



## Spanish version of the Dimensional Obsessive–Compulsive Scale (DOCS): Psychometric properties and relation to obsessive beliefs

Clara López-Solà<sup>a,b,d,e</sup>, Fernando Gutiérrez<sup>c</sup>, Pino Alonso<sup>a,b,d,e</sup>, Silvia Rosado<sup>f</sup>,  
Joan Taberner<sup>g</sup>, Cinto Segalàs<sup>a</sup>, Eva Real<sup>a</sup>, José Manuel Menchón<sup>a,b,d,e</sup>,  
Miquel A. Fullana<sup>f,g,h,\*</sup>

<sup>a</sup>OCD Clinical and Research Unit, Department of Psychiatry, Hospital de Bellvitge, Barcelona, Spain

<sup>b</sup>CIBERSAM (Centro de Investigación en Red de Salud Mental), Carlos III Health Institute, Spain

<sup>c</sup>Personality Disorder Unit, Institute of Neuroscience, Hospital Clinic de Barcelona, and IDIBAPS, Barcelona, Spain

<sup>d</sup>Bellvitge Biomedical Research Institute-IDIBELL, Barcelona, Spain

<sup>e</sup>Department of Clinical Sciences, Bellvitge Campus, University of Barcelona, Barcelona, Spain

<sup>f</sup>Institute of Neuropsychiatry & Addictions (INAD), Hospital del Mar, Barcelona, Spain

<sup>g</sup>Department of Psychiatry, Autonomous University of Barcelona, Barcelona, Spain

<sup>h</sup>King's College London Institute of Psychiatry, London, UK

### Abstract

**Objectives:** Our main goal was to provide the psychometric properties of the Spanish version of the Dimensional Obsessive–Compulsive Scale (DOCS) in a non-clinical sample ( $n = 237$ ) and in adult patients with Obsessive–Compulsive Disorder (OCD) ( $n = 110$ ). We also examined the association between OC symptom dimensions and obsessive beliefs.

**Methods:** The psychometric properties involved four steps: reliability, structural validity, convergent and discriminant validity and diagnostic sensitivity. Linear regression analyses were used to assess the associations between OC symptoms and obsessive beliefs.

**Results:** Exploratory and confirmatory factor analyses replicated the original four-factor structure in both samples. The DOCS showed good performance in terms of internal consistency, test–retest reliability and convergent validity in both samples. The DOCS showed better diagnostic sensitivity than another self-report instrument of OC symptoms, the Obsessive–Compulsive Inventory Revised. Findings of the relationship between obsessive beliefs and OC symptoms revealed that certain obsessive beliefs predicted specific OC symptom dimensions.

**Conclusions:** The Spanish version of the DOCS has similar psychometric properties than the original English instrument, although its performance is somewhat better in OCD patients than in students. It will be important to ascertain its ability to discriminate OCD from other associated disorders.

© 2013 Elsevier Inc. All rights reserved.

### 1. Introduction

Obsessive–compulsive disorder (OCD) is characterized by intrusive unwanted thoughts/images/urges (obsessions) and/or behaviours or mental acts (compulsions), which relieve the anxiety caused by the obsessions [1]. OCD is clinically heterogeneous and can be described with a few consistent, temporally stable symptom dimensions, which refer to the thematic content of an individual's obsessions

and related compulsions [2]. Research has consistently identified between three and six obsessive–compulsive (OC) symptom dimensions [3]. The most replicated are: (a) contamination obsessions and washing/cleaning compulsions; (b) obsessions about responsibility for causing harm and checking compulsions; (c) obsessions about order and symmetry and ordering/arranging compulsions; and (d) “repugnant” obsessions concerning sex, religion or violence along with mental compulsive rituals as well as other covert neutralizing strategies.

Several instruments have been developed to measure the severity of these dimensions. The Obsessive–Compulsive Inventory Revised (OCI-R) [4] is an 18-item self-report instrument that assesses six OC symptom dimensions

\* Corresponding author. PO 69 Section of Cognitive Neuropsychiatry, Institute of Psychiatry, King's College London, De Crespigny Park. London SE5 8AF. Tel.: +44 2078 480 543; fax: +44 2078 480 379.

E-mail address: [Miguel.Fullana@kcl.ac.uk](mailto:Miguel.Fullana@kcl.ac.uk) (M.A. Fullana).

(Washing, Obsessing, Hoarding, Ordering, Checking and Neutralizing). It has shown excellent properties in clinical and non-clinical samples [4], and is the only instrument whose diagnostic sensitivity has been empirically established [5]. The Dimensional Yale–Brown Obsessive–Compulsive Scale (DY-BOCS) [6] allows patient and clinician ratings of dimension-specific symptom as well as global symptom severity. The DY-BOCS self-report consists of an 88-item checklist covering six OC symptom dimensions (Aggression, Sexual/Religious, Symmetry, Contamination, Hoarding and Miscellaneous). After reviewing the symptoms endorsed in each dimension, the clinician rates the severity for each dimension as well as the global severity on the basis of the frequency, distress, interference, and impairment caused by OC symptoms, yielding a maximum total global severity score of 30 [6].

Although these two scales are sound instruments, they have some limitations for assessing the severity of OC symptom dimensions. For example, the OCI-R only measures “distress”, whereas severity is a multidimensional concept consisting of parameters such as distress, functional interference, and the frequency or duration of symptoms [7]. The ability of DY-BOCS to assess OC symptoms in non-clinical samples has not been previously evaluated. This is important given that OC phenomena are common in the general population [8,9]. Furthermore, both the OCI-R and the DY-BOCS contain one Hoarding dimension. Although a substantial part of OCD patients reports hoarding symptoms (18–53%) [10–12], hoarding is similarly associated with a range of other disorders (e.g., mood, anxiety and eating disorders, schizophrenia, dementia) [13–15]. Furthermore, the apparent distinctiveness of hoarding has led a number of investigators to recommend viewing it as separate from OCD [16–18].

