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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]; $P = .001$). 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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Contributions

AJA and BPB designed the study. AJA and JIH undertook the statistical analyses. JAE, JMC, and MAJ wrote the protocol for data collection and oversaw all data management. HGP contributed to data analysis and manuscript preparation. AJA wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

Keywords

obsessive-compulsive disorder; OCD; disgust; contamination

1. Introduction

Obsessive-compulsive disorder (OCD) affects approximately 2 to 3 percent 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; Gilbert et al., 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 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 hours 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 (.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), $t(211) = 2.0$, $P = .04$). Of the 131 participants in this group who completed both admission and discharge Y-BOCS measures, 50.4% were treatment responders (defined as a 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]; $P < .001$) (Table 2). Forbidden thoughts/checking symptoms were significantly associated with baseline DS-R scores at the $P < .05$ level ($\beta = 0.16$ [0.02–0.31]; $P = .02$), 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]; $P = .001$). 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]; $P = .001$). In other words, participants with higher baseline disgust propensity had a greater reduction in contamination/washing symptoms. Baseline disgust was not significantly associated with change in any of the other three OCD symptom dimensions.

3.3 Association of change in disgust propensity and change in OCD symptoms

Reduction in disgust propensity was significantly associated with reduction in symptoms of contamination/washing ($\beta = 0.25$ [0.11–0.39]; $P = .001$) (Table 3), but not with changes in symptoms within the other three OCD symptom dimensions. Change in disgust propensity was not significantly associated with change in total Y-BOCS or with baseline Y-BOCS.

3.4 Exploratory analysis of disgust domains and OCD symptoms

Previous work has suggested that the DS-R can be broken down into three distinct domains of disgust propensity: Core Disgust, Animal Reminder Disgust, and Contamination-Based Disgust (Olatunji et al., 2007). In an effort to examine whether there is an association between individual disgust domains and OCD symptom dimensions, particularly contamination/washing symptoms, we carried out an exploratory analysis examining the association between baseline scores on the three disgust domains and factor scores on each of the four symptom dimensions. We found that all three disgust domains were significantly associated with contamination symptoms (Core: $\beta = 0.21$ [95% confidence interval: 0.09–0.34]; $P = .001$); Animal-Reminder: $\beta = 0.16$ [0.03–0.29]; $P = .018$); and Contamination-Based: $\beta = 0.37$ [0.25–0.50]; $P < .001$). Only the Contamination-Based domain of the DS-R was statistically significantly associated with forbidden thoughts ($\beta = 0.19$ [0.05–0.34]; $P = .009$). None of the three disgust domains were significantly associated with hoarding or symmetry symptoms.

We also carried out analyses of the association between change in the three disgust domains and change in symptoms dimensions. These analyses revealed that change in both Core Disgust and Contamination-Based Disgust was significantly associated with reduction in

contamination symptoms ($\beta = 0.23$ [0.003–0.45]; $P = .047$ and $\beta = 0.49$ [0.28–0.70]; $P < .001$, respectively). There were no other significant associations between change in any of the three disgust domains and change in symptom dimensions. Note that the significance values in the above two paragraphs are quoted without Bonferroni correction for multiple comparisons, and thus not all of these values would meet the adjusted alpha of 0.005 used previously in our a priori analyses.

4. Discussion

In 134 patients receiving IRT for severe OCD, 1) disgust propensity was significantly associated at baseline with contamination/washing symptoms, but not with other OCD symptom dimensions; 2) disgust propensity improved with treatment and was significantly associated with improvements in contamination/washing symptoms, but not with changes in other symptom dimensions; and 3) change in disgust propensity was not associated with change in overall OCD severity.

These findings are important for two main reasons. First, they suggest that successful treatment results in a reduction in disgust propensity that occurs in parallel with improvement in washing/contamination symptoms. Second, our findings provide further support for a relationship between disgust propensity and the contamination/washing subtype of OCD, adding to the growing literature on this topic, and bolstering the concept that increased disgust propensity may be specific to the contamination/washing subtype of OCD – an important contribution given the relative paucity of established biomarkers differentiating OCD symptom dimensions. Moreover, given the substantial work that has already provided a basic understanding of the brain regions involved in disgust processing (Mataix-Cols et al., 2008; Phillips et al., 1997), our findings would encourage further study of the neural circuitry underlying disgust propensity and how these circuits change with successful treatment. Such investigation may serve as a bridge to better understand the neurobiology of contamination/washing symptoms, and ultimately lead to more refined treatment approaches specific to this OCD subtype.

Consistent with our initial hypothesis, we found that change in disgust propensity was not strongly associated with change in *overall* OCD symptoms, as measured by the Y-BOCS. This finding offers further support for a specific association between disgust propensity and contamination/washing. This result also suggests that global Y-BOCS score may fail to capture more fine-grained changes in individual OCD symptom dimensions.

