



## Specificity of disgust vulnerability in the distinction and treatment of OCD

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### ABSTRACT

A growing body of research has implicated disgust as a potential risk factor for the development and maintenance of obsessive-compulsive disorder (OCD). The first aim of the present study was to determine whether related, yet distinct, disgust vulnerabilities are endorsed more strongly by individuals with OCD than by those with another anxiety disorder. The second aim was to examine the unique contributions of changes in disgust to symptom improvement observed with exposure-based treatment for OCD. In study 1, individuals with OCD, generalized anxiety disorder (GAD), and nonclinical controls (NCCs) completed a measure of disgust propensity and disgust sensitivity. Compared to NCCs and individuals with GAD, those with OCD more strongly endorsed disgust propensity. However, individuals with OCD did not significantly differ from individuals with GAD in disgust sensitivity, although both groups reported significantly higher disgust sensitivity levels compared to NCCs. Study 2 comprised mediation analyses of symptom improvement among individuals with OCD and revealed that decreases in disgust propensity over time mediated improvement in OCD symptoms, even after controlling for improvements in negative affect. The implications of these findings for conceptualizing the role of disgust in the nature and treatment of OCD are discussed.

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Obsessive-compulsive disorder (OCD) is characterized by recurrent obsessions or compulsions that cause marked distress and interfere with daily functioning (American Psychiatric Association, 2000). Obsessions are typically defined as intrusive, repetitive thoughts, images, or impulses; and compulsions are purposeful, repetitive overt and covert behaviors or rituals performed in an effort to relieve obsessional distress. Despite recent advances in knowledge on the phenomenology of OCD (Abramowitz et al., 2008), much remains unknown about the causal mechanisms of OCD. A growing body of research has implicated disgust proneness in the etiology and maintenance of OCD (Olatunji et al., 2004; Schienle et al., 2003). For example, recent research has revealed that self-report measures of disgust proneness significantly predict OCD symptoms (Olatunji et al., 2007a; Thorpe et al., 2003). Furthermore, it has been observed that the neurocircuits involved in disgust processing may be relevant to OCD (Husted et al., 2006). This growing body of research is in line with the notion that OCD may reflect a false contamination alarm that is mediated by disgust, not only at a basic brain level, but also in terms of the psychosocial aspects of the disorder (Stein et al.,

2001). However, this only explains the contamination obsessions and washing compulsions dimension of OCD. Although much less is known about disgust in other OCD symptom dimensions (symmetry/ordering, checking, pure obsessions), it is plausible that disgust may play a role in other OCD symptom dimensions as a byproduct of a broader emotion regulation deficit (Taylor and Liberzon, 2007).

Several studies have shown that the tendency to experience disgust predicts symptoms of OCD, even after controlling for negative affect (Mancini et al., 2001; Thorpe et al., 2003). However, a robust association between disgust and OCD has not been consistently observed in the literature. For example, Muris et al. (1999) found that the association between disgust levels and OCD symptoms among children became nonsignificant when controlling for trait anxiety. A prior study also found that disgust levels among adult OCD patients were not significantly higher than those of patients with social phobia (Woody and Tolin, 2002). However, the psychometric properties of disgust measures employed in such research have been questioned, and it has been proposed that the discrepant findings may partially be accounted for by differences in how vulnerabilities associated with disgust proneness are operationalized (Olatunji and Cisler, 2009). Although the earliest measures of disgust have been argued to assess one's sensitivity to disgust, such scales appear to be better operationalized as measures

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of ones proneness to experiencing disgust. Recently, van Overveld et al. (2006) identified *disgust propensity* and *disgust sensitivity* as two distinct types of disgust-based vulnerabilities. Disgust propensity is the general tendency (which may be defined by both frequency and/or intensity of responding) to respond with disgust in any given situation, whereas disgust sensitivity is the over-estimation of the negative consequences of experiencing disgust.

Disgust propensity may reflect a specific aspect of the general tendency to experience negative emotion. Rather than intensely experiencing disgust or experiencing disgust frequently, however, some individuals may appraise cues of disgust and the experience of disgust as threatening, and such disgust sensitivity may confer risk for OCD (Olatunji, 2010). This notion is akin to the role that anxiety sensitivity (i.e., the fear of somatic arousal; Reiss, 1991) plays in the development of panic and related disorders (Schmidt et al., 1997; Schmidt et al., 2006). van Overveld et al. (2006) developed the Disgust Propensity and Sensitivity Scale-Revised (DPSS-R) to reliably assess the two types of disgust-based vulnerabilities. Their research has shown that disgust propensity and disgust sensitivity differentially relate to anxiety disorder symptoms. Specifically, disgust propensity was found to be a significant predictor of spider fear, whereas both disgust propensity and disgust sensitivity were significant predictors of blood fear. Disgust sensitivity has also been found to be a stronger predictor of fear of vomiting relative to disgust propensity (van Overveld et al., 2008). Furthermore, disgust sensitivity has also been shown to demonstrate incremental validity over disgust propensity in predicting fear-relevant phobias (i.e., dog, heights), whereas disgust propensity does not appear to show incremental validity over disgust sensitivity (Fergus and Valentiner, 2009). However, recent work suggests that disgust propensity is more strongly associated with avoidance of sources of contagion than disgust sensitivity (Van Overveld et al., 2010).