The Dimensional Obsessive–Compulsive Scale (DOCS) [5] is a recently developed 20-item self-report instrument addressing these limitations. It assesses the four most consistently replicated OC symptom dimensions [3,19]: (a) Contamination (contamination obsessions and decontamination – washing and cleaning – compulsions); (b) Responsibility for Harm, Injury or Bad Luck (obsessions about causing harm by various means, and checking, reassurance seeking, and related compulsions); (c) Unacceptable Thoughts (violent, sexual, and religious obsessions with mental rituals and other forms of neutralizing); and (d) Symmetry, Completeness and Exactness (obsessions regarding something not being “just right” and compulsions involving ordering and repeating). It yields a severity score over the past month for each dimension, based on: (a) time occupied by obsessions and compulsions, (b) avoidance behaviour, (c) associated distress, (d) functional interference, and (e) difficulty disregarding the obsessions and refraining from the compulsions. So far, the DOCS has been studied in North-American samples only.

A related topic with the assessment of OCD is “obsessive beliefs”. This concept refers to beliefs involved in the

development and maintenance of OCD and include Over-importance and Need to Control the Thoughts; Responsibility/Overestimation of Threat; and Perfectionism/Intolerance to Uncertainty [20]. The association between these beliefs and OC symptom dimensions has been the focus of several studies using clinical [20–24] and non-clinical samples [25,26]. However, results of these studies are inconsistent. Checking symptoms, for example, were associated with inflated Responsibility/Overestimation of Threat in some studies [21,25,26], but with the need for Perfectionism and Intolerance to Uncertainty in others [20,23]. Contamination symptoms have been associated with inflated estimates of Responsibility/Overestimation of Threat in some reports [20,21,24] but not in all studies [23]. Finally, beliefs about the Importance to Control the Thoughts were associated with Unacceptable Thoughts in some studies [21,23,24,26] but not in others [20]. It is possible that such discrepant findings emerged because of the way in which OC symptoms were conceptualized and assessed, i.e., that different instruments show different associations between OC symptom dimensions and the different obsessive beliefs. To our knowledge this has not yet been investigated.

In the present study our main goal was to provide the initial Spanish norms for the DOCS and to examine its psychometric properties in a non-clinical sample of college students and in adult patients with OCD. To our knowledge, this would be the first validation study in non-American samples and by an independent research group. We hypothesized that the psychometric properties of the Spanish DOCS would be similar to those of the original instrument. We also examined the association between OC symptom dimensions as measured by the DOCS and obsessive beliefs, and tested to what extent the association was similar if different measures of these dimensions (OCI-R or the DOCS) were used.

## 2. Material and methods

### 2.1. Participants

The study sample consisted of 347 adults, including 237 unselected undergraduate students (45 males and 192 females) and 110 OCD patients (60 males and 50 females). The mean age (SD) was 22.6 (5.7) in the student sample – 21.9 (6.2) in males and 22.8 (5.6) in females – and 36.0 (9.6) in OCD patients — 34.5 (9.4) in males and 37.8 (9.7) in females. Non-clinical participants were recruited from two different Spanish Universities (University of Barcelona and Autonomous University of Barcelona). Participation was voluntary and no payment or course credits were offered. OCD patients were recruited at the OCD-Unit of Bellvitge University Hospital (Barcelona, Spain) and were at different stages of treatment. Ethical approval was obtained from the corresponding ethical committees. All students completed the self-report measures described below during a lecture period. A brief description of the purpose of the study was

given and written informed consent was obtained. Since Hajcak [27] found significant order effects for the OCI-R, approximately half of the students firstly completed the DOCS followed by the other measures, whereas the remaining participants completed the other measures first and then the DOCS. OCD patients completed the measures during their initial baseline visit.

### 2.1.1. Test–retest sample

A subset of 29 students (26 females, mean age = 30.2 years, SD = 6.4) completed a second administration of the DOCS 12 weeks after the first administration. Also, a subset of 26 patients (11 females, mean age = 37.7 years, SD = 9.5) completed a second administration of the DOCS 6 months later. The clinical subsample included patients whose pharmacological treatment had been stable for at least three months before the first assessment and was not modified during the 6-month period.

## 2.2. Measures

The original version of the DOCS was translated into Spanish by two of us (MAF and CLS) and back-translated by a professional bilingual translator. The first two authors then reviewed the translated version in order to verify the accuracy of the translation. This version was pre-tested in a small non-clinical sample ( $n = 5$ ) to ensure applicability. The Spanish DOCS is available from the corresponding author upon request.

The following measures were also used in the study.

### 2.2.1. Obsessive–Compulsive Inventory Revised (OCI-R)

The Spanish version [28] of the OCI-R [4] is an 18-item self-administered questionnaire designed to assess distress associated with obsessive–compulsive symptoms. It assesses six OC symptom dimensions (Washing, Checking, Obsessing, Ordering, Neutralizing and Hoarding). It requests a response on a 0–4 scale. The total OCI-R score is the sum of all items and ranges from 0 to 72. The Spanish version of the OCI-R has good internal consistency, test–retest reliability, and convergent validity, and a similar factor structure to the original version [28,29].

