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Running head: VALIDATION OF AN INTERVIEW-ONLY VERSION OF THE DY-BOCS

**Highlights**

- Obsessive-compulsive disorder is a highly heterogeneous disorder
- The DY-BOCS is the most comprehensive measure of OCD heterogeneity
- An interview-only version of the DY-BOCS showed intact psychometric properties
- This version can be carried out by a clinician in one hour or less
- The measure was sensitive to the effects of treatment for pediatric OCD

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# Validation of an interview-only version of the Dimensional Yale-Brown Obsessive-Compulsive Scale (DY-BOCS) in treatment-seeking youth with obsessive-compulsive disorder

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**Abstract**

There is a growing body of evidence suggesting that individuals with obsessive-compulsive disorder (OCD) may be sub-typed along different symptom dimensions. These dimensions may help explain responsiveness to current treatments. The Dimensional Yale-Brown Obsessive-Compulsive Scale (DY-BOCS) is a validated instrument involving a self-report screening tool followed by a structured interview in which the presence/absence and severity of OCD symptom dimensions are assessed and rated. The present study investigated the validity of a briefer, interview-only version of the DY-BOCS modified for use in routine care. Clinically-referred children and adolescents (*N*=119) with OCD were administered the DY-BOCS along with other measures of OCD, anxiety, depression, and overall functioning and a subset (*N*=100) were reassessed on average 14 months after initial assessment. This briefer, interview-only version of the DY-BOCS demonstrated high levels of internal consistency and correlated in the moderate to strong range with alternative measures of OCD severity and OCD symptom dimensions. Change scores on the DY-BOCS from baseline to follow-up were significantly correlated with change scores on the alternative measures of OCD and clinician-rated improvement, suggesting that this brief version of the DY-BOCS is valid and sensitive to the effects of treatment for OCD delivered in routine clinical care.

**Key Words:** Dimensional Yale-Brown Obsessive Compulsive Scale; Obsessive-Compulsive Disorder; Validity; Clinical Utility; Assessment

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## 1. Introduction

Obsessive-compulsive disorder (OCD) is defined by the presence of unwanted, intrusive and highly distressing thoughts, urges, or images (obsessions), and attempts to ignore or suppress these thoughts or the associated distress through some other thought or action (compulsions; American Psychiatric Association, 2013). The prevalence is approximately 2% in children and adults (Abramowitz, Taylor, & McKay, 2009; Geller, 2006) with OCD tending to onset during childhood and running a chronic or recurrent course (Micali et al., 2010; Stewart et al., 2004), placing significant burdens on the individual, their family, and the healthcare system (Olesen et al., 2012).

OCD is a heterogeneous condition in several respects, with multiple genes and brain regions, as well as environmental and psychological risk factors playing a role in its etiology (Brander, Perez-Vigil, Larsson, & Mataix-Cols, 2016; Pauls, Abramovitch, Rauch, & Geller, 2014). Furthermore, while onset prior to 18 years of age is the most common, OCD can appear at any time across the life span, and present with varying patterns of psychiatric comorbidity (Kessler et al., 2005). It is also established that the content (or focus) of the obsessions and compulsions can vary over time, but that affected individuals show temporal stability in respect to main symptom themes (Fernandez de la Cruz et al., 2013; Rettew, Swedo, Leonard, Lenane, & Rapoport, 1992). In efforts to improve the understanding of OCD, and improve treatment outcomes, a good deal of attention has been focused on trying to establish the validity and clinical utility of subtypes based on distinct but overlapping OCD symptom dimensions (Leckman et al., 2010; McKay et al., 2004). The DSM-5 criteria for OCD do not specify subtypes per se but their accompanying text offers a description of these major symptom dimensions (American Psychiatric Association,

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2013). Previously conceptualized as either a symptom of obsessive-compulsive personality disorder or of OCD, hoarding is now classified as a separate disorder in DSM-5.

