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The Obsessive–Compulsive Inventory: Development and Validation of a Short Version

Edna B. Foa, Jonathan D. Huppert, Susanne Leiberg, Robert Langner, and Rafael Kichic
University of Pennsylvania

Greg Hajcak
University of Pennsylvania and University of Delaware

Paul M. Salkovskis
University of London

This article reports on the development of a revised version of the Obsessive–Compulsive Inventory (OCI; E. B. Foa, M. J. Kozak, P. Salkovskis, M. E. Coles, & N. Amir, 1998), a psychometrically sound, theoretically driven, self-report measure. The revised OCI (OCI–R) improves on the parent version in 3 ways: It eliminates the redundant frequency scale, simplifies the scoring of the subscales, and reduces overlap across subscales. The reliability and validity of the OCI–R were examined in 215 patients with obsessive–compulsive disorder (OCD), 243 patients with other anxiety disorders, and 677 nonanxious individuals. The OCI–R, which contains 18 items and 6 subscales, has retained excellent psychometric properties. The OCI–R and its subscales differentiated well between individuals with and without OCD. Receiver operating characteristic (ROC) analyses demonstrated the usefulness of the OCI–R as a diagnostic tool for screening patients with OCD, utilizing empirically derived cutscores.

The Obsessive–Compulsive Inventory (OCI) is a comprehensive self-report measure for assessing symptoms of obsessive–compulsive disorder (OCD). It contains 42 items rated on two 5-point Likert-type scales: one measuring the frequency of symptoms and the other evaluating the distress caused by the symptoms (Foa, Kozak, Salkovskis, Coles, & Amir, 1998). The 42 items form seven subscales, which are based on symptom categories that are commonly found in obsessive–compulsive disorder: Checking (9 items), Washing (8 items), Obsessing (8 items), Mental Neutralizing (6 items), Ordering (5 items), Hoarding (3 items), and Doubting (3 items). Foa et al. (1998) reported good to excellent internal consistency (range = .59–.96) for the full scale and the subscales for patients with OCD, generalized social phobia (GSP), and posttraumatic stress disorder (PTSD), as well as for nonanxious controls (NACs). Foa et al. (1998) also reported good to excellent test–retest reliability across a 2-week time period for OCD patients (*r*s = .77–.97) and a 1-week period for NACs (*r*s = .68–.90). The OCI also demonstrated excellent discriminant validity between diagnostic groups and satisfactory convergent validity with other measures of OCD. Larger correlations between the distress and frequency ratings were found for the OCD group than for the non-OCD groups, although the two scales were highly correlated in all groups. The non-OCD groups showed higher frequency scores than distress scores, whereas the OCD group showed equivalent distress and frequency ratings.

The psychometric properties of the OCI were further examined in a nonclinical student sample (Simonds, Thorpe, & Elliott, 2000). High internal consistency emerged for the total frequency and distress scales, and for each subscale (all alpha coefficients were above .70). The test–retest reliability over a 4-week period was good to excellent for the full scales and for the subscales (.69–.88) but was overall somewhat lower than the correlations reported in Foa et al.'s (1998) study. Simonds et al. attributed this difference to the fact that in their study, the test–retest interval was greater than in the Foa et al. (1998) sample. Simonds et al. also found good convergent validity with the Maudsley Obsessive–Compulsive Inventory (MOCI; Hodgson & Rachman, 1977; *r*s ranged from .61 to .75) when Pearson correlations were calculated to compare the OCI Doubting subscale with items from the MOCI Doubting subscale. As in the Foa et al. (1998) study, means for frequency scores were found to be higher than for distress scores.

The OCI is a substantial improvement over previously developed self-report measures for OCD symptoms, given that it assesses a broad range of symptoms, uses Likert-scale ratings to assess the severity of symptoms, and can readily be administered to clinical and nonclinical populations (see Foa et al., 1998, for a review). However, a number of features of the scale can be improved to better accommodate its use in both clinical and research settings. First, in the Foa et al. (1998) study as well as in subsequent analyses, we have repeatedly found a high correlation (above .90) between the distress and frequency total scores, sug-

Edna B. Foa, Jonathan D. Huppert, Susanne Leiberg, Robert Langner, and Rafael Kichic, Center for the Treatment and Study of Anxiety, University of Pennsylvania; Greg Hajcak, Center for the Treatment and Study of Anxiety, University of Pennsylvania, and Department of Psychology, University of Delaware; Paul M. Salkovskis, Institute of Psychiatry, University of London, London, England.

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Correspondence concerning this article should be addressed to Edna B. Foa, Center for the Treatment and Study of Anxiety, University of Pennsylvania, 3535 Market Street, Suite 600N, Philadelphia, Pennsylvania 19104. E-mail: foa@mail.med.upenn.edu

gesting redundancy in the two scales. In addition, because the subscales contain different numbers of items, subscale symptom severity can only be compared by averaging the item scores for each subscale—a process that can be somewhat unwieldy for clinicians. Moreover, even if the items of the OCI were rated on only one scale (i.e., either distress or frequency), it would still be somewhat long for routine use in clinical settings.

The present study was undertaken in an effort to (a) develop a shorter version of the OCI (the OCI–R) that assesses obsessions and a variety of compulsions, and examine its psychometric features, and (b) present receiver operating characteristics (ROC) analyses to examine the usefulness of the OCI–R as a diagnostic tool.

Development of the OCI–R

In this section we describe the process by which we selected the items for the short version of the OCI.

Method

Participants

Participants were a subsample from the Foa et al. (1998) study that included 97 patients diagnosed with OCD (OCs), 57 diagnosed with GSP (GSPs), 40 diagnosed with PTSD, and 126 NACs. The mean age of the OCs was 33.2 years; 46.7% were women. The mean age of the GSPs was 38.8 years; 45.6% were women. Participants with PTSD had a mean age of 31.4 years; all of them were women. Controls had a mean age of 21.3 years; 69.6% were women. Patients with OCD were diagnosed via an interview that utilized the Yale–Brown Obsessive–Compulsive Scale (Y-BOCS; Goodman et al., 1989) to confirm *Diagnostic and Statistical Manual of Mental Disorders* (4th ed. [*DSM–IV*]; American Psychiatric Association, 1994) criteria; patients with GSP and PTSD were diagnosed through administration of the Structured Clinical Interview for *DSM–IV* Axis I Disorders (SCID–IV; First, Spitzer, Gibbon, & Williams, 1995). For more information on diagnosis for these samples, see Foa et al. (1998).

Missing Value Procedures

Missing values in the OCI were dealt with as follows: Each item with a missing value on the distress scale and a zero value on the frequency scale received a zero value on the distress scale. After this substitution, participants who had more than 20% missing values on either the distress or the frequency scale were removed from further analyses. For the remaining participants, the missing values were substituted either with the item's value on the other scale (e.g., replacing the missing value on distress with the item's value on frequency) or with the participant's mean score of the respective subscale. For each item, the decision of which substitution method to use was made by examining the correlation between the item's frequency and distress scores and the correlation of the item and its subscale. The method yielding the higher correlation was selected.