### 2.2.2. State–Trait Anxiety Inventory, Trait Subscale (STAI-T)

The Spanish version of the STAI-T [30] was used to assess trait anxiety. The STAI-T is a 20-item questionnaire rated on a 0–3 scale in the Spanish version (original version rated from 1–4). Total score ranges from 0 to 60 in the Spanish version and from 20 to 80 in the original American version. It has demonstrated sound psychometric properties [30].

### 2.2.3. Beck Depression Inventory-II (BDI-II)

The BDI-II is a 21-item self-report instrument assessing the severity of depressive symptoms in adults. Total score ranges from 0 to 63. Several studies support the reliability and validity of the BDI-II in diverse samples [31–33]. The

validated Spanish version of the BDI-II has shown good psychometric properties [34].

### 2.2.4. Obsessive Beliefs Questionnaire (OBQ-44)

The OBQ-44 [20] consists of three subscales: Perfectionism/ Intolerance of Uncertainty (PC, 16 items), Over-importance and Need to Control the Thoughts (ICT, 12 items) and Responsibility/Overestimation of Threat (RT, 16 items). Respondents are asked to indicate their general level of agreement with each of the 44 statements on a 7-point scale ranging from 0 (disagree very much) to 7 (agree very much). The OBQ is the best available measure, in terms of reliability, validity and content coverage, to assess obsessive beliefs related to OCD. The validated Spanish version was used [35].

Valid data for each questionnaire varied: DOCS,  $n = 336$ , OCI-R,  $n = 325$ , STAI-T,  $n = 338$ , BDI-II,  $n = 346$ , and OBQ-44,  $n = 306$ .

## 2.3. Data analysis

For descriptive purposes we calculated means, standard deviations and gender differences for the four OC dimensions and total score of the DOCS and for the OBQ-44 total score and its subscales. The approach to examining the psychometric properties of the DOCS involved four steps in both the student and the clinical sample. First, reliability was assessed via internal consistency and test–retest coefficients. Second, structural validity was tested by examining the correlations of the DOCS subscales with each other and with the total score (with and without controlling for the BDI-II), and by means of exploratory (EFA) and confirmatory (CFA) factor analytic procedures based on the item-level polychoric correlation matrix. Third, the convergent and discriminant validity was studied by correlating the total and subscale scores of the DOCS with scores of the OCI-R and of the BDI-II and the STAI-T, respectively. Cohen's criteria [36] were used to evaluate the size of the correlations. Correlations  $>.50$  will be defined as “large”, from  $.30$  to  $.49$  as “medium”, and from  $.10$  to  $.29$  as “small”. Fourth, the diagnostic sensitivity of the DOCS for discriminating patients from students was examined by means of receiver operating characteristic (ROC) analysis and compared to that of the OCI-R. Cut-offs were established based on sensitivity and specificity coefficients.

The associations between OC symptoms and obsessive beliefs (OBQ-44) were tested via linear regression analyses with each DOCS subscale as the dependent variable. For each regression, the BDI-II was entered in the first step to control for general negative affect, and the OBQ subscales were entered simultaneously in the second step. The same analyses were performed for the conceptually equivalent OCI-R subscales: OCI-R Washing (DOCS Contamination); OCI-R Obsessing (DOCS Unacceptable Thoughts); OCI-R Checking (DOCS Responsibility for Harm); and OCI-R Ordering (DOCS Symmetry). The other two OCI-R subscales (Neutralizing and Hoarding) were excluded from

Table 1

Means, standard deviations and internal consistency (Cronbach's  $\alpha$ ) for the DOCS total scale and subscales in OCD patients and students by gender (n = 336).

	OCD patients (n = 104)				Students (n = 232)			
	Males M (SD)	Females M (SD)	t (p)	$\alpha$	Males M (SD)	Females M (SD)	t (p)	$\alpha$
DOCS total	24.2 (14)	32.0 (21.1)	2.17 (.03)	.95	11.0 (8.3)	9.8 (9.3)	.78 (.43)	.93
Contamination	4.7 (4.6)	6.9 (6.3)	2.05 (.04)	.92	2.4 (2.6)	2.1 (2.3)	.83 (.41)	.80
Responsibility for Harm	5.9 (4.7)	8.5 (6.7)	2.29 (.03)	.94	3.3 (2.8)	2.5 (2.9)	1.65 (.10)	.86
Unacceptable Thoughts	8.3 (5.1)	9.0 (6.3)	0.60 (.55)	.94	2.9 (2.6)	2.6 (3.0)	.63 (.53)	.87
Symmetry/Completeness	4.9 (4.4)	7.7 (6.1)	2.58 (.01)	.93	2.4 (2.5)	2.5 (3.1)	-.24 (.81)	.88

these analyses because of the lack of any equivalent in the DOCS.

All analyses were carried out with SPSS (version 18) except factor analyses that were conducted using Mplus [37]. Statistical significance was set at  $p < .05$ . All statistical tests were two-tailed.

### 3. Results

#### 3.1. Descriptive data, internal consistency and gender differences

Table 1 shows the means, standard deviations and Cronbach's alphas for the total DOCS and each of its subscales in students and patients. Internal consistency for the total score was  $\alpha = .93$  for students and  $\alpha = .95$  for patients. Similar values were obtained for all subscales (Table 1). In the sample of patients, females scored significantly higher than males in the total and DOCS subscales.

Table 2 shows the means and standard deviations by gender for the total OBQ-44 score and each of its subscales in students and patients.

#### 3.2. Test–retest reliability

Table 3 shows the Pearson's  $r$  correlations measuring test–retest reliability for both samples. Coefficients in the OCD sample fell in the range (.70–.80) of what is typically considered evidence of adequate stability of test scores [38]. On the contrary, test–retest correlations for the student sample fell far below this range (see Table 3). Intraclass correlation coefficients were similar (data not shown).

