant arrived at the Anxiety Disorders Research Lab, they were asked to read and sign the informed consent if they were willing to participate in the study.

The computer portion of the study contained two parts: Disgust and Fear. The order in which participants received the parts was randomly assigned. In general, an IAT requires participants to categorize stimuli, whether the stimuli are an image or word, into two overarching categories. Words to be classified that belong to the categories of fear or disgust, respectively, are listed in Table 1.

Table 1
*Descriptor Categories and Associated Stimuli to be Classified in the IAT*

| Descriptor category label | | Stimuli to be classified | |
|---|---|---|---|
| Disgusting | Gross | Repulsive | Sickening |
| Appealing | Tasty | Attractive | Tempting |
| Afraid | Scared | Frightened | Alarmed |
| Unafraid | Calm | Relaxed | Tranquil |

A description of what each individual participant encounters during the IAT follows: The instructions on the first screen the participant encounters tell them to place their left hand index finger on the "e" key and their right hand index finger on the "i" key. The participant is instructed that two superordinate, or overarching, categories will appear on the screen—one in the upper left corner of the screen, and one in the upper right corner of the screen. For example, for the "disgusting-appealing" section of the disgusting trial, instructions on the screen will tell the participant that the word "disgusting" will appear in the upper left corner of the screen and the word "appealing" will appear in the upper right corner of the screen. They are also told that words will flash in the center of the screen, and these words must be sorted into one of the two categories. Participants are told to press the "e" key to indicate that the word that flashes up in the center of the screen belongs to the category in the upper left corner and to press the "i" key if the word that flashes up belongs to the "appealing" category in the upper right corner of the screen. For example, if the word that flashes up in the center of the screen is "gross," the participant would press the "e" key to indicate that the word "gross" belongs to the "disgusting" category. A word such as "tasty" should be placed into the "appealing" category, and the participant must press the "i" key to indicate that category. Once the participant presses the "e" or "i" key, a new word or image appears on the screen immediately, to be sorted again. If the participant presses the incorrect key, a red "X" flashes on the screen, and they are instructed to immediately press the correct key in order to move on. Three words belong to the "disgusting" category and three words belong to the "appealing" category, and during the first section of the first trial, participants categorize each word into the appropriate category; therefore, it is assumed that the participants already know or have learned to which category each word belongs and can use that information in later sections of the disgusting trial.

The second section of the first trial asks participants to categorize images into two categories: "mutilation" or "flowers." Again, the instructions are given that when an image appears on the screen, if the image belongs to the word in the upper left corner of the screen, "mutilation," for example, then the participant should press the "e" key. If the image belongs to the category in the upper right hand corner the screen, "flowers," then the participant should press the "i" key, indicating that the picture belongs in that category. After participants go through this section and are exposed to each image belonging to either the "mutilation" or "flower" category, and correctly place each image in the correct category, it is assumed that the participant understands to which category each belongs. These are not meant to be difficult to categorize, as it is quite obvious to which category each image belongs.

The third section of this trial asks participants to categorize images or words into a combination of the first two categories. For instance, in the upper left hand corner of the screen, the words "disgusting OR mutilation" will appear. In the upper right hand corner of the screen, the words "appealing OR flowers" will appear. Again, the instructions are given that participants should sort the word or image that appears into the appropriate category, which they learned in the previous two sections, using the "e" and "i" keys, representing the upper left corner and upper right corner of the screen respectively. This trial is considered to be a "matched pairs" trial because "disgusting OR mutilation" are thought to be more closely related, or matched, than "appealing OR mutilation."

The fourth section of this trial asks participants to again engage in categorizing images into either the "mutilation" category or "flower" category, but this time, the placement of the categories on the screen is reversed.

The final section of this first "disgusting-appealing" trial asks participants to sort words and images, the same words and images from the previous trials, into two categories: "disgusting OR flowers" and "appealing OR mutilation." This section is asking participants to sort the words and images into categories of non-matched pairs, and has been shown to be more difficult than the third section of the first trial.

Response latencies are recorded for the third section of the first trial and the fifth section of the first trial. These are the only response latencies of interest, because they are measuring the relatedness of the concepts in question. The response latencies are recorded. The assumption is that the shortest response latency should indicate the implicit attitudes toward the stimuli.

