



## Development of a Psychometric Instrument Based on the Inference-Based Approach to Obsessive-Compulsive Disorder: The Obsessional Probabilistic Inference Scale

Obsesif Kompulsif Bozukluğa Çıkarıma Dayalı Yaklaşım Temelinde Psikometrik Bir Araç Geliştirilmesi: Obsesyonel Olasılıklı Çıkarım Ölçeği

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### ABSTRACT

**Introduction:** The current article addresses the validation of the construct of obsessional probabilistic inference in clinical and non-clinical samples. Obsessional probabilistic inference or obsessional doubt refers to a type of inferential process resulting in the belief that a state of affairs "maybe" causes development of a maladaptive cognitive coping style in terms of obsessing.

**Methods:** The latent structure of the Obsessional Probabilistic Inference Scale (OPIS) was evaluated with confirmatory factor analysis.

**Results:** Explanatory and confirmatory factor analyses indicated that a one-factor solution was satisfactory for the instrument, assessing a unidimensional psychological construct. The OPIS was shown to have high internal consistency in all samples, as well as temporal stability, relying on predominantly non-clinical individuals. The scale exhibited high convergent validity and successfully discriminated patients with obsessive-compulsive disorder from both depressive patients and controls.

**Conclusion:** The findings replicated and extended the role of reasoning process in the development and maintenance of obsessive compulsive symptoms. The results are discussed in regard to assumptions of the inference-based approach to obsessive-compulsive disorder. (*Archives of Neuropsychiatry 2014; 51: 355-362*)

**Key words:** Obsessional probabilistic inference, obsessive beliefs, obsessive-compulsive disorder, major depression, validation

**Conflict of Interest:** The authors reported no conflict of interest related to this article.

### ÖZET

**Giriş:** Obsesyonel olasılıklı çıkarım veya obsesyonel şüphe, uyumu bozucu bir bilişsel başa çıkma stili olarak kabul edilen obsesyonların tetikleyicisi olarak kişinin her an olumsuz bir şeylerle karşılaşabileceği yönde çıkarımlar yapmasına neden olan sürece verilen addır. Bu çalışmada klinik ve klinik olmayan örnekleme obsesyonel olasılıklı çıkarım kavramı altında ele alınan yapısının geçerliği araştırılmıştır.

**Yöntem:** Araştırmaya 50 obsesif kompulsif bozukluk hastası, 50 majör depresyon hastası ve 411 üniversite öğrencisi katılmıştır. Obsesyonel Olasılıklı Çıkarım Ölçeği'nin gizil faktör yapısı açımlayıcı ve doğrulayıcı faktör analizleriyle değerlendirilmiştir. Aracın birlikte geçerliğini değerlendirebilmek amacıyla Padua Envanteri-Revize, Obsesif İnanışlar Ölçeği ve Beck Depresyon Envanteri uygulanmıştır. Ölçme aracının ayırt ediciliği gruplar arasında varyans analizi yapılarak değerlendirilmiştir.

**Bulgular:** Açımlayıcı ve doğrulayıcı faktör analizleri ölçme aracının tek boyutlu bir yapıyı temsil ettiğini göstermiştir. Ölçeğin farklı örneklemlerde elde edilen iç tutarlılığı ve sadece klinik olmayan örneklemden elde edilen kararlılığı yüksek bulunmuştur. Yapılan analizler sonucunda ölçme aracının obsesif kompulsif bozukluk hastalarını majör depresyon ve normal toplum grubundan başarıyla ayırdığı görülmüştür.