#### 3.3. Factor structure

Correlations between each of the subscales and the total DOCS score were large for both students and patients (Table 4). In the student sample, all the inter-correlations were large. The inter-correlations between contamination with the other subscales were only medium in the patients' sample (Table 4).

##### 3.3.1. Exploratory factor analysis

Given that the DOCS has Likert-type items of five points with a mean skewness of 1.36 (range .90 to 2.13) and mean kurtosis 1.42 (range .01 to 4.12), a robust weighted least squares (WLSMV) approach [39,40] based in the polychoric correlation matrix was used in Mplus [37]. Kaiser–Meyer–Olkin test was .89 and Bartlett's test was statistically significant at  $p < .001$ . Eigenvalues of the first five factors were 12.64, 2.08, 1.56, 1.01 and 0.37. Although Scree test and Kaiser's criterion suggested the retention of four factors, adaptations of both parallel test and Velicer's MAP for categorical items [41] suggested retaining from one to three factors. In consequence, one to four factors were successively retained, rotated to oblimin and examined. The one-factor solution consisted of a general dimension of OC symptoms with all items loading above .67. The two- and three-factor solutions, in which the Contamination and the Symmetry items broke off sequentially from the general factor, showed numerous cross-loadings. Finally, the four-factor solution showed a simple structure as shown in Table 5. These four factors explained 83% of the variance and closely reflected the proposed structure of the DOCS. This structure was compared with (a) solutions based in the Pearson's correlation matrix, (b) an alternative Unweighted Least Squares (ULS) extraction that has recently proved to

Table 2

Means and standard deviations for the OBQ-44 total scale and subscales in OCD patients and students by gender (n = 306).

	OCD patients (n = 86)			Students (n = 220)		
	Males M (SD)	Females M (SD)	t (p)	Males M (SD)	Females M (SD)	t (p)
OBQ-total	166.8 (49.8)	183.9 (59.6)	1.45 (n.s)	131.9 (30)	129.9 (39.1)	.31 (n.s)
OBQ-PC	68.3 (19.9)	75.3 (21.4)	1.67 (n.s)	55.2 (14.9)	57.8 (17.5)	.91 (n.s)
OBQ-ICT	39.7 (15.4)	42.6 (17.5)	.89 (n.s)	26.8 (9.8)	26.9 (11)	.06 (n.s)
OBQ-RT	60.3 (21.3)	63.2 (25.9)	.60 (n.s)	49.3 (11.3)	45.9 (16.3)	1.66 (n.s)

OBQ-PC = Perfectionism/Intolerance of Uncertainty; OBQ-ICT = Overimportance and Need to Control the Thoughts and OBQ-RT = Responsibility/Overestimation of Threat.

Table 3

Test–Retest Coefficients for the DOCS total score and subscales in OCD patients and students.

DOCS subscales	OCD patients (n = 26)	Students (n = 29)
DOCS total	.81**	.43*
Contamination	.79**	.02
Responsibility for Harm	.82**	.46*
Unacceptable Thoughts	.79**	.22
Symmetry/Completeness	.74**	.22

\* $p < .05$ ; \*\*  $p < .01$ .

have a slightly better performance than WLSMV [42], and (c) alternative oblique (Promax) and orthogonal (Varimax) rotations. Congruence coefficients [43] were 1.00 in all cases with the exception of Varimax that ranged from .89 to .90 (mean .90).

### 3.3.2. Confirmatory factor analysis

The goodness-of-fit of the EFA structures was tested through CFA, even if this admittedly capitalized on chance. As in the case of EFA, a WLSMV approach based on the polychoric correlation matrix was used in Mplus. The following indices of fit were examined: chi-square, CFI and TLI with threshold  $\geq .95$  [44], RMSEA with threshold  $\leq .07$  [45] and SRMR with threshold  $\leq .08$  [44]. The four correlated factors in Table 5 obtained the best fit, even if some parameters were suboptimal: chi-square = 187.69, d.f. = 54,  $p < .0001$ ; CFI = .96; TLI = .99; RMSEA = .09; and SRMR = .04. Results were similar when the clinical and student subsamples were analyzed separately and also when an alternative ULS approach, based in either the polychoric or the Pearson correlation matrices, was applied. Fit decreased gradually from the four- to the one-factor solutions. A higher-order model with a general factor accounting for the relationships between the four lower-order factors attained acceptable fit as well, with chi-square = 159.31, d.f. = 42,  $p < .0001$ ; CFI = .97; TLI = .99; RMSEA = .09; and SRMR = .05. No model modifica-

Table 4

Correlations among DOCS subscales in OCD patients and students (n = 336).

DOCS Subscales	Responsibility for Harm	Unacceptable Thoughts	Symmetry/Completeness	Total
Contamination				
OCD patients	.49*	.28*	.49*	.71*
Students	.62*	.51*	.46**	.77*
Responsibility for Harm				
OCD patients		.63*	.61*	.86**
Students		.64*	.54*	.86**
Unacceptable Thoughts				
OCD patients			.53*	.78*
Students			.54*	.83*
Symmetry/Completeness				
OCD patients				.83*
Students				.79*

\*  $p < 0.006$  (Bonferroni-corrected).

tions were attempted in order to avoid overfitting. However, given that the clinical and the student subsamples presented about the same structure when analyzed separately (congruence coefficients ranged from .90 to .98, mean .94), this was interpreted as a sort of cross-validation.

### 3.4. Convergent and discriminant validity: DOCS total and subscales

Results are presented in Tables 6 and 7. The DOCS total score showed a large correlation with the OCI-R total score ( $r = .86$ ) indicating excellent convergent validity in OCD-patients. The correlations between the DOCS and the BDI-II and STAI-T scores were medium suggesting acceptable discriminant validity of the DOCS in both students and patients (Table 7).

