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Psychometric properties of the DY-BOCS in a Turkish sample of children and adolescents

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Abstract

Background: Dimensional Yale-Brown Obsessive-Compulsive Scale (DY-BOCS) is a promising scale for assessing frequency and severity of symptom dimensions. The main objective of the study was to assess the psychometric properties of the DY-BOCS in a large sample of children and adolescents from Turkey.
Methods: We studied 143 children and adolescents, 7–18 years, with well characterized DSM-IV-R OCD, ascertained from seven collaborating university or state hospital sites. We compared the DY-BOCS scores with the Children's Yale-Brown Obsessive-Compulsive Scale (CY-BOCS), the Children's Depression Inventory (CDI), the Yale Global Tic Severity Scale (YGTSS) and the Child Behavior Checklist 6–18 years (CBCL 6-18).
Results: The internal consistency of the DY-BOCS symptom dimensions and inter-rater agreement of component scores were excellent. The agreement between global DY-BOCS score and the total CY-BOCS score was highly significant (Pearson's r = 0.55, p < 0.0001). Severity scores for individual symptom dimensions were independent of one another, only modestly correlating with the global ratings, and were also differentially related to ratings of depression, anxiety and tic severity.
Conclusion: The DY-BOCS is a reliable and valid instrument for assessing multiple aspects of OCD symptom severity in children and adolescents from Turkey.
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1. Introduction

Obsessive compulsive disorder (OCD) is a chronic condition affecting 1%–3% of the global population [1–3]. OCD affects children, adolescents and adults and has a marked disabling influence on the lives of many people worldwide [3]. The disorder is characterized by obsessions (defined as persistent distressing, intrusive, and unwanted thoughts, fears or images) and/or compulsions (defined as ritualized behaviors or mental acts, performed to relieve the distress caused by the obsessions) [4, 5]. As of May 2013, the DSM-5 [5] excluded OCD from the anxiety disorders and created the OCD spectrum disorders.

Subjects with OCD exhibit remarkably heterogeneous symptoms with a complex overlap between obsessive-compulsive (OC) symptom dimensions [6, 7]. In DSM-5 [5], the issue of heterogeneity remains unresolved but is

acknowledged that the dimensional perspective may help unresolve this issue [8]. Numerous studies have described a four or five factor solution to better describe the OC symptom dimensionality [6, 9]. Furthermore, there is support for OC symptom dimensionality among child [10, 11] and adult samples [12–14], that are temporally stable [15, 16], have associations with specific brain regions in neuroimaging studies [17–21], and correlate meaningfully with various genetic variables [22–26] as well as treatment response [12, 27–30]. Therefore, there is a relevant rationale for assessing OC symptom dimensions.

To date, the instruments considered as "gold standard" for assessing OCD include the Yale-Brown Obsessive Compulsive Scale (Y-BOCS) and the Children's Yale-Brown Obsessive Compulsive Scale (CY-BOCS). Despite the strengths, these measures have important limitations: for example, obsessions and compulsions rarely occur in isolation, and the "resistance" and "control" items contribute weakly to the overall severity score [31]. Moreover, the Y-BOCS and CY-BOCS do not allow the assessment of severity for specific symptom dimensions.

More recently, the Dimensional Yale-Brown Obsessive Compulsive Scale (DY-BOCS) was developed to further assess the presence and severity of specific OC symptom dimensions. The DY-BOCS provides a more detailed description of OC symptoms, divided in six OC symptom dimensions. Developed to better investigate this dimensional approach to OCD, the DY-BOCS has many strengths, such as: (i) obsessions and compulsions are assessed together, according to their content; (ii) it inquires about symptoms that are otherwise inherently ubiquitous (e.g., checking, repetition mental and avoidance compulsions are inquired as part of several dimensions. For instance, checking related to sexual and religious obsessions versus checking related to contamination worries, etc.) [32]; (iii) the DY-BOCS assessment of symptom dimension severity investigates frequency, distress and interference; (iv) the DY-BOCS global severity includes not only the assessment of symptom severity but also the assessment of the impairment as a result of the symptoms.

