



The Icelandic version of the dimensional obsessive compulsive scale (DOCS) and its relationship with obsessive beliefs [☆]

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ABSTRACT

The Dimensional Obsessive Compulsive Scale (DOCS) is a self-report instrument to assess severity of OC symptoms along four thematically distinct symptom dimensions. This may carry benefits; both in assessment and for studying the link between OC related beliefs and symptoms. The validity and factor structure of the Icelandic version of the DOCS was investigated in a sample of 547 university students and the congruence between OC related beliefs and symptoms was also compared across different symptom measures (DOCS and OCI-R). Confirmatory factor analysis supported the proposed four-factor structure and a model with a higher-order general severity factor accounting for the inter-relations between the factors. Convergent validity of the scale was supported with moderate to strong correlations with the OCI-R and the Y-BOCS-Self Report version and its symptom checklist. Divergent validity was supported with low to moderate correlations with measures of general anxiety, depression and worry. Regression analyses partly replicated previous results regarding congruence between beliefs and DOCS symptom dimensions. Results did not depend on the symptom measure used. The DOCS has good psychometric properties and may be a useful assessment instrument in both research and clinical settings, although its advantages compared to other self-report measures are not clear.

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1. Introduction

Obsessive-Compulsive Disorder (OCD) is an anxiety disorder characterized by inappropriate or distressing repetitive thoughts, impulses or images (i.e., obsessions) and repeated and ritualistic behaviors, or mental acts (i.e., compulsions) that people feel an urge to perform in response to the obsessions to reduce distress or avoid a dreaded event (American Psychiatric Association, 2000). Specific manifestation of obsessions and compulsions may vary between patients. Frequently encountered obsessions focus on diverse things such as dirt and contamination, doubt, aggression, unacceptable sexual acts, order and precision, but frequent compulsions may involve washing rituals, checking and other repetitive behaviors or

mental rituals, and behaviors aimed at restoring order, balance or symmetry (American Psychiatric Association, 2000). OCD is therefore a heterogeneous condition regarding symptom presentation (McKay et al., 2004).

Major contemporary cognitive behavioral models of OCD converge on the idea that certain types of beliefs and assumptions result in otherwise normal everyday intrusive thoughts are appraised as being personally meaningful or signifying threat in some way (Shafran, 2005). Different models emphasize the role of specific types of beliefs and appraisals (Clark, 2004; Obsessive Compulsive Cognitions Working Group, 1997; Rachman, 1997, 1998; Salkovskis, 1985; Salkovskis, Forrester, & Richards, 1998), but all models make the central prediction that intrusive thoughts that run contrary to a person's belief system, can invoke distress and subsequent control attempts (i.e., compulsive rituals) to reduce discomfort and prevent negative outcomes. Congruency in themes between beliefs (e.g., being personally responsible for preventing harm and misfortunes), the intrusive thoughts being appraised as threatening and invoking distress (e.g., thoughts about leaving the stove on) and compulsions and rituals following intrusions (e.g., repeated checking to ensure that the stove is turned off) is therefore expected.

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In line with cognitive theories of OCD, the nature of the relationship between beliefs and OCD symptoms should be general (all symptoms are associated at least with some type of belief), congruent (specific symptoms are related to specific types of beliefs in a meaningful and congruent way) and specific (a stronger link is observed between such beliefs and OCD symptoms than with symptoms of other disorders; [Tolin, Worhunsky, & Maltby, 2006](#)). The Obsessive Beliefs Questionnaire (OBQ; Obsessive Compulsive Cognitions Working Group, 2001), and its revision (OBQ-44; Obsessive Compulsive Cognitions Working Group, 2005), has been used to study the role of beliefs in OCD. The OBQ-44 provides a measure of three types of beliefs related to: (1) the tendency to inflate personal responsibility and overestimate threat (responsibility/threat), (2) estimation of the importance and significance of intrusive thoughts and the need to have such thoughts under perfect control (importance of thoughts/thought control), and (3) beliefs concerning perfectionism and uncertainty (perfectionism/uncertainty). Studies show that although beliefs and OC symptoms are generally related ([Tolin, Brady, & Hannan, 2008](#); [Tolin, Woods, & Abramowitz, 2003](#); [Wu & Carter, 2008](#)), results regarding congruence and specificity have been mixed, with some studies supporting this ([Emmelkamp & Aardema, 1999](#); [Julien et al., 2008](#); [Tolin et al., 2003, 2008](#)) but others not ([Anholt et al., 2004, 2006](#); [Baptista, Magna, McKay, & Del-Porto, 2011](#); [Belloch et al., 2010](#)).

