The OCI-R: Validation of the subscales in a clinical sample

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Abstract

The psychometric properties of the Obsessive–Compulsive Inventory-Revised (OCI-R) subscales have not been validated in a clinical sample of individuals diagnosed with obsessive–compulsive disorder (OCD). Data were collected on 186 patients diagnosed with OCD and 17 patients diagnosed with generalized anxiety disorder (GAD) using the OCI-R and the Yale-Brown Obsessive–Compulsive Scale (Y-BOCS). Confirmatory factor analysis revealed an acceptable factor structure. Patients with a given primary symptom subtype were elevated on the corresponding subscale of the OCI-R compared to other OCD patients and patients with GAD. In addition, patients who acknowledged that symptom subtype as present but not primary on the Y-BOCS had elevated OCI-R scores on that scale compared to patients who did not endorse that symptom subtype and patients with GAD. Results indicate that the subscales of the OCI-R are valid measures of six symptom subtypes of OCD. The OCI-R is a psychometrically sound, brief instrument. The current data combined with previous efforts suggest that it is appropriate for clinical and non-clinical populations, and for clinical and research purposes. Further research should examine the sensitivity of the specific subscales to treatment effects, and the potential for adding more items to account for other symptom domains of OCD.
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Obsessive–compulsive disorder (OCD) is characterized by intrusive, distressing thoughts, and/or repetitive behaviors. Although the Diagnostics and Statistics Manual of Mental Disorders (DSM-IV; American Psychiatric Association (APA), 2000) classifies OCD as single disorder, patients with OCD demonstrate considerable heterogeneity with respect to their specific symptoms (Mataix-Cols, Rosario-Campos, & Leckman, 2005). For instance, patients may have contamination/washing concerns; concerns about making a mistake/checking; obsessive concerns about sex, harm, or religion; ordering and arranging; and/or hoarding. Individuals with OCD may present with one or all of these symptoms, with varying degrees of severity (Mataix-Cols et al., 2005). Efforts to assess the clinical presentations of symptoms have led to the development of a number of self-report measures including: the Obsessive–Compulsive Inventory (Foa, Kozak, Salkovskis, Coles, & Amir, 1998) and its revised, shorter version (OCI-R; Foa et al., 2002); the Padua Inventory (Burns Keortge, Formea, & Sternberger, 1996); the Vancouver Obsessional Compulsive Inventory (VOCI; Thordarson et al., 2004); and the Schedule of Compulsions, Obsessions, and Pathological Impulses (SCOPI; Watson & Wu, 2005). However, data on the validity of the symptom subscales in clinical samples of OCD patients need further support. The OCI-R is increasingly being used in research on OCD subtypes (e.g.,Simpson et al., 2006; Tolin, Woods, & Abromowitz, 2003). However, the validity of using this measure to determine symptom subtypes has not previously been studied in a clinical sample.

The OCI-R is an 18-item self-report measure that uses a five-point Likert Scale that provides scores on six subscales (washing, checking, ordering, obsessing, hoarding, and neutralizing) and a total score. It has shown to have good internal consistency, convergent validity, and test–retest reliability in a mixed sample of patients with OCD, other anxiety disorders, and non-anxious controls (Foa et al., 2002). It has been translated into many languages including French, Spanish, German, Turkish, and Icelandic. In addition, the six factors were confirmed in two non-clinical college samples (Hajcak, Huppert, Simons, & Foa, 2004). Hajcak et al. also found that the OCI-R had good internal consistency, convergent validity, and test–retest reliability. One clear advantage of the OCI-R over other OCD measures it its brevity. With only 18 items, it can be used as an efficient screening tool. In addition, it assesses a broad range of symptoms that are most common in OCD patients.

