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Specificity of Fear and Disgust Experienced During Traumatic Interpersonal Victimization in Predicting Posttraumatic Stress and Contamination-Based Obsessive-Compulsive Symptoms

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Abstract

Emerging evidence has documented comorbidity between posttraumatic stress disorder (PTSD) and obsessive-compulsive disorder (OCD) among individuals with a history of traumatic events. There is growing recognition of the importance of disgust in each of these conditions independently. No study, however, has examined the potential role of disgust in these conditions following traumatic event exposure. The current study examined the unique role of peritraumatic fear, self-focused disgust, and other-focused disgust in predicting posttraumatic stress symptoms and contamination-based OC symptoms among 49 adult women (M_{age} = 28.37, SD = 13.86) with a history of traumatic interpersonal victimization. Results demonstrated that intensity of peritraumatic self-focused disgust was significantly related to contamination-based OC symptoms while peritraumatic fear and other-focused disgust were related to posttraumatic stress symptoms. These results highlight the need for future research aimed at elucidating the nature of the association between disgust experienced during traumatic events and subsequent psychopathology.

Keywords

Posttraumatic Stress Disorder; Obsessive-Compulsive Disorder; Disgust

1. Introduction

Multiple lines of evidence indicate that elevated posttraumatic stress and obsessive-compulsive (OC) symptoms frequently co-occur among individuals with a history of traumatic experiences. In fact, the 12-month prevalence of obsessive-compulsive disorder (OCD) is approximately 30% among people with posttraumatic stress disorder (PTSD) compared to only 1% in the general population (Boudreaux, Kilpatrick, Resnick, Best, & Saunders, 1998; Brown, Campbell, Lehman, Grisham, & Mancil, 2001; Kessler, Chiu, Demler, & Walters, 2005). Individuals with PTSD report elevated OC symptoms compared

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to both anxious controls and the general population (Boudreaux et al., 1998; Huppert et al., 2005; Solomon et al., 1991). Those with OCD also endorse greater posttraumatic stress symptoms compared to anxious controls (Fontenelle et al., 2007; Huppert et al., 2005). Despite this growing recognition of the overlap between posttraumatic stress and OC symptoms, there is a dearth of research aimed at understanding the nature of these problems among individuals with a history of traumatic experiences.

Both PTSD and OCD have traditionally been conceptualized as disorders of anxiety (American Psychiatric Association [APA], 2000). However, a growing body of research has begun to identify an important role of disgust, defined as a rejection/revulsion response aimed at removing oneself from a potential source of contamination (Davey, 1994), in understanding both OC and posttraumatic stress symptomatology, independent of fear or anxiety. For example, a host of self-report, behavioral, and neuroimaging evidence (see Brady, Adams & Lohr, [2010]; Olatunji, Cisler, McKay, and Phillips, [2010]; Stein, Liu, Shapira, & Goodman, [2001] for reviews) supports a link between disgust and specifically contamination-based OCD (i.e., obsessive concerns of being contaminated as well as compulsive washing behaviors), which is the most commonly occurring subtype of obsessive-compulsive symptoms (Rasmussen & Tsuang, 1986; Steketee, Grayson, & Foa, 1985). For example, neuroimaging studies have identified increased activation of neural structures associated with the processing of disgust (i.e., insula) in the context of contamination-based OCD (Lawrence et al., 2007; Phillips et al., 2000). Additionally, a number of cross-sectional studies have established correlations between elevated contamination fear and the trait-like vulnerabilities of disgust propensity (Deacon & Olatunji, 2007; Moretz & McKay, 2008; Olatunji, Lohr, Sawchuck, & Tolin, 2007; Tolin, Woods, & Abramowitz, 2006) and disgust sensitivity (Bieke et al., 2009; Mitte, 2008), defined as the tendency to experience disgust in response to an array of stimuli, and to be bothered by feelings of disgust; respectively (van Overveld, de Jong, Peters, Cavanagh, & Davey, 2006). Evidence drawn from prospective research further suggests disgust vulnerabilities may serve as specific risk factors involved in the etiology and/or maintenance of OC symptomatology (Berle et al., 2012; Olatunji, 2010; Olatunji, Tart, Ciesielski, McGath, & Smits, 2011).

In contrast to contamination-based OCD, the role of disgust in posttraumatic stress has only recently begun to receive attention in the literature. This emerging work has documented elevated feelings of disgust among individuals with PTSD generally (Finucane, Dima, Ferreira, & Halvorsen, in press; Foy, Sipprelle, Rueger, & Caroll, 1984) as well as in response to reminders of traumatic experiences (Shin et al., 1999). Significant associations have been identified between posttraumatic stress symptom severity and elevations in disgust propensity among sexual assault/abuse victims (Rüsch et al., 2011) and disgust sensitivity among combat Veterans (Engelhard, Olatunji, & de Jong, 2010) in cross-sectional designs. However, these results are far from conclusive, as Engelhard and colleagues (2010) failed to observe a significant association between disgust propensity and posttraumatic stress symptoms. Furthermore, disgust propensity and disgust sensitivity assessed at 6 months post-deployment showed no significant associations with posttraumatic stress symptom severity at 15 months.

