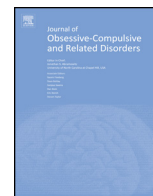




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Short communication

Reduced disgust propensity is associated with improvement in contamination/washing symptoms in obsessive-compulsive disorder



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ABSTRACT

Objectives: Disgust is a well-established phenomenon with known neurobiological correlates. However, it remains unclear how or whether disgust changes with clinical treatment, because few longitudinal studies have tracked the association of disgust vulnerability and clinical symptoms in patient populations.

Methods: We assessed disgust propensity and symptoms of obsessive-compulsive disorder (OCD) in 134 patients receiving intensive residential treatment for OCD. Using linear regression with adjustment for age, sex, and depression severity, we tested the association between change in disgust propensity and change in OCD symptoms from admission to discharge.

Results: Change in disgust propensity was significantly associated with improvement in contamination/washing symptoms ($\beta=0.25$ [95% confidence interval: 0.11–0.39]; $P=0.001$). No significant association was found between change in disgust propensity and change in other OCD symptom dimensions.

Conclusions: In patients with OCD undergoing intensive residential treatment, disgust propensity appears to improve in parallel with contamination/washing symptoms.

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1. Introduction

Obsessive-compulsive disorder (OCD) affects approximately 2% to 3% of people, often causing clinically significant levels of disability (Ruscio, Stein, Chiu, & Kessler, 2010). Factor analyses have consistently identified four symptom dimensions of OCD: symmetry/repeating and ordering, forbidden thoughts/checking, contamination/washing, and hoarding (Bloch, Landeros-Weisenberger, Rosario, Pittenger, & Leckman, 2008). While several studies have suggested differences in treatment response (Bloch et al., 2014; Landeros-Weisenberger et al., 2010; Mataix-Cols, Marks, Greist, Kobak, & Baer, 2002; Mataix-Cols, Rauch, Manzo, Jenike, & Baer, 1999; Storch et al., 2008; Williams et al., 2014) and neurobiology (Gilbert et al., 2009, 2008; Harrison et al., 2013; Mataix-Cols et al., 2004; Phillips & Mataix-Cols, 2004; van den Heuvel et al., 2009; Via et al., 2014) between these symptom dimensions, clear distinctions are lacking.

Disgust is a well-studied emotion that has been theorized to evolve from the primitive response to bad-tasting foods (Darwin, 1872; Rozin, Haidt, & McCauley, 2000), and may have developed as a protection against the contraction of diseases through contact with harmful or contaminated substances (Rozin & Fallon, 1987; Rozin et al., 2000). As such, disgust has been implicated in the etiology and maintenance of anxiety disorders-particularly those that involve a component of disease-avoidance such as the contamination/washing subtype of OCD (Olatunji, Cisler, McKay, & Phillips, 2010). Moreover, the neural circuitry underlying the disgust response has been well described, and recent evidence from neuroimaging studies of OCD patients with contamination/washing symptoms suggest abnormal activation in brain regions within this circuit – particularly the anterior insula (Husted, Shapira, & Goodman, 2006; Phillips et al., 2000; Shapira et al., 2003). Therefore, further investigation into the role of disgust in the etiology and treatment of contamination/washing symptoms may lead to an improved understanding of how this OCD subtype is distinct from other OCD symptom dimensions on a phenomenological and neurobiological level.

One line of inquiry involves examining the effects of treatment on disgust vulnerability in OCD patients with contamination/washing symptoms to determine if changes in disgust correlate with symptom

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improvement. To date, it remains unclear whether disgust changes with clinical improvement in OCD or remains relatively stable – because most studies examining the relationship between disgust vulnerability and OCD symptoms have used cross-sectional designs. To our knowledge, only two studies (Olatunji, 2010; Olatunji, Tart, Ciesielski, McGrath, & Smits, 2011) have examined prospectively the association between changes in disgust vulnerability and changes in OCD symptoms. The first (Olatunji, 2010) found that changes in disgust propensity (an individual's likelihood to experience disgust) over a 12-week period predicted changes in self-reported contamination-based OCD symptoms in a non-clinical sample receiving no intervention. The second (Olatunji et al., 2011) reported that changes in disgust propensity were significantly associated with overall symptom improvement, regardless of symptom domain, in a sample of 40 patients with OCD treated with exposure-response prevention therapy in an intensive outpatient program. We sought to: 1) replicate these findings in a larger sample of patients with severe OCD and 2) examine whether reduction in disgust propensity is associated specifically with improvement in contamination-based OCD symptoms and more broadly with other OCD symptom domains.

Our primary aim was to examine the association between changes in disgust propensity, as measured by the Disgust Scale-Revised (DS-R), and changes in the four dimensions of OCD symptoms among patients receiving intensive residential treatment (IRT). Secondary aims were to: 1) examine the association between disgust propensity and OCD symptoms at admission, and 2) examine the association between changes in disgust propensity and changes in overall OCD symptoms, as measured by the Yale–Brown Obsessive–Compulsive Scale (Y–BOCS). We hypothesized that disgust propensity would improve with treatment, and that this improvement would occur in parallel with improvements in contamination/washing symptoms, but not other OCD symptom dimensions. We also hypothesized that disgust propensity would be specifically associated with contamination/washing symptoms at admission, but we predicted that change in disgust propensity would not be associated with change in overall Y–BOCS scores.