While it is clear that the OCI-R effectively discriminates between OCD patients and other anxiety disorders and non-anxious controls, it is not known whether its subscales can discriminate between subtypes of OCD. In particular, some have argued that the brevity of the subscales may affect the subscales' validity (Clark, Antony, Beck, Swinson, & Steer, 2005). Therefore, the purpose of the present study was: (1) to further evaluate the psychometric properties of the OCI-R in a sample of patients diagnosed with OCD by examining the factor structure, and internal consistency of the OCI-R subscales; and (2) to examine the convergent and discriminant validity of the subscales of the OCI-R with symptom subtypes identified via the Yale-Brown Obsessive Compulsive Scale (Y-BOCS), a semi-structured clinician interview that is commonly used to evaluate subtypes and severity (Goodman et al., 1989). It was hypothesized that OCD patients who rated specific symptom subtypes as primary during the Y-BOCS interview (e.g., contamination/washing) would have elevated OCI-R scores on the corresponding OCI-R subscale (e.g., contamination) compared to individuals who stated that the symptom was present, but not primary. Further, it was hypothesized that individuals who were determined to have a particular symptom subtype on the Y-BOCS will show elevated scores on the corresponding OCI-R subscale compared to OCD patients without that symptom subtype as well as to patients diagnosed with generalized anxiety disorder (GAD). Patients with GAD were used as the non-OCD control group to provide a strong test of the hypothesis given the potential symptom overlap

of obsessions and worries. Finally, it was hypothesized that OCD patients would have higher scores on the OCI-R subscale corresponding to their primary subtype identified by the Y-BOCS than on any of the other OCI-R subscales.

1. Method

1.1. Participants

Data were collected from 186 patients with OCD and 17 patients with GAD. OCD patients' data were derived from two sources. One hundred and one patients sought treatment for OCD through the Center for the Treatment and Study of Anxiety (CTSA) fee-for-service clinic. Eighty-five patients participated in a randomized clinical trial examining cognitive–behavioral treatment augmentation for partial responders to SRIs either at the CTSA or at the New York State Psychiatric Institute. Patients with GAD sought fee-for-service treatment at the CTSA, and were only included if they were not diagnosed with comorbid OCD. Consent was obtained from the local IRB to collect this information via chart review for all fee-for-service patients, and informed consent was obtained for all study participants.

1.2. Measures

1.2.1. OCI-R

The Obsessive–Compulsive Inventory-Revised (Foa et al., 2002) is an 18-item self-report measure that assesses the distress associated with obsessions and compulsions. In addition to the total score, six separate subscale scores are calculated by adding the three items that comprise each subscale: washing, checking, ordering, obsessing, hoarding, and neutralizing. Foa et al. (2002) report good internal consistency, test–retest reliability, and good discriminant validity in clinical patients with OCD, post-traumatic stress disorder (PTSD), generalized social phobia (GSP), and non-anxious controls. The total score ranges from 0 to 72, and each subscale ranges from 0 to 12.

1.2.2. Y-BOCS checklist

The Yale-Brown Obsessive–Compulsive Scale (Goodman et al., 1989) is a semi-structured interview that evaluates symptom severity of patients with OCD. The checklist inquires about presence or absence of 78 symptoms of OCD. After completing the YBOCS checklist, the evaluator then determines the three primary obsessions and primary compulsions in order of severity.

1.3. Procedures

In the fee-for-service clinic, patients seeking treatment for OCD were screened by BA level intake coordinators, who then sent out self-report packets to the patient to be completed for the intake evaluation. Licensed clinical psychologists or unlicensed clinical psychology interns supervised by licensed clinical psychologists evaluated patients at the intake using the Y-BOCS, and OCD diagnosis was confirmed with the MINI-OCD module. The checklist was administered as part of the Y-BOCS, and after the checklist, clinicians rank-ordered and recorded the three most severe obsessions and the three most severe compulsions determined by the frequency and intensity of the symptoms. For the current study, the main obsession and compulsion were used to

determine primary concerns. Patients who participated in the treatment study were screened, provided written consent, and were administered the SCID-I (First, Spitzer, Gibbon, & Williams, 1996) prior to completing the self-report measures. Independent evaluators supervised by the first author administered the Y-BOCS and its checklist and determined the three most severe obsessions and compulsions.

1.4. Data analysis

Missing values for the OCI-R for OCD patients were replaced with the mean item rating for the rest of the OCD sample. There were only a total of 21 missing items out of 3348 total items. Missing items on the Y-BOCS were not replaced.

To examine the factor structure and internal consistency of the OCI-R, confirmatory factor analysis (CFA) using maximum likelihood estimates was conducted using Proc Calis in SAS Version 8.02. Latent factors were allowed to covary, while errors were not. The six-factor model that was derived from a mixed sample by Foa et al. (2002) was compared to an alternate one-factor model. Correlations among the latent factors were calculated. In addition, Cronbach's Alpha was calculated for each subscale to determine internal consistency.