The DY-BOCS was initially validated in English and Portuguese, with excellent psychometric properties [32] and subsequently translated and validated in Spanish [31], Chinese [33], Hungarian [34], Korean [35] and Japanese [36] with excellent psychometric properties. In summary, the DY-BOCS is noted to be a valid and reliable tool for assessing OC symptom dimensions as well as providing valid overall estimates of symptom severity. To date, these validation studies (apart from the original validation study [32]) have been conducted in adult samples.

The main objective of the study was to assess the psychometric properties of the DY-BOCS in a large sample of children and adolescents from Turkey. To our knowledge this study is the first analysis of the DY-BOCS in a pediatric sample after the original validation study. Our hypothesis was that DY-BOCS would have excellent psychometric properties.

2. Method

One hundred and forty-three outpatient OCD subjects, aged 7–18 years, were recruited from 7 collaborating university and research and training hospital sites in the country: Sivas, n = 19; Sakarya, n = 30; Erenköy, Istanbul, n = 21; Tekirdağ n = 29; Göztepe, Istanbul n = 21; Malatya n = 18; and Samsun (N = 5). The centers developed a network of established child psychiatry units collaborating across the country.

Inclusion criteria were: parental informed consent and child informed assent; DSM-IV OCD criteria, age 7–18 years and an intelligence quotient (IQ) > 70). Exclusion criteria were: head trauma resulting in loss of consciousness, chronic neurological disorder (e.g. epilepsy, cerebral palsy); psychosis, bipolar disorder, autism spectrum, and substance use disorders. Subjects were also excluded if they were concurrently undergoing either cognitive behavior therapy (CBT) and/or using psychotropic medications. All the subjects were assessed for the first time at clinic intake and the study did not impede the subsequent provision of normative care. The project was approved by the respective institutional review boards at each site. After a thorough description of the study and the assurance that their decision to participate would be voluntary and would not interfere with their access to clinical treatment, parents of all patients were asked to sign an informed consent document. Children and adolescents were asked to sign an assent form if they agreed to participate in the study after a detailed description of the study.

3. Instruments

3.1. Clinician-rated instruments

3.1.1. Sociodemographic questionnaire

This questionnaire included questions about child's age, gender, family income, educational and occupational status of the parents, psychiatric family history in first-degree relatives, child's age at OC symptom onset, child's age when treatment was sought, stressors around time of symptom onset, and medical history (including history of frequent infections, and temporal association of any throat infections with onset of tics and/or OC symptoms).

3.1.2. Kiddie-Schedule for Affective Disorders and Schizophrenia for school age children-Present and Lifetime version (K-SADS-PL)

This semi-structured interview based on the DSM-IV criteria was used to investigate OCD and possible co-occurring conditions [37]. The reliability and validity of the Turkish version has been established [38].

3.1.3. Children's Yale-Brown Obsessive-Compulsive Scale (CY-BOCS)

The CY-BOCS is a 10-item, clinician-rated, semi-structured instrument designed to assess the symptom

severity of OCD during a subject's previous week. The CY-BOCS has good psychometric data [39] and was used to assess convergent validity. The psychometric properties of the Turkish version of the CY-BOCS have been previously established [40].

3.1.4. Yale Global Tic Severity Scale (YGTSS) [41]

The YGTSS is a semi-structured clinician-rated instrument to assess the presence and severity of motor and vocal tics. Reliability of the Turkish version is available (Zaimoğlu S: unpublished data 1995). The presence of motor and vocal tics based on child and parent(s) reports over the previous week and behavioral observations are assessed. Severity scores are based on the number, frequency, intensity, complexity and interference of the tics (range = 0–50). A separate, one-item impairment rating is also included that captures distress and impairment in interpersonal, academic, and occupational domains related to the endorsed tics (range = 0–50).

