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Examination of perception of threat from emotion as mechanisms underlying the relationship between obsessive compulsive symptom dimensions and anxiety symptoms

Esengul Ekici^{1*} and Kadir Ozdel²

Abstract

Background The present study examined the mediating role of perceived threats from anxiety in the relationships among trait anxiety, state anxiety, and the obsessive–compulsive symptom dimension in obsessive–compulsive disorder (OCD).

Methods Patients with OCD ($N = 170$) completed scales assessing trait and state anxiety, OCD dimensions symptom severity, and perceived threat from anxiety with mediation analyses.

Results Perceived threat from anxiety appears to be a significant mediator between trait anxiety and harm and unacceptable thoughts symptom dimensions; perceived threat from anxiety had minimal power as a mediator in the relationship between trait anxiety and in the contamination or symmetry dimensions. However, there were no significant relationships between state anxiety and harm and mistakes, unacceptable thoughts or symmetry dimensions except for the contamination dimension.

Conclusions The findings from our study indicate the significance of perceived threats of anxiety as a mediator function between trait anxiety and OCD symptom dimensions, which may be a maintenance factor. Enhancing the recognition of the role of cognitive mechanisms in the association between trait anxiety rather than state anxiety and different obsessive–compulsive symptom dimensions could contribute to the development of dimension-specific interventions.

Keywords Obsessive–compulsive symptoms, Anxiety, Perceived threat from anxiety, Dimension

Introduction

Obsessive–compulsive Disorder (OCD) is a psychiatric disorder characterized by obsessions and/or compulsions that imply considerable impairments in social,

interpersonal, professional, and academic lives [1]. OCD is heterogeneous, the clinical presentations of obsessive and compulsive symptoms are idiosyncratic, and symptoms may be categorized with dimensions- such as contamination obsessions-washing/cleaning behaviors, obsessional doubts-checking behaviors, obsessions concerning symmetry-ordering behaviors, and unwanted thoughts mental/other behaviors for neutralization [2]. Even though the etiology of OCD is not fully known, some researchers have determined that some features related to cognitive and emotional vulnerability increase

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susceptibility to the onset and progression of this disorder [3, 4], which could help improve the effectiveness of symptom dimension-targeted interventions.

OCD has typically been identified as an anxiety-based psychiatric disorder. While anxiety is crucial for the onset and prognosis of OCD, it has diverse roles in the severity of OCD symptoms dimensions [5] for example, it has an aversive role in that it could be an obstacle to anxiety [6]. "State anxiety" indicates temporary psychological responses directly bonded to unfavorable circumstances at a particular moment. The association between trait affect and emotional reasoning highlights how trait affect influences individuals' utilization of state affect in risk assessments. "Trait anxiety" is identified as a personality trait that implies that individual variations lead to a predisposition to experience state anxiety [7]. Trait anxiety is a characteristic feature in individuals who perceive situations as threatening, which leads to higher baseline physiological arousal and avoidance of anxiety-evoking difficulties [8]. These difficulties could serve as different predictors of trait anxiety [3] in patients with OCD symptoms rather than state anxiety [9]. In addition to anxiety in OCD symptomatology, some researchers propose that appraisals, plans, and strategies related to anxiety may also be critical in terms of coping with the feeling of anxiety, which is one of the features of vulnerability [3, 10]. According to Lazarus's appraisal theory, "primary appraisal" comprises a response to a stressful situation and assesses how relevant the stressful situation is to the individual's goals, values, beliefs, and well-being. "Secondary appraisal" involves evaluating available resources, options, perceived coping strategies, and management potential associated with the stressor [11]. Therefore, Mayer and Gaschke (1988) emphasized that the primary appraisal of emotion represents the initial assessment of the experienced emotion, but, secondary appraisal involves evaluating the perceived coping potential associated with emotions [12]. Very few studies exist on the impacts of negative emotional appraisals. Several researchers have demonstrated that negative emotional appraisals impact the determination of emotion regulation strategies [13, 14], so maladaptive regulation strategies further cause emotion dysregulation [15, 16]. Gaynor and Gordon assume that the cognitive maintenance model of emotional dysregulation, a type of negative secondary appraisal of emotion, contributes to the intensity and duration of dysregulation of emotions among the general population [17]. The cognitive maintenance model of emotional dysregulation could also serve as a maladaptive emotion regulation strategy in OCD symptoms [10, 18].

A few studies have examined the distinct relationships between the appraisal of negative emotion and OCD

symptoms. McCubbin and Sampson (2006) postulated that perceived threats of emotions significantly predict values related to a general measurement of obsessiveness through the Padua Inventory. Therefore, a greater degree of perceived threat about emotions is strongly linked to increased obsessive compulsive (OC) symptoms, even after accounting for depression and anxiety. Perceived threats from anxiety scores are the sole significant predictor, surpassing cognitive measures such as 'general' beliefs regarding responsibility and thought-action fusion beliefs in predicting obsessiveness [6]. McDermott et al. (2019) reported that the appraisal of negative emotion did not fully explain the relationship between distress intolerance (DI), which symbolized the ability to endure challenging emotional and physical sensations as a transdiagnostic factor, and internalizing symptoms. However, fear of negative emotions only explains the connection between DI and OC symptoms [19]. In undergraduate students, the perception of threats of anxiety and embarrassment negative emotions explained approximately 17% of the variance in OC symptoms [16].