To examine the convergent and discriminant validity of the OCI-R subscales, we first used the individual items of the Y-BOCS checklist to create six symptom subtypes. There have been a number of different subtypes proposed, mainly ranging from 4 to 7 subtypes (e.g., Calamari et al., 2004; Mataix-Cols et al., 2005), and we determined that these six reflected the most commonly reported subtypes (with the exception of a miscellaneous category). However, many of the studies that have attempted to define subtypes have used the Y-BOCS symptom categories, not the items within each category. We selected specific items that reflected six subtypes that are commonly reported. We chose to use item level over category level because we believe that some categories (e.g., aggressive thoughts/harm) contain diverse concepts, which are not theoretically coherent (e.g., fear of harming others by stabbing them with a knife is quite different than fear of being responsible for one's house burning down due to not checking). Using the YBOCS symptom checklist, we categorized presence or absence of current symptoms into the following categories (Y-BOCS items in parentheses): (1) obsessions (intrusive thoughts of harm to self, intrusive thoughts of harm to others, violent or horrific images, bothersome sexual thoughts or images about men, women, children, relatives or aggressive sexual thoughts, thoughts about blasphemy or sacrilege), (2) contamination/ washing (concerns about contamination by: bodily fluids, dirt, germs, environmental contaminants, household items, animals or insects, or sticky substances or residues; concerns the one will get ill or get others ill from contamination, feelings of disgust or anxiety about contact without other consequences), (3) checking (checking locks, stoves, appliances, etc., and checking if one made a mistake), (4) neutralizing (counting items or actions, mental counting), (5) ordering (ordering or arranging things), and (6) hoarding (deciding what to throw out; collecting papers, junk mail, empty containers, etc.). The same six categories were used to describe the most severe obsession and/or the most severe compulsion. For each patient, each of the six symptom subtypes as determined by the Y-BOCS checklist was coded in terms of the following categories: primary symptom (most severe obsession or compulsion identified by the evaluator; hereafter *primary*); presence of symptoms, but not primary (hereafter *present*); and not endorsed on the checklist (hereafter *absent*).

Following the analysis of the factor structure of the OCI-R, we examined subscale and total scores for the GAD sample versus the whole OCD sample because patients with GAD were not

included in the comparative groups in Foa et al. (2002). Then, we examined whether patients identified to have each of the primary symptom subtypes based on the Y-BOCS differed on the corresponding OCI-R subscale from those who had the symptoms present, those who did not have the symptoms, and those with GAD. For example, patients identified as having primary contamination concerns on the Y-BOCS were compared on the washing subscale of the OCI-R to: (1) those with contamination concerns that were not primary; (2) those who did not endorse contamination concerns at all; and (3) to patients with GAD. ANOVAs were conducted, using Tukey's HSD pairwise comparisons to adjust for multiple comparisons between groups. Alpha was set to $p < .05$. Paired sample t-tests were then conducted to examine whether the OCI-R subscale score corresponding to the primary symptom was elevated compared with other OCI-R subscale scores.

2. Results

The average age of the 186 patients with OCD was 35 (S.D. = 13), and 45% were female. The large majority (93%) was Caucasian, while 1% was African American, 2% were Asian or Asian American, and 3% were Latino. The GAD sample had similar characteristics: average age was 31 (S.D. = 11), 53% female, and 94% Caucasian. Means and standard deviations for the OCI-R total and subscale scores are presented in Table 1. Tests of equality of variance between the patients with OCD and patients with GAD suggested that patients with OCD had larger standard deviations. Thus, t-tests were adjusted for unequal variances. Overall, patients with OCD had higher scores than patients with GAD on all subscales and the total scale score.

A total of 159 of the 186 patients with OCD had complete Y-BOCS checklists which included a description of the primary area of obsessions and compulsions. As a result, the factor structure and internal consistency were conducted using a sample of 186 OCD patients but the convergent/discriminant analyses were conducted using a sample of 159 OCD patients. Forty seven (30%) had primary obsessions, 46 (29%) had primary contamination/washing concerns, 23 (14%) had primary checking compulsions, 4 (3%) had primary counting/neutralizing compulsions, 5 (3%) had primary ordering/arranging compulsions, 22 (14%) had primary hoarding, and 39 (25%) had OCD concerns which did not meet any of the six a priori defined categories. Primary symptoms that were not captured included repeating, reassurance seeking, hypochondriacal concerns, and mental reviewing.