3.1.5. Dimensional Yale-Brown Obsession Compulsion Scale (DY-BOCS) [32]

The DY-BOCS is a semi-structured interview-based scale for assessing the presence and severity of OC symptom dimensions in two parts: (a) an 88-item OC symptom checklist; and (b) rating scales for each OC symptom dimension, for the assessment of the impairment caused by the symptoms and an overall estimate of OCD severity. The checklist provides a detailed description of six OC symptom dimensions: *(i) obsessions about harm due to aggression/injury/violence/natural disasters and related compulsions*; *(ii) obsessions concerning sexual/ moral/religious thoughts and related compulsions*; *(iii) obsessions about symmetry/'just-right' perceptions, and compulsions to count or order/arrange*; *(iv) contamination obsessions and cleaning compulsions*; *(v) hoarding obsessions and compulsions*; and *(vi) miscellaneous obsessions and compulsions that relate to somatic concerns and superstitions, among other symptoms*.

3.1.5.1. *DY-BOCS measures.* Patients are asked to endorse both lifetime and current symptoms, reviewed by a clinician to ensure that endorsed items meet OC symptom guidelines. Severity of each OC dimension is measured on three ordinal scales with six anchor points that focus on: symptom frequency (0–5); amount of distress they caused (0–5); and the degree to which they interfered with functioning (0–5) during the previous week. The clinicians are required to assess the subject's overall level of current impairment due to OC symptoms on a Likert scale (0 = none, to 15 =severe). *Total global score* (0 = 30) is obtained by combining the overall symptom severity score (0–15) and the impairment score (0–15).

3.2. Parent-rated instruments

3.2.1. Child Behavior Checklist for ages 6–18 years (CBCL 6-18) [42]

This parent-rated CBCL provided information on the index subject's behaviors in the past 6 months (0–2) grouped under subscales. Two general behavior scores are obtained from the scale: Internalizing and Externalizing. These include: withdrawal, somatic complaints, anxiety/ depression scores form the internalizing behavior scale; and conduct behavior and aggression subscales form the externalizing behavior scale. There are other subscales assessing social problems, attention problems, and thought problems. Scores of all of the subscales sum up to form the total problem score. The reliability and validity of the Turkish version of CBCL 6-18 is well established [43]. In this study we use the CBCL internalizing behavior subscale scores that are known to correlate well with other anxiety scales [44–47].

3.3. Child-rated instruments

3.3.1. Children's Depression Inventory (CDI) [48]

The CDI is a widely used self-report measure of depressive symptoms in youth, 7–17 years. It consists of 27 items designed to assess symptoms of depression, including sleep disturbance, appetite loss, suicidal thoughts, and general dysphoria. CDI items are scored on a 3-point scale (0–2). Total score is the sum of all item scores. The validity and reliability of the Turkish version of the CDI has been established [49] with scores >19 signaling need for evaluation for depression.

YGTSS, CDI and CBCL (internalizing symptoms, i.e., withdrawn, anxious/depressive subscales) were used to assess the divergent validity of the component scales of the DY-BOCS. K-SADS interviews were completed initially to endorse diagnosis of OCD and for identification of co-occurring conditions.

4. Procedures

4.1. Translation of the instruments

The translation of the DY-BOCS from English into Turkish was authorized by the main authors (JFL and MCR) and made by some of the authors (YY, LB and ASG). Later, a native speaker in English did the back-translation into English. The two versions were then compared and inconsistencies resolved. All other instruments had previously been translated into Turkish.

4.2. Interviews

Informants included a parent and the child in the assessment room. Adolescents had the choice to be interviewed individually and additional information was sought from parents when needed. Each subject was evaluated separately by one clinician. Before starting the

interview the clinician reviewed the consent forms and asked the subjects to sign them. The clinician first administered the K-SADS for diagnosis of OCD and identification of co-occurring conditions. Next, he/she reviewed the DY-BOCS self-report completed by the child (with or without assistance of his/her parents) and then completed the clinician symptom checklist and severity ratings of DY-BOCS. This DY-BOCS interview was videotaped for inter-rater reliability. The interviewer then completed the other clinician ratings, including the YGTSS and CY-BOCS.

4.3. Training of the interviewers

All interviewers were psychiatrists, familiar with all instruments. In order to improve reliability across sites, the DY-BOCS was thoroughly explained to all investigators in an initial startup meeting, problems that arose during the study process were discussed with the research coordinator via telephone or online calls or at scientific meetings to which the investigators attended.