**Sonuç:** Bulgular obsesif kompulsif belirtilerin ortaya çıkmasında ve süreğenliğinde bilişsel mantıksal çıkarım sürecinin önemli rol oynadığını göstermiştir. Sonuçlar obsesif kompulsif bozukluğa ilişkin çıkarımsa dayalı yaklaşımın varsayımları ışığında tartışılmıştır. (*Nöropsikiyatri Arşivi 2014; 51: 355-362*)

**Anahtar kelimeler:** Obsesyonel olasılıklı çıkarım, obsesif inanışlar, obsesif kompulsif bozukluk, majör depresyon, geçerlik

**Çıkar Çatışması:** Yazarlar bu makale ile ilgili olarak herhangi bir çıkar çatışması bildirmemişlerdir.

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## Introduction

Obsessive-compulsive disorder (OCD) is characterized by unwanted and repetitive thoughts and compulsive behaviors, including contamination, fear of harm, hoarding, order or symmetry, and control or checking (1,2,3). Cognitive models of obsessive-compulsive disorder have emphasized the role of underlying assumptions and beliefs that are central to misinterpretations of the significance of obsessive intrusions (4). This view of obsessions comes from findings that have found an equivalence in the content between normal preoccupations and obsessional intrusions (5,6). Contemporary cognitive behavior therapy (CBT) model derives largely from the *content-specificity hypothesis* of Beck (7) and has accentuated the interpretation process of intrusions that are converted into obsessions by virtue of significance for the person.

Clinical obsessions or intrusions are defined as ideas, thoughts, doubts, images, or impulses that intrude into the flow of consciousness (4,8). The CBT model has been criticized, in that contextual factors are not generally featured as an integral part of the schematic model of obsessions and compulsions (9). In the inference model of obsessive-compulsive disorder, the development of obsessions is not initiated by intrusions; rather, the initial event is an external or internal percept tied to a real event. The person experiences a scene, even as ordinary as seeing an object or hearing a word, etc., which then leads to worrying inferences. In short, the initial stage is an event in the inference-based approach of OCD. A primary inference follows this internal/external event, focusing on the negative consequences of the event. A secondary inference following the primary one represents anticipated consequences with regards to the content of primary inference (9,10,11).

The inference-based approach (IBA) does not completely disavow the current conceptualization of OCD; rather, it complements the CBT model by focusing on the reasoning process. The IBA has noted that the reasoning process may play a significant role in the development of obsession prior to obsessive appraisals. The model does not locate the source of distress in intrusive cognitions or in appraisals but rather in an initial doubting inference preceding appraisals specific to people with OCD. Doubting inference seems to be a part of the inductive process in OCD, which generates distrust to personal senses by causing distress and absorbing attention (9,11).

Initial studies looking at the reasoning process in obsessive-compulsive disorder detected that patients with OCD have a different style of reasoning in decision-making. Patients with OCD were consistently more cautious and require excessively more information in drawing conclusions in comparison to other types of anxiety disorders and normal controls (12,13,14,15). People with OCD seem to exhibit no significant differences from controls with deduction but do differ with inductive reasoning (16). O'Connor and Robillard (10,17) have delineated the existence of a specific inductive reasoning style peculiar to patients

with OCD, leading to onset and maintenance of obsessions and compulsions. Scholars have consistently found that the more a person with OCD infers in a way of probabilistic reasoning, the more he commits secondary inference, including negative expectations about the consequences that generate obsessions and compulsions (18,19,20).

Individuals with OCD will jump to the solution that the harm is possible rather than investigating or being certain about the danger. It seems like a particular reasoning process is in charge in OCD in which, if there is a chance of harm, even with very little probability, the possibility of harm is appraised as if it was strongly or inevitably present (11,21). People with OCD do not seem to have any problems perceiving reality (22) and employ a normal inference process in non-OCD situations (23,24). However, it appears that they focus on the probability of any harm, even in actual ordinary experiences, thereby resulting in the belief that "maybe" a state of affairs causes the development of a maladaptive coping style in terms of obsessing. In other words, the development of obsessions appears to be a coping response to this specific distressing inference style.

The inference-based model of obsessions is a relatively recent development in CBT, in that psychometric instruments assessing the claims of the model in clinical and non-clinical samples have been developed. The initial version of the Inferential Confusion Questionnaire (25) was developed to measure several key aspects of the concept of "inferential confusion" formulated by O'Connor and Robillard (17). An advanced version of the instrument, the Inferential Confusion Questionnaire-Expanded Version, offers a more comprehensive assessment of a tendency to make systematic reasoning errors that could give rise to the obsessional inference (26). A tendency to make reasoning errors, which is termed "inferential confusion," covers confusion of two logically distinct properties or objects, confusion of distinct events, selective use of out-of context facts, making up convincing scenarios, creating chances of arbitrary associations, distrust of normal perception, and inverse inferences (11,21).

