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Behavioral Avoidance and the Evaluation, Expression, and Intensity of Emotions in Generalized Anxiety and Major Depressive Disorders

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Behavioral Avoidance and the Evaluation, Expression, and Intensity of Emotions in Generalized Anxiety and Major Depressive Disorders

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Abstract

Theories of emotion dysregulation in generalized anxiety disorder (GAD) and major depressive disorder (MDD) have been empirically-supported. Emotion dysregulation manifests in a variety of ways, including behavioral avoidance and differential patterns of emotional reactivity and processing (i.e., facial expression, meta-evaluation, and intensity of emotion) when those with GAD and MDD are compared to healthy controls. The current study compared behavioral avoidance tendencies in those with GAD, MDD, and in healthy controls. It also examined whether avoidance and experience of emotions are associated differently across the three groups and investigated group differences in expression of emotions, the intensity of the emotional experience, and differences in meta-evaluation of emotion, and the relationships between these measures of emotionality. Participants viewed a series of increasingly disgusting body mutilation slides with an opt-out option. Facial expressions were coded and assessments of emotion intensity and evaluation were administered. These findings provide preliminary evidence for a differential emotional experience in those with MDD versus those with GAD and healthy controls.

Introduction

Generalized Anxiety Disorder and Major Depression

Anxiety is a common and, at times, advantageous human experience (Mennin and Fresco, 2014; Rosen & Schulkin, 1998). The emotional experience of anxiety has several adaptive functions; it serves as a motivator to decrease a negative emotional state, readies us for potentially negative occurrences, and aids us in planning for the future (Barlow, 2000). For instance, one might be motivated to prepare for an interview due to the realization that walking into a job interview unprepared will lead to negative emotionality and, potentially, failure to obtain the goal (i.e., job). This scenario demonstrates the adaptive function of anxiety as well as successful antecedent down-regulation of emotion (the process of altering an emotional experience before it occurs; Gross, 1998). Though seemingly straightforward, this process becomes overly complex and challenging for people suffering from generalized anxiety disorder (GAD). GAD is an anxiety disorder characterized by intense and persistent worry, without necessary precipitants, about various events or activities for at least six months (American Psychiatric Association, 2013; Davey et al., 2007; Roemer et al., 2009). The worry is difficult to control and causes distress and impairment. Common symptoms include restlessness, fatigue, difficulty concentrating, irritability, muscle tension, and sleep disturbance (American Psychiatric Association, 2013).

GAD is widespread and chronic; it is one of the most common anxiety disorders in the United States and demonstrates a low spontaneous remission rate over a five-year period, with the majority of people diagnosed with GAD continuing to report symptoms 6 to 12 years after the initial diagnosis (Tyrer & Baldwin, 2006). Furthermore, the majority of people suffering from GAD are also diagnosed with comorbid depression, thereby increasing obstructions to treatment (Nutt,

Argyropoulos, Hood, & Potokar, 2006). Most non-institutionalized adults with GAD are moderately to seriously disabled and experience a significantly reduced quality of life (American Psychiatric Association, 2013; Hoffman, Dukes, & Wittchen, 2008). People with GAD exhibit impairment in multiple domains, including occupational performance and social functioning (Roemer et al., 2009; Yoon & Zinbarg, 2007; Hoffman, Dukes, & Wittchen, 2008; Michelson et al., 2011). For example, GAD accounts for 110 million disability days per year in the United States (American Psychiatric Association, 2013). Those with GAD bear of the burden of impaired role functioning due to the emotional difficulties, physical pain, and health problems that accompany the disorder (Hoffman, Dukes, & Wittchen, 2008).

Major depressive disorder (MDD) is commonly comorbid with GAD. The two disorders share genetic susceptibility as well as vulnerable personality traits (Moffit et al., 2007). According to Moffit and colleagues (2007), as many as 72% of lifetime GAD cases have a history of depression. MDD is characterized by depressed mood and/or a loss of interest in most or all previously enjoyed activities for most of the day, nearly everyday of a two-week period (American Psychiatric Association, 2013). The depression and its accompanying symptoms are a source of distress and impairment; common symptoms include weight/appetite changes, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue, feelings of worthlessness, excessive guilt, inability to concentrate, difficulty making decisions, and suicide ideation, plans, or attempts (American Psychiatric Association, 2013). With or without a comorbid anxiety disorder, MDD is one of the most common psychological disorders, with lifetime prevalence estimated at approximately 16.6% (Snyder, 2013).

Functional impairments in MDD typically vary with the duration and severity of the illness, but may persist even after syndromal remission (Papakostas, 2009). People with MDD typically suffer from cognitive impairments, leading to low motivation, slow processing speed, generally depleted cognitive resources, and difficulty coping with novel occurrences, making decisions, planning for the future, and prioritizing actions while considering potential risks (Snyder, 2013). Occupationally, people with MDD comorbid with GAD report high levels of work impairment, usually in the form of cutting back on the amount of work they are able to complete mixed with days of inability to carry out any work (Kessler et al., 1990). Socially, those with MDD report experiencing familial and peer-relationship role impairments and are known to endorse interpersonal deficits, such as poor social problem-solving skills (Kessler et al., 1990; Raes et al., 2005).

