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GOING TO BAT: ASSESSING DISGUST SENSITIVITY AND RELATED FACTORS IN
BEHAVIORAL AVOIDANCE

A Thesis

presented in partial fulfillment of requirements

for the degree of Master of Arts

in Clinical Psychology

The University of Mississippi

Molly E. Wickenhauser

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ABSTRACT

The emotion of disgust plays a crucial role in anxiety and related disorders, such as specific phobias and obsessive-compulsive disorder (OCD). Disgust sensitivity (i.e., one's proclivity to experience the emotion of disgust), in particular, has been strongly linked to anxious pathology and avoidant behavior. Maladaptive avoidance motivated by disgust has been proposed as an important mechanism in the development and maintenance of these disgust-related disorders. Further, other transdiagnostic factors, such as anxiety sensitivity and emotion dysregulation, also have associations with avoidant behavior as well as disgust sensitivity. The current study examined the contributions of disgust sensitivity, anxiety sensitivity, and emotion dysregulation together in the context of disgust-motivated avoidant behavior.

The present study used archival data ($N = 194$) consisting of responses from a battery of questionnaires and data from eight behavioral avoidance tasks (BATs). Correlational analyses demonstrated that disgust sensitivity, anxiety sensitivity, state disgust and anxiety ratings during BATs, and behavioral avoidance on BATs were significantly correlated. Higher disgust sensitivity and behavioral avoidance was also associated with being female. Unexpectedly, emotion dysregulation was not correlated with disgust sensitivity or behavioral avoidance. Next, a series of hierarchical multiple linear regressions indicated that the contamination disgust domain appeared to be the strongest predictor of behavioral avoidance on core- and contamination-related BATs, while animal reminder disgust appeared to be the strongest on animal reminder-related BATs. Surprisingly, core disgust did not individually predict avoidance on any associated BATs. A subsequent hierarchical multiple linear regression demonstrated that

disgust sensitivity (Step 4) uniquely predicted steps refused on the BATs while controlling for gender (Step 1), state disgust and anxiety ratings (Step 2), and anxiety sensitivity and emotion dysregulation (Step 3). Interestingly, this model was not significant when examining distance approached on the BATs, and neither anxiety sensitivity nor emotion dysregulation significantly contributed to either models. Lastly, moderation analyses revealed that emotion dysregulation and anxiety sensitivity did not moderate the relationship between disgust sensitivity and behavioral avoidance. Overall, findings from the present study highlight that sensitivity towards the emotion of disgust is particularly important to increased behavioral avoidance in this context.

TABLE OF CONTENTS

ABSTRACT	ii
LIST OF TABLES.....	v
LIST OF FIGURES.....	vi
INTRODUCTION.....	1
METHODS.....	28
RESULTS.....	33
DISCUSSION.....	38
REFERENCES.....	49
APPENDICES.....	83
CURRICULUM VITA.....	93

LIST OF TABLES

1. Behavioral Avoidance Tasks (BATs).....	72
2. Descriptive Statistics and Correlations Among Primary Variables and Possible Covariates.....	73
3. Correlations Among Disgust Domains and BAT Avoidance on Particular Tasks.....	74
4. Regressions Examining the Disgust Domains and Associated BATs with Steps Refused as the Outcome Variable.....	75
5. Regressions Examining the Disgust Domains and Associated BATs with Distance Approached as the Outcome Variable.....	76
6. Hierarchical Multiple Linear Regression with Steps Refused as the Outcome Variable.....	77
7. Hierarchical Multiple Linear Regression with Distance Approached as the Outcome Variable.....	78
8. Anxiety Sensitivity and Emotion Dysregulation as Moderators of the Relationship between Disgust Sensitivity and Behavioral Avoidance.....	79

LIST OF FIGURES

1. Anxiety Sensitivity as a Moderator between Disgust Sensitivity and Steps	
Refused.....	81
2. Emotion Dysregulation as a Moderator between Disgust Sensitivity and Steps	
Refused.....	82

I. INTRODUCTION

Disgust

Disgust is a basic emotion described as a revulsive, disease- and/or harm-avoidance response to real or imagined aversive stimuli (Darwin, 1872; Rozin, Haidt, & McCauley, 2008). Drawing from past evidentiary theories (e.g., Ekman, 1999; Levenson, 1999; Panksepp, 2000; Tomkins, 1962), Izard (2007) described basic emotions as a set of neural, bodily/expressive, and feeling/motivational structural components that include distinctive characteristics. Based on these criteria, the emotion of disgust is conceptualized as a basic emotion. The neural component of disgust is demonstrated by the association between disgust and activation of the parasympathetic nervous system (Levenson, 1992; McKay & Tsao, 2005). Specifically, reduced blood pressure, heart rate deceleration, and an increase in skin conductance occur as a result of experiencing the emotion of disgust (de Jong, van Overveld, & Peters, 2011; Stark, Walter, Schienle, & Vaitl, 2005; van Overveld, de Jong, & Peters, 2009). This response is distinguishable from other negative emotions (e.g., fear, anger) that are associated with activation of the sympathetic nervous system (Levenson, 1992; McKay & Tsao, 2005).

The bodily/expressive component of disgust is epitomized by the “gape” response, or the facial and bodily expressions associated with experiencing disgust. Also known as the “disgust face,” the facial expression of disgust encompasses features such as a gape, protruded tongue, wrinkled nose, and raised upper lip (Darwin, 1872; Rozin, Lowery, & Ebert, 1994). This facial expression is often accompanied by gestures such as pushing away or guarding oneself (Rozin et

al., 2008). Importantly, universality and innateness are characteristic of basic emotions and can be demonstrated by examining emotional responses cross-culturally and in infancy (Darwin, 1872; Izard, 2007). Evidence for the universality of disgust includes the cross-cultural observation of the disgust facial expression in response to common disgust-eliciting stimuli (Ekman, 1994; Izard, 1994). Similarly, evidence of the innateness of disgust is demonstrated by the observation of the disgust facial expression in infants after exposure to bitter substances (Rozin et al., 2008).

Finally, the feeling/motivational component of disgust is illustrated by the experience of strong negative feelings (e.g., revulsion, nausea) that have specific motivational properties which influence behavior (i.e., protecting oneself against disease or harm; Matchett & Davey, 1991; Olatunji, Unoka, Beran, David, & Armstrong, 2009). Disgust is characterized by avoidant behavior, such as rejecting or distancing oneself from a disgusting stimulus (Olatunji, Haidt, McKay, & David, 2008; Olatunji & Sawchuk, 2005; Rozin et al., 2008). This behavior is theoretically explained by two concepts: disease avoidance and harm avoidance. Disease avoidance behavior refers to the avoidance of certain objects (e.g., rotten foods, germs) perceived to be disgusting as a function of protecting oneself from disease (Curtis, 2011; Matchett & Davey, 1991; Oaten, Stevenson, & Case, 2009). Disgust evokes disease avoidance behavior when the stimuli associated with disgust are characteristic of disease, illness, and/or contamination. On the other hand, harm avoidance behavior refers to the avoidance of objects or situations that could result in harm to the body (Olatunji et al., 2009). The function of this particular avoidance is to protect the body from physical harm, as opposed to disease. Although the overall function of disgust is to protect oneself, maladaptive disgust-associated avoidance

may contribute to the development and maintenance of psychopathology (Meunier & Tolin, 2009).

An abundance of research has demonstrated that avoidance plays a key role in the development and maintenance of anxiety disorders (Barlow, 2002; Lovibond, 2006; Mineka & Oehlberg, 2008; Mineka & Zinbarg, 2006). Research has also demonstrated that the combination of the emotion of disgust and the behavioral component of avoidance contributes to anxiety and related disorders, such as specific phobias and contamination-based obsessive-compulsive disorder (OCD; Deacon & Olatunji, 2007; Koch, O'Neill, Sawchuk, & Connolly, 2002; McKay, 2006; Mulkens, de Jong, & Merckelbach, 1996). Research investigating disgust sensitivity, which is characterized by the tendency to experience the emotion of disgust in response to aversive stimuli (Olatunji et al., 2007a), further supports the role of disgust in psychopathology. Other emotions, such as fear and anxiety, may also elicit strong negative feelings that result in similar motivational properties. For example, fear activates a defensive response in the presence of a threat and anxiety triggers a preparatory response in anticipation of a potential future threat (Barlow, 2002; Lang, Davis, & Ohman, 2000). However, the revulsive response elicited at the possibility of contracting a disease or harming the body (Matchett & Davey, 1991; Olatunji et al., 2009) is a key distinguishing component of disgust from these other emotions. Taken together, the literature suggests that the emotion of disgust plays a key role in disgust-related disorders.

Domains of Disgust

Within the emotion of disgust, three general domains are considered: core, animal reminder, and contamination-based. Core disgust represents the emotional response related to the threat of oral incorporation of an offensive object (Rozin et al., 2008). Such stimuli include rotten foods, human and/or animal bodily products (e.g., feces, urine, vomit, spit), and products

associated with garbage (Olatunji et al., 2008; Rozin et al., 2008). Research evaluating the role of disgust sensitivity in animal fears has demonstrated a relationship between core disgust and animals that evoke fear and/or revulsion, such as rats, maggots, and spiders (Davey, 1994; Matchett & Davey, 1991). Further, several studies examining factors related to spider phobia have found that individuals with spider phobia endorse higher disgust sensitivity than individuals without spider phobia (de Jong, Andrea, & Muris, 1997; Merckelbach, de Jong, Arntz, & Schouten, 1993; Mulkens et al., 1996; Sawchuk, Lohr, Tolin, Lee, & Kleinknecht, 2000). Similarly, a study investigating emotional responses to behavioral avoidance tasks (BATs) found that individuals with spider phobia responded with more disgust and fear during a spider-related BAT compared to individuals without spider phobia (Olatunji & Deacon, 2008), which is consistent with prior research (e.g., Tolin, Lohr, Sawchuk, & Lee, 1997). Interestingly, results also demonstrated that disgust sensitivity was associated with participants' disgust responses on the spider-related BAT, even after controlling for spider phobia status, age, gender, negative affect, trait anxiety, and contamination fear (Olatunji & Deacon, 2008). However, the association between disgust sensitivity and fear responses was only marginally significant after controlling for the aforementioned variables. This demonstrates that the functions of fear and disgust have differing roles in spider phobia for avoidant individuals who are highly disgust sensitive.

In addition to spider phobia, research has demonstrated a relationship between eating disorder symptoms and core disgust elicitors (Troop, Treasure, & Serpell, 2002). Studies examining associations between disgust responses and eating disorders found that, compared to healthy controls, women with abnormal eating attitudes and women diagnosed with eating disorders were more sensitive to disgust-related stimuli, such as high-calorie foods and bodily products (Harvey et al., 2002; Troop, Murphy, Bramon, & Treasure, 2000). Yet, another study

investigating the causal relationship between disgust and eating psychopathology found that eliciting disgust using a bad smelling odor did not influence eating disorder symptoms in a sample of female undergraduate students (Mayer, Bos, Muris, Huijding, & Vlieland, 2008). Similarly, when investigating unique associations between negative emotions and disordered eating patterns, Fox and Froom (2009) found that disgust predicted eating disorder symptoms, but the finding was no longer significant when controlling for other negative emotions (i.e., fear, anger, sadness). These studies suggest that disgust may indirectly influence eating disorders, as opposed to having a direct, causal role.

The second domain of disgust, animal reminder disgust, is elicited when individuals are reminded of their animalistic nature and mortality (Goldenberg et al., 2001; Rozin et al., 2008). Elicitors primarily include stimuli associated with death (e.g., corpses, smell of decay), blood, and injuries to the body (Haidt, McCauley, & Rozin, 1994; Rozin et al., 2008). Research has demonstrated that animal reminder disgust has unique associations with fear of death and blood-injection-injury (BII) phobia (de Jong & Merckelbach, 1998; Olatunji et al., 2008). For instance, in studies examining associations between the disgust domains and anxiety symptoms, animal reminder disgust explained significant variance of fears related to death, injuries, blood, and surgical procedures as well as disgust towards stimuli and situations related to mutilation and death (Kleinknecht, Kleinknecht, & Thorndike, 1997; Olatunji et al., 2008). Individuals with BII phobia also appear to experience heightened disgust sensitivity, specifically in relation to core disgust elicitors (e.g., rotting foods, bodily products, animals, spiders; de Jong & Merckelbach, 1998; Olatunji et al., 2008; Sawchuk et al., 2000; Tolin, Lohr, Sawchuk, & Lee, 1997). Furthermore, when investigating disgust and fear responses in BII phobia, BII phobics' self-reported ratings on subscales directly related to blood-injury stimuli (e.g., mutilation and death,

injections, blood draws) were higher compared to individuals without BII phobia (Koch et al., 2002). Various studies have demonstrated that individuals with BII fears primarily respond with the emotion of disgust, as opposed to other emotions such as fear and anxiety, when presented with disgust elicitors related to blood, injuries, and surgeries (Koch et al., 2002; Sawchuk, Lohr, Westendorf, Meunier, & Tolin, 2002; Schienle, Stark, & Vaitl, 2001; Tolin, Sawchuk, & Lee, 1999). The contribution of disgust, particularly in the animal reminder domain, seems to uniquely be involved in the experience of BII phobia.

Finally, contamination disgust involves the experience of disgust when there is a risk of disease or transmission of illness, often in relation to other persons (Rozin et al., 2008). This can involve direct (e.g., a person with influenza) or indirect (e.g., clothing of a stranger, toilets) contact with others or with objects that could potentially be contaminated. Research has demonstrated that contamination disgust is related to contamination fear and other OCD symptoms (Mancini, Gragnani, & D'Olimpio, 2001; Morteza & McKay, 2008; Olatunji et al., 2008; Sawchuk et al., 2000). When investigating associations between the disgust domains and contamination fear, contamination disgust was the only disgust domain that explained unique variance in predicting contamination fear (Olatunji et al., 2008). In addition, a study examining the unique contribution of disgust in different OCD symptom domains found that the relationship between contamination disgust and OCD seems to be specific to washing and checking behaviors, as opposed to impulse and rumination symptoms that may be more characteristic of anxiety and depression (Mancini et al., 2001). However, other studies examining disgust sensitivity and OCD symptoms found that generalized disgust sensitivity toward all disgust domains is related to OCD symptoms such as contamination fear (Olatunji, Lohr, Sawchuk, & Tolin, 2007b; Olatunji, Sawchuk, Lohr, & de Jong, 2004). This suggests that the relationship

between disgust sensitivity and contamination concerns is not limited to contamination disgust, but encompasses generalized disgust sensitivity. Further evidence for the relationship between disgust sensitivity and contamination-based OCD is demonstrated by higher disgust sensitivity endorsed by individuals with high contamination obsessions and washing compulsions, as compared to those with low contamination obsessions and washing compulsions (Olatunji et al., 2007b).