Emotional appraisals, including those relevant to disgust, anxiety, guilt, and anger, have significance in the OCD literature, especially perceived threats related to anxiety [16, 20]. Research has indicated that the perceived threat of anxiety is differently associated with OCD symptom dimensions. The perceived threat of anxiety is correlated with responsibility for harm and unwanted obsessional thoughts, but not with the contamination and symmetry dimensions [20]. Smith et al. (2012) reported that the perceived threat of anxiety is associated with responsibility for harm, unwanted thoughts, and symmetry dimensions but not the contamination dimension [21]. Additionally, related to emotional appraisals and possible emotional regulation outcomes, some differences between OCD symptom dimensions have been reported [3]. These results are in line with those of past studies that revealed the associations of the different degrees of the perceived threats of negative emotion as a cognitive structure in obsessive-compulsive symptom dimensions.

Research has shown that there is a distinct relationship between anxiety, perceived threats of anxiety, and OC symptoms in individuals with OCD. A limited number of studies have investigated how these factors may explain this relationship; few studies have examined the relative importance of various appraisal mechanisms for different dimensions of OCD symptoms. Defining the specific cognitive pathways that underlie different dimensions of OCD could lead to the promotion of more targeted interventions for individuals with OCD. Our study aims to address this gap, which is the first study, to the best of our knowledge, understanding "Does perceived threat

of anxiety mediate the relation between both state anxiety, trait anxiety, and the severity of four distinct obsessive–compulsive symptom dimensions?” is our research question for the perspective of cognitive and behavioral approach. We hypothesize that the perceived threats from the anxiety mediate the relationship between both state anxiety, trait anxiety, and the severity of contamination, harm and unacceptable thoughts, symmetry dimensions.

Method

Participants and procedure

A total of 170 patients who were diagnosed with OCD via the Structured Clinical Interview for Diagnostic and Statistical Mental Disorders 5-Clinician Version (SCID 5-CV) [22] and admitted to the psychiatry outpatient clinic of a hospital between 2023 and 2024 were included in our study. The inclusion criteria for our study included being an OCD patient on the basis of the DSM-5, being over 18 year of age, being able to provide informed consent, and having the ability to read and write. The exclusion criteria for the study included schizophrenia and psychotic disorders, bipolar affective disorders, neurological disorders, mental retardation, and substance use disorders, according to the DSM-5. The participants were presented with detailed information about our study, and informed consent was obtained. Each participant subsequently provided demographic information and three questionnaires. All the materials and procedures followed the ethical guidelines and were approved by the Yuksek Ihtisas University Ethics Committee outlined by the 2013 Helsinki Declaration (Date: 23.11.2023, Number: 2023/03/43).

Measurements

Dimensional Obsession Compulsion Scale (DOCS)

The DOCS assesses the severity of obsessive–compulsive symptoms. It has 20 items and four domains: contamination/washing (DOCS-C), responsibility from harm and mistakes/checking behavior (DOCS-H), unacceptable obsessional thoughts/neutralization behavior (DOCS-U), and symmetry/ordering (DOCS-S) [2]. Safak and colleagues (2018) examined scale psychometric properties and adapted them to Turkish. The reliability coefficients were calculated as 0.93 for the contamination subscale of the DOCS, 0.93 for the harm subscale of the DOCS, 0.95 for the unaccepted thoughts subscale of the DOCS, and 0.92 for the symmetry subscale of the DOCS, on the basis of Cronbach's alpha values [23]. Compared with the original study, the adapted measurement of the DOCS has satisfactory psychometric features. Our study's Cronbach's alpha coefficient values were 0.91 for the contamination subscale, 0.91 for the responsibility harm and

mistakes subscale, 0.93 for the unwanted thoughts subscale, and 0.90 for the symmetry subscale.

Perceptions Threat from Emotions Questionnaire (PTEQ)

This scale examines threat beliefs related to happiness, sadness, anger, fear/anxiety, disgust, guilt, lust, and strong emotions. We used only the anxiety subscale for our study. For instance, sample items include “Do you think it is dangerous to feel anxiety?”, “Could anxiety cause you to lose control and do things you would later regret?” and “Could anxiety overwhelm you so that you are unable to function?”. Responses were scored on a five-point Likert scale ranging from not at all (0) to definitely (5). In the original scale, the first seven items related to ‘perceptions of threat about emotion,’ followed by item 8, checking whether individuals can identify each emotion, and item 9, asking about the frequency with which they experience each emotion. The PTEQ has nine items, but total scores were obtained with the first seven items summed and used for analyses. This measurement's divergent validity and reliability ($\alpha \geq 0.70$) were shown to be satisfactory [6]. Ekici and Özdel (2023) assessed the psychometric properties of the Turkish language's anger, anxiety, guilt, and disgust subscales. Compared with original PTEQ, the adapted version of the four subscales has shown exemplary internal consistency, test–retest reliability, convergent validity, and an acceptable factor structure [24]. The Cronbach's alpha coefficient of the PTEQ anxiety score was 0.91, which is the reliability analysis in our study.

State-Trait Anxiety Inventory (STAI)

The STAI evaluates state and trait anxiety with 40 items [25]. Higher questionnaire scores are related to higher anxiety levels. Oner and LeCompte examined the psychometric properties of the Turkish form. They demonstrated high reliability and validity with comparable original scales [26]. In our study, the reliability value via Cronbach's alpha was 0.93 for the STAI-state (STAI-S) and 0.90 for the STAI-trait (STAI-T).

