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# Validation of a classification system of obsessive–compulsive spectrum disorder symptoms in a non-clinical sample

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ABSTRACT

Controversy surrounds the classification of obsessive–compulsive spectrum disorder (OCSD) symptoms. In this study, we tested whether a broad OCSD symptoms model consisting of obsessive–compulsive, body dysmorphic, health anxiety, trichotillomania, pathological skin picking, impulsivity, and anxiety symptoms displayed sufficient data fit. Alternatively, we tested whether a reduced OCSD symptoms model consisting of obsessive–compulsive, body dysmorphic, health anxiety, trichotillomania, and pathological skin picking symptoms demonstrated superior fit. The reduced OCSD symptoms model demonstrated good data fit. However, the broader OCSD symptoms model only displayed marginal data fit. In context with other findings, results of this study support an OCSD symptoms dimension that includes obsessive–compulsive, body dysmorphic, health anxiety, trichotillomania, and pathological skin picking symptoms. Implications of these findings are discussed as they relate to proposed changes in the forthcoming edition of the Diagnostic and Statistical Manual.



## 1. Introduction

The validity of an obsessive–compulsive disorder spectrum is being debated as researchers and clinicians anticipate nosological changes in the forthcoming edition of the Diagnostic and Statistical Manual (DSM; Storch et al., 2008; Hollander et al., 2009). Some propose categorizing obsessive–compulsive spectrum disorders (OCSDs) on a broad symptoms dimension that includes disorders characterized by impulsivity (i.e., sensation seeking/self-stimulatory behaviors) and compulsivity (anxiety-driven harm-reductive/avoidant behaviors; Bartz and Hollander, 2006; Ettelt et al., 2007). Others, in contrast, highlight mixed or inconclusive support for a broad OCSD dimension (Bienvenu et al., 2000; Summerfeldt et al., 2004).

Mixed findings on the validity of an OCSD dimension are likely related to the different combinations of symptoms and disorders included across studies. Some studies test a broad OCSD dimension that includes symptoms of compulsivity (e.g., obsessive–compulsive disorder [OCD], body dysmorphic disorder [BDD]) and impulsivity (e.g., pathological gambling, kleptomania) whereas others include fewer disorders or symptoms groups. Thus, central to the debate over the existence of an OCSD symptoms dimension is the extent to which the dimension should contain a wide variety of impulsive and compulsive symptoms or if a narrow group of symptoms is more appropriate.

Empirical support has been growing for an OCSD symptom dimension that includes disorders with compulsive features (i.e., symptoms may reduce anxiety or prevent possible harm from occurring) even though it is unclear whether some impulse–control disorders or impulsivity symptoms warrant inclusion on this dimension (Potenza et al., 2009; Sulkowski et al., 2009). Significant co-occurrence rates exist between OCD and many body-focused repetitive disorders including BDD (Perugi et al., 1997; Gunstad and Phillips, 2003), health anxiety (Barsky et al., 1992; Jaisoorya et al., 2003; Abramowitz et al., 2006), trichotillomania (King et al., 1995; Fontenelle et al., 2005), and pathological skin picking (Wilhelm et al., 1999; Cullen et al., 2001). Furthermore, symptoms of OCD, BDD, health anxiety, trichotillomania, and pathological skin picking occur more commonly in case than in control probands (Bienvenu et al., 2000), which suggests the existence of a strong familial relationship between these disorders.

This study explores the relationship between obsessive–compulsive, body dysmorphic, health anxiety, trichotillomania, pathological skin picking, impulsivity, and anxiety symptoms to test the validity of two classification systems for OCSD symptoms. Specifically, we tested whether a broad OCSD model including obsessive–compulsive, body dysmorphic, health anxiety, trichotillomania, pathological skin picking, impulsivity, and anxiety symptoms displayed sufficient data fit, and thus, has theoretical vitality. To test this model, broad measures of anxiety and impulsivity were included to reflect the myriad of disorders that have these features yet were too numerous for inclusion. For

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example, instead of including specific measures for pathological gambling, pyromania, or kleptomania, the Barrett Impulsivity Scale-15 was used to broadly assess the impulsive features of these disorders (i.e., acting on impulse, seeking short-term gain at the expense of a possible long-term loss).

As an alternative to the aforementioned broad OCSD model, the fit of a reduced OCSD model consisting of obsessive–compulsive, body dysmorphic, health anxiety, trichotillomania, and pathological skin picking symptoms also was tested. We hypothesized that the reduced model would demonstrate superior fit over the broad model due to emerging research that highlights the association between these OCSDs and mixed findings regarding their association with impulse control disorders (Bienvenu et al., 2000; Potenza et al., 2009).