Although researchers have begun to consider the general feelings of disgust and trait-like disgust vulnerabilities in relation to posttraumatic stress, there is a need to specifically examine the implications of disgust experienced during a traumatic event (i.e., peritraumatically). Indeed, etiological models of PTSD emphasize the importance of conditioned emotional learning during a traumatic event in contributing to the maintenance of initial symptomatic reactions to traumatic event exposure (e.g., Foa & Kozak, 1986; Keane, Zimmering, & Caddell, 1985); however, the bulk of this research has centered on the

emotions of fear and to a lesser degree helplessness and horror (Andrews, Brewin, Rose, & Kirk, 2000; Bovin & Marx, 2011). The studies that have examined this issue have found retrospective report of disgust intensity experienced during a traumatic event to be a significant predictor of posttraumatic stress symptoms even after accounting for variance associated with peritraumatic fear, helplessness, and horror (Engelhard et al., 2010; Lancaster, Melka, & Rodriguez, 2011). This relation appears to be particularly strong among individuals high in disgust sensitivity (Engelhard et al., 2010), highlighting the importance of examining pre-existing individual differences in disgust vulnerabilities. In summary, although data have implicated disgust in both contamination-based OCD and PTSD independently, research has yet to examine links between disgust and both symptom types concurrently among individuals with a history of traumatic event exposure.

As compared to other events, traumatic interpersonal victimization (e.g., sexual assault, physical assault, criminal victimization) is particularly likely to lead to PTSD (Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993), and experiences of rape, molestation, and life threatening criminal victimization have all been shown to positively relate to a diagnosis of OCD (Boudreaux et al., 1998; Peles, Adelson, & Schreiber, 2009; Saunders, Villeponteaux, Lipovsky, Kilpatrick, & Veronen, 1992). Indeed, experiences involving interpersonal victimization are the most common type of traumatic event documented among individuals with comorbid PTSD and OCD (Gershuny et al., 2008). Interpersonal victimization may involve exposure to an array of stimuli capable of eliciting feelings of disgust (Badour et al., in 2011a; Bonanno et al., 2002; Shin et al., 1999). For example, these events may involve a repulsive individual (e.g., perpetrator) as well as physical contact with bodily products, such as blood or semen. Such experiences may also result in internal perceptions of self-debasement or violation (Rozin & Fallon, 1987). Consistent with this idea, individuals with a history of interpersonal victimization have been found to respond to reminders of their traumatic experience with increased disgust as compared to those with a history of non-interpersonally relevant traumatic experiences (e.g., accidents, natural disasters; Badour et al., 2011a).

In considering the role of disgust within the context of interpersonal victimization it may be especially important to examine the target of the emotional reaction (Andrews et al., 2000; Ulrich & Maercker, 2009). For example disgust reactions might involve external or other-focused disgust (e.g., toward the perpetrator), which may be elicited by perceptions of danger in the external environment, similar to fear. This type of conditioned emotional learning might be particularly likely to lead to hypervigilance for threat in the external environment, characteristic of symptoms seen within the context of posttraumatic stress reactions. Consistent with this proposition, research has shown that perceived disgustingness of stimuli is causally related to perceived threat (Muris, Mayer, Huijding, & Konings, 2008). Self-focused disgust reactions may also be particularly important to examine. Although research on internalized or self-focused disgust in relation to psychopathology is particularly limited (Overton et al., 2008; Power & Dalgleish, 1997; Simpson, Hillman, Crawford, & Overton, 2010), preliminary findings among women with a history of sexual victimization may offer some direction in this domain. For example, Petrak, Doyle, Williams, Buchan, and Forster (1997) found that the majority of women reported ongoing distress related to feelings of self-disgust following a sexual assault. Similarly, Fairbrother and Rachman (2004) found that 70% of women experienced urges to wash, with 25% reporting excessive washing that persisted for several months or more than a year after the assault. It has been hypothesized that the persistent internal feelings of dirtiness and urges to wash may result from an internalization of feelings of disgust (Olatunji, Elwood, Williams, & Lohr, 2008) leading to a view of the self as being contaminated or morally tainted (Elliot & Radomsky, 2009; Fairbrother & Rachman, 2004). This perception may result in persistent contamination-focused obsessions that are accompanied by compulsive washing behavior

comparable to washing observed among people with contamination-based OCD. Importantly, these internal feelings of dirtiness and urges to wash have also been found to positively correlate with posttraumatic stress symptoms (Fairbrother & Rachman, 2004; Olatunji et al., 2008) highlighting the importance of further elucidating the nature of this phenomenon.

Based on this backdrop, the current study examined the relative contributions of peritraumatic intensity of both other- and self-focused disgust in uniquely predicting posttraumatic stress symptoms and contamination-based OC symptoms among females with a history of interpersonal victimization. As a test of specificity, the unique contribution of peritraumatic fear was also examined. It was hypothesized that peritraumatic fear and other-focused disgust should uniquely predict posttraumatic stress symptoms after accounting for variance associated with contamination-based OC symptoms and other theoretically relevant covariates. Conversely, it was hypothesized that self-focused disgust should predict contamination-based OC symptoms after accounting for variance associated with posttraumatic stress symptoms and other theoretically relevant covariates.