[Abramowitz et al. \(2010\)](#) (see also [Wheaton, Abramowitz, Berman, Riemann, & Hale, 2010](#)) have pointed out that inconsistencies in results may partly reflect the conceptualization of OC symptoms in the measures that have been used. There is mounting evidence in the research literature (e.g., [Mataix-Cols, Rosario-Campos, & Leckman, 2005](#)) that the phenomenology of OCD can be represented by four thematically coherent symptom dimensions representing obsessions and compulsions related to: (1) contamination and cleaning, (2) responsibility, harm and checking, (3) symmetry, ordering and arranging, and (4) unacceptable thoughts concerning sex, religion and violence ([Mataix-Cols et al., 2005](#)). These dimensions are based on factor analyses of individual symptoms, for example the symptom checklist of the Yale-Brown Obsessive-Compulsive Scale that assesses severity of obsession and compulsions (Y-BOCS; [Goodman et al., 1989](#)). [Abramowitz et al. \(2010\)](#) argue that a better way to study the relationship between beliefs and symptoms may therefore be to use symptom dimensions because they capture the functional relations between specific symptoms that often explain their co-occurrence. The majority of studies on the relationship between beliefs and symptoms, have relied on measures of specific sorts of OC symptoms, such as the Obsessive-Compulsive Inventory-Revised (OCI-R; [Foa et al., 2002](#)), that categorizes symptoms as obsessions or compulsions rather than reflecting their thematic content. This may affect results on congruence between beliefs and symptoms where the congruence would be expected to exist in the theme of beliefs and symptoms rather than specific sorts of symptoms.

The Dimensional Obsessive Compulsive Scale (DOCS; [Abramowitz et al., 2010](#)) is a 20 item self-report instrument to assess severity of OCD symptoms developed with the previously mentioned shortcomings in mind. Assessment of severity with the DOCS is based on four empirically derived symptom dimensions and represents obsessions and compulsions related to: (1) contamination, (2) responsibility for harm and mistakes, (3) symmetry and ordering, and (4) unacceptable thoughts. Assessment therefore reflects functional relations between symptoms, rather than individual symptoms or symptom types (i.e., obsessions or compulsions). Rather than listing specific symptoms belonging to each dimension, examples of a number of thoughts, rituals and compulsions, that are typical for each

dimension, are given along with the instruction that respondents' experiences may differ from the examples. The severity of each symptom dimension over the past month is assessed with five items that measure the time occupied by the symptoms, avoidance behavior, associated distress, interference with daily functioning, and difficulty controlling the symptoms. According to [Abramowitz et al. \(2010\)](#), the structure of the DOCS carries benefits compared to established symptom-based measures in the field that are based on specific symptoms assessed with a single indicator of severity (e.g., OCI-R) or do not capture the functional relations between symptoms (e.g., OCI-R, Y-BOCS). Severity assessment with the DOCS may also capture idiosyncratic symptoms (given that they share a theme with the symptom dimensions) and be less dependent on type or frequency of specific symptoms. However, a shortcoming of the DOCS is that it is unclear which specific symptoms is the focus of the assessment.

Only a handful of studies of the psychometric properties of the DOCS and its usefulness as a research tool are available. [Abramowitz et al. \(2010\)](#) investigated the psychometric properties of the scale in university student samples, OCD patients and patients with other anxiety disorders in the USA. Their results supported a higher order factor structure of the DOCS with a general severity factor accounting for the inter-relations between four internally consistent subscales in both student and clinical samples. The convergent and divergent validity of the DOCS was supported against the OCI-R and measures of general anxiety, depression, stress and symptoms of social phobia. The DOCS was sensitive to treatment effects and showed better diagnostic sensitivity compared to the OCI-R ([Abramowitz et al., 2010](#)).

[Viar, Bilsky, Armstrong and Olatunji \(2011\)](#) investigated the congruence between OC beliefs (OBQ-44), and symptoms (DOCS) in a set of hierarchical regression analyses, when controlling for negative affect. In a sample of university students (study 1) and a mixed sample of patients with Generalized Anxiety Disorder, Obsessive Compulsive Disorder and non-clinical controls (study 2), OBQ-44 responsibility/threat predicted DOCS responsibility for harm and OBQ-44 importance of thoughts/thought control predicted severity of unacceptable thoughts on the DOCS. OBQ-44 perfectionism/uncertainty predicted severity of symmetry and ordering on the DOCS but no single OBQ-44 subscale was a significant predictor of the DOCS contamination dimension. [Wheaton et al. \(2010\)](#) also report similar results for a sample of OCD patients, where OBQ-44 responsibility/threat also predicted DOCS contamination severity. Taken together, there is support for congruence between OC related beliefs and symptom severity along (at least) three of the four thematic symptom dimensions of the DOCS in both patient and student samples.

1.1. Current aims

The DOCS represents a novel approach to severity assessment of OC symptoms, with results providing preliminary support for its usefulness. Studies are needed on the DOCS in different languages since the focus in previous studies has mainly been on its use in USA. Also, more information is needed on the validity of the DOCS severity dimensions and the benefits this approach may have, compared to other established measures in the field. With this in mind, we had two aims in the present study. Firstly, we investigated the psychometric properties of an Icelandic version of the DOCS in a sample of university students to obtain information on its convergent and divergent validity. Given that OCD is a universally observed disorder, with similar core features, replication of the factor structure and psychometric properties of the DOCS in a different language area and culture should provide information on the multicultural applicability of the

questionnaire. We expected to replicate the higher order factor structure of the DOCS with a general severity factor accounting for the inter-relations between the four symptom dimensions.

