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Changes in disgust correspond with changes in symptoms of contamination-based OCD: A prospective examination of specificity

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ABSTRACT

Although several studies have implicated disgust in contamination-based obsessive-compulsive disorder (OCD), there remains a paucity of research examining this relationship prospectively. To address this gap in the literature, undergraduate students ($n = 177$) participated in a 12-week prospective study for which they completed measures of contamination-based OCD symptoms, disgust, and negative affect. Change in disgust levels over the 12-week period predicted change in symptoms of contamination-based OCD, even when controlling for age, gender, and change in negative affect. However, this association was driven by change in the perceived negative impact of experiencing disgust (disgust sensitivity) rather than change in the intensity that disgust is generally experienced (disgust propensity). Subsequent analyses also revealed that change in disgust sensitivity fully mediated the association between change in disgust propensity and change in symptoms of contamination-based OCD. The implications of these findings for further delineating the causal role of disgust-related vulnerabilities in contamination-based OCD are discussed.

Disgust is a basic emotion with distinct behavioral, cognitive, and physiological dimensions that functions to prevent contamination and disease (Curtis & Biran, 2001; Oaten, Stevenson, & Case, 2009). Accordingly, there has been emerging research interest on the role of disgust in the etiology of various anxiety disorders (Olatunji & Sawchuk, 2005; Woody & Teachman, 2000), including contamination-based obsessive-compulsive disorder (OCD). OCD is characterized by the presence of distressing, time consuming obsessions and/or compulsions that significantly interfere with social and/or occupational functioning (*DSM-IV TR*; American Psychiatric Association [APA], 2000). Symmetry/ordering, hoarding, contamination/cleaning, and obsessions/checking have been indentified as the most common presentations of OCD (Mataix Cols, do Rosario Campos, & Leckman, 2005). These distinct OCD dimensions may be marked by distinct risk factors (see McKay et al., 2004 for review), and recent research suggests that disgust-specific vulnerabilities may be particularly relevant for the development of the contamination subtype of OCD (Olatunji & Armstrong, 2009; Olatunji & McKay, 2007).

Fear of contamination is the most common theme associated with OCD (Steketee, Grayson, & Foa, 1985), accounting for approximately 55% of concerns reported by such patients (Rasmussen & Tsuang, 1986). Descriptive and experimental research suggests that compulsions (i.e., washing) associated with contamination-based OCD function to negatively reinforce obsessional thoughts of increased likelihood and severity of acquiring a disease (Rachman & Shafran, 1998). Given the emphasis on disease-avoidance, contamination-based OCD may represent a dysfunction in the appraisal and processing of disgust. Consistent with this notion, research has shown that self-report measures of individual differences in experiencing disgust correlate significantly with measures of contamination-based OCD (Olatunji, Williams, Lohr, & Sawchuk, 2005) even after controlling for anxiety (Mancini, Gragnani, & D'Olimpio, 2001; Olatunji et al., 2007b) and depression (Tolin, Woods, & Abramowitz, 2006). Behavioral research has also implicated disgust in contamination-based OCD. For example, Deacon and Olatunji (2007) found that disgust levels significantly predicted behavioral avoidance of sources of contamination even when controlling for negative affect. A review of neuroimaging studies has also led to the conclusion that neurocircuits involved in the processing of disgust (i.e., insula) may be relevant to contamination-based OCD (Husted, Shapira, & Goodman, 2006).

Evidence from self-report, behavioral, and neuroimaging research suggests that the tendency to experience disgust may be a risk factor for the development of contamination-based OCD (Olatunji, Cisler, McKay, & Phillips, 2010), however the nature of the disgust vulnerability that may be implicated remains unclear. Based on advances in the assessment of disgust (van Overveld, de Jong, Peters, Cavanagh, & Davey, 2006), disgust vulnerabilities may

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be categorized in terms of disgust propensity (elevations in the perceived frequency/intensity of experiencing disgust) or disgust sensitivity (elevations in the perceived negative impact of experiencing disgust). The propensity towards experiencing disgust (disgust propensity), and the catastrophic evaluation and interpretation of one's experience of disgust (disgust sensitivity) has been shown to be independent constructs. However, few studies have examined the unique contributions of disgust propensity and disgust sensitivity in relation to contamination-based OCD. A recent study did find that only disgust sensitivity contributed unique variance to the prediction of contamination fear and contamination-related safety seeking when controlling for negative affect (Olatunji, Cisler, Deacon, Connolly, & Lohr, 2007). A recent study also found that disgust sensitivity significantly predicted estimates regarding the likelihood of catching a disease, even after controlling for anxiety symptoms (Mitte, 2008).