2. Method

2.1 Participants

Participants included 49 women (M_{age} = 28.37, SD = 13.86) recruited via announcements and postings placed throughout a community in the south-central United States as part of a larger laboratory-based study examining emotional reactivity to reminders of traumatic interpersonal victimization. Participants were included in the study if they met criteria for a *Diagnostic and Statistical Manual—Fourth Edition Text Revision* (DSM-IV-TR; APA, 2000)-defined traumatic sexual or physical assault. Of the total sample, 8.2% (n = 4) described themselves as ethnically 'Hispanic,' 87.8% (n = 43) identified themselves as 'Caucasian,' 2.0% (n = 1) as 'African American,' 2.0% (n = 1) as 'American Indian/Alaska Native,' 6.1% (n = 3) as 'Multi-racial,' and 2.0% (n = 1) as 'Other.' Please see Table 1 for additional demographic information.

2.2 Measures

2.2.1. Posttraumatic stress symptoms—Posttraumatic stress symptoms and PTSD diagnostic status were assessed using the Clinician Administered PTSD Scale (CAPS; Blake et al., 1995), a well-established semi-structured interview that, in part, yields an index of DSM-IV (APA, 1994)-defined traumatic event exposure. The CAPS also provides a measure of past-month frequency and intensity of 17 posttraumatic stress symptoms, and a dichotomous index of current PTSD diagnosis. The CAPS has excellent psychometric properties including both convergent and discriminant validity, adequate test-retest and inter-rater reliability, and internal consistency (Weathers, Keane, & Davidson, 2001). This interview is considered a "gold standard" of posttraumatic stress symptom assessment. A graduate-level researcher trained in CAPS administration conducted all interviews. An independent doctoral student in clinical psychology trained in the administration of the CAPS conducted reliability checks of 20% of interviews. Reliability checks yielded 100% diagnostic agreement.

For the purposes of the current study, a symptom severity score representing current posttraumatic stress symptoms was computed by summing the frequency and intensity scores obtained for the 17 symptoms on the CAPS. A continuous index was used in this study based upon research suggesting posttraumatic psychopathology is best represented by a dimensional (as opposed to taxonic) symptom structure, with PTSD at the upper end of this continuum (Ruscio, Ruscio, & Keane, 2002). Additionally, diagnostic status was

obtained for descriptive purposes using established scoring rules (1, 2 scoring rule; Weathers, Ruscio, and Keane, 1999).

2.2.2. Peritraumatic emotional assessment—Following the CAPS interview, participants were asked to provide a rating on a 0 – 100 scale regarding the degree to which they experienced peritraumatic fear, disgust toward themselves, and disgust toward the perpetrator. Single item ratings of the intensity of peritraumatic emotion have been used extensively in previous research (e.g., Brewin, Andrews, & Rose, 2000; Engelhard et al., 2010; Feldner, Frala, Badour, Leen-Feldner, & Olatunji, 2010; Lancaster et al., 2011; Roemer, Orsillo, Borkovec, & Litz, 1998). Correlations between single-item ratings of peritraumatic fear or disgust and measures of disgust propensity/sensitivity and anxiety sensitivity offer evidence of convergent validity (Engelhard et al., 2010). This approach has also demonstrated discriminant validity in predicting emotional reactions to experimental procedures (Badour, et al., 2011b).

2.2.3. Contamination-based obsessive-compulsive symptoms—Severity of contamination-based OC symptoms was assessed using the Washing subscale of the well-established Obsessive-Compulsive Inventory-Revised (OCI-R; Foa et al., 2002). The OCI-R is an 18-item self-report measure that provides an index of the severity of 6 domains of OC symptoms, including washing (i.e., contamination concerns), checking/doubting, obsessing, neutralizing, ordering, and hoarding. Summing each of the subscale scores can also generate a total symptom score. Items are rated on a 5-point Likert-type scale ranging from 0 (*not at all*) to 4 (*extremely*). This measure has evidenced strong psychometric properties (Foa et al., 2002) including good internal consistency (alphas = .81 to .93 across samples) and adequate test-retest reliability (.57 to .91 across samples). A cutoff score of 15 on the OCI-R has been identified as displaying good sensitivity and specificity in its ability to distinguish individuals with OCD from nonclinical individuals (Foa et al., 2002).

2.2.4. General vulnerability factors—Several trait-like vulnerability factors that have been linked to both posttraumatic stress (Engelhard et al., 2010; Monson, Price, Rodriquez, Ripley, & Warner, 2004; Taylor, 2003) and OC symptoms (Calamari, Rector, Woodard, Cohen, & Chik 2008; Olatunji et al., 2007) were examined for appropriateness of inclusion as covariates to increase confidence that significant associations are due to hypothesized variables and not relevant third variables.