More information on the validity of the scale is also needed. The convergent and divergent validity of the DOCS and its subscales has been established against the OCI-R in one study (Abramowitz et al., 2010) and we expected to replicate these findings with the Icelandic version in the present study. However, the relationship between DOCS and the presence or absence of particular symptoms belonging to each of the proposed four thematic symptom dimensions in DOCS is yet to be studied. Therefore, we also included a self-report version of the Y-BOCS (Y-BOCS-SR; Baer, 1991) along with its symptom checklist. We expected correlations to be higher between corresponding than non-corresponding dimensions of the DOCS and the Y-BOCS symptoms checklist. Given the sample size in the present study, the Y-BOCS self-report version, rather than the interview format, was used, that has shown strong correlations with the interview in previous studies (e.g., Steketee, Frost, & Bogart, 1996). We also tested the divergent validity of the DOCS against measures of general anxiety, depression and pathological worry and expected DOCS to have lower correlations with these measures than with the OCI-R.

Secondly, we investigated the relationship between DOCS domains and specific OC related beliefs (measured with the OBQ-44) using hierarchical regression analyses. Abramowitz et al. (2010) and Wheaton et al. (2010) suggest that the DOCS is better suited for this than existing measures of OC symptoms (e.g., OCI-R), but no direct comparisons have been made. Based on previous results with the DOCS (Viar et al., 2011; Wheaton et al., 2010), we expected that: severity of contamination symptoms and symptoms related to responsibility for harm would be predicted by responsibility/threat beliefs; severity of symmetry symptoms would be predicted by perfectionism/certainty beliefs; and that severity of unacceptable thoughts would be predicted by beliefs related to importance of thoughts and control of thoughts. We also expected to find greater congruence with the DOCS than the OCI-R.

2. Method

2.1. Participants

In total, 547 students (69.5% females) at the Department of Psychology and Department of Social Sciences of the University of Iceland participated in the study. Mean age was 24.2 years ($SD=5.7$). Recruitment of participants for the study followed a conventional procedure used at the university where, upon teacher approval, classes were visited, the study briefly introduced and students asked to voluntarily participate. Participants formed two samples based on which of the two questionnaire booklets they filled in, that were randomly distributed to participants (see below). Participants in sample 1 were 280, with a mean age of 24.1 ($SD=5.1$) and participants in sample 2 were 267, with a mean age of 24.1 ($SD=5.9$). No compensation for participation was given.

2.2. Materials

In total, six self-report questionnaires were used in the study and are described below. Participants in both samples answered the DOCS and OCI-R. In addition, participants in sample 1 answered the Y-BOCS-SR but participants in sample 2 answered the OBQ-44, HADS and PSWQ-SF.

2.3. Dimensional obsessive compulsive scale (DOCS)

The DOCS (Abramowitz et al., 2010) is a 20 item self-report questionnaire that assesses severity of obsessions and compulsions on four symptom dimensions: (a) contamination symptoms, (b) responsibility, (c) unacceptable thoughts and (d) symmetry. Severity of each symptom dimension is assessed with five items that measure, on a scale from 0 to 4, the time occupied by the symptoms, avoidance behavior, associated distress, interference with daily functioning, and

difficulty controlling the symptoms. Psychometric properties of the original English version are described in the introduction. Three independent Icelandic translations of the DOCS were created by the authors (RPO, JBA, PA) who were native Icelandic, but fluent in English. A consensus meeting was held where the authors discussed discrepancies between the three translations and derived a final version for the study. The use of independent translations is one of the procedures that are recommended when tests and questionnaires are translated and adapted (van de Vijver & Hambleton, 1996).

2.4. Obsessive compulsive inventory-revised

The OCI-R (Foa et al., 2002) is an 18 item self-report inventory that assesses distress related to OCD symptoms. Participants rate how distressing the symptoms have been during the past month on a five point scale, from 0 (not at all) to 4 (extremely). The inventory yields a total score for overall distress as well as a score for six subscales related to washing, obsessions, hoarding, ordering, checking and neutralizing symptoms. The Icelandic translation of the OCI-R has demonstrated good psychometric properties in a non-clinical student sample (Smári, Ólason, Eyþórsdóttir, & Frólunde, 2007).