Emotion Regulation and Expressivity

The process by which people influence their emotional experience by (consciously or unconsciously) determining which emotions are experienced, when they are experienced, how they are experienced, and how others experience them through emotional expression is known as emotion regulation (Gross, 1998). Emotion regulation patterns are integral to effective functioning and, when successfully implemented, lead to the maintenance of cognitive, emotional, social, and physical health (Gross, 2002). Alternatively, emotion dysregulation has been identified as a common factor, if not a defining feature, of many psychological disorders, including GAD and MDD (Cole, Michel, & O'Donnell Teti, 1994; Raes et al., 2005). When compared to healthy controls, people diagnosed with GAD report a more intense emotional experience, a poorer understanding of their emotions, and a suboptimal aptitude for eliciting adaptive regulation

strategies (Mennin et al., 2002; Mennin & Fresco, 2014). Instead, they tend to rely on maladaptive strategies (e.g., behavioral avoidance, worry, rumination) in an attempt to control or avoid emotional experiences (Mennin et al., 2002; Heimberg & Becker, 2002). Behavioral avoidance is a particularly problematic approach to emotion regulation, as it deprives the individual of the opportunity to learn that worrying can be internally controlled and may not be a true indicator of danger in the environment (Wells, 2002). Instead, behavioral avoidance teaches the individual to avoid the source of distress, thereby reinforcing this response pattern increasing the likelihood that it will be used again. Avoidance creates restrictions on life activities and leads to additional disturbances (Borkovec, Ray, & Stöber, 1998).

Emotion dysregulation is as common within MDD as it is in individuals with GAD (Heimberg & Becker, 2002; Raes et al., 2005). Some functional impairments, such as social deficits, have been related to emotion dysregulation patterns commonly found in people with MDD (Raes et al., 2005). Research has shown that the regulation strategy of behavioral avoidance is correlated with both rumination and depression, and is a common tactic used by those with depression (Moulds et al., 2007; Carvalho & Hopko, 2011; Ottenbreit & Dobson, 2004). Behavioral avoidance reduces the opportunity for environmental positive reinforcement and sustains, worsens, or even produces depressive symptoms (Carvalho & Hopko, 2011). The emotional consequences of maladaptive regulation strategies employed in MDD (and GAD) may be observable through differential patterns of facial expression (Davies, Schmidt, Stahl, & Tchanturia, 2011).

Facial expression of emotion is a component of emotion regulation and is a powerful, universal form of nonverbal communication reflective of one's internal physiological and affective experience (Batty & Taylor, 2003; Davies, Schmidt, Stahl, & Tchanturia, 2011; Elrich, Schiano, &

Sheridan, 2000). The face has been identified as the primary carrier of expressed emotion, thereby playing a major role in emotional responding and interpersonal communication (Elrich, Schiano, & Sheridan, 2000). Facial electromyography (EMG) studies have supported facial expressions as the "emotional readout" of internal experiences. Concordance between self-report measures and EMG activity have shown that facial expression (e.g., through the movement of facial muscles) varies as a function of the direction of the affective intensity being experienced. It is important to note, however, that people are capable of consciously altering or suppressing their facial expressions and that the behavior varies with individual differences such as gender (i.e., women are more expressive) and culture (Cacioppo et al., 1986; Hess, Adams, & Kleck, 2004; Simon & Nath, 2004; Soto et al., 2011; Marsh, Elfenbein, Ambady, 2003).

Presence and form of psychopathology are reflected by facial expression tendencies (Davies, Schmidt, Stahl, & Tchanturia, 2011; Gross & Levenson, 1993). Rottenberg and colleagues (2005) suggest that depressive symptoms are related to emotion context insensitivity, or a restricted emotional experience and expression range in which depressed individuals facially respond to positive and negative stimuli in much the same way as neutral stimuli. In support of this, Gehricke & Shapiro (2000) demonstrated that patients with MDD had reduced facial muscle activity when asked to imagine happy and sad situations in comparison with non-depressed individuals. Of note, however, there were no group differences in self-reports of emotion. However, such findings contradict the mood facilitation hypothesis, which claims that mood will facilitate emotional reactions; moods are diffuse feeling states that are loosely tied to general situations, whereas emotions are quick reactions to meaningful stimuli (Rottenberg et al., 2005; Rottenberg, 2005).

It has been suggested that the mood facilitation hypothesis may better suit anxiety disorders, in which anxious mood facilitates strong adverse reactions to mood-relevant stimuli (e.g., panic attacks; Rottenberg, 2005). Turk and colleagues (2005) reported that those with GAD are more expressive of negative, but not positive, emotions than healthy individuals, a finding which supports the mood facilitation hypothesis. However, there seems to be a deficit in research investigating the facial expression behaviors of patients with GAD. A study addressing the differential patterns of facial expression in GAD and their relationship to the internal experience would be beneficial as this line of research has been useful for predicting the course and severity of psychopathology; for instance, less emotional reactivity in depressed patients is related with poorer psychosocial functioning (Rottenberg, Kasch, Gross, & Gotlib, 2002).