Results

The OCI was shortened in two ways: First, we thought to eliminate either the frequency or distress scale because of the previous impression that ratings of the two are extremely similar; second, we thought to reduce the number of items per subscale to three in order to equate the length of the subscales and thus simplify the rating system of the subscales. Kolmogorov–Smirnov tests of the distributions of scores showed that the scores were not normally distributed on either scale; therefore, we used a nonparametric measure of association. As expected from the prior impression, the Spearman rank correlation coefficient of the OCI frequency and distress scales on participants from Foa et al.'s (1998) study who completed both scales revealed a high intercorrelation ($r_s = .92$, $N = 186$). This supported the notion that the two scales yield redundant information. To decide which scale should be retained, we examined the between-group effect size (ES) of the distress and the frequency total scores using the following formula: $(\text{mean}_{\text{OCs}} - \text{mean}_{\text{non-OCs}})$/pooled standard deviation (Cohen, 1988). The ES of the distress scale ($d = 1.45$) was higher than the ES of the frequency scale ($d = 1.28$), indicating greater discriminative power for the former. Accordingly, the distress scale was selected for the development of the OCI–R.

Reducing the number of items per subscale was carried out on the basis of a factor analysis. We performed a principal-components analysis with promax rotation because the subscales were significantly correlated with each other (r_ss $= .28–.74$, ps $< .01$). Examination of the scree plot from the factor analysis of the 42 distress items suggested an eight-factor solution, which explained 70.4% of variance. Inspection of the items with high factor loadings suggested that the components represented (a) Washing, (b) Checking/Doubting, (c) Obsessing, (d) Mental Neutralizing, (e) Ordering, (f) Hoarding, and (g) Harming. The eighth factor was not interpretable and only contained two substantial loadings ("I need to pray to cancel bad thoughts or feelings" from the Mental Neutralizing subscale and "Before going to sleep I have to do certain things in a certain way" from the Checking subscale) and was therefore eliminated.

The first criterion for selecting the three items per subscale was their factor loading on their respective factor: First, we excluded items that substantially loaded on more than one factor or had the highest loading on a factor with less than three substantially loaded items. Second, the items with the highest loading on a given subscale were selected for that subscale. However, if several items had similarly high loadings on a given subscale, we selected the item with the higher between-group ES. Furthermore, we eliminated items that had redundant wording, selecting items that had higher factor loading and ES. Using these rules, three items of each subscale were chosen to form the preliminary short version of the OCI–R, which, in turn, was subjected to another principal-components analysis with promax rotation. This analysis led to six rather than seven factors. The Harming factor could not be replicated: two of its items loaded on the Obsessing subscale and the third one on the Checking subscale. According to our selection criteria, these three items were eliminated from the final revised version. The remaining 18 items were reanalyzed by principal-components analysis, yielding six factors that accounted for 80.8% of variance and formed the final version of the short OCI–R. The items of the OCI–R and their factor loadings and communalities are shown in Table 1. Factor intercorrelations ranged from .23 to .51 (see Table 2).

Discussion

Using data from Foa et al. (1998), we were able to develop a shorter version of the OCI, which contained six of the seven original, theoretically derived subscales through factor analysis. On the whole, the factor solution confirmed the subscales of the

Table 1
Factor Loadings of the OCI–R From Exploratory Factor Analysis With Promax Rotation on the Old Sample (N = 320) and Confirmatory Factor Analysis (CFA) From the New Sample (N = 338)

	Factor 1 (Washing)		Factor 2 (Obsessing)		Factor 3 (Hoarding)		Factor 4 (Ordering)		Factor 5 (Checking)		Factor 6 (Neutralizing)		Communalities
Item	OS	NS	OS	NS	OS	NS	OS	NS	OS	NS	OS	NS	(OS)
5	**.86**	**.77**	.04	.14	−.04	.14	.05	.14	−.08	.14	.05	.14	.78
11	**.92**	**.78**	.03	.14	.06	.14	−.04	.14	.02	.14	−.02	.14	.87
17	**.89**	**.77**	−.05	.14	−.01	.14	.02	.14	.09	.14	.02	.14	.86
6	.03	.14	**.87**	**.82**	.02	.14	.01	.14	.04	.14	.00	.14	.84
12	.03	.14	**.92**	**.82**	.02	.14	−.02	.14	−.03	.14	.00	.14	.84
18	−.03	.13	**.93**	**.75**	−.05	.13	.00	.13	−.03	.13	−.02	.13	.79
1	.03	.12	.00	.12	**.94**	**.79**	−.08	.12	−.01	.12	−.02	.12	.82
7	−.02	.11	−.07	.11	**.90**	**.84**	.04	.11	−.05	.11	.05	.11	.80
13	−.01	.14	.05	.14	**.87**	**.79**	.04	.14	.03	.14	−.02	.14	.81
3	−.03	.16	.03	.13	.00	.16	**.94**	**.81**	−.04	.13	.01	.16	.86
9	−.04	.14	−.02	.15	−.08	.15	**.91**	**.80**	.04	.15	.09	.15	.84
15	.11	.15	−.02	.14	.09	.14	**.85**	**.75**	.00	.14	−.12	.14	.78
2	−.03	.25	.05	.25	.07	.25	.08	.25	**.74**	**.63**	.06	.25	.73
8	.00	.23	−.05	.23	−.05	.23	.00	.23	**1.00**	**.66**	−.09	.23	.85
14	.04	.20	.01	.20	−.01	.20	−.06	.20	**.89**	**.66**	.05	.20	.82
4	−.08	.14	.05	.14	.02	.14	.07	.14	.02	.14	**.84**	**.73**	.78
10	−.05	.14	.02	.14	.07	.14	−.03	.14	.07	.14	**.86**	**.87**	.81
16	.19	.14	−.08	.14	−.07	.14	−.04	.14	−.10	.14	**.83**	**.73**	.65
Eigenvalue	7.4		1.9		1.6		1.4		1.2		1.1		
Total % of variance	40.9		10.8		8.8		7.8		6.7		5.8		

Note. Items loading above .30 are in bold. As a result of promax rotation, which allows correlated components, sums of squared loadings cannot be added to obtain a total variance. Communalities and eigenvalues are presented only for the old sample (OS). For the new sample (NS), standardized factor loadings are from the CFA. Results of the CFA are presented in the text. Items associated with item numbers are found in the Appendix. OCI–R = Obsessive–Compulsive Inventory—Revised.

OCI with one exception: The Doubting subscale was not replicated as a separate construct; all of its items loaded highly on the Checking factor. To validate the new OCI–R, we administered the OCI to a new sample and examined the psychometric properties of the OCI–R.

Psychometric Properties of the OCI–R

In this section, we report on the factor structure, internal consistency, and convergent and discriminant validity of the OCI–R using a new sample. We also report on the test–retest reliability of the new scale, using data from Foa et al. (1998), which were not used for the analyses described above.