2.5. Yale-Brown obsessive compulsive scale-self report (Y-BOCS-SR)

The Y-BOCS-SR (Baer, 1991; Steketee et al., 1996) is a self report version of the Yale-Brown Obsessive Compulsive Scale (Goodman et al., 1989) that is an interview to assess severity of obsessions and compulsions. The Y-BOCS-SR contains a 58-item symptom checklist where respondents indicate whether the symptoms are currently present (last 30 days), were present in the past, or otherwise leave a blank. If a symptom was not present, the answer is coded as 0, symptom present during the last 30 days or in the past is assigned a score of 1, and if a symptom had been present both in the past and in the last 30 days the answer is assigned a score of 2. Participants then answer the 10-item severity scale based on their most prominent obsessions and compulsions during the previous week. The severity scale assesses, for obsessions and compulsions separately: (1) time spent on symptoms, (2) interference with functioning, (3) subjective distress, (4) resistance to the symptoms and (5) control over them. The items on the severity scale are rated in terms of average severity during the previous week. The Icelandic version of the Y-BOCS-SR has shown good psychometric properties in a student sample, with a confirmatory factor analysis supporting a previously reported five dimensional latent structure (pure obsessions, checking, arranging, contamination/cleaning, hoarding) of its symptom checklist (Ólafsson, Snorrason, & Smári, 2010; Wu, Watson, & Clark, 2007). Scores for each of the five symptom dimensions were based on summed scores of the corresponding symptoms (see Ólafsson et al. (2010) for more information and preliminary evidence for the validity of this procedure).

2.6. Obsessive beliefs questionnaire-44

OCD related beliefs and assumptions were assessed with the OBQ-44 (Obsessive Compulsive Cognitions Working Group, 2005), a 44 item questionnaire where participants indicate on a seven point Likert scale from 1 (disagree very much) to 7 (agree very much) the degree each statement reflects the way they think most of the time. In addition to a total score, three subscale scores can be calculated that assess inflated responsibility and threat estimation (16 items), perfectionism and need for certainty (16 items) and importance of thoughts and need to control them (12 items). The psychometric properties of the Icelandic version of the OBQ-44 are satisfactory in non-clinical student samples (Pétursdóttir, 2008).

2.7. Hospital anxiety depression scale (HADS)

The HADS (Zigmond & Snaith, 1983) is a 14 item self-report questionnaire that assesses symptoms of anxiety and depression with two seven-item subscales. Participants are asked to rate each item on a four-point scale. The Icelandic translation has good psychometric properties (Schaaber, Smári, & Óskarsson, 1990; Smári, Ólason, Arnarson, & Sigurðsson, 2008).

2.8. Penn state worry questionnaire-short form (PSWQ-SF)

The PSWQ (Meyer, Miller, Metzger, & Borkovec, 1990) is a self-report questionnaire measuring the tendency to worry excessively and difficulty with dismissing or controlling worrisome thoughts. The PSWQ is widely used to measure pathological worrying that is one of the cardinal symptoms of Generalized Anxiety Disorder (American Psychiatric Association, 2000). A short eight-item version has good psychometric properties and high correlation with the total score of the original 16-item version (Hopko et al., 2003). The Icelandic versions of both the original 16-item scale (Jónsdóttir & Smári, 2000) and the eight-item short form (Ólafsson, 2008) have good psychometric properties.

2.9. Procedure

The study was reported to the Data Protection Authority of Iceland and approved by the National Bioethics Committee. Participants filled in the questionnaires during class at the University of Iceland. Participants in sample 1 answered the DOCS, YBOCS-SR and OCI-R while participants in sample 2 answered the DOCS, HADS, OCI-R, PSWQ-SF and the OBQ-44. The DOCS was always the first questionnaire in the booklets that participants received, since it was the primary measure. The order of the other questionnaires was counter-balanced across subjects.

2.10. Statistical analysis

SPSS was used for all statistical analyses except for confirmatory factor analyses (CFA) where we used Lisrel 8.80 (Jöreskog & Sörbom, 2007). CFA was conducted with the robust weighted least square (DWLS) estimation method to match the ordinal nature of the DOCS items. This method is well suited to relatively small samples (see for example Flora & Curran, 2004). The polychoric correlation matrix and asymptotic covariance matrix were used for analysis. The Satorra–Bentler scaled chi-square statistic ($S-B \chi^2$; Satorra & Bentler, 1994) was used to evaluate the overall fit of the models tested. The chi-square statistic is a badness-of-fit index with higher values representing greater discrepancy between a model and data, thus, small and non-significant values are indicative of a well-fitting model (Kline, 2005). The chi-square test has been criticized for being sensitive to sample size (Bentler & Bonnet, 1980), thus other indices of fit should also be used (Hu & Bentler, 1999). We used the following: the comparative fit index (CFI; Bentler, 1990), the non-normed fit index (NNFI; Bentler & Bonnet, 1980) and the root mean-square error of approximation (RMSEA; Browne & Cudeck, 1993). CFI and NNFI values of 0.95 or higher and a RMSEA value of 0.06 or lower were considered indicative of a well-fitting model (Hu & Bentler, 1999). Differences in the fit between two nested models were evaluated by comparing the comparative fit indices of the models (ΔCFI) where a difference greater than 0.01 suggests a significant difference in fit (Cheung & Rensvold, 2002).