Facial expressions of emotion convey useful information about the behavioral tendencies of the expressor. That is, behavioral motivations are typically associated with experienced emotions, which are expressed by corresponding facial expressions (Adams et al., 2006). Behavioral tendencies, such as avoidance, may reflect emotion dysregulation in populations with GAD and MDD (Heimberg & Becker, 2002; Moulds et al., 2007). Though emotion, emotion expression, and other behavioral tendencies are concordant in healthy populations, these relationships have not been directly studied in those with GAD and MDD.

In addition to emotion regulation and expression, meta-evaluation of emotion is an important component of emotion regulation. Meta-evaluation is the conscious process of monitoring, evaluating, and regulating feelings (Fitness & Curtis, 2005). Campbell-Sills and colleagues (2006) found that those with anxiety and mood disorders, including GAD and MDD, judge their emotions as less acceptable than healthy controls. However, the few studies assessing

meta-evaluation focus on mood rather than emotion. Thus, while emotion regulation in anxiety and depression has been widely studied (e.g., Bylsma, Morris, & Rottenberg, 2008; Aldao, Nolen-Hoeksema, & Schweizer, 2010) and there has been some emerging research examining expression in these disorders, the study of meta-evaluation of emotion in these populations is relatively novel. Studying meta-evaluation of emotion in anxiety and depression will be useful in helping us understand which factors or judgments influence conscious emotion regulation, a process which can be a useful tool in the clinical setting (Mayer & Stevens, 1994). Furthermore, the way in which people judge their emotions leads to meta-emotions, or secondary emotions of which primary emotions are the object (i.e., feeling guilty about feeling angry). Meta-emotions have been identified as an important part of the emotion regulation process and psychological well-being (Mitmansgruber et al., 2009). Psychological and emotional functioning are compromised as a result of MDD and GAD in that these disorders involve emotion dysregulation and differential patterns of emotional expression and intensity when compared to healthy controls. Examining meta-evaluations of emotions in these populations may lend insight to the cause of the impaired emotional functioning associated with the disorders.

Current Study

The present data were collected as part of a larger study, which examined behavioral disengagement, facial expressivity, and intensity and depth of worry during induced anxious and non-anxious states in non-comorbid GAD, non-comorbid depression, and healthy participants (Cooper, Miranda, & Mennin, 2013). The goal of the present study is to test whether behavioral avoidance, either through expression suppression or physical withdrawal, differentially relates to

the evaluation and intensity of emotions in those with a self-reported diagnosis of GAD, those with high levels of self-reported depression, and healthy controls.

The aim of the study was to test whether behavioral avoidance (i.e., expression suppression and task disengagement) related to emotionality (i.e., intensity and evaluation of emotions) in GAD, MDD, and healthy controls. It was hypothesized that 1a) facial expression of emotion and evaluation of emotions would relate differentially by group, particularly with a significant relationship in those with GAD, 1b) facial expression of emotion and intensity of emotions would relate differentially by group, 2a) task disengagement and evaluation of emotions would not relate for any of the groups as no literature suggested meta-evaluation of an emotion is linked to the length of exposure to the emotion-eliciting stimuli, 2b) task disengagement and intensity of emotion would relate differentially by group, where healthy controls who were able to participate in the task longer would show a significant decrease in emotional intensity over time.

Method

Participants

A total of 104 undergraduate students were recruited at a metropolitan university. Participants were enrolled in an introductory psychology class and received course credit for their participation. Participants either met criteria for non-comorbid self-reported GAD (GAD-Q-IV; Newman et al., 2002), non-comorbid self-reported depression (BDI-II; Beck, Steer, & Brown, 1996), or did not meet criteria on either measure (e.g., control) as defined below.

Measures of Behavioral Avoidance

Slide Viewing Task

Participants viewed a series of increasingly disgusting images (according to IAPS distress ratings) of body mutilation from the International Affect Picture System (IAPS; Lang, Bradley, & Cuthbert, 2008; Lang, Bradley, & Cuthbert, 1997) in a slide viewing task completed on a computer; the body mutilation images fall into the negative valence category of the IAPS, as opposed to positive or neutral valence. Each picture was displayed for 15 seconds and a total of 16 images were displayed, for a total of 240 seconds. The participant could terminate the task at any point by pressing any keyboard button.

Facial Coding

Facial expressions throughout the slide-viewing task were video recorded and coded using The Facial Expression Coding System (FACES; Kring & Sloan, 1991). FACES assesses dimensional (i.e., valence, negative or positive, and arousal, relaxed or excited) and discrete (i.e., fear and disgust) facial expressivity and has been used in several studies of emotion (e.g., Blanchard, Kring, & Neale, 1994; Kring et al., 1993; Kring & Tbmarken, 1993) as well as studies examining emotional components of psychopathology (Aghevli, Blanchard, & Horan, 2003; Wagner, Roemer, Orsillo, & Liz, 2003). FACES regards an expression as any change in the face from a neutral display to a non-neutral display and back to the baseline neutral display. When an expression is observed, coders rate its valence (positive or negative), duration, and intensity, where 1=low (i.e, slight smile), 2=medium (i.e., open-mouthed smile), 3= high (i.e., laughter), 4=very high (i.e., undeniable laughter involving substantial movement of the rest of the face). Two undergraduate students trained to use FACES served as a coders for the study and rated video