The trial "afraid-unafraid" is conducted in the same manner as the trial described above, with the use of the category "afraid" in place of "disgusting" and "unafraid" in the place of "appealing." Words that belong to the category "afraid," such as "scary," are used in place of the "disgusting" words. Images used in this trial are the same images used previously. Response latencies are recorded and averaged for the third and fifth sections.

Once the IAT was completed, the participant was given a packet of questionnaires containing the DS and the brief demographics questionnaire. Upon completion of the packet of two questionnaires, the participant was given a debriefing form and class credit for participation or $5.00.

CHAPTER 3

RESULTS

All participants were American University students (see Table 2). The majority of participants identified themselves as Caucasian (75.6%), female (77.8%), and were approximately 20 years old.

Table 2
*Demographic Information*

| | Phobics | | Non-phobics | |
|---|---|---|---|---|
| Gender | | | | |
| Male | $1^a$ | | $8^b$ | |
| Female | $23^a$ | | $13^b$ | |
| Ethnicity | | | | |
| Caucasian | 15 | | 19 | |
| African-American | 1 | | 1 | |
| Asian/Pacific Islander | 4 | | 0 | |
| Hispanic | 3 | | 0 | |
| Other | 1 | | 1 | |
| | $\bar{x}$ | *sd* | $\bar{x}$ | *sd* |
| Age | 20.29 | 3.86 | 19.90 | 1.81 |
| BDI-II | 7.83 | 5.33 | 5.94 | 4.04 |
| Mutilation Questionnaire | $16.79^a$ | 4.71 | $5.28^b$ | 1.84 |
| Disgust Scale | $19.12^a$ | 5.06 | $13.78^b$ | 3.97 |

*Note.* Different superscripts indicate significant difference between groups.

A chi-square test was used to determine whether or not there was a significant difference in the gender distribution between phobics and non-phobics. The chi-square calculation demonstrated that there was indeed a significant difference in gender distribution between phobics and non-phobics, $x^2(1)=8.06$, $p=.004$. An additional chi-square was computed to determine whether or not there was a significant difference in the ethnicity distribution between phobics and non-phobics. Specifically, categories were combined so as to compare the distribution between phobics and NPs for Caucasian versus other. There was a significant difference in ethnicity distribution between BIIP and NPs, $x^2(1)=4.75$, $p=.029$.

An independent samples t-test was computed to determine whether or not there was a significant difference in BDI scores between phobics and non-phobics, which indicated that there is no significant difference between groups, $t(43)=-1.32$, $p=.195$. A separate independent samples t-test on age indicated no significant difference between phobics and non-phobics, $t(43)=-.420$, $p=.677$.

A MANOVA was conducted on MQ and DS scores in order to determine if scores on the MQ and DS varied with respect to the independent variable (status as a phobic or non-phobic). The results from the MANOVA indicated a significant difference between phobics and NPs, $F(2,42)=60.78$, $p=.000$. When ANOVAs were performed on the DS and MQ separately, it was found that phobics scored significantly higher than non-phobics on the MQ, $F(1,43)=109.88$, $p=.000$, and DS, $F(1,43)=15.14$, $p=.000$. For the MQ, the Cohen's *d* was 3.22 with an effect size $r=.85$, indicating a large effect size. For the DS, the Cohen's *d* was 1.17 with an effect size of $r=.51$, indicating a moderate effect size.

Four mean reaction times were then calculated for each participant: "afraid OR mutilation" (referred to as reaction time afraid matched pair [RTAm]), "afraid OR flowers" (referred to as reaction time afraid non-matched pair [RTAn]), "disgusting OR mutilation" (referred to as reaction time disgust matched pair [RTDm]), and "disgusting OR flowers" (referred to as reaction time disgust non-matched pair [RTDn]). Reaction times are depicted in Table 3.

## Manipulation Check

Matched pairs are expected to be easier to categorize than non-matched pairs. To check that this was the case, mean reaction times for matched pairs of afraid were compared across all participants—collapsed across groups (see Table 3). As predicted, when a paired samples t-test was conducted, results demonstrated that participants responded faster to matched pairs of afraid-mutilation than to non-matched pairs of afraid-flowers, $t(44)=5.92$, $p=.000$, with a Cohen's $d$ of 0.62 and an effect size $r=.30$, indicating a moderate effect size. Participants also responded significantly faster to matched pairs of disgusting-mutilation than to non-matched pairing of disgusting-flowers, $t(44)=9.35$, $p=.000$, with a Cohen's $d$ of .99 and an effect size $r=.45$, indicating a moderate effect size.