Method

Participants

Participants in this study (hereafter called the new sample) comprised 338 individuals, of whom 118 were diagnosed with OCD, 75 with GSP, and 71 with PTSD, and of whom 74 were NACs. OCI–R scores were extracted from the original OCI data collected between 1997 and 2001. If

Table 2
Correlations Between Obsessive–Compulsive Inventory—Revised Factor Scores From the Old Sample (OS; N = 321) and Between Subscale Scores for the New Sample (NS; N = 338)

	Subscale										
	Checking		Ordering		Obsessing		Hoarding		Neutralizing		
Subscale	OS	NS	OS	NS	OS	NS	OS	NS	OS	NS	Total
Washing	.40	.55	.43	.45	.39	.45	.25	.36	.45	.42	.70
Checking	—		.46	.57	.41	.53	.32	.43	.51	.52	.80
Ordering			—		.36	.42	.42	.48	.47	.44	.73
Obsessing					—		.30	.31	.46	.40	.78
Hoarding							—		.36	.39	.63
Neutralizing									—		.64

Note. All *p*s < .01.

any participant was missing more than 20% of the items on a secondary measure, then only this measure was eliminated from the analyses. Also, any participant missing more than 20% of the OCI items was removed from the analyses. Of the initial 358 participants, 11 OCs, 6 individuals with PTSD, and 3 NACs were excluded from the analyses.

OCs all sought treatment at the Center for the Treatment and Study of Anxiety (CTSA) in Philadelphia, Pennsylvania. Most received the OCI as part of an intake assessment ($n = 105$). Patients who did not complete the OCI before their treatment but who had a posttreatment score of more than 16 on the Y-BOCS were administered the OCI ($n = 13$) and their data were included in the study. OCD severity was assessed with the Y-BOCS by trained doctoral level clinicians who had considerable expertise in the diagnosis of OCD. Data were only used if the patient was determined to have a principal diagnosis of OCD. The assessment procedure also included the Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960) and the National Institute of Mental Health (NIMH) Global Obsessive–Compulsive Scale (GOCS; Goodman & Price, 1992). In addition, some participants completed other self-report measures, including the Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979) and the MOCI (Hodgson & Rachman, 1977).

Participants in the GSP and PTSD groups participated in various studies conducted at the CTSA. Exclusion criteria for the GSP and PTSD samples included presence of a psychotic disorder or substance dependence. Participants diagnosed with comorbid OCD were also excluded. The control sample consisted of 40 randomly selected students from an introductory psychology course at the University of Delaware and 34 individuals who participated as controls in other studies. All participants in the control groups completed a battery of self-report measures, including the OCI. All participants in the control groups, except the 40 students, were evaluated by using the SCID–IV (First et al., 1995).

Age, sex, and race of the sample are reported in Table 3. Statistical group comparisons yielded significant differences for sex, $\chi^2(3, n = 337) = 60.86$, $p < .01$, and race, $\chi^2(12, n = 271) = 64.00$, $p < .01$. The OC and GSP groups included significantly fewer women than the PTSD and NAC groups. The NAC group included significantly fewer women than the PTSD group, because the latter was only comprised of women. The vast majority of OCs were Caucasian, in contrast to two thirds of the GSPs and NACs and one half of the participants in the PTSD group. There were no significant age differences between the groups, $F(3, 297) = 1.47$, $p > .05$.

To examine test–retest reliability of the OCI–R, we used a subsample of 41 participants with OCD and 69 nonpatient controls from the Foa et al. (1998) study who were administered the OCI twice. Participants with OCD had a mean age of 34.3 years; 31.0% were women. Controls had a mean age of 18.6 years; 69.6% were women.

Measures

SCID–IV. The SCID–IV is a semistructured diagnostic interview to determine *DSM–IV* diagnoses.

Y-BOCS. The Y-BOCS is a semistructured interview that evaluates symptom severity and treatment responses of people with OCD. Severity scores (obsessions, compulsions, and their sum) are derived from 10 items, each rated on a 5-point scale. Although interrater reliability was not assessed directly in the study, previous research at our center that used the same evaluation method revealed satisfactory interrater reliability for the Y-BOCS severity score (intraclass correlation coefficient = .63; Foa et al., 1995). The discriminant validity of the Y-BOCS is deemed to be rather poor (Taylor, 1995) because it has been found to correlate with measures of anxiety and depression as high as with measures of OCD.

GOCS. The NIMH GOCS is a clinician-rated index of OCD illness severity that is based on other global measures of psychopathology (e.g., Murphy, Pickar, & Alterman, 1982). The GOCS is a single-item composite rating of OCD illness severity ranging from 1 (*normal*) to 15 (*very severe*); a rating of 7 denotes meeting clinical severity for the diagnosis of OCD. The GOCS scale has demonstrated excellent test–retest reliability (Kim, Dysken, & Kuskowski, 1992), and several studies have found large correlations with the Y-BOCS (e.g., Black, Kelly, Myers, & Noyes, 1990).

MOCI. The MOCI is a 30-item true–false self-report questionnaire that assesses overt rituals and their related obsessions, providing four subscales and a total score. The scale has been shown to have satisfactory test–retest reliability ($r = .80$) and internal consistency (.70 to .80; Rachman & Hodgson, 1980). The MOCI's validity was found to be satisfactory with the Washing and Checking subscales, showing good discriminant and convergent validity (Taylor, 1998).

HRSD. The HRSD is a 17-item scale of depressive symptoms that is administered by trained clinicians. The total score ranges from 0 to 50, and the scale, which has often been used in psychological and psychiatric research, has been shown to have strong interrater reliability ($r = .90$; Hamilton, 1960) and good validity (Hedlund & Vieweg, 1979).

BDI. The BDI is a 21-item self-report scale used to assess cognitive and physical symptoms of depression, with a total score ranging from 0

Table 3
Demographic Characteristics of the New Sample

	Group			
Characteristic	OC ($n = 118$)	GSP ($n = 75$)	PTSD ($n = 71$)	Control ($n = 74$)
Age (in years)	35.0_a (12.0)	32.4_a (8.9)	31.9_a (11.6)	33.1_a (11.7)
Gender				
Male	50.8_a	50.0_a	0.0_b	27.0_c
Female	49.2_a	50.0_a	100.0_b	73.0_c
Race				
White	93.1	68.5	50.0	67.6
Black	1.7	23.3	47.9	23.5
Hispanic	0.0	1.4	2.1	0.0
Asian	2.6	6.8	0.0	2.9
Other	2.6	0.0	0.0	5.9

Note. Data are presented as percentages, except for age (*M* and *SD* in years; *SD*s are in parentheses). Within each row, different subscripts indicate significant differences ($p < .05$). Age, gender, and race are calculated for a smaller sample; 41 participants did not report age, 1 participant did not report gender, and 67 participants did not report race. OC = obsessive–compulsive disorder; GSP = generalized social phobia; PTSD = posttraumatic stress disorder.

to 63. It has been widely used in psychological research, which has demonstrated the scale's good reliability and validity.

Missing Value Procedures

Missing value procedures for the OCI were described above. Missing values in the BDI and HRSD were substituted by the participant's mean item rating, and in the MOCI by the participant's mode of the respective subscale.

Results

Kolmogorov–Smirnov tests of the distributions of scores on all measures indicated that most measures were not normally distributed. Therefore, we used nonparametric statistics whenever appropriate.

Stability of the Factor Structure

To test the factorial stability of the six subscales of the carved-out 18-item OCI–R in the entire new sample ($N = 338$), we used a confirmatory factor analysis using Proc Calis in SAS Version 8.02. The six-factor structure of the OCI–R was confirmed in the new sample, using criteria recommended by Hu and Bentler (1999). The model had a significant chi-square, $\chi^2(138, N = 338) = 351$, $p < .01$, a goodness-of-fit index of .897, a comparative-fit index of .946, a root mean square residual of .070, and a root mean square error of approximation of .067. All of these values suggest an excellent fit for the model. As shown in Table 1, all items had very high standardized factor loadings on the factor that they belonged to, and very low standardized loadings on other factors.