Statistical analysis

Descriptive statistics were defined with means, standard deviations, ranges, skewness and kurtosis values, and frequencies, percentages. The correlations between the severity of OCD dimensions, state and trait anxiety, and PTEQ-anxiety variables were analyzed via correlation analysis. Mediation models were utilized via SPSS (version 25), Mplus (version 8), and JASP (version 0.18.1.0) for the regression-based mediation analysis with the MedMod package (R program-based). One model was used four times for the mediation analyses. Firstly, for the factors related to the severity levels of DOCS-C;

secondly, for the factors related to the extent of DOCS-H, thirdly the factors associated with the severity levels of DOCS-U; and lastly, the factors related to the extent of DOCS-S were modeled separately. The sampling distribution of the indirect effects was bootstrapped 10,000 times to establish the lower and upper bounds of the 95% confidence interval (CI) of the indirect effects. A CI that does not include 0 indicates that the indirect effect is statistically significant with 95% confidence [27, 28]. Mediation analyses that utilize bootstrapping are not sensitive to deviations from normality assumptions. This is because the bootstrap confidence interval approach for testing indirect effects does not rely on the assumption that these effects follow a normal distribution [29]. In bootstrap resampling, the estimates are derived from nonparametric sampling distributions of the indirect effects. Consequently, unlike standard confidence intervals, bootstrap confidence intervals do not have to follow a normal distribution [28]. The direct impacts of anxiety and PTEQ-anxiety scores on all the dependent variables (DOCS-C, DOCS-H, DOCS-U, DOCS-S) are reported below.

Results

Clinical characteristics

A total of 32.4% of the OCD patients were male ($N=55$), their mean age was 31.52 ± 11.64 years and their mean years of education was 12.38 ± 3.66 years. Additionally, 29.4% of these patients were smokers ($N=50$). Some individuals with OCD had other psychiatric disorders, such as general anxiety disorder ($N=17$), depression ($N=45$), social anxiety disorder ($N=25$), specific phobia ($N=52$), and OCD-related disorders ($N=34$). (see Table 1).

Table 2 shows the means, standard deviations, ranges, skewness and kurtosis values, Cronbach's alpha coefficients, and correlations between the DOCS, STAI-state, STAI-trait, and PTEQ-anxiety subscales. The skewness and kurtosis values of the DOCS-C, DOCS-H, DOCS-U, DOCS-S, STAI-state, STAI-trait, and PTEQ-anxiety subscales used in the present study were within the range of ± 2 (Shiel & Cartwright, 2015). The reliability of all the scales was good (Cronbach's $\alpha \geq 0.90$). The strongest relationship was found between the DOCS-unacceptable subscale scores and the STAI-trait subscale scores ($r=0.61, p<0.01$), and the most negligible relationship was found between the STAI-state scores and the DOCS-symmetry subscale scores ($r=0.30, p<0.01$) in patients with OCD (see Table 2).

Mediation Analyses

In the first mediation analysis, we used the DOCS-C score as the dependent variable. Table 3 shows that the direct effects of the STAI-state and STAI-trait scores

Table 1 Sociodemographic characteristics of OCD sample

OCD (N=170)		
Age; year <i>M</i> (<i>SD</i>)		
31.52 (11.64)		
Years of education; year <i>M</i> (<i>SD</i>)		
12.38 (3.66)		
Sex	Female	115 (67.6%)
	Male	55 (32.4%)
Marital status	Single	99 (58.23%)
	Married	71 (41.77%)
Occupation	Unemployed	14 (8.2%)
	Students	52 (30.6%)
	Housewives	38 (22.4%)
	Civil servants/workers	60 (35.3%)
	Retired	6 (3.5%)
Current treatment	Yes	98 (67.1%)
	No	48 (32.9%)
Past treatment	Yes	91 (62.3%)
	No	55 (37.7%)

on the DOCS-C score were statistically significant (total effect, $\beta=0.081, p<0.05$; 95% $CI=-0.015-0.158$; $\beta=0.115, p<0.05$; 95% $CI=-0.010-0.175$, respectively). When the mediator variable (PTEQ-anxiety) was included in the model, the STAI-state and STAI-trait levels had statistically insignificant effects on the DOCS-C score (direct effect, $\beta=0.075, p>0.05$; 95% $CI=-0.015-0.158$; $\beta=0.077, p>0.05$; 95% $CI=-0.010-0.175$). The results indicated that the STAI-trait score indirectly affected the DOCS-C score, which was fully mediated by the PTEQ-anxiety score (indirect effect, $\beta=0.039, p<0.05$; 95% $CI=0.008-0.090$). As a result, the PTEQ-anxiety score fully mediated the relationships between the STAI-trait score and the STAI-state and DOCS-C scores (see Fig. 1).

The DOCS-H score was used as the dependent variable in the second mediation analysis. Table 4 shows that the direct impact of the STAI-trait level on the DOCS-H score was statistically significant, whereas that of the STAI-state was not significant (total effect, $\beta=0.242, p<0.05$; 95% $CI=0.136-0.345$; $\beta=0.003, p>0.05$; 95% $CI=-0.091-0.096$, respectively). When the mediator variable (PTEQ-anxiety) was included in the model, the results revealed that the STAI-trait level was still statistically significant for the DOCS-H score (direct effect, $\beta=0.168, p<0.001$; 95% $CI=0.073-0.280$). The results implied that the STAI-trait score indirectly affected the DOCS-H score, partially mediated by the PTEQ-anxiety score (indirect effect, $\beta=0.074, p<0.05$; 95% $CI=0.036-0.129$). As a result, the PTEQ-anxiety score was found to play a partial mediating role in the relationship between the STAI-trait score and the DOCS-H score.