Several limitations to this study should be considered. First, we did not formally assess comorbid mental disorders at admission. It is possible that many participants carried diagnoses of other anxiety disorders such as specific phobias, panic disorder, and post-traumatic stress disorder, which may be related to disgust propensity (Olatunji et al., 2010), and therefore could have influenced our findings. Second, without a treatment control group, we are unable to exclude the possibility that non-specific effects could have contributed to our observed changes in disgust propensity and OCD symptoms. Third, we used only admission and discharge assessments to examine change in disgust propensity and OCD symptoms, and further these pre- and post-treatment observations were spaced at a variable

interval of time. Future studies should include multiple assessments of both measures over time, preferably at fixed intervals, in order to examine better their respective trajectories of change, leading to a more informative examination of the relationship between change in disgust propensity and change in contamination/washing symptoms. Fourth, we did not include any measures other than the QIDS to assess negative affect or affective vulnerabilities (e.g., anxiety sensitivity, trait anxiety). Therefore, we cannot exclude the possibility that changes in these characteristics may have contributed to our findings.

In summary, disgust propensity appears to be a potentially malleable emotional state that may improve in parallel with improvement in contamination/washing symptoms among individuals with severe OCD receiving IRT. Indeed, disgust propensity may represent a marker specific to the contamination/washing subtype of OCD. Further investigation into the genetics and neural circuitry of disgust propensity is warranted.

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References

- Bloch MH, Bartley CA, Zipperer L, Jakubovski E, Landeros-Weisenberger A, Pittenger C, et al. Meta-analysis: hoarding symptoms associated with poor treatment outcome in obsessive-compulsive disorder. *Mol Psychiatry*. 2014; 19(9):1025–1030. [PubMed: 24912494]
- Bloch MH, Landeros-Weisenberger A, Rosario MC, Pittenger C, Leckman JF. Meta-analysis of the symptom structure of obsessive-compulsive disorder. *Am J Psychiatry*. 2008; 165(12):1532–1542. [PubMed: 18923068]
- Darwin, CR. *The Expression of Emotions in Man and Animals*. London: John Murray; 1872. (Reprint: The University of Chicago Press, Chicago, IL-1965).
- Farris SG, McLean CP, Van Meter PE, Simpson HB, Foa EB. Treatment response, symptom remission, and wellness in obsessive-compulsive disorder. *J Clin Psychiatry*. 2013; 74(7):685–690. [PubMed: 23945445]
- Gilbert AR, Akkal D, Almeida JR, Mataix-Cols D, Kalas C, Devlin B, et al. Neural correlates of symptom dimensions in pediatric obsessive-compulsive disorder: a functional magnetic resonance imaging study. *J Am Acad Child Adolesc Psychiatry*. 2009; 48(9):936–944. [PubMed: 19625980]
- Gilbert AR, Mataix-Cols D, Almeida JR, Lawrence N, Nutche J, Diwadkar V, et al. Brain structure and symptom dimension relationships in obsessive-compulsive disorder: a voxel-based morphometry study. *J Affect Disord*. 2008; 109(1–2):117–126. [PubMed: 18342953]
- Goodman WK, Price LH, Rasmussen SA, Mazure C, Fleischmann RL, Hill CL, et al. The Yale-Brown Obsessive Compulsive Scale. I. Development, use, and reliability. *Arch Gen Psychiatry*. 1989; 46(11):1006–1011. [PubMed: 2684084]