2. Materials and methods

2.1. Study participants

Study participants were first-time admissions to the McLean Hospital Obsessive–Compulsive Disorder Institute (OCDI), an IRT program for patients with severe OCD. The OCDI utilizes a multidisciplinary staff to provide intensive behavioral, pharmacologic, and group treatment at both residential and partial hospital levels of care. On average, IRT involves about 2–4 h of daily exposure response prevention therapy, weekly meetings with psychiatrists who specialize in the pharmacologic management of OCD, and case management with a social worker to address family dynamics and aftercare planning. The average length of stay in the OCDI is approximately 45 days, and about 25% of patients stay at least 3 months.

Participants gave written informed consent to allow their data to be used in a longitudinal research study approved by the McLean Hospital Institutional Review Board. Each participant had a confirmed diagnosis of OCD based on unstructured clinical interviews by both a behavioral therapist and a psychiatrist with expertise in OCD.

2.2. Clinical assessments

We utilized four self-report clinical rating scales administered to each patient at admission and discharge. The DS-R, our primary measure of disgust propensity, is a 25-item scale used to measure individual differences in the tendency to experience disgust (Haidt, McCauley, & Rozin, 1994; Olatunji et al., 2007). The Obsessive–Compulsive Symptoms Rating Scale (OCSRS), our primary measure of OCD severity within symptom dimension, is a self-report measure covering 67 specific OCD and obsessive–compulsive spectrum symptoms grouped into 22 categories, including obsessions (e.g., aggression, contamination, sexual, hoarding, religious, symmetry, somatic), compulsions (e.g., cleaning, checking, repeating, counting, ordering, hoarding), and several miscellaneous categories (e.g., mental rituals, reassurance seeking, superstitious behaviors, tic-like repetitive behaviors, and self-damaging behaviors) (Wilhelm & Steketee, 2006). Individuals rate the

severity of each category on a scale from 0 (no problem) to 10 (very severe). These category scores have been shown to be reliable and valid with good internal consistency (Yovel et al., 2012). The Y–BOCS, used to assess the overall severity of both obsessions and compulsions, is a 10-item scale with demonstrated reliability used to assess the severity of both obsessions and compulsions, with each item rated on a scale between 0 (lowest severity) and 4 (highest severity) (Goodman et al., 1989). The 16-item Quick Inventory of Depressive Symptomatology – Self Report Version (QIDS), a widely used 16-item self-report scale with demonstrated high internal consistency and validity (Rush et al., 2003) assesses the severity of depressive symptoms.

2.3. Statistical analyses

For the primary analysis of the association between change in disgust propensity and change in OCD symptoms within symptom dimensions, we used the widely accepted four-factor solution for OCD symptoms, which includes: 1) forbidden thoughts (aggressive, sexual, and religious obsessions) and checking compulsions; 2) symmetry obsessions and ordering compulsions; 3) contamination obsessions and washing compulsions; and 4) hoarding obsessions and compulsions, (Bloch et al., 2008) and calculated factor scores for each of the four factor domains by adding the symptom category ratings within each factor. Change scores were calculated for each measure by subtracting admission scores from discharge scores, and linear regression was conducted using outcome measures (total DS-R score, factor scores for each of the four symptom domains, and total Y–BOCS) transformed to Z-scores adjusted for age, sex, and depression severity at admission. For our secondary analyses, linear regression was used to examine: 1) the association between DS-R scores and OCSRS scores within symptom dimensions at admission and 2) the association between change in DS-R scores and change in Y–BOCS scores.

Tests of our a priori hypotheses were conducted using Bonferroni adjusted alpha levels of .005 per test (0.05/10). We performed all analyses using Stata version 9.2 software (Stata Corporation, College Station, TX).

3. Results

3.1. Baseline characteristics

We assessed 213 participants with OCD admitted for the first time to the OCDI between May 2011 and May 2013 (Table 1). Of these, 134 completed both admission and discharge measures of disgust propensity and OCD symptom dimensions and were included in the primary analysis. Mean (SD) length of stay for this group was 55.6 (25.2) days. Examination of baseline differences between this group and the 79 participants who did not provide discharge measures revealed only a significant difference in age – namely, participants who did not complete discharge measures were significantly older than those who did (35.0 (1.5) vs. 31.1 (1.1), $t(211)=2.0$, $P=0.04$). Of the 131 participants in this group who completed both admission and discharge Y–BOCS measures, 50.4% were treatment responders (defined as a $\geq 35\%$ reduction in Y–BOCS) (Farris, McLean, Van Meter, Simpson, & Foa, 2013) and 19% achieved “wellness” (defined as a discharge Y–BOCS ≤ 12) (Farris et al., 2013).

3.2. Association of baseline disgust propensity and OCD symptoms

Baseline disgust propensity, as measured by the Disgust Scale, was significantly associated with contamination/washing symptoms ($\beta=0.30$ [95% confidence interval: 0.17–0.43]; $P<0.001$) (Table 2). Forbidden thoughts/checking symptoms were significantly associated with baseline DS-R scores at the $P<0.05$ level ($\beta=0.16$ [0.02–0.31]; $P=0.02$), but did not survive correction for multiple comparisons. Symmetry/repeating and hoarding symptoms were not significantly associated with baseline disgust propensity. Baseline disgust propensity was also significantly associated with baseline total Y–BOCS scores ($\beta=0.23$ [0.10–0.37]; $P=0.001$). With regard to change in OCD symptoms, baseline disgust propensity was inversely associated with change in contamination/washing symptoms ($\beta=-0.35$ [–0.56 to –0.14]; $P=0.001$). In other words, participants with higher baseline disgust propensity had a greater reduction in

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