3. Results

Descriptive statistics and internal consistency estimates of all measures used in the study (except the DOCS) are reported in Table 1. In general, they are comparable to results of previous studies of non-clinical samples (see Methods section).

3.1. Confirmatory factor analysis

A Confirmatory Factor Analysis (CFA) of the DOCS was conducted by combining data from samples 1 and 2. The model with four correlated factors showed a good fit according to all fit indices (RMSEA=0.051; CFI=0.99; NNFI=0.99), except for the significant chi-square test ($S-B \chi^2=399.13$, $df=164$, $p < 0.001$). Factor loadings and error terms are reported in Table 2. All items have high and significant loadings on their purported factors although the loadings on the contamination factor tended to be somewhat lower than on the other factors. Factor inter-correlations were strong (ranging from 0.50 to 0.71; see Table 2).

We also tested a model with a higher-order general severity factor that accounted for the inter-correlation between the four lower order factors. The loading of the first item on every factor (DOCS items 1, 6, 11 and 16) was fixed to unity to scale the latent factors in this analysis. The fit of this higher order factor model was also good (RMSEA=0.052; CFI=0.99; NNFI=0.99) although the chi-square test was again significant ($S-B \chi^2=408.57$, $df=166$, $p < 0.001$). Standardized factor loadings of the lower order factors on the higher order general severity factor were strong and significant in all cases, 0.79, 0.91, 0.72, and 0.71 for the contamination, responsibility, unacceptable thoughts and symmetry factors respectively. The CFI difference test for the four-factor model and the higher-order factor model is zero, indicating that the two models fit equally well. Similar results were obtained when the highest loading items of each factor were used to scale the latent factors.

Table 1

Descriptive statistics and internal consistency for measures used in the study.

	M	SD	α
OCI-R ($n=547$) ^{a,b}			
Washing	1.47	2.16	0.80
Checking	2.20	2.42	0.79
Obsessing	2.18	2.50	0.87
Ordering	2.54	2.46	0.85
Neutralizing	0.87	1.64	0.67
Hoarding	2.47	2.36	0.76
Total score	11.73	9.05	0.87
OBQ-44 ($n=267$) ^b			
OBQ-RT	43.03	15.82	0.89
OBQ-ITC	26.45	8.48	0.77
OBQ-PC	49.48	17.70	0.91
Total score	118.96	36.26	0.94
Y-BOCS-SR ($n=252$) ^a			
Obsessions	1.71	2.94	0.91
Compulsions	1.13	2.41	0.89
Total score	2.86	4.94	0.93
HADS ($n=267$) ^b			
Depression	2.71	2.61	0.73
Anxiety	5.64	3.62	0.82
PSWQ-SF ($n=267$) ^b	17.30	7.09	0.93

Note: OCI-R=obsessive-compulsive inventory-revised; OBQ44=compulsive beliefs questionnaire-44; OBQ44-RT=responsibility and threat subscale of the OBQ-44; OBQ44-ITC=importance of thoughts and thought control subscale of the OBQ-44; OBQ44-PC=perfectionism and certainty subscale of the OBQ-44. Y-BOCS-SR total=Yale-Brown obsessive-compulsive scale-self report version total score; HADS=hospital anxiety depression scale; PSWQ-SF=Penn State worry questionnaire short form.

^a Sample 1.

^b Sample 2.

3.2. Descriptives and internal consistency estimates of the DOCS

Descriptive statistics along with indicators of internal consistency of the DOCS total and subscale scores are reported in Table 3. There were no significant differences between males and females (data not shown). Correlations of individual items with other items in the scale (item-total correlations) were well above the traditional, 0.30, minimum in all cases. Reliability (Cronbach's coefficient alpha) of the contamination scale was the lowest, but acceptable. Reliability of the other three subscales was good and very high for the total score (see Table 3).

3.3. Convergent and discriminant validity of the DOCS

Correlations between the DOCS and other measures in the study are reported in Table 4. As expected, the total score of the DOCS correlated strongly with the total score of the OCI-R (data from samples 1 and 2 combined). Correlations between the subscales of the DOCS and OCI-R show that the DOCS subscales correlate most highly with the corresponding subscale of the OCI-R (in all cases above 0.50). Using Steiger's (1980) method for testing differences between dependent correlations, contamination, unacceptable thoughts and symmetry subscales of the DOCS had a significantly higher correlation with their corresponding OCI-R subscales compared to other subscales of the OCI-R ($p < 0.05$ in all cases). The DOCS responsibility subscale was equally correlated with the checking and obsessing subscales of the OCI-R ($p=0.46$).

The DOCS total score correlated moderately with the total severity score and severity of obsessions and compulsions of the Y-BOCS-SR in sample 1. Correlations between the DOCS subscales and scores on the five symptom categories of the Y-BOCS-SR symptom checklist were low to moderate. The DOCS contamination scale had significantly higher correlations with the corresponding category than other

Table 2

Results from a confirmatory factor analysis of the hypothesized four factor structure of the DOCS.

