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Harm avoidance and incompleteness core motivations in obsessive-compulsive disorder: validation of the Farsi version of the Obsessive-Compulsive Trait Core Dimensions Questionnaire (F-OC-TCDQ) in Iran

Mahjoubeh Pourebrahimi[1], Mehdireza Sarafraz[1*], Habib Hadianfard[1] and Nurallah Mohammadi[1]

Abstract

Background Attention to the heterogeneous manifestations of obsessive-compulsive symptoms observed in clinical and nonclinical populations has motivated researchers to use tools to identify homogeneous subgroups of obsessive-compulsive disorder (OCD) patients. The Obsessive-Compulsive Trait Core Dimensions Questionnaire (OC-TCDQ) is used to evaluate two motivational dimensions of OCD (harm avoidance (HA) and incompleteness (INC)), which has been developed in recent years based on the core dimensions model, and to classify homogeneous subgroups. This study aimed to validate the Farsi version of the OC-TCDQ in Iran.

Methods The psychometric properties of the OC-TCDQ were tested in two clinical samples (209 patients with OCD) and nonclinical samples (209 participants without OCD). Confirmatory factor analysis (CFA) was conducted to test the two-factor structure. The measurement invariance between the clinical and nonclinical groups was evaluated. Reliability was tested using Cronbach's alpha, split-half, and retesting (two-week intervals). Convergent and divergent validity were analysed with Pearson's correlation and the incremental validity of this scale in predicting Yale-Brown Obsession Scale (Y-BOCS) and Beck Anxiety Inventory (BAI) scores using hierarchical regression analysis. The discriminant validity of the two clinical and nonclinical groups was investigated with a t-test.

Results Similar to the original version, the CFA showed a good fit for the two-factor structure. The invariance of measurement between samples, good internal consistency and retest reliability, and convergent and divergent validity of this scale were confirmed. The results of hierarchical regression analysis indicated the increasing validity of this scale in predicting the Y-BOCS and BAI compared to the OBQ-44 ($p < 0.05$), and comparing the scores of two groups with and without OCD indicated its discriminant validity ($p < 0.01$).

Conclusion These findings show that the Farsi-OC-TCDQ is a valid tool for evaluating the motivational dimensions of harm avoidance and incompleteness in Iranian individuals with and without OCD, and it allows us to compare the scores across groups.

*Correspondence:
Mehdireza Sarafraz
msarafraz@shirazu.ac.ir
Full list of author information is available at the end of the article

Keywords Harm avoidance, Incompleteness, Obsessive compulsive trait core dimensions Questionnaire (OC-TCDQ), OCD, Measurement invariance, Farsi version, Psychometric

Introduction

Obsessive compulsive disorder (OCD) is an anxiety disorder that manifests with recurrent obsessive thoughts and repetitive behaviors and causes significant distress and interference in the daily functioning of a person. The estimated annual prevalence of this disorder in all nations is almost the same and is estimated to be 1.5% for women and 1% for men [1]. In Iranian society, with similar statistics, the lifetime prevalence of this disorder is reported to be approximately two to three% [2, 3]. Some researchers have estimated that among outpatients in psychiatric clinics, the prevalence of the disorder reaches 10% [4]. Additionally, various undiagnosed obsessive thoughts and actions are often identified among normal people. Fullana et al. [5] estimated that 21 to 25% of the general population shows obsessive-compulsive traits or undiagnosed symptoms of OCD.

Despite the prevalence of this disorder, there are important problems in its assessment and diagnosis, including the diversity of diagnostic tools and standardized scales, which are caused by heterogeneous manifestations and complexity of obsessive symptoms and the lack of comprehensiveness of tools to examine all symptoms. Therefore, an accurate understanding of the heterogeneous nature of obsessive-compulsive disorder, categorization of symptoms into distinct and homogeneous subgroups, and comprehensive and practical evaluation of all subgroups in both clinical and nonclinical populations are necessary for the scientific community. In recent decades, significant studies with different methods have investigated these subgroups and developed tools to identify them [6, 7].

In the first classification of obsessive-compulsive disorder, overt symptoms such as washing versus checking were emphasized [8], and the Maudsley Obsessive Compulsive Inventory (MOCI; Hodgson & Rachman, 1977), Compulsive Activity Checklist (CAC; Philpott, 1975), and the Padua Inventory (PI; Sanavio, 1988) was created. Finally, the Yale-Brown Obsessive Compulsive Scale (Y-BOCS; Goodman et al., 1989) were published as the most comprehensive checklist of obsessive-compulsive disorder symptoms for investigating obvious symptoms. The considerable overlap between the apparently distinct symptom "subcategories" in each of these instruments, their emphasis on common symptoms in clinical samples and the neglect of less frequently observed symptoms, especially mental compulsions, and the final classification, which was formed more theoretically and logically than based on studies and empirically, was the most important drawback of these tools [9, 10].

In the last two decades, the main dimensions model based on the OCD motivation model, which was created by Rasmussen and Eisen (1992), has focused on the main motivations underlying OCD symptoms, and according to the identification of two motivations, harm avoidance (HA) and incompleteness (INC), in people with OCD, they have been subgrouped accordingly. HA refers to symptoms that act to avoid harm to oneself or others (such as contracting an illness or unwanted aggression). INC refers to symptoms associated with internalized feelings of inadequacy and incompleteness of actions or intentions [15]. Summerfeldt et al. [16] further developed and adapted the motivation model to depict motivations more dimensionally rather than categorically. They hypothesized that HA and INC underlie compulsions, sometimes alone and sometimes in combination. To investigate these motivational dimensions and evaluate whether these motivations are related to all OCD symptoms and can provide a comprehensive assessment of these symptoms, Summerfeldt et al. [17] the Obsessive-Compulsive Trait Core Dimensions Questionnaire (OC-TCDQ), developed a two-dimensional questionnaire to assess HA and INC.

To date, several studies have evaluated the psychometric properties of the OC-TCDQ and validated its English and German versions in both OCD patients and nonclinical participants [16, 18, 19]. Some studies have also examined the relationship between HA and INC motivational dimensions with other OCD measures. Researchers found that HA was significantly associated with doubting/checking, obsessing, and washing, while INC was significantly associated with doubting/checking, ordering, neutralizing, OCPD features (such as perfectionism), and lower quality of life [14, 19]. Bragdon and Coles [15] reported that the subgroup with high HA had greater beliefs about responsibility/overestimation of threats, but the subgroup with high INC had more perfectionistic beliefs and greater intolerance of uncertainty.

The abovementioned studies confirmed the psychometric properties of the OC-TCDQ and examined the relationship between HA and INC dimensions with other measures related to obsession, but there are still gaps, including the lack of examination of the psychometric properties of the OC-TCDQ in a clinical sample,

and nonclinical peers (clinical with OCD to evaluate two motivational dimensions underlying obsessive-compulsive symptoms (HA and INC) and in the nonclinical peer population to evaluate these dimensions as traits), and the use of this tool to investigate the role of motivations in prediction of OCD symptoms and whether these motivations predict OCD symptoms as important predictors beyond obsessive beliefs and as additional variance. In addition, in Iran due to the heterogeneity of obsessive symptoms and the high overlap of obsession with other emotional disorders, there are still barriers to early diagnosis of this disorder and it is necessary to have a tool that can help to diagnose and classify the heterogeneous symptoms of OCD in the clinical population and identify the underlying traits of obsession in the nonclinical population [20]. These gaps encouraged us to examine the psychometric properties and usefulness of the OC-TCDQ in more detail, and the present study was conducted with the aim of performing confirmatory factor analysis (CFA) to test the two-factor structure, examining the equivalence of the OC-TCDQ in clinical and nonclinical groups, and examining the validity and reliability of this instrument.