Table 3
*IAT Reaction Times Collapsed Across Groups*

| Disgust | $\bar{x}$ | *sd* |
|---|---|---|
| Matched pairs (RTDm) | 679.58[a] | 227.79 |
| Non-matched pairs (RTDn) | 926.51[b] | 267.44 |

| | | |
|---|---|---|
| Afraid | | |
| Matched pairs (RTAm) | 751.31[a] | 304.23 |
| Non-matched pairs (RTAn) | 946.86[b] | 324.11 |

*Note.* All reaction times are in milliseconds.
Superscripts denote a significant difference in reaction times.

Paired samples t-tests were again conducted for each group to compare non-matched pairs and matched pairs for both afraid and disgusting. As shown in Table 4, BIIP participants demonstrated significantly faster reaction times to matched pairs of afraid-mutilation than non-matched pairs of afraid-mutilation, $t(23)=-3.67$, $p=.001$, with a Cohen's $d$ of 0.49, and an effect size $r=.24$, indicating a weak effect size. In addition, BIIP participants demonstrated significantly faster reaction times to matched pairs of disgusting-mutilation than non-matched pairs of disgusting-mutilation, $t(23)=8.13$, $p=.000$, with a Cohen's $d$ of .99 and an effect size $r=.45$, indicating a moderate effect size.

As expected, non-phobic participants also demonstrated significantly faster reaction times to matched pairs of afraid-mutilation than non-matched pairs of afraid-mutilation, $t(20)=4.85$, $p=.000$ (Cohen's $d=1.14$; effect size $r=.50$, indicating a moderate effect size) and to matched pairs of disgusting-mutilation than non-matched pairs of disgusting-mutilation, $t(20)=5.26$, $p=.000$ (Cohen's $d=1.03$; effect size $r=.46$, indicating a moderate effect size). This indicates that in each group (phobic and non-phobic) participants respond the fastest, or have the strongest implicit associations, between matched pairs (afraid-mutilation and disgusting-mutilation) than non-matched pairs (unafraid-mutilation and appealing-mutilation). Again, these results also demonstrate that the IAT is effective in distinguishing between matched pairs and non-matched pairs based on reaction time.

Hypothesis 1

The first hypothesis predicted that BIIP individuals would more quickly associate mutilation stimuli with negative descriptors (disgusting, afraid) than NPs. To investigate the first hypothesis, an independent samples t-test was computed. In terms of disgust, the hypothesis was not supported (see Table 4). There was no significant difference in mean reaction times for matched pairs of disgusting-mutilation between BIIP individuals and NPs, $t(43)=-1.159$, $p=.253$. In terms of fear, the hypothesis was also not supported, as NPs were significantly faster responders to matched pairs of afraid-mutilation than BIIP, $t(43)=-2.097$, $p=.042$. The Cohen's *d* for this calculation was 0.64 with an effect size $r=.31$, which is a small effect size.

Table 4
*IAT Reaction Times*

| | | BIIP | | NP | |
|---|---|---|---|---|---|
| Disgust | | $\bar{x}$ | *sd* | $\bar{x}$ | *sd* |
| | Matched pairs (RTDm) | 716.24[1] | 233.45 | 637.68 | 219.08 |
| | Non-matched pairs (RTDn) | 981.72 | 296.90 | 863.42 | 219.43 |
| Afraid | | | | | |
| | Matched pairs (RTAm) | 837.03[a2] | 381.61 | 653.34[b] | 131.56 |
| | Non-matched pairs (RTAn) | 1019.04 | 363.85 | 864.37 | 225.84 |

*Note.* All reaction times are in milliseconds.
Superscripts denote a significant difference between reaction times.