Internal Consistency

Coefficient alphas are presented in Table 4. The full scale and the six subscales had good internal consistency, with four of the six coefficients exceeding .72. The two exceptions were the coefficient alphas for the Mental Neutralizing and Checking subscales in the NAC sample (.34 and .65). The coefficients for the total scale for each group were all high, ranging between .81 (OCs) and .93 (GSPs).

Spearman intercorrelations among the subscales and the total score of the OCI–R, computed for the entire sample, are presented in Table 2. The correlations among the subscales were moderate, ranging from .31 to .57, indicating that the subscales are related but not redundant. The correlations between the subscales and the total score were moderate to high, ranging from .63 to .80, indicating that the subscales are from the same universe of content (i.e., OCD symptoms).

Test–Retest Reliability

The temporal stability of the OCI–R was examined by calculating Spearman correlations. The test–retest interval was approximately 2 weeks for OCs and 1 week for NACs. Overall, the reliability for the total and subscale scores was excellent for OCs (ranging from .74 to .91) and good to excellent for NACs (ranging from .57 to .87; see Table 5).

Convergent and Discriminant Validity

To determine the association between the original OCI and the OCI–R, Spearman correlations using the combined sample were calculated. The correlation coefficient for both scales' total scores was $r_s = .98$. All subscale correlations exceeded $r_s = .90$, except for the correlation between the Mental Neutralizing scales ($r_s = .74$).

Spearman correlations between the scores of the OCI–R and the Y-BOCS, GOCS, and MOCI are presented in Table 6. To increase the range of scores for the various scales, we combined the OC and NAC samples for these analyses. Significant positive correlations were found between the OCI–R total score and all other OCD measures used. Furthermore, because OCs do not form a homogenous group in terms of symptom presentation, we evaluated the correlation between the OCI–R subscales and other criterion measures of OCD subtypes in addition to the total scores. Specifically, the analyses revealed high correlations between the Washing and Checking subscales of the OCI–R with the corresponding subscales of the MOCI (Washing: $r_s = .78$, $n = 34$; Checking: $r_s = .72$, $n = 34$) and a moderate correlation between the OCI–R Obsessing subscale and the Y-BOCS Obsessions score ($r_s = .51$, $n = 124$).

To examine the discriminant validity of the OCI–R, we conducted Spearman correlations between the OCI–R total score and

Table 4
Coefficient Alphas for the Obsessive–Compulsive Inventory—Revised Subscale and Total Scores

	Group				
Subscale	OC ($n = 118$)	GSP ($n = 75$)	PTSD ($n = 71$)	NAC ($n = 74$)	Total ($N = 338$)
Washing	.86	.89	.77	.73	.88
Checking	.88	.81	.76	.65	.83
Ordering	.90	.89	.84	.82	.90
Obsessing	.82	.86	.83	.89	.88
Hoarding	.90	.88	.86	.76	.90
Neutralizing	.86	.79	.85	.34	.83
Total score	.81	.93	.91	.89	.90

Note. OC = obsessive–compulsive disorder; GSP = generalized social phobia; PTSD = posttraumatic stress disorder; NAC = nonanxious control.

Table 5
Test–Retest Reliability for Obsessive–Compulsive Inventory—Revised Subscales and Total Score

Subscale	Group: OC (n = 41)	Group: Controls (n = 69)
Washing	.91	.87
Checking	.74	.75
Ordering	.84	.84
Obsessing	.84	.66
Hoarding	.79	.78
Mental Neutralizing	.82	.57
Total score	.82	.84

Note. All values are significant at $p < .01$. OC = obsessive–compulsive disorder.

the BDI and HRSD total scores for the combined sample of OCs and NACs (see Table 6). The correlations between the OCI–R and BDI and the HRSD were substantial.

Discussion

The OCI–R was shown to have excellent psychometric properties that are similar to those of the original OCI scale. As expected, the OCI–R and its subscales were strongly correlated with the long version of the OCI and its subscales. Internal consistency was high for the total score and for each subscale across samples, except for Mental Neutralizing in NACs. Test–retest reliability was also moderate to high for the total score and all subscales across samples. Thus, the OCI–R appears to be a reliable measure.

In terms of validity, the OCI–R was found to have a solid factor structure, reflected by the uniformity of the factors across samples. Furthermore, the measure was moderately related to observer ratings of OCD severity as measured by the Y-BOCS and GOCS, and strongly related to the MOCI, a self-report measure. The correlations with the self-report ratings of OCD were higher than those with a self-report measure of depression, whereas the correlations with observer ratings of OCD were similar to those with observer ratings of depression. On the whole, the findings support the convergent validity of the OCI–R, although the relationship between the OCI–R and observer's measures of OCD and depression need further exploration.

Stand-Alone OCI–R Compared to the Carved-Out Items

All previous OCI–R data had been extracted from the completed 42-item distress subscale of the original OCI. To examine whether there were differences when the 18 items of the OCI–R were administered as a stand-alone scale, we administered the OCI–R to an additional 30 OCs who had Y-BOCS scores above 16 and to 477 NACs (students at the University of Delaware). The data from the 30 OCs suggested that mean scores on the stand-alone OCI–R (M = 27.9, SD = 11.1) were similar to the carved-out mean scores of the 215 OCs who had completed the original version of the OCI (M = 28.01, SD = 13.5), $t(243) = .054$, $p = .95$ (effect size = −0.008); similar results were found for subscales. However, there were significant differences for the students from the same university (mean from the stand-alone OCI–R [n = 477] = 18.8, SD = 11.1; mean from carved-out version [n = 519] = 10.0, SD = 9.9; effect size = 0.84), $t(994) = 13.2$, $p < .01$. This difference suggests that NACs endorse more symptoms on the OCI–R than on the OCI. However, the same factors and similar coefficient alphas and test–retest reliabilities emerged from the stand-alone and the carved-out versions of the OCI–R in the NAC group (Hajcak, Huppert, Simons, & Foa, 2002). Because NACs completed the OCI–R differently than the OCI long version, we used data from the stand-alone OCI–R for NACs in the subsequent analyses.

Differences Among Diagnostic Groups

In this section, differences between OCs, GSPs, PTSDs, and NACs on the OCI–R and its subscales are examined first through tests of differences between means and then through ROC analyses. Then, the sensitivity and specificity of various cutoff points and the optimal cutscores are determined.

Method

Participants

In this analysis, the anxious participants from Foa et al.'s (1998) study and the new sample were combined to form a sample of 215 OCs, 132 GSPs, and 111 individuals with PTSD. For ROC analyses, we collapsed the PTSD and GSP groups to form an anxious-control (AC) group comprising 243 individuals. An additional 477 psychology students at the University of Delaware were used as the NAC group.