2.2.4.1. Disgust propensity and sensitivity: The Disgust Propensity and Sensitivity Scale-Revised (DPSS-R; van Overveld, de Jong, Peters, Cavanagh, & Davey, 2006) is a 16-item questionnaire that was employed to measure disgust propensity and disgust sensitivity. Items are rated on a 5-point Likert-type scale ranging from 0 (*never*) to 5 (*always*). The DPSS-R has evidenced adequate psychometric properties including acceptable levels of internal consistency for the Disgust Propensity and Disgust Sensitivity subscales and has demonstrated both convergent and divergent validity with other relevant constructs (van Overveld et al., 2006). Disgust propensity and disgust sensitivity were each examined for inclusion as covariates as individual differences in disgust vulnerability have been linked to contamination-based OC symptoms (Moretz & McKay, 2008; Olatunji, 2010; Tolin et al., 2006), posttraumatic stress symptoms (Engelhard et al., 2010; Rüsch et al., 2011), and ratings of peritraumatic disgust (Engelhard et al., 2010).

2.2.4.2. Anxiety Sensitivity: Anxiety sensitivity, or the trait-like tendency to be concerned about possible negative consequences of anxiety, was measured using the Anxiety Sensitivity Index-3 (ASI-3; Taylor et al., 2007). The ASI-3 is an 18-item questionnaire that asks respondents to rate items on a 5-point Likert-type scale ranging from 0 (*very little*) to 4

(*very much*). The structure of the ASI-3 is hierarchical, with three first-order factors involving concerns pertaining to physical, cognitive, and social consequences of anxiety as well as a single, higher order general factor (Taylor et al., 2007). The total score and the three subscales of the ASI-3 have demonstrated excellent psychometric properties including convergent, discriminant, and criterion-related validity, and adequate internal consistency (α = .76 – .92; Taylor et al., 2007). The general factor was examined for inclusion as a covariate as this has been shown to account for most of the variance in anxiety sensitivity (Mohlman & Zinbarg, 2000; Osman et al., 2010), and has been shown to positively correlate with both posttraumatic stress symptoms (Lang, Kennedy, & Stein, 2002; Taylor, 2003) and contamination-based obsessive compulsive symptoms (Cisler, Reardon, Williams, & Lohr, 2007; Deacon, & Abramowitz, 2006).

2.2.4.3. Negative Affect: The general tendency to experience negative affect was assessed using the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS is a 20-item questionnaire that yields indices of two domains of affectivity: positive and negative. Items rated on a 5-point Likert-type scale (1 = *very slightly or not at all* to 5 = *extremely*) measure the extent to which respondents generally feel different feelings and emotions (e.g., “Hostile”). The PANAS evidences strong psychometric properties and has frequently and successfully been used to measure generalized affect in psychopathology research (Watson, 2000; Watson et al., 1988). The negative affect scale of the PANAS was examined as a potential covariate as negative affect has been demonstrated to be an individual difference factor that is elevated among individuals with both PTSD and OCD (Brown, Chorpita, & Barlow, 1998).

2.3. Procedure

Individuals responding to study announcements first completed a preliminary screening for eligibility via telephone. Potentially eligible participants were scheduled to attend a single laboratory-based assessment. All participants provided written informed consent upon arrival to the laboratory and the CAPS and interview-based assessment of peritraumatic emotion were administered. Participants then completed a randomized questionnaire battery that included demographic information, the OCI-R, DPSS-R, ASI-3, and PANAS. Subsequently, participants completed procedures related to the larger study aimed at examining affective correlates of experiences of traumatic assault. Finally, participants were debriefed and provided with a list of community mental health resources, thanked for their time, and compensated $30.

3. Results

3.1. Descriptive Statistics and Zero-Order Correlations

Fifty-five percent (n = 27) of participants reported a history of sexual assault and 44.9% (n = 22) reported a history of physical assault. Eight percent (n = 4) of participants reported that a stranger perpetrated their index traumatic assault, while the remaining individuals indicated that the index assault was perpetrated by someone known (e.g., family member, romantic partner, friend, acquaintance). Time since the index assault ranged from less than 1 year to 58 years (M = 10.94, SD = 14.35). Independent samples t-tests comparing victims of sexual versus physical assault revealed no significant differences on any study variables. Of the total sample, 29% (n = 14) of participants met diagnostic criteria for PTSD, which is slightly higher than rates observed in previous community samples of assaulted women (Kilpatrick & Acierno, 2003). Thirty seven percent (n = 18) of participants endorsed a level of OC symptoms above the cutoff recommended by Foa and colleagues (2002) for distinguishing between individuals with OCD and nonclinical individuals. Eighteen percent of the total sample satisfied diagnostic criteria for PTSD while concurrently meeting the cutoff for a

probable diagnosis of OCD (n = 9). Table 1 includes additional demographic and descriptive information.