recordings of the experimental session for fear and disgust expressions. The negative facial expressions of fear and disgust were emphasized throughout the analysis because these emotions are more likely to be displayed in response to the slide-viewing task (Gross & Levenson, 1995). The coder was validated by a second coder and consensus scores. The coders separately coded the same random selection of 25% of the videotapes. Coder 1 and Coder 2 were 96% reliable with each other, indicating that 96% of the time Coder 1 and Coder 2 assigned the same code to a video independently. When Coder 1 and Coder 2 recorded different codes for the same video (4% of the time), they met to establish a consensus score. The consensus meeting allowed the coders review the videotapes independently, discuss their individuals codes, and come to an agreement on the final code for the video. Coder 1's independent scores were 98% reliable with the consensus scores, and Coder 2's independent scores were 95% reliable with the consensus scores; a 98% reliability with consensus scores indicatinges that, 98% of the time, Coder 1 and Coder 2 decided that Coder 1's original code was appropriate for the video being discussed. Upon arriving at these rates, Coder 1 was deemed to be effectively reliable and completed the remainder of the video coding independently; Coder 1's codes were used in the present analysis.

Measures of Emotionality

State Meta-Mood Scale (SMMS; Mayer & Gascke, 1988; Mayer & Stevens, 1994). The SMMS is a state measure assessing the degree of monitoring, evaluating, and regulating of one's current mood. It is comprised of two scales: the Meta-Evaluation Scale (MES; 24 items) and the Meta-Regulation Scale (MRS; 10 items). While emotion regulation in anxiety and depression has been widely studied, examining meta-emotion evaluation in these populations is relatively novel; therefore, the analysis in this study focuses on the MES subscale. The MES includes four subscales: Clarity,

Acceptance, Typicality, and Influence. Each subscale is scored on a 5-point Likert scale from "definitely does not describe my mood" to "definitely does describe my mood". Examples of items from each subscale, respectively, include "I know exactly how I'm feeling", "I shouldn't feel this way", "It's very typical for me", and "My beliefs and opinions are unchanged by this mood". The entire 34-item SMMS has demonstrated good internal consistency (.75-.87; Mayer & Stevens, 1994).

Multiple Affect Adjective Check List – Revised (MAACL-R; Zuckerman & Lubin, 1985).The MAACL-R is commonly used as a manipulation check in mood induction studies (e.g., Blagden and Craske, 1996; Segal et al., 1999). It consists of five subscales (Anxiety, Depression, Hostility, Positive Affect, and Sensation Seeking) represented by a 132-item adjective checklist of current moods; each subscale is scored using a unipolar, 5-point Likert scale (from "right now I feel very much like this" [1] to "right now I feel not at all like this" [5]). The MAACL-R has been shown to have high internal consistency and good convergent and discriminant validity. The Anxiety (10 words) and Depression (12 words) subscales of the "Today" form of the MAACL-R were used to assess levels of state affect in the current study as opposed to the "In General" form, which measures trait affect. The MAACL-R was modified from a checked item procedure to the 5-point Likert scale to better suit the study; this alteration served to increase sensitivity to changes in state affect and to increase reliability by avoiding over-checking (Herron, 1969).

Procedure

Participants were recruited from an introductory psychology class at a university. Informed consent was obtained at the beginning of the experimental session and all participants were informed that they would be video-recorded throughout the session; the study called for only one experimental session. To determine which group a participant would be placed into, the GAD-Q-IV and the BDI-II were administered. Following the completion of these assessments, participants were categorized into one of three groups: the MDD group, the GAD group, and the healthy control group. The MAACL-R was administered as a baseline measure of mood. Immediately prior to the slide viewing task, participants were told, *"Now you're going to be watching a series of slides. Some of these slides may be disturbing, so I would like you to watch only as long as you feel like watching. When you would no longer like to watch, press the spacebar once to stop and let me know."* All participants viewed a series of increasingly disgusting images of body mutilation from the IAPS (Lang, Bradley, & Cuthbert, 2008). Each of the 16 images was displayed for 15 seconds, bringing the total time for the entire task to 240 seconds. Participants were allowed to opt-out of the task at any time. After either quitting out of or completing the slide viewing task, participants were asked to complete the MAACL-R for a second time along with the SMMS-MES to measure intensity and evaluation of emotion post-slide viewing task, respectively.

Results

Primary Outcomes

Sample Demographics. A total of 104 (82 women, 22 men, *M* age = 19.8, *SD* = 3.0) undergraduate students participated in the study. The mean age of the sample (N = 104, M = 19.8, SD = 3.0) did not significantly differ between groups, $F(2,101) = 1.418$, $p > ..05$. A χ^2 analysis

determined no significant difference in ethnicity between groups, $\chi^2(10, 104) = 12.03$, $p > .05$. Ethnicity data was missing for one participant. A χ^2 analysis suggested there were no significant difference in gender between groups, $\chi^2(2, 105) = 1.008$, $p > .05$. Sample characteristics are reported in Table 1.