Similarly, research has also demonstrated a significant relationship between disgust sensitivity and health anxiety (i.e., dysfunctional beliefs about having a serious illness; Salkovskis, Rimes, Warwick, & Clark, 2002) in nonclinical samples (Davey & Bond, 2006; Fan & Olatunji, 2013; Olatunji, 2009; Thorpe, Patel, & Simonds, 2003). Studies examining the unique association between disgust sensitivity and health anxiety found that this relationship remains significant after controlling for trait anxiety (Davey & Bond, 2006) as well as negative affect and contamination fear (Olatunji, 2009). Although most research in this area has not focused on the relationship between health anxiety and specific disgust domains, the relationship between health anxiety and disgust has been examined using contamination- and health-related BATs (Goetz, Lee, & Cogle, 2013a; Fan & Olatunji, 2013). In a nonclinical sample, health anxiety predicted participants' disgust responses during a BAT involving a disgust-eliciting mixture (i.e., dirt, dead insects, dog hair) after controlling for gender, negative affect, and contamination fear (Goetz et al., 2013a). In addition, when controlling for gender, trait anxiety, health anxiety, and depression, disgust sensitivity uniquely predicted participants' anxiety ratings during BATs involving health-related concerns (Fan & Olatunji, 2013). Specifically, the health-related BATs included exposures to a tissue used by someone with the common cold, an oral thermometer used by someone with the flu, and a water bottle used by someone with

mononucleosis. These results further demonstrate the unique role of disgust in anxious psychopathology.

Relative to the aforementioned disgust-related disorders, less is known about disgust's contribution to other psychopathology, such as posttraumatic stress disorder (PTSD) and borderline personality disorder (BPD). A study examined the unique contribution of disgust in the development of PTSD pre- and post-deployment (i.e., six and 15 months after returning home) in a sample of soldiers (Engelhard, Olatunji, & de Jong, 2011). Greater peritraumatic disgust (i.e., disgust experienced during a traumatic event) uniquely predicted PTSD symptom severity at six months post-deployment, while higher disgust sensitivity uniquely predicted more peritraumatic disgust. These associations remained significant after controlling for peritraumatic fear, neuroticism, and anxiety sensitivity. Moreover, disgust sensitivity moderated the relationship between peritraumatic disgust and PTSD symptom severity, such that greater disgust sensitivity and peritraumatic disgust better predicted PTSD symptom severity. Another study examined disgust levels in a sample of women with PTSD and/or BPD and found that, compared to healthy controls, women with PTSD and/or BPD reported higher levels of disgust sensitivity (Rusch et al., 2011). In a study investigating disgust in women with BPD, greater self-reported disgust sensitivity was associated with BPD symptom severity (Schienle, Haas-Krammer, Schoggl, Kapfhammer, & Ille, 2013). Taken together, these findings illustrate the influence of disgust in a plethora of anxiety disorders and related psychopathology, providing evidence of the transdiagnostic nature of disgust sensitivity. Thus, it is important to better understand the mechanisms by which disgust influences different psychopathology.

Disgust Sensitivity and Avoidance

As evidenced above, disgust sensitivity plays an important role in several anxiety and related disorders. One hypothesis of how disgust contributes to the development and maintenance of these disorders is through avoidance, specifically behavioral avoidance (Cisler, Olatunji, & Lohr, 2009; Davey, 2011; Olatunji, Cisler, McKay, & Phillips, 2010). Numerous studies using undergraduate and analogue (e.g., individuals high in contamination-based OCD symptoms) samples have demonstrated that disgust sensitivity predicts behavioral avoidance on various disgust-related BATs (Deacon & Maack, 2008; Deacon & Olatunji, 2007; Olatunji et al., 2008; Olatunji et al., 2007b; van Overveld, de Jong, & Peters, 2010). In a sample of undergraduate students with varying levels of disgust sensitivity, disgust sensitivity predicted behavioral avoidance on several BATs, such as drinking from a dog's bowl, touching a live worm, and touching a bloody band aid (van Overveld et al., 2010). Further, for individuals with high and low levels of contamination fear, disgust sensitivity uniquely predicted behavioral avoidance during contamination-related BATs involving a used comb, a cookie that was on the floor, and a bedpan filled with toilet water (Deacon & Maack, 2008). This relationship between disgust sensitivity and behavioral avoidance remained significant after controlling for gender, contamination fear, anxiety, and depression. Consistent with these findings, individuals with high OCD contamination concerns engaged in more behavioral avoidance on various BATs (e.g., engaging with a moldy orange, cow eyeball, a pencil that had been dropped in the toilet) compared to individuals with low OCD concerns (Olatunji et al., 2007b). These studies provide support for disgust sensitivity motivating behavioral avoidance.

Although research seems to be moving towards assessing generalized disgust sensitivity, different theories have been proposed related to how specific disgust domains motivate

avoidance. It is suggested that avoidance specific to core and contamination disgust can be explained by the disease avoidance model of animal fears (Davey, 1994). For instance, core and contamination disgust elicitors (e.g., spiders, toilets) are associated with contamination and the spreading of disease (Rozin & Fallon, 1987), and the adaptive function is, therefore, to avoid and prevent the transmission of illness. In other words, individuals who experience elevated levels of disgust sensitivity specific to core and contamination disgust may be more susceptible to developing animal phobias and/or contamination-based OCD. Providing support for this theory, significant relationships between behavioral avoidance and core and contamination disgust have been demonstrated in several studies (Olatunji, Ebesutani, Haidt, & Sawchuk, 2014a; Olatunji et al., 2008). When examining associations between the disgust domains and avoidant behavior, higher scores of core and contamination disgust predicted visual avoidance of watching core disgust- and contamination disgust-related videos (Olatunji et al., 2008). Results from this study also illustrated that core disgust predicted behavioral avoidance on a BAT in which the participants were asked to chew up a grape, spit it in a cup, and then drink the contents of the cup (Olatunji et al., 2008). Consistent with these findings, a study examining the disgust domains and contamination-related anxiety and avoidance found that contamination disgust predicted avoidant behavior in a public restroom (Olatunji et al., 2014a). Another study found that contamination disgust predicted behavioral avoidance on health-related BATs (i.e., exposure to stimuli that came into contact with ill persons) while controlling for gender, anxiety, depression, and health anxiety (Fan & Olatunji, 2013). Research examining mechanisms that influence emotional and behavioral responses on BATs demonstrated that disgust sensitivity mediates the relationship between contamination overestimation/contamination fear and BAT responses (Deacon & Olatunji, 2007; Olatunji & Deacon, 2008; Olatunji et al., 2007b). This suggests that

high contamination worries contribute to high disgust sensitivity, which, in turn, contributes to avoidant responses to contamination- or disease-related disgust stimuli. Taken together, these studies provide support for the disease avoidance theory of disgust by illustrating that core and contamination disgust motivate avoidance in this context.

While avoidance related to core and contamination disgust is best explained by the disease avoidance model, avoidance related to animal reminder disgust can be conceptualized as harm avoidance. Olatunji and colleagues (2009) examined this theory by assessing the predictive power of the disgust domains in predicting “contamination anxiety” (i.e., contamination fear, health anxiety, disgust proneness) and “non-contamination anxiety” (i.e., trait anxiety, negative affect, anxiety sensitivity) above and beyond generalized disgust sensitivity. Each of the three disgust domains uniquely predicted contamination anxiety. However, animal reminder disgust was the only unique predictor of non-contamination anxiety. These results provide evidence that behavioral avoidance in this context can potentially be better explained by protecting oneself from harm, opposed to disease as core and contamination disgust are characterized. Several studies have identified significant relationships between behavioral avoidance and animal reminder disgust, providing support for the harm avoidance theory (Olatunji et al., 2008; Koch et al., 2002; Woody & Tolin, 2002). When assessing behavioral responses of individuals with high BII fears, animal reminder disgust predicted visual avoidance to pictures depicting a surgical glove and a blood draw procedure (Woody & Tolin, 2002). Compared to nonphobics, BII phobics reported higher levels of disgust sensitivity and engaged in more avoidant behavior on animal reminder-related BATs involving blood stimuli (e.g., mutilation, bloody gauze, severed deer leg; Koch et al., 2002). In addition to providing support for the harm avoidance theory of

disgust, these findings also illustrate the aforementioned utility in examining individual disgust domains and specific elicitors.

Although prior research has identified disgust sensitivity as an important predictor of behavioral avoidance, *state* disgust (i.e., verbal reports of disgust during BATs) has been proposed to be a better predictor. In a study examining behavioral responses to disgust-eliciting stimuli in individuals with high spider fears, state disgust was assessed by prompting participants to verbally report their experience of disgust on a scale of 0-100 during BATs that included a food task, a vomit task, a worm task, and a surgery video (Woody & Tolin, 2002). Disgust sensitivity was measured using the Disgust Scale (DS; Haidt et al., 1994) and was conceptualized as trait disgust. Results demonstrated that state disgust predicted behavioral avoidance on all BATs, while disgust sensitivity/trait disgust only predicted behavioral avoidance on the worm BAT. This finding was supported by a later study illustrating that disgust sensitivity, in addition to anxiety sensitivity, did not add any predictive value of behavioral avoidance on spider- and contamination-related BATs above and beyond state disgust and state anxiety (Woody, McLean, & Klassen, 2005). Consistent with prior research, results also demonstrated that state disgust was a significant predictor of avoidance while state anxiety was not (de Jong & Muris, 2002). These studies further highlight the role of disgust, in particular state disgust, in behavioral avoidance. Disgust sensitivity and state disgust may function differently in behavioral avoidance.

Anxiety Sensitivity

Anxiety sensitivity is another contributing factor in the development and maintenance of anxiety disorders (Bardeen, Fergus, & Orcutt, 2014; Zinbarg, Brown, Barlow, & Rapee, 2011; Zvolensky & Forsyth, 2002). Anxiety sensitivity, also described as the fear of fear, is defined as the fear of arousal-related symptoms of anxiety (e.g., heart palpitations, difficulty breathing) due

to the belief that these symptoms will result in serious, harmful consequences (Reiss & McNally, 1985). Reiss' expectancy model posits that when individuals with elevated anxiety sensitivity are presented with an anxiety-provoking stimulus, they experience fear about the stimulus in addition to fear about their anxiety symptoms (Reiss, 1991; Reiss & McNally, 1985). It has further been hypothesized that individuals who are sensitive to experiencing bodily sensations and physiological arousal experience a fear of emotions in general and the loss of control over these emotions (Chambless & Goldstein, 1981; Norton & Edwards, 2017). Support for this theory is illustrated in a study examining predisposition factors for panic in a nonclinical sample with no history of panic attacks (Chambless & Goldstein, 1981). Results demonstrated that individuals with high self-reported levels of fear of general emotions (i.e., fear of losing control over their emotions or behavioral responses) were more frightened by bodily sensations that were experimentally induced using in vivo tasks (i.e., spinning, hyperventilation, tube breathing). This suggests that anxiety sensitivity may comprise the fear of other emotional arousal as well as anxiety (e.g., disgust).

Similar to disgust sensitivity, research has demonstrated relationships between anxiety sensitivity and various psychopathology (Deacon & Abramowitz, 2006; Naragon-Gainey, 2010; Olatunji & Wolitzky-Taylor, 2009; Taylor, 2003; Taylor, Koch, & McNally, 1992). For example, clear associations between anxiety sensitivity and panic disorder (PD) have been demonstrated. Anxiety sensitivity predicted anxious responding in experimental studies using a carbon-dioxide enriched air challenge to mimic symptoms of panic (Rassovsky, Kushner, Schwarze, & Wangensteen, 2000; Zvolensky et al., 2001). Research examining anxiety sensitivity as a risk factor for anxious psychopathology found that anxiety sensitivity is also predictive of the development of spontaneous panic attacks (Schmidt, Lerew, & Jackson, 1999)

as well as perceived seriousness of panic attacks and agoraphobic avoidance (Norton, Pidlubny, & Norton, 1999). Compared to controls, elevations of anxiety sensitivity have been observed in patients with many different anxiety disorders, including PD, PTSD, generalized anxiety disorder (GAD), social anxiety disorder (SAD), OCD, and specific phobias (Deacon & Abramowitz, 2006; Lang, Kennedy, & Stein, 2002; Rodriguez, Bruce, Spencer, & Keller, 2004). Anxiety sensitivity predicts PTSD symptoms in nonclinical and clinical samples (Feldner, Zvolensky, Schmidt, & Smith, 2008; Simpson, Jakupcak, & Luterek, 2006). A reciprocal relationship between anxiety sensitivity and PTSD symptoms was illustrated in a study examining anxiety sensitivity and PTSD symptom severity in survivors of a traumatic physical injury (Marshalls, Miles, & Stewart, 2010). Specifically, the presence of high levels of anxiety sensitivity increased the likelihood of heightened PTSD symptoms over time. Additionally, the experience of PTSD symptoms (e.g., re-experiencing the trauma, hyperarousal, avoidance) also led to heightened awareness and attention to cues of anxiety symptoms (i.e., anxiety sensitivity). Taken together, the majority of research seems to agree that PD and PTSD are most closely associated with anxiety sensitivity (Deacon & Abramowitz, 2006; Olatunji & Wolitzky-Taylor, 2009; Taylor, 2003; Taylor et al., 1992), with some research suggesting GAD as well (Naragon-Gainey, 2010).

It has been hypothesized that an individual's tendency to engage in avoidance is amplified by anxiety sensitivity (Reiss, 1991). Associations between anxiety sensitivity and avoidance have been demonstrated (White, Brown, Somers, & Barlow, 2006; Wilson & Hayward, 2006), particularly the relationship between anxiety sensitivity and experiential avoidance (Zvolensky & Forsyth, 2002). Experiential avoidance is defined as an emotion regulation strategy that involves avoiding distressing emotions, thoughts, images, memories, and physical sensations (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Self-reported body

vigilance (i.e., exaggerated alertness to potentially dangerous bodily sensations), anxiety sensitivity, and experiential avoidance were assessed in a nonclinical sample (Zvolensky & Forsyth, 2002). Results from this study demonstrated that anxiety sensitivity predicted body vigilance as well as experiential avoidance when controlling for demographic variables (i.e., gender, age, ethnicity, education), medical treatment history for respiratory and heart problems, subclinical panic attack history, and trait anxiety. Other research has examined the relationship between anxiety sensitivity and behavioral avoidance (Lebowitz, Shic, Campbell, Basile, & Silverman, 2015; Norton & Asmundson, 2004; Wilson & Hayward, 2006). One study examined the ability of anxiety sensitivity to prospectively predict behavioral avoidance in a community sample of adolescents (Wilson & Hayward, 2006). Behavioral avoidance was assessed using a self-report measure of phobic avoidance (Fear Questionnaire; Marks & Matthews, 1979). Results demonstrated that anxiety sensitivity predicted increased self-reported behavioral avoidance, after controlling for gender, trait anxiety, panic attacks, and baseline avoidance (Wilson & Hayward, 2006). Further, a study examining the effects of anxiety sensitivity and spider fears on behavioral avoidance found that self-rated fear of spiders predicted behavioral avoidance of spider stimuli in clinically anxious youth with high, but not low, anxiety sensitivity (Lebowitz et al., 2015). In other words, anxiety sensitivity moderated the relationship between self-rated fear of spiders and behavioral avoidance. Although disgust was not measured, the results are still important given the evidence that disgust plays a role in fear of spiders (e.g., Olatunji et al., 2007a; Tolin et al., 1997). These studies illustrate the influential role of anxiety sensitivity in avoidance.