Building on factor analytic, behavioral genetic, and treatment research, one of the most influential dimensional models of OCD proposes five main symptom dimensions that revolve around symptom content related to: 1) aggression, harm, and responsibility; 2) religious and sexual content (taboo thoughts); 3) ordering and symmetry; 4) hoarding, and 5) contamination and cleaning (Rosario-Campos et al., 2006; for similar models see Bloch, Landeros-Weisenberger, Rosario, Pittenger, & Leckman, 2008 & Hojgaard et al., 2016). There is now a growing body of evidence suggesting that these symptom dimensions are of relevance to our understanding of OCD's etiology and the severity and persistence of the disorder (see Leckman et al., 2010 for a review). For example, dimensions involving forbidden thoughts and contamination show stronger genetic overlap with anxiety-related disorders than do symmetry symptoms, the latter related more strongly to hoarding and body dysmorphic disorder (Lopez-Sola et al., 2016). Neuroimaging results also suggest that the involved brain regions differ across symptom dimensions (van den Heuvel et al., 2009). Further, there is evidence that differences between the symptom dimensions emerge in relation to responsivity to OCD treatments (Mataix-Cols, Marks, Greist, Kobak, & Baer, 2002).

Measures of OCD symptom dimensions can be broken down into two broad categories, those based purely on self-reports and those involving a clinical interview. In the self-report category, two of the most widely-used scales are the 20-item, self-report Dimensional Obsessive-Compulsive Scale (DOCS; Abramowitz et al., 2010) and the 21-item, self-report Obsessive-

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Compulsive Inventory (OCI; Foa et al., 2010; Foa et al., 2002). The DOCS assesses the severity of symptom dimensions defined as responsibility, unacceptable thoughts, contamination, and symmetry. The OCI assesses the severity of dimensions defined as washing, checking, ordering, obsessing, hoarding, and neutralizing, as well as providing an overall severity score. While both scales show high levels of internal consistency and correlate significantly with other measures of OCD, neither of these instruments overlap entirely with the most commonly identified symptom dimensions (see previous paragraph).

In the interview category, the most comprehensive and empirically supported instrument is the Dimensional Yale-Brown Obsessive-Compulsive Scale (DY-BOCS; Rosario-Campos et al., 2006). The DY-BOCS is based on the most widely-used, interview-based measure of OCD severity, the Yale-Brown Obsessive Compulsive Scale (Y-BOCS; Goodman et al., 1989), and assesses dimensions defined as aggressive, sexual/religious, symmetry, contamination, hoarding, and miscellaneous. Excluding the hoarding and miscellaneous categories, the remaining dimensions overlap with those most commonly identified in the literature. In its original version, the patient completes an 88-item self-report checklist that is then used as part of a semi-structured, clinician-led interview to assess the presence and severity of the six different symptom dimensions, as well as total symptom severity and global impairment. The scale also includes avoidance and mental rituals as core symptoms of OCD, improving the clinical utility of the measure. The DY-BOCS possesses high levels of internal consistency and correlates well with other measures of OCD in children, adolescents, and adults (Garcia-Delgar et al., 2016; Guler et al., 2016; Harsanyi et al., 2012; Pertusa, Fernandez de la Cruz, Alonso, Menchon, & Mataix-Cols, 2012; Rosario-Campos et al., 2006).

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While self-report measures are an important part of the assessment and treatment of OCD, structured diagnostic interviews are considered the gold-standard for establishing the presence, severity, and impact of OCD symptoms (Koran et al., 2007). However, while the DY-BOCS benefits from the inclusion of an interview portion, it hasn't been adapted to separate hoarding symptoms that may occur as part of OCD from those that, since the publication of the DSM-5, form the core symptoms of hoarding disorder, which is now considered distinct from OCD. The original DY-BOCS miscellaneous dimension also includes symptoms associated with several other disorders (eating disturbances, body dysmorphic preoccupations, illness anxiety, skin picking, trichotillomania, and separation anxiety). Further, in the original DY-BOCS validation study the average completion time for the 88-item self-report portion was 41 minutes (SD = 13.3 min; range = 10–120 min) and for the interview portion 49 minutes (SD = 23.3 min; range = 20-65 min). While the inclusion of both self-report and interview-based portions may improve the overall sensitivity of the DY-BOCS, an approximately 90-minute average assessment time may make the original DY-BOCS unwieldy for use in routine clinical practice. Setting aside these issues, the extent to which the DY-BOCS is sensitive to the effects of treatment for OCD in youth remains to be examined.