- Haidt J, McCauley C, Rozin P. Individual differences in sensitivity to disgust: A scale sampling seven domains of disgust elicitors. *Pers Individ Dif*. 1994; 16:701–713.
- Harrison BJ, Pujol J, Cardoner N, Deus J, Alonso P, Lopez-Sola M, et al. Brain corticostriatal systems and the major clinical symptom dimensions of obsessive-compulsive disorder. *Biol Psychiatry*. 2013; 73(4):321–328. [PubMed: 23200527]
- Husted DS, Shapira NA, Goodman WK. The neurocircuitry of obsessive-compulsive disorder and disgust. *Prog Neuropsychopharmacol Biol Psychiatry*. 2006; 30(3):389–399. [PubMed: 16443315]
- Landeros-Weisenberger A, Bloch MH, Kelmendi B, Wegner R, Nudel J, Dombrowski P, et al. Dimensional predictors of response to SRI pharmacotherapy in obsessive-compulsive disorder. *J Affect Disord*. 2010; 121(1–2):175–179. [PubMed: 19577308]
- Mataix-Cols D, An SK, Lawrence NS, Caseras X, Speckens A, Giampietro V, et al. Individual differences in disgust sensitivity modulate neural responses to aversive/disgusting stimuli. *Eur J Neurosci*. 2008; 27(11):3050–3058. [PubMed: 18588543]
- Mataix-Cols D, Marks IM, Greist JH, Kobak KA, Baer L. Obsessive-compulsive symptom dimensions as predictors of compliance with and response to behaviour therapy: results from a controlled trial. *Psychother Psychosom*. 2002; 71(5):255–262. [PubMed: 12207105]
- Mataix-Cols D, Rauch SL, Manzo PA, Jenike MA, Baer L. Use of factor-analyzed symptom dimensions to predict outcome with serotonin reuptake inhibitors and placebo in the treatment of obsessive-compulsive disorder. *Am J Psychiatry*. 1999; 156(9):1409–1416. [PubMed: 10484953]
- Mataix-Cols D, Wooderson S, Lawrence N, Brammer MJ, Speckens A, Phillips ML. Distinct neural correlates of washing, checking, and hoarding symptom dimensions in obsessive-compulsive disorder. *Arch Gen Psychiatry*. 2004; 61(6):564–576. [PubMed: 15184236]
- Olatunji BO. Changes in disgust correspond with changes in symptoms of contamination-based OCD: a prospective examination of specificity. *J Anxiety Disord*. 2010; 24(3):313–317. [PubMed: 20097515]
- Olatunji BO, Cisler J, McKay D, Phillips ML. Is disgust associated with psychopathology? Emerging research in the anxiety disorders. *Psychiatry Res*. 2010; 175(1–2):1–10. [PubMed: 19969378]
- Olatunji BO, Tart CD, Ciesielski BG, McGrath PB, Smits JA. Specificity of disgust vulnerability in the distinction and treatment of OCD. *J Psychiatr Res*. 2011; 45(9):1236–1242. [PubMed: 21353249]
- Olatunji BO, Williams NL, Tolin DF, Abramowitz JS, Sawchuk CN, Lohr JM, et al. The Disgust Scale: item analysis, factor structure, and suggestions for refinement. *Psychol Assess*. 2007; 19(3):281–297. [PubMed: 17845120]
- Phillips ML, Marks IM, Senior C, Lythgoe D, O'Dwyer AM, Meehan O, et al. A differential neural response in obsessive-compulsive disorder patients with washing compared with checking symptoms to disgust. *Psychol Med*. 2000; 30(5):1037–1050. [PubMed: 12027041]
- Phillips ML, Mataix-Cols D. Patterns of neural response to emotive stimuli distinguish the different symptom dimensions of obsessive-compulsive disorder. *CNS Spectr*. 2004; 9(4):275–283. [PubMed: 15048052]
- Phillips ML, Young AW, Senior C, Brammer M, Andrew C, Calder AJ, et al. A specific neural substrate for perceiving facial expressions of disgust. *Nature*. 1997; 389(6650):495–498. [PubMed: 9333238]
- Rozin P, Fallon AE. A perspective on disgust. *Psychol Rev*. 1987; 94(1):23–41. [PubMed: 3823304]
- Rozin, P.; Haidt, J.; McCauley, CR. *Handbook of Emotions*. Lewis, M.; Haviland, JM., editors. New York, NY: Guilford Publications; 2000.
- Ruscio AM, Stein DJ, Chiu WT, Kessler RC. The epidemiology of obsessive-compulsive disorder in the National Comorbidity Survey Replication. *Mol Psychiatry*. 2010; 15(1):53–63. [PubMed: 18725912]
- Rush AJ, Trivedi MH, Ibrahim HM, Carmody TJ, Arnow B, Klein DN, et al. The 16-Item Quick Inventory of Depressive Symptomatology (QIDS), clinician rating (QIDS-C), and self-report (QIDS-SR): a psychometric evaluation in patients with chronic major depression. *Biol Psychiatry*. 2003; 54(5):573–583. [PubMed: 12946886]