In addition to avoidance, research has also repeatedly demonstrated a relationship between anxiety sensitivity and disgust sensitivity (Badour, Bown, Adams, Bunaciu, & Feldner,

2012; David et al., 2009; Olatunji, Armstrong, Fan, & Zhao, 2014b; Williams, Abramowitz, & Olatunji, 2012). Most of the research examining anxiety sensitivity and disgust sensitivity has focused on their relation with OCD. For example, in a study examining factors related to OCD symptoms and behavioral avoidance in a large nonclinical sample, disgust uniquely predicted anxiety sensitivity when controlling for OCD symptoms, negative affect, and gender (Goetz, Lee, Cogle, & Turkel, 2013b). As mentioned previously, elevated levels of anxiety sensitivity (Deacon & Abramowitz, 2006) and disgust sensitivity (Olatunji et al., 2007b) have been observed in samples with elevated OCD symptoms. Similar to disgust sensitivity, research has also demonstrated significant relationships between anxiety sensitivity and contamination-based OCD symptoms (Cisler, Reardon, Williams, & Lohr, 2007; Olatunji, Sawchuk, Arrindell, & Lohr, 2005). However, mixed findings have been found related to the contribution of anxiety sensitivity in contamination-based OCD symptoms in nonclinical samples. When examining gender differences in disgust sensitivity and contamination fear, Olatunji and colleagues (2005) found that both disgust sensitivity and anxiety sensitivity emerged as significant predictors of contamination fears using stepwise multiple regressions of gender, trait anxiety, disgust sensitivity, and anxiety sensitivity. On the other hand, in a study exploring differences in contamination cognitions, anxiety, and disgust among White and Black participants, Williams and colleagues (2012) found that disgust sensitivity predicted contamination concerns while anxiety sensitivity did not. Given the discrepancies in findings, it is important to examine the differential contributions of disgust sensitivity and anxiety sensitivity in psychopathology.

Research has further examined the unique relationship between disgust and OCD when controlling for anxiety sensitivity. A study assessing the relationship between disgust sensitivity and OCD symptoms in three large nonclinical samples found that the relationship between

disgust sensitivity and OCD symptoms remained significant when controlling for anxiety sensitivity (Olatunji, Ebesutani, & Kim, 2016). Similarly, when assessing disgust sensitivity and OCD symptoms at two time points over a 12-week period, disgust sensitivity was related to OCD symptoms when controlling for anxiety sensitivity as well as negative affect (David et al., 2009). However, disgust sensitivity did not uniquely predict residual change in OCD symptoms over the 12-week period when accounting for obsessive beliefs, negative affect, and anxiety sensitivity. Conversely, when examining behavioral avoidance on a BAT involving a disgust-eliciting mixture (i.e., dirt, dead insects, dog hair), disgust sensitivity and state disgust were unique predictors of behavioral avoidance (Goetz et al., 2013b). These relationships remained significant while controlling for obsessive-compulsive symptoms, negative affect, gender, and anxiety sensitivity. These mixed findings could be a result of the heterogeneous nature of OCD and its several distinct subtypes (Abramowitz et al., 2010; McKay et al., 2004). Anxiety sensitivity may be more important in some OCD subtypes while disgust sensitivity may play a more important role in others (i.e., contamination-based OCD).

Mixed findings have also been found related to the comparative roles of anxiety sensitivity and disgust sensitivity in psychopathology. In a study examining the unique contribution of disgust in health anxiety using self-report measures in a nonclinical sample, disgust sensitivity no longer significantly predicted health anxiety when controlling for anxiety sensitivity (Brady, Cisler, & Lohr, 2014). Similarly, disgust sensitivity failed to predict significant variance in eating disorder symptomatology after controlling for trait anxiety and anxiety sensitivity (Davey & Chapman, 2009). Conversely, evidence supporting the unique contribution of disgust in PTSD was demonstrated in a study that assessed potential influential factors in the development of PTSD in soldiers pre- and post-deployment (Engelhard et al.,

2011). Specifically, greater peritraumatic disgust uniquely predicted PTSD symptom severity at six months post-deployment while controlling for peritraumatic fear, neuroticism, as well as anxiety sensitivity. As the literature is equivocal, it is important to continue to parse apart the differential influences of anxiety sensitivity and disgust sensitivity in various psychopathology.

A few studies have examined the causal and interactive effects of anxiety sensitivity and disgust. For instance, one study aimed to determine if inducing disgust and anxiety resulted in increases in self-reported anxiety sensitivity (Davey & Hurrell, 2009). Undergraduate students were asked to read mood-relevant vignettes for seven minutes while listening to mood-congruent music. This was followed by the placement of mood-relevant pictures in front of the participant for the remainder of the study (i.e., filling out the rest of the self-report measures). For instance, in the disgust condition, participants were asked to imagine approaching a public toilet full of diarrhea while listening to disgust noises through headphones (e.g., burps, flatulence, vomit noises). After seven minutes, the participant was then asked to fill out the remaining self-report measures while sitting in front of a picture of dog feces. The anxiety condition used the same procedures, but with anxiety-provoking stimuli. Results demonstrated that the anxious mood induction resulted in increases in self-reported anxiety sensitivity, but the disgust mood induction did not (Davey & Hurrell, 2009). In other words, experiencing disgust did not result in increased anxiety sensitivity. Another study examined the effects of induced disgust and anxiety in facilitating interpretational biases using a homophone spelling task (Leathers-Smith & Davey, 2011). Disgust and anxiety were induced using the same procedures as the previously mentioned study (Davey & Hurrell, 2009), but some stimuli were slightly modified. For example, a picture of a dirty, unflushed toilet was used for the disgust condition instead of a picture of dog feces. Results demonstrated that both induced disgust and anxiety resulted in a threat interpretation

bias. Specifically, individuals who experienced disgust and anxiety interpreted neutral and threatening stimuli as more threatening compared to individuals who experienced a neutral mood. Further analyses indicated that the disgust-generated interpretation bias was not moderated by generalized anxiety, anxiety sensitivity, or disgust sensitivity. Results from these studies suggest that disgust may have a casual influence on certain types of anxious psychopathology (e.g., facilitating a threat interpretation bias), but not others (e.g., increasing anxiety sensitivity).

Additionally, correlational studies examining how anxiety sensitivity and disgust sensitivity interact to influence contamination fear in undergraduate students demonstrated that anxiety sensitivity moderated the relationship between disgust and contamination fear (Cisler, Olatunji, Sawchuk, & Lohr, 2008; Cisler et al., 2007). Individuals with high disgust sensitivity and high, but not low, levels of anxiety sensitivity predicted contamination fear. However, this interaction between anxiety sensitivity and disgust sensitivity was not found in predicting BII fears (Cisler et al., 2008). Given these findings, disgust sensitivity and anxiety sensitivity may interact to influence certain psychopathology.

Emotion Dysregulation

Emotion dysregulation is another factor that contributes to the development and maintenance of symptoms across various anxiety disorders (Campbell-Sills & Barlow, 2007; Cisler, Olatunji, Feldner, & Forsyth, 2010). Emotion dysregulation is defined as a lack of understanding of one's own emotions and the inability to identify and modulate negative emotions (Gratz & Roemer, 2004). It has been proposed that mood and anxiety disorders (Gross, 2013; Thayer & Lane, 2000), in addition to other psychological disorders such as BPD (Linehan, 1993), can be characterized by dysregulated emotional states. In anxiety and mood disorders,

maladaptive emotion regulation strategies (e.g., emotional suppression, experiential or behavioral avoidance, rumination) are employed to downregulate negative emotions (e.g., disgust; Barlow, Allen, & Choate, 2016; Campbell-Sills & Barlow, 2007; Gross, 2013; Sloan et al., 2017). These strategies may offer short-term relief from intense emotions, but are often counterproductive and increase the experience of negative emotions and distress in the long run (Barlow & Cerny, 1988; Schmidt et al., 2000).

Evidence of the increased distress as a result of maladaptive use of emotion regulation strategies has been demonstrated in many experimental studies. Compared to individuals with low self-reported experiential avoidance, individuals with high levels experienced greater anxiety and affective distress during a carbon-dioxide enriched air challenge (Feldner, Zvolensky, Eifert, & Spira, 2003). Similarly, nonclinical participants instructed to suppress emotional responses during the same challenge also reported higher levels of anxiety compared to individuals instructed to simply observe their emotional responses (Feldner et al., 2003). In studies assessing emotion regulation in undergraduate students, individuals instructed to suppress their emotional reactions during a disgust-eliciting film evidenced greater physiological arousal compared to individuals simply told to watch the film (Gross, 1998; Gross & Levenson, 1993). Further, undergraduate students who engaged in suppression during disgust-inducing videos reported significantly more emotional distress compared to individuals who practiced reappraisal, which was defined as a detached and unemotional attitude (Olatunji, Berg, & Zhao, 2017). However, conflicting results were found in a study assessing males with high and low disgust sensitivity, such that there were no emotional or physiological differences between suppression and reappraisal strategies during a disgust-inducing film (Rohrman, Hopp, Schienle, & Hodapp, 2009). Taken together, the majority of research demonstrates that the use of

maladaptive emotion regulation strategies, such as experiential avoidance and suppression, often unintentionally results in increased distress.

Similar to disgust sensitivity and anxiety sensitivity, emotion dysregulation is associated with a range of psychopathology (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Campbell-Sills & Barlow, 2007; Sloan et al., 2017; Tolin, Abramowitz, Przeworski, & Foa, 2002). For example, individuals with anxiety or mood disorders report being less accepting of their emotions and using more suppression techniques compared to nonclinical samples (Campbell-Sills, Barlow, Brown, & Hofmann, 2006). Difficulties with emotion regulation are further associated with worry (Salters-Pedneault, Roemer, Tull, Rucker, & Mennin, 2006; Stern, Nota, Heimberg, Holaway, & Coles, 2014) and individuals with GAD, in particular, demonstrate greater emotion regulation difficulties compared to healthy controls (Mennin, Heimberg, Turk, & Fresco, 2005; Salters-Pedneault et al., 2006; Turk, Heimberg, Luterek, Mennin, & Fresco, 2005). Specifically, in a study assessing the relationship between emotion dysregulation and GAD symptoms, emotion dysregulation predicted presence of chronic worry as well as analogue GAD diagnostic status (i.e., a score above 5.7 on the Generalized Anxiety Disorders Questionnaire-IV; Newman, Zeullig, & Kachin, 2002) in a nonclinical sample (Salters-Pedneault et al., 2006). Similarly, Mennin and colleagues (2005) aimed to test the relationship between emotion dysregulation and GAD symptoms in a sample of undergraduate students with GAD. Results demonstrated that the predictive ability of emotion dysregulation in the presence of GAD remained significant after controlling for worry, anxiety, and depressive symptoms. Similar to the experimental studies mentioned above, individuals with GAD reported more physiological symptoms and difficulty managing emotional reactions during an emotion-inducing task compared to healthy controls

(Mennin et al., 2005). Altogether, these studies highlight the relationship between emotion dysregulation and GAD.

Difficulties with emotion regulation are also common in patients with SAD, depression, and PTSD. Patients with SAD report greater difficulties with emotion regulation compared to healthy controls (Turk et al., 2005), in addition to lower self-efficacy to implement emotion regulation strategies such as cognitive reappraisal (Werner, Goldin, Ball, Heimberg, & Gross, 2011). Similarly, less frequent use of cognitive reappraisal and more rumination (i.e., emotional dysregulation) are associated with higher levels of depressive symptoms in patients with major depression (Joormann & Gotlib, 2010). Emotion dysregulation difficulties are also associated with severity of PTSD symptoms in women with a history of child abuse (Cloitre, Miranda, Stovall-McClough, & Han, 2005) as well as veterans with PTSD (Roemer, Litz, Orsillo, & Wagner, 2001). Notably, veterans with PTSD reported more frequent use of suppression compared to those without PTSD (Roemer et al., 2001). This means that veterans with PTSD are more likely to intentionally withhold the expression of their emotions, which likely contributes to more severe PTSD symptoms. Another study examined emotion dysregulation and PTSD symptoms in a sample of undergraduate students who were exposed to a traumatic event that evoked feelings of fear, helplessness, or horror (Tull, Barrett, McMillian, & Roemer, 2007). Results demonstrated that the relationship between PTSD severity and emotion dysregulation remained significant after controlling for negative affect. These findings add to the understanding of emotion dysregulation as a transdiagnostic factor in anxiety and related disorders.

A study examining emotion regulation deficits in a sample of undergraduate students found a significant relationship between difficulties with emotion regulation and OCD symptoms

(Stern et al., 2014). Further, when investigating the unique contributions of emotion regulation difficulties with OCD in a community sample, the relationship between emotion dysregulation and OCD remained significant after accounting for general distress (Fergus & Bardeen, 2014). Consistent with these findings, another study assessing the unique contribution of emotion dysregulation found that individuals with OCD experienced more emotion regulation difficulties compared to a nonclinical, matched control group, with emotion dysregulation predicting severity of OCD symptoms (Yap et al., 2018). Similar to findings in OCD, research has also investigated the relationship between emotion regulation difficulties and disordered eating. In general, patients with eating disorders report greater difficulties with emotion regulation compared to healthy normal-weight and overweight controls (Brockmeyer et al., 2014). In addition, a study assessing the contribution of emotion dysregulation to disordered eating and body dissatisfaction in men found that emotion regulation difficulties predicted disordered eating symptoms and body dissatisfaction after controlling for negative affect (Lavender & Anderson, 2010). Taken together, relationships between emotion regulation difficulties and various psychopathology have been consistently demonstrated in research.

Other studies have examined associations between the maladaptive strategy of experiential avoidance and psychopathology. Experiential avoidance is related to overall difficulties in emotion regulation (Gratz & Roemer, 2004), anxiety sensitivity (Tull & Gratz, 2008), BPD (Chapman, Specht, & Cellucci, 2005), as well as depression, anxiety, and somatization (Tull, Gratz, Salters, & Roemer, 2004). In a recent meta-analysis, maladaptive emotion regulation strategies, such as rumination, avoidance (i.e., both experiential and behavioral), and suppression, were associated with more psychopathology (e.g., anxiety, depression, substance use disorders, eating disorders; Aldao et al., 2010). Adaptive strategies,

such as acceptance, reappraisal, and problem solving were associated with less psychopathology. Notably, rumination was found to be most strongly related to overall psychopathology. Results also suggested that the presence of maladaptive emotion regulation strategies is more detrimental than the absence of adaptive strategies.