4.4. Interrater reliability

Videos from the interviews of four patients were sent to all the study sites and all the investigators at each site were requested to rate the DY-BOCS scores. All the questions raised by the investigators were discussed and clarified.

4.5. Statistical analysis

The internal consistency of the DY-BOCS was determined by using Cronbach's α to assess the 3 severity items (time, distress, and interference) in each of the dimensions. Convergent validity was assessed with Pearson correlations between the DY-BOCS and the CY-BOCS. To assess the divergent validity of the Turkish version of the DY-BOCS, we calculated correlations between the DY-BOCS subscales and the YGTSS, the CDI, and the CBCL scores for the anxious-depressed and withdrawn dimensions. Large correlations were defined as .50 or greater, medium correlations between .30 and .49, and small correlations from .10 to .29 [50]. Interrater reliability was determined for a subset of patients using intraclass correlation coefficients. The interviews were video recorded (4 videos), and 6 raters (none of whom was the rater who performed the initial interview) scored them independently. The intercorrelations between each of the different OC symptom dimensions and the level of agreement between self-report and clinician ratings were assessed by Pearson correlation coefficients. All analyses were conducted with SPSS (version 17). All statistical tests were 2 tailed.

5. Results

All together, 143 subjects (76 male, 67 female; mean age 12.2 years [s.d. = 2.6]) were assessed. There were no significant differences by site based on age (F (6, 136) =

1.23; p = NS, two-tailed) and gender (χ^2 (6) = 2.58, NS). 30.8% of the sample (N = 44) reported low monthly income, 61.5% (N = 88) low to medium monthly income and 7.7% (N = 11) higher income.

Sixty four (44.8% of the sample) subjects lived in large city centers, 53 (37.1%) lived in city centers, 21 (14.7%) in districts or towns, and 5 (3.5%) on country side. 88.1% of the children (N = 126) had siblings. 53.1% of the cases (N = 76) were the first child of the family. No preceding (before the onset of OC symptoms) stressful life event was reported for 65.7% of the sample (N = 94) and for 15.4% of the sample (N = 22), school-related stress factors (test anxiety, being a bullying victim etc) preceding the onset of OC symptoms were reported.

The mean scores on each of the DY-BOCS dimensions, on the CY-BOCS, YGTSS, the CDI and the CBCL are presented in Table 1.

Table 2 presents the number of patients presenting symptoms in each of the OC dimensions, as well as the frequency of avoidance behaviors related to each dimension in the Turkish and USA samples.

Table 1
Mean scores on the DY-BOCS, the CY-BOCS, the YGTSS, the CDI and the CBCL scales.

	Subjects (N)	Mean (s.d.)	Range
DY-BOCS global score	143	18.6 (4.9)	8–28
DY-BOCS dimensions			
Aggression	143	4.2 (4.5)	0–14
Sexual/religious	143	4.7 (4.6)	0–15
Symmetry	143	5.7 (3.8)	0–14
Contamination	143	5.6 (4.5)	0–15
Hoarding	143	1.7 (2.9)	0–14
Miscellaneous	143	2.6 (3.7)	0–13
Total symptom score	143	9.5 (2.4)	3–15
DY-BOCS impairment	143	9.1 (2.7)	2–14
CY-BOCS total score	135	24.9 (6.7)	7–40
CY-BOCS obsessions	135	12.7 (3.8)	0–20
CY-BOCS compulsions	135	12.1 (3.9)	0–20
YGTSS total score	54	16.2 (11.1)	0–48
YGTSS motor tics	54	10.1 (5.9)	0–22
YGTSS vocal tics	54	5.1 (5.9)	0–19
CDI	120	14.3 (8.2)	1–46
CBCL total T score	127	63.7 (9.1)	41–84
CBCL internalizing	127	65.7 (9.7)	41–95
CBCL externalizing	127	60.6 (9.0)	34–79
CBCL withdrawal	127	60.7 (9.2)	50–90
CBCL somatic	127	61.9 (9.4)	50–90
CBCL anxious	127	68.0 (10.2)	50–96
CBCL social problems	127	62.4 (8.6)	50–93
CBCL thought problems	127	65.3 (9.0)	50–90
CBCL attention problems	127	58.2 (6.7)	50–80
CBCL delinquency	127	59.4 (6.4)	50–74
CBCL aggression	127	62.3 (9.3)	50–87

DY-BOCS = Dimensional Yale-Brown Obsessive-Compulsive Scale, CY-BOCS = Children's Yale-Brown Obsessive-Compulsive Scale, YGTSS = Yale Global Tic Severity Scale, CDI = Children's Depression Inventory, CBCL (6-18) = Child Behavior Checklist for ages 6 to 18 years.