Table 1
Means and standard deviations for OCD and GAD samples on the OCI-R (total and subscales)

	OCD ($n = 186$)		GAD ($n = 17$)	
	Mean	S.D.	Mean	S.D.
Obsessing	6.6[**]	3.8	3.6	2.6
Washing	4.1[**]	4.0	0.7	1.3
Checking	4.4[**]	3.6	1.7	1.3
Neutralizing	2.5[**]	3.2	0.8	1.3
Ordering	4.4[**]	3.5	1.5	1.6
Hoarding	4.3[**]	4.1	2.4	2.1
Total	26.3[**]	12.8	10.6	5.6

[**] $p < .01$.

Table 2
Correlations of the latent factors of the OCI-R subscales

	Washing	Checking	Neutralizing	Ordering	Hoarding
Obsessing	0.09	0.06	0.17	−0.12	0.01
Washing		0.37	0.37	0.29	0.15
Checking			0.32	0.39	0.27
Neutralizing				0.34	0.25
Ordering					0.35

3. Scale properties with the OCD sample

3.1. CFA

The six-factor structure of the OCI-R was confirmed, using criteria recommended by Hu and Bentler (1999). The model had a significant Chi-square ($\chi^2(121) = 216.4$, $p < .0001$), a Goodness of Fix Index (GFI) of .89, a Comparative Fit Index (CFI) of .95, a root mean square residual (RMR) of .099, and a root mean square error of approximation (RMSEA) of .06 (90% confidence interval .05–.08). All of these values indicate an adequate fit for the model except the Chi-square. The fit was significantly better than a one-factor structure ($\chi^2(136) = 1610$, $p < .0001$, GFI = .50, CFI = .29, RMR = .34, RMSEA = .24). Intercorrelations of the six subscales based on their latent factors are presented in Table 2. Overall, there were low to moderate correlations among the subscales, and the correlations with the obsessing subscale were the lowest.

3.2. Internal consistency

Cronbach's Alpha was calculated within the OCD sample for OCI-R total score and subscales. Results suggested adequate internal consistency for most subscales, with a modest reliability for the neutralizing scale: obsessing = .88, washing = .69, checking = .87, neutralizing = .57, ordering = .89, hoarding = .93, total scale = .84. Items comprising each subscale correlated with other items within a subscale (.49 (in neutralizing) to .81 (in hoarding)) with a mean correlation between scale items of .68.

4. Convergent and discriminant validity of the subscales: differences between groups

For all six categories of symptoms, the overall ANOVAs were significant (F's$(3, 172) > 16$, p's $< .001$). For each subscale on the OCI-R, Tukey's comparisons generally showed that patients identified by the Y-BOCS to have that symptom as primary had higher scores on the corresponding OCI-R subscale than patients who had the symptom present but not primary; the latter patients had higher OCI-R subscale scores than both those OCD patients who did not endorse the symptom on the Y-BOCS checklist and patients with GAD (see Tables 3–8).[1] However, differences were not significant between primary and present for patients with obsessing or neutralizing. Patients with primary symptoms on the Y-BOCS checklist that were

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[1] While means and standard deviations are presented in the tables for each group on non-target subscales, we did not conduct significant tests of differences among means because we had no a priori hypotheses.

Table 3

Descriptive statistics of the OCI-R in OCD patients regarding subtype of obsessing (harm, sexual, and religious thoughts as primary, present, or absent) and GAD patients

OCI-R subscale	Obsessing						GAD ($n = 17$)	
	Primary ($n = 47$)		Present ($n = 44$)		Absent ($n = 68$)		Mean	S.D.
	Mean	S.D.	Mean	S.D.	Mean	S.D.		
Obsessing	**8.6**[a]	**3.2**	**7.2**[a]	**3.4**	**4.8**[b]	**3.6**	**3.6**[b]	**2.6**
Washing	**3.1**	**3.4**	4.0	3.3	4.4	4.2	0.7	1.3
Checking	**3.6**	**3.3**	4.7	3.2	4.3	3.7	1.7	1.3
Neutralizing	**2.3**	**3.0**	2.6	2.9	2.1	2.9	0.8	1.3
Ordering	**3.1**	**2.8**	4.8	3.5	4.8	4.0	1.5	1.6
Hoarding	**3.2**	**3.7**	4.9	4.0	4.5	4.3	2.4	2.1
Total	**24.0**	**10.7**	28.1	12.5	25.0	12.7	10.6	5.6

Means with different superscripts were significantly different from other means, Tukey's HSD, $p < .05$. GAD, generalized anxiety disorder.