Research has examined the specific relationships between the experience of disgust and difficulties in emotion regulation. Overall difficulties in emotion regulation are associated with disgust sensitivity (Cisler et al., 2009). In a study assessing various factors (e.g., impulsivity, self-regulation, emotion regulation) and self-disgust (i.e., disgust directed toward the self; Power & Dalgleish, 2008) in a nonclinical population, self-disgust was positively associated with suppression and negatively associated with cognitive reappraisal (Lazuras, Ypsilanti, Powell, & Overton, 2018). When investigating the role of disgust in a clinical population, women with BPD reported higher self-disgust and scored higher on different self-report measures of disgust sensitivity compared to healthy women controls (Schienle et al., 2013). Disgust sensitivity was also found to predict symptoms of BPD, but anxiety sensitivity did not. Other studies have used experimental methods to assess emotion dysregulation factors related to disgust. For example, Rohrmann and colleagues (2009) assessed physiological responses and subjective ratings of emotional arousal throughout a disgust-inducing film. Participants with high and low levels of disgust sensitivity were instructed to either suppress their emotional responses, reappraise their emotional responses, or simply watch the film. Results demonstrated that individuals with high disgust sensitivity were more physiological and emotionally aroused than individuals with low disgust sensitivity. However, results did not demonstrate any differences as a result of the suppression, reappraisal, or control conditions. Compared to those with low disgust sensitivity, those with high engaged in more visual avoidance, which was described as a defensive coping

style. This demonstration of avoidance could be conceptualized as a maladaptive emotion regulation strategy that could have influenced the high disgust sensitive participants' physiological and emotional responses. Overall, these studies illustrate that the experience of disgust and disgust sensitivity is associated with maladaptive emotion regulation strategies and overall emotion dysregulation.

It is proposed that emotion regulation may enhance the contribution of emotional reactivity (e.g., anxiety sensitivity, disgust sensitivity) on anxiety symptoms (Cisler et al., 2010). A few studies have shown support for this theory. For example, Kashdan & Steger (2006) examined contributing factors of social anxiety symptoms and positive daily experiences in a sample of socially anxious individuals. Specifically, participants were asked to complete daily measures of social anxiety, emotion regulation, positive affect, and positive events. Results demonstrated that emotion regulation difficulties moderated the relationship between social anxiety and daily experiences for socially anxious individuals. Specifically, the number of positive events experienced was lowest on days when participants reported more social anxiety and suppression of emotions. On the contrary, the number of positive events was highest on days when participants reported less social anxiety and more acceptance of emotional experiences. Another study investigating the negative impact of high anxiety sensitivity and emotion dysregulation found that emotion regulation also moderated the relationship between anxiety sensitivity and anxiety symptoms (Kashdan, Zvolensky, & McLeish, 2008). In particular, non-acceptance of emotions and limited access to emotion regulation strategies was related to greater anxious arousal, worry, and agoraphobic cognitions for individuals with high anxiety sensitivity. Similarly, in a study assessing the associations between disgust sensitivity, emotion dysregulation, and specific fears (i.e., spiders, BII, contamination), emotion regulation

moderated the relationship between disgust sensitivity and spider and contamination fears (Cisler et al., 2009). Disgust sensitivity better predicted spider and contamination fears at high levels of emotion dysregulation compared to low levels. Results did not find a significant interaction when predicting BII fears. Taken together, both anxiety sensitivity and emotion dysregulation moderated the relationship between disgust sensitivity and disgust-related anxiety symptoms. However, no research has examined these constructs together with disgust sensitivity in the context of behavioral avoidance.

The Present Study

The present study aimed to examine the contributions of disgust sensitivity, anxiety sensitivity, and emotion dysregulation in relation to behavioral avoidance. Specifically, given the associations demonstrated in the research between disgust sensitivity, anxiety sensitivity, emotion dysregulation, and avoidance, the following was hypothesized:

- 1) All primary variables of interest will be significantly related. Specifically, disgust sensitivity, anxiety sensitivity, emotion dysregulation, state disgust and anxiety ratings during BATs, and steps refused on BATs will all be positively correlated, while distance approached on BATs will be negatively correlated.
- 2) The core and contamination disgust domains will be stronger predictors for behavioral avoidance on core and contamination disgust-related BATs, while animal reminder disgust will be a stronger predictor for behavioral avoidance on animal reminder disgust-related BATs.
- 3) Controlling for possible covariates (i.e., state disgust and anxiety ratings, gender), as well as anxiety sensitivity and emotion regulation, disgust sensitivity will uniquely predict behavioral avoidance on BATs.

- 4) Anxiety sensitivity and emotion regulation will moderate the relationship between disgust sensitivity and behavioral avoidance while controlling for possible covariates (i.e., state disgust and anxiety ratings, gender).

II. METHODS

Participants

The present study employed archival data from a larger lab study approved by the University of Mississippi IRB. Participants included 240 undergraduate students, above the age of 18 years-old, from the University of Mississippi. An a priori power analysis using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009) indicated that, for a linear multiple regression containing six predictor variables, a sample size of 98 participants is needed in order to detect a medium effect size. As such, the archival data set of 240 participants was well powered to test the proposed hypotheses.

Measures

Demographic Questionnaire (see Appendix A). The Demographic Questionnaire included questions that assess basic demographic information, including age, gender, marital status, education level, employment status, household income, race, ethnicity, and religious affiliation.

Disgust Scale-Revised (see Appendix B). The Disgust Scale-Revised (DS-R; Olatunji et al., 2007a) is a 27-item self-report measure that assesses individual differences in disgust sensitivity. This is a context-dependent measure of core, animal reminder, and contamination disgust. Questions 1-14 ask participants to indicate how much they agree with statements related to disgusting objects and situations (e.g., “It would bother me to see a rat run across my path in a park”) on a 5-point Likert scale from 0 (“strongly disagree”) to 4 (“strongly agree”). Questions 15-27 ask participants to indicate how disgusting certain experiences would be to them (e.g.,

“You are about to drink a glass of milk when you smell that it is spoiled”) on a 5-point Likert scale ranging from 0 (“not disgusting at all”) to 4 (“very disgusting”). The core subscale contains 12 items; the animal reminder subscale contains 8 items; and the contamination subscale contains 5 items. Items 12 and 16 are used as validity checks and excluded from the computation of scores. Due to the unequal number of items per subscale and to help with missed items, Olatunji and colleagues (2007a) and van Overveld, de Jong, Peters, and Schouten (2011) recommend averaging the subscale scores and the total score. The DS-R demonstrated good convergent and construct validity in the initial validation paper (Olatunji et al., 2007a). The overall scale ($\alpha = .88$), along with the core ($\alpha = .82$), animal reminder ($\alpha = .73$), and contamination-based disgust ($\alpha = .71$) subscales, evidenced adequate internal consistency (Olatunji et al., 2007a). In the current study, the total scale ($\alpha = .89$) as well as the core ($\alpha = .80$) and animal reminder ($\alpha = .81$) subscales evidenced good internal consistency. The contamination subscale ($\alpha = .70$) demonstrated acceptable internal consistency. The overall DS-R score, in addition to the separate domain scores, were used to assess the role of disgust sensitivity and the disgust domains as predictors of avoidance of disgust stimuli.

Anxiety Sensitivity Index-3 (see Appendix C). The Anxiety Sensitivity Index-3 (ASI-3; Taylor et al., 2007) is an 18-item self-report measure that assesses the severity of anxiety sensitivity, which is characterized by the fear of arousal-related sensations of anxiety. For example, one item states, “It scares me when my heart beats rapidly.” Participants are asked to rate how much each item applies to them on a 5-point Likert scale, with 0 indicating “very little” and 4 indicating “very much.” The possible range is from 0-72, with higher scores indicating higher anxiety sensitivity. The ASI-3 has evidenced good convergent, discriminant, and criterion-related validity (Taylor et al., 2007). Further, each of the ASI-3 subscales (i.e., physical

concerns, cognitive concerns, social concerns) demonstrated adequate internal consistency ($\alpha = .86, .91, .86$, respectively; Taylor et al., 2007). However, given the present study's hypotheses in addition to evidence that a bifactor model (i.e., a general AS factor) better explains anxiety sensitivity (Ebustani, McLeish, Luberto Young, & Maack, 2014), only the overall ASI-3 score was used to assess the role of anxiety sensitivity as a predictor in avoidance of disgust stimuli. In the current study, the total scale demonstrated good internal consistency ($\alpha = .89$).

Difficulties in Emotion Regulation Scale (see Appendix D). The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a 36-item self-report measure that assesses the complexities of emotion dysregulation. For example, one item states, "When I become upset, I feel embarrassed for feeling that way." Participants are asked to rate how often each statement applies to them on a 5-point Likert scale, with 1 indicating "almost never" and 5 indicating "almost always." The possible range is from 36-180, with higher scores indicating greater difficulties in emotion regulation (i.e., emotion dysregulation). The DERS has demonstrated good construct validity, predictive validity, as well as internal consistency ($\alpha = .93$; Gratz & Roemer, 2004). In the current study, the total scale evidenced excellent internal consistency ($\alpha = .93$). The overall DERS score was used to assess the role of emotion dysregulation as a predictor of avoidance of disgust stimuli.

Behavioral Avoidance Tasks (see Table 1). Behavioral Avoidance Tasks (BATs) involve the presentation and request to engage with potentially emotionally provoking stimuli (Tsao & McKay, 2004; Woody & Teachman, 2000). Previous research has recommended including behavioral measures in the examination of disgust sensitivity as a multimodal assessment (e.g., Woody & Teachman, 2000). Specifically, behavioral measures of disgust can help more objectively identify motivating factors related to behavioral avoidance. In the present

study, behavioral avoidance of disgust was measured using eight BATs based on previous research and demonstrated to be valid measures of disgust motivated behavioral avoidance (Olatunji et al., 2007b; Deacon & Maack, 2008; Rozin et al., 1999; Tsao & McKay, 2004). Three BATs used core disgust-related stimuli (i.e., earthworm, stained underwear, rotting orange). Two BATs involved animal reminder disgust-related stimuli (i.e., urn, cow eye). Three BATs included contamination disgust-related stimuli (contaminated clothing, sanitized pencil, dirty bedpan).

For each of the eight BATs, participants were asked to complete three separate steps of increasing difficulty. In the first step, participants were asked to approach the particular stimulus. Upon completion of this step, the physical distance between the participant and the stimulus was measured, which ranged from 0-120 inches. The second step involved the participant touching at least a part of the stimulus, while the third step included interacting more with the stimulus (e.g., holding it). Following each BAT step, participants were asked to report peak disgust and anxiety ratings (i.e., *state* disgust and anxiety) on a scale from 0-10, regardless if the task was completed or not. Behavioral avoidance scores were computed by: 1) totaling the number of steps refused for each BAT (i.e., steps refused), and 2) averaging the distance approached across the eight BATs (i.e., distance approached). The higher number of steps refused and the lower the distance approached indicated more avoidant behavior. Further, to examine domain-specific avoidance, the total steps refused and the average distance approached on the three core disgust-related BATs were computed to reflect core disgust-related behavioral avoidance. The same was computed for the two animal reminder disgust-related BATs to represent animal reminder disgust-related behavioral avoidance, and the three contamination disgust-related BATs to reflect contamination disgust-related behavioral avoidance.

Procedure

Undergraduate students enrolled in a psychology course at the University of Mississippi were recruited using SONA Systems. Participants presented to the ADEPT lab and, following consent, were asked to complete a battery of self-report measures. Only the aforementioned self-report measures were used in the present study. Subsequently, the eight BATs were presented in random order for each participant. Following completion of the study, students were granted research or extra course credit.

III. RESULTS

Preliminary Analyses

All analyses for the present study were performed using SPSS Version 25 (IBM Corp., 2017). Upon data cleaning, of the 240 participants, data from 46 were excluded from the study. Sixteen participants were excluded due to data entry errors. Twenty-six participants did not complete the ASI-3 and one participant did not complete any of the BATs. Using Mahalanobis distance, no multivariate outliers were identified. However, three participants were excluded due to univariate outliers on primary independent variable outcome measures (i.e., disgust sensitivity, anxiety sensitivity, emotion regulation). Two univariate outliers were identified on dependent variable outcome measures (i.e., behavioral avoidance on the BATs). However, they were not excluded based on the primary goals of the study, which are to better understand behavioral avoidance. Further analyses were completed on the remaining 194 participants. This data demonstrated normality, as evidenced by no skewness or kurtosis. Further, the distribution of the data was linear, and no multicollinearity, heterogeneity, or heteroscedasticity was found.

The final sample of 194 participants was 74.3% female with ages ranging between 18 and 36 years ($M = 19.07$, $SD = 1.67$). Participants were 71.9% White, 21.4% Black, 4.7% Multiracial, 1.6% Asian, and 0.5% Native American/Alaskan Native, and 5.2% were Hispanic. See Table 2 for descriptive statistics of the primary variables of interest.

Primary Analyses

Hypothesis 1. Zero-order Pearson correlations were run to test the hypothesis that disgust sensitivity, anxiety sensitivity, emotion dysregulation, state disgust and anxiety ratings, and steps

refused would all be positively correlated, and distance approached would be negatively correlated (see Table 2). Results showed that disgust sensitivity, anxiety sensitivity, state disgust and anxiety ratings, steps refused, and distance approached were all significantly associated with each other in the expected directions ($r_s = |.21-.64|$, $p_s < .01$). However, emotion dysregulation was not related to disgust sensitivity, steps refused, or distance approached ($r_s = |.03-.12|$, $p_s > .05$). Additionally, point-biserial correlations demonstrated that increased disgust sensitivity, more steps refused, and less distance approached was associated with being female ($r_s = |.21-.45|$, $p_s < .001$). Given the results from the correlational analyses, state disgust and anxiety ratings and gender were included as covariates in all subsequent analyses.

Hypothesis 2. Zero-order Pearson correlations and a series of hierarchical multiple regressions were used to examine the hypothesis that the core and contamination disgust domains would be stronger predictors for core- and contamination-related behavioral avoidance, while the animal reminder disgust domain would be a stronger predictor for animal reminder-related behavioral avoidance. Refer to Table 1 for information related to associated disgust domains for each BAT. Correlational analyses (see Table 3) demonstrated that higher core, animal reminder, and contamination disgust were significantly related to increased steps refused on core-, animal reminder-, and contamination-associated BATs ($r_s = .38-.57$, $p_s < .001$). Additionally, disgust ratings, anxiety ratings, and gender were significantly related to all disgust domains and associated BATs ($r_s = .16-.50$, $p_s < .05$).