Table 2
The frequency of symptom dimensions and avoidance behaviors in the Turkish and the USA samples.

	Turkish sample (N = 143)		USA sample (N = 59)*	
	DY-BOCS		DY-BOCS	
	Symptom dimensions	Avoidance behaviors	Symptom dimensions	Avoidance behaviors
Aggression	61 (42.7%)	28.7%	33 (56%)	32%
Sexual/religious	62 (43.4%)	24%	20 (34%)	25%
Symmetry	84 (58.7%)	19.6%	51 (86%)	52%
Contamination	76 (53.1%)	43.4%	36 (61%)	54%
Hoarding	29 (20.3%)	4.2%	22 (37%)	15%
Miscellaneous	28 (19.6%)	12.6%	50 (85%)	54%

* Data comes from the original validation study of the DY-BOCS (Rosario-Campos et al., 2006). There is no statistical comparison between the Turkish and the USA sample.

6. Reliability

6.1. Interrater reliability

The interrater reliability between the DY-BOCS raters was excellent. Intraclass correlation coefficients (ICCs) were >0.88 for each component of the global severity score of the DY-BOCS.

6.2. Internal consistency

The internal consistency across the domains of time, distress, and interference for each dimension was also excellent. Cronbach's alphas were 0.96 for aggressive, 0.94 for sexual/religious, 0.93 for symmetry, 0.95 for contamination, 0.95 for hoarding and 0.94 for miscellaneous dimensions.

7. Validity

7.1. Construct validity

There were no significant differences between the sites with regard to the DY-BOCS total scores (F (6, 136) = 1.56, p = NS, two-tailed). Correlations between each of the DY-BOCS dimensions and the total DY-BOCS scores are presented in Table 3.

With the exception of severity ratings for the hoarding dimension, each of the other severity ratings for specific dimensions, and also the DY-BOCS impairment rating was positively correlated with the DY-BOCS global severity score, with Pearson correlations ranging from 0.18 to 0.93.

Table 4 presents the intercorrelations between each of the different OC symptom dimensions. With a few exceptions, each dimension-specific severity rating was largely independent of the others.

7.2. Convergent validity

The correlation between the DY-BOCS total global score and the CY-BOCS total score was high (Pearson's r = 0.55,

p < 0.0001), indicating very good convergent validity of the DY-BOCS total global severity score. Similarly, the correlation between DY-BOCS impairment rating and the CY-BOCS total score (Pearson's r = 0.45, p < 0.0001) was significant. The correlations between the DY-BOCS impairment subscale and the obsession (Pearson's r = 0.47, p < 0.0001) and compulsion (Pearson's r = 0.35, p < 0.0001) subscales of the CY-BOCS were also significant.

7.3. Divergent validity

Evidence in support of the divergent validity of the DY-BOCS include the independent character of the dimensional severity ratings in Table 4 as well as the differential relationships between the dimensional severity scores and measures of tic severity, as well as CDI and CBCL internalizing, withdrawal and anxious-depressive subscales (Table 5).

8. Discussion

The DY-BOCS focuses on the assessment of presence and severity of specific OC symptom dimensions as well as estimates of global OCD symptom severity. The current study provides the first analysis of its psychometric properties in a child and adolescent population outside the USA by an independent group of researchers. The results demonstrated that the DY-BOCS is a valid and reliable instrument for assessing OC symptom dimensions in children and adolescents from Turkey.