Research hypotheses:

1. Confirmatory factor analysis reveale a favourable fit for the two-factor structure of the OC-TCDQ in the Iranian population.
2. The OC-TCDQ has good equivalence in Iranian clinical and nonclinical groups.
3. The OC-TCDQ has good internal consistency and retest reliability, convergent and divergent validity, and adequate incremental and discriminant validity in the Iranian population.

Methods

Participants

Clinical sample

A total of 209 individuals with OCD who were referred to psychiatric and psychological clinics in Kerman (84 patients), Sirjan (49 patients), Rafsanjan (45 patients), and Zarand (31 patients) in 2023 were purposefully and accessibly selected for investigation. The primary diagnosis of OCD was based on DSM-V criteria, utilizing the Structured Clinical Interview for DSM-5 Disorders (SCID-5-CV) [21], which was conducted by trained clinicians and clinical psychologists. The participants' OCD symptoms ranged from moderate to severe, as assessed by the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS). The mean total score on the Yale-Brown scale was 238.29, with mean subscale scores of 131.49 for obsession and 106.79 for compulsion. Exclusion criteria included comorbidity of other disorders, particularly anxiety disorders as the primary diagnosis, individuals under the age of 18, and those with an education level below a diploma.

Nonclinical sample

The nonclinical participants were 209 individuals without a history of psychiatric disorders who were selected in an accessible and purposeful manner to match the clinical sample in terms of demographic variables such as age, gender, level of education, and marital status. The demographic characteristics of both the clinical and nonclinical groups are presented in Table 1.

Sample size calculation

To calculate the minimum sample size for this study, Cohen's formula and G-Power software were used with $1-\beta=0.8$ and a minimum effect size of 0.15. The minimum required sample was 411 people. Therefore, this study was conducted on 418 people (209 people in the clinical group and 209 people in the nonclinical group).

Procedures

In this study, after receiving a letter of recommendation from Shiraz University, coordinating with Kerman University of Medical Sciences and obtaining necessary permits, data collection began. The participants in the clinical group were selected by referring to psychiatry and psychology clinics and with targeted and accessible sampling, and the nonclinical participants were selected in an accessible and targeted manner in line with the clinical sample in terms of demographic variables such as age, gender, level of education, and marital status. All the participants in the two clinical and nonclinical groups voluntarily participated in the research, and before the implementation of the research, a brief explanation was given to them about the objectives of the research, and written informed consent was obtained from them to participate in the study. Additionally, they were assured of the privacy and confidentiality of the information, and in this way, the codes of conduct proposed by the American Psychiatric Association were observed, and ethical considerations were implemented. This research had an ethics approval certificate (IR.US.PSYEDU.REC.1402.013) issued by Shiraz University of Medical Sciences. Clinical participants completed the Yale-Brown Obsessive Compulsive Scale (Y-BOCS), Obsessive Compulsive Core Dimensions Interview (OC-CDI), Obsessive Beliefs Questionnaire (OBQ-44), Beck Anxiety Inventory (BAI), and Persian Translation of Obsessive-Compulsive Trait Core Dimensions Questionnaire (OC-TCDQ) to assess the HA and INC as specific motivations for clinical OCD. Nonclinical participants only completed the OC-TCDQ to assess the HA and INC as stylistic traits in the

Table 1 Demographic characteristics of the participants (clinical sample = nonclinical sample = 209)

Variable	Kerman N (%)	Sirjan N (%)	Rafsanjan N (%)	Zarand N (%)	Total N (%)
Gender					
Male	20 (9.6%)	9 (4.3%)	7 (3.3%)	6 (2.9%)	42 (20.1%)
Female	64 (30.6%)	40 (19.1%)	38 (18.2%)	25 (12%)	167 (79.9%)
Age					
≤ 25	13 (6.2%)	7 (3.3%)	5 (2.4%)	5 (2.4%)	30 (14.4%)
26–35	39 (18.7%)	30 (14.4%)	29 (13.9%)	17 (8.1%)	115 (55%)
36–45	26 (12.4%)	10 (4.8%)	8 (3.8%)	9 (4.3%)	53 (25.4%)
46≤	6 (2.9%)	2 (1%)	3 (1.4%)	0 (0%)	11 (5.3%)
Educational Level					
Diploma	7 (3.3%)	7 (3.3%)	12 (5.7%)	6 (2.9%)	32 (15.3%)
Associate Degree	14 (6.7%)	9 (4.3%)	13 (6.2%)	19 (9.1%)	55 (26.3%)
Bachelor's degree	59 (28.2%)	32 (15.3%)	20 (9.6%)	6 (2.9%)	117 (56%)
Master's degree≤	4 (1.9%)	1 (0.5%)	0 (0%)	0 (0%)	5 (2.4%)
Marital status					
Single	20 (9.6%)	13 (6.2%)	15 (7.2%)	10 (4.8%)	58 (27.8%)
Marriage	59 (28.2%)	34 (16.3%)	26 (12.4%)	19 (9.1%)	138 (66%)
Divorced	5 (2.4%)	2 (1%)	4 (1.9%)	2 (1%)	13 (6.2%)

nonclinical population. Additionally, 60 participants (30 from each group) were randomly selected and asked to complete the OC-TCDQ again after a two-week interval to assess its test-retest reliability.

Translation and cross-cultural adaptation

The translation and cross-cultural adaptation of the questionnaire were performed according to the recommendations of the international guidelines and considering the different lifestyles and cultures [22].

To adapt the 20-question version of the OC-TCDQ for use in the Iranian population, we initially translated the German version [18] into Persian with the assistance of two German language experts who were knowledgeable in psychology terminology. Subsequently, another expert performed a back-translation of the translated version into German and corrected any discrepancies. Once the translation process was completed, the translated version was provided to two psychological experts who verified the face validity of the questionnaire.

In a preliminary study, the translated questionnaire was administered to a sample of 10 psychology master's and doctoral students and five patients with OCD. After the questionnaires, were collected, any words that were not understandable to them were rewritten and replaced with the closest word. Throughout all these stages, based on the opinions of the experts and the test sample, there was no need to remove or revise any of the items. Finally, the Farsi version was created by keeping 20 items from the original version of the OC-TCDQ and using a 5-point Likert scale ranging from 1 ("never") to 5 ("always"). This version was then implemented on the main sample of 418 people (male and female).

Measures

Obsessive-Compulsive Trait Core Dimensions Questionnaire (OC-TCDQ)

The OC-TCDQ is a 20-item self-report questionnaire developed by Summerfeld et al. [17] and Summerfeld et al. [16]. This questionnaire evaluates the suggested motivational dimensions underlying obsessive-compulsive disorder, including the following: (1) Harm avoidance (HA) and (2) Incompleteness (INC). It is rated on a 5-point Likert scale from 1 (never) to 5 (always) and the range of scores is between 20 and 100. Previous psychometric research obtained strong internal consistency ($\alpha = 0.93$) and good convergent validity (OCI = 0.47–0.54) for this questionnaire in measuring the underlying motivations of obsessive-compulsive symptoms [16, 19]. Additionally, the German version of this scale has excellent internal consistency for the incompleteness dimension ($\alpha = 0.88$) and satisfactory consistency for harm avoidance ($\alpha = 0.77$) and has good construct validity for the severity of OCD symptoms ($r = 0.45$, $r = 0.45$), anxiety ($r = 0.26$, $r = 0.41$), worry ($r = 0.36$, $r = 0.52$) and obsessive-compulsive personality traits ($r = 0.22$, $r = 0.46$) [18]. The data of this study in the clinical sample showed good internal consistency for the total score of this scale ($\alpha = 0.80$), harm avoidance subscales ($\alpha = 0.81$),

and incompleteness ($\alpha = 0.80$). The nonclinical sample showed acceptable internal consistency for the total score of this scale ($\alpha = 0.79$) and harm avoidance subscales ($\alpha = 0.79$) and good internal consistency for incompleteness ($\alpha = 0.83$).