In this study, we aimed at developing a new self-reported instrument to assess obsessional probabilistic inferences in line with the theoretical framework offered by the IBA model of OCD. The Obsessional Probabilistic Inference Scale (OPIS) consists of questions with regards to the probabilistic inferences about OCD-related themes. In each statement, the possibility of a negative event coming into reality, which may lead to doubt and obsessive thinking, is rated. This cognition is distinct from the inferential confusion in that obsessional inference is proposed as a type of systematic perception or inference style rather than being an error in the reasoning process. It is proposed in the current study that people with OCD may have such cognition, which may be a vulnerability factor for making negative inferences from which the obsessions are thought to originate. It is hypothesized that patients diagnosed with OCD will report significantly higher scores on this scale as compared

to both patients diagnosed with major depression and normal controls. Also, our aim was to confirm the construct validity of obsessional probabilistic inference in OCD by exploring the psychometric properties of the OPIS.

## Methods

### Participants

Participants in the obsessive-compulsive group were recruited from consecutive outpatient admissions to the psychiatry polyclinics at Ataturk University Yakutiye and Erzurum Regional Research and Training Hospitals, Erzurum, Turkey. The group was diagnosed with a primary disorder of obsessive-compulsive disorder by three independent clinicians with at least 5 years of experience. Patients were diagnosed with OCD on the basis of a clinical interview using the criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR). Inclusion criteria for the study were i) a primary diagnosis of OCD and ii) no evidence of current or past substance abuse/dependence, schizophrenia, bipolar disorder, or any organic mental disorder. The group consisted of 50 patients with OCD (28 were females, 56.0%). The average age was 27.94 years ( $SD \pm 8.46$ ; range from 18 to 62). The average time of education was 10.34 years ( $SD \pm 4.21$ ).

Patients in the major depressive disorder group were recruited from consecutive outpatient admissions to the psychiatry polyclinics at the Ataturk University Yakutiye and Erzurum Regional Research and Training Hospitals to seek help. Recruitment procedures followed the same general procedures, similar to the recruitment process in the OCD group. The diagnosis was based on a clinical interview by clinicians with at least 5 years of training using DSM-IV-TR criteria for major depressive disorder. Entry criteria for inclusion in the study were: i) a primary diagnosis of major depressive disorder and ii) no evidence of current or past substance abuse/dependence, schizophrenia, bipolar disorder, or any organic mental disorder. The sample of patients with major depression (MD) included 50 subjects (35 were females, 70.0%). The mean age was 29.50 years ( $SD \pm 9.71$ ; range from 17 to 59). The average amount of education was 12.42 years ( $SD \pm 3.61$ ).

The control sample consisted of 411 undergraduate students. There were 298 (72.5%) females and 113 males (27.5%). The mean age was 21.93 years, with a standard deviation of 1.93 and age range of 17 to 28 years. The average amount of education of the patients and controls was 13.86 years ( $SD \pm 0.84$ ). The regional ethics committee approved the study protocol, and all participants provided written informed consent.

### Measures

#### *Padua Inventory-Revised (PI-R)*

The PI-R is a 41-item revision of the original 60-item self-report instrument and offers improved discriminant validity over

the initial version, in that items that revealed high correlations with "worry construct" were removed (27,28). The revised version of the scale has five scales: Impulses, Checking, Washing, Rumination, and Precision. Each item is rated on a 5-point scale, ranging from 0 (*not at all*) to 4 (*very much*). The subscales showed adequate internal consistency in a sample recruited from clinical and non-clinical individuals (coefficient alphas ranged from 0.81 to 0.90) (29).

#### *Obsessive Beliefs Questionnaire (OBQ)*

The OBQ is a 44-item shortened version of the original 87-item psychometric instrument developed to assess the presence and strength of obsessive beliefs (30). Each item is rated on a 7-point Likert-type scale, ranging from 1 (*disagree very much*) to 7 (*strongly agree*). The original three-factor structure was replicated for the Turkish version of the scale. Its three subscales showed good internal consistency (coefficient alphas ranged from .86 to .88), temporal stability (correlations within two applications ranged from .69 to .81), and concurrent validity in discriminating patients with OCD from non-clinical controls (31).