The current study is of interest since the DY-BOCS is capable of advancing the research on the dimensional perspective of OCD. It is important to mention that the study was conducted in a large enough sample (N = 143) and that the current study is the first child and adolescent study to be undertaken after the original validation study. Furthermore, the study was undertaken as a collaborative joint project across sites and contributed to the awareness of a dimensional approach to the study of OCD, and to the further enhancement of our understanding of OCD in a youth population especially in a low-to-middle income country context. Therefore, we believe that it increases the knowledge and awareness of OCD in the country.

Avoidance symptoms are commonly reported by OCD patients and the question for avoidance follows each dimension of the symptom checklist and is also an integral part of the severity ratings. Inquiring about avoidance behaviors is useful in understanding the severity of the condition. The frequencies of the avoidance symptoms varied according to the specific dimensions in our sample, with the highest frequency of avoidance being in the contamination dimension.

Frequencies of OC symptom dimensions were similar to the pediatric sample of the original validation study, except for the miscellaneous and the symmetry dimensions, which were lower in the current study. The reasons for these

Table 3
Correlations between the dimensional DY-BOCS global score and the symptom severity ratings for each dimension, the components of the global severity ratings and the impairment rating.

	Pearson's r	p
Dimensions		
Aggression	0.43	<0.0001
Sexual/religious	0.38	<0.0001
Symmetry	0.20	0.014
Contamination	0.21	0.009
Hoarding	0.15	NS
Miscellaneous	0.18	0.024
Global Severity		
Time	0.77	<0.0001
Distress	0.80	<0.0001
Interference	0.79	<0.0001
Impairment Rating	0.93	<0.0001

differences are not clear. Early-onset OCD cases have a higher overlap with tic-related OCD. Both groups of patients frequently present with higher frequencies of symmetry, hoarding and miscellaneous dimensions [51]. In the original validation study, data was not shown about the characteristics of the cases and therefore it was not possible to analyze the possible reasons for these differences.

As in the initial validation study [32], the subscales of the DY-BOCS were largely independent from one another and correlated moderately with the DY-BOCS global severity score. This suggests that the Turkish version of the DY-BOCS is also capable of measuring the different symptom dimensions of OCD without being confounded by other co-occurring symptoms. These results also confirm the relative independence of the various symptom dimensions of OCD [6].

Correlations between the DY-BOCS global severity scale and the clinician-administered CY-BOCS were significant, suggesting that the DY-BOCS continues to provide valid overall estimates of global OCD symptom severity [32]. Correlation coefficient for the DY-BOCS global severity and the CY-BOCS total score was 0.55; this coefficient, although large, was lower than that reported in the original validation study (r = 0.79) [32]. It is important to mention that in the original validation study correlation coefficients for adults were higher than the pediatric group [32]. Future studies investigating the psychometric properties of the DY-BOCS in adult Turkish OCD patients are warranted.

The divergent validity of the DY-BOCS was satisfactory. As expected, the correlations between the DY-BOCS subscales and the CDI and CBCL internalizing symptoms, anxiety and withdrawal subscales ranged from small to moderate and were smaller than the correlations among OCD scales. As seen in Table 5, the DY-BOCS aggression dimension scores showed moderate correlation with the CDI (r = 0.39) and small correlation with CBCL anxious/depressed subscale (r = 0.19). Aggression, symmetry and contamination dimensions showed small correlations with the CBCL internalizing subscale; symmetry dimension also had a mild correlation with the withdrawal subscale. These results are partially in agreement with those reported in the original validation study [32] where the authors found that the aggression dimension had the strongest correlations with the HAM-D (Hamilton-Depression Scale) and HAM-A (Hamilton-Anxiety Scale) scores. The differences may be due to the use of different instruments in the two studies.

Although highly significant, the correlations between the DY-BOCS impairment subscale and the obsession and compulsion CY-BOCS subscales were not very high (0.47 and 0.35, respectively). The impairment subscale was an innovation included as part of the DY-BOCS because of the clinical observation that each patient experiences the impact caused by the symptoms in their lives very differently. For instance, some patients have mild symptoms with very high scores on the impairment DY-BOCS subscale while others have moderate to severe symptoms and low impairment scores. The lower correlations might be due to the fact that the CY-BOCS does not have an overall impairment score.