Obsessive-Compulsive Core Dimensions Interview (OC-CDI)

This interview was created by Summerfeld et al. [16] and is used to evaluate the motives for avoiding harm and incompleteness in patients with obsessive-compulsive disorder. In this interview, immediately after completing the complete checklist of symptoms of the Yale-Brown obsessive compulsive scale, explanations about the motivations to harm avoidance and incompleteness are given to the participants, and they are told that any one of these motivations or both motivations may be related to each of their obsessive experiences. After ensuring the subject's full understanding, the interviewer asked two standardized questions for each of the target-endorsed symptoms on the Yale-Brown Obsession Scale: "To what extent do you associate this with the fear that something harmful/bad might happen?" and "To what extent do you associate this with the need to have things 'right' and to make sure they are perfect?". Otherwise, you feel incomplete, tense, or upset?". After each question, the respondent selects the best answer for each motive on a rating scale of 0 to 4, which results in two ratings (from 0 to 4) for each target symptom. The range of scores for each of these two questions is between 0 and 308, and higher scores indicate greater involvement of harm avoidance and incompleteness in obsessions and compulsions in the past week [16]. Summerfeld et al. [16] and Cervin and Perrin [19] found good psychometric properties for this interview, including the structure of the healthy factor, and the significant overlap of its two dimensions with the dimensions of harm avoidance and the incompleteness of the OC-TCDQ were obtained. In the current study, the Cronbach's alpha values for the total score ($\alpha = 0.93$), harm avoidance subscale ($\alpha = 0.91$), and incompleteness subscale ($\alpha = 0.92$) indicated the excellent internal consistency of the interview in the clinical group.

The Yale-Brown Obsessive Compulsive Scale (Y-BOCS)

The Y-BOCS is a tool for measuring obsessive-compulsive disorder that was created by Goodman et al. (1986). It generally has two parts and is used to assess the symptomatology of OCD and determine the severity of symptoms. (1) The symptom checklist (SC) which includes 77 questions, was used to identify eight types of obsessions (contamination, aggression, sexual, religious, symmetry, physical, hoarding, and miscellaneous) and seven types of compulsions (washing, controlling, repetition, counting, order, hoarding, and miscellaneous). (2) The severity scale (SS) includes 10 questions (5 questions to evaluate obsessive thoughts and 5 questions to evaluate compulsive actions) and is used to measure the intensity of obsessions or compulsions, regardless of the type of obsessions and compulsions. Both sections are graded on a 5-point Likert scale, the range of SC scores is between 0 and 308, and the range of SS scores on the questionnaire is between 0 and 40. Based on the SS, patients with a cut-off of point of 17 or above were considered suffer from OCD. The data related to the validity and reliability of this scale showed that the interrater reliability was 0.98, and the internal consistency coefficient was 0.89. The reliability of the retest method after two weeks was 0.84, and its discriminant validity with the Beck Depression Questionnaire and the scale- Hamilton's classification of depression has been reported to be as 0.64 and 0.59, respectively [23]. Rajzi Esfahani et al. [24] obtained internal consistency values of 0.97 and 0.95, respectively; split-half reliability values of 0.93 and 0.89, respectively; and a retest reliability of 0.99 for SC and SS in Iran. Additionally, in this research, the convergent validity of the symptom checklist was confirmed with the mental symptom checklist (SCL-90-R), and the severity scale was confirmed with the structured clinical interview (SCID-I). In the present study, in the clinical sample, Cronbach's alpha showed good internal consistency for the total score ($\alpha = 0.81$), acceptable for the SC scale ($\alpha = 0.76$), and the subscales of contamination ($\alpha = 0.79$), aggression ($\alpha = 0.78$), sexual ($\alpha = 0.72$), religious ($\alpha = 0.75$), symmetry ($\alpha = 0.79$), physical ($\alpha = 0.73$), hoarding ($\alpha = 0.73$), washing ($\alpha = 0.78$), controlling ($\alpha = 0.75$), repetition ($\alpha = 0.74$), counting ($\alpha = 0.75$), order ($\alpha = 0.79$), hoarding ($\alpha = 0.72$)), and good for the SS scale ($\alpha = 0.82$), and subscales of obsessive thoughts ($\alpha = 0.83$) and compulsive actions ($\alpha = 0.80$).

The Obsessive Beliefs Questionnaire (OBQ-44)

This questionnaire was created by the Obsessive-Compulsive Cognitions Working Group [12] to evaluate beliefs related to OCD and is a 44-item self-report scale. These items consist of 6 subgroups (in three subscales) of thoughts that are key areas of cognition in obsessive-compulsive disorder: (1) inflated responsibility and overestimation of threat (RH), (2) perfectionism and intolerance of uncertainty (PC), and (3) importance and overcontrol of thoughts (IT). Items are rated on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). This questionnaire has an internal consistency of 0.80 and good test-retest reliability. In Iran, the results of Shams et al.'s study [25] showed an internal consistency of 0.92 and a reliability coefficient of 0.82. In the present study, in the clinical group, Cronbach's alpha showed good internal consistency for the total score ($\alpha = 0.82$)

and the subscales of RH ($\alpha = 0.83$), PC ($\alpha = 0.80$), and IT ($\alpha = 0.81$).

Beck Anxiety Inventory (BAI)

The BAI is a 21-item self-report scale developed by Beck et al. [26] that measures the severity of physical and cognitive symptoms of anxiety in the past week on a four-point Likert scale (0 to 3). Beck et al.'s study [26] showed excellent internal consistency ($\alpha = 0.92$), good test-retest reliability (0.75), and reliable convergent and discriminant validity ($p < 0.01$, $r = 0.79$, and $r = 0.83$, respectively). In Iran, the study of Kaviani and Mousavi [27] showed acceptable validity ($r = 0.72$, $p < 0.01$), good reliability ($r = 0.83$, $p < 0.01$), and excellent internal consistency ($\alpha = 0.92$). Cronbach's alpha in the clinical sample of this research was also excellent ($\alpha = 0.91$).

Statistical analysis

A descriptive analysis of the items was performed, including the study of univariate normal distributions (skewness and kurtosis). Cronbach's alpha coefficient was calculated by removing items individually to identify inconsistent questions. The correlation of each question with the total score was calculated without including the score of that question to evaluate the discrimination index of the items of the OC-TCDQ. Additionally, using Pearson's correlation coefficient, the correlation between the subscales and the total score was evaluated in both clinical and nonclinical samples.

Confirmatory factor analysis (CFA) was performed using the maximum likelihood method to investigate whether the OC-TCDQ in clinical and nonclinical samples conformed to the factor model of the original version (i.e., 2-factor structure). Model fitting was assessed using the results of the chi-square test ($\chi 2$), root mean square residual (SRMR), normalized fit index (NFI), Tucker-Lewis index (TLI), comparative fit index (CFI), and root mean square error of approximation (RMSEA). According to Klein [28], a model fit is considered good if the values of the RMSEA and SRMR indices are less than 0.05 and average if they are between 0.05 and 0.08. A perfect fit is indicated by NFI, TLI, and CFI values above 0.95, while values above 0.90 indicate a good model fit.

Since one of the assumptions of structural equation modelling is the normality of the distribution of variables, before checking the fit of the model, univariate and multivariate analyses were performed to check the normality of the data. According to Klein [28], in the evaluation of univariate analysis, the values of skewness and kurtosis of the questions should not be more than ± 3 to meet the assumption of normality of the data. Additionally, the multivariate normality of the data was checked via Mardia's normalized multivariate kurtosis. According to Bentler [29], values greater than 5 for the Mardia coefficient indicate an abnormal data distribution. For missing data, the mean replacement method was used.