#### *Beck Depression Inventory (BDI)*

The BDI is a 21-item self-report inventory developed to assess severity of depressive symptoms (32). On each of the items of the BDI, scores range from 0 to 3. The Turkish version of the instrument showed good psychometric properties in the validation study (33).

#### *Obsessional Probabilistic Inferences Scale (OPIS)*

The OPIS is a 20-item self-administered scale that was developed in the current study to systematically assess the initial obsessional probabilistic inference in OCD, based on the theoretical assumptions of the IBA model. Each item contains obsessive-compulsive symptom-related themes rated on an 11-point Likert-type scale, ranging from 0% to 100%. The instrument inquires as to the possibility of OCD-related situations happening that may doubt about even an ordinary state of affairs and convince the person with OCD to distrust his or her senses. The composite score of the questionnaire is used after the summed-up score is averaged. It is assumed that the more a participant reports the OPIS scores, the more prone he is to doubt, causing preceding appraisals, including anticipated negative consequences, and the more prone he is to generate obsessions.

#### **Statistical Analysis**

We begin with computing item total correlation coefficients to explore the level of item discrimination for each item included in the OPIS and INFER. Initial explanatory factor analysis using a principal component analysis algorithm was conducted to explore the factor structure of the psychometric instrument. The confirmatory factor analysis with a structural equation procedure was used to assess the fitness of the factor structure of

the data for the OPIS. Researchers should recognize that latent variable analysis with maximum likelihood minimization function may produce misleading results when assumptions of multivariate normality distribution are severely violated (34,35). Hence, we used a correction to fit indexes and standard errors for multivariate normality in estimating the model fit (36).

One-way ANOVAs were performed to explore the mean differences between groups on the measures of psychological variables. The Student-Newman-Keuls (SNK) test was preferred for post hoc multiple comparisons. Pearson product-moment correlation coefficients and partial correlation were computed to evaluate the convergent validity of the obsessional probabilistic inference. The internal consistency for each group and temporal stability over 15 days were computed. The statistical significance threshold was held to  $p < 0.05$ .

### Procedure

After obtaining written informed consent for the application protocol, students completed the battery of questionnaires in their classrooms after their lectures ended. Administration took on average 45 minutes.

### Results

Initially, we computed item-total correlations for the OPIS. The average item-total correlation in the overall sample for the OPIS was 0.48 (range 0.30 to 0.65). Principal component analysis was performed in the overall sample, consisting of clinical and non-clinical groups, in order to assess the construction of both scales. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.87 for the OPIS, which indicated that there were a sufficient number of participants in the sample to permit factor analyses. In the factor analytic assessment of the OPIS, a large first factor was emerged with an eigenvalue of 6.22, explaining 31% of the variance. The Cattell's scree plot analysis pointed out that most variance was explained by the initial factor, followed by a large drop and an elbow toward a less steep decline. All factor loadings obtained with the principal component analysis exceeded 0.30, which can be interpreted as satisfactory for an item.

Hence, a one-factor solution fit the sample data ( $n=511$ ) by using structural equation modeling. The model did not fit the data well: Satorra-Bentler scaled  $\chi^2(170)=1313.26$ ,  $P < 0.001$ ; RMSEA=0.115, 90% CI for RMSEA=0.11-0.12, SRMR=0.11, CFI=0.86, and TFI=0.85. Evaluation of possible strains in this solution indicated that there was strong evidence of correlated error covariances between items 17 and 18, items 2 and 3, items 4 and 5, and items 6 and 7. Each modification provided a significant decrease in the  $\chi^2$  value of the model:  $\chi^2 \text{ diff}(1, \theta_{17,18})=161$ ,  $p < .01$ ;  $\chi^2 \text{ diff}(1, \theta_{2,3})=141$ ,  $p < .01$ ;  $\chi^2 \text{ diff}(1, \theta_{4,5})=153$ ,  $p < .01$ ; and  $\chi^2 \text{ diff}(1, \theta_{6,7})=103$ ,  $p < .01$ . The one-factor structure was refit to the data freely estimating the four error covariances between