Table 2 Descriptive statistics and correlations among the study measures (*N* = 170)

Variables	<i>M</i>	<i>SD</i>	Range	<i>SK</i>	<i>KU</i>	α	1	2	3	4	5	6
1. STAI-state	43.68	12.10	22–75	0.18	−0.61	0.93	–					
2. STAI-trait	50.76	10.92	26–78	0.14	−0.24	0.90	0.71**	–				
3. PTEQ-anxiety	17.42	5.98	5–28	0.38	−0.62	0.91	0.43**	0.54**	–			
4. DOCS-C	8.14	4.88	0–20	0.45	−0.65	0.91	0.38**	0.40**	0.35**	–		
5. DOCS-H	7.65	5.07	0–20	0.43	−0.90	0.91	0.38**	0.53**	0.52**	0.37**	–	
6. DOCS-U	8.00	5.35	0–20	0.72	−0.47	0.93	0.48**	0.61**	0.58**	0.38**	0.67**	–
7. DOCS-S	5.55	4.59	0–18	−0.12	−0.85	0.90	0.30**	0.32**	0.34**	0.45**	0.45**	0.49**

Significant effects are in bold

DOCS-C Dimensional Obsessive Compulsive Scale-Contamination, *DOCS-H* Dimensional Obsessive Compulsive Scale-Harm, *DOCS-U* Dimensional Obsessive Compulsive Scale-Unacceptable Thoughts, *DOCS-S* Dimensional Obsessive Compulsive Scale-Symmetry, *PTEQ-anxiety* Perceived Threats of Emotion Questionnaire-anxiety subscales, *STAI* State-Trait Anxiety Inventory

* *p* < 0.05

** *p* < 0.01

Table 3 Standardized direct and indirect effects of STAI-state, STAI-trait and PTEQ-anxiety on the DOCS-C score

Path	Effect	β	Lower 95% CI	Upper 95% CI	<i>P</i>
Indirect	STAI-state $\Rightarrow$ PTEQ-Anxiety $\Rightarrow$ DOCS-C	0.006	−0.008	0.028	0.395
	STAI-trait $\Rightarrow$ PTEQ-Anxiety $\Rightarrow$ DOCS-C	0.039	0.008	0.090	0.045
Components	STAI-state $\Rightarrow$ PTEQ-Anxiety	0.042	−0.077	0.145	0.355
	PTEQ-Anxiety $\Rightarrow$ DOCS-C	0.145	0.023	0.275	0.030
	STAI-trait $\Rightarrow$ PTEQ-Anxiety	0.266	0.144	0.387	0.000
Direct	STAI-state $\Rightarrow$ DOCS-C	0.075	−0.015	0.158	0.059
	STAI-trait $\Rightarrow$ DOCS-C	0.077	−0.010	0.175	0.104
Total	STAI-state $\Rightarrow$ DOCS-C	0.081	−0.015	0.158	0.043
	STAI-trait $\Rightarrow$ DOCS-C	0.115	−0.010	0.175	0.009

DOCS-C Dimensional Obsessive Compulsive Scale-Contamination, *PTEQ-anxiety* Perceived Threats of Emotion Questionnaire-anxiety subscale; state and trait anxiety domains of *STAI* State-Trait Anxiety Inventory. Numbers represent standardized β coefficients. In bootstrapping analysis, significant indirect effects (*p* < 0.05, two-tailed) are indicated by a 95% bias-corrected and accelerated confidence intervals (CI) that do not include the value of 0. Significant effects are in bold

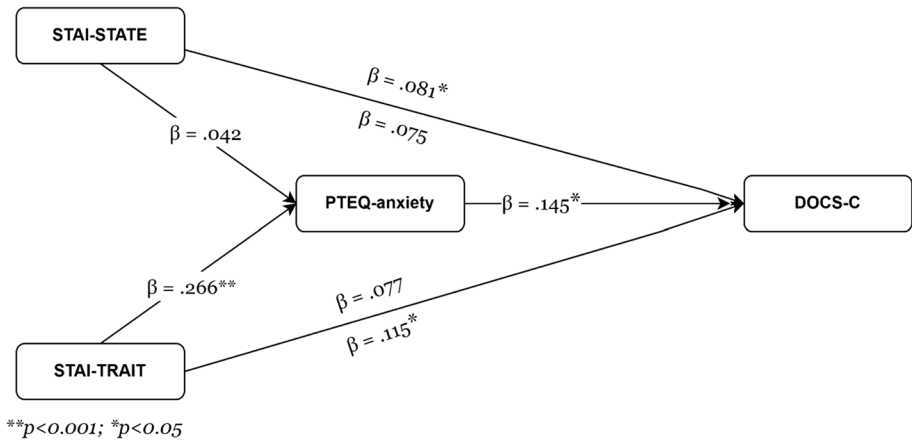


Fig. 1 Mediation model with scores on the state and trait domains of State-Trait Anxiety Inventory (STAI) as the predictor variable; Dimensional Obsessive Compulsive Scale-Contamination (DOCS-C) as the outcome variable; and PTEQ-anxiety = Perceived Threats of Emotion Questionnaire-anxiety subscale as mediator. Numbers represent standardized β coefficients. **p* < 0.05; ***p* < 0.001