The measurement invariance between the clinical and nonclinical groups was tested. Following the recommendations of Milfont et al. [30] the theoretical two-factor model was tested in four increasingly restricted models: (1) configural, (2) metric, (3) scalar, and (4) strict. Model (1) tested that the two-factor structure of the OC-TCDQ was stable in both the clinical and nonclinical groups. Model (2) kept the factor loadings equal across groups, followed by Model (3) which additionally restricted the intercepts. Finally, model (4) constrained factor loadings, intercepts, and error variances between the clinical and nonclinical groups. Measurement invariance was evaluated by changes (Δ) in fit indices, including $\Delta\chi 2$, ΔCFI, ΔTLI, and ΔRSMEA. When sample sizes are equal, as in this study, Chen [31] recommends adequate cut-off criteria for testing levels of invariance: TLI and CFI index changes (ΔTLI and ΔCF) less than or equal to 0.01, along with changes in RMSEA (ΔRSMEA) less than or equal to 0.015, which indicates no change.

Cronbach's alpha coefficients and split-half reliability were used to test the internal consistency of the OC-TCDQ. Reliability values greater than 0.7 are considered acceptable [32]. The test-retest reliability of the OC-TCDQ total/subscale scores was estimated using Pearson's correlation coefficient. According to Cohen's classification [33], a correlation coefficient of $r \geq 0.50$ indicates a strong correlation.

The convergent validity of the OC-TCDQ was assessed by examining the correlation between the total score and subscales of the OC-TCDQ with the total score and subscales of the OC-CDI, Y-BOCS, and OBQ-44. Divergent validity was assessed by examining the correlation between the total score and subscales of the OC-TCDQ with the BAI score. The significance threshold was set at $p < 0.05$, and the strength of the correlation was classified as weak (< 0.30), moderate (0.30 to 0.70), or strong (> 0.70) [34].

Incremental validity was assessed through hierarchical regression analysis to investigate whether the OC-TCDQ score predicts the Y-BOCS score more accurately than does the OBQ-44 score. In Step 1, the only independent variable for the Y-BOCS was the OBQ-44, while in Step 2, the OC-TCDQ was included alongside the OBQ-44. It was expected that there would be a significant increase in predictive power in Step 2 and that the OC-TCDQ would be positively correlated with the Y-BOCS.

In addition, we examined the difference between the scores of the clinical and nonclinical groups on the OC-TCDQ to determine discriminant validity through an

Table 2 Item means, standard deviations, ranges, Cronbach's alpha coefficients (α), corrected item-rest correlations (r), skewness (SE), and kurtosis (SE)

Items	Clinical sample							Nonclinical sample						
	M	SD	Range	α	r	SE	SE	M	SD	Range	α	r	SE	SE
Q1	3.70	0.99	1–5	0.835	0.529	0.63	0.17	1.86	0.78	1–4	0.796	0.623	-0.21	0.93
Q2	3.34	1.09	1–5	0.819	0.489	0.50	0.38	1.86	0.76	1–4	0.808	0.472	-0.31	-0.47
Q3	3.71	1.06	1–5	0.821	0.569	-0.45	0.23	1.89	0.76	1–4	0.791	0.675	0.32	0.18
Q4	3.35	1.17	1–5	0.828	0.610	-0.89	0.22	1.82	0.74	1–4	0.814	0.460	-0.15	0.79
Q5	3.84	0.98	1–5	0.792	0.512	0.48	0.75	1.87	0.75	1–4	0.789	0.642	0.54	0.66
Q6	3.46	1.01	1–5	0.812	0.534	-0.25	0.44	1.84	0.69	1–3	0.806	0.462	-0.12	-0.73
Q7	3.74	0.92	1–5	0.841	0.547	0.88	0.41	1.83	0.77	1–4	0.788	0.560	0.53	0.29
Q8	3.44	1.08	1–5	0.825	0.621	-0.13	-0.49	1.82	0.64	1–3	0.812	0.467	-0.44	-0.09
Q9	3.85	1.07	1–5	0.801	0.502	0.16	0.76	1.80	0.70	1–4	0.781	0.525	0.96	0.31
Q10	3.52	1.03	1–5	0.819	0.530	0.42	0.91	1.81	0.64	1–3	0.809	0.447	0.67	0.11
Q11	3.77	0.90	1–5	0.799	0.529	0.31	-0.43	1.76	0.67	1–3	0.793	0.513	-0.73	-0.66
Q12	3.52	1.12	1–5	0.829	0.608	-0.26	-0.25	1.80	0.60	1–3	0.811	0.430	0.54	0.37
Q13	3.73	1.02	1–5	0.839	0.557	-0.16	0.65	1.75	0.63	1–3	0.790	0.520	0.81	-0.26
Q14	3.49	1.07	1–5	0.831	0.536	-0.04	-0.37	1.79	0.60	1–3	0.821	0.514	-0.21	-0.66
Q15	3.74	1.06	1–5	0.835	0.553	0.38	0.15	1.73	0.66	1–3	0.787	0.483	0.72	0.44
Q16	3.52	1.10	1–5	0.807	0.541	0.84	0.19	1.86	0.68	1–3	0.809	0.435	0.73	0.77
Q17	3.85	0.95	1–5	0.833	0.546	-0.92	0.22	1.71	0.70	1–4	0.785	0.586	0.39	-0.54
Q18	3.56	1.09	1–5	0.825	0.592	-0.49	0.47	1.85	0.71	1–4	0.819	0.463	-0.60	0.48
Q19	3.63	1.07	1–5	0.829	0.564	0.59	0.15	1.91	0.83	1–4	0.794	0.524	0.34	0.76
Q20	3.66	1.07	1–5	0.901	0.446	-0.36	-0.21	2.09	0.56	1–4	0.926	0.401	0.21	0.94

independent t-test. Statistical analyses were performed using IBM SPSS-26 and Amos-24.

Results

Descriptive analysis of the item

In the clinical group, the average of all 20 items was in the highest range of the scale (average greater than 3.34); in the nonclinical group, all 20 items were in the lowest range (average less than 2.09). In both the clinical and nonclinical groups, all 20 items had skewness and kurtosis indices less than one in absolute value, which shows no deviation from the normality of the distribution of univariate items. (Table 2). Additionally, the value of Mardia's coefficient for the research data was equal to 2.89, which indicated that the assumption of multivariate normality was established. The use of Cronbach's alpha coefficient with item deletion to identify inconsistent questions on the test in both the clinical and nonclinical groups showed that all the test questions had good internal consistency except for question 20. Its elimination slightly increased the Cronbach's alpha coefficient in both the clinical and nonclinical groups ($\alpha = 0.926$ and 0.901, respectively). The item-total correlation coefficient was used to test each item. The results showed that the scores of all items had a positive and significant correlation with the scale's total score, but this correlation was lower for item 20 in both groups. Due to the good correlation of the items with the total score in both groups (more than 0.4), all 20 items were included in the reliability and validity analysis (Table 2).

Additionally, the Pearson correlation results showed a positive and significant relationship between the HA and INC subscales together and with the total score in the clinical sample ($r = 0.324$, $r = 0.545$ and $r = 0.639$, $p < 0.01$, respectively) and the nonclinical sample ($r = 0.143$, $r = 0.421$ and $r = 0.498$, $p < 0.01$, respectively).