Table 6
Spearman Correlations of the Obsessive–Compulsive Inventory—Revised With Other Measures of OCD and Measures of Depression

Measure	OCs and NACs combined: r_s	n
Convergent		
Y-BOCS		
Total	.53	124
Obsessions	.49	124
Compulsions	.54	124
GOCS	.66	86
MOCI	.85	34
Divergent		
HRSD	.58	121
BDI	.70	141

Note. All values are significant at $p < .01$. OCD = obsessive–compulsive disorder; OCs = patients diagnosed with OCD; NACs = nonanxious controls; Y-BOCS = Yale–Brown Obsessive–Compulsive Scale (Goodman et al., 1989); GOCS = National Institute of Mental Health Global Obsessive–Compulsive Scale (Goodman & Price, 1992); MOCI = Maudsley Obsessive–Compulsive Inventory (Hodgson & Rachman, 1977); HRSD = Hamilton Rating Scale for Depression (Hamilton, 1960); BDI = Beck Depression Inventory (Beck et al., 1979).

Median or Mean Analyses

To examine the ability of the OCI–R to discriminate OCs from other diagnostic groups, we compared group medians of subscale and total scores, using Kruskal–Wallis tests. Significant results were followed by Mann–Whitney *U* tests. Effect sizes between groups were also calculated. Group medians and interquartile ranges are presented in Table 7. The new student sample and the OCs had distributions within the normal range, so *t* tests were used to compare these samples.

ROC Analyses

To determine the extent to which the OCI–R can accurately diagnose OCD, we conducted ROC analyses using the Analyse-It add-in for Microsoft Excel and examined the sensitivity and specificity of the measure at different cutscores. The ROC analysis uses the association between sensitivity and specificity to derive an area under the curve (AUC), which indicates how well overall a measure distinguishes between case positive (i.e., OCD) and case negative (i.e., AC or NAC) in a given sample irrespective of the base rate. A value of .50 of the AUC indicates chance level and 1.0 indicates a perfect diagnostic tool. For detailed descriptions of the underlying principles of ROC analysis and its applications in psychology, see Swets (1996), McFall and Treat (1999), and Swets, Dawes, and Monahan (2000).

Results

Kruskal–Wallis tests indicated group differences on all scales: total score, $\chi^2(2, N = 458) = 136.8$, $p < .01$; Washing, $\chi^2(2, N = 458) = 76.7$, $p < .01$; Checking, $\chi^2(2, N = 458) = 77.1$, $p < .01$; Ordering, $\chi^2(2, N = 458) = 39.6$, $p < .01$; Obsessing, $\chi^2(2, N = 338) = 95.2$, $p < .01$; Hoarding, $\chi^2(2, N = 458) = 12.8$, $p = .02$; and Mental Neutralizing, $\chi^2(2, N = 458) = 79.4$, $p < .01$. Mann–Whitney *U* tests indicated that the OCs were significantly more distressed than the other groups on the total score and on all subscales but the Hoarding subscale, on which the OC and GSP groups did not differ significantly from one another (*U*s ranged from 2,139.50 to 4,361.50, $p > .01$). In addition, the GSP and PTSD groups differed significantly only on the Checking scale (see Table 7).

Because our samples varied significantly in their gender composition, we conducted the same analyses with women only. The pattern of results was the same as for the whole sample, and effect sizes were quite similar (about .10 smaller than for the entire sample), ranging from .10 (OC vs. GSP Hoarding) to 1.02 (OC vs. PTSD total score).

Medians, means, standard deviations, and effect sizes for OCI–R total and subscale scores for OCs and NACs are presented in Table 8. For all *t* tests comparing OCs to NACs, equal variances were not assumed based on Levene's test for equality of variances. In terms of the OCI–R total score, *t* tests revealed that OCs ($M = 28.0$, $SD = 13.53$) scored significantly higher than NACs ($M = 18.82$, $SD = 11.10$), $t(349.22) = 8.72$, $p < .01$, and OCs scored significantly higher than NACs on four of six subscales, $ts(280.09–314.52) = 4.85–15.06$, $p < .01$. The two exceptions were the Ordering subscale, $t(329.10) = 1.15$, $p = .25$, and the Hoarding subscale, $t(309.19) = -2.56$, $p = .01$.

The empirical ROC curve using either the Obsession subscale or the total score for OCs and NACs is depicted in Figure 1 and the curve for OCs and ACs is depicted in Figure 2. The nonparametrically computed AUC of each curve is large. For NACs, the Obsession subscale differentiated between OCs and NACs better than the total score (AUC for total score = .70, 95% confidence interval [CI] = .66–.74; Obsession subscale = .81, 95% CI = .77–.85). However, the AUCs were better for the total score than for the Obsession subscale when differentiating the OC and AC groups (total score = .82, 95% CI = .78–.85; Obsession subscale = .76, 95% CI = .71–.80). Overall, these results indicate excellent discriminative power of the OCI–R for distinguishing OC cases from both nonanxious cases and cases with other anxiety disorders.

The use of the OCI–R as a diagnostic tool requires the identification of a cutscore, which yields the optimal combination of sensitivity (accurately identifying true positives) and specificity (accurately identifying true negatives), which may vary depending on the situation. Table 9 presents the sensitivity and specificity of the OCI–R and the Obsession subscale for different cutscores. We

Table 7
Medians and Interquartile Ranges for Subscale and Total Scores of the Obsessive–Compulsive Inventory—Revised for Patients With OCD, GSP, and PTSD

	Group							
	OCD ($n = 215$)		GSP ($n = 132$)			PTSD ($n = 111$)		
Subscale	*Mdn*	IR	*Mdn*	IR	Effect size	*Mdn*	IR	Effect size
Washing	3.00_a	8.00	0.00_b	1.00	0.93	0.00_b	2.00	0.74
Checking	4.00_a	7.00	1.00_b	3.00	0.96	2.00_c	5.00	0.64
Ordering	4.00_a	7.00	2.00_b	4.00	0.55	1.25_b	4.00	0.65
Obsessing	8.00_a	7.00	2.00_b	5.53	1.13	3.66_b	5.00	0.83
Hoarding	2.00_a	6.00	$2.00_{a,b}$	4.00	0.18	1.00_b	4.00	0.43
Neutralizing	2.00_a	5.00	0.00_b	1.00	0.78	0.00_b	0.00	0.82
Total score	25.00_a	18.00	7.00_b	15.18	1.22	11.00_b	15.00	1.14

Note. Medians with different subscripts differ significantly at $p < .01$ by the Mann–Whitney *U* test. Subscale scores ranged from 0 to 12 and represent the summed rating for that subscale. The total score ranged from 0 to 72. Effect sizes are Cohen's *d*s using OCD as the reference group. OCD = obsessive–compulsive disorder; GSP = generalized social phobia; PTSD = posttraumatic stress disorder; IR = interquartile range.