Table 2 includes zero-order correlations among all continuous predictor and criterion variables. Time since the assault was not found to significantly correlate with any predictors or outcome factors1. Contrary to prior research, disgust propensity and disgust sensitivity were not significantly correlated with contamination-based OC symptoms at the zero-order level.2 Disgust sensitivity, but not disgust propensity, was significantly correlated with posttraumatic stress symptoms. Both anxiety sensitivity and negative affect were significantly and positively correlated with both contamination-based OC symptoms and posttraumatic stress symptoms. As expected, peritraumatic self-focused disgust was significantly correlated with contamination-based OC symptoms but not posttraumatic stress symptoms, and peritraumatic fear was significantly correlated with posttraumatic stress symptoms but not contamination-based OC symptoms. Contrary to hypotheses, no significant associations between other-focused disgust and either posttraumatic stress symptoms or contamination-based OC symptoms emerged at the zero-order level. Based on this pattern of associations, disgust sensitivity, negative affect, and anxiety sensitivity were maintained as covariates in the primary analyses.

3.2. Primary Hypothesis Tests

Two separate hierarchical regression analyses were performed to test the incremental validity of peritraumatic fear, self-focused disgust, and other-focused disgust ratings in predicting contamination-based OC symptoms and posttraumatic stress symptoms above and beyond the inclusion of theoretically and empirically relevant covariates (Haynes & Lench, 2003; Sechrest, 1963). In each model, disgust sensitivity, anxiety sensitivity, and negative affect were entered as covariates in step 1. In order to examine specificity in predicting the two symptom types, posttraumatic stress symptoms and OC symptoms were also entered as covariates in step 1 in the respective analyses. Ratings of peritraumatic fear, self-focused disgust, and other-focused disgust were entered into step 2 of each model to demonstrate incremental predictive utility above and beyond the covariates entered into step 1. Inspection of variance inflation factors (VIFs) showed that all predictor variables demonstrated independence and an absence of multicollinearity (Please see Table 3; O'Brien, 2007).

With regards to contamination-based OC symptoms, covariates entered at step 1 accounted for 23.8% of the total variance ($p < .05$). Predictors entered into step 2 of this model accounted for an additional 13.2% of variance ($p < .05$). Consistent with hypotheses, a significant relation emerged for self-focused disgust ($t = 2.56$, $p < .05$, $sr^2 = 0.10$). However, associations with peritraumatic fear ($t = 0.91$, $p = .37$) and other-focused disgust ($t = -0.54$, p = .59) were not significant.

With regards to posttraumatic stress symptoms, covariates entered into step 1 of the model (i.e., OC symptoms, disgust sensitivity, anxiety sensitivity, and negative affect) accounted for 40.0% of the total variance ($p < .01$). Predictors entered into step 2 of this model accounted for an additional 16.0% of variance ($p < .05$). As predicted, peritraumatic fear ($t = 2.88$, $p < .01$, $sr^2 = 0.09$) and other-focused disgust ($t = 2.50$, $p < .05$, $sr^2 = 0.07$) emerged as significant individual predictors of posttraumatic stress symptoms. The effect size of

[1]Although time since the index assault was not significantly correlated with any of the primary factors at the zero-order level, the wide range of time since the index trauma (less than 1 year to 58 years) may have affected memory of emotions experienced during a traumatic event. As such, the primary analyses were conducted including time since index assault as a covariate in step 1. Inclusion of this covariate did not change the pattern of results.

[2]Inspection of quadratic correlations showed that contamination-based OC symptoms were significantly (ps ≤ .001) correlated with disgust propensity ($r = 0.54$) and disgust sensitivity ($r = 0.72$).

peritraumatic other-focused disgust was larger in the full regression equation than at the zero-order level, thus suggesting cooperative suppression (Cohen & Cohen, 1975). Post-hoc analyses revealed that no individual covariate was acting as the suppressor variable. However, the multivariate combination of all covariates was cooperatively suppressing variance, thus allowing peritraumatic other-focused disgust to become a significant predictor of posttraumatic stress symptoms. After removing all covariates, the effects of peritraumatic other-focused disgust on posttraumatic stress symptoms was small and non-significant (t = 1.29, p = .20, sr^2 = 0.03). The association with self-focused disgust was not significant (t = −1.37, p = .18). Table 3 includes an overview of the regression analyses employed to test the current hypotheses.

4. Discussion

Despite a documented association between posttraumatic stress and OC symptoms following exposure to traumatic events (Boudreaux et al., 1998; Brown et al., 2001; Kessler et al., 2005), there is a dearth of research examining possible factors associated with the nature of this comorbidity. Disgust has been proposed as one possible mechanism involved in the etiology of both PTSD and certain types of OCD (Cisler et al., 2008; Engelhard et al., 2010; Olatunji et al., 2010). Specifically, a number of studies have documented a link between disgust and contamination-based OC symptoms (see Olatunji et al. [2010] for a review), and a separate emerging literature has begun to outline an association between disgust and posttraumatic stress (Engelhard et al., 2010; Finucane et al., in press; Foy et al., 1984; Shin et al., 1999). The current study was one of the first to integrate these disparate literatures by examining how intensity of disgust and fear experienced during a traumatic event (i.e., peritraumatically) might uniquely relate to contamination-based OC or posttraumatic stress symptoms among women with a history of traumatic interpersonal victimization. It was hypothesized that internal or self-focused disgust would be most strongly associated with contamination-based OC symptoms while external or other-focused disgust (e.g., toward the perpetrator) and fear would most strongly relate to posttraumatic stress symptoms. Results were consistent with these hypotheses.