Confirmatory Factor Analysis (CFA) of clinical and nonclinical samples

CFA was performed to confirm the two-factor structure of the OC-TCDQ in the clinical sample ($n = 209$). The preliminary results showed that some indices (CMIN/DF ≤ 3, SRMR ≤ 0.05, CFI ≥ 0.9, and RMSEA ≤ 0.05) were acceptable, but the NFI was close to the acceptable range ($0.875 < 0.9$). Considering that models with an NFI value less than 0.9 can usually be significantly improved [35], by referring to the correction indices in the output of Amos, the results showed that some error variables are correlated with each other, and by creating covariance between the mentioned errors, the results showed a good fit (Table 3). All standardized factor loadings were

Table 3 Confirmatory factor analysis and measurement invariance tests

	X^2	df	*p*	SRMR	NFI	TLI	CFI	RMSEA	$\Delta\chi^2$	Δdf	ΔTLI	ΔCFI	ΔRMSEA
Clinical sample (state version)	231.867	169	< 0.01	0.044	0.919	0.977	0.978	0.042					
Nonclinical sample (trait version)	251.491	169	< 0.01	0.037	0.912	0.972	0.973	0.048					
Measurement invariance													
Configural	450.396	316	< 0.01	0.041	0.910	0.969	0.970	0.045					
Metric	452.765	330	< 0.01	0.043	0.908	0.967	0.968	0.042	32.369	14	-0.002	-0.002	-0.003
Scalar	461.632	344	< 0.01	0.045	0.907	0.966	0.966	0.040	25.867	14	-0.001	-0.002	-0.002
Strict	458.136	364	< 0.01	0.049	0.905	0.962	0.963	0.035	47.504	20	-0.004	-0.003	-0.005

χ2, chi-square, *df* degrees of freedom, *SRMR* standardized root mean square residual, *TLI* Tucker-Lewis index, *CFI* comparative fit index, *RMSEA* root mean square error of approximation, Δχ2 differences in chi-square, Δ*df* differences in degrees of freedom, Δ TLI change in Tucker-Lewis index, Δ*CFI* change in comparative fit index, Δ*RMSEA* change in root mean square error of approximation

greater than 0.40 and statistically significant (0.59–0.83). The correlation between the two OC-TCDQ subscales was statistically significant (0.35, $p < 0.01$). Additionally, the CFA results in the nonclinical sample ($n = 209$) were lower than the acceptable range for the NFI index ($0.875 < 0.9$). By creating covariance between some errors derived from correction indices in the Amos output, the results showed a good fit of the two-factor structure (Table 3). All standardized factor loadings were greater than 0.40 and statistically significant (0.57–0.83). The correlation between the two OC-TCDQ subscales in the nonclinical sample was statistically significant (0.17, $p < 0.01$).

Measurement invariance

The two-factor OC-TCDQ was tested to measure invariance between the clinical and nonclinical groups using the maximum likelihood method. The fit indices of the robust and modified Satura-Bentler models for each of the four hierarchical models are presented in Table 3. According to the recommendations of Chen [31], the ΔCFI and ΔRMSEA for metric and scalar models clearly show measurement invariance. According to the exact model, the ΔCFI and ΔRMSEA support measurement invariance. Therefore, it can be argued that the OC-TCDQ tends toward strong invariance between clinical and nonclinical groups, as indicated by the configural invariance test. Overall, the two-factor structure of the OC-TCDQ was stable in both the clinical and nonclinical groups. Metric invariance keeps factor loadings equal across groups, and the scalar invariance test further constrains the items. Finally, strict invariance of factor loadings limits intercepts and error variances between clinical and nonclinical groups.

Reliability: internal consistency and temporal consistency

In the clinical sample, the Cronbach's alpha coefficients of the Farsi version of the OC-TCDQ were 0.80, and those of the HA and INC subscales were 0.81 and 0.80, respectively. Its split-half reliability was 0.80, which indicated satisfactory internal consistency of the scale. Additionally, the total scale and the HA and INC subscales showed good test-retest reliability (0.81, 0.78, and 0.72, respectively).

In the nonclinical sample, the Cronbach's alpha coefficients of the total scale and the HA and INC subscales were 0.79, 0.79, and 0.83, respectively. Its split-half reliability was 0.80 which indicated satisfactory internal consistency of the scale. Additionally, the total scale and the HA and INC subscales showed good test-retest reliability (0.74, 0.75, and 0.80, respectively).

Convergent and divergent, incremental and discriminant validity

The relationships between the total score and subscales of the OC-TCDQ with the total score and subscales of the OC-CDI, Y-BOCS (SC and SS), and OBQ-44 were investigated in the clinical sample. The total score of the OC-TCDQ had a significant positive relationship with other scales and subscales except hoarding (ranging from 0.12 to 0.78, $p < 0.05$). Convergent validity was also confirmed for the OC-TCDQ subscales: the HA-Q had a significant positive relationship with the total score of the OC-CDI and the HA-I subscale; the total score of the Y-BOCS and the contamination, aggression, sexual, religious, physical, washing, and controlling subscales; the severity scale (SS); the total score of the OBQ-44 and the RH and IT subscales (ranging from 0.14 to 0.83, $p < 0.05$). However, it had a weak and significant negative relationship with the INC-I subscale ($r = -0.09$, $p < 0.05$), and had no significant association with the other subscales ($p > 0.05$). The INC-Q had a meaningful positive relationship with the total score of the OC-CDI and INC-I subscale; the total score of the Y-BOCS and the subscales of contamination, symmetry, washing, controlling, repetition, counting, and order; the severity scale (SS); the total score

Table 4 Pearson's correlation coefficient between the total score and subscales of the OC-CDQ with the total scores and subscales of the OC-CDI, Y-BOCS, OBQ-44, and BAI in the clinical sample

	OC-CDQ	HA-Q	INC-Q
OC-CDI	0.76**	0.81**	0.70**
HA-I	0.78**	0.83**	-0.11*
INC-I	0.67**	-0.09*	0.77**
Y-BOCS	0.69**	0.73**	0.63**
SC			
contamination	0.44**	0.49**	0.43*
aggression	0.19*	0.31*	0.11
sexual	0.09*	0.14*	0.06
religious	0.24*	0.35*	0.09
symmetry	0.44*	0.12	0.67**
physical	0.17*	0.21*	0.10
hoarding	0.11	0.07	0.13
washing	0.41**	0.46**	0.38*
controlling	0.30**	0.30**	0.28**
repetition	0.15*	0.09	0.23*
counting	0.12*	0.07	0.16*
order	0.42*	0.22	0.57**
hoarding	0.15	0.08	0.19
SS	0.64**	0.60**	0.63**
OBQ-44	0.67*	0.70*	0.62*
RH	0.38*	0.62**	0.08
PC	0.34*	0.11	0.68**
IT	0.21*	0.40*	0.12
BAI	0.47**	0.49**	0.43**

OC-CDQ Obsessive-Compulsive Core Dimensions Questionnaire, *HA* Harm avoidance, *INC* Incompleteness, *OC-CDI* Obsessive-Compulsive Core Dimensions Interview, *Y-BOCS* Yale-Brown Obsessive Compulsive Scale, *SC* Symptom Checklist, *SS* Severity Scale, *OBQ-44* Obsessive Beliefs Questionnaire, *RH* inflated responsibility and overestimation of threat, *PC* perfectionism and intolerance of uncertainty, *IT* importance and overcontrol of thoughts, *BAI* Beck Anxiety Inventory

** $p<0.01$, * $p<0.05$

of the OBQ-44; the PC subscale; and the BAI (ranging from 0.16 to 0.77, $p<0.05$). However, it had a weak and significant negative relationship with the HA-I subscale (r= -0.11, $p<0.05$) and no significant relationship with the other subscales ($p>0.05$) (Table 4). Additionally, the results of Table 4 show a positive and moderate correlation between the OC-TCDQ total score and the HA and INC subscales with the BAI (0.47, 0.49, and 0.43, respectively), indicating the divergent validity of this scale.