Each demographic variable (age, gender, ethnicity) was correlated with all variables used in this analysis to ensure that any confounding factors were controlled for. Two variables, the SMMS-MES acceptance and clarity subscales, were significantly correlated with gender. The results indicated that acceptance and clarity of emotion were significantly lower in women than in men ($r = -.21$, $p < .05$; $r = -.25$, $p < .05$, respectively). This was addressed by controlling for gender when applicable.

Slide Viewing Time. There was no significant variability in behavioral disengagement from the slide viewing task as a function of group. These data are presented in Table 1.

Level of Expression. The mean intensity of negative emotion expression did not differ as a function of group. Neither fear expressions nor disgust expressions differed as a function of group. These data are represented in Table 1.

Self-Reported Intensity. Group differences in MAACL-R scores post-slide viewing task were tested for by performing two ANCOVAs; the results are presented in Table 1.. The first ANCOVA was conducted for the anxiety subscale, controlling for baseline anxiety scores. The second ANCOVA was conducted for the depression subscale, controlling for baseline depression scores. There was a trending difference for the intensity of anxiety upon completion of the slide view task as self-reported by the MAACL-R as a function of group. Post hoc Bonferroni comparisons revealed the control group differed significantly from the depression group, $p < .05$.

Participants with depression reported experiencing higher levels of anxiety following the slide-viewing task in comparison to healthy controls. The intensity of depression upon completion of the slide-viewing task did not significantly differ as a function of group.

Evaluation of Emotion. A one-way ANCOVA tested for group differences in the evaluation of the clarity, acceptance, typicality, and influence of emotions after completing the slide-viewing task; the ANCOVA allowed us to control for gender. A post hoc test on an ANOVA for these variables tested for the main effect of diagnostic group. The results are presented in Table 1. Evaluation of clarity of emotions was significantly different across groups; the depression group scored significantly lower than healthy controls on the clarity subscale, $p = .01$. Evaluation of acceptance of emotions differed significantly across groups; the depression group scored significantly lower on the acceptance subscale than both the control, $p = .01$, and GAD, $p < .05$, groups. The groups did not significantly differ in their evaluation of typicality of emotions. There was a trend for group differences in evaluation of the influence of emotions; healthy controls scored significantly lower on the influence subscale than the depression group, $p < .05$.

Facial Expression as a Measure of Behavioral Avoidance

Facial Expression and Evaluation of Emotion. Each subscale of the SMMS-MES was correlated with each measurement of facial expression for each group to test whether or not the level of expression was related to evaluation of emotion as a function of group. These results are presented in Table 4. None of the variables were significantly correlated for healthy controls or the depression group. The typicality subscale of the SMMS-MES was significantly correlated to multiple measurements of facial expression for participants with GAD. In particular, the

participants' evaluation of the typicality of an emotion was significantly negatively correlated with the mean intensity of negative expressions and the level of disgust expressed.

Facial Expression and Self-Reported Intensity. Both the anxiety and depression subscales of the MAACL-R were correlated with scores post-slide viewing with each measurement of facial expression for the three groups to test whether or not the level of expression was related to self-reported intensity of anxiety/depression. Baseline MAACL-R scores were controlled for. These results are presented in Table 3.

In the healthy control group, expressions of disgust were significantly positively correlated with self-reported intensity of both anxiety and depression. A positive trend existed between expressions of fear and self-reported intensity of depression. For individuals with GAD, mean intensity of negative emotional expressions and expression of disgust were significantly positively correlated with self-reported intensity of anxiety, while expressions of fear were significantly positively correlated with self-reported intensity of depression. Finally, in the depression group, expressions of disgust were significantly positively correlated with self-reported intensity of depression.

Task Disengagement as a Measure of Behavioral Avoidance

Slide Viewing Time and Evaluation of Emotion. Time spent viewing slides served as the measure of task disengagement. Bivariate correlations between slide viewing time and the SMMS-MES subscales (clarity, acceptance, typicality, and influence of emotions) were conducted for each group. There were no significant relationships between slide viewing time and any of the SMMS-MES subscales for any of the three groups. These results are presented in Table 5.

Slide Viewing Time and Change in Self-Reported Intensity. Partial correlations were conducted for each to group to test the relationship between slide viewing time and intensity of anxiety and depression as self-reported using the MAACL-R; the results are shown in Table 6. The slide viewing time for healthy controls was significantly negatively correlated with the change in self-reported anxiety from baseline to post-slide viewing, indicating that controls who engaged in the slide viewing task longer experienced a greater decrease in anxiety intensity from baseline to post-slide viewing. The control group's slide viewing time was not significantly correlated with the change in self-reported depression from baseline to post-slide viewing, indicating that the change in the intensity of depression from baseline to post-slide viewing task was not related to the length of time the healthy participants engaged in the task.

The slide viewing time for the GAD group was significantly negatively correlated with the change in self-reported anxiety from baseline to post-slide viewing. The GAD group's slide viewing time was not significantly correlated with the change in self-reported depression from baseline to post-slide viewing.