### 3.5. Diagnostic sensitivity of DOCS scores relative to OCI-R scores

The results for the ROC analyses of the DOCS total and subscale scores discriminating OCD patients from students ranged from .68 (Contamination) to .81 (Unacceptable Thoughts). A value of 1.0 indicates perfect diagnostic prediction, whereas .50 indicates the level of chance. The area under the curve (AUC) estimated for Responsibility for Harm was .72 and for Symmetry .70. The DOCS total score evidenced the highest AUC with .82 (95% CI = .78–.87).

An ROC analysis on the OCI-R total score revealed AUC estimates of .73 (95% CI = .67 to .79). The AUCs estimated for the six OCI-R subscales were .46 for Hoarding, .52 for Ordering, .68 for Washing, .70 for Checking and Neutralizing, and .81 for Obsessing. The DOCS total score appears thus to have higher diagnostic sensitivity than the OCI-R total score (AUC difference .09,  $SE = .04$ ;  $z = 2.25$ ;  $p = .02$ ).

We established a cut-off score with optimal diagnostic sensitivity and specificity for distinguishing between individuals with OCD from students. A score equal or greater than 15 provided the best balance between sensitivity and specificity. This cut-off score correctly classified 71% of the OCD patients (sensitivity) and 76% of the students' sample (specificity).

### 3.6. Association of OC symptom dimensions and obsessive beliefs (OBQ-44)

Results from the regression analyses predicting each DOCS subscale are presented in Table 8. In the student sample, Contamination, Responsibility for Harm and Unacceptable Thoughts were predicted only by the OBQ-Responsibility. However, for Symmetry the three domains of the OBQ (Responsibility, Perfectionism and Overimportance and Need to Control the Thoughts) were significant predictors. In OCD patients, Contamination, Responsibility for Harm, and Unacceptable Thoughts were predicted also by OBQ-Responsibility (Table 8). For the Symmetry dimension the OBQ-Perfectionism domain emerged as the only significant predictor.

Table 5

Four-factor, oblimin-rotated solution for the DOCS items in the whole sample (n = 336).

DOCS item	DOCS factor			
	Factor 1: Unacceptable Thoughts	Factor 2: Contamination	Factor 3: Symmetry	Factor 4: Responsibility for Harm
1. Contamination: Time spent	−0.00	<b>0.92</b>	−0.01	−0.04
2. Contamination: Avoidance	0.03	<b>0.86</b>	−0.04	0.07
3. Contamination: Distress	−0.11	<b>0.90</b>	0.06	0.03
4. Contamination: Interference	0.09	<b>0.82</b>	0.06	0.01
5. Contamination: Control	0.04	<b>0.85</b>	0.04	0.01
6. Responsibility: Time spent	−0.04	−0.08	0.03	<b>0.98</b>
7. Responsibility: Avoidance	0.08	0.14	−0.02	<b>0.75</b>
8. Responsibility: Distress	0.06	0.05	0.04	<b>0.82</b>
9. Responsibility: Interference	0.19	0.09	0.07	<b>0.69</b>
10. Responsibility: Control	0.23	0.15	0.09	<b>0.59</b>
11. U. Thoughts: Time spent	<b>0.87</b>	−0.00	−0.07	0.09
12. U. Thoughts: Avoidance	<b>0.64</b>	0.03	0.05	0.24
13. U. Thoughts: Distress	<b>0.89</b>	0.03	−0.00	0.01
14. U. Thoughts: Interference	<b>0.94</b>	−0.02	0.12	−0.03
15. U. Thoughts: Control	<b>0.89</b>	0.01	0.10	−0.01
16. Symmetry: Time spent	−0.09	−0.01	<b>0.90</b>	0.08
17. Symmetry: Avoidance	0.08	0.10	<b>0.64</b>	0.19
18. Symmetry: Distress	−0.02	0.02	<b>0.89</b>	0.05
19. Symmetry: Interference	0.13	0.10	<b>0.85</b>	−0.09
20. Symmetry: Control	0.14	−0.02	<b>0.87</b>	−0.02

Mean congruence was .94 (range .90 to .98) between the solutions for the two samples, so the joint solution is shown.

When we compared the DOCS with the corresponding OCI-R subscales, the results were similar for the students and OCD patients in two of the OC symptom dimensions (Contamination/Washing and Unacceptable Thoughts/Obsessing). Regarding Responsibility for Harm/Checking dimension the results were similar with the DOCS and OCI-R only for the student sample. Finally, Symmetry/Ordering symptoms were predicted by Perfectionism in OCD patients with both scales. However, for the student sample there was more than one obsessive belief that was involved in the prediction. The variance explained by each obsessive belief

in each OC dimension was always higher in OCD patients than in students regardless of using DOCS or OCI-R (Table 8).

#### 4. Discussion

The present study analyzed the psychometric properties of the Spanish version of the DOCS and provided normative data in students and OCD patients. Also, the relationships between OC symptom dimensions and obsessive beliefs

Table 6

Convergent validity of the DOCS for OCD patients and for students.