**Table 1. The Obsessional Probabilistic Inference Scale item descriptive statistics**

Items	Item-total	PCA	CFA	T	P
	Correlations	Loadings	Loadings		
1.	0.53	0.61	0.58	11.19	0.000
2.	0.51	0.59	0.61	13.83	0.000
3.	0.56	0.64	0.61	12.20	0.000
4.	0.52	0.60	0.49	10.75	0.000
5.	0.49	0.53	0.48	10.27	0.000
6.	0.48	0.53	0.46	9.71	0.000
7.	0.63	0.70	0.72	16.16	0.000
8.	0.38	0.47	0.46	10.09	0.000
9.	0.40	0.48	0.39	7.15	0.000
10.	0.42	0.46	0.38	7.43	0.000
11.	0.34	0.39	0.31	6.31	0.000
12.	0.46	0.53	0.52	10.69	0.000
13.	0.54	0.62	0.60	11.23	0.000
14.	0.30	0.37	0.29	5.32	0.000
15.	0.48	0.52	0.46	10.10	0.000
16.	0.62	0.69	0.61	12.95	0.000
17.	0.65	0.70	0.70	15.65	0.000
18.	0.48	0.55	0.54	11.17	0.000
19.	0.39	0.47	0.43	6.82	0.000
20.	0.49	0.53	0.48	10.11	0.000

PCA=Principle component analysis, CFA=Confirmatory factor analysis

these items above. After entering freely estimating covariances into the model, a one-dimensional structure fit the data well: Satorra-Bentler scaled  $\chi^2(166)=786.27$ ,  $P < .001$ ; RMSEA=0.086, 90% CI for RMSEA=0.080-0.092, SRMR=0.093, CFI=0.93, and TFI=0.92. Standardized item loadings, estimated with maximum likelihood in the confirmatory factor analysis, were statistically significant for all items. Maximum likelihood estimates, critical values, and  $R^2$ s are presented in Table 1.

Means and standard deviations of the PI-R, OBQ, BDI, and OPIS are shown in Table 1. Separate one-way analysis of variances indicated significant differences between the groups on the PI-R scales, OBQ scales, BDI, and OPIS scores. Subsequent multiple comparisons between groups were performed with the Student-Newman-Keuls test. We found clear-cut differences between patients with OCD disorder and other groups, including patients with MD and healthy controls, on the Washing, Checking, and Precision subscales of the PI-R. Patients with OCD and MD scored higher than the control group on the Impulses and Rumination subscales of the PI-R, whereas there were no significant differences between OCD and MD groups on these two scales.

ANOVAs pointed out statistically significant differences between groups in level of obsessive beliefs measured by OBQ. SNK post hoc comparisons indicated that those in clinical

**Table 2. Means and standard deviations of clinical and non-clinical groups**

	Groups								P	Post Hoc
	OCD		MD		Control		Total			
	Mean	SD	Mean	SD	Mean	SD	F	df		
<b>Padua Inventory</b>										
Impulses	9.14	7.49	8.26	7.74	5.70	4.30	14.064	(2, 503)	0.000	OCD=MD>C
Washing	20.92	10.60	13.62	10.39	17.00	8.19	8.776	(2, 507)	0.000	OCD>MD=C
Checking	17.61	8.89	12.70	8.47	10.79	6.52	21.542	(2, 507)	0.000	OCD>MD=C
Rumination	23.76	9.90	22.34	11.06	14.30	7.59	45.220	(2, 502)	0.000	OCD=MD>C
Precision	8.44	5.93	6.94	5.77	5.56	4.05	10.332	(2, 505)	0.000	OCD>MD=C
<b>Obsessive Beliefs Questionnaire</b>										
Responsibility/Threat Estimation	71.78	20.41	74.22	17.16	61.24	14.18	24.218	(2, 496)	0.000	OCD=MD>C
Perfectionism/Certainty	80.38	16.60	79.32	17.71	65.18	15.38	34.773	(2, 498)	0.000	OCD=MD>C
Importance/Control of Thoughts	52.66	13.79	49.74	15.24	40.38	12.12	30.190	(2, 506)	0.000	OCD=MD>C
Beck Depression Inventory	23.10	12.95	27.88	10.82	11.18	8.78	94.977	(2, 508)	0.000	MD>OCD>C
Obsessional Probabilistic Inference Scale	31.32	14.07	25.50	16.97	26.44	11.21	3.903	(2, 508)	0.021	OCD>MD=C