Although recent studies suggest that contamination-based OCD is best characterized by sensitivity to disgust experiences (Mitte, 2008; Olatunji et al., 2007a), rather than the propensity towards experiencing disgust, additional research is needed to further clarify the nature of the disgust vulnerability that may contribute to contamination-based OCD. Perhaps more concerning is that the overwhelming majority of the evidence implicating disgust in contamination-based OCD is based on cross-sectional data with no currently available data from prospective designs. To address this gap in the research literature, a prospective design over a 12-week period was employed in the present study. It was predicted that change in disgust levels would predict change in symptoms of contamination-based OCD over the 12-week period, even after controlling for changes in negative affect and depression. It was also predicted that relative to change in disgust propensity, changes in disgust sensitivity would be a more robust predictor of change in symptoms of contamination-based OCD. Lastly, exploratory analyses were conducted to examine the extent to which change in disgust sensitivity mediated the association between change in disgust propensity and change in symptoms of contamination-based OCD.

1. Method

1.1. Participants

One hundred and seventy seven participants (68% women) were recruited from undergraduate courses at a large southern university in exchange for research credit. Participants ranged in age from 17 to 42 years (M = 20.27, SD = 2.98) and were primarily Caucasian (82%). An important issue concerns whether the study of nonclinical samples is relevant to understanding OCD in clinical populations. A growing literature supports the notion that OCD symptoms occur on a continuum of severity and have their origin in largely normal human processes (Burns, Formea, Keortge, & Sternberger, 1995; see Gibbs, 1996 for a review). Thus, the results of psychopathology studies using nonclinical samples may be relevant to understanding processes that underlie the development of OCD.

1.2. Materials

The *Padua Inventory* (PI; Burns, Keortge, Formea, & Sternberger, 1996) contamination subscale consists of ten items assessing contamination concerns. Items are scored on a five-point scale ranging from 0 = "Not at all" to 4 = "Very much."

The *Disgust Propensity and Sensitivity Scale-Revised* (DPSS-R; van Overveld et al., 2006) is a 16-item measure designed to assess the frequency of disgust experiences (*Disgust Propensity*) and the emotional impact of disgust experiences (*Disgust Sensitivity*). Subjects rate their agreement with the each item on a scale ranging from 1 ("never") to 5 ("always").

The Negative Affectivity subscale of the *Positive and Negative Affectivity Schedule* (PANAS-NA: Watson, Clark, & Tellegen, 1988) is a 10-item measure of the propensity to experience chronic negative emotions. Participants are asked to rate the degree to which they generally experience 10 negative affective experiences (e.g., nervous, jittery, distressed, scared, afraid) using a five-point Likert scale, ranging from 1 = "Very slightly or not at all" to 5 = "Extreme."

The *Beck Depression Inventory-II* (BDI-II; Beck, Steer, & Brown, 1996) is a 21-item, self-report measure of depressive symptoms. Participants indicate how frequently they have experienced each of the 21 symptoms over the past 2 weeks on a four-point Likert scale from 1 = "Never" to 4 = "All the time."

1.3. Procedure

Participants completed a questionnaire packet containing the above measures in a classroom setting at two time points approximately 12 weeks apart and received course credit for their participation. A 12-week follow-up interval was chosen for convenience (approximately the length of the academic semester). A 12-week follow-up interval also maximizes participant retention while also allowing sufficient time for participants to experience life events. One hundred and thirty one participants completed the assessment battery at time 2. Thus, 74% of participants completed the measures at both time points. Given that the questionnaires were completed in a classroom setting, drop out is largely attributed to attendance.

2. Results

2.1. Descriptive statistics and zero-order correlations

Table 1 presents descriptive statistics on each measure for the total sample at time 1 and time 2. Zero-order Pearson correlations

Table 1
Descriptive statistics for study measures according to time point.

Measure	Time 1			Time 2		
	Mean (*SD*)	Range	Alpha	Mean (*SD*)	Range	Alpha
PI	9.58 (7.49)	0.00–37.00	.90	9.79 (7.49)	0.00–34.00	.91
DPSS-R	19.50 (9.55)	0.00–55.00	.90	18.18 (9.76)	0.00–55.00	.92
DP	11.67 (4.66)	0.00–26.00	.87	10.81 (5.17)	0.00–32.00	.89
DS	7.85 (5.50)	0.00–29.00	.82	7.36 (5.36)	0.00–28.00	.84
NA	21.03 (6.74)	10.00–46.00	.87	19.18 (6.89)	10.00–50.00	.90
BDI-II	8.95 (8.21)	0.00–51.00	.91	8.13 (7.79)	0.00–55.00	.91

Note: PI = Padua Inventory Contamination Fear; DPSS-R = Disgust Propensity and Sensitivity Scale-Revised; DP = disgust propensity; DS = disgust sensitivity; NA = negative affect; BDI-II = Beck Depression Inventory-II.