Table 4 Standardized direct and indirect effects of STAI-state, STAI-trait and PTEQ-anxiety on the DOCS-H score

Path	Effect	β	Lower 95% CI	Upper 95% CI	<i>p</i>
Indirect	STAI-state $\Rightarrow$ PTEQ-Anxiety $\Rightarrow$ DOCS-H	0.012	−0.015	0.050	0.366
	STAI-trait $\Rightarrow$ PTEQ-Anxiety $\Rightarrow$ DOCS-H	0.074	0.036	0.129	0.000
Components	STAI-state $\Rightarrow$ PTEQ-Anxiety	0.042	−0.064	0.162	0.355
	PTEQ-Anxiety $\Rightarrow$ DOCS-H	0.277	0.154	0.412	0.000
	STAI-trait $\Rightarrow$ PTEQ-Anxiety	0.266	0.153	0.380	0.000
Direct	STAI-state $\Rightarrow$ DOCS-H	−0.009	−0.096	0.070	0.816
	STAI-trait $\Rightarrow$ DOCS-H	0.168	0.073	0.280	0.000
Total	STAI-state $\Rightarrow$ DOCS-H	0.003	−0.091	0.096	0.077
	STAI-trait $\Rightarrow$ DOCS-H	0.242	0.136	0.345	0.000

Significant effects are in bold

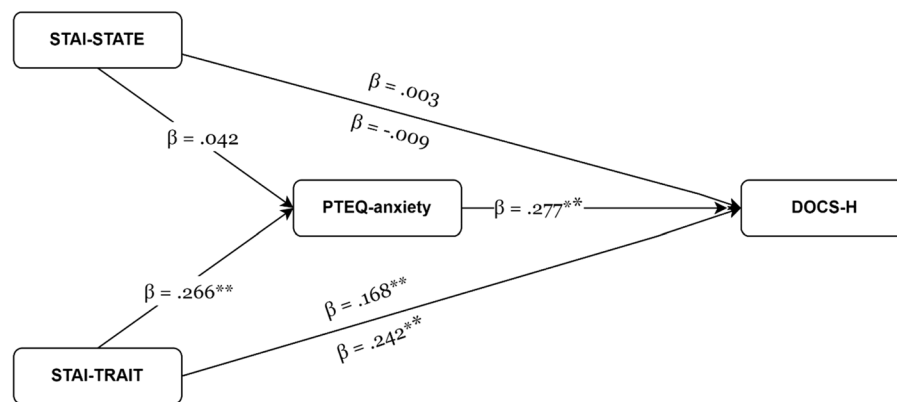
DOCS-H Dimensional Obsessive Compulsive Scale-Harm; *PTEQ-anxiety* Perceived Threats of Emotion Questionnaire-anxiety subscale; state and trait anxiety domains of *STAI* State-Trait Anxiety Inventory. Numbers represent standardized β coefficients. In bootstrapping analysis, significant indirect effects ($p < 0.05$, two-tailed) are indicated by a 95% bias-corrected and accelerated confidence intervals (CI) that do not include the value of 0

Nevertheless, no statistically significant relationship existed between the STAI-state score and the DOCS-H score (see Fig. 2).

In the third mediation analysis, we used the DOCS-U score as the dependent variable. Table 5 shows that the results of the direct effect of the STAI-trait level on the DOCS-U score were statistically significant, but the STAI-state was not significant (total effect, $\beta = 0.268$, $p < 0.001$; 95% $CI = 0.181$ – 0.369 ; $\beta = 0.040$, $p > 0.05$; 95% $CI = -0.051$ – 0.133 , respectively). When the mediator variable (PTEQ-anxiety) was incorporated into the model, the STAI-trait level was still statistically significant for the DOCS-U score (direct effect, $\beta = 0.184$, $p < 0.001$; 95% $CI = 0.100$ to 0.282). The results demonstrated that the STAI score indirectly affected the DOCS-U score, which was partially mediated by the PTEQ-anxiety score (indirect effect, $\beta = 0.084$, $p < 0.05$;

95% $CI = 0.047$ – 0.144). As a result, the PTEQ-anxiety score partially mediated the relationship between the STAI-trait score and the DOCS-U score. Nevertheless, no statistically significant relationship existed between the STAI-state score and the DOCS-U score (see Fig. 3).

In the last mediation analyses, we used the DOCS-S score as the dependent variable. Table 6 shows that the direct effect of the STAI-trait level on the DOCS-S score was statistically significant, but the STAI-state was not significant (total effect, $\beta = 0.091$, $p < 0.05$; 95% $CI = 0.008$ – 0.182 ; $\beta = 0.055$, $p > 0.05$; 95% $CI = -0.029$ – 0.127 , respectively). When the mediator variable (PTEQ-anxiety) was included in the model, the STAI-trait level was still statistically significant on the DOCS-S score (direct effect, $\beta = 0.043$, $p > 0.05$; 95% $CI = -0.046$ to 0.132). The results indicated that the STAI-trait score indirectly affected the DOCS-S



** $p < 0.001$; * $p < 0.05$

Fig. 2 Mediation model with scores on the state and trait domains of State-Trait Anxiety Inventory (STAI) as the predictor variable; Dimensional Obsessive Compulsive Scale-Harm (DOCS-H) as the outcome variable; and PTEQ-anxiety = Perceived Threats of Emotion Questionnaire-anxiety subscale as mediator. Numbers represent standardized β coefficients. * $p < 0.05$; ** $p < 0.001$