Hierarchical regression analysis was conducted to examine the incremental validity of the OC-TCDQ. We investigated whether the OC-TCDQ is better at explaining the incremental variance of the Y-BOCS and BAI than the OBQ-44. As shown in Table 5, the OC-TCDQ and its subscales accounted for a significant amount of additional variance (5–19%) in the Y-BOCS and BAI. The results indicated that even after controlling for the effects of the OBQ-44 on the dependent variables, the effects of the OC-TCDQ and its subscales (ΔR2) on the Y-BOCS and BAI remained significant. Specifically, the OC-TCDQ and its subscales were found to be significant independent explanatory variables for the Y-BOCS and BAI.

To compare the average scores obtained for the group differences, a t-test for two independent groups was conducted after checking for homogeneity of variance. The results indicated a significant difference between the means of the two groups in the HA and INC subscales, as well as the total score of the OC-TCDQ ($p<0.01$). The mean scores of the clinical group were greater than those of the nonclinical group. The Cohen's d effect sizes for the HA and INC subscales and the total score of the OC-TCDQ are greater than 0.8, which indicates a large effect size and, as a result, the discriminating power of this scale and its subscales between the two clinical and nonclinical groups (Table 6).

Discussion

The purpose of this study was to develop the Persian version of the OC-TCDQ and to examine its psychometric properties. A questionnaire designed to identify distinct and homogeneous subgroups of OCD based on underlying motivation. In previous studies, item analysis was not performed to identify inconsistent questions in the test; In the present study, these analyses were first performed in both clinical and nonclinical groups, and the results showed that the removal of any of the items had no significant effect on increasing Cronbach's alpha. Only the removal of item 20 in the clinical and nonclinical groups increased the Cronbach's alpha to some extent. Further examination of the data through the discrimination index of the items confirmed the above results and showed that item 20 had a lower correlation with the modified total-item correlation than the other items in both groups. The inconsistency of this item may indicate that the above item is ambiguous and should be further investigated in terms of the content of the translation. The results of CFA and measurement invariance in this study showed that the Farsi version of the OC-TCDQ has the same two-factor structure in clinical and nonclinical populations, and this result was consistent with previous studies [16, 18]. Additionally, the scalar invariance between the clinical and nonclinical groups showed that the OC-TCDQ can be used to compare the average scores of these two groups.

The two dimensions of HA and INC had a relatively moderate positive correlation in the clinical population and a relatively weak positive correlation with each other in the nonclinical group, which indicates that these dimensions measure distinct motives but also capture

Table 5 Incremental validity of the OC-CDQ above the OBQ-44

Variables	B	SE	β	T	R^2	ΔR^2
Y-BOCS						
Step1					0.16***	
OBQ-44	0.47	0.07	0.40***	6.36		
Step2					0.29***	0.13***
OBQ-44	0.27	0.07	0.18*	3.27		
Total scores of OC-CDQ	1.56	0.20	0.49***	6.72		
Step1					0.16***	
OBQ-44	0.47	0.07	0.40*	6.36		
Step2					0.35***	0.19***
OBQ-44	0.17	0.06	0.11*	1.30		
HA	3.56	0.27	0.68***	8.93		
INC	2.41	0.26	0.59**	5.09		
BAI						
Step1					0.07**	
OBQ-44	0.04	0.01	0.19*	2.40		
Step2					0.12**	0.05**
OBQ-44	0.01	0.01	0.07*	1.03		
Total scores of OC-CDQ	0.11	0.04	0.21**	2.69		
Step1					0.05**	
OBQ-44	0.04	0.01	0.19*	2.40		
Step2					0.14**	0.09**
OBQ-44	0.01	0.01	0.05*	0.98		
HA	0.15	0.07	0.23**	2.94		
INC	0.09	0.03	0.16*	1.07		

Y-BOCS Yale-Brown Obsessive Compulsive Scale, *OBQ-44* Obsessive Beliefs Questionnaire, *OC-CDQ* Obsessive-Compulsive Core Dimensions Questionnaire, *HA* Harm avoidance, *INC* Incompleteness, *BAI* Beck Anxiety Inventory

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 6 Comparison of the total score and subscales of the OC-CDQ in group differences

	M (SD.) Clinical sample	M (SD.) Nonclinical sample	t-test	df	*P*	Cohen's "d"
OC-CDQ	71.06 (10.18)	49.96 (6.95)	27.13***	416	0.001	0.85
HA	32.53 (5.73)	22.38 (3.74)	18.46***	416	0.001	0.81
INC	38.52 (6.01)	25.57 (4.73)	19.18***	416	0.001	0.84

OC-CDQ Obsessive-Compulsive Core Dimensions Questionnaire, *HA* Harm avoidance, *INC* Incompleteness

*** $p < 0.001$

commonalities. This relationship indicates that in the clinical population, compulsion is often caused by both dimensions, but in different people, the effectiveness of each of these two dimensions may be different. This finding and the subsequent finding that both the HA and INC dimensions had a significant positive relationship with the total score, consistent with previous studies [16, 18, 35–37], may indicate how these two dimensions functionally affect this disorder. These studies have suggested that while avoiding harm may be the key to the initiation of obsessive rituals, incompleteness is the key to their continuation. Levels of harm avoidance may predict whether an individual responds to intrusive (i.e., threatening) thoughts. However, levels of incompleteness may predict the likelihood of terminating action sequences and rituals [16]. The comparison of the results of the nonclinical group with those of the clinical group is consistent with the main assumption of the later models of psychopathology indicating the chain between normal and abnormal functional processes. The pattern provided by the established state and trait models may suggest a way to conceptualize these two dimensions as traits and

transitive experiences. The relatively weak correlation between these two dimensions is also in accordance with the findings of Summerfeldt et al. [16] who suggested that in the nonclinical population, the HA dimension is associated with constructs such as trait anxiety, which form the personality substratum of anxiety disorders. However, they consider INC to be a type of "sensory perfectionism" that is a precursor to obsessive-compulsive personality disorder (OCPD) and consider it to be two independent dimensions. Consistent with Summerfeldt's model [10] and other previous studies [18] that assumed that injury avoidance plays a greater role than does incompleteness in other anxiety disorders, in this study, the level of anxiety in the clinical group was more related to HA than to INC.

The reliability of the total score of the Farsi version of the OC-TCDQ and its subscales in both the clinical and nonclinical groups was excellent according to the Cronbach's alpha coefficient and the split-half method and was good according to the test-retest reliability of the total score of the OC-TCDQ, which supported the temporal stability of the scale. To assess the validity of the OC-TCDQ, the present study revealed that the total score of the OC-TCDQ showed excellent convergent validity with strong positive correlations with the OC-CDI, Y-BOCS, and OBQ-44. It also demonstrated good divergent validity with a moderate positive correlation with the BAI. Furthermore, the strong correlation between HA and INC in the OC-TCDQ with HA and INC in the OC-CDI, as well as the weak and negative correlation between HA and INC in the OC–CDQ with INC and HA in the OC-CDI, further support the construct validity of the OC-TCDQ and are consistent with previous research [16, 19].