	Factor 1 (Cont.)	Factor 2 (Resp.)	Factor 3 (Un. th.)	Factor 4 (Sym.)
1. Contamination: time	0.64 (0.59)	–	–	–
2. Contamination: avoidance	0.73 (0.47)	–	–	–
3. Contamination: distress	0.71 (0.49)	–	–	–
4. Contamination: interference	0.87 (0.24)	–	–	–
5. Contamination: control	0.71 (0.50)	–	–	–
6. Responsibility: time	–	0.75 (0.44)	–	–
7. Responsibility: avoidance	–	0.81 (0.35)	–	–
8. Responsibility: distress	–	0.80 (0.36)	–	–
9. Responsibility: interference	–	0.92 (0.16 [*])	–	–
10. Responsibility: control	–	0.81 (0.34)	–	–
11. Unacceptable thoughts: time	–	–	0.79 (0.37)	–
12. Unacceptable thoughts: avoidance	–	–	0.81 (0.34)	–
13. Unacceptable thoughts: distress	–	–	0.81 (0.35)	–
14. Unacceptable thoughts: interference	–	–	0.85 (0.27)	–
15. Unacceptable thoughts: control	–	–	0.85 (0.28)	–
16. Symmetry: time	–	–	–	0.82 (0.33)
17. Symmetry: avoidance	–	–	–	0.85 (0.27)
18. Symmetry: distress	–	–	–	0.77 (0.41)
19. Symmetry: interference	–	–	–	0.90 (0.19)
20. Symmetry: control	–	–	–	0.85 (0.28)
Factor 1: contamination	1	–	–	–
Factor 2: responsibility	0.71	1	–	–
Factor 3: unacceptable thoughts	0.52	0.68	1	–
Factor 4: symmetry	0.62	0.62	0.50	1

Note: Estimates of factor loadings (and errors) are shown. All parameter estimates are significant in the table ($t > 1.96$) except.

^{*} ($t < 1.96$). Analysis is based on data from sample 1 and sample 2 ($n = 547$).

Table 3

Descriptive statistics and internal consistency for the DOCS subscales and total score.

	Scores		Item-total correlation		Reliability	
	Low-high	M	Low-high	Mean	α	
Contamination	0–15	2.84	2.65	0.46–0.58	0.53	0.75
Responsibility	0–18	2.57	2.78	0.63–0.69	0.66	0.84
Unacceptable thoughts	0–16	3.00	3.05	0.63–0.71	0.68	0.86
Symmetry	0–17	2.34	2.81	0.67–0.74	0.68	0.86
Total score	0–52	10.75	8.83	0.43–0.66	0.55	0.91

Note: Based on data from sample 1 and sample 2 ($n = 547$).

categories on the symptom checklist according to the Steiger's method ($p < 0.05$). Although the DOCS responsibility, unacceptable thoughts and symmetry subscales had their highest correlations with their corresponding symptom categories on the Y-BOCS-SR, these correlations were not significantly different when compared with the correlations that were the second highest ($p > 0.10$ in all cases).

Finally, the divergent validity of the DOCS against measures of general negative affect (anxiety and depression) and pathological worrying was investigated using data from sample 2. The DOCS total score correlated more strongly with the OCI-R total score ($r = 0.68$, $p < 0.001$) than with HADS anxiety ($r = 0.44$, $p < 0.001$) and depression ($r = 0.27$, $p < 0.001$) or pathological worrying, measured with the PSWQ-SF ($r = 0.34$, $p < 0.001$). These results support the divergent validity of the DOCS as a measure of severity of OC related pathology rather than a measure of general anxiety, depression and repetitive worrisome thoughts.

3.4. Relationship between OC related beliefs and symptom measures

We conducted a series of hierarchical regression analyses where subscales of the OBQ-44 were used to predict scores on

Table 4

Correlations between the subscales of the DOCS and with other measures of OCD symptoms (OCI-R and Y-BOCS-SR)*.

	DOCS subscales				
	Cont.	Resp.	Un. th.	Sym.	Total
OCI-R ($n = 547$) ^{a,b}					
Washing	0.58	0.33	0.26	0.36	0.48
Checking	0.35	0.51	0.25	0.31	0.45
Obsessing	0.25	0.48	0.65	0.34	0.56
Ordering	0.32	0.36	0.24	0.62	0.49
Neutralizing	0.31	0.37	0.38	0.44	0.48
Hoarding	0.20	0.29	0.26	0.20	0.31
Total score	0.50	0.59	0.51	0.56	0.69
Y-BOCS-SR severity ($n = 252$) ^a					
Obsessions	0.31	0.47	0.49	0.45	0.55
Compulsions	0.32	0.34	0.28	0.40	0.42
Total score	0.34	0.45	0.43	0.46	0.54
Y-BOCS-SR symptom categories ($n = 280$) ^a					
Contamination/cleaning	0.48	0.32	0.19	0.32	0.41
Checking/repeating	0.37	0.44	0.34	0.46	0.51
Pure obsessions	0.32	0.41	0.34	0.33	0.44
Arranging	0.23	0.22	0.17	0.39	0.32
Hoarding	0.34	0.22	0.23	0.22	0.32
HADS anxiety ($n = 267$) ^b					
HADS depression	0.21	0.20	0.25	0.16	0.27
PSWQ-SF	0.23	0.38	0.30	0.12	0.34