**Table 3. Pearson correlations of the OPIS scores with the BDI, PI-R subscales and OBQ belief domains by groups**

	OCD	MD	Control
<b>Padua Inventory</b>			
Impulses	0.39**	0.45**	0.31**
Washing	0.32*	0.37**	-0.04
Checking	0.28	0.45**	0.05
Rumination	0.42**	0.51**	0.28**
Precision	0.26	0.21	0.06
<b>Obsessive Beliefs Questionnaire</b>			
Responsibility/Threat Estimation	0.39**	0.37**	0.19**
Perfectionism/Certainty	0.52**	0.40**	0.01
Importance/Control of Thoughts	0.44**	0.32*	0.08
Beck Depression Inventory	0.37**	0.46**	0.24**

\*: p<0.05, \*\*: p<0.01

groups scored significantly higher than the non-clinical group on all of the subscales of the OBQ. However, the differences between the OCD and MD groups were not significant on subscales of the OBQ. Significant differences between groups were also found on severity of depressive symptoms.

Post hoc SNK comparisons revealed that those with MD scored significantly higher than both patients with OCD and controls. The MD group was followed by the OCD group, reporting higher scores than the control group on BDI.

Finally, significant differences between groups were found on the OPIS scores. Post hoc SNK comparisons indicated that patients with OCD reported significantly higher scores than both patients diagnosed with MD and healthy individuals on the OPIS.

No differences were found between the MD and control groups.

Convergent validity of the instrument was assessed by computing Pearson product moments of the OPIS with the PI-R scales, OBQ belief domains, and BDI. The OPIS exhibited mediocre to high correlations with the subscales of the PI-R in the clinical and non-clinical groups. Connections were stronger in the clinical groups. Although significant relationships with subtypes of obsessive-compulsive symptoms were generally found, the Precision subscale of the PI-R was not related to the OPIS independently of the groups.

Strong associations were found between the OPIS scores and obsessive belief domains in both the OCD and MD groups. On the contrary, in the control group, connections between inferential style and obsessive belief domains were not substantial, but there was a weak relationship with the Responsibility/Threat Estimation belief domain.

Depressive symptoms were significantly associated with the OPIS in all subsamples. Stronger relationships of the OPIS with the level of depression were found in the OCD and MD groups than in the healthy control group.

In addition to the Pearson correlations between psychological variables specific to groups, zero-order correlations of the OPIS with the PADUA subscales and partial correlations between psychological variables were computed for the overall sample. As seen in Table 4, the OPIS scores were significantly associated with the Impulses, Checking, Rumination, and Precision subscales of the PI-R. However, partial relationships between probabilistic inference and obsessive-compulsive symptom severity decreased after controlling for the effects of the obsessive belief domains.

The OPIS revealed high internal consistency in the different samples. Cronbach's alpha in the OCD group was 0.82, 0.91

**Table 4. Zero-order and partial correlations of the OPIS and OBQ subscales with Padua subscales for the overall sample**

	Impulses	Washing	Checking	Rumination	Precision
OPIS	0.35**/0.28**	0.09/0.05	0.17**/0.11*	0.34**/0.24**	0.13**/0.07
RTE	0.30**/0.23**	0.07/0.06	0.19**/0.17**	0.24**/0.18**	0.08/0.06
PC	0.01/0.02	0.25**/0.25**	0.22**/0.23*	0.28**/0.29**	0.20**/0.21**
ICT	0.14*/0.12*	0.02/0.02	0.03/0.02	0.12*/0.10*	0.10/0.10

\*:  $p < 0.05$ , \*\*:  $p < 0.01$ ; Partial correlations are written in bold  
 OPIS=Obsessional Probabilistic Inference Scale, RTE=Responsibility/Threat Estimation,  
 PC=Perfectionism/Certainty, ICT=Importance/Control of Thoughts

in the MD group, .88 in the control group, and .88 in the overall sample. In the control group, the test-retest reliability with an interval of 2 weeks between measurements was 0.74 ( $p < 0.001$ ;  $n = 47$ ).