Table 5 Standardized direct and indirect effects of STAI-state, STAI-trait and PTEQ-anxiety on the DOCS-U score

Path	Effect	β	Lower 95% CI	Upper 95% CI	P
Indirect	STAI-state $\Rightarrow$ PTEQ-Anxiety $\Rightarrow$ DOCS-U	0.013	−0.021	0.049	0.362
	STAI-trait $\Rightarrow$ PTEQ-Anxiety $\Rightarrow$ DOCS-U	0.084	0.047	0.144	0.000
Components	STAI-state $\Rightarrow$ PTEQ-Anxiety	0.042	−0.067	0.148	0.355
	PTEQ-Anxiety $\Rightarrow$ DOCS-U	0.316	0.200	0.440	0.000
	STAI-trait $\Rightarrow$ PTEQ-Anxiety	0.266	0.153	0.389	0.000
Direct	STAI-state $\Rightarrow$ DOCS-U	0.027	−0.053	0.111	0.447
	STAI-trait $\Rightarrow$ DOCS-U	0.184	0.100	0.282	0.000
Total	STAI-state $\Rightarrow$ DOCS-U	0.040	−0.051	0.133	0.292
	STAI-trait $\Rightarrow$ DOCS-U	0.268	0.181	0.369	0.000

Significant effects are in bold

DOCS-U Dimensional Obsessive Compulsive Scale-Unacceptable thoughts, *PTEQ-anxiety* Perceived Threats of Emotion Questionnaire-anxiety subscale; state and trait anxiety domains of *STAI* State-Trait Anxiety Inventory. Numbers represent standardized β coefficients. In bootstrapping analysis, significant indirect effects ($p < 0.05$, two-tailed) are indicated by a 95% bias-corrected and accelerated confidence intervals (CI) that do not include the value of 0

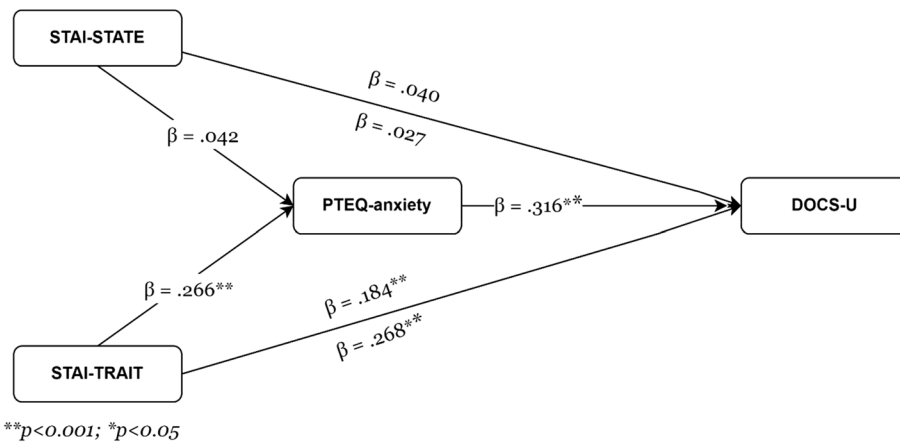


Fig. 3 Mediation model with scores on the state and trait domains of State-Trait Anxiety Inventory (STAI) as the predictor variable; Dimensional Obsessive Compulsive Scale-Unacceptable thoughts (DOCS-U) as the outcome variable; and PTEQ-anxiety = Perceived Threats of Emotion Questionnaire-anxiety subscale as mediator. Numbers represent standardized β coefficients. * $p < 0.05$; ** $p < 0.001$

Table 6 Standardized direct and indirect effects of STAI-state, STAI-trait and PTEQ-anxiety on the DOCS-S score

Path	Effect	β	Lower 95% CI	Upper 95% CI	p
Indirect	STAI-state $\Rightarrow$ PTEQ-Anxiety $\Rightarrow$ DOCS-S	0.008	−0.013	0.033	0.380
	STAI-trait $\Rightarrow$ PTEQ-Anxiety $\Rightarrow$ DOCS-S	0.048	0.017	0.094	0.014
Components	STAI-state $\Rightarrow$ PTEQ-Anxiety	0.042	−0.088	0.133	0.355
	PTEQ-Anxiety $\Rightarrow$ DOCS-S	0.181	0.050	0.323	0.005
	STAI-trait $\Rightarrow$ PTEQ-Anxiety	0.266	0.156	0.392	0.000
Direct	STAI-state $\Rightarrow$ DOCS-S	0.047	−0.036	0.114	0.222
	STAI-trait $\Rightarrow$ DOCS-S	0.043	−0.046	0.132	0.348
Total	STAI-state $\Rightarrow$ DOCS-S	0.055	−0.029	0.127	0.164
	STAI-trait $\Rightarrow$ DOCS-S	0.091	0.008	0.182	0.036

Significant effects are in bold

DOCS-S Dimensional Obsessive Compulsive Scale-Symmetry, *PTEQ-anxiety* Perceived Threats of Emotion Questionnaire-anxiety subscale; state and trait anxiety domains of *STAI* State-Trait Anxiety Inventory. Numbers represent standardized β coefficients. In bootstrapping analysis, significant indirect effects ($p < 0.05$, two-tailed) are indicated by a 95% bias-corrected and accelerated confidence intervals (CI) that do not include the value of 0

score, which was fully mediated by the PTEQ-anxiety score (indirect effect, $\beta = 0.006$, $p < 0.001$; 95% $CI = 0.002-0.010$). As a result, it was demonstrated that the PTEQ-anxiety score fully mediated the relationship between the STAI-trait level and the DOCS-S score. Nevertheless, no statistically significant relationship existed between the STAI-state score and the DOCS-S score (see Fig. 4).