In the depression group, the slide viewing time was not significantly correlated with the changes in self-reported anxiety and depression from baseline to post-slide viewing, indicating that the length of time spent engaged in the slide viewing task was not significantly related to the change in anxiety and depression intensity.

Group Differences

Facial Expression and Evaluation of Emotion. Independent correlations were conducted pairwise by group. The test of independent correlations showed that the GAD group was

independent from both the healthy control ($z = -2.45$, $p = .01$) and depression ($z = -2.62$, $p = .01$) groups in regards to the relationship between typicality and mean intensity of negative emotions.

Facial Expression and Self-Reported Intensity. Independent correlations were conducted pairwise by group. The test of independent correlations showed that the GAD group was independent from the depression group in regards to the relationship between disgust and self-reported intensity of depression ($z = 2.08$, $p < .05$). The GAD group was also independent from the healthy control group in regards to the relationship between fear and self-reported intensity of depression ($z = -3.57$; $p < .01$). Finally, results demonstrated that the GAD group was independent from the healthy control and depression groups in regards to the relationship between mean intensity of negative expressions and self-reported anxiety ($z = 2.28$, $p < .05$; $z = -2.14$; $p < .05$).

Slide Viewing Time and Self-Reported Intensity. A test of independent correlations yielded no significant results.

Discussion

This study was designed to investigate the relationship between behavioral avoidance and emotionality in GAD, MDD, and healthy controls. This was accomplished by presenting participants with negative stimuli with an opt-out option, recording and coding their facial expression during the exposure, and having them complete self-report measures assessing emotional evaluation and intensity. Then, the relationship between both measures of behavioral avoidance (expression suppression and task disengagement) and both measures of emotionality (evaluation and intensity) were tested in each group. The results of this study suggest a differential relationship between avoidance via expression suppression and both evaluation and intensity of

emotions. Also, the results suggest a differential relationship between avoidance via behavioral disengagement and intensity, but not evaluation, of emotions.

No one group was more or less likely to engage in behavioral avoidance via task disengagement than another. This may seem contradictory as behavioral avoidance is commonly discussed as a strategy indicative of emotion dysregulation strategy in MDD and GAD (i.e., Wells, 2002; Carvalho & Hopko, 2011), but behavioral disengagement has been found to have a positive relationship with distress in healthy controls (Rasmussen et al., 2006). Considering the distressing nature of the slides in the task, it follows that the groups did not significantly differ in time spent engaging the task as the healthy controls were also likely to disengage as a function of distress. In other words, the stimuli may have created a ceiling effect in responses, a phenomena that is identifies as the strong situation. The strong situation refers to an experimental situation in which unambiguously threatening stimuli evokes the same adaptive fear response in both anxiety patients and healthy controls (Lissek, Pine, & Grillon, 2006).

No one group was more or less likely to engage in behavioral avoidance via expression suppression than another. It was presumed that those with MDD would differ from healthy controls based on the literature stating that those with MDD exhibit restricted emotional expression in response to both positive and negative stimuli (Rottenberg et al., 2005; Gehricke & Shapiro, 2000). Other studies suggest that restricted emotion in MDD applies only to positive stimuli, while responsiveness to negative stimuli is not blunted (Sloan et al., 1997; 2001). Though literature of facial expressivity in GAD is scarce, it was hypothesized that expression would be related to the higher intensity of emotion experienced by those with GAD. Existing literature demonstrates that those with GAD are more expressive of negative, but not positive, emotions than healthy

individuals (Turk et al., 2005). The current results may contradict such findings because of the nature of the stimuli. Despite its relationship with anxiety-related psychopathologies (i.e., blood-injection-injury phobia, obsessive compulsive disorder), disgust has been shown to be independent of other relevant emotions such as anxiety (Davey, 2011). It is possible that disgust-eliciting stimuli had the same affect on all three groups due to its evocative nature. Again, this could be explained by the strong situation (Lissek, Pine, & Grillon, 2006). Alternatively, the results may be explained by the small effect size of .02.

Findings supported the prediction of a differential relationship between expression and evaluation of emotions in those with GAD compared to those with MDD and healthy controls. The GAD group's evaluation of the typicality of their emotions was significantly negatively correlated with the mean intensity of negative expressions and the level of disgust expressed, while the MDD group and the healthy control group yielded no significant findings. Since facial expressions of emotion reflect the intensity of the emotional experience, these findings suggest that intensity is indirectly related to familiarity in those with GAD (Cacioppo et al., 1986). This suggests that novel threatening stimuli have a greater negative emotional impact on those with GAD than healthy controls or those with MDD. It is possible that those with GAD experienced increased emotional reactivity in novel situations, particularly those involving a perceived threat.