Hypothesis 2

The second hypothesis predicted that BIIP participants would more quickly associate mutilation stimuli with the negative descriptor of disgust rather than afraid. To examine this hypothesis, a paired samples t-test was conducted. Although not significant at the $p$=.05 level, BIIP did have faster reaction times to matched pairs of disgusting-mutilation than matched pairs of afraid-mutilation, $t(23)$=2.02, $p$=.055, demonstrating support for the hypothesis. The researcher also conducted an effect size calculation, which in this case, was a Cohen's $d$ because the data came from a paired-samples t-test. The effect size calculation produced a Cohen's $d$ of 0.38 and an effect size $r$=.19, which is considered a small effect size. Additionally, the researcher conducted a linear regression. Reaction time for matched-pairs of disgusting-mutilation was the dependent variable and gender, DS score, and MQ score were the three predictor variables. The regression produced a nearly significant relationship between the variables, $F(3,41)$=2.67, $p$=.060. Results indicated that MQ score was the only significant predictor when controlling for gender ($t$=2.27, $p$=.028), and that gender was not significant ($t$=-1.89, $p$=.065). These results indicate that because BIIP individuals respond with faster reaction times to pairings of disgusting-mutilation than afraid-mutilation, the concepts of mutilation and disgust are more closely related in their cognitive network than afraid and mutilation.

For non-phobic participants, a paired samples t-test was conducted to determine whether or not there is a significant difference in reaction time between matched pairs of disgusting-mutilation and afraid-mutilation. Results indicated that there was no significant difference in reaction time between matched pairs of disgusting-mutilation and afraid-mutilation for NP participants, $t(20)=.47$, $p=.64$, which supported the researcher's hypothesis.

## CHAPTER 4

## DISCUSSION

Support for the hypothesis, that BIIP individuals will associate disgust more closely with mutilation than fear and that NP would not demonstrate the same difference, was obtained. Disgust began to emerge as the dominant emotion present for BIIP participants when exposed to images of mutilation during an IAT. Although not significant at the $p$=.05 level, the difference was approaching significance, with a *p-value* of .055, and a Cohen's $d$ of .38 and an effect size $r$=.19, which is considered a small effect size. This suggests that individuals who are BII-fearful have the concept of disgust more closely related to mutilation stimuli than the concept of fear in their cognitive network.

Perhaps it did not reach significance at the .05 level because, on average, the individuals who were categorized as BII phobics were not severe enough phobics. Schienle et al. (2005) reported that the average score on the MQ for BII phobics as 23.09, which is somewhat higher than the 16.79 in the current study. However, there were two individuals who had an MQ score of over 23, and 7 individuals who had MQ scores above 20, suggesting that there were several phobic individuals in the study. Perhaps if the cutoff had been more stringent, the BIIP would have been more severe phobics, and even faster responders in the IAT for the disgusting-mutilation pairings.

An additional analysis was run with the middle-third of participants, based on their MQ scores, removed from the data. Results indicated that BIIP had faster reaction times to matched pairs of disgusting-mutilation than afraid mutilation, though still not significant, t(28)=-1.93, *p*=.064. NP appeared to have faster reaction times than BIIP overall, but this finding was also not significant, t(28)=-1.86, *p*=.074 (see Table 5). Although the results do not achieve significance, from the standard deviations for the participants with the top-third of MQ scores, it is clear that this is still a heterogeneous group. Page (1994) suggests that BIIP are a heterogeneous group that contains individuals who respond primarily with fear, primarily with disgust, or with both emotions. The range of scores, indicated by large standard deviations, may suggest that the group of phobics, even in the top-third of MQ scores is a heterogeneous group. The work of Page (1994) is discussed in more detail later.

Table 5
*IAT Reaction Times for Participants in Top-third and Bottom-third of MQ Scores*

| | Top-third | | Bottom-third | |
|---|---|---|---|---|
| Disgust | $\bar{x}$ | *sd* | $\bar{x}$ | *sd* |
| Matched pairs (RTDm) | 749.46 | 280.46 | 605.49 | 107.61 |
| Afraid | | | | |
| Matched pairs (RTAm) | 875.87 | 459.80 | 642.40 | 93.44 |

*Note*. All reaction times are in milliseconds.
Superscripts denote a significant difference between reaction times.

Previous literature has indicated that disgust is more closely related to BII stimuli than to fear through both behavioral measures (Koch et al., 2002; Olatunji et al., 2008) and self-report measures (de Jong & Merkelbach, 1998; Olatunji et al., 2007; Teachman & Saporito, 2008). However, this is the first time in the literature that implicit associations have been used to measure the degree of association between disgust and fear and BII stimuli. This is important because implicit associations are not fakable, so from the data, it can be concluded that the relationship between these two concepts exists for BII phobics.