In the three hierarchical multiple linear regressions (see Table 4), Step 1 included state disgust and anxiety ratings and gender, while Step 2 included the core, animal reminder, and contamination disgust domains. In the first regression, steps refused on core disgust-associated BATs was examined. Step 1 was significant [$F(3, 165) = 14.68$, $p < .001$, $\Delta R^2 = .21$]. However,

gender was the only unique predictor at the individual level, such that females were more likely to refuse to complete a BAT step in comparison to males. Step 2 was also significant [$F(3, 162) = 12.42, p < .001, \Delta R^2 = .15$], with the contamination disgust domain being the only unique predictor. Next, steps refused on animal reminder disgust-related BATs were assessed. Step 1 was significant [$F(3, 180) = 13.64, p < .001, \Delta R^2 = .19$]. Similar to the previous regression, gender was the only unique predictor. Step 2 was also significant [$F(13, 177) = 19.49, p < .001, \Delta R^2 = .20$], and the animal reminder and contamination disgust domains uniquely contributed to the model. When examining the standardized coefficients, animal reminder disgust ($\beta = .39$) appeared to be a stronger predictor than contamination disgust ($\beta = .15$). The final regression examined steps refused on contamination disgust-associated BATs. Step 1 was significant [$F(3, 173) = 10.18, p < .001, \Delta R^2 = .15$], with gender and disgust ratings being the only unique predictors. Step 2 was also significant [$F(3, 170) = 10.83, p < .001, \Delta R^2 = .14$], and contamination disgust was the only unique predictor.

Hypothesis 3. A hierarchical multiple linear regression was conducted to test the hypothesis that disgust sensitivity would uniquely predict behavioral avoidance when controlling for gender, state variables (i.e., disgust and anxiety ratings), anxiety sensitivity, and emotion dysregulation. Gender was entered into the regression as a predictor at Step 1; state disgust and anxiety ratings were entered at Step 2; anxiety sensitivity and emotion regulation were entered at Step 3; and disgust sensitivity was entered at Step 4. Steps refused was entered as the outcome variable (see Table 6). Results indicated that the six variables explained 38% of the variance in steps refused. Step 1 was significant [$F(1, 148) = 25.07, p < .001, \Delta R^2 = .15$]. Females were more likely to refuse to complete a BAT step in comparison to males. Step 2 was also significant [$F(2, 146) = 6.79, p < .01, \Delta R^2 = .07$]. However, when examining the contribution of each

predictor at the individual level, neither state disgust nor state anxiety independently contributed to the model. Step 3 was not significant [$F(2, 144) = .79, p = .45, \Delta R^2 = .01$]. Anxiety sensitivity and emotion regulation did not uniquely contribute to the model. Lastly, Step 4 was significant [$F(1, 143) = 35.29, p < .001, \Delta R^2 = .15$]. Higher disgust sensitivity was associated with a higher number of steps refused on the BATs.

Hypothesis 4. Finally, a moderation analyses using Hayes' PROCESS (Hayes, 2018) was conducted to address the hypothesis that anxiety sensitivity and emotion dysregulation would moderate the relationship between disgust sensitivity and steps refused while controlling for state disgust and anxiety ratings and gender. Results did not support moderation (see Table 8). The overall model was significant and accounted for 37.94% of the variance [$F(8, 141) = 10.78, p < .001$]. However, the disgust sensitivity x anxiety sensitivity [$F(1, 141) = .002, p = .96$] and disgust sensitivity x emotion regulation [$F(1, 141) = .02, p = .89$] interaction terms were not significant, meaning that the influence of disgust sensitivity on steps refused during the BATs did not vary depending on higher or lower levels of anxiety sensitivity or emotion regulation (see Figures 1 and 2). In other words, the effect of disgust sensitivity on steps refused was independent of anxiety sensitivity and emotion regulation.

Distance approached. All analyses for Hypotheses 2, 3, and 4 were subsequently run using distance approached as the outcome variable to identify any differing findings from the previous analyses that used steps refused as the outcome variable. When examining Hypothesis 2 (see Table 5), the disgust domains (entered at Step 2) did not significantly predict core-related avoidance. All other steps of the regressions were significant. At Step 1, gender and disgust ratings significantly predicted core disgust-related avoidance, while both gender and anxiety ratings significantly predicted animal reminder-related avoidance. None of the three variables

significantly contributed to contamination-related avoidance at the individual level. At Step 2, the findings were the same as the previous analyses, with the exception that contamination disgust did not significantly predict distance approached on animal reminder-related BATs.

Results from the hierarchical multiple linear regression examining Hypothesis 3 (see Table 7) found that disgust sensitivity did not uniquely predict distance approached when controlling for gender, disgust ratings, and anxiety ratings [$F(1, 159) = 3.77, p = .054, \Delta R^2 = .02$]. Lastly, results from the moderation analysis that assessed Hypothesis 4 (see Table 8) demonstrated that the overall model was significant and accounted for 22.03% of the variance [$F(8, 157) = 5.54, p < .001$]. However, similar to previous analysis, the disgust sensitivity x anxiety sensitivity [$F(1, 157) = .98, p = .32$] and disgust sensitivity x emotion regulation [$F(1, 157) = .01, p = .90$] interaction terms were not significant, meaning no moderation effects were found when examining distance approached.

IV. DISCUSSION

Disgust sensitivity, anxiety sensitivity, and emotion dysregulation are all factors known to influence behavioral avoidance (Deacon & Maack, 2008; Campbell-Sills et al., 2006; Lebowitz et al., 2015; Olatunji et al., 2008; van Overveld et al., 2010). Research has proposed that anxiety sensitivity and emotion dysregulation may interact with disgust sensitivity to influence psychopathology (Cisler et al., 2007; Cisler et al., 2008; Cisler et al., 2009). However, there is a lack of research that examines these factors together in this context. The purpose of the present study was to explore the contributions of disgust, anxiety sensitivity, and emotion dysregulation factors in disgust-motivated behavioral avoidance in order to gain a better understanding of how they might influence behavioral avoidance.

Relationships Between Study Variables

First, relationships between study variables (disgust sensitivity, anxiety sensitivity, emotion dysregulation, state disgust and anxiety ratings, behavioral avoidance) were examined. Results from correlational analyses partially supported study hypotheses, such that disgust sensitivity, anxiety sensitivity, state disgust and anxiety ratings, and behavioral avoidance (i.e., steps refused and distance approached on BATs) were all correlated. However, the expected associations between emotion dysregulation, disgust sensitivity, and behavioral avoidance were not found. The relationships observed between disgust sensitivity, anxiety sensitivity, state disgust and anxiety ratings, and behavioral avoidance in the present study replicated previous research. For example, disgust sensitivity and anxiety sensitivity have been found to be related in undergraduate samples similar to the one in the present study (Cisler et al., 2007; Cisler et al.,

2008; David et al., 2009; Goetz et al., 2013b; Olatunji et al., 2005; Williams et al., 2012), as well as in samples of individuals with a history of trauma (Badour et al., 2012) and PTSD (Olatunji et al., 2015). As discussed previously, both disgust and anxiety sensitivity have also been linked to behavioral avoidance (e.g., Deacon & Maack, 2008; Lebowitz et al., 2015; Olatunji et al., 2008). However, little research has examined the relationship between disgust and anxiety sensitivity using disgust-related behavioral measures. The consistent finding that disgust, anxiety sensitivity, and behavioral avoidance are correlated across different studies and procedures highlight the interconnectedness among these constructs. This suggests that these experiences likely coincide, and experiencing one of the symptoms (e.g., sensitivity to disgust) increases the likelihood of experiencing the others (e.g., anxiety sensitivity, behavioral avoidance). Given this information, it makes sense that behavioral avoidance would be a common response to this pattern of symptomatology. The associations between disgust, anxiety sensitivity, and behavioral avoidance are also likely bidirectional, such that continuing to avoid certain stimuli and situations is likely to increase your experience of disgust and anxiety in the long-term and vice versa (Barlow, 2002).

Analyses also indicated that higher levels of disgust sensitivity and greater behavioral avoidance were associated with being female. This is consistent with the plethora of research examining gender differences in disgust sensitivity, which finds that females tend to report greater disgust sensitivity compared to males (Haidt et al., 1994; Olatunji et al., 2005; Schienle et al., 2003). Previous research has also demonstrated that females report higher avoidance (e.g., Olatunji et al., 2009). Perhaps the most striking gender differences have been found in agoraphobic-related avoidance, with females reporting significantly more severe avoidance of engaging in situations alone compared to males (Cameron & Hill, 1989; Turgeon, Marchand, &

Dupuis, 1998). The present study adds to this literature by suggesting that disgust-motivated avoidance may also result in similar, grave gender differences. Taken together, this research suggests that gender differences may be especially important in disgust research and is likely to impact results.

Inconsistent with study hypotheses however, emotion dysregulation was not significantly correlated with disgust sensitivity. This is contrary to previous research (Cisler et al., 2009), which demonstrated a significant relationship between disgust sensitivity and emotion dysregulation in a similar sample of undergraduate students using the same self-report measures. However, Cisler and colleagues (2009) had a much larger sample ($N = 594$) and the relationship between the DS-R and DERS was weak ($r = .20$). Similarly, in the present study, a significant relationship between the DERS and average disgust ratings during the BATs (i.e., state disgust) was detected, but also weak ($r = .16$). Although emotion regulation difficulties have been proposed to play a primary role in the development and maintenance of mood and anxiety disorders (Gross, 2013; Thayer & Lane, 2000), it may not play as important of a role in disgust psychopathology. Because the basic emotion of disgust is fundamentally different than the emotions of anxiety and fear, more research is needed to examine what contributes to increased sensitivity to disgust. Another potential reason for this finding could be the way in which emotion dysregulation was measured in the current study. The DERS assesses general difficulties in emotion regulation, as opposed to specific emotion regulation strategies. It may be that certain strategies, such as suppression, are more relevant to disgust sensitivity, as opposed to more broad difficulties.

Further conflicting with study hypotheses, emotion dysregulation was not associated with disgust-motivated behavioral avoidance. Much of the research examining the role of emotion

dysregulation in avoidance has focused on experiential avoidance and emotional suppression (Aldao et al., 2010; Campbell-Sills et al., 2006; Gratz & Roemer, 2004). This is the first study to examine emotion dysregulation in the context of disgust-motivated behavioral avoidance using BATs. It may be that emotion dysregulation is related to some types of avoidance, such as cognitive avoidance and behavioral avoidance motivated by different emotions (e.g., anxiety), but not disgust-motivated behavioral avoidance. This result is consistent with the null finding between the relationship of disgust sensitivity and emotion dysregulation, and further suggests that general emotion regulation difficulties may not be an important factor in the context of disgust. However, more research is needed to support this claim and to obtain a better understanding of the relationships among disgust and emotion dysregulation in the context of disgust-motivated behavioral avoidance.

Disgust Domains and Behavioral Avoidance on Associated-BATs

The second aim of the study was to explore the relationships between the three domains of disgust (i.e., core, animal reminder, contamination) and behavioral avoidance on associated BATs. As depicted in Table 1, the core BATs involved interacting with an earthworm, underwear with a “feces” stain, and a rotting orange. The animal reminder BATs included an urn filled with “human” ashes and a cow eye. The contamination BATs included contaminated clothing, a sanitized pencil previously dropped in toilet water, and a bedpan filled with “urine.” Results from a series of hierarchical multiple linear regressions partially supported hypotheses. For example, contamination disgust appeared to be the strongest predictor for core- and contamination-related avoidance. This is consistent with previous research (Olatunji et al., 2008), which found that contamination disgust predicted visual avoidance on core- and contamination-related videos. Additionally, studies examining contamination- and health-related BATs found

that only the contamination disgust domain predicted avoidance in a public restroom (Olatunji et al., 2014a) and during exposures to the common cold, flu, and mononucleosis (Fan & Olatunji, 2013).

Also supporting hypotheses, animal reminder disgust appeared to be the strongest predictor for animal reminder-related avoidance. Studies have found only the animal reminder disgust domain to predict visual avoidance while watching an animal reminder-related video (Olatunji et al., 2008) and while looking at animal reminder-related pictures (Woody & Tolin, 2002). These findings provide some support for the differentiation between disease avoidance and harm avoidance. Disease avoidance is theorized to better explain the motivation behind avoidance of core and contamination disgust elicitors, while harm avoidance is thought to best explain animal reminder-related avoidance (Olatunji et al., 2009).

A surprising finding that was contrary to study hypotheses and previous research was that core disgust did not significantly predict steps refused or distance approached on core-, animal reminder-, or contamination-related BATs. Olatunji and colleagues (2008) found that core disgust significantly predicted visual avoidance on videos depicting uncommon food habits involving a cow blood and milk mixture (core), an open-heart surgery (animal reminder), and toilets and garbage (contamination) videos. One explanation for the difference in findings may be that the videos used by Olatunji and colleagues (2008) seem to have displayed elicitors across the disgust domains, while the elicitors in the present study were more domain-specific. Although each video in the study by Olatunji and colleagues (2008) was intended to be linked to a specific domain, the core disgust video portrayed cow blood, which could prompt the experience of animal reminder disgust. Similarly, the contamination video depicted scenes with

garbage, which could stimulate core disgust. Given these findings, it may be that core disgust is better able to predict avoidance when various domain elicitors are present.

Olatunji and colleagues (2008) also found core disgust to predict behavioral avoidance on a core-related BAT that involved drinking the contents of a previously chewed up grape. Compared to the BATs used in the present study which primarily focused on the sense of touch, the grape task comprised of the sense of taste which may elicit a different behavioral response. Overall, the present study's findings highlight the challenge in assessing and differentiating between the motivations behind disease and harm avoidance. Due to the inconclusive findings of the present study, more behavioral research is needed to test the claims related to the differentiation between the two theories.

Disgust Sensitivity as a Unique Predictor of Behavioral Avoidance

The third aim of this study was to investigate the predictive abilities of anxiety sensitivity, emotion dysregulation, and disgust sensitivity in behavioral avoidance while accounting for covariates. Contrary to hypotheses, anxiety sensitivity and emotion dysregulation did not uniquely predict behavioral avoidance after controlling for gender and state disgust and anxiety ratings in the present study. Previous research has found that disgust sensitivity and anxiety sensitivity no longer predicted behavioral avoidance after controlling for state disgust and anxiety ratings (Woody & Tolin, 2002; Woody et al., 2005). Important to note, these studies did not include gender as a covariate. Given that state disgust and anxiety ratings in addition to gender were entered into the regression before anxiety sensitivity and emotion dysregulation, it could be that the variance that would have been explained by anxiety sensitivity and emotion dysregulation is being accounted for by these covariates. For example, gender accounted for 15% of the variance in steps refused and 3% in distance approached. The state variables accounted for

7% of the variance in steps refused and 16% in distance approached. Together, those three variables alone are accounting for 19-22% of the variance in behavioral avoidance.