Note: Cont.=contamination; Resp.=responsibility; Un. th.=unacceptable thoughts; Sym.=symmetry; Y-BOCS-SR total=Yale-Brown obsessive-compulsive scale-self report version; OCI-R=obsessive-compulsive inventory-revised; HADS=hospital anxiety depression scale; PSWQ-SF=Penn State worry questionnaire-shorf form. Correlations between corresponding subscales are in bold.

^{*} $p < 0.05$ for all coefficients in the table.

^a Sample 1.

^b Sample 2.

the DOCS subscales and corresponding subscales of the OCI-R in sample 2. HADS depression scores were entered on the first step in all analyses, to control for negative affectivity, and the three

OBQ-44 subscales were then entered on the second step. The results are reported in Table 5.

OC related beliefs (OBQ-44) add significantly to the prediction of all DOCS subscale scores, over and above what can be accounted for by depression symptoms. The OBQ-44 responsibility/threat predicts DOCS contamination and responsibility scores as expected, but also predicts scores on the DOCS unacceptable-thoughts dimension. OBQ-44 perfectionism/certainty is the only significant predictor of DOCS symmetry scores as expected. Comparing this to the results obtained with corresponding subscales of the OCI-R reveals little discrepancies, since OC related beliefs are related to the symptom subscales in all cases and the same pattern emerges concerning congruence between belief types and symptoms (see Table 5).

4. Discussion

Our results show that the Icelandic version of the DOCS has good psychometric properties, supporting its cross-national usability. Means and standard deviations for the total score and subscales were highly similar to those reported in other studies using the original English version in comparable samples (Abramowitz et al., 2010; Viar et al., 2011, study 1). Internal consistency estimates for the total and subscale scores ranged from satisfactory to good and confirmatory factor analysis supported the hypothesized four-factor structure of the DOCS. Our

Table 5
Results from hierarchical regression analyses (final step) using negative affect (depression) and obsessive compulsive beliefs to predict DOCS and OCI-R subscale scores in sample 2 ($n=267$).

	R ² change	Beta	R ² change	Beta
<i>Predicting DOCS contamination</i>		<i>Predicting OCI-R washing</i>		
First step	0.043**	–	0.045***	–
HADS depression	–	0.089	–	0.115
Second step	0.121***	–	0.077***	–
OBQ44-RT	–	0.390***	–	0.282**
OBQ44-ICT	–	0.010	–	–0.004
OBQ44-PC	–	–0.044	–	0.022
<i>Predicting DOCS responsibility/harm</i>		<i>Predicting OCI-R checking</i>		
First step	0.039**	–	0.018*	–
HADS depression	–	0.039	–	–0.027
Second step	0.208***	–	0.220***	–
OBQ44-RT	–	0.500***	–	0.481***
OBQ44-ICT	–	0.035	–	–0.025
OBQ44-PC	–	–0.057	–	0.042
<i>Predicting DOCS unacceptable thoughts</i>		<i>Predicting OCI-R obsessing</i>		
First step	0.061***	–	0.090***	–
HADS depression	–	0.145*	–	0.205**
Second step	0.080***	–	0.065***	–
OBQ44-RT	–	0.281**	–	0.180*
OBQ44-ICT	–	0.094	–	0.052
OBQ44-PC	–	–0.066	–	0.077
<i>Predicting DOCS symmetry</i>		<i>Predicting OCI-R ordering</i>		
First step	0.025**	–	0.060***	–
HADS depression	–	0.077	–	0.138*
Second step	0.070***	–	0.125***	–
OBQ44-RT	–	0.139	–	0.011
OBQ44-ICT	–	–0.056	–	0.051
OBQ44-PC	–	0.196*	–	0.331***

Note: DOCS=dimensional obsessive compulsive scale; HADS=hospital anxiety depression scale; OCI-R=obsessive-compulsive inventory-revised; OBQ44-RT=obsessive compulsive beliefs questionnaire-44 responsibility and threat subscale; OBQ44-ICT=obsessive compulsive beliefs questionnaire-44, importance of thoughts and thought control subscale; OBQ44-PC=obsessive compulsive beliefs questionnaire-44, perfectionism and certainty subscale.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

analyses showed that a model with a higher order general severity factor accounting for the inter-correlations between the four symptom dimensions fitted the data equally well. This is in line with the results of Abramowitz et al. (2010) on university students in USA and indicates that a general factor representing severity of OCD pathology explains the inter-relations between the four dimensions. This finding and the strong correlations between the dimensions, means that both a total score and scores on each dimension can be computed and used to represent OCD symptom severity.