Discussion

Our study evaluated the “Does the perceived threat of anxiety mediate the relation between both state anxiety, trait anxiety, and the severity of four distinct obsessive-compulsive symptom dimensions?”. Our study revealed that trait anxiety was determined to be a considerable predictor of all obsessive-compulsive symptom domains in patients with OCD. However, unlike the STAI-trait, no statistically significant relationships exist between the DOCS-H, DOCS-U, DOCS-S, and STAI-state, except the contamination dimension. Our results determined that the PTEQ-anxiety score is fully mediated between the DOCS-C score and the STAI-state score. However, it could be emphasized that the explanatory power of the PTEQ-anxiety varied for each OCD symptom dimension.

The cognitive maintenance model of emotional dysregulation presumes that the severity and duration of experienced emotional dysregulation are pointed out in secondary appraisals, hyperactivating attachment strategies, deactivating attachment strategies, and rumination for maintenance [17]. Our findings indicate that trait anxiety rather than state anxiety is a significant positive predictor of perceived threats from anxiety for all OCD symptom dimensions. These results are aligned with those of people with high levels of trait anxiety, who are more vulnerable to stress and present particular

neurocognitive styles that involve an attentional bias toward threat stimuli, which could be used to interpret ambiguous stimuli about emotion as negative data, leading to the development of conditioned fear responses [30]. Specifically, dysregulated emotions such as anxiety are perceived as overwhelming and threatening. For example, ‘I will not be able to overcome these emotions’ and ‘these emotions are excessive and unbearable for coping’ [17]. These appraisals enhance the salience of dysregulated emotions [31, 32]. Individuals prone to perceiving threats about anxiety who have anxiety in the context of distressing thoughts or images may be related to strengthened vigilance against danger, efforts to evade emotions, and the utilization of maladaptive strategies to handle unpleasant emotions such as performing compulsion [6], which is consistent with our findings.

The PTEQ-anxiety scale was shown to mediate the relationships between trait anxiety and the DOCS-C, DOCS-H, DOCS-U, and DOCS-S dimensions, which is consistent with our hypothesis. These findings replicate those of previous studies that have indicated that the PTEQ-anxiety is related to obsessions and compulsions about responsibility from harm and repugnant unwanted thoughts symptom dimensions but not contamination and symmetry dimensions in OCD and anxiety disorders [20]. Smith et al. (2012) reported that the perceived threat of anxiety is associated with responsibility for harm, unwanted thoughts, and symmetry symptom dimensions but not with contamination [21]. The necessity of diminishing negative emotions and negative emotion appraisal, which is related to the heightened sensitivity and nonacceptance of anxiety [18], might result in avoidance or reassurance-seeking to abolish anxiety. The perceived threats from anxiety could include attempts at

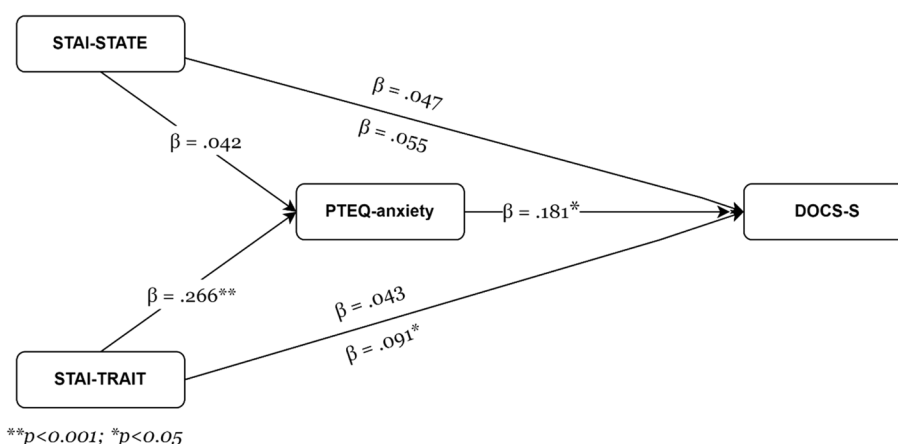


Fig. 4 Mediation model with scores on the state and trait domains of State-Trait Anxiety Inventory (STAI) as the predictor variable; Dimensional Obsessive Compulsive Scale-Symmetry (DOCS-S) as the outcome variable; and PTEQ-anxiety = Perceived Threats of Emotion Questionnaire-anxiety subscale as mediator. Numbers represent standardized β coefficients. * $p < 0.05$; ** $p < 0.001$