Another possibility is that anxiety sensitivity and emotion dysregulation do not predict disgust-motivated behavioral avoidance. As discussed previously, difficulties in emotion regulation may not play a role in disgust like it appears to in anxiety. Previous research has found emotion dysregulation to be linked to disgust-related disorders, such as OCD (Stern et al., 2014; Yap et al., 2018). The current study's findings suggest that the mechanisms in which emotion dysregulation influences these symptoms is not through behavioral avoidance. It may also be that disgust is related to certain emotion regulation strategies, as opposed to general emotion regulation difficulties. Comparatively, anxiety sensitivity may not have predicted behavioral avoidance due to the nature of the BATs. The purpose of the BATs in the present study was to elicit disgust reactions. It may be that the BATs did not evoke the experience of fear related to anxiety sensations (i.e., anxiety sensitivity). Because there has been research demonstrating differences in the physiological reactions of disgust and anxiety (de Jong et al., 2011; van Overveld et al., 2009), anxiety sensitivity may not have been relevant in this context.

Perhaps the most noteworthy finding from the present study was that disgust sensitivity uniquely predicted steps refused on the BATs above and beyond gender, state disgust and anxiety ratings, anxiety sensitivity, and emotion dysregulation. After accounting for these variables, disgust sensitivity accounted for an additional 15% of the variance in steps refused. Previous research has consistently demonstrated that disgust sensitivity predicts behavioral avoidance (Deacon & Maack, 2008; Deacon & Olatunji, 2007; Olatunji et al., 2008; Olatunji et al., 2007b; van Overveld, de Jong, & Peters, 2010). However, as discussed previously, some research has suggested that state disgust and state anxiety are better predictors of disgust-

motivated avoidance compared to disgust sensitivity and anxiety sensitivity (Woody & Tolin, 2002; Woody et al., 2005). In contrast to these findings, the current study found that disgust sensitivity is a meaningful predictor of steps refused on BATs. Given how much variance was accounted for by the covariates, these findings stress the importance of disgust in this context.

The last aim of the study further speaks to the importance of disgust sensitivity in behavioral avoidance. Anxiety sensitivity and emotion dysregulation did not moderate the relationship between disgust sensitivity and behavioral avoidance. This suggests that the predictive ability of disgust sensitivity in behavioral avoidance was independent of differing levels of anxiety sensitivity and emotion dysregulation. This is contrary to previous findings that have shown anxiety sensitivity (Cisler et al., 2007; Cisler et al., 2008) and emotion dysregulation (Cisler et al., 2009) to moderate the relationship between disgust sensitivity and contamination fears. Cisler and colleagues (2009) additionally found emotion dysregulation to moderate the relationship between disgust sensitivity and spider fears. However, neither variables had a moderating effect when examining BII fears in these studies. This could indicate that the interaction effects may depend on what psychopathology is being assessed. No studies have examined the moderating effects of anxiety sensitivity and emotion dysregulation when assessing disgust sensitivity and disgust-motivated behavioral avoidance. Overall, these results highlight that sensitivity towards the basic emotion of disgust is well-linked to increased behavioral avoidance on disgust-related tasks. Different emotions are associated with different response patterns, and this study helped identify situations in which people are likely going to be influenced by their sensitivity towards disgust, more so than other vulnerabilities like anxiety sensitivity and emotion dysregulation.

The difference in findings between steps refused and distance approached throughout the study are also important to mention. The two measures of avoidance were significantly related with a moderate effect size ($r = -.64$). This indicates that although these variables are significantly correlated, they are measuring different aspects of behavior, suggesting that the way behavioral avoidance is assessed is likely to influence results. This is reflective of the overall differential findings in the present study between the two outcome variables (i.e., disgust sensitivity uniquely predicted steps refused on the BATs, but not distance approached). Steps refused requires persistence through increasingly distressing situations, while distance approached includes brief contact with the stimulus and the subsequent opportunity to immediately back away or avoid. Given these differences, steps refused seems to capture a more accurate representation of behavioral avoidance. Therefore, it may be better for research to use steps refused on BATs as an indicator of behavioral avoidance, as opposed to distance approached. Distance approached may be more relevant for research interested in examining what influences individuals to initially engaging in that first step.

Limitations and Future Directions

Although the present study had many strengths, including the use of behavioral measures of avoidance, a few limitations are important to note related to the generalizability of the findings. First, there was a lack of diversity in the sample used in the present study. Given that participants were all college students and primarily White and female, the results of the present study may not generalize in other, more diverse populations. The use of a nonclinical sample is another limitation. A clinical sample may have yielded different results and richer interpretations that generalize better to understanding factors related to behavioral avoidance in clinical populations.

Moreover, the BATs were structured in a way that refusal to participate in any BAT step or discontinue the study at any time (without any adverse consequences) was an option. As a result, it may not have been necessary for participants to push themselves to the point where they needed to practice emotion regulation strategies. The option to refuse or discontinue could also be one explanation for the low average disgust and anxiety ratings during the BATs (e.g., state variables) in the present study. Based on these considerations, the findings from the present study may not generalize to forced engagement situations in which one is not given an opportunity to avoid.

Future research in this area, with both nonclinical and clinical populations, could benefit from assessing what emotion regulation strategies participants or patients use during the BATs. This may yield more information about other avoidance strategies people engage in to help complete the behavioral tasks (e.g., cognitive avoidance, emotional suppression). Additionally, using a variety of types of BATs may be useful for understanding the role of disgust across different contexts. For example, including disgust-eliciting videos or a task that involves tasting a substance may provide useful information about how the involvement of different senses during BATs might result in different behaviors. Anxiety-related BATs would also be beneficial to include, so factors influencing avoidance can be compared across disgust- and anxiety-related contexts. For example, disgust reactions may also play a role in behavioral responses during anxiety-focused interoceptive exposures, such as those proposed by Antony, Ledley, Liss, and Swinson (2006; e.g., spinning, tongue depressor). These tasks could be used to assess and compare anxiety and disgust reactions. Examining physiological responses during the BATs could also yield more information related to the differential responses in disgust and anxiety during distressing situations.

Conclusion

The goal of the present study was to better understand how disgust sensitivity, anxiety sensitivity, and emotion dysregulation contributes to behavioral avoidance. Previous studies have found that these transdiagnostic factors impact behavioral avoidance (Deacon & Maack, 2008; Campbell-Sills et al., 2006; Lebowitz et al., 2015; Olatunji et al., 2008; van Overveld et al., 2010). Additional research has emphasized the importance of other variables, such as state experiences (i.e., state disgust and anxiety ratings during BATs) and gender, in this context as well (Haidt et al., 1994; Schienle et al., 2003; Woody & Tolin, 2002; Woody et al., 2005). However, no research has examined all of the above-mentioned factors together and how they differentially contribute to behavioral avoidance.

The current study incorporated the assessment of disgust sensitivity, anxiety sensitivity, emotion dysregulation, state disgust and anxiety, and gender to expand upon previous research and better understand influences of behavioral avoidance on disgust-related BATs. Findings add to previous research by highlighting the unique contribution of disgust sensitivity in behavioral avoidance, above and beyond gender, state disgust and anxiety ratings during BATs, and the transdiagnostic constructs of anxiety sensitivity and emotion dysregulation. Given the present study's findings, future research is needed to examine additional factors that may influence the relationship between disgust and behavioral avoidance. Moreover, it is important that research incorporates the assessment of disgust when examining psychopathology known to be associated with disgust.

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LIST OF TABLES

Table 1. Behavioral Avoidance Tasks (BATs).

BAT	Domain	Description	Participants are asked if they are willing to...		
			Step 1: Approach	Step 2: Touch	Step 3: Immersion
Earthworm	Core	A live earthworm is presented.	Approach the earthworm	Touch the earthworm	Pick up the earthworm and let it crawl on their hand
Stained Underwear ^a	Core	A pair of stained underwear is presented. Participants are told the brown stain is feces.	Approach the underwear	Touch part of the underwear	Touch the stain on the underwear
Rotting Orange	Core	A moldy, rotting orange is presented.	Approach the orange	Touch the orange	Hold the orange
Urn ^a	Animal Reminder	A ceramic urn filled with ashes is presented. Participants are told the ashes are human remains.	Approach the urn	Touch the inside of the urn	Touch the ashes
Cow Eye	Animal Reminder	A cow eyeball and hypodermic needle filled with water is presented on a tray.	Approach the eye	Touch the eye	Inject the eye with the syringe filled with water
Contaminated Clothing	Contamination	A shirt that is in a zip locked bag is presented. Participants are told that the shirt was in a dog kennel for a couple of days and contains traces of dog urine and feces.	Approach and open the bag to smell the shirt	Touch the shirt	Remove the shirt, smell it, and return it to the bag
Sanitized Pencil	Contamination	A pencil that was dropped in toilet water and then thoroughly sanitized is presented.	Approach the pencil	Touch the pencil	Hold the pencil
Dirty Bedpan ^a	Contamination	A bedpan containing a yellow liquid is presented. Participants are told the liquid is urine.	Approach the bedpan	Put hand in the urine while wearing a latex glove	Remove the glove and submerge hand in the bedpan

Note: Deception was used during three of the BATs (i.e., Stained Underwear, Urn, Bedpan). ^aThe stain on the underwear is old pudding, not feces. ^bThe urn contains ashes, but they are not human ashes. ^cThe yellow liquid in the bedpan task is water and added deer pee smell.

Table 2. *Descriptive Statistics and Correlations Among Primary Variables and Possible Covariates.*

	<i>M</i>	<i>SD</i>	1.	2.	3.	4.	5.	6.	7.	8.
1. Disgust Sensitivity (DS-R)	2.35	.73	---	.22**	.12	.62***	-.37***	.32***	.38***	.45***
2. Anxiety Sensitivity (ASI-3)	11.90	10.28		---	.47***	.21***	-.24***	.35***	.41***	.01
3. Emotion Dysregulation (DERS)	79.50	21.76			---	.03	-.04	.16*	.23**	-.04
4. Steps Refused (BATs)	11.31	5.70				---	-.64***	.25**	.27***	.39***
5. Distance Approached (BATs)	96.35	27.02					---	-.38***	-.39***	-.21***
6. State Disgust Ratings (BATs)	1.94	1.91						---	.77***	.01
7. State Anxiety Ratings (BATs)	1.62	1.71							---	.12
8. Gender^a										---

Note: * $p < .05$; ** $p < .01$; *** $p < .001$. DS-R = Disgust Scale-Revised. ASI-3 = Anxiety Sensitivity Index-3. DERS = Difficulties in Emotion Regulation. BATs = Behavioral Avoidance Tasks. ^a0 = male, 1 = female.

Table 3. *Correlations Among Disgust Domains and BAT Avoidance on Particular Tasks.*

	Behavioral Avoidance					
	Steps Refused			Distance Approached		
	Core BATs	Animal Reminder BATs	Contamination BATs	Core BATs	Animal Reminder BATs	Contamination BATs
DS-R Core Subscale	.52***	.52***	.47***	-.23**	-.36***	-.23**
DS-R Animal Reminder Subscale	.45***	.57***	.41***	-.15*	-.36***	-.24**
DS-R Contamination Subscale	.43***	.38***	.40***	-.30***	-.25**	-.29***

*Note: *p < .05; **p < .01; ***p < .001. BATs = Behavioral Avoidance Tasks. DS-R = Disgust Scale-Revised.*

Table 4. Regressions Examining the Disgust Domains and Associated BATs with Steps Refused as the Outcome Variable.

	Steps Refused								
	Core BATS			Animal Reminder BATS			Contamination BATS		
	ΔR^2	β	p	ΔR^2	β	p	ΔR^2	β	p
Step 1	.21		< .001	.19		< .001	.15		< .001
State Disgust Ratings		.13	.22		.14	.17		.24	< .05
State Anxiety Ratings		.14	.19		.11	.29		-.02	.87
Gender		.36	< .001		.34	< .001		.31	< .001
Step 2	.15		< .001	.20		< .001	.14		< .001
DS-R Core Subscale		.16	.13		.07	.48		.18	.09
DS-R Animal Reminder Subscale		.17	.053		.39	< .001		.14	.13
DS-R Contamination Subscale		.23	< .01		.15	< .05		.21	< .01

Note: BATs = Behavioral Avoidance Tasks. DS-R = Disgust Scale-Revised.

Table 5. Regressions Examining the Disgust Domains and Associated BATs with Distance Approached as the Outcome Variable.

	Distance Approached								
	Core BATs			Animal Reminder BATs			Contamination BATs		
	ΔR^2	β	p	ΔR^2	β	p	ΔR^2	β	p
Step 1	.13		< .001	.13		< .001	.10		< .001
State Disgust Ratings		-.34	< .01		-.03	.78		-.20	.07
State Anxiety Ratings		.02	.88		-.27	< .05		-.11	.30
Gender		-.17	< .05		-.19	< .01		-.11	.12
Step 2	.03		.12	.06		< .01	.05		< .05
DS-R Core Subscale		.03	.79		-.07	.52		.11	.35
DS-R Animal Reminder Subscale		.006	.95		-.20	< .05		-.17	.08
DS-R Contamination Subscale		-.19	< .05		-.06	.48		-.18	< .05

Note: BATs = Behavioral Avoidance Tasks. DS-R = Disgust Scale-Revised.

Table 6. *Hierarchical Multiple Linear Regression with Steps Refused as the Outcome Variable.*

	Steps Refused					
	ΔR^2	<i>B</i>	<i>SE B</i>	β	<i>pr</i> ²	<i>p</i>
Step 1	.15					< .001
Gender		4.89	.98	.38	.15	< .001
Step 2	.07					< .01
State Disgust Ratings (BATs)		.63	.34	.21	.02	.06
State Anxiety Ratings (BATs)		.22	.38	.07	.002	.56
Step 3	.01					.45
Anxiety Sensitivity (ASI-3)		.06	.05	.10	.009	.25
Emotion Dysregulation (DERS)		-.02	.02	-.08	.006	.35
Step 4	.15					< .001
Disgust Sensitivity (DS-R)		3.61	.61	.47	.20	< .001

Note: BATs = Behavioral Avoidance Tasks. ASI-3 = Anxiety Sensitivity Index-3. DERS = Difficulties in Emotion Regulation Scale. DS-R = Disgust Scale-Revised.

Table 7. Hierarchical Multiple Linear Regression with Distance Approached as the Outcome Variable.

	Distance Approached					
	ΔR^2	<i>B</i>	<i>SE B</i>	β	<i>pr</i> ²	<i>p</i>
Step 1	.03					< .05
Gender		-10.81	4.49	-.19	.03	< .05
Step 2	.16					< .001
State Disgust Ratings (BATs)		-3.59	1.47	-.28	.04	< .05
State Anxiety Ratings (BATs)		-2.14	1.69	-.14	.01	.21
Step 3	.001					.94
Anxiety Sensitivity (ASI-3)		.04	.21	.02	.000	.84
Emotion Dysregulation (DERS)		.02	.09	.01	.000	.86
Step 4	.02					.054
Disgust Sensitivity (DS-R)		-5.71	2.94	-.17	.02	.054

Note: BATs = Behavioral Avoidance Tasks. ASI-3 = Anxiety Sensitivity Index-3. DERS = Difficulties in Emotion Regulation Scale. DS-R = Disgust Scale-Revised.