Specifically, after substantial variability in symptom levels was accounted for by empirically-derived covariates (ranging from 23.8% to 40%), intensity of peritraumatic self-focused disgust was found to be uniquely related to contamination-based OC symptoms, while peritraumatic fear and other-focused disgust were not significantly associated with this type of symptom. Confidence in this finding is increased by the medium to large effect size observed (sr^2 = .10; Cohen, 1988) for self-focused disgust as compared to near zero effect sizes observed for peritraumatic fear and other-focused disgust. Moreover, self-focused disgust demonstrated a pattern of specificity in predicting OC symptoms such that significant associations emerged with contamination-based OC symptoms after controlling for variance associated with posttraumatic stress. While this pattern suggests self-focused disgust may be uniquely important for understanding contamination-based OC symptoms among survivors of interpersonal assault, it is important to note that this pattern will need to be replicated in a larger sample to increase confidence in the reliability and generalizability.

Intensity of peritraumatic fear emerged as a unique predictor of posttraumatic stress symptoms, which is consistent with a large body of literature documenting an association between the intensity of peritraumatic fear and posttraumatic stress symptoms (Breslau & Kessler, 2001; Brewin et al., 2000; Creamer, McFarlane, & Burgess, 2005; Schnurr, Spiro, Vielhauer, Findler, & Hamblen, 2002). A similar pattern emerged for peritraumatic other-focused disgust. Effect sizes for other-focused disgust (sr^2 = .07) and fear (sr^2 = .09) were medium in magnitude (Cohen, 1988), suggesting a relatively robust and specific role for these peritraumatic affective experiences, particularly in light of the large amount of

variance in symptoms (40%) accounted for by covariates in the model. Although significant overlap between disgust and fear has been documented (e.g., Woody & Teachman, 2000), other-focused disgust and peritraumatic fear both emerged as unique predictors of posttraumatic stress when simultaneously entered into the regression equation. It is worth noting that the zero-order relation between peritraumatic other-focused disgust and posttraumatic stress symptoms was small and non-significant. This relation became significant after controlling for covariates. This shows that the significant effect between peritraumatic other-focused disgust and posttraumatic stress symptoms was likely due to a cooperative suppression effect (Cohen & Cohen, 1975). In other words, the effect of peritraumatic other-focused disgust was only relevant in the presence of emotional vulnerability factors (e.g., disgust and anxiety sensitivities). Nonetheless, these results suggest peritraumatic other-focused disgust may play an important and unique role in posttraumatic stress symptom reactions above and beyond peritraumatic fear. This finding is consistent with a growing literature documenting the importance of disgust in posttraumatic stress symptoms (Engelhard et al., 2010; Olatunji et al., 2009; Shin et al., 1999).

This study is unique in that it provides the first examination of peritraumatic affective processes associated with posttraumatic stress and contamination-based OCD symptoms following interpersonal victimization. Accordingly, it was critical to consider posttraumatic stress and OC symptom levels on a continuum as opposed to restricting the examination to a clinical sample (e.g., those with PTSD). This approach, is consistent with research examining the nature of such symptoms (Broman-Fulks et al., 2009; Ruscio et al., 2002), and avoided restricting the range of the criterion variables of interest. Such an exclusive focus on people with elevated symptom levels (e.g., meeting diagnostic criteria for PTSD and OCD) could result in missing important relations between peritraumatic emotional reactions and symptom levels. Confidence in the generalizability of these findings to a clinical sample is increased, however, by the fact that nearly 20% of the current sample met criteria for a probable comorbid diagnosis of both PTSD and OCD and the mean for both posttraumatic stress and OC symptoms was in the moderate symptom range. Nonetheless, extension of the current study to a group design comparing responses of traumatic event-exposed individuals with no diagnosis, PTSD alone, OCD alone, and comorbid PTSD and OCD, would increase confidence regarding the role of peritraumatic disgust, relative to fear, in PTSD and OCD.

It is also important to recognize that the cross-sectional nature of the current study precludes any conclusions regarding the temporal patterning of the observed association between peritraumatic disgust and either contamination-based OC symptoms or posttraumatic stress symptoms. First, it is possible that existing elevations in OC symptoms may have led to increased feelings of self-focused disgust during the interpersonal victimization experience. Alternatively, it is possible that elevations in posttraumatic stress and OC symptoms at the time of measurement may have led to a bias in respondents' retrospective reports of peritraumatic emotions. Similarly, it is possible that current symptoms may have affected measurement of general vulnerability factors (i.e., anxiety sensitivity, disgust propensity/sensitivity, negative affect). Longitudinal work is now needed to document temporal (and potentially causal) associations between peritraumatic disgust and the development and/or maintenance of specific types of posttraumatic psychopathology. The reliance on retrospective report of peritraumatic emotion in this study is also a limitation (Pitman & Orr, 1990; Southwick, Morgan, Nicolaou, & Charney, 1997). To the best of our knowledge there has been no controlled examination of the reliability of retrospective report of intensity of specific peritraumatic emotions. However, Krinsley, Gallagher, Weathers, Kutter, and Kaloupek (2003) found that the presence of peritraumatic fear, helplessness, and horror increased the reliability of reporting traumatic event exposure history. Identification of measures against which to compare the validity of self-reported peritraumatic emotion is