Lastly, a non-clinical college sample was used to augment findings obtained in clinical samples and allow dimensional comparisons to be made across symptoms. Although limited data exist on the nature OCSDs in non-clinical populations, support exists for the temporal stability (Fullana et al., 2007) and familial loading of OCSDs such as OCD (Taberner et al., 2009) in college samples. Furthermore, in a similar vein, non-clinical individuals who score high on self-report OCD measures often meet OCD diagnostic criteria (Sternberger and Burns, 1991; Burns et al., 1995) and have similar comorbidity profiles (Gibbs, 1996), neuropsychological functioning (Mataix-Cols et al., 1999), and broad personality factors as clinical patients (Fullana et al., 2004).

## 2. Method

### 2.1. Participants

Participants ($N = 360$) were recruited from undergraduate courses at the University of Florida. The sample included 255 females and 102 males (three participants did not report their gender). Participant ages ranged from 17 to 27 years ($M = 19.45$, S.D. = 1.19), with 86.8% listing their age between 18 and 21 years. Participants were ethnically diverse, as 56.4% listed their ethnic background as White/Caucasian, 18.1% as Black/African American, 11.5% as Hispanic/Latino, 8.5% as Asian, and 4.4% as Mixed/Other.

### 2.2. Measures

#### 2.2.1. Obsessive–Compulsive Inventory-Revised

The Obsessive–Compulsive Inventory—Revised (OCI—R; Foa et al., 2002) is an 18-item measure of obsessive–compulsive symptomology (i.e., hoarding, washing, ordering, checking, obsessing, and mental neutralizing symptoms). The measure employs a 5-point scale and allows for the presentation and severity of obsessive–compulsive symptoms to be assessed simultaneously. Total OCI-R severity scores range from 0 to 72 with higher scores indicative of greater symptomology. Good internal consistency ($\alpha = 0.86$–$0.88$) and acceptable test–retest reliability ($r = 0.67$–$0.70$) have been found with the OCI-R in non-clinical samples (Hajcak et al., 2004). Convergent validity support for the OCI—R has been found with self-report (Hajcak et al., 2004) and clinician-administered measures of obsessive–compulsive symptomology (Sulkowski et al., 2008). Discriminant validity support has been established with measures of anxiety and depression (Foa et al., 2002; Huppert et al., 2007).

#### 2.2.2. Massachusetts General Hospital Hairpulling Scale

The Massachusetts General Hospital Hairpulling Scale (MGH-HPS; Keuthen et al., 1995) is a 7-item self-report measure of hair pulling behaviors. The MGH-HPS assesses the frequency, intensity, and control of hair pulling urges over a month's time. Items are rated on a five-point scale and composite scores ranging from 0 "no symptomology" to 28 "highly impaired." The MGH-HPS has been used in both clinical and non-clinical samples (Keuthen et al., 1995; Hajcak et al., 2006). Good internal consistency ($\alpha = 0.89$; Keuthen et al., 1995) and test–retest reliability ($r = 0.97$; O'Sullivan et al., 1995) has been found for the MGH-HPS. Convergent validity support has been found with measures of trichotillomania and divergent validity support for the MGH-HPS has been found with measures of depression and anxiety (O'Sullivan et al., 1995).

#### 2.2.3. Skin Picking Scale

The Skin Picking Scale (SPS; Keuthen et al., 2001) is a 6-item self-report measure of skin pickings symptoms (i.e., picking urges, time spent on picking, control over picking urges, interference of skin picking behaviors on individual's social/occupational functioning, distress associated with picking, and behavioral avoidance due to picking). Items are rated on a 4-point scale ranging from 0 "no symptomology" to 4 "extreme symptomology" and total scores range from 0 to 24. Good internal consistency has been found for the SPS ($\alpha = 0.80$; Keuthen et al., 2001). The SPS has been used in clinical and non-clinical samples (Hajcak et al., 2006) and convergent validity support has been found for the SPS with other self-report measures of skin picking in a non-clinical sample (Hayes et al., 2009).