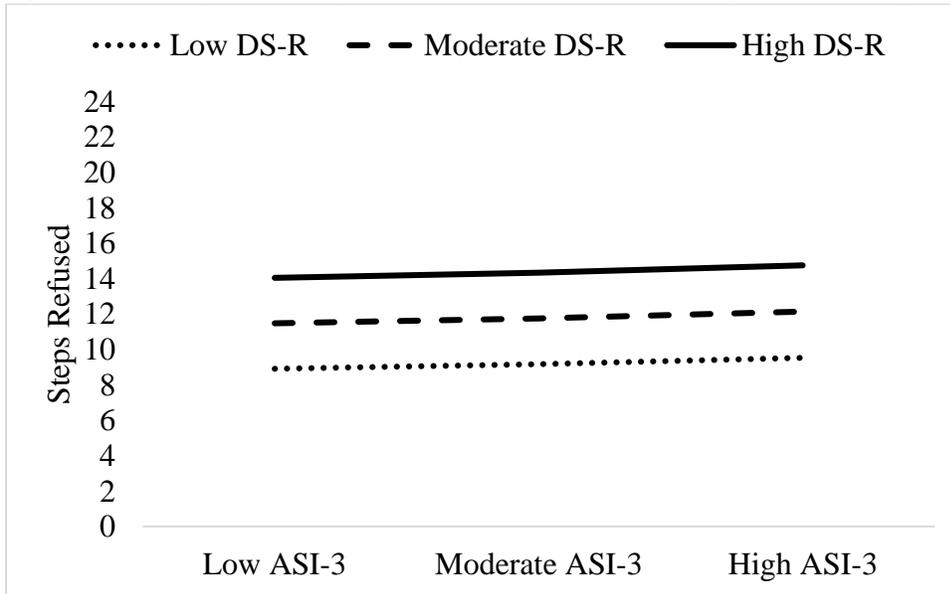
Table 8. *Anxiety Sensitivity and Emotion Dysregulation as Moderators of the Relationship between Disgust Sensitivity and Behavioral Avoidance.*

	Behavioral Avoidance					
	Steps Refused			Distance Approached		
	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>
Disgust Sensitivity (DS-R)	3.42	1.25	< .01	-9.67	5.79	.10
Anxiety Sensitivity (ASI-3)	.03	.19	.87	-.85	.93	.36
Emotion Dysregulation (DERS)	-.03	.06	.61	.008	.31	.98
DS-R x ASI-3	.004	.07	.96	.35	.35	.32
DS-R x DERS	.004	.03	.89	.02	.13	.90

Note: DS-R = Disgust Scale-Revised. ASI-3 = Anxiety Sensitivity Index-3. DERS = Difficulties in Emotion Regulation. Covariates included gender, state disgust ratings, state anxiety ratings.

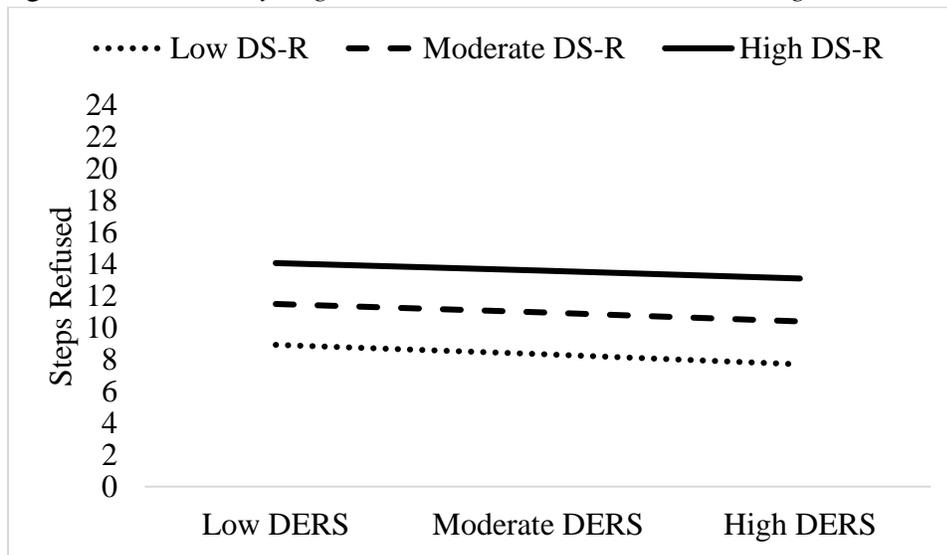
LIST OF FIGURES

Figure 1. Anxiety Sensitivity as a Moderator between Disgust Sensitivity and Steps Refused.



Note: DS-R = Disgust Scale-Revised. ASI-3 = Anxiety Sensitivity Index-3.

Figure 2. *Emotion Dysregulation as a Moderator between Disgust Sensitivity and Steps Refused.*



Note: DS-R = Disgust Scale-Revised. DERS = Difficulties in Emotion Regulation Scale.

LIST OF APPENDICES

APPENDIX A: DEMOGRAPHIC INFORMATION

Please answer the following questions.

1. What is your biological sex?
0 = Male
1 = Female
2. How old are you? ____ (Ranges from 18 to 64)
3. What is your marital status?
0 = Never married
1 = Married
2 = Divorced/Annulled
3 = Separated
4 = Widowed
5 = Not married, but living with partner
4. Who do you currently live with? Check all that apply.
0 = Alone
1 = Spouse or romantic partner
2 = Children (under age 18)
3 = Other relative
4 = Friend or roommate
5. What is your *highest* education level completed?
0 = Elementary (8th grade or less)
1 = Some High School
2 = High School Diploma
3 = Some College
4 = Bachelor's Degree
5 = Master's Degree
6 = Doctoral or professional degree (PhD, MD, etc.)
6. What best describes your current employment status?
0 = Unemployed
1 = Home Maker
2 = Part-Time
3 = Full-time (40 hours per week or more)
7. What best describes your total household income (before taxes)?
0 = Less than 10,000
1 = \$10,000 to \$20,000
2 = \$21,000 to \$30,000
3 = \$31,000 to \$50,000
4 = \$51,000 to \$100,000
5 = Greater than \$100,000
8. Do you describe yourself as a Hispanic or Latino?
0 = No
1 = Yes
9. What is your race?
0 = White
1 = Black/African American
2 = Asian
3 = Native American, Alaskan Native
4 = Asian or Pacific Islander
5 = Native Hawaiian or Other Pacific Islander
6 = Multiracial (list numbers ____ & ____ & ____)
10. What is your religious affiliation?
 1. Protestant Christian
 2. Roman Catholic
 3. Evangelical Christian
 4. Jewish
 5. Muslim
 6. Hindu
 7. Buddhist
 8. Other: _____
 9. I am not religious

APPENDIX B: DISGUST SCALE-REVISED (DS-R)

Please indicate how much you agree with each of the following statements, or how true it is about you. Please write a number (0-4) to indicate your answer:

- 0** = Strongly disagree (very untrue about me)
- 1** = Mildly disagree (somewhat untrue about me)
- 2** = Neither agree nor disagree
- 3** = Mildly agree (somewhat true about me)
- 4** = Strongly agree (very true about me)

- ___ 1. I might be willing to try eating monkey meat, under some circumstances.
- ___ 2. It would bother me to be in a science class, and to see a human hand preserved in a jar.
- ___ 3. It bothers me to hear someone clear a throat full of mucous.
- ___ 4. I never let any part of my body touch the toilet seat in public restrooms.
- ___ 5. I would go out of my way to avoid walking through a graveyard.
- ___ 6. Seeing a cockroach in someone else's house doesn't bother me.
- ___ 7. It would bother me tremendously to touch a dead body.
- ___ 8. If I see someone vomit, it makes me sick to my stomach.
- ___ 9. I probably would not go to my favorite restaurant if I found out that the cook had a cold.
- ___ 10. It would not upset me at all to watch a person with a glass eye take the eye out of the socket.
- ___ 11. It would bother me to see a rat run across my path in a park.
- ___ 12. I would rather eat a piece of fruit than a piece of paper
- ___ 13. Even if I was hungry, I would not drink a bowl of my favorite soup if it had been stirred by a used but thoroughly washed flyswatter.
- ___ 14. It would bother me to sleep in a nice hotel room if I knew that a man had died of a heart attack in that room the night before.

How disgusting would you find each of the following experiences? Please write a number (0-4) to indicate your answer:

- 0** = Not disgusting at all
- 1** = Slightly disgusting
- 2** = Moderately disgusting
- 3** = Very disgusting
- 4** = Extremely disgusting

- ___ 15. You see maggots on a piece of meat in an outdoor garbage pail.
- ___ 16. You see a person eating an apple with a knife and fork
- ___ 17. While you are walking through a tunnel under a railroad track, you smell urine.
- ___ 18. You take a sip of soda, and then realize that you drank from the glass that an acquaintance of yours had been drinking from.
- ___ 19. Your friend's pet cat dies, and you have to pick up the dead body with your bare hands.
- ___ 20. You see someone put ketchup on vanilla ice cream, and eat it.
- ___ 21. You see a man with his intestines exposed after an accident.
- ___ 22. You discover that a friend of yours changes underwear only once a week.
- ___ 23. A friend offers you a piece of chocolate shaped like dog-doo.
- ___ 24. You accidentally touch the ashes of a person who has been cremated.
- ___ 25. You are about to drink a glass of milk when you smell that it is spoiled.
- ___ 26. As part of a sex education class, you are required to inflate a new unlubricated condom, using your mouth.
- ___ 27. You are walking barefoot on concrete, and you step on an earthworm.

APPENDIX C: ANXIETY SENSITIVITY INDEX-3 (ASI-3)

Please rate each item by selecting one of the five answers for each question. Please answer each statement by circling the number that best applies to you.

	Very Little	A little	Some	Much	Very much
1. It is important for me not to appear nervous.	0	1	2	3	4
2. When I cannot keep my mind on a task, I worry that I might be going crazy.	0	1	2	3	4
3. It scares me when my heart beats rapidly.	0	1	2	3	4
4. When my stomach is upset, I worry that I might be seriously ill.	0	1	2	3	4
5. It scares me when I am unable to keep my mind on a task.	0	1	2	3	4
6. When I tremble in the presence of others, I fear what people might think of me.	0	1	2	3	4
7. When my chest feels tight, I get scared that I won't be able to breathe properly.	0	1	2	3	4
8. When I feel pain in my chest, I worry that I am going to have a heart attack.	0	1	2	3	4
9. I worry that other people will notice my anxiety.	0	1	2	3	4
10. When I feel "spacey" or spaced out I worry that I may be mentally ill.	0	1	2	3	4
11. It scares me when I blush in front of people.	0	1	2	3	4
12. When I notice my heart skipping a beat, I worry that there is something seriously wrong with me.	0	1	2	3.	4
13. When I begin to sweat in a social situation, I fear people will think negatively of me.	0	1	2	3	4
14. When my thoughts seem to speed up, I worry that I might be going crazy.	0	1	2	3	4
15. When my throat feels tight, I worry that I could choke to death.	0	1	2	3	4
16. When I have trouble thinking clearly, I worry that there is something wrong with me.	0	1	2	3	4
17. I think it would be horrible for me to faint in public.	0	1	2	3	4
18. When my mind goes blank, I worry there is something terribly wrong with me.	0	1	2	3	4

APPENDIX D: DIFFICULTIES IN EMOTION REGULATION SCALE (DERS)

Please indicate how often the following statements apply to you by writing the appropriate number from the scale below on the line beside each item:

1	2	3	4	5
Almost never	Sometimes	About half the time	Most of the time	Almost always
(0-10%)	(11-35%)	(36-65%)	(66-90%)	(91-100%)

	Almost Never	Some- times	About 1/2 the time	Most of the time	Almost Always
1. I am clear about my feelings.	1	2	3	4	5
2. I pay attention to how I feel.	1	2	3	4	5
3. I experience my emotions as overwhelming and out of control.	1	2	3	4	5
4. I have no idea how I am feeling.	1	2	3	4	5
5. I have difficulty making sense out of my feelings.	1	2	3	4	5
6. I am attentive to my feelings.	1	2	3	4	5
7. I know exactly how I am feeling.	1	2	3	4	5
8. I care about what I am feeling.	1	2	3	4	5
9. I am confused about how I feel.	1	2	3	4	5
10. When I'm upset, I acknowledge my emotions.	1	2	3	4	5
11. When I'm upset, I become angry with myself for feeling that way.	1	2	3	4	5
12. When I'm upset, I become embarrassed for feeling that way.	1	2	3	4	5
13. When I'm upset, I have difficulty getting work done.	1	2	3	4	5
14. When I'm upset, I become out of control.	1	2	3	4	5
15. When I'm upset, I believe that I will remain that way for a long time.	1	2	3	4	5
16. When I'm upset, I believe that I'll end up feeling very depressed.	1	2	3	4	5
17. When I'm upset, I believe that my feelings are valid and important.	1	2	3	4	5
18. When I'm upset, I have difficulty focusing on other things.	1	2	3	4	5
19. When I'm upset, I feel out of control.	1	2	3	4	5
20. When I'm upset, I can still get things done.	1	2	3	4	5

21. When I'm upset, I feel ashamed with myself for feeling that way.	1	2	3	4	5
22. When I'm upset, I know that I can find a way to eventually feel better.	1	2	3	4	5
23. When I'm upset, I feel like I am weak.	1	2	3	4	5
24. When I'm upset, I feel like I can remain in control of my behaviors	1	2	3	4	5
25. When I'm upset, I feel guilty for feeling that way.	1	2	3	4	5
26. When I'm upset, I have difficulty concentrating.	1	2	3	4	5
27. When I'm upset, I have difficulty controlling my behaviors	1	2	3	4	5
28. When I'm upset, I believe that there is nothing I can do to make myself feel better.	1	2	3	4	5
29. When I'm upset, I become irritated with myself for feeling that way.	1	2	3	4	5
30. When I'm upset, I start to feel very bad about myself.	1	2	3	4	5
31. When I'm upset, I believe that wallowing in it is all I can do.	1	2	3	4	5
32. When I'm upset, I lose control over my behaviors.	1	2	3	4	5
33. When I'm upset, I have difficulty thinking about anything else.	1	2	3	4	5
34. When I'm upset, I take time to figure out what I'm really feeling.	1	2	3	4	5
35. When I'm upset, it takes me a long time to feel better.	1	2	3	4	5
36. When I'm upset, my emotions feel overwhelming.	1	2	3	4	5

CURRICULUM VITA

Molly E. Wickenhauser

Clinical Psychology Doctoral Student
University of Mississippi
Department of Psychology
205 Peabody Building
University, MS 38677
(618) 610-9620
mwickenh@go.olemiss.edu

EDUCATION

- 2016 – present **Doctor of Philosophy, Clinical Psychology (expected May 2021)**
University of Mississippi, University, MS
Thesis: *Going to BAT: Assessing Disgust Sensitivity and Related Factors in Behavioral Avoidance*
Major Advisor: Danielle Maack, Ph.D.
- 2014 – 2016 **Bachelor of Science, Psychology**
Southern Illinois University Edwardsville, Edwardsville, MS
Thesis: *Negative Life Events and Depression/Anxiety: The Roles of Intrusive Thinking, Rumination, and Gender*
Major Advisor: Christopher Rosnick, Ph.D.
Graduated *Summa cum Laude*
-

RESEARCH INTERESTS

- **Transdiagnostic vulnerabilities of disgust and anxiety pathology**
 - **Interventions and the role of habituation of disgust**
 - **Differentiating the construct of Moral Disgust from other domains (i.e., Core, Animal-Reminder, Contamination)**
-

MANUSCRIPTS IN PREPARATION/SUBMITTED

Wickenhauser, M. E. & Maack, D. J. *Examining disgust sensitivity and anxiety sensitivity in contamination-based OCD symptoms.*

Wickenhauser, M. E., Khan, R. B., Raches, D., Ashford, J. M., Russell, K. M. W., & Conklin, H. M. *Characterizing Posterior Fossa Syndrome: A survey of experts.*

PROFESSIONAL PRESENTATIONS

SYMPOSIUM/ORAL PRESENTATIONS

Wickenhauser, M. E. & Maack, D. J. (2019). *Understanding disgust-motivated behavioral avoidance.* Oral presentation submitted to the 6th annual UM Conference of Psychological Science, April 12, 2019 in University, MS.