This finding provides support for the cognitive model of anxiety (Beck & Clark, 1997). The cognitive model of anxiety posits that BIIP participants have a schema, or mental structure, of BII stimuli. The findings from this study illuminate the relationship between certain stimuli in an individual's cognitive network. Specifically, results indicate that mutilation stimuli are most closely linked with the concept of disgust and less closely linked with the concept of fear in the cognitive network of BIIP individuals, because faster reaction times indicate a closer connection in the cognitive network.

In addition to the important findings regarding BIIP, there is also an important finding relative to NPs. For NPs, the difference in reaction times between matched pairings of mutilation-disgusting and mutilation-afraid did not occur as it did for BIIP. This indicates that NPs do not associate mutilation stimuli with the concept of disgust or fear more closely. Thus, the current finding is specific to BII phobics. This is also an important finding because this differentiates NPs from BIIP. This again provides support for the cognitive model of anxiety, because the cognitive bias was specific to those who are BII fearful or phobic. The development of a specific phobia may have occurred partly due to the close association between mutilation stimuli and the concept of disgusting.

The hypothesis that BIIP individuals would more quickly associate mutilation stimuli with negative descriptors (disgusting, afraid) than NPs was not supported. NPs were faster responders than BIIP overall. It is possible that there was a floor effect for NPs such that there was no room to decrease their scores for disgusting-mutilation. If this was the cause, however, there should be no difference in the relationship between disgusting-mutilation and afraid-mutilation because neither concept should be more closely related to mutilation than the other. It could also be that BIIP were slower responders than NPs because the initial shock of viewing a disturbing image delayed their reaction time by over 100 milliseconds. NPs, who are not bothered by graphic images of mutilation, would not experience the same momentary shock and therefore can respond by sorting the image into a category more quickly than BIIP. However, this idea is completely contrary to the principle behind the IAT. Faster reaction times are supposed to indicate a closer relationship between two concepts. But, since no IATs that contain graphic images have ever been used in research, the delay in processing of graphic stimuli for phobics is a possibility and could be explored further. Future research should investigate this particular difference between phobics and non-phobics to determine whether or not there is an initial delay due to the shock of viewing a disturbing image.

Research on the emotional Stroop effect may help to explain why phobic participants reacted more slowly than NPs to images of mutilation. When negative and neutral words are presented to participants and participants are asked to respond with the color the word is written in, participants are slower to verbalize the color of the negative word than they are to verbalize the color of the neutral word. This phenomenon is referred to as the emotional Stroop effect (ESE). In the real world, individuals typically respond to emotional stimuli more quickly than neutral stimuli, but this same finding does not occur in a laboratory setting (Chajut et al., 2010). A recent study demonstrated that participants are slower to physically move toward emotionally charged words (Chajut et al., 2010). For this reason, perhaps BIIP were slower to respond to mutilation stimuli than NPs because the image was an emotional image and they were presented with the stimulus in a laboratory setting.

Additionally, if participants associated mutilation stimuli more closely with disgust, which the IAT demonstrated, then their bodies are very likely mirroring that experience. Therefore, it is not unreasonable to guess that if the BIIP individuals are experiencing disgust, then physiologically, they are having an increase in activation of their parasympathetic nervous system (Tolin, 1999), which slows respiration and heart rate. This, in turn, may decrease their ability to respond quickly to reaction time tasks. However, Gerlach et al. (2006), found that participants who self-reported disgust were actually, physiologically, experiencing an activation in their sympathetic nervous system, which is said to be caused by the experience of fear (Tolin, 1999), which would mean a decrease in reaction time speed. However, these findings were reported during a blood draw, which is different than being exposed to mutilation images, so the findings of Gerlach et al. (2006) may not apply directly to the current study. A possibility for a future study that uses reaction time tasks would be to compare reaction times of participants after their sympathetic and parasympathetic nervous systems are activated. By comparing the difference in reaction time when each system is activated, it would allow for the effect that the arousal of each nervous system has on reaction time speed to be more fully understood. It would also be helpful to take each participant's heart rate, respiration rate, or rate of salivation while they are completing the reaction time task to discover which nervous system is being activated during the task.

An alternative explanation for why NPs may be faster responders than phobics overall could be due to a small group of NPs that had high scores on the DS. To test this, a small group of individuals who were categorized as NPs but had DS scores above one standard deviation away from the typical DS mean score for NPs was removed from the data. Surprisingly, their average reaction times further decreased, though not significantly, for matched pairs of disgusting-mutilation and afraid-mutilation. This provides initial support for the idea that participants who are disgust sensitive are delayed by several milliseconds in their responding because of the shock of seeing such a graphic image.