DOCS (n = 336)	OCI-R (n = 325)						Total
	Washing	Checking	Obsessing	Hoarding	Ordering	Neutralizing	
Contamination							
OCD patients	<b>.84*</b>	.37*	.21	.24	.44*	.18	.53*
Students	<b>.57*</b>	.28*	.31*	.25*	.27*	.24*	.40*
Responsibility for Harm							
OCD patients	.43*	<b>.63*</b>	.56*	.32*	.52*	.45*	.68*
Students	.38*	<b>.44*</b>	.35*	.36*	.26*	.30*	.46*
Unacceptable Thoughts							
OCD patients	.25	.47*	<b>.73*</b>	.31	.36*	.37*	.57*
Students	.32*	.35*	<b>.55*</b>	.36*	.30*	.34*	.49*
Symmetry/Completeness							
OCD patients	.44*	.68*	.47*	.47*	<b>.79*</b>	.57*	.78*
Students	.44*	.44*	.33*	.36*	<b>.52*</b>	.30*	.54*
Total							
OCD patients	.61*	.72*	.64*	.49*	.71*	.52*	<b>.86*</b>
Students	.52*	.47*	.48*	.41*	.42*	.37*	<b>.59*</b>

The highest correlation for each DOCS dimension in each subsample (OCD and students) is in bold.

\*  $p < 0.0014$  (Bonferroni-corrected, calculated within each group).

Table 7  
Discriminant validity for the DOCS in OCD patients and students.

DOCS subscales	OCD patients		Students	
	BDI-II STAI-T		BDI-II STAI-T	
	(n = 109)	(n = 104)	(n = 237)	(n = 234)
Contamination	.49*	.35*	.33*	.35*
Responsibility for Harm	.60*	.55*	.43*	.55*
Unacceptable Thoughts	.59*	.60*	.39*	.60*
Symmetry/Completeness	.50*	.47*	.46*	.47*
Total	.69*	.64*	.50*	.64*

\*  $p < 0.01$ .

were examined. Overall, our results on the psychometric properties of the DOCS were comparable to those of the original version [5] with the exception of the test–retest and discriminant validity estimates, which were lower than expected.

Our data show that the DOCS has a four-factor structure that is robust across clinical and non-clinical samples and across different extraction and rotation methods.

Regarding reliability data, internal consistency coefficients in both students and OCD patients were slightly higher than those reported for the original version [5].

The test–retest stability of the DOCS subscales was good in OCD patients. However, for the student sample these coefficients were low. Although these results deserve further investigation, it is plausible that they reflect true differences in the stability of OC symptoms in clinical versus non-clinical populations. Whereas symptoms are usually stable in OCD patients [46], transient obsessions and compulsions that may vary in intensity on a regular basis may occur in the general population [5,8]. An equally plausible explanation is

that non-clinical samples show an effect of restriction of range when they respond to clinical scales, which can considerably reduce correlations [47].

The convergent validity of the Spanish DOCS total score was higher for both students and patients than that of the original version. For the DOCS subscales, convergent validity was similar to the original version and higher for OCD patients than for students, again probably because of the restriction of range. The discriminant validity estimates of the DOCS were more modest. High correlations with the BDI-II were obtained for the Responsibility for Harm and Unacceptable Thoughts subscales, suggesting some overlap between these constructs and depressive symptoms, although this was only observed in OCD patients.

Similarly to Abramowitz [5], the DOCS scores demonstrated good diagnostic sensitivity, which was comparable and significantly higher to that reported for the OCI-R. Although other properties (e.g. sensitivity to treatment) of the instrument need to be studied, these data suggest that in clinical settings the DOCS may offer some advantages as compared with the OCI-R.

As regards the obsessive beliefs underlying OC symptoms, our results were similar to other previous studies when predicting Contamination [21,48,49], Responsibility for Harm [21,50] and Unacceptable Thoughts [20]. On the other hand, Symmetry symptoms in the students were not associated with specific obsessive beliefs, whereas in OCD patients this dimension was related to Perfectionism, in agreement with previous studies [21]. Finally, the OBQ-44 scale predicted better Responsibility for Harm and Symmetry symptoms in OCD patients, and Responsibility for Harm, Contamination and Unacceptable Thoughts in students when

Table 8  
Summary statistics for the final step of regression equations predicting DOCS and OCI-R subscales with the OBQ-44.

Variables	OCI-R						DOCS					
	OCD patients (n = 86)			Students (n = 220)			OCD patients (n = 86)			Students (n = 220)		
	$R^2$ *	$\beta$ **	$p$	$R^2$ *	$\beta$ **	$p$	$R^2$ *	$\beta$ **	$p$	$R^2$ *	$\beta$ **	$p$
Contamination/Washing												
Final Model:	.07			.08			.06			.13		
OBQ-RT		.34	.009		.33	.001		.32	.008		.42	<.001
Responsibility for Harm/Checking												
Final Model:	.14			.12			.25			.16		
OBQ-RT		–	n.s.		.40	.001		.65	<.001		.46	<.001
OBQ-PC		.47	.001		–	n.s.		–	n.s.		–	n.s.
Unacceptable Thoughts/Obsessing												
Final Model:	.08			.07			.07			.13		
OBQ-RT		.37	.001		.31	.001		.34	.002		.41	<.001
Symmetry/Ordering												
Final Model:	.08			.18			.12			.17		
OBQ-RT		–	n.s.		.25	.001		–	n.s.		.20	.017
OBQ-PC		.35	.001		.31	.001		.43	<.001		.20	.007
OBQ-ICT		–	n.s.		–	n.s.		–	n.s.		.15	.035

\* $R^2$  Change; \*\* $\beta$  Standardized.

DOCS = Dimensional Obsessive Compulsive Scale; OCD = Obsessive Compulsive Disorder; BDI-II = Beck Depression Inventory-II; OBQ = Obsessive Believe Questionnaire; RT = Responsibility/Overestimation of Threat subscale; PC = Perfectionism/Intolerance of Uncertainty subscale; ICT = Importance to Control the Thoughts subscale.

they were assessed with the DOCS in comparison to the OCI-R.