The relationship between expression and self-reported intensity of anxiety and depression differed by group. Facial expression of disgust was positively correlated with self-reports of anxiety and depression for the healthy control group. In the GAD group, disgust and mean intensity of negative facial expressions were positively correlated with anxiety while fear was positively correlated with depression. It is intuitive to think that anxiety would follow exposure to disgust

stimuli, and past studies have shown that disgust sensitivity, or an enhanced fear of disgust and fear-related stimuli that are not physically harmful, is related to general anxiety (Thorpe, Patel, & Simonds, 2003). Yet, in the depression group, disgust was positively correlated with post-task depression intensity, not post-task anxiety intensity. This may be explained by the complex relationship between disgust and the core symptoms of depression (Surguladze et al., 2010). Depression is thought to be influenced by altered disgust processing, wherein those with depression turn disgust inward, even when it is initially presented in external stimuli (Schienle et al., 2003). In depression, the emotion of disgust tends to be tied in with the perception of the self and may be related to the complex feelings that those with depression often feel, such as shame and guilt (Phillips et al., 1998). In conjunction with previous research, the findings suggest that people with GAD and MDD are differentially affected by exposure to the same external stimuli. Again, those with GAD seem to bear more similarities to healthy controls than those with depression. This pattern may speak to the natures of the disorders. The excessive worry in GAD is clinically significant and a source of distress, mood, and health problems, but research has indicated that the worry content in GAD is related to age-relevant developmental changes and mirrors worry patterns in non-clinical counterparts. Normal worry may persist for an entire developmental stage without becoming clinical (Diefenbach, Stanley, & Beck, 2010). In contrast, the healthy counterpart of depression is sadness, which is caused by some event (i.e., misfortune, loss) that occurs and passes, as does the sadness (Bowlby, 1980). It appears that worry may be more streamlined into the experience of healthy individuals; perhaps those with GAD share more cognitions and emotions with healthy individuals than those with MDD. This might explain why those with GAD and healthy controls report similar experiences when presented with the same stimuli.

It was hypothesized that both the GAD and depression groups would report a steady level of intensity regardless of slide viewing time, while healthy controls who were able to view the slides for a longer duration would show a significant decrease in emotional intensity over time. This hypothesis was partially supported by the data, which showed that levels of anxiety decreased for those who engaged in the task longer in both the healthy control and the GAD groups. The MDD group, however, did not report changes in anxiety and depression based on slide viewing time. Again, results showed that GAD and healthy controls share similar fluctuations in emotionality while the depression group has a unique experience. In this instance, both the GAD and healthy control groups were able to adjust to the anxiety-provoking stimuli over time while the depression group maintained high levels of depression and anxiety regardless of how long they were exposed to the stimuli. This suggests that those with MDD have an impaired ability to adjust to adverse emotional experiences.

In support of the hypothesis, the data showed that evaluation of emotions did not differ in relation to slide viewing time. This indicates that meta-evaluation of an emotion did not vary with length of time spent exposed to the emotionally laden stimuli, suggesting that evaluation of emotion occurs relatively quickly and remains constant. It is interesting that slide viewing time was not related to meta-evaluation of emotion considering the slides were increasingly disturbing in nature. This suggests that evaluation of emotion does not depend on the intensity of the stimuli, but on the internal emotional experience.

Some limitations of the study should be addressed to strengthen future research. Importantly, the reason for disengaging from the task was not directly assessed, when applicable. It was assumed, based on past literature, that disengagement reflected the emotion dysregulation strategy

of behavioral avoidance. However, it is possible that the participants were aiming to avoid some other experience. For example, the disgusting nature of the slides may have caused physical reactions (i.e., nausea) not immediately recognizable as an emotional experience. Alternatively, it is possible that the participants were not interested in the task and disengaged due to boredom or impatience. If and when applicable, a brief interview inquiring about the reason for disengagement may clear up such ambiguities in future studies. The current study also did not include any entirely objective measures of arousal. Though the study included self-reported measures of intensity and objectively measured facial expressions, it would be beneficial to include a psychophysiological measure, such as an electromyograph (muscle activity) or an electrocardiograph (heart activity), to gain a clear, unbiased understanding of group differences in arousal. Such data would also provide a context for behavioral findings. For example, finding a relationship between arousal and behavioral disengagement would allow for a better determination of the functionality of this action.

The use of self-report measures to determine group affiliation is a limitation. For example, the self-report bias toward social desirability may have led some participants to report lower levels of anxiety or depression leading to inclusion in the control group (van de Mortel, 2008). The use of a clinical interview with high reliability conducted by a trained professional would address this issue.

The sample was relatively homogenous, with the majority (63%) of participants identifying as "white". This is a limitation considering the ethnic and cultural differences that have been observed in emotionality, particularly expression (Matsumoto, 2006). Such an issue could be rectified by selecting a sample more representative of diverse populations. Similarly, a 78.8% female sample is a limitation considering the gender differences in emotionality (McRae et al., 2008; Kring & Gordon, 1998). Use of a college age sample also limits generalizability.

Future research should further examine dysfunctional responses to emotional stimuli. Knowledge of the long-term impact of behavioral avoidance would be useful for the clinical treatment of GAD and MDD. A future study might explore this by employing a longitudinal study design in which a follow-up visit tested the likelihood of continued use of behavioral avoidance. Future research should also focus on understanding the differences in emotional reactions to the same stimuli in GAD, MDD, and healthy individuals and why those with MDD seem to, in some ways, have a different experience from those with GAD and healthy controls. Again, this would be useful for developing treatments that aim to develop coping skills to deal with life events and challenges based on emotional responding tendencies. Considering the high rates of comorbidity between GAD and MDD, it would be particularly useful to explore for differences in emotional responding, expressivity, and evaluation in comorbid populations.