Table 8
Means, Standard Deviations, and Medians for Subscale and Total Scores of the Obsessive–Compulsive Inventory—Revised for OCs and NACs

	Group						
	OCs (n = 215)			NACs (n = 477)			
Subscale	*M*	*SD*	*Mdn*	*M*	*SD*	*Mdn*	Effect size
Washing	4.35*	4.31	3	2.41	2.50	2	0.61
Checking	4.83*	3.86	4	2.91	2.56	2	0.64
Ordering	4.76	4.00	4	4.40	3.03	4	0.11
Obsessing	7.23*	3.84	8	2.86	2.72	2	1.40
Hoarding	3.67	3.87	2	4.41*	2.67	4	−0.24
Neutralizing	3.18*	3.81	2	1.82	2.20	1	0.48
Total score	28.01*	13.53	25	18.82	11.10	17	0.77

Note. Means with an asterisk are significantly greater at $p < .01$ by t test adjusting for unequal variance. Subscale scores ranged from 0 to 12 and represent the summed rating for that subscale. The total score ranged from 0 to 72. Effect sizes are Cohen's *d*s using OCs as the reference group. OCs = patients with obsessive–compulsive disorder; NACs = nonanxious controls.

have calculated the optimal cutscores by considering both sensitivity and specificity of the various cutscores. In the OCs–NACs sample, the optimal total score of the OCI–R is 21 (sensitivity: 65.6%; specificity: 63.9%), resulting in a correct classification of 141 of 215 OCs and 305 of 477 NACs. However, in looking at ROC curves for OCI–R subscale scores, we found that the Obsessing subscale actually was better at differentiating OCs from NACs. When the Obsessing subscale is used, the optimal cutscore is 4 (sensitivity: 74.4%; specificity: 76.1%), yielding a correct classification of 160 of 215 OCs and 363 of 477 NACs. In the OC–AC sample, the optimal cutscore for total OCI–R score is 18 (sensitivity: 74.0%; specificity: 75.2%), leading to a correct classification of 159 of 215 OCs and 182 of 243 ACs. In terms of the Obsessing subscale only, the optimal cutscore of 5 (sensitivity:

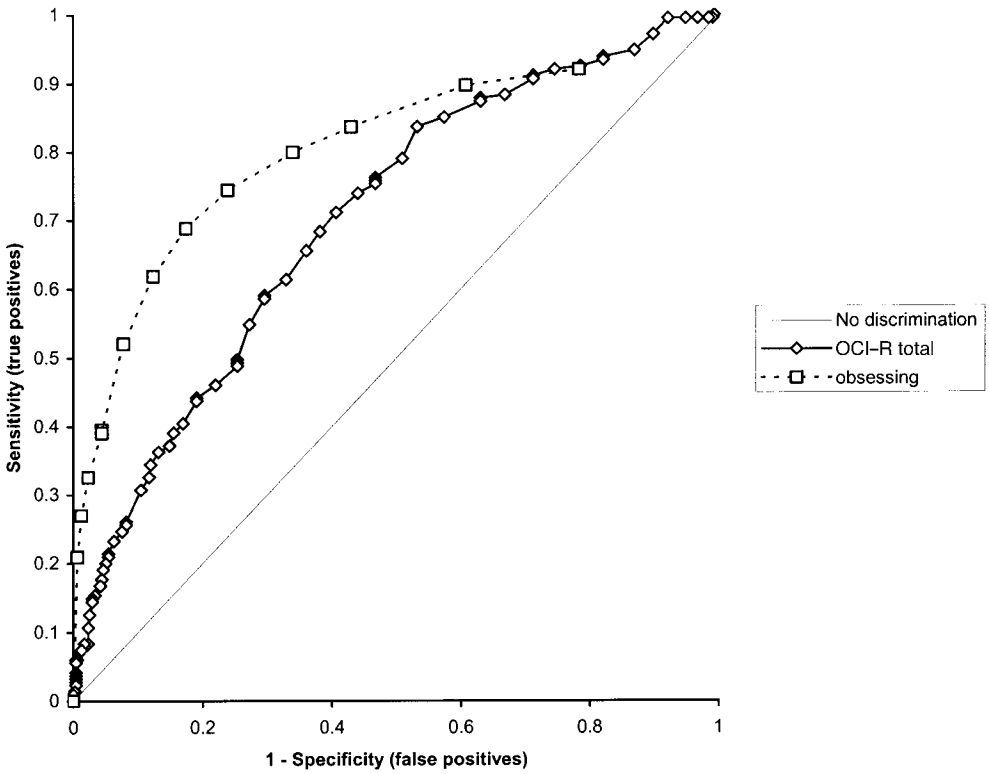

Figure 1. Receiver operating characteristic curve for the obsessive–compulsive/nonanxious control sample. OCI–R = Obsessive–Compulsive Inventory—Revised.

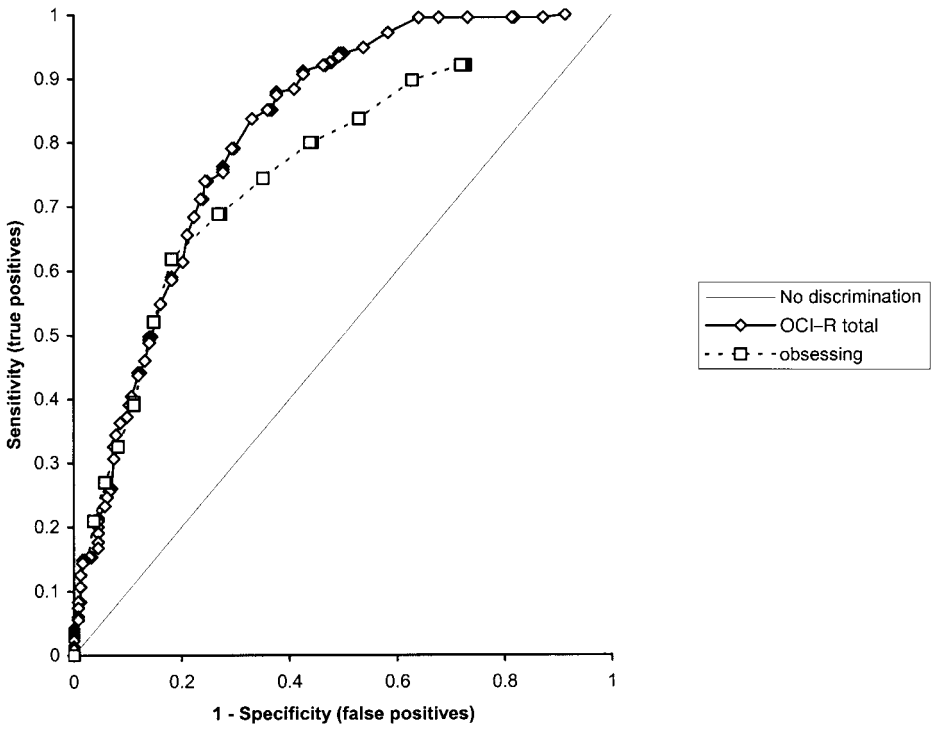

Figure 2. Receiver operating characteristic curve for the obsessive–compulsive/anxious control sample. OCI–R = Obsessive–Compulsive Inventory—Revised.

68.8%; specificity: 72.7%) correctly classified 148 of 215 OCs and 176 of 243 ACs.