This study showed that the HA and INC are significantly related to contamination, washing, and checking. Sica [38] and Mathes [39] suggested that although the duration of washing may be partly determined by cognitive factors such as safety requirements against injury, the end of washing may depend on subjective sensory experiences that are less cognitively based and is caused by sensitivity to sensory phenomena and the need to soothe unpleasant and incomplete feelings. Washing behavior can be driven by the desire to achieve perfection rather than decontamination [40]. Checking also had a significant relationship with both main motivations. After analysing a network of dimensions of OCD symptoms, Cervin et al. [41] found that the doubt/checking factor is very central in relation to all OCD symptoms, and this centrality of doubt and examination may be partly related to motivational heterogeneity. The INC was uniquely associated with symmetry/exactness obsessions and ordering/arranging compulsions [16, 36] and with counting and repetition [42]. Summerfeldt et al. [16] hypothesized that incompleteness may be better conceptualized by sensory-emotional disorganization, and that behaviors related to symmetry and order may be an attempt to reduce distress caused by difficulties in processing complex external stimuli and sensory-emotional dysfunction that should be considered in the treatment process. The results of counting should be interpreted with caution, as there are no consistent, reliable, or valid measures of this symptom dimension, and it refers exclusively to number counting complaints. Additionally, this study showed that HA is uniquely related to aggressive, sexual, religious and physical obsessions. In a study previously carried out by Rezazadeh and Zarani [4], who systematically investigated cultural issues related to OCD in Iran, they found that an ineffective belief-value system can lead to misinterpretations and incorrect attitudes in people with OCD that can be related to the HA dimension, including determining hard and dry moral standards and morbid guilt, extreme responsibility, increasing annoying ruminations, fear of getting hurt, fear of making mistakes and harming others. Factors that, according to the content of Y-BOCS items in aggressive, sexual, religious and physical obsessions, can determine their role in these obsessions. The findings obtained for hoarding, which indicate that hoarding is not related to any of the motives of HA or INC, were also consistent with similar studies in children and adults [14]. The DSM-5 now considers hoarding to be distinct from OCD because it differs from other OCD symptoms. Although there is evidence that individuals with hoarding disorder often show INC-related symmetry obsessions and repetition and order compulsions [18, 42], our results further support the distinction between OCD and hoarding and show that further studies on the relationship between hoarding and INC may be useful. In addition, it may be fruitful to include additional and specific hoarding motives such as avoiding grief in such research.

In this study, the INC group had strong beliefs about PC. In contrast, the HA group showed a traditional OCD profile characterized by increased beliefs related to RH and IT. The findings of the current study agree with previous research [15, 43] showing that HA and INC are related to different beliefs and symptoms. Hierarchical regression analysis revealed a significant increase in the prediction of Y-BOCS and BAI scores by adding the OC-TCDQ score to the OBQ-44 score. Additional analysis using subscales also supported HA and INC as significant independent explanatory variables for predicting Y-BOCS and BAI scores. Considering that motivation is a process that affects cognitive processes and how they are processed and guides and maintains human behavior, it can predict obsessive symptoms and the level of anxiety of people with OCD in a dimension greater than

obsessive beliefs. Additionally, according to the previously mentioned materials, some obsessive thoughts and actions may depend on sensory experiences and disturbances in sensory-emotional functioning, which are less based on cognition and cannot be simply related to obsessive beliefs. Here, instead of focusing on changing the interpretation of external stimuli, it may be useful to direct attention to internal sensory and emotional experiences and strengthen acceptance and psychological flexibility processes [16].

Repeating the results of previous studies in Iran confirms the psychometric properties of the Farsi version of the OC-TCDQ and shows that this questionnaire can provide important information on the motivations underlying obsession and its relationship with beliefs, obsessions, and compulsions in Iranian adulthood. Additionally, matching the findings of motivation-based subgroups with content-based frameworks of symptoms and beliefs will facilitate our understanding of clinical heterogeneity in OCD and allow for better personalization of treatment. Although our sample's characteristics are consistent with those of other extensive OCD studies, this study was conducted in adults, and the majority of the sample group was female. The findings cannot be generalized to a larger OCD population. Future research could validate the OC-TCDQ for other age groups and for larger samples, considering the significant presence of male participants. Additionally, this sample was not epidemiologic, and the relatively low representation of racial/ethnic minorities limits generalizability. Second, due to the bias of the participants in answering the self-report questions, future researchers can explore alternative methods, such as structural and functional neuroimaging methods, to expand their understanding of the underlying neural substrate of the HA and INC. Third, nearly half of the sample had high or low levels of both motivations. Therefore, it is essential to understand the nature of the "low" and "high" groups when considering a motivation-based classification system.

Conclusion

The present study showed that the OC-TCDQ has good psychometric properties, similar to previous studies, and is a reliable tool to be used in Iranian patients with OCD to investigate the underlying motivations of OCD, facilitate the conceptualization of clinical heterogeneity in OCD, and guide subsequent treatment protocols. It can also be a valid scale to be used in the nonclinical Iranian population to examine the traits of harm avoidance and incompleteness as underlying traits of clinical disorders, including anxiety disorders and OCPD.

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Authors' contributions
M.P. and M.R.S. conceptualized the study, adapted the instrument, collected and analyzed data, and drafted and wrote the article. H.H. and N.M. supervised the data analysis, editing, and final manuscript preparation. All the authors have read and approved the final manuscript.

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Data availability
The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
This article was derived from the first author's doctoral dissertation in Clinical Psychology from Shiraz University. All questionnaires and methodology for this study were approved by the Research Ethics Committee of Shiraz University of Medical Sciences, Iran (ethical code: IR.US.PSYEDU.REC.1402.013). Informed consent was obtained from all participants included in the study.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Author details
[1]Department of Clinical Psychology, Faculty of Educational Sciences and Psychology, Shiraz University, Shiraz, Iran.

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References

1. Fawcett EJ, Power H, Fawcett JM. Women are at greater risk of OCD than men: a meta-analytic review of OCD prevalence worldwide. J Clin Psychiatry. 2020;81(4):19r13085. https://doi.org/10.4088/JCP.19r13085.
2. Salehi M, Salarifar M, Hadian M. The frequency pattern of compulsive disorder - OCD. J New Cogn Sci. 2003;6(2):87–94.
3. Mohammadi MR, GHanizadeh A, Rahgozar M. Prevalence of OCD in Iran. BioMed Cent Psychiatry. 2004;4(2):1–8.
4. Rezazadeh Z, Zarani F. Obsessive-compulsive disorder and related cultural issues in Iran: a systematic review. Rooyesh. 2022;11(2):45–58.
5. 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(3):329–36. https://doi.org/10.1176/appi.ajp.2008.08071006.
6. Abramovitch A, Abramowitz JS, Mittelman A. The neuropsychology of adult obsessive-compulsive disorder: a meta-analysis. Clin Psychol Rev. 2013;33(8):1163–71. https://doi.org/10.1016/j.cpr.2013.09.004.
7. Farris SG, McLean CP, Van Meter PE, Simpson HB, Foa EB. Treatment response, symptom remission, and wellness in obsessive-compulsive disorder. J Clin Psychiatry. 2013;74(7):685–90. https://doi.org/10.4088/JCP.12m07789.
8. McKay D, Abramowitz JS, Calamari JE, Kyrios M, Radomsky A, Sookman D, Wilhelm S. A critical evaluation of obsessive-compulsive disorder subtypes: symptoms versus mechanisms. Clin Psychol Rev. 2004;24(3):283–313. https://doi.org/10.1016/j.cpr.2004.04.003.
9. Cameron DH. Neuropsychological functioning, symptom dimensions and cognitive remediation in obsessive-compulsive disorder. Ph.D. Dissertation Faculty of Philosophy, McMaster University, Canada. 2018.http://hd1.handle.net/11375/24149.