A calculation on the differences in reaction times between ethnicities, that is, Caucasian versus individuals who did not identify as Caucasian, was not conducted. There was too much variability in the non-Caucasian group since the group contained individuals who identified as African-American, Hispanic, or Asian/Pacific Islander, so the calculation would not have illuminated generalizable differences.

There are several limitations to the current study. Although cutoff scores for sorting participants into phobic and non-phobic groups were drawn from previous empirical work, it appears that the cutoffs may not have been stringent enough. Additionally, participants were given the DS after they engaged in the IAT, so disgust scores could have been slightly elevated after seeing the mutilation images. The DS scores for participants, both phobic and non-phobic, in the current study were slightly higher than the scores of participants in other studies. However, all individuals were given the questionnaires in the same order, regardless of status as a phobic or NP, so if this caused an elevation in DS scores, it should be relatively consistent across phobic and NP groups because each participant was exposed to the exact same ordering of tasks. Furthermore, research indicating that the IAT is not fakable would indicate that being primed to the concept of disgust should not negatively influence the results.

Future studies should consider the work of Page (1994) who postulates that BIIP may be a heterogeneous group. Page (1994) proposed three types of BII phobics: fearful non-fainters (respond primarily with fear), non-fearful fainters (respond primarily with disgust), and a combination of the two, or biphasic responders (respond with a combination of fear and disgust). If the current study contained participants who were biphasic responders, this may have accounted for the smaller difference between fear and disgust response times, or why the paired-samples t-test demonstrated that the difference between reaction times for disgusting-mutilation pairings and afraid-mutilation pairing were only approaching significance. Future studies could categorize BII phobic individuals according to the three categorized posited by Page (1994) in order to test whether the categorization as a fearful non-fainter, non-fearful fainter, or biphasic responder is actually demonstrated through the use of an IAT. However, in order to categorize individuals into the three categories, a method to do so must first be created. Research such as this might be able to demonstrate that BII phobics are not completely homogeneous and that different individuals respond with fear, disgust, or a combination of the two, and may help to individuals to better understand some of the mixed findings in the literature.

It is important to continue exploring the relationship between disgust and BII phobia by examining whether there are associations between disgust and other BII stimuli, such as needles, medical equipment, surgical equipment, and blood, instead of just mutilation. Additionally, it would be interesting to see if BIIP individuals also have the concept of disgust associated closely with other common disgust-elicitors such as feces, urine, spiders, insects, and other small animals.

In addition, because the IAT was successful in distinguishing BIIP from NP individuals, it may be used as a diagnostic tool in the future. Individuals who meet criteria for BII phobia according to scores on certain phobia measures may also be given the IAT as a supplementary tool to measure their maladaptive cognitions and provide additional support for categorization as a BII phobic. These findings also affect the possible methods that a clinical psychologist should use to treat an individual with BIIP. For instance, a psychologist might focus part of the treatment on reducing the strength of the relationship between BII stimuli and disgust, which would in turn, help to correct the faulty processing that is occurring in the cognitive networks of BII phobics, according to the cognitive model of anxiety.

Reducing the strength of the relationship between BII stimuli and disgust can be done in a variety of ways, such as exposure or cognitive restructuring methods. For instance, Choplin and Carter (2010) found that repeated exposure to disgust or fear stimuli resulted in a significant reduction in fear among spider phobics. It is unknown if a similar procedure would hold true for BII phobics, or if exposures can produce change in the cognitive networks of phobics in general. In addition, a study conducted by Olatunji et al. (2007) demonstrated that exposing BII-fearful individuals to BII stimuli, specifically a hypodermic needle, syringe, alcohol prep wipes, latex medical gloves, and a mannequin dressed in a hospital gown with a tourniquet on its arm, helped reduce levels of fear and disgust. However, the reduction in the levels of disgust was not as prominent as the fear reduction. For this reason, it might be important for researchers and clinicians to use a variety of ways to reduce disgust sensitivity in BIIP individuals, in addition to exposure, such as cognitive restructuring techniques. Overall, the findings from the current study, that BIIP implicitly associate mutilation stimuli more closely with disgust rather than fear, add to both the research literature on BII phobics and clinical applications.

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