Discussion

As expected, the OCI–R total scores were higher in the OC group than in the other three groups, further supporting the clinical utility of the scale. These differences were similar to those found in the original version of the OCI. In all but two subscales, Hoarding and Ordering, the OC group had higher scores than the other groups. This suggests initial support for the clinical sensitivity of the subscales as well. The absence of group differences between OCs and other groups on the Hoarding subscale is likely

Table 9
Cutoff Points for the OCI–R Total Score and Obsession Subscale and Resulting Sensitivity and Specificity for Discriminating Between OCs and NACs and Between OCs and ACs

	Sample			
	OCs/NACs		OCs/ACs	
Cutscore	Sensitivity (%)	Specificity (%)	Sensitivity (%)	Specificity (%)
OCI–R total				
5	99.5	7.8	99.5	36.0
10	92.1	25.4	92.1	53.5
15	83.7	46.8	83.7	66.9
18	74.0	56.0	**74.0**	**75.2**
20	68.4	61.8	68.4	77.8
21	**65.6**	**63.4**	65.6	78.9
25	50.2	93.5	49.8	85.5
Obsession subscale				
3	80.0	66.0	80.0	55.8
4	**74.4**	**76.1**	74.4	64.9
5	68.8	82.6	**68.8**	**72.7**
6	61.9	87.6	61.9	81.8

Note. Items in bold represent optimal cutscores. OCI–R = Obsessive–Compulsive Inventory—Revised; OCs = patients with obsessive–compulsive disorder; NACs = nonanxious controls; ACs = anxious controls.

to be due to the relatively low frequency of hoarders in our OC sample. The fact that college students actually scored higher on the Hoarding subscale than the OC sample might suggest that students are more likely to endorse some distress about the clutter in their life than OCs (most of whom are not hoarders). More information is needed on the reason that students did not differ from OCs on the ordering subscale.

The ROC analyses indicate that the OCI–R is a highly effective measure for discriminating between patients with OCD and patients with other anxiety disorders, as well as between OCD patients and nonpatients. For the sample in the present study, the optimal score for distinguishing between OCs and nonpatients was 21. At the optimal cutscores, the measure had good sensitivity and specificity. The OCI–R Obsessing subscale differentiated NACs from OCs better than the total score, whereas the reverse was true for OC–AC differentiation. This may be because ACs are likely to manifest some intrusive thoughts and therefore endorse some obsessional ideas, making the whole constellation of obsessions and compulsions as portrayed by the total score a better measure for differentiating OCD from the other anxiety disorders. The fact that the cutscore for ACs was lower than for NACs is consistent with our previous work on the original OCI (Foa et al., 1998) and may be related to ACs' focus on their symptoms in comparison with OCD symptoms and NACs not having such a comparison.

When determining the cutscore that best discriminates one population from another, we need to consider the prevalence of the population of interest in the sample (i.e., OCs). The sensitivity and specificity yielded by different cutscores are not affected by the prevalence (because they are given in percentages), but the absolute numbers of false positives and false negatives are affected by the base rate of the disorder in the sample of interest. For example, in a sample with a very low OCD prevalence, setting a low cutscore would yield only a few additional correctly diagnosed OCD cases compared to a higher cutscore, but many more non-OCD cases would be falsely diagnosed with OCD. Thus, costs and benefits of both sensitivity and specificity need to be considered when setting the cutscore.

General Discussion

This article describes the development of an 18-item, revised version of the OCI, called the OCI–R. The OCI–R retains many of the qualities of the OCI. It was found to have good to excellent internal consistency, test–retest reliability, and convergent validity. ROC analyses demonstrated that the measure effectively discriminates between patients with OCD and other groups; the Obsessing subscale alone best differentiated OCs from NACs. Thus, by revising the OCI we have reduced the number of items from 84 (42 Distress and 42 Frequency) to 18 without losing the quality of the instrument, rendering the OCI–R a highly useful diagnostic screening instrument in research and clinical settings. To arrive at a shorter scale, we eliminated the redundant Frequency scale, retained only three items per subscale, and removed the Doubting subscale because it overlapped with the Checking subscale. As a result of equating the number of items across subscales, it is now possible to compute a total score by simply adding the scores of all items, and it is possible to compare the symptom severity across subscales by adding their item scores.

Should the OCI–R replace the OCI? Given its similar psychometrics, the answer is yes. Clinicians would find the OCI–R easier to administer and score repeatedly when monitoring treatment progress, and patients would find the OCI–R to be less of a burden than the original version. However, given some questions about the differentiation of NACs from OCs on some of the subscales, this conclusion may be premature at this time.

A few issues need further evaluation. First, not all OCI–R subscales adequately differentiated OCs from non-OCs. For example, the Hoarding subscale did not differentiate well between OCs and individuals with other anxiety disorders. This may have been due to the low prevalence of hoarding symptoms in our OC sample; in this vein, it is possible that the Hoarding subscale may discriminate patients with and without hoarding symptoms in a sample with higher prevalence of these symptoms. The lack of differentiation between NACs and OCs on the Ordering subscale may be explained similarly. The variability among subscales in how well they differentiate OCs from non-OCs may reflect the symptom variability within OCs. The finding that the Obsessing subscale, the scale that taps into uncontrollable thoughts that are common to the vast majority of OCs, best differentiated OCs from college students provides strong support for the validity of this subscale. The finding that the Obsession subscale did not differentiate as well between OCs and other anxious patients is consistent with clinical observations that many individuals with anxiety disorders suffer from distressing, intrusive thoughts (especially in PTSD). Further studies should examine the performance of each subscale using samples of OC patients with clinical presentations that match each subscale (e.g., orderers, hoarders).

Second, the OCI and OCI–R are heavily weighted to assess compulsions over obsessions. Future research should explore the utility of adding subscales for various types of obsessions such as scrupulosity, sexual intrusions, and harm intrusions.

Third, the psychometric properties of the OCI–R have been evaluated by extracting a subset of items from the long version of the OCI. Although means for OC participants appear to be identical for both the carved-out and stand-alone version of the OCI–R, the means for the NACs went up significantly when they took the stand-alone version of the OCI–R. Nonetheless, the standard deviations remained similar, and the factor structure remained solid. The significant increase in reported symptoms was probably due to the elimination of the Frequency items, which may have anchored the Distress items. Additionally, the longer list of items may have suggested more severe symptoms than the shortened list, and thus been related to lower scores. It is unclear at this time whether anxious controls will show stability between stand-alone and carved-out versions of the OCI–R, as did the OCs, or endorse more items on the stand-alone version, as did the NACs. Because of this uncertainty, we recommend using the ROC cutscores with caution when differentiating OCs from ACs. Future studies should examine the psychometric properties of the short version when administered on its own to clinical samples other than OCs.

Fourth, the discriminant validity of measures of OCD with measures of depression has constantly plagued researchers and psychometricians developing measures of OC (for a review see Taylor, 1998). The OCI–R is no worse, but it is not an exception. Perhaps the high correlations found between measures of depression and measures of OCD reflect the high levels of depression observed in many patients with OCD. Future studies should ex-

amine the differential performance of the OCI–R and measures of depression with patients diagnosed with major depression with and without OCD. Furthermore, more information is needed on the ability of the OCI–R to discriminate OCD from other types of anxiety such as worry and general anxiety. In summary, the discriminant validity of the OCI–R needs further examination.

Fifth, our data suggested that ACs differed in ethnicity and gender from the OCs. Although we did not find differences between OCs and ACs when we examined women only, ethnic differences in the endorsement of OC symptoms should be further explored. The psychometrics of the OCI–R in African American and Latino patients with OCD should be examined.

In conclusion, the OCI–R appears to be a psychometrically sound, brief scale that measures the major concerns of patients with OCD. It is a reliable measure, has good convergent validity, and differentiates well between patients with OCD and individuals without OCD. More information is needed regarding the OCI–R's discriminative ability, sensitivity to treatment, and validity of its subscales.