Table 4

Descriptive statistics of the OCI-R in OCD patients regarding subtype of contamination (germs, illness, washing, cleaning as primary, present, or absent) and GAD patients

OCI-R subscale	Washing						GAD ($n = 17$)	
	Primary ($n = 46$)		Present ($n = 73$)		Absent ($n = 40$)		Mean	S.D.
	Mean	S.D.	Mean	S.D.	Mean	S.D.		
Obsessing	**5.7**	**3.8**	6.7	3.7	7.3	3.8	3.6	2.6
Washing	**7.0**[a]	**3.7**	**3.7**[b]	**2.8**	**0.6**[c]	**1.8**	**0.7**[c]	**1.3**
Checking	**4.5**	**3.6**	4.8	3.5	2.7	2.8	1.7	1.3
Neutralizing	**2.6**	**2.9**	2.7	3.2	1.3	2.2	0.8	1.3
Ordering	**4.9**	**3.7**	4.8	3.5	2.8	3.2	1.5	1.6
Hoarding	**3.9**	**3.8**	5.2	4.2	3.0	3.8	2.4	2.1
Total	**29.0**	**13.4**	27.9	11.3	17.7	8.2	10.6	5.6

Means with different superscripts were significantly different from other means, Tukey's HSD, $p < .05$. GAD, generalized anxiety disorder.

Table 5

Descriptive statistics of the OCI-R in OCD patients regarding subtype of checking (stoves, appliances, etc. as primary, present, or absent) and GAD patients

OCI-R Subscale	Checking						GAD ($n = 17$)	
	Primary ($n = 23$)		Present ($n = 87$)		Absent ($n = 49$)		Mean	S.D.
	Mean	S.D.	Mean	S.D.	Mean	S.D.		
Obsessing	**5.8**	**3.5**	6.5	3.5	7.1	4.4	3.6	2.6
Washing	**3.6**	**3.0**	4.0	3.7	3.8	4.21	0.7	1.3
Checking	**7.3**[a]	**4.1**	**4.6**[b]	**3.2**	**2.1**[c]	**2.0**	**1.7**[c]	**1.3**
Neutralizing	**2.0**	**2.8**	2.8	3.2	1.7	2.3	0.8	1.3
Ordering	**4.7**	**4.1**	4.9	3.6	3.2	2.9	1.5	1.6
Hoarding	**4.1**	**4.5**	5.2	4.1	2.6	3.4	2.4	2.1
Total	**27.6**	**12.8**	27.9	12.5	20.4	9.5	10.6	5.6

Means with different superscripts were significantly different from other means, Tukey's HSD, $p < .05$. GAD, generalized anxiety disorder.

Table 6
Descriptive statistics of the OCI-R in OCD patients regarding subtype of neutralizing (mental counting, counting rituals, or objects as primary, present, or absent) and GAD patients

| OCI-R Subscale | Neutralizing | | | | | | GAD ($n = 17$) | |
| | Primary ($n = 4$) | | Present ($n = 50$) | | Absent ($n = 105$) | | Mean | S.D. |
	Mean	S.D.	Mean	S.D.	Mean	S.D.		
Obsessing	**2.5**	**3.3**	6.9	3.4	6.6	3.9	3.6	2.6
Washing	**4.3**	**4.0**	5.2	3.4	3.2	3.7	0.7	1.3
Checking	**7.0**	**4.3**	5.6	3.5	3.4	3.2	1.7	1.3
Neutralizing	**6.5**[a]	**3.7**	**4.2**[a]	**3.2**	**1.3**[b]	**2.1**	**0.8**[b]	**1.3**
Ordering	**9.5**	**1.7**	5.4	4.0	3.6	3.1	1.5	1.6
Hoarding	**4.5**	**4.4**	5.2	3.7	3.8	4.2	2.4	2.1
Total	**34.3**	**13.2**	32.3	12.4	22.0	10.4	10.6	5.6

Means with different superscripts were significantly different from other means, Tukey's HSD, $p < .05$. GAD, generalized anxiety disorder.