also a challenge due to a scarcity of well-established instruments tapping into this construct and the obvious obstacles to assessing such emotions during a traumatic event (Andrews, 1998; Brewin et al., 2000). Assessment of peritraumatic emotion could be conducted shortly following a traumatic experience (i.e., in the emergency room) to begin to understand the reliability of retrospectively reported peritraumatic emotion as it relates to time since traumatic event exposure.

It is also interesting to note that time since assault was not related to either posttraumatic stress or OC symptom levels. This is inconsistent with research documenting that posttraumatic stress symptoms typically decrease across time subsequent to assault (Gilboa-Schechtman & Foa, 2001). However, in contrast to controlled studies that track symptom decreases subsequent to assault, symptoms were not monitored subsequent to assault in the current study. It is possible that relatively high symptom levels among participants experiencing chronic posttraumatic stress along with relatively low symptom levels of women more recently assaulted (particularly in light of the relatively small sample) resulted in the current non-significant association between time since assault and symptom levels.

This study included a relatively homogenous sample (see Table 1). The sample included predominantly educated Caucasian women with a history of interpersonal victimization, which limits the generalizability of the current findings. Extension of this research to more diverse samples is needed. Given that case studies have documented some concurrence between the content of a traumatic event and subsequent obsessions and compulsions (de Silva & Marks, 2001; Gershuny et al., 2003; Moraes et al., 2008; Sasson et al., 2005), it is possible that the observed pattern may be specific to experiences of traumatic interpersonal victimization. Such experiences have been hypothesized to frequently involve interpretations that one has been contaminated by the traumatic experience, which may motivate subsequent compulsive washing behavior (e.g., Elliot & Radomsky, 2009; Fairbrother & Rachman, 2004; Olatunji et al., 2008). It will be important for future research to examine this association among other traumatic event-exposed samples in which peritraumatic self-focused disgust is also likely to occur (e.g., combat).

These limitations notwithstanding, the present findings offer a number of clinical implications that warrant attention. First, within the context of gold-standard assessment for PTSD, identification of peritraumatic emotions is typically limited to whether intense feelings of fear, helplessness, or horror were present or absent during the traumatic event (Criterion A2; APA, 1994; 2000). Consistent with a number of criticisms that have been offered regarding the limited scope of this assessment approach (Bovin & Marx, 2011; Resick & Schnicke, 1992), results of the current study suggest that ascertaining not only the presence or absence of peritraumatic disgust, but also information regarding the intensity and target of disgust reactions may offer important insight into the range of possible posttraumatic reactions that might be expected. The present findings also underscore the need to develop increasingly sophisticated ways of assessing disgust reactivity within the context of traumatic events (e.g., self- versus other-focused disgust), and to assess for the presence of both posttraumatic stress and OC symptoms following traumatic event exposure.

Research suggests the co-occurrence of PTSD and OCD among individuals with a history of traumatic events predicts poorer response to behavioral treatments (Gershuny, Baer, Jenike, Minichiello, & Wilhem, 2002). As such, it will be particularly important to identify specific mechanisms involved in the pathogenesis and maintenance of these conditions in an effort to develop targeted intervention approaches. Emerging evidence suggests that conditioned disgust may be relatively resistant to extinction as compared to fear (Olatunji, Forsyth, & Cherian, 2007; Mason & Richardson, 2010). Indeed, disgust appears to decline slower than fear in response to *in vivo* exposure among individuals with contamination-based OCD

(McKay, 2006) as well as those high in contamination concerns (Adams, Willems, & Bridges, 2011; Olatunji, Wolitzky-Taylor, Willems, Lohr, & Armstrong, 2009). Extinction of disgust-based reactions in PTSD has not been empirically examined; however, it has been theorized that disgust, related emotions of guilt and shame (Barret, Zahn-Waxler, & Cole, 1993), and feelings of having been contaminated by a traumatic experience may be less amenable to exposure-based treatments as compared to emotions of fear or anxiety (Jung & Steil, 2012; Resick & Schnicke, 1992). Future research should examine how peritraumatic disgust, as well as persistent traumatic event-related disgust reactions, predicts response to treatment among individuals with PTSD and/or posttraumatic OCD.

- Obsessive-compulsive (OC) and posttraumatic stress symptoms frequently co-occur.
- Unique affective predictors were examined following interpersonal victimization.
- Peritraumatic fear uniquely predicted posttraumatic stress symptoms.
- Other-focused disgust uniquely predicted posttraumatic stress symptoms.
- Peritraumatic self-focused disgust uniquely predicted contamination OC symptoms.