To improve its alignment with DSM-5, and reduce assessment burden, we modified the DY-BOCS for use with children and adolescents presenting for treatment of OCD. First, and in collaboration with the original developers of the DY-BOCS (M.C. do Rosario, personal communication, March 24, 2015), we improved the screening questions employed for each dimension in the interview portion of the DY-BOCS by creating overarching descriptions of the

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main obsessive and compulsive concepts included in that dimension which were read aloud to the patient. If symptoms were affirmed, a careful assessment of all aspects of these and related symptoms were carried out. Furthermore, for each symptom dimension, the interviewer read through a checklist of specific symptoms within that dimension. When all symptom content within a dimension had been assessed, severity ratings for all present symptoms within that dimension were carried out. By strengthening the screening features of the interview portion, it was possible to remove from the assessment the entire 88-item self-report section and potentially reduce the average length of the assessment by one-half. Second, although hoarding-like behaviors can still be part of OCD under DSM-5, pure hoarding symptoms should no longer be classified as OCD. Accordingly, we removed the original hoarding dimension from the interview. We also clarified within the miscellaneous dimension any symptoms that should not be classified as symptoms of OCD. Following Pertusa et al. (2012), we modified the instructions so that symptoms from the main dimensions were not scored under the miscellaneous dimension. The Swedish language version of the scale employed in the present study is provided online (https://osf.io/p8sx7/). A corresponding version in the English language can also be found online (https://osf.io/zp89q/).

We administered this briefer, interview-only version of the DY-BOCS to a large sample of Swedish youth referred for treatment of OCD and examined its internal consistency, construct validity, and sensitivity to the effects of treatment for OCD.

## 2. Methods

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### 2.1. Participants

Participants were 119 children and adolescents (74 females and 45 males; mean age = 13.4 years, *SD* = 2.7; range = 6.50 – 17.75 years) referred to an outpatient, mental health clinic based in the south of Sweden at which there is an ongoing (funded) research project examining the cognitive and emotional underpinnings of pediatric OCD. The clinic accepts self-referrals and referrals from primary care and schools across the region and assesses approximately 60 patients with OCD per year. The 119 participants in the study all fulfilled criteria for a current diagnosis of OCD according to DSM-5. The most commonly occurring (current) comorbid disorders were anxiety disorders (50.4%), followed by neurodevelopmental disorders (21.8%; ADHD: 15.1%; Autism: 7.6%), and major depression (9.2%). Lifetime prevalence was assessed for tic disorder and major depressive disorder, resulting in a lifetime prevalence rate of 29.4% for tic disorder (including provisional tic disorder) and of 37.8% for major depression. Based on parent reports, 21.8% of participants had a first degree relative with OCD. Approximately two-thirds (63.9%) were living in a home with two parents/caregivers with more than 75% having a mother or father who graduated from university. The majority of parents/caregivers (77%) rated the family's economic situation as good or very good. Of the 119 participants, 100 (63 females and 37 males; mean age = 14.5 years, *SD* = 2.8; range = 8.5 – 19.5 years) were reassessed at an average of 14.0 months (*SD* = 7.0; range = 5.0 – 26.5 months) post-baseline. Of the 100 participants reassessed with the DY-BOCS and CY-BOCS, 69 provided self-report measures both at baseline and follow-up.