Future studies focused on Responsibility for Harm and Unacceptable Thoughts dimensions are warranted. Findings of the association between these two dimensions and dysfunctional beliefs are less robust [20,21,23,25,26]. Perhaps including other cognitive phenomena related to OCD, such as disgust sensitivity, sensory phenomena or cognitive flexibility may help explain these discrepancies.

Some limitations of the study should be mentioned. Firstly, some analyses (especially test–retest calculations) were based on relatively small samples. Secondly, some psychometric properties such as sensitivity to treatment, which may be important, particularly in clinical settings, were not assessed. Lastly, a comparison between the DOCS and the DY-BOCS was not made.

## 5. Conclusions

The Spanish version of the DOCS has similar psychometric properties than the original English instrument, although its performance is somewhat better in OCD patients than in students. It will be important in the future to ascertain its ability to discriminate OCD from other associated disorders.

## Acknowledgment

We thank all the participants and our colleague Joan Deus, who helped us with the study, and Marta Pulido, MD, for editing the manuscript.

## References

- [1] Diagnostic and statistical manual of mental disorders (DSM-5) 5th ed. American Psychiatric Association; 2013.
- [2] Bloch MH, Landeros-Weisenberger A, Rosario MC, Pittenger C, Leckman JF. Meta-analysis of the symptom structure of obsessive–compulsive disorder. *Am J Psychiatry* 2008;165:1532–42.
- [3] Mataix-Cols D, Rosario-Campos MC, Leckman JF. A multidimensional model of obsessive–compulsive disorder. *Am J Psychiatry* 2005;162:228–38.
- [4] Foa EB, Huppert JD, Leiberg S, Langner R, Kichic R, Hajcak G, et al. The Obsessive–Compulsive Inventory: development and validation of a short version. *Psychol Assess* 2002;14:485–96.
- [5] Abramowitz JS, Deacon BJ, Olatunji BO, Wheaton MG, Berman NC, Losardo D, et al. Assessment of obsessive–compulsive symptom dimensions: development and evaluation of the Dimensional Obsessive–Compulsive Scale. *Psychol Assess* 2010;22:180–98.
- [6] Rosario-Campos MC, Miguel EC, Quatrano S, Chacon P, Ferrao Y, Findley D, et al. The Dimensional Yale–Brown Obsessive–Compulsive Scale (DY-BOCS): an instrument for assessing obsessive–compulsive symptom dimensions. *Mol Psychiatry* 2006;11:495–504.
- [7] Deacon BJ, Abramowitz JS. The Yale–Brown Obsessive Compulsive Scale: factor analysis, construct validity, and suggestions for refinement. *J Anxiety Disord* 2005;19:573–85.
- [8] Rachman S, de Silva P. Abnormal and normal obsessions. *Behav Res Ther* 1978;16:233–48.
- [9] Fullana MA, Mataix-Cols D, Caspi A, Harrington H, Grisham JR, Moffitt TE, et al. Obsessions and compulsions in the community: prevalence, interference, help-seeking, developmental stability, and co-occurring psychiatric conditions. *Am J Psychiatry* 2009;166:329–36.
- [10] Frost RO, Krause MS, Steketee G. Hoarding and obsessive–compulsive symptoms. *Behav Modif* 1996;20:116–32.
- [11] Mataix-Cols D, Nakatani E, Micali N, Heyman I. Structure of obsessive–compulsive symptoms in pediatric OCD. *J Am Acad Child Adolesc Psychiatry* 2008;47:773–8.
- [12] Samuels J, Bienvenu OJ, Riddle MA, Cullen BAM, Grados MA, Liang KY, et al. Hoarding in obsessive compulsive disorder: results from a case–control study. *Behav Res Ther* 2002;40:517–28.
- [13] Ayers CR, Saxena S, Golshan S, Wetherell JL. Age at onset and clinical features of late life compulsive hoarding. *Int J Geriatr Psychiatry* 2010;25:142–9.
- [14] Hartl TL, Duffany SR, Allen GJ, Steketee G, Frost RO. Relationships among compulsive hoarding, trauma, and attention-deficit/hyperactivity disorder. *Behav Res Ther* 2005;43:269–76.
- [15] Muroff J, Steketee G, Rasmussen J, Gibson A, Bratistis C, Sorrentino C. Group cognitive and behavioral treatment for compulsive hoarding: a preliminary trial. *Depress Anxiety* 2009;26:634–40.
- [16] Abramowitz JS, Wheaton MG, Storch EA. The status of hoarding as a symptom of obsessive–compulsive disorder. *Behav Res Ther* 2008;46:1026–33.
- [17] Mataix-Cols D, Frost RO, Pertusa A, Clark LA, Saxena S, Leckman JF, et al. Hoarding disorder: a new diagnosis for DSM-V? *Depress Anxiety* 2010;27:556–72.
- [18] Rachman S, Elliott CM, Shafran R, Radomsky AS. Separating hoarding from OCD. *Behav Res Ther* 2009;47:520–2.
- [19] McKay D, Abramowitz JS, Calamari JE, Kyrios M, Radomsky A, Sookman D, et al. A critical evaluation of obsessive–compulsive disorder subtypes: symptoms versus mechanisms. *Clin Psychol Rev* 2004;24:283–313.
- [20] OCCWG. Psychometric validation of the obsessive belief questionnaire and interpretation of intrusions inventory—part 2: factor analyses and testing of a brief version. *Behav Res Ther* 2005;43:1527–42.
- [21] Wheaton MG, Abramowitz JS, Berman NC, Riemann BC, Hale LR. The relationship between obsessive beliefs and symptom dimensions in obsessive–compulsive disorder. *Behav Res Ther* 2010;48:949–54.
- [22] Abramowitz JS, Deacon BJ. Psychometric properties and construct validity of the Obsessive–Compulsive Inventory—Revised: replication and extension with a clinical sample. *J Anxiety Disord* 2006;20:1016–35.
- [23] Julien D, O'Connor KP, Aardema F, Todorov C. The specificity of belief domains in obsessive–compulsive disorder. *Personal Individ Differ* 2006;41:1205–16.
- [24] Tolin DF, Brady RE, Hannan SE. Obsessional beliefs and symptoms of obsessive–compulsive disorder in a clinical sample. *J Psychopathol Behav Assess* 2008;30:31–42.
- [25] Myers SG, Fisher PL, Wells A. Belief domains of the Obsessive Beliefs Questionnaire-44 (OBQ-44) and their specific relationship with obsessive–compulsive symptoms. *J Anxiety Disord* 2008;22:475–84.
- [26] Tolin DF, Woods CM, Abramowitz JS. Relationship between obsessional beliefs and obsessive–compulsive symptoms. *Cognit Ther Res* 2003;27:657–69.
- [27] Hajcak G, Huppert JD, Simons RF, Foa EB. Psychometric properties of the OCI-R in a college sample. *Behav Res Ther* 2004;42:115–23.
- [28] Fullana MA, Tortella-Feliu M, Caseras X, Andion O, Torrubia R, Mataix-Cols D. Psychometric properties of the Spanish version of the Obsessive–Compulsive Inventory—Revised in a non-clinical sample. *J Anxiety Disord* 2005;19:893–903.
- [29] Malpica MJ, Ruiz VM, Godoy A, Gavino A. Inventario de Obsesiones y Compulsiones-Revisado (OCI-R): aplicabilidad a la población general (Obsessions and Compulsions Inventory-Revised (OCI-R): applicability to the general population.). *Anales de Psicología* 2009;25:217–26.
- [30] Spielberg CD, Gorsuch RL, Lushene RE. Cuestionario de Ansiedad Estado-Rasgo. [State–Trait Anxiety Questionnaire]. Madrid: TEA ediciones; 1982.