10. Summerfeldt LJ, Kloosterman PH, Antony MM, Richter MA, Swinson RP. The relationship between miscellaneous symptoms and major symptom factors in obsessive-compulsive disorder. Behav Res Ther. 2004;42:1453–67. https://doi.org/10.1016/j.brat.2003.09.006.
11. Clark DA. Cognitive-behavioral therapy for OCD. New York: Guilford Press; 2004.
12. Obsessive Compulsive Cognitions Working Group. Psychometrics Validation of the obsessive beliefs questionnaire and the interpretation of intrusions Inventory— Part 2: factor analysis and testing of a brief version. Behav Res Ther. 2005;43:1527–42. https://doi.org/10.1016/j.brat.2004.07.010.
13. Polman A, O'Connor KP, Huisman M. Dysfunctional belief-based subgroups and inferential confusion in obsessive-compulsive disorder. Pers Individ Dif. 2011;50(2):153–8. https://doi.org/10.1016/j.paid.2010.09.017.
14. Schreck M, Georgiadis C, Garcia A, Benito K, Case B, Herren J, Walther M, Freeman J. Core motivations of Childhood Obsessive–compulsive disorder: the role of harm avoidance and incompleteness. Child Psychiatry Hum Dev. 2020;52(5):957–65. https://doi.org/10.1007/s10578-020-01075-5.
15. Bragdon LB, Coles ME. Examining heterogeneity of obsessive-compulsive disorder: evidence for subgroups based on motivations. J Anxiety Dis. 2017;45:64–71. https://doi.org/10.1016/j.janxdis.2016.12.
16. Summerfeldt LJ, Kloosterman PH, Antony MM, Swinson RP. Examining an obsessive-compulsive core dimensions model: structural validity of harm avoidance and incompleteness. J Obsessive-Compulsive Relat Dis. 2014;3(2):83–94. https://doi.org/10.1016/j.jocrd.2014.01.003.
17. Summerfeldt LJ, Kloosterman PH, Parker JDA, Antony MM, Swinson RP. Assessing and validating the obsessive-compulsive-related construct of incompleteness. Ste-Foy, Quebec: Poster presented at the 62nd Annual Convention of the Canadian Psychological Association; 2001. [Google Scholar].
18. Ecker W, Gönner S, Wilm K. Die messung von motivdimensionen der zwangsstörung: unvollständigkeitserleben und schadensvermeidung [The measurement of motivational dimensions of OCD: incompleteness and harm avoidance]. Psychother Psychosom Med Psychol. 2011;61(2):62–9. https://doi.org/10.1055/s-0030-1251972.
19. Cervin M, Perrin S. Measuring harm avoidance, incompleteness, and disgust in youth with obsessive-compulsive disorder and anxiety disorders. J Obsessive-Compulsive Relat Dis. 2019;22:100442. https://doi.org/10.1016/j.jocrd.2019.100442.
20. Keshavarz Afshar H, Barabari A, Hosseinzadeh M. The validity and reliability of the Persian version of Padua inventory in nonclinical population of Iran. J Police Med. 2017;6(2):117–25.
21. First MB, Williams JBW, Karg RS, Spitzer RL. SCID-5-CV: structured clinical interview for DSM-5 disorders, clinician version. Arlington: American Psychiatric Association Publishing; 2015.
22. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. Spine. 2000;25(24):3186–91. https://doi.org/10.1097/00007632-200012150-00014.
23. Wilson KA, Chambless DL. Inflated perceptions of responsibility and obsessive-compulsive symptoms. Behav Res Ther. 1999;37(4):325–35. https://doi.org/10.1016/s0005-7967(98)00146-6.
24. Rajezi Esfahani S, Motaghipour Y, Kamkari K, Zahiredin A, Janbozorgi M. Reliability and validity of the Persian version of the Yale-Brown obsessive-compulsive scale (Y-BOCS). Iran J Psychiatry Clin Psychol. 2012;17(4):297–303.
25. Shams G, Karam Ghadiri N, Esmaeli Torkanbori Y, Ebrahimkhani N. Validation and reliability assessment of the Persian version of obsessive beliefs questionnaire-44. Adv Cog Sci. 2004;6(1):23–36.
26. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: psychometric properties. J Consult Clin Psychol. 1988;56(6):893–7. https://doi.org/10.1037//0022-006x.56.6.893.
27. Kaviani H, Mousavi A. Psychometric properties of the Persian version of Beck Anxiety inventory (BAI). Tehran Univ Med J. 2008;66:136–40.
28. Kline RB. Principles and practice of structural equation modelling. 2nd ed. New York: Guilford Press; 2016.
29. Bentler PM. EQS 6 structural equations Program Manual. Encino, CA: Multivariate Software; 2005.
30. Milfont TL, Fischer R. Testing measurement invariance across groups: applications in cross-cultural research. Int J Psychol Res. 2010;3(1):111–30. https://doi.org/10.21500/20112084.857.
31. Chen FF. Sensitivity of goodness of fit indices to lack of measurement invariance. Struct Equ Model. 2007;14(3):464–504. https://doi.org/10.1080/10705510701301834.
32. Zhang C, Wang T, Zeng P, Zhao M, Zhang G, Zhai S, Meng L, Wang Y, Liu D. Reliability, validity, and measurement invariance of the general anxiety disorder scale among Chinese medical university students. Front Psychiatry. 2021;12:648755. https://doi.org/10.3389/fpsyt.2021.648755.
33. Cohen J. Statistical power analysis for the behavioral sciences. New York: Academic; 1977.
34. Gerstman BB. Basic biostatistics: statistics for public health practice. 2nd ed. Burlington, MA: Jones and Bartlett Learning; 2015.
35. Bentler PM, Bonett DG. Significance tests and goodness of fit in the analysis of covariance structures. Psychol Bull. 1980;88(3):588–606. https://doi.org/10.1037/0033-2909.88.3.588.
36. Sibrava NJ, Boisseau CL, Eisen JL, Mancebo MC, Rasmussen SA. An empirical investigation of incompleteness in a large clinical sample of obsessive compulsive disorder. J Anxiety Dis. 2016;42:45–51. https://doi.org/10.1016/j.janxdis.2016.05.005.
37. Apa F, Tumkaya S, Yucens B, Kashyap H. Are not just-right experiences traits and/or state markers for obsessive-compulsive disorder? Eur J Psychiatry. 2022;36:51–9. https://doi.org/10.1016/j.ejpsy.2021.09.003.
38. Sica C, Caudek C, Belloch A, Bottesi G, Ghisi M, Melli G, García-Soriano G, Olatunji BO. Not just right experiences, disgust proneness and their associations to obsessive-compulsive symptoms: a stringent test with structural equation modelling analysis. Cog Ther Res. 2019;43(6):1086–96. https://doi.org/10.1007/s10608-019-10029-8.
39. Mathes BM, Kennedy GA, Wilver NL, Carlton CN, Cougle JR. A multimethod analysis of incompleteness in behavioral treatment of contamination-based OCD. Behav Res Ther. 2019;114:1–6. https://doi.org/10.1016/j.brat.2018.12.008.
40. Ólafsson RP, Emmelkamp P, Olason DT, Kristjansson A. Disgust and contamination concerns: the mediating role of harm avoidance and incompleteness. Inter J Cog Ther. 2020;13(3):251–70. https://doi.org/10.1007/s41811-020-00076-5.
41. Cervin M, Perrin S, Olsson E, Claesdotter-Knutsson E, Lindvall M. Incompleteness, harm avoidance, and disgust: a comparison of youth with OCD, anxiety disorders, and no psychiatric disorder. J Anxiety Dis. 2020;69:102175. https://doi.org/10.1016/j.janxdis.2019.
42. Ecker W, Kupfer J, Gonner S. Incompleteness as a link between obsessive-compulsive personality traits and specific symptom dimensions of obsessive-compulsive disorder. Clin Psychol Psychother. 2014;21(5):394–402. https://doi.org/10.1016/j.jocrd.2013.12.001.
43. Pietrefesa AS, Coles ME. Moving beyond an exclusive focus on harm avoidance in obsessive-compulsive disorder: considering the role of incompleteness. Behav Ther. 2008;39(3):224–31. https://doi.org/10.1016/j.beth.2007.08.004.

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