### 2.2. Measures

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**2.2.1. Diagnostic status and OCD symptoms/dimensions.** All participants were assessed with the Mini International Neuropsychiatric Interview for Children and Adolescents (MINI-KID; Sheehan et al., 2010), a structured diagnostic interview designed to assess the 30 most common and clinically relevant disorders or disorder subtypes in pediatric mental health services. The MINI-KID is a reliable and valid tool to establish the presence or absence of DSM-IV and ICD-10 mental disorders in youth (Sheehan et al., 2010). Due to time restraints, the Suicidality and Addiction sections of the MINI-KID were not administered. The presence or absence of a DSM-5 OCD diagnosis was established using the MINI-KID (with DSM-5 additions) and the overall severity of OCD was assessed using the interview-based Children's Yale-Brown Obsessive-Compulsive Scale (CY-BOCS; Scahill et al., 1997) where obsessions and compulsions are identified by the clinician and then rated for severity using a 10-item scale (5 items for obsessions and 5 items for compulsions). Scores on the 10 items are summed (ranging from 0-40) with higher scores indicating higher (overall) levels of severity. OCD symptom dimensions were assessed using our modified version of the interview portion of the DY-BOCS, which yields five dimensional scores (0-15), a total score (0-15), an overall impairment score (0-15), and a global score (total + overall impairment score; 0-30). The DY-BOCS and the CY-BOCS have been found to be reliable and valid scales for the assessment of OCD symptoms in children and adolescents (Garcia-Delgar et al., 2016; Guler et al., 2016; Rosario-Campos et al., 2006; Scahill et al., 1997). The Swedish DY-BOCS version employed in the present study was an adaptation (described in the Introduction) of an existing Swedish translation of the measure; a translation initially conducted by members of the Rücklab (a research group on OCD and related disorders) at the Karolinska Institute in Stockholm.

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At baseline and follow-up, participants were administered the Child Version of the OCI (OCI-CV; Foa, Coles, Huppert et al., 2010). The OCI-CV is a 21-item self-report measure of the frequency of DSM-IV OCD symptoms. Each item is rated on a 3-point scale (0 = Never, 1 = Sometimes, 2 = Always) with higher scores indicating more frequent symptoms. The OCI-CV yields scores for six dimensional subscales (Doubting/Checking, Obsessing, Hoarding, Washing, Ordering, Neutralizing) and a total score. The OCI-CV has been shown to be a reliable and valid measure of OCD symptoms in clinical samples (Foa et al., 2010; Jones et al., 2013). In the present sample, Cronbach's alpha for the scores of the total severity scale of the OCI-CV was high (baseline: $\alpha$ = .81; follow-up: $\alpha$ = .88), with α's for the scores of the dimension subscales being of similar magnitude in both the baseline and the follow-up sample ($\alpha$ = .71 to .88), except for scores of the neutralizing domain in the baseline sample ($\alpha$ = .51).

**2.2.2. Anxiety, worry, and depression.** At baseline, the participants were administered the 41-item, child-report version of the Screen for Child Anxiety Related Emotional Disorders (SCARED; Birmaher, Brent, Chiapetta et al., 1999). Each item is rated on a 3-point scale (0 = Never True, 1 = Sometimes True, 2 = Often True). A total score (ranging from 0-82) is obtained along with scores on five symptom dimensions: panic/somatic (7 items), separation anxiety (5 items), generalized anxiety (9 items), social anxiety (8 items), and school phobia (3 items). Only the total score was used in this study. Worry frequency was assessed at baseline with the 14-item, Penn State Worry Questionnaire for Children (PSWQ-C; Chorpita, Tracey, Brown, Collica, & Barlow, 1997). Items are rated on a 4-point scale (0 = never to 3 = always) with a total score ranging from 0-42. At baseline, depression over the past two weeks was assessed with the 10-

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item Children's Depression Inventory – Short Version (CDI-SV; Allgaier et al., 2012). Items are rated on a 3-point severity scale (0-2), yielding a total score (ranging from 0-20). Higher scores on the SCARED, PSWQ-C, and CDI-SV all indicate more frequent symptoms. The CDI-SV, SCARED, and PSWQ-C have sound psychometric properties (Allgaier et al., 2012; Birmaher et al., 1999; Foa et al., 2010; Pestle, Chorpita, & Schiffman, 2008). In the present study, the Cronbach's alphas for the scores of the SCARED (α = .92), PSWQ-C (α = .93), and CDI-SV (α = .86) were all in the acceptable range.