Table 7
Descriptive statistics of the OCI-R in OCD patients regarding subtype of ordering (ordering or arranging things in a particular fashion as primary, present, or absent) and GAD patients

| OCI-R Subscale | Ordering | | | | | | GAD ($n = 17$) | |
| | Primary ($n = 5$) | | Present ($n = 87$) | | Absent ($n = 67$) | | Mean | S.D. |
	Mean	S.D.	Mean	S.D.	Mean	S.D.		
Obsessing	**7.4**	**3.8**	6.1	3.5	7.1	4.1	3.6	2.6
Washing	**2.0**	**3.4**	4.1	3.6	3.7	4.0	0.7	1.3
Checking	**5.8**	**2.9**	4.7	3.7	3.4	3.1	1.7	1.3
Neutralizing	**0.6**	**0.9**	2.8	3.3	1.9	2.4	0.8	1.3
Ordering	**9.6**[a]	**1.5**	**5.6**[b]	**3.3**	**2.3**[c]	**2.8**	**1.5**[c]	**1.6**
Hoarding	**3.2**	**4.5**	4.5	4.1	3.9	4.1	2.4	2.1
Total	**28.6**	**10.1**	27.9	12.6	22.3	11.0	10.6	5.6

Means with different superscripts were significantly different from other means, Tukey's HSD, $p < .05$. GAD, generalized anxiety disorder.

Table 8
Descriptive statistics of the OCI-R in OCD patients regarding subtype of hoarding (collecting as primary, present, or absent) and GAD patients

| OCI-R Subscale | Hoarding | | | | | | GAD ($n = 17$) | |
| | Primary ($n = 22$) | | Present ($n = 53$) | | Absent ($n = 84$) | | Mean | S.D. |
	Mean	S.D.	Mean	S.D.	Mean	S.D.		
Obsessing	**5.0**	**3.3**	6.3	3.4	7.2	4.0	3.6	2.6
Washing	**2.4**	**2.8**	5.1	3.7	3.5	3.8	0.7	1.3
Checking	**3.5**	**2.5**	5.4	3.6	3.6	3.4	1.7	1.3
Neutralizing	**1.0**	**1.7**	3.1	3.3	2.1	2.8	0.8	1.3
Ordering	**5.2**	**3.1**	4.9	3.6	3.7	3.6	1.5	1.6
Hoarding	**9.2**[a]	**3.9**	**6.4**[b]	**3.4**	**1.6**[c]	**2.0**	**2.4**[c]	**2.1**
Total	**26.2**	**11.0**	31.3	12.4	21.7	10.7	10.6	5.6

Means with different superscripts were significantly different from other means, Tukey's HSD, $p < .05$. GAD, generalized anxiety disorder.

Table 9
Differences between patients diagnosed with OCD without any of the six primary symptom subtypes endorsed and patients diagnosed with GAD

OCI-R Subscale	Primary other (n = 39)		GAD (n = 17)	
	Mean	S.D.	Mean	S.D.
Obsessing	6.91[**]	3.4	3.62	2.6
Washing	2.91[**]	3.0	0.72	1.3
Checking	3.41[**]	2.8	1.72	1.3
Neutralizing	2.91[**]	3.5	0.82	1.4
Ordering	3.71[**]	3.5	1.52	1.6
Hoarding	4.00	3.2	2.40	2.2
Total	23.8[**]	12.6	10.6	5.6

GAD, generalized anxiety disorder.

[**] $p < .01$, *t*-test, two tailed.

not reflected by any of the six symptom categories had significantly higher subscale and total OCI-R scores than GAD patients on all subscales except hoarding (see Table 9).

4.1. Differences within groups

Within sample *t*-tests were calculated to determine whether primary subscales were elevated compared with other OCI-R subscales. Patients with primary obsessions (n = 47) had elevated obsessing subscales relative to all other OCI-R subscales (p's < .001). Patients with primary washing/contamination symptoms had elevated contamination scores relative to other subscales (p's < .01), except obsessing. Patients with primary hoarding symptoms had elevated hoarding scores relative to other subscales (p's < .01), except obsessing and ordering. Patients with primary ordering symptoms had elevated ordering scores relative to other subscales (neutralizing $p < .01$, other p's < .05), except obsessing and hoarding (p's > .05). Patients with primary checking symptoms had elevated checking scores relative to other subscales (ordering $p < .05$, other p's < .01), except obsessing ($p > .05$). Neutralizers did not significantly differ on the neutralizing subscale compared with other subscales (p's > .05).