avoiding emotions due to the utilization of maladaptive strategies such as reassurance-seeking and the amplification of increasingly complicated routines and rituals [10]. Checking compulsions is conceptualized as seeking to obstruct harm or dangerous outcomes or to lessen anxiety (e.g., checking the oven to prevent fire, checking the news, their messages, and reassurance seeking from loved ones about being a pedophile or killer). Therefore, the mediation of the perceived threat of anxiety in the harm and responsibility and unacceptable thoughts symptom dimensions may lead to strengthened checking or reassurance-seeking behaviors. It might be a maintenance factor for the compulsion of these OCD domains. This could also explain why individuals with worry and rumination could avoid or reduce their negative feelings, which is relevant to their obsessions in controlling negative emotions [33]. Rumination is significant in responsibility for harm and mistakes [34] and unacceptable thoughts [3, 34, 35]. Researchers have shown that negative emotional appraisal is associated with more intense emotional dysregulation, which leads to increased OCD symptoms [10, 18] mediated by rumination [36]. However, rumination and emotional dysregulation were not examined in our study. Our study demonstrated that perceived threats of anxiety also mediated between trait anxiety and the contamination and symmetry dimensions. Contamination symptoms might be related to disgust appraisals [37] and guilt appraisals [38], which were not examined in our study. In addition, for symmetry, the symptom dimension is related to and predicted by not just right feelings (NJRF) [38, 39] or NJRF appraisal [21], which are not measured in our study. Future investigations are necessary to better understand the emotional processes between trait anxiety, rumination, disgust, guilt, NJRF emotional appraisals, emotional dysregulation, and OCD symptom dimensions.

Our study revealed that the PTEQ-anxiety score is fully mediated between the DOCS-C score and the STAI-state score, which is consistent with our hypothesis and is supported by several studies in the literature [40, 41]. However, unlike the STAI-trait, no statistically significant relationships exist between the DOCS-H, DOCS-U, DOCS-S, and STAI-state, which is discrepant with our hypothesis. Only mediation through the PTEQ-anxiety score between the STAI-state and DOCS-C rather than other symptom dimensions could be related to the fact that induced anxiety could enhance reported disgust (Marzillier & Davey et al., 2005), which could cause an emotion-specific interpretation bias (Fink-Lamotte et al., 2020) and is vital for contamination related-OCD rather than other dimensions [45]. However, disgust was not measured in our study. Future investigations are necessary to examine the emotional processes between the

state anxiety, disgust, emotional appraisal, and OCD symptom dimensions.

Our study has several limitations in interpreting the findings. Our OCD sample is heterogeneous concerning sex and the duration of the OCD, which has a possible effect on OC symptoms, and the type and duration of pharmacotherapy, which has a potential impact on the results regarding the state of anxiety. The size and single center of the study sample could prevent the generalization of our findings. Another limitation of our study is its cross-sectional design, which limits our ability to make causal inferences about the relationships, nonexperimental measurements, and self-reported measurements. Therefore, it is necessary to involve longitudinal, larger, experimental, multiple-center, qualitative analysis as a mixed-method approach.

Despite our limitations, this study has numerous strengths. In the literature, studies have examined links related to anxiety and emotional appraisal; to our knowledge, the present study is the first to explore the relationships among trait anxiety, state anxiety, the perceived threat of anxiety, and OCD symptom dimensions in an OCD sample. A few studies have shown the relevance of emotional appraisals as a vulnerability factor indicated in psychopathologies [17], especially OCD [21]. Accordingly, traditional cognitive and behavioral strategies such as exposure and response prevention (ERP) target beliefs and appraisals have been indicated to have significant effectiveness for the psychotherapy of OCD [42]. Hence, to optimize the efficacy of interventions in OCD patients, clinicians could consider employing cognitive techniques tailored to address these perceived threats of anxiety [43] via techniques that emerge from the emotional schema therapy approach, which targets beliefs about normalization, understanding, tolerance or self-regulation of emotions or acceptance and mindfulness (e.g., acceptance and commitment therapy)-based approaches, which might be helpful for acceptance, incorporating behavioral experiments designed to alter these appraisals, which may enhance effectiveness compared with conventional ERP alone. Future research may facilitate highlighting relationships between obsessive-compulsive symptom dimensions and perceived threat from anxiety by focusing on other cognitive or affective vulnerability factors with specific interventions in different OCD dimensions.

The findings from our study implicated the significance of perceived threats related to anxiety as a mediator relationship between trait anxiety and the OCD symptom dimension, which may be a maintenance factor. Specifically, the PTEQ-anxiety score seems to be a significant mediator between trait anxiety and harm and unacceptable thoughts symptom dimensions. The PTEQ-anxiety score had minimal power as a mediator in the

relationship between trait anxiety and the context of contamination or symmetry dimensions. The most effective and adequate treatments for OCD fail to elicit a response in approximately 50% of individuals with OCD [44]. There is a need to promote the efficacy of interventions for OCD dimensions, which were previously determined to have distinct features relevant to cognitive or affective vulnerability factors [3, 45]. Enhancing the recognition of the role of cognitive mechanisms in the association between trait anxiety rather than state anxiety and different obsessive-compulsive symptom dimensions could contribute to the development of dimension-specific interventions. In particular, the results from our study may reinforce the integration of interventions that help directly address negative appraisals of anxiety when working with individuals exhibiting responsibility from harm and mistakes and unacceptable symptom dimensions.

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Authors' contributions

Research idea: KÖ, EE. Design of the study: KÖ, EE. Acquisition of data for the study: EE. Analysis of data for the study: KÖ, EE. Interpretation of data for the study: KÖ, EE. Drafting the manuscript: KÖ, EE. Revising it critically for important intellectual content: KÖ, EE. Final approval of the version to be published: KÖ, EE.

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Data availability

All relevant data are within the manuscript and they are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This study (November 23rd, 2023; 2023/03/43) received Yuksek Ihtisas University Ethics Committee approval, and it was conducted under the ethical standards set out in the 2013 Helsinki Declaration. The participants were informed in detail, and informed consent was obtained.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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