**2.2.3. Global functioning, disorder severity, and clinical improvement.** As part of the routine monitoring of disorder severity and clinical improvement, participants were administered the Clinical Global Impression Scale (CGI; Busner & Targum, 2007). The CGI is comprised of two parts; the first is a single-item scale (1-7) that asks the clinician to rate the overall severity of any psychopathology (CGI-S), in this study OCD. Higher scores indicate greater severity. The second part is also a single-item scale, that asks the clinician to rate the degree of clinical improvement from the start of treatment (CGI-I) to the present. Improvement is rated on a 1-7 scale with lower scores indicating greater improvement. The CGI scales have been shown to be valid for measuring severity and improvement in various diseases and disorders including OCD (Busner & Targum, 2007; Storch, Lewin, De Nadai, & Murphy, 2010). In addition to the CGI, clinicians rated the participant's overall level of functioning using the Children's Global Assessment Scale (CGAS; Shaffer et al., 1983). The CGAS is a single-item, 1-100 scale of general functioning, with detailed descriptions of functioning at 10-point intervals along the scale. The CGAS has been shown to be a reliable measure of overall functioning in children and

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adolescents with psychiatric disorders seen in routine mental health settings (Lundh, Kowalski, Sundberg, Gumpert, & Landen, 2010; Shaffer et al., 1983).

### 2.3. Procedure

After referral to the clinic (hereafter 'baseline') all patients referred for problems related to OCD were administered the MINI-KID, DY-BOCS, CY-BOCS, OCI-CV, SCARED, PSWQ-C, CDI-SV, CGAS, and CGI-S as part of a larger research project on pediatric OCD. Patients who had OCD as their primary or secondary disorder according to the DSM-5 criteria and CY-BOCS were included in the study. Patients with OCD were only excluded if they had intellectual disabilities or language problems that prevented them from completing the self-report measures or from being the sole informant of their functioning in clinical interviews. At baseline, the MINI-KID, CY-BOCS, DY-BOCS, CGI-S, and CGAS were all administered by four clinical psychologists (including the first and third authors), all of whom had formal training and extensive (supervised) experience carrying out these interviews in clinical and research contexts. In addition, the four assessors attended weekly supervision sessions to discuss and review the results of the clinical interviews used in this study. All DY-BOCS interviews were carried out without the aid of any patient (e.g., OCI-CV) or parent self-report measures. Following the baseline assessments, all participants with OCD received psychoeducation about OCD and were offered psychological treatment in form of cognitive behavioral therapy involving exposure plus response prevention. Psychotropic medication (primarily selective serotonin reuptake inhibitors) was offered to those participants who did not respond to or were unable to participate in psychological treatment. All 100 follow-up assessments were conducted by the first or third

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author. All participants and their legal guardians gave full informed consent to participate in the study. The study was approved by the regional ethics committee (Dnr 2015/663).

### 2.4. Data analyses

All statistical analyses were carried out in SPSS v. 23.0 (IBM Corp, Armonk, NY). Data were screened for missing items, statistical outliers, and non-normality. The dimensional DY-BOCS scores differed from normality owing to the proportion of participants who received a value of zero on different dimensions for which they did not affirm any ongoing symptoms. Further investigation suggested no transformation of the data was necessary and parametric estimates are presented throughout this study. The rate of missing self-reported data was very low in the baseline (1.72%) and follow-up (0.13%) assessments. Little's MCAR test in the baseline sample was not significant ($p$ = .55) suggesting that data were missing completely at random. For data collected at both baseline and follow-up, Expectation-Maximization algorithms were used to impute the missing data.

To evaluate the psychometric properties of this modified, interview-only version of the DY-BOCS, the reliability (internal consistency) of the scores of the global severity and dimensional subscales was assessed with Cronbach's alpha. To analyze construct (specifically convergent) validity, we examined the pairwise correlations between scores on the DY-BOCS (dimensional and global) and the total score on the CY-BOCS, and the total and dimensional subscales on the OCI-CV. No measures were administered for the purposes of assessing discriminant validity. Construct validity was further examined through pairwise correlations between the DY-BOCS

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(global and dimensional) and total scores on the measures of anxiety (SCARED), worry (PSWQ-C), and depression (CDI-SV). We examined criterion validity (and clinical utility) through pairwise correlations between change scores (baseline to follow-up) on the DY-BOCS and the other measures of OCD (CY-BOCS, OCI-CV), and clinician ratings of severity and improvement (CGI-S/I). Finally, to investigate the utility of the present DY-BOCS version to capture symptoms within the different dimensions, we compared the frequencies of the DY-BOCS dimensions between the present study and the three previous validation studies with youth samples (Garcia-Delgar et al., 2016; Guler et al., 2016; Rosario-Campos et al., 2006). Independent samples t-tests were carried out and effect sizes (Cohen's *d*), for the differences between the present and previous studies, were calculated.