The pattern of correlations with other questionnaires in the study generally supports the convergent and divergent validity of the DOCS. The DOCS total score correlated strongly with the OCI-R total score and significantly higher than with the PSWQ-SF worry and HADS depression and anxiety scales. The DOCS subscales converged with their corresponding subscales of the OCI-R and these correlations were strong in all cases. This replicates the results by Abramowitz et al. (2010) in their university student sample. Furthermore, the responsibility subscale of the DOCS was equally correlated with the checking and obsessing subscales of the OCI-R. This is not surprising given that the responsibility dimension on the DOCS includes both compulsions and obsessive thoughts related to responsibility, harm and bad luck.

The present results provide additional information about the dimensional structure of the DOCS by exploring the link with symptom categories of the Y-BOCS-SR. The symptom checklist of the Y-BOCS has been the source in most investigations into the possible dimensions underlying OC symptoms. The structure of the DOCS is based on these dimensions. The DOCS contamination scale had a higher correlation with the contamination/cleaning than other symptom categories on the Y-BOCS-SR but the pattern for the three other DOCS symptom dimensions was less clear. The DOCS responsibility score correlated equally with the checking/arranging and pure obsessions on the checklist and this was also the case for the DOCS unacceptable thoughts. This may be because the responsibility dimension of the DOCS refers to both compulsions and obsessions that in some cases can involve harm. The unacceptable thoughts dimension on the DOCS refers also to compulsions and ritualistic behaviors. The present study is, to our knowledge, the first to investigate the agreement between assessment of severity of OC symptoms provided by the DOCS dimensions and the presence or absence of symptoms belonging to the corresponding symptom category on the Y-BOCS symptom checklist. Although the results partly support the thematic content of the DOCS dimensions, this should be further explored in future studies.

The total score of the DOCS had a higher correlation with the OCI-R total score than with the Y-BOCS-SR total score as in Abramowitz et al. (2010) who used the interview format of the Y-BOCS in an OCD patient sample. One would expect the correlation to be stronger between the two severity measures. One possible explanation could be that the scope of the assessment is broad with the DOCS and OCI-R but severity assessment in the Y-BOCS (and the Y-BOCS-SR) is focused on two of the most upsetting obsessions and compulsions experienced. The DOCS and OCI-R also converge on the time frame of past month but assessment of severity with the Y-BOCS (and Y-BOCS-SR) has a time frame of one week. Further studies are needed to investigate the significance of these differences. It is important to test the diagnostic accuracy of the DOCS relative to Y-BOCS in future studies. Its accuracy has presently only been established relative to OCI-R (Abramowitz et al., 2010).

We partly replicated the congruence in the pattern between DOCS dimensions and OC specific beliefs observed by Viar et al. (2011) study 1 in a student sample. The two studies show that beliefs related to responsibility and threat are uniquely associated

with severity of symptoms related to possible harm and bad luck, and that beliefs related to perfectionism and certainty are uniquely related to severity of symmetry and ordering symptoms. This pattern has also been found in a mixed sample of patients and non-clinical controls (Viar et al., 2011, study 2) and OCD patients (Wheaton et al., 2010) and is in line with previous suggestions in the literature (Rachman, 2002; Summerfeldt, 2008). Responsibility and threat beliefs predicted severity of unacceptable thoughts here, but beliefs concerning importance of thoughts and thought control were associated with this dimension in previous studies in both student and clinical samples (Viar et al., 2011; Wheaton et al., 2010). Responsibility and threat beliefs were also related to the contamination dimension of the DOCS here, but this dimension was not predicted by any specific belief scale in the study of Viar et al. (2011). Here, responsibility and threat emerge as a more general belief linked with three of the four DOCS dimensions. Beliefs concerning overestimation of threat may be characteristic of anxiety pathology in general (e.g., Tolin et al., 2003). However, only a handful of studies have been conducted on congruence between beliefs and OC symptoms assessed with the DOCS.

The same pattern between beliefs and symptoms was found with the OCI-R. This indicates that discrepancies between previous studies do not necessarily arise because of different symptom measures being used. It remains to be seen if the dimensional approach taken with the DOCS, is better suited than previous measures to investigating the role of obsessive beliefs in OCD.

Finally, number of limitations to the present study should be noted. A sample of university students was used, thus the generalization of the findings to older adults and clinical forms of OC symptoms is unclear. The study is cross sectional in nature, precluding causal inferences regarding the link between specific beliefs and symptoms. Although longitudinal studies support the role of OC beliefs in the development of OC symptoms (Abramowitz, Khandker, Nelson, Deacon, & Rygwall, 2006), prospective studies on the congruence between beliefs and OC symptoms or symptom dimensions are lacking. Although our results support the cross-national usability of the DOCS, more stringent tests of this should be carried in future studies with multi-group comparisons of measurement invariance of the measure.

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