- Shapira NA, Liu Y, He AG, Bradley MM, Lessig MC, James GA, et al. Brain activation by disgust-inducing pictures in obsessive-compulsive disorder. *Biol Psychiatry*. 2003; 54(7):751–756. [PubMed: 14512216]
- Storch EA, Merlo LJ, Larson MJ, Bloss CS, Geffken GR, Jacob ML, et al. Symptom dimensions and cognitive-behavioural therapy outcome for pediatric obsessive-compulsive disorder. *Acta Psychiatr Scand*. 2008; 117(1):67–75. [PubMed: 17986317]
- van den Heuvel OA, Remijnse PL, Mataix-Cols D, Vrenken H, Groenewegen HJ, Uylings HB, et al. The major symptom dimensions of obsessive-compulsive disorder are mediated by partially distinct neural systems. *Brain*. 2009; 132(Pt 4):853–868. [PubMed: 18952675]
- Via E, Cardoner N, Pujol J, Alonso P, Lopez-Sola M, Real E, et al. Amygdala activation and symptom dimensions in obsessive-compulsive disorder. *Br J Psychiatry*. 2014; 204(1):61–68. [PubMed: 24262816]
- Wilhelm, S.; Steketee, G. *Cognitive therapy for obsessive-compulsive disorder: A guide for professionals*. Oakland, CA: New Harbinger Publications; 2006.
- Williams MT, Farris SG, Turkheimer EN, Franklin ME, Simpson HB, Liebowitz M, et al. The impact of symptom dimensions on outcome for exposure and ritual prevention therapy in obsessive-compulsive disorder. *J Anxiety Disord*. 2014; 28(6):553–558. [PubMed: 24983796]
- Yovel I, Gershuny BS, Steketee G, Buhlmann U, Fama JM, Mitchell J, et al. Idiosyncratic Severity Profiles of Obsessive Compulsive Dysfunction: A Detailed Self Report Assessment of a Multifaceted Syndrome. *Cogn Ther Res*. 2012; 36:694–713.

Highlights

- Disgust propensity is associated with contamination/washing symptoms
- Reduction in disgust propensity is associated with improvement in contamination/washing symptoms
- Disgust propensity may be a marker specific to the contamination/washing subtype of OCD

TABLE 1**Demographic and Clinical Characteristics of Subjects at Admission**

Characteristic	N (%)	Mean (SD)	Range
Age, years (<i>N</i> = 213)		32.6 (13.5)	16–78
Sex (<i>N</i> = 213)			
Male	106 (49.8)		
Female	107 (50.2)		
Ethnicity (<i>N</i> = 210)			
Hispanic or Latino	9 (4.3)		
Not Hispanic or Latino	201 (95.7)		
Race (<i>N</i> = 213)			
White/Caucasian	189 (88.7)		
Black/African American	3 (1.4)		
Asian	15 (7.0)		
American Indian/Alaskan Native	0		
Native Hawaiian/Pacific Islander	2 (0.9)		
Other	2 (0.9)		
Education (<i>N</i> = 205)			
High school diploma/GED	63 (30.7)		
Some college	34 (16.6)		
Associates degree	13 (6.3)		
Bachelors degree	67 (32.7)		
Graduate degree	28 (13.7)		
Employment Status (<i>N</i> = 205)			
Employed	59 (28.8)		
On leave	16 (7.8)		
Unemployed	130 (63.4)		
Duration of OCD, years (<i>N</i> = 176)		18.7 (13.1)	1–64.4
Disgust Scale – Revised (<i>N</i> = 213)		52.5 (17.3)	1–95
Yale-Brown Obsessive Compulsive Scale (<i>N</i> = 213)		26.3 (6.0)	5–40
Quick Inventory of Depressive Symptomatology – 16 item (<i>N</i> = 212)		13.1 (5.4)	1–26
Contamination/washing symptoms (<i>N</i> = 213)		7.8 (7.0)	0–20
Symmetry/repeating ordering symptoms (<i>N</i> = 212)		9.2 (9.6)	0–40
Forbidden thoughts/checking symptoms (<i>N</i> = 207)		12.3 (10.6)	0–50
Hoarding symptoms (<i>N</i> = 209)		3.3 (5.6)	0–20

TABLE 2Association of Disgust Propensity and OCD Symptoms at Admission^a

Symptom Dimension	N	Coefficient	95% CI	p-value
Contamination	212	0.30	(0.17, 0.43)	<0.001
Hoarding	208	−0.12	(−0.26, 0.02)	0.09
Symmetry	211	0.003	(−0.13, 0.14)	0.96
Forbidden thoughts	206	0.16	(0.02, 0.31)	0.02
Yale-Brown Obsessive Compulsive Scale total score	212	0.23	(0.10, 0.37)	0.001

^aSymptom-dimension analyses were adjusted for age, sex, and QIDS scores at baseline

TABLE 3Association of Change in Disgust Propensity and Change in OCD Symptoms^a

Symptom Dimension	N	Coefficient	95% CI	p-value
Contamination	134	0.25	(0.11, 0.39)	0.001
Hoarding	131	-0.08	(-0.27, 0.10)	0.37
Symmetry	134	-0.03	(-0.21, 0.15)	0.73
Forbidden thoughts	127	0.14	(-0.03, 0.30)	0.11
Yale-Brown Obsessive Compulsive Scale total score	130	0.06	(-0.04, 0.15)	0.24

^a Symptom-dimension analyses were adjusted for age, sex, and QIDS scores at baseline