Wickenhauser, M. E. & Maack, D. J. (2019). *An examination of factors related to OCD symptom subtypes.* Oral presentation accepted to the 9th annual convention of the Graduate Student Council Research Day, March 26, 2019 in University, MS.

Wickenhauser, M. E. & Maack, D. J. (2019). *Contamination disgust mediated effect of anxiety sensitivity on OCD symptoms.* Oral presentation presented at the 65th annual convention of the Southeastern Psychological Association, March 20-23, 2019 in Jacksonville, FL.

Wickenhauser, M. E. (2018). *Disgust in obsessive compulsive disorder.* Oral presentation presented at the Three Minute Thesis (3MT) competition, October 23, 2018 in University, MS.

Wickenhauser, M. E. (2018). *Defining Posterior Fossa Syndrome: A clinical survey and questionnaire development.* Oral presentation presented at the Psychology Rounds at St. Jude Children's Research Hospital, July 16, 2018 in Memphis, TN.

Wickenhauser, M. E. & Maack, D. J. (2018). *Is the relationship between disgust sensitivity and behavioral avoidance moderated by the flight and freeze responses?.* Data blitz presented at the 5th annual UM Conference of Psychological Science, March 23, 2018 in University, MS.

Wickenhauser, M. E. (2017). *The Importance of disgust in behavioral avoidance.* Oral presentation presented at the Three Minute Thesis (3MT) competition, October 26, 2017 in University, MS.

Wickenhauser, M. E., Scott, S. M., Zhao, M. S., Tynes, B. L. & Maack, D. J. (2017). *"Ew, gross, and yuck!" Understanding cognitive and behavioral responses to disgust.*

Symposium presented at the 4th annual UM Conference of Psychological Science, April 21, 2017 in University, MS.

POSTER PRESENTATIONS

Mandabach, M., **Wickenhauser, M. E.**, & Maack, D. J. (2019). *Previous Pregnancies and Relations with Depression and Anxiety Symptoms*. Poster submitted to the 6th annual UM Conference of Psychological Science, April 12, 2019 in University, MS.

Wickenhauser, M. E., Khan, R. B., Raches, D., Ashford, J. M., Russell, K. M. W., & Conklin, H. M. (2019). *Operationalizing Posterior Fossa Syndrome: A survey of experts*. Poster presented at the 47th annual convention of the International Neuropsychological Society, February 20-23, 2019 in New York, NY.

Gilbert, A. M., **Wickenhauser, M. E.**, & Maack, D. J. (2018). *Behavioral avoidance: The contribution of obsessive-compulsive symptoms above and beyond disgust and emotion regulation*. Poster presented at the 44th annual convention of the Association for Behavior Analysis International, May 26-28, 2018 in San Diego, CA.

Rosnick, C. R., **Wickenhauser, M. E.**, Welleritter, L., & Jacobs, S. (2018). *Technology-related anxiety is good for middle age/older adults' processing speed and working memory*. Poser presented at the 30th annual convention of the Association for Psychological Sciences, May 24-27, 2018 in San Francisco, CA.

Abbott, K., **Wickenhauser, M. E.** & Maack, D. J. (2018). *Obsessive-compulsive disorder (OCD) symptoms and their relationship with the Fight Flight Freeze System (FFFS)*. Poster presented at the 5th annual UM Conference of Psychological Science, March 23, 2018 in University, MS.

Wickenhauser, M. E. & Maack, D. J. (2018). *Predicting behavioral avoidance: The roles of disgust, fear, and anxiety*. Poster presented at the 64th annual convention of the Southeastern Psychological Association, March 6-9, 2018 in Charleston, SC.

Wickenhauser, M. E. & Maack, D. J. (2017). *The examination of sex differences in behavioral avoidance, disgust sensitivity, and emotion regulation*. Poster presented at the 68th annual convention of the Mississippi Psychological Association, September 20-22, 2017 in Biloxi, MS.

Scott, S. M., Tynes, B. L., Zhao, M. S., Pineau, D., **Wickenhauser, M. E.**, Sapp, B., & Maack, D. J. (2016). *Bible burning, dog fighting, and partner violence: Is moral disgust a real construct? Piloting a multi-method assessment of moral disgust*. Poster presented at the 50th annual convention of the Association for Behavioral and Cognitive Therapies, October 27-30, 2016 in New York, NY.

Zhao, M., Maack, D. J., Tynes, B., Scott, S. M., Pineau, D., Sapp-Spence, B., & **Wickenhauser, M. E.** (2016). *Disgust domains and fear of contamination predict safety behavior usage in an analogue sample*. Poster presented at the 50th annual convention of the Association for Behavioral and Cognitive Therapies, October 27-30, 2016 in New York, NY.

Wickenhauser, M. E. (2016). *Negative life events and depression/anxiety: The roles of intrusive thinking, rumination, and gender*. Poster presented at the 88th annual convention of the Midwestern Psychological Association (Psi Chi session), May 5-7, 2016 in Chicago, IL.

Wickenhauser, M. E., Rosnick, C. B., & Meeks, J. T. (2016). *Negative life events and depression/anxiety: The mediating role of event-based intrusive thinking*. Poster presented at the 28th annual convention of the Association for Psychological Sciences (Psi Chi session), May 26-29, 2016 in Chicago, IL.

RESEARCH EXPERIENCE

Research Assistant, ADEPT Lab

University of Mississippi, University, MS

2016 – present

Supervisor: Danielle Maack, Ph.D.

- **Pregnancy Initiative**
 - Recruited pregnant women at the OBGYN Associates of Tupelo and Oxford OBGYN to participate in a study examining levels of depression, anxiety, disgust, emetophobia, and sleep
 - Provided mental health feedback to physicians
- **Emetophobia Study**
 - Contributed to the development of Behavioral Avoidance Tasks (BATs) used in a study assessing behavioral avoidance related to the fear of vomiting
- **Explication of Moral Disgust**
 - Learned how to operate physiological equipment in a study examining physiological and behavioral responses to disgust eliciting videos

Master's Thesis, ADEPT Lab

Going to BAT: Assessing Disgust Sensitivity and Related Factors in Behavioral Avoidance

University of Mississippi, University, MS

2016 – 2019

Supervisor: Danielle Maack, Ph.D.

- Examined the roles of disgust sensitivity, anxiety sensitivity, and emotion dysregulation in predicting behavioral avoidance using Behavioral Avoidance Tasks (BATs)

Graduate Student Intern, Psychology Department

St. Jude Children's Research Hospital, Memphis, TN

2017 – 2018

Supervisor: Heather Conklin, Ph.D.

- **Posterior Fossa Syndrome (PFS) Project**

- Organized a project with the goal to better operationalize PFS, which involves some combination of speech/language difficulties, motor deficits, and emotional lability following the resection of a posterior fossa tumor
- Conducted statistical analyses to examine the validity of a questionnaire that is used across various disciplines in the field

Lab Coordinator, Mississippi Contextual Psychology Lab

University of Mississippi, University, MS

2016 – 2017

Supervisors: Kelly Wilson, Ph.D. & Kate Kellum, Ph.D.

- Managed 30+ undergraduate research assistants (e.g., scheduled lab times, designated lab duties, assisted with research projects)
- Attended weekly lab meetings that focused on Acceptance Commitment Therapy (ACT) skills and techniques

Undergraduate Thesis, Robert J. McLaughlin Honors Academy

Southern Illinois University Edwardsville, Edwardsville, IL

2015 – 2016

Supervisor: Christopher Rosnick, Ph.D.

- **Negative Life Events and Depression/Anxiety: The Roles of Intrusive Thinking, Rumination, and Gender**
 - Conducted a research study examining the possible mediating effects of intrusive thinking and rumination on the negative life events-anxiety/depression relationship with further consideration of possible gender differences

Research Assistant, Psychopathology Research Lab

Southern Illinois University Edwardsville, Edwardsville, IL

2016

Supervisor: Euyne Ro, Ph.D.

- **Preliminary Investigation of a Comprehensive Measure of Psychological Adjustment**
 - Assisted graduate students in running participants for a study that examined psychological adjustment
 - Obtained informed consent and provided on-campus resources to participants

Research Assistant, Cognitive and Developmental Lab

Southern Illinois University Edwardsville, Edwardsville, IL

2015

Supervisor: Christopher Rosnick, Ph.D.

- **Weight Management, Cognitive Training, and Stress Markers**
 - Assisted in a research study examining weight management, cognitive training, and stress markers
 - Performed cognitive testing on young-to-middle-aged adults
- **Technology-Related Anxiety and Cognitive Performance**
 - Assisted in a research study examining technology-related anxiety and cognitive performance
 - Performed cognitive testing on younger and older adults

CLINICAL INTERESTS

- **Provide evidence-based practice to all patients**
 - **Efficiently administer cognitive and diagnostic assessments to assist in conceptualizing cases and helping patients receive the appropriate services they need**
-

CLINICAL EXPERIENCE

Graduate Clinic Director

Psychological Assessment Clinic, University, MS 2018 – present
Supervisor: Scott Gustafson, Ph.D.

- Coordinated assessments and consulted with graduate students about assessment cases
- Ordered necessary materials for the clinic and tracked the clinic budget

Assessment Team

Psychological Assessment Clinic, University, MS 2018 – present
Supervisors: Scott Gustafson, Ph.D.

- Administered a range of assessments to children and adults, including ADHD assessments, learning disability evaluations, and fitness for duty exams

Graduate Student Therapist

Psychological Services Center, University, MS 2017 – present
Supervisors: Danielle Maack, Ph.D.
John Young, Ph.D.

- Provided individual therapy using evidence-based CBT techniques (e.g., exposure, mindfulness, cognitive restructuring)
- Administered structured clinical interviews, such as the Mini International Neuropsychiatric Interview-5.0 (MINI-5.0) and -6.0 (MINI-6.0) for adults and the Children's Interview for Psychiatric Syndromes, child (CHIPS) and parent (P-CHIPS) versions
- Collected additional information via self-report measures to assist in conceptualizing cases and to track progress throughout treatment

Clinical Practicum

University of Mississippi, University, MS 2016 – present
Supervisors: Danielle Maack, Ph.D.
John Young, Ph.D.

- Attended weekly supervision meetings to review client cases
- Observed CBT techniques for children and adults

LAMBDA Support Group

University of Mississippi, University, MS

2017

Supervisor: Laura Johnson, Ph.D.

- Worked with other graduate student therapists to offer a safe and open environment for Lesbian, Gay, Bisexual, Transsexual, and others (LGBTQ+) individuals
- Discussed a variety of concerns for this population and helped the group develop positive coping strategies

Direct Care Intern

McCallum Place Eating Disorder Treatment Center, St. Louis, MO

2015

Supervisor: Abigail Nedved, M.A.

- Worked directly with patients who have been diagnosed with eating disorders and experience associated physical and mental health symptoms
- Redirected eating disorder behaviors and maladaptive thought processes during mealtime
- Observed group therapy sessions

Head Start Intern

Cahokia Head Start Program, Cahokia, IL and

2015

East St. Louis Early Head Start Program, East St. Louis, IL

Supervisor: Stephen Hupp, Ph.D.

- Applied Parent-Child Interaction Therapy – PRIDE Skills (Praise, Reflection, Imitation, Descriptions, Enthusiasm) to children between one and three years old to increase interest, good behavior, and self-esteem
- Implemented the *Second Step Social-Emotional Skills for Early Learning* curriculum to three- and four-year olds

TEACHING EXPERIENCE

Guest Lecturer: Tests and Measures

2019

University of Mississippi, University, MS

Supervisor: Scott Gustafson, Ph.D.

Guest Lecturer: Abnormal Psychology

University of Mississippi, University, MS

2016

Supervisor: Kelly Wilson, Ph.D.

- Taught on the following topics: Attention-Deficit Hyperactivity Disorder, Sexual and Gender Identity Disorders

Teaching Assistant: Abnormal Psychology

University of Mississippi, University, MS

2016 – 2017

Supervisor: Kelly Wilson, Ph.D.

- Assisted in an inter-teaching focused classroom
- Prepared and assisted with grading daily assignments, weekly quizzes, and exams

- Managed undergraduate TAs

Teaching Assistant: Data Analysis with SPSS

Southern Illinois University Edwardsville, Edwardsville, IL 2015

Supervisor: Christopher Rosnick, Ph.D.

- Worked with Qualtrics to create and administer surveys for data collection
- Assisted students with questions concerning statistical analyses
- Graded and provided feedback on homework assignments, projects, and exams

HONORS AND ASSOCIATIONS

Graduate Student Representative

Mississippi Psychological Association 2019 – present

Professional Membership

Mississippi Psychological Association 2017 – present

Southeastern Psychological Association 2017 – present

Finalist at the 3MT Competition

University of Mississippi 2018

Top Poster Presentation – Graduate Student Level

Mississippi Psychological Association 2017

Robert J. McLaughlin Honor’s Academy

Southern Illinois University Edwardsville 2015 – 2016

Psi Chi International Honor Society in Psychology

Southern Illinois University Edwardsville 2015 – 2016

Phi Theta Kappa Honor Society

Lewis and Clark Community College 2013 – 2014