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Table 1

Demographic and Relevant Descriptive Information

	M or *n*	(*SD* or %)	Range
Demographics			
Age	28.37	13.86	18 – 67
Education Completed			
High School or Equivalent	3	6.1%	
Some College	28	57.1%	
2-Year College	4	8.2%	
4-Year College	3	6.1%	
Some Postgraduate Education	5	10.2%	
Completed Postgraduate Education	5	10.2%	
Marital Status			
Single	5	10.2%	
Married	9	18.4%	
Cohabitating	6	12.2%	
Separated	3	6.1%	
Divorced	26	53.1%	
Annual Income			
Not Reported	12	24.5%	
Less than $10,000	15	30.6%	
$10,000 to $19,999	7	14.3%	
$20,000 to $29,999	5	10.2%	
$30,000 to $39,000	5	10.2%	
$40,000 to $49,000	1	2.0%	
$50,000 or Greater	4	8.2%	
Time Since Index Traumatic Event (Years)	10.94	14.35	0 – 58
Symptom Severity			
Contamination-Based OC Symptoms (OCI-R)	1.49	2.00	0.0 – 9.0
Posttraumatic Stress Symptoms (CAPS)	30.43	18.86	4.0 – 70.0
Peritraumatic Emotional Responding			
Self-Focused Disgust	39.61	37.10	0.0 – 100.0
Other-Focused Disgust	82.76	30.30	0.0 – 100.0
Fear	79.25	29.54	0.0 – 100.0
General Vulnerability Factors			
Disgust Propensity (DPSS-R)	20.37	5.62	2.0 – 36.0
Disgust Sensitivity (DPSS-R)	16.20	5.75	1.0 – 29.0
Anxiety Sensitivity (ASI-3)	17.51	13.48	1.0 – 58.0
Negative Affect (PANAS)	20.55	6.56	11.0 – 34.0

Note: N = 49; OC = Obsessive-Compulsive; OCI-R = Obsessive-Compulsive Inventory-Revised; CAPS = Clinician-Administered PTSD Scale; DPSS-R = Disgust Propensity and Sensitivity Scale-Revised; ASI-3 = Anxiety Sensitivity Index-3; PANAS = Positive and Negative Affect Schedule

Table 2

Zero-Order Relations among Continuous Predictor and Criterion Variables

	1	2	3	4	5	6	7	8	9	10
1. Disgust Propensity	--	.59**	.33*	.21	.08	.05	.22	−.13	.03	.03
2. Disgust Sensitivity	--	--	.60**	.46**	−.15	.24	.32*	−.01	−.19	.06
3. Anxiety Sensitivity	--	--	--	.61**	−.08	.35*	.41**	.04	.01	−.03
4. Negative Affect	--	--	--	--	−.27	.44**	.61**	.15	−.09	−.03
5. Time Since Assault	--	--	--	--	--	−.09	−.21	−.10	.04	−.14
6. OC Symptoms	--	--	--	--	--	--	.42**	.38**	.00	.22
7. PTS Symptoms	--	--	--	--	--	--	--	.07	.17	.31*
8. Self - Disgust	--	--	--	--	--	--	--	--	.17	.11
9. Other - Disgust	--	--	--	--	--	--	--	--	--	−.03
10. Fear	--	--	--	--	--	--	--	--	--	--

Note: N = 49; OC = obsessive-compulsive; PTS = posttraumatic stress.

* $p < .05$;

** $p < .01$.

Table 3

Peritraumatic Fear, Self-Focused Disgust, and Other-Focused Disgust as Predictors of Obsessive-Compulsive Symptoms and Posttraumatic Stress

	R^2	*t*	β (each predictor)	sr^2	*VIF*
Model 1: Predicting OC Symptoms					
Step 1	0.24*				
Disgust Sensitivity		−0.96	−0.01	0.00	1.60
Anxiety Sensitivity		0.63	0.02	0.01	2.00
Negative Affect		1.20	0.07	0.03	2.13
PTS Symptoms		1.44	0.03	0.04	1.59
Step 2	0.37*				
Self-Disgust		2.56	0.02	0.10*	1.11
Other-Disgust		−0.54	−0.01	0.00	1.27
Fear		0.91	0.01	0.01	1.29
Model 2: Predicting PTS Symptoms					
Step 1	0.40**				
Disgust Sensitivity		0.25	0.12	0.00	1.60
Anxiety Sensitivity		0.11	0.02	0.00	2.02
Negative Affect		3.17	1.38	0.14**	1.79
OC Symptoms		1.44	1.72	0.03	1.25
Step 2	0.56**				
Self-Disgust		−1.30	−0.17	0.02	1.23
Other-Disgust		2.24	0.25	0.07*	1.11
Fear		2.76	0.32	0.09**	1.09

Note: N = 49; β = standardized beta weight; sr^2 = squared semi-partial correlation; *VIF* = variance inflation factor; OC = obsessive-compulsive; PTS = posttraumatic stress.

* $p < .05$;

** $p < .01$.