There were positive correlations between the aggressive and the sexual/religious dimensions. Aggressive, sexual and religious obsessions tend to co-occur and among the 4-OCD factors, aggression and sexual/religious obsessions were counted together under "forbidden thoughts" factor [52]. The miscellaneous dimension comprises several different OC symptoms (e.g., about disease, superstitious fears/behaviors, obsessions about food, and pathologic grooming behaviors such as skin picking or trichotillomania) [31]. This dimension showed moderate correlations with the aggression, sexual/religious and the hoarding dimensions of the DY-BOCS, suggesting that some of the symptoms included in the miscellaneous dimension might be associated with these dimensions. It is unclear whether some symptoms

Table 4
Intercorrelations between estimates of current symptom severity within each of the dimensional components of the DY-BOCS.

Dimensions	Sexual/religious	Symmetry	Contamination	Hoarding	Miscellaneous
Aggression	0.54*	0.06	-0.04	0.15	0.24*
Sexual/religious		-0.10	-0.14	0.10	0.25*
Symmetry			-0.06	0.12	0.12
Contamination				0.07	0.06
Hoarding					0.28*

* Correlation is significant at the .01 level (2-tailed).

Table 5
Correlations between each of the DY-BOCS dimensions and scores of the YGTSS, CDI and CBCL internalizing, withdrawal and anxious subscales.

Dimensions	YGTSS	CDI	CBCL internalizing	CBCL withdrawal	CBCL anxious
Aggression	0.01	0.36**	0.18*	0.14	0.19*
Sexual/religious	-0.05	0.17	0.03	-0.03	0.11
Symmetry	0.06	0.07	0.21*	0.25**	0.14
Contamination	-0.05	0.02	0.19*	0.15	0.15
Hoarding	-0.04	0.12	0.06	0.11	0.04
Miscellaneous	-0.10	0.25**	0.16	0.10	0.14

YGTSS: Yale Global Tic Severity Scale; CDI: Children's Depression Inventory; CBCL (6-18): Child Behavior Checklist for ages 6 to 18 years.
  * Correlation is significant at the .05 level (2-tailed).
 ** Correlation is significant at the .01 level (2-tailed).

included in the miscellaneous dimension may constitute one or more independent dimensions.

After completing the symptom checklist and reviewing it with the clinician, most of the subjects reported that their knowledge about OCD had increased, as did their awareness about the concepts, such as frequency, severity, interference, avoidance and the impairment due to the symptoms. Therefore, it is reasonable to conclude that the DY-BOCS is a valuable tool not only for research purposes but also for clinicians, since it can provide information on obsessions and compulsions that had not been previously reported by the patient.

9. Limitations

The findings reported in the study need to be considered in the context of a number of limitations. First, the sample was comprised of children and adolescents in Turkey and cannot be generalized to the characteristics of adult OCD population in the country or elsewhere. We could therefore compare and contrast our findings with one study involving US children to date. Second, inter-rater reliability was determined for a subset of subjects in view of challenges given the length of administration of DY-BOCS clinician interviews. Third, as in the original validation study, we did not evaluate the test–retest reliability of the DY-BOCS self-report. Therefore, we could not assess the variability of the instrument which limits its use as an outcome measure in treatment studies. Fourth, earliest age at onset was 1 year, which was probably a memory bias, but such retrospective recall bias is well known and cannot be clinically ignored.

As mentioned in the original validation paper, one limitation of the DY-BOCS is the time required for administration of the instrument. According to the original validation study, an average patient needs approximately 40 minutes to complete the interview [32].

10. Conclusions

OCD is a serious disabling disorder with observed core symptoms consistent across cultures [53]. The results of the present study confirm that the DY-BOCS has excellent

psychometric properties in a large clinical sample of children and adolescents in Turkey.

Future studies should better investigate the psychometric properties of the DY-BOCS in nonclinical populations and also in adult OCD patients. It would also be interesting to investigate possible differences in OC symptom frequencies in different countries, trying to better understand possible cultural effects on symptom manifestation.

Declaration of Conflicts of Interest

Funding

Acknowledgment

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