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(*Appendix follows*)

Appendix

Obsessive–Compulsive Inventory—Revised

The following statements refer to experiences that many people have in their everyday lives. Circle the number that best describes **HOW MUCH** that experience has **DISTRESSED or BOTHERED you during the PAST MONTH.** The numbers refer to the following verbal labels:

0	1	2	3	4
Not at all	A little	Moderately	A lot	Extremely

1. I have saved up so many things that they get in the way.	0	1	2	3	4
2. I check things more often than necessary.	0	1	2	3	4
3. I get upset if objects are not arranged properly.	0	1	2	3	4
4. I feel compelled to count while I am doing things.	0	1	2	3	4
5. I find it difficult to touch an object when I know it has been touched by strangers or certain people.	0	1	2	3	4
6. I find it difficult to control my own thoughts.	0	1	2	3	4
7. I collect things I don't need.	0	1	2	3	4
8. I repeatedly check doors, windows, drawers, etc.	0	1	2	3	4
9. I get upset if others change the way I have arranged things.	0	1	2	3	4
10. I feel I have to repeat certain numbers.	0	1	2	3	4
11. I sometimes have to wash or clean myself simply because I feel contaminated.	0	1	2	3	4
12. I am upset by unpleasant thoughts that come into my mind against my will.	0	1	2	3	4
13. I avoid throwing things away because I am afraid I might need them later.	0	1	2	3	4
14. I repeatedly check gas and water taps and light switches after turning them off.	0	1	2	3	4
15. I need things to be arranged in a particular order.	0	1	2	3	4
16. I feel that there are good and bad numbers.	0	1	2	3	4
17. I wash my hands more often and longer than necessary.	0	1	2	3	4
18. I frequently get nasty thoughts and have difficulty in getting rid of them.	0	1	2	3	4

Note.

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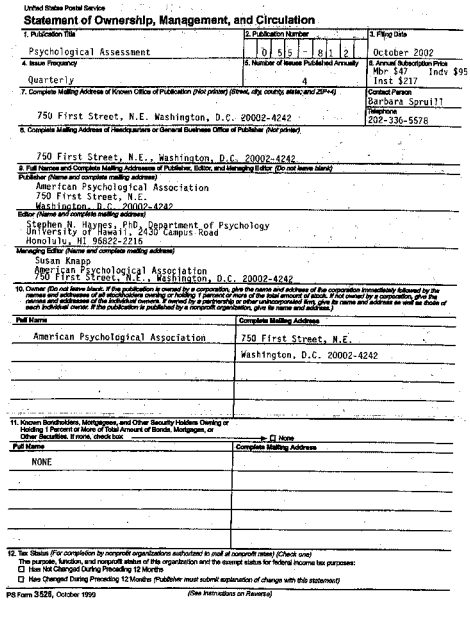

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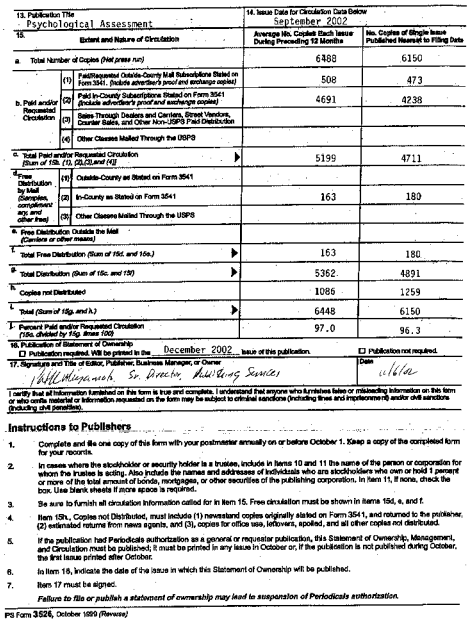
11. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages, or Other Securities. If none, check box → ☐ None

Full Name	Complete Mailing Address
NONE	

12. Tax Status (For completion by nonprofit organizations authorized to mail at nonprofit rates) (Check one)
The purpose, function, and nonprofit status of this organization and the exempt status for federal income tax purposes:
☐ Has Not Changed During Preceding 12 Months
☐ Has Changed During Preceding 12 Months (Publisher must submit explanation of change with this statement)

PS Form 3526, October 1999 (See Instructions on Reverse)



13. Publication Title: Psychological Assessment	14. Issue Date for Circulation Data Below: September 2002	
15. Extent and Nature of Circulation	Average No. Copies Each Issue During Preceding 12 Months	No. Copies of Single Issue Published Nearest to Filing Date
a. Total Number of Copies (Net press run)	6488	6150
b. Paid and/or Requested Circulation (1) Paid/Requested Outside-County Mail Subscriptions Stated on Form 3541. (Include advertiser's proof and exchange copies)	508	473
(2) Paid In-County Subscriptions Stated on Form 3541 (Include advertiser's proof and exchange copies)	4691	4238
(3) Sales Through Dealers and Carriers, Street Vendors, Counter Sales, and Other Non-USPS Paid Distribution		
(4) Other Classes Mailed Through the USPS		
c. Total Paid and/or Requested Circulation (Sum of 15b. (1), (2),(3),and (4))	5199	4711
d. Free Distribution by Mail (Samples, complimentary, and other free) (1) Outside-County as Stated on Form 3541		
(2) In-County as Stated on Form 3541	163	180
(3) Other Classes Mailed Through the USPS		
e. Free Distribution Outside the Mail (Carriers or other means)		
f. Total Free Distribution (Sum of 15d. and 15e.)	163	180
g. Total Distribution (Sum of 15c. and 15f)	5362	4891
h. Copies not Distributed	1086	1259
i. Total (Sum of 15g. and h.)	6448	6150
j. Percent Paid and/or Requested Circulation (15c. divided by 15g. times 100)	97.0	96.3

16. Publication of Statement of Ownership
☐ Publication required. Will be printed in the December 2002 issue of this publication. ☐ Publication not required.

17. Signature and Title of Editor, Publisher, Business Manager, or Owner: Kathleen Heaney, Sr. Director, Marketing Services — Date: 10/1/02

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil forfeiture).

Instructions to Publishers

1. Complete and file one copy of this form with your postmaster annually on or before October 1. Keep a copy of the completed form for your records.
2. In cases where the stockholder or security holder is a trustee, include in items 10 and 11 the name of the person or corporation for whom the trustee is acting. Also include the names and addresses of individuals who are stockholders who own or hold 1 percent or more of the total amount of bonds, mortgages, or other securities of the publishing corporation. In item 11, if none, check the box. Use blank sheets if more space is required.
3. Be sure to furnish all circulation information called for in item 15. Free circulation must be shown in items 15d, e, and f.
4. Item 15h., Copies not Distributed, must include (1) newsstand copies originally stated on Form 3541, and returned to the publisher, (2) estimated returns from news agents, and (3), copies for office use, leftovers, spoiled, and all other copies not distributed.
5. If the publication had Periodicals authorization as a general or requester publication, this Statement of Ownership, Management, and Circulation must be published; it must be printed in any issue in October or, if the publication is not published during October, the first issue printed after October.
6. In item 16, indicate the date of the issue in which this Statement of Ownership will be published.
7. Item 17 must be signed.

Failure to file or publish a statement of ownership may lead to suspension of Periodicals authorization.

PS Form 3526, October 1999 (Reverse)