#### 2.2.4. Health Anxiety Inventory—Short Form

The Health Anxiety Inventory—Short Form (HAI—SF; Salkovskis et al., 2002) is an 18-item self-report measure of health anxiety/hypochondriac symptoms. Items are rated on a four-point scale that allows for the assessment of symptom presence and severity. Total scores range from 0 to 54, with higher scores being indicative of greater symptomology. The HAI—SF assesses the degree of anxiety individuals experience about their health as well as how they think they would react if they thought that they had a serious medical condition. Good internal consistency ($\alpha = 0.89$) and test–retest reliability ($r = 0.90$) have been found for the HAI—SF (Salkovskis et al., 2002). Convergent validity support for the HAI—SF has been found with measures of hypochondriasis (Salkovskis et al., 2002).

#### 2.2.5. Body Dysmorphic Disorder Questionnaire

The Body Dysmorphic Disorder Questionnaire (BDDQ; Phillips, 1996) is a 10-item self-report measure of body dysmorphic symptoms as listed in the DSM-IV-TR. Items are rated on a four-point scale ranging from 0 "no symptomology" to 4 "extreme symptomology." Total scores on the BDDQ range from 0 to 40 and higher scores are indicative of greater psychopathology. The BDDQ has been used extensively with clinical (Dyl et al., 2006) and non-clinical samples (Bohne et al., 2002). The BDDQ has been found to demonstrate high sensitivity (100%) and selectivity (93%) for identifying individuals with clinically meaningful rates of body dysmorphic symptoms (Grant et al., 2001).

#### 2.2.6. Beck Anxiety Inventory

The Beck Anxiety Inventory (BAI; Beck and Steer, 1990) is 21-item self-report anxiety measure. Items are rated on a four-point scale and composite scores ranging from 0 to 63 with higher scores indicative of higher anxiety. Good internal consistency ($\alpha = 0.91$) and sufficient test–retest reliability ($r = 0.62$) have been found for the BAI in non-clinical samples (Creamer et al., 1995). The BAI demonstrates acceptable convergent validity with general measures of anxiety and low to moderate correlations with measures of depression (Creamer et al., 1995), OCD, (Gönner et al., 2008), and health anxiety (Abramowitz et al., 2006).

#### 2.2.7. Barratt Impulsiveness Scale-15

The Barratt Impulsiveness Scale-15 (BIS-15; Spinella, 2007) is an abbreviated version of the 30-item Barratt Impulsiveness Scale-11 (Patton et al., 1995) that has been used to assess symptomology in individuals with pathological gambling (Petry, 2001), kleptomania (Bayle et al., 2003), bulimia nervosa (Newton et al., 1993), and substance abuse disorders (Petry, 2001). The BIS-15 is 15-item a self-report measure that is rated on a four-point scale, with composite scores ranging from 15 to 60. The measure assesses various aspects of impulsivity (i.e., non-planning, motor impulsivity, attention impulsivity). Good internal consistency has been found for the BIS-15 ($\alpha = 0.81$) and validity support exists with a measure impulsivity and executive functions (Spinella, 2007).

### 2.3. Procedures

A member of the research team administered the OCI—R, BDDQ, HAI—SF, MGH-HPS, SPS, BAI, BIS-15 and a brief demographic questionnaire to the participants. Data were collected in undergraduate classes while instructors were absent from the room. Participation was voluntary and no compensation was provided. However, some participants did receive course credit for participating as determined by their instructor. Students were informed that all of their responses would remain confidential. They provided no identifying information and completed the questionnaires at individual desks. All data collection procedures were approved by the university Institutional Review Board.

### 2.4. Data analysis

Descriptive statistics and single-order correlations were computed using SPSS 15.0. Mplus 6.0 was used for conducting confirmatory factor analysis. Prior to analyzing data, six outliers were identified and removed using the Mahalanobis distance statistic. All observations were independent and no high interfactor correlations were observed. Missing data were present in about 20% percent of cases and appeared to be missing at random (i.e., were independent of other missing data values; (Byrne, 2001)). Associations among latent variables were estimated with robust maximum likelihood (ML) estimation, a method robust to non-normality and superior to available case and data-imputation methods in the presence of missing data (Byrne, 2001).

The two OCSD classification systems were tested by examining standardized factor loadings and several model fit indices including the chi-square fit index, comparative fit index (CFI), root mean square error of approximation (RMSEA), and Akaike information criterion (AIC). The chi-square fit index assesses whether a model perfectly fits the data exactly. The CFI and RMSEA assess the degree to which a model fits the data adequately. Specifically, The CFI indicates the degree of improvement in model fit relative to a null model and the RMSEA estimates the discrepancy between the model-implied and unrestricted correlation matrix per degree of freedom. Thus, the RMSEA is independent of sample size (Widaman and Thompson, 2003). Comparative fit index values above