- [31] Beck AT, Steer RA, Brown GK. BDI-II. Beck Depression Inventory—second edition. Manual. San Antonio: The Psychological Corporation; 1996.
- [32] Steer RA, Ball R, Ranieri WF, Beck AT. Dimensions of the Beck Depression Inventory-II in clinically depressed outpatients. *J Clin Psychol* 1999;55:117-28.
- [33] Coelho R, Martins A, Barros H. Clinical profiles relating gender and depressive symptoms among adolescents ascertained by the Beck Depression Inventory II. *Eur Psychiatry* 2002;17:222-6.
- [34] Sanz J, Navarro ME, Vázquez C. Adaptación Española del Inventario para la Depresión de Beck-II (BDI-II): propiedades psicométricas en estudiantes universitarios (Spanish adaptation of the Beck Depression Inventory-II (BDI-II): psychometric properties in university students.). *Análisis y Modificación de Conducta* 2003;29:239-88.
- [35] Ruiz C, Gavino A, Godoy A. Propiedades psicométricas de la versión española del Cuestionario de Creencias Obsesivas (OBQ) (Psychometric properties of the Spanish version of the Obsessive Beliefs Questionnaire (OBQ)). *Ansiedad y Estrés* 2008;14:175-85.
- [36] Cohen J. Statistical power analysis for the behavioural sciences. Revised edition. New York, NY: Academy Press; 1977.
- [37] Muthén LK, Muthén BO. *Mplus user's guide*. 7th ed. Muthén & Muthén: Los Angeles, CA; 2012.
- [38] Nunally J. Introduction to psychological measurement. New York, NY: McGraw-Hill; 1970.
- [39] Flora DB, Curran PJ. An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data. *Psychol Methods* 2004;9:466-91.
- [40] Míndrilá D. Maximum likelihood (ML) and diagonally weighted least squares (DWLS) estimation procedures: a comparison of estimation bias with ordinal and multivariate non-normal data. *Intern J Digital Society (IJDS)* 2010;1:60-6.
- [41] Timmerman ME, Lorenzo-Seva U. Dimensionality assessment of ordered polytomous items with parallel analysis. *Psychol Methods* 2011;16:209-20.
- [42] Forero CG, Maydeu-Olivares A, Gallardo-Pujol D. Factor analysis with ordinal indicators: a Monte Carlo study comparing DWLS and ULS estimation. *Struct Equ Modeling* 2009;16:625-41.
- [43] Guadagnoli E, Velicer WF. A comparison of several factor matching indices: a simulation study. *Multivar Behav Res* 1991;26:323-43.
- [44] Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct Equ Modeling* 1999;6:1-55.
- [45] Steiger JH. Understanding the limitations of global fit assessment in structural equation modeling. *Pers Individ Differ* 2007;42:893-8.
- [46] Rufer M, Grothusen A, Mass R, Peter H, Hand I. Temporal stability of symptom dimensions in adult patients with obsessive-compulsive disorder. *J Affect Disorders* 2005;88:99-102.
- [47] Zimmerman DW, Williams RH. Restriction of range and correlation in outlier-prone distributions. *Appl Psych Meas* 2000;24:267-80.
- [48] Jones MK, Menzies RG. The cognitive mediation of obsessive-compulsive handwashing. *Behav Res Ther* 1997;35:843-50.
- [49] Rachman S. Fear of contamination. *Behav Res Ther* 2004;42:1227-55.
- [50] Rachman S. A cognitive theory of compulsive checking. *Behav Res Ther* 2002;40:625-39.