## Discussion

The goal of the present study was to develop a psychometric instrument to assess probabilistic inferential style peculiar to people with OCD. Therefore, the psychometric properties of the OPIS, developed to assess probabilistic inference process, were evaluated in this study. The study represents a validation of the psychological construct of the probabilistic inference measured by the OPIS. The questionnaire is a 20-item self-reported measure developed to measure probabilistic inferential style peculiar to OCD. The explanatory and confirmatory factor analyses consistently confirmed a unidimensional factor structure with high and statistically significant factor loadings. With respect to the reliability of the OPIS, the findings confirmed the reliability of the instrument. We found good internal consistency for each group and the overall sample. The temporal stability of the scale was also adequate. The study provided additional evidence that an inclination to negative probabilistic inference or obsessional doubt is prominent in people with OCD. The principal hypothesis of the IBA model of OCD is that all types of obsessions are generated due to an inference of doubt about a state of affairs. The current findings also showed that probabilistic inference is a specific process playing a pivotal role distinct from obsessive-compulsive belief domains in OCD.

OCD has a pattern of high comorbidity with depression, even though researchers have found inconsistent results. The severity of obsessive-compulsive symptoms was found to be influenced by depressive symptoms (37,38) but not in all research being conducted (39,40). Moreover, cognitive features that are central in OCD appear to play a pivotal role in depression, as well (41). Our findings were in line with the previous studies supporting the overlapping features in OCD and depression, in that levels of obsessive beliefs did not differ between these two clinical groups. However, the OPIS performed well in dis-

criminating OCD patients from other groups, particularly from patients with MD. Patients with OCD revealed distinct features characterized by obsessional probabilistic inference and reported higher scores in the OPIS than both patients with MD and healthy controls.

Sensitivity to threat and harm for oneself and others seems to be a distinguishing feature of OCD (42,43). Aardema and O'Connor (44) noted that primary appraisals that originate from the fearful content give rise to obsessions. The probabilistic inference process also refers to expectations of negative events, including obsessive themes peculiar to people with OCD. There were significant linkages between OPIS scores and the Responsibility/Threat Estimation subscale of the OBQ in both the OCD and MD groups but not a complete overlap within these psychological constructs, since the relationship was average. However, the strength of the associations between OPIS scores and obsessive-compulsive symptoms decreased after controlling for obsessive belief domains. This seems mostly due to an overlap between probabilistic inference and overestimation of threat.

This study has several limitations. First, the number of patients in the clinical groups was relatively small. Hence, the findings should be replicated in larger samples, particularly including more patients with OCD. Second, the control group comprised only college students. The generalizability of our findings decreased, since participants with younger or older age were not recruited into this study. Third, the research design of this study was cross-sectional, whereas a longitudinal research design should have provided more valid information and causal relations about the associations of the obsessional probabilistic inference process with obsessive-compulsive symptoms and other psychological variables. Finally, inferential confusion is central to obsessive-compulsive symptoms in the inference-based theory of OCD. In the study, we only addressed the relationships between probabilistic inference style, obsessive-compulsive symptoms, and obsessive beliefs. Further studies are needed to unpack the linkages and causal relations between probabilistic inference and inferential confusion. Interactions between the obsessional probabilistic inference process with inferential confusion may render remote possibilities of danger turning into proximal or strong probability of harm for people with OCD or other people around him or her.