5. Discussion

The current study was designed to examine the psychometric properties of the subscales of the OCI-R in patients diagnosed with OCD, and to examine the convergent validity of the six subscales of the OCI-R and the corresponding six OCD subtypes derived from the Y-BOCS checklist. In addition, we further examined the discriminant validity of the OCI-R subscales to OCD by comparing the scores of OCD and GAD patients.

Adequate to excellent model fit and internal consistency were found for the six subscales, supporting the reliability of the factor scores in patients with OCD and the view that six subtypes of OCD symptoms are well represented by the OCI-R. Furthermore, each subscale score was highest in patients identified as having primary concerns corresponding to that subscale, next highest in patients who endorsed the symptoms of that subscale, and lowest in both those OCD patients who denied those symptoms and patients with GAD. In addition, in the present study, patients diagnosed with GAD had substantially lower OCI-R total and subscale scores than the OCD total sample. Thus, the OCI-R subscales appear to demonstrate good convergent and discriminant validity.

The results of the present study are consistent with those reported in previous studies in confirming the factor structure, reliability, and validity of the subscales of the OCI-R, despite the fact that the other studies have used either a mixed sample of patients with OCD, other anxiety disorders, and normal controls (Foa et al., 2002) or student samples (Hajcak et al., 2004; Fullana et al., 2005). The fact that all studies have found a good fit for the six subscales suggests that OCD subtypes may manifest in similar patterns in clinical and non-clinical groups.

Further information was gained regarding the convergent and discriminant validity of each subscale. Overall, washing and checking subscales discriminated among groups as expected. The obsessing subscale performed similarly, though individuals with non-primary obsessing did not differ from those with primary obsessing. The obsessing subscale measures intrusive, bothersome thoughts, which are commonly related to themes of sex, harm, or religion, but are also a cardinal feature of obsessions themselves. In fact, one item is "I find it difficult to control my own thoughts," while the other two items describe intrusive unpleasant or nasty thoughts. Therefore, the purpose of the obsessing subscale is to get a global measure of obsessions, but it is particularly relevant for "obsessers" who have concerns about sex, harm, or religion. Therefore, the obsessing subscale is elevated in general in individuals with OCD, which is why it was a good predictor of OCD status in ROC analyses (Foa et al., 2002). In addition, the obsessing subscale did differentiate between individuals with OCD who have obsessions regarding sex, harm, or religion, and those who do not. However, it did not differentiate between patients with OCD who had this symptom subtype as primary and others who reported the presence of these symptoms, though not as primary. This may be due to the fact that when one has intrusive thoughts of sex, harm, or religion, they are indeed quite distressing and intrusive, as they are ego dystonic even more than other subtypes. The idea that these obsessions are more distressing is consistent with the findings by Lee and Kwon (2003) that autogenous obsessions (internally generated; comparable to those measured by the obsessing subscale) are more unacceptable than reactive obsessions (cued; such as contamination concerns or fears of consequences of not checking). Thus, the presence of obsessions related to even if not as primary obsessions, are likely to be endorsed as quite distressing.

Previous analyses of the hoarding subscale (Foa et al., 1998, 2002) suggested that patients with OCD (undifferentiated by subtype) were no more elevated on this subscale than non-clinical participants. This appeared to raise questions regarding the validity of the hoarding subscale. However, Fullana et al. (2005) found strong convergence of the hoarding subscale and the Saving Inventory-Revised (Frost, Steketee, & Grisham, 2004), a well-validated measure of hoarding symptoms. The current data demonstrate that patients with primary hoarding are elevated on that subscale compared to other patients with OCD and GAD controls. Thus, the hoarding subscale appears to have support for its convergent and discriminant validity. However, these data do not speak to the validity of hoarding as a subtype of OCD, which is a current controversy within the field (e.g., Grisham, Brown, Liverant, & Campbell-Sills, 2005; Wu & Watson, 2005). In fact, Grisham et al. (2005) suggest a distinction between pure hoarders and hoarding within the context of other OCD symptoms. We found that most patients with hoarding symptoms (70%) had other symptoms as primary, and within the primary hoarding group, seven (32%) of the 22 had an additional primary symptom in addition to hoarding. Only two (9%) of the 22 patients had no other symptoms endorsed on the Y-BOCS checklist. Thus, while the distinction of pure versus mixed hoarding is important, it should be noted that it is likely to comprise a small subset of individuals who have only hoarding symptoms, as the large majority (86%) had substantial non-hoarding OCD symptoms in our sample and in Grisham et al. (70%).