Overall, the current study addresses relatively novel phenomena such as the meta-evaluation of emotion in MDD and GAD and facial expression in GAD. The study of behavioral avoidance and emotionality in GAD and MDD may prove useful for the development of treatments. For example, differences in emotionality in MDD and GAD may influence the way clinicians prepare people with MDD to cope with adverse life events. This study may also influence researchers to further explore the relationship between emotionality and behavior in these populations. This study provides preliminary evidence for a differential emotional experience in people with MDD as compared to people with GAD and healthy controls, thereby providing insight into the distinct natures of these disorders and the unique experiences of their respective populations.

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Table 1

Primary Outcomes

	All Participants (N = 104)	**GAD (*n* = 32)**	**Depression (*n* = 26)**	**Control (*n* = 46)**
Age in years, *M (SD)*	19.8 (3.0)	20.5 (4.7)	19.2 (1.0)	19.63 (2.1)
Gender, *n (%)*				
Women	82 (78.8)	25 (78.1)	22 (84.6)	35 (74.5)
Men	22 (21.2)	7 (21.9)	4 (15.4)	12 (25.5)
Race/Ethnicity, *n (%)*				
White	63 (56.3)	21 (65.6)	16 (61.5)	26 (55.3)
Asian	5 (4.5)	1 (3.1)	0 (0.0)	4 (8.5)
Hispanic	13 (11.6)	4 (12.5)	2 (7.7)	7 (14.9)
Black	14 (12.5)	4 (12.5)	5 (19.2)	5 (10.6)
Other	5 (4.5)	2 (6.3)	0 (0.0)	3 (6.4)
GAD-Q-IV, *M (SD)*	7.6 (2.9)	9.4 (2.2)	8.8 (2.3)	5.8 (2.5)
BDI-II, *M (SD)*	13.6 (8.5)	13.8 (6.9)	21.9 (9.1)	9 (5.0)
Group Differences	***df***	***F***	***η***	***p***
Slide Viewing Time	2	1.34	.03	.27
Facial Expression	2	1.10	.02	.34
Mean Negative Intensity	2	.00	.00	.99
Fear	2	1.06	.02	.35
Disgust				
Self-Reported Intensity				
Anxiety	2	3.08	.02	.20
Depression	2	1.33	.02	.17
Meta-Evaluation				
Clarity	3	5.21	.09	.00*
Acceptability	3	5.10	.09	.00*
Typicality	3	1.52	.04	.21
Influence	3	2.70	.07	.05

Note. M = mean; SD = standard deviation; GAD-Q-IV = Generalized Anxiety Disorder Questionnaire-IV; BDI-II = Beck Depression Inventory-II.

Table 2

Relationship between Expression and Evaluation of Emotions

MES Subscale	Mean Negative Intensity		Fear		Disgust	
	r	*p*	*r*	*p*	*r*	*p*
Clarity						
GAD	.04	.86	.0*3*	.87	-.03	.88
Depression	-.29	.15	-.17	.41	-.25	.22
Control	-.05	.72	.02	.89	-.10	.52
Acceptability						
GAD	.02	.93	-.15	.47	-.20	.32
Depression	-.38	.06	-.37	.06	-.17	.42
Control	.05	.74	.00	.05	.99	.75
Typicality						
GAD	-.46	.02*	-.20	.33	-.43	.03*
Depression	.23	.27	.01	.95	-.05	.81
Control	.09	.54	-.13	.38	-.07	.63
Influence						
GAD	-.25	.22	.27	.17	-.18	.38
Depression	.18	.39	.11	.61	.29	.15
Control	.03	.87	-.06	.69	.08	.59

Table 3

Relationship between Expression and Self-Reported Intensity

Measures of Expression	**MAACL-R Anxiety**						**MAACL-R Depression**					
	GAD		Depression		Control		GAD		Depression		Control	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
Mean Negative Intensity	.42	.03*	-.15	.48	-.10	.53	-.16	.43	-.19	.37	.03	.85
Fear	-.10	.62	-.08	.72	.22	.15	-.50	.01*	-.03	.89	.30	.05
Disgust	.45	.02*	.29	.16	.43	.02*	.08	.70	.57	.00*	.42	.00*

Table 4

Relationship between Slide Viewing Time and Change in Self-Reported Intensity

	MAACL-R Anxiety						**MAACL-R Depression**					
	GAD		Depression		Control		GAD		Depression		Control	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
Slide View Time	-.39	.03*	-.08	.69	-.38	.01*	-.05	.80	-.01	.96	-.01	.96

Table 5

Relationship between Slide Viewing Time and Evaluation of Emotions

MES Subscale	Mean Negative Intensity	
	r	*p*
Clarity		
GAD	-.06	.73
Depression	-.08	.70
Control	-.04	.81
Acceptability		
GAD	.18	.3
Depression	.02	.92
Control	.23	.13
Typicality		
GAD	.28	.12
Depression	.25	.22
Control	.09	.54
Influence		
GAD	-.03	.89
Depression	.19	.34
Control	-.06	.70