Although disgust propensity and disgust sensitivity are both uniquely associated with specific phobias (Olatunji et al., 2007a,b), it remains unclear how the two vulnerabilities relate to OCD. A recent study did find that whereas disgust sensitivity was significantly positively correlated with only hoarding symptoms among patients with OCD, disgust propensity was significantly correlated with hoarding, neutralizing, ordering, and washing symptoms among OCD patients (Olatunji et al., 2010a,b). The association between disgust and hoarding is particularly intriguing (and perhaps counterintuitive) and the authors speculate that this finding may reflect a more general deficit in emotion regulation/tolerance in hoarding. In general, this initial finding does suggest that disgust propensity may be more broadly associated with OCD than disgust sensitivity. The present study builds upon this work by examining the specificity of the relationship between OCD and disgust vulnerability processes. To this end, individuals with OCD were compared to those with generalized anxiety disorder (GAD) and nonclinical controls with respect to their responses on the DPSS-R (Study 1). It was hypothesized that individuals with OCD would report higher levels of disgust propensity and disgust sensitivity than those with GAD and NCCs.

A second aim of this study was to examine the extent to which disgust vulnerability plays a role in OCD symptom improvement observed with treatment. Exposure and response prevention has been shown to reduce disgust responses among those with OCD (McKay, 2006), but it is not clear whether these observed changes account for OCD symptom improvement. Indeed, to the extent that disgust vulnerabilities underlie OCD, one would expect that changes in disgust vulnerabilities during treatment would account for changes in OCD symptoms during treatment. In addressing this mediational hypothesis, we focused on disgust vulnerability processes (e.g., disgust propensity, disgust sensitivity) specific to

OCD. That is, as potential mediators, we only selected disgust vulnerability variables that had been shown to be specific to OCD in Study 1. To further test for specificity, we evaluated whether the mediational effect of disgust vulnerability decline would remain significant after controlling for a plausible rival change mechanism, namely improvements in negative affect. To test these hypotheses, we administered measures of disgust vulnerability before and after exposure-based treatment to an independent sample of treatment-seeking adults with OCD.

## 1. Study 1: method & materials

### 1.1. Sample characteristics

Participants consisted of 30 adults with a diagnosis of GAD, 30 with OCD, and 30 NCCs with no history of an Axis 1 disorder. OCD participants, who mostly (37%) expressed contamination obsessions and washing compulsions, were recruited mainly from the Obsessive-Compulsive Disorder/Tourette Syndrome Program at Vanderbilt University. GAD and NCC participants were recruited from community advertisements or referrals from the Vanderbilt Adult Psychiatry Outpatient Clinic. The *Structured Clinical Interview for the DSM-IV* (SCID-IV; First et al., 1997) was administered and supervised by a trained clinical psychologist to confirm diagnosis for all participants with the exclusionary criteria for all groups with a diagnosis of bipolar disorder, substance abuse, ADHD, pervasive developmental disorders, mental retardation, or current or past central nervous system diseases; also, inclusionary criteria for the clinical groups could not overlap (i.e., OCD participants could not have history or current GAD diagnosis). Institutional review board (IRB) approval (Vanderbilt University) was obtained for procedures and all patients gave their written informed consent. Participants were seated at a computer where they completed self-report questionnaires as part of a larger study on information processing. Table 1 presents demographic information for the participants in each diagnostic group. The groups did not significantly differ in age, gender, ethnicity, and education. However, the groups did differ in marital status ( $\chi^2 = 10.84, p < 0.03$ ), with significantly more married participants in the GAD group compared to those with OCD and NCCs.

### 1.2. Measures

The *Obsessive-Compulsive Inventory-Revised* (OCI-R; Foa et al., 2002) is an 18-item measure of OCD symptoms. Participants rate the degree to which they are bothered or distressed by OCD symptoms in the past month on a 5-point scale from 0 = "Not at all" to 4 = "Extremely". The OCI-R assesses six types of OCD symptoms: Washing concerns ( $M = 4.43, SD = 4.03$ ), Checking/Doubting ( $M = 4.73, SD = 3.36$ ), Obsessing ( $M = 7.46, SD = 3.33$ ), Mental Neutralizing ( $M = 3.03, SD = 3.65$ ), Ordering ( $M = 4.73, SD = 3.99$ ), and Hoarding ( $M = 4.33, SD = 4.22$ ). The OCI-R had good internal consistency in the present study ( $\alpha = 0.92$ ).

**Table 1**  
Demographic characteristics by diagnostic group.

	OCD	GAD	NCC
N	30	30	30
Age	39.23 (11.91)	38.63 (11.26)	39.50 (10.29)
% female	50	50	50
% Caucasian	96.7	86.7	73.3
% Married	30.0	65.5	30.0
% College Degree	43.3	37.9	46.6

Note: OCD = Obsessive-compulsive disorder; GAD = Generalized-anxiety disorder; NCC = Non-clinical control.

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