The neutralizing subscale had the lowest internal consistency, as it did in prior studies. Although the items that comprise this subscale are all related to numbers, the three items on the neutralizing subscale seem to tap into relatively different concepts (bad numbers vs. counting vs. repeating numbers). In contrast, the other subscales seem to be more internally homogenous (e.g., checking). Furthermore, the primary and present groups did not differentiate themselves on the neutralizing subscale. This is likely to be an issue of power, given that only four patients in the present sample had primary neutralizing. Although some have suggested that the neutralizing subscale should be removed from the OCI (cf., Wu & Watson, 2003), further development of the subscale rather than its removal could help account for more of the variability of symptoms in OCD. It is important to note that a significant number of patients with OCD endorsed neutralizing in their clinical presentation, and these patients were elevated on the subscale compared with patients with GAD. This suggests that neutralizing may constitute an important aspect of the clinical picture although neutralizing symptoms may not be primary in many patients. By developing more items that are thematically consistent (e.g., superstitious beliefs to go with bad numbers or other repeating behaviors to go with repeating numbers), a revised scale may account for more of the approximately 25% of patients with OCD who did not have primary symptoms captured by any of the six subtypes determined by the Y-BOCS. On the other hand, removal of the scale in its current form would improve the factor structure of the measure, given the good internal consistency of the other five scales.

In the first report examining OCI-R related symptom change from treatment, Abramowitz, Tolin, and Diefenbach (2005) reported that change in the OCI-R total score was correlated with change in the Y-BOCS total score. Furthermore, selecting the highest subscale score and examining only change on this subscale compared to change in the Y-BOCS total score significantly improved the relationship between changes in the measures. The current study may further increase the clinical utility of the OCI-R in measuring treatment outcome by providing norms for symptom domains. This may allow individuals to utilize all elevated subscales in determining clinical change during treatment. Further research examining the sensitivity of the subscales to treatment effects is warranted.

Overall, the themes of the obsessions or compulsions of patients who did not have primary symptoms in any of the six domains varied considerably. Common themes were reassurance seeking, hypochondriacal concerns, repeating, and mental reviewing. We are not aware of measures of OCD that capture all of these themes. In fact, subscales of many recent OCD measures resemble the OCI-R subscales. For example, the Padua Inventory includes subscales on cleaning, checking, harm (obsessing), and ordering, and the VOCI includes cleaning, checking, obsessions, just right (ordering), hoarding, and indecisiveness (doubting). Given the interest in comprehensively defining and measuring subtypes of OCD (e.g., Mataix-Cols et al., 2005), perhaps integrating the current self-report measures of OCD into a single measure or expanding the OCI-R to address these other symptoms with 7–10 subscales will advance the field. These considerations notwithstanding, the OCI-R can successfully differentiate between patients with the six primary symptom domains and other patients groups.

Limitations of the current study include the fact that interrater reliability data were not collected for YBOCS checklist or the primary symptoms. However, data were collected from experienced clinicians who have extensive experience in administering these measures. In addition, the samples of patients with primary neutralizing, hoarding, and ordering were quite small. However, the effects were significant even in these small groups, and the sample sizes reflect the general prevalence of primary symptoms in the OCD population (Foa, Kozak, Goodman, & Hollander, 1995). Furthermore, these symptoms were quite prevalent in the

symptom profile, though they were not primary. Finally, the use of only a single primary symptom leaves out the possibility of multiple symptom subtypes being equally distressing (e.g., contamination and checking both being severe); however, the inclusion of multiple categories of symptoms as primary could create a situation in which the second rated symptom may be substantially less severe than the primary symptom, but is considered on equal ground. Given that each of the top three symptoms was not rated separately for severity, we chose to be underinclusive rather than overinclusive.

In conclusion, the current study further demonstrates that the OCI-R is a psychometrically sound, brief instrument that examines many of the main symptom subtypes of OCD. It is easy to administer, and the current data combined with previous efforts (e.g., Fullana et al., 2005; Hajcak et al., 2004) suggest that it is appropriate for clinical and non-clinical populations, and for clinical and research purposes. Further research should examine the sensitivity of the specific subscales to treatment effects, and the potential for adding more items to account for other symptom domains of OCD.

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