Overall, the current findings were encouraging for the role of the obsessional probabilistic inference process in OCD. A tendency to make more negative inferences on obsessional matters among people with OCD was clear as compared to people with MD and controls. Probabilistic inference was significantly associated with obsessive-compulsive symptom severity and obsessive beliefs in all groups. The results replicated and extended previous clinical observations and studies, which have emphasized the role of reasoning process in the development and maintenance of obsessive-compulsive symptoms (10,17,19,20). The OPIS seems to be a reliable and valid instrument to assess a cognitive vulnerability factor peculiar to people with OCD.

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### Obsesyonel Olasılıklı Çıkarım Ölçeği

Aşağıda yaşamda karşılaşılabileceğiniz bazı durumlara ilişkin bir liste verilmiştir. Listede yer alan durumların gerçekleşme olasılığını %0 ve %100 arasında size uygun gelen yüzdeliğe bir çarpı (X) koyarak değerlendiriniz. Lütfen hiçbir soruyu BOŞ BIRAKMAYINIZ.

1. Kendinize, yakınlarınıza veya bir başkasına bilerek veya bilmeyerek zarar verme olasılığınız nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
2. Herhangi bir eşya, evrak veya malzemeyi saklamadığınız veya biriktirmediğiniz için sonrasında zor durumda kalma olasılığınız nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
3. Verdiğiniz bir karar sonucunda kendinizin, yakınlarınızın veya diğer insanların bir çıkmaza girmesi, zarara veya kayıplara uğraması olasılığı nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
4. Beklemediğiniz bir anda, ağızınızdan bir şekilde müstehcen veya hakaret içeren sözlerin çıkması olasılığı nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
5. Herhangi bir şekilde size kir veya mikrop bulaşma olasılığı nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
6. Kendinizin veya değer verdiğiniz insanların bir kazaya veya saldırıya uğrama veya herhangi bir başka şekilde zarar görme olasılığı nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
7. Yaptığınız bir hata, unuttuğunuz veya atladığınız bir şeylerden dolayı kendinizin, yakınlarınızın veya başkalarının zarar görebilme olasılığı nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
8. Sizin sorumluluğunuzda olan bir işin eksik, hatalı veya tam doğru olmama olasılığı nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
9. Herhangi bir şekilde uygunsuz cinsel içerikli düşüncelere kapılma veya davranışlarda bulunma olasılığınız nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
10. Bir başka insanın veya hayvanın vücut salgılarının (ter, tükürük, idrar, vb.) size bulaşma olasılığı nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
11. Tanımadığınız insanların bir kaza, saldırı veya herhangi başka bir şekilde zarar görme olasılığı nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
12. Kontrol etmediğiniz için çok önemli bir işi eksik yapma (örn., kapı veya tüpü açık bırakma, vb.) olasılığınız nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
13. Evinizde, işinizde veya sizin de içinde bulunduğunuz herhangi bir organizasyonda bir şekilde düzensizliğe veya karmaşaya neden olma olasılığınız nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
14. Bir şekilde sizin için kutsal olan değerlere saygısızlık yapma, inandığınız değerlere ters düşecek veya bu değerlere zarar verebilecek düşüncelere kapılma veya davranışlarda bulunma olasılığınız nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
15. Size bulaşan kir, mikrop veya vücut salgıları sonucu bir hastalığa kapılma veya bir şekilde zarar görme olasılığınız nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
16. İnsanlarla konuşmalarınızda bilerek veya farkında olmadan bir şekilde kendinize, yakınlarınıza veya başkalarına zarar verebilecek şeyler söyleme olasılığınız nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
17. Kontrol etmediğiniz veya önlem almadığınız bir şeylerden dolayı kendinizin, yakınlarınızın veya diğer insanların zarar görebilme olasılığı nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
18. Gelecekte işinize yarayabilecek veya şu anda sizin için hayati değeri olan bir eşya, evrak veya malzemenin atılma veya kaybolma olasılığı nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
19. Bir şekilde kontrolünüzü kaybedip, sizi zor durumda bırakabilecek olmadık davranışlarda bulunma olasılığınız nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100
20. Bedeninizde tehlikeli olabilecek bir hastalığın ortaya çıkma olasılığı nedir?  
%0 %10 %20 %30 %40 %50 %60 %70 %80 %90 %100