## 3. Results

We did not record the precise number of minutes required to administer this version of the DY-BOCS, only if it could be administered in a single 60-minute session. The majority (93%) of the baseline DY-BOCS interviews were carried out in a single 60-minute session. When a second assessment session was needed, the participants were usually younger (< 9 years), had a neurodevelopmental disorder (ADHD and/or autism), a broad array of OCD symptoms, or a combination of these factors. The internal consistency coefficients ($\alpha$) for the scores of the DY-BOCS symptom dimensions and the total severity scale were: Aggression = .94; Sexual/Religious = .93; Symmetry = .92; Contamination = .95; Miscellaneous = .97; Total Severity = .70.

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Table 1 presents the means and standard deviations for scores on the DY-BOCS, CY-BOCS, OCI-CV, CDI-SV, SCARED, PSWQ-C, CGI-S, and CGAS at baseline and DY-BOCS, CY-BOCS, OCI-CV, CGI-S, and CGI-I at follow up. The observed means for the DY-BOCS and the other symptom measures are consistent with those reported for other samples of treatment-seeking youth with OCD.

Insert Table 1 Here

Table 2 presents the pairwise correlations between the global score on the DY-BOCS and total scores on the measures of OCD, anxiety, worry, depression, overall OCD severity, and general functioning at baseline. In support of the construct validity of our modified version of the DY-BOCS, correlations between the DY-BOCS global score and the measures of OCD (CY-BOCS, OCI-CV) were in the moderate to strong range, in the strong range with measures of clinician-rated severity and functioning (CGI-S and CGAS), and in the small range with measures of anxiety (SCARED-R) and worry (PSWQ-C). No statistical significant correlation was found between the DY-BOCS and depression (CDI-SV).

Insert Table 2 Here

Table 3 presents the pairwise correlations between scores on the dimensional subscales of the DY-BOCS and the symptom dimensions from the OCI-CV. While the dimensions of the OCI-CV do not correspond directly to the DY-BOCS dimensions, some dimensions show substantial resemblance (e.g., the OCI-CV dimensions of obsessing and doubting/checking and the DY-

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BOCS aggressive dimension, OCI-CV obsessing and DY-BOCS sexual/religious, OCI-CV ordering and DY-BOCS symmetry, and OCI-CV washing and DY-BOCS contamination). The correlations between the corresponding dimensions of the OCI-CV and the DY-BOCS were in the expected direction and in the moderate to strong range.

Insert Table 3 Here

We calculated the change in total scores from baseline to follow-up for the DY-BOCS, CY-BOCS, OCI-CV, and CGI-S for the 100 participants who completed follow-up assessments. Table 4 presents the pairwise correlations between the change scores on these measures and the CGI-I. Changes in the DY-BOCS global score were significantly correlated with CGI-I and change scores on the CY-BOCS, OCI-CV, and CGI-S suggesting that the DY-BOCS is sensitive to the effects of OCD treatment. Table 5 presents the correlation between change scores on the OCD dimensions as measured by the DY-BOCS and OCD dimensions as measured by the OCI-CV. Again, symptom change within the DY-BOCS dimensions correlated in the expected direction with change in the corresponding symptom dimensions of the OCI-CV.

Insert Tables 4 and 5

In Table 6 we present the frequencies of the different DY-BOCS dimensions across the present and previous validation studies with youth samples. Out of 15 group comparisons, 8 were statistically significant. Effect sizes were mainly in the small to moderate range. Three effect sizes were in the large range of which two showed lower frequencies of sexual/religious

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symptoms in the present study than in the Guler et al. (2016) and Rosario-Campos et al. (2006) studies, and the third lower frequencies of miscellaneous symptoms in the present study than in the Garcia Delgar et al. (2016) study. No group differences were present in the contamination dimension and the largest differences were generally found in the miscellaneous dimension.

Insert Table 6 Here

## 4. Discussion

The aim of the present study was to investigate if a briefer, interview-only version of the DY-BOCS would preserve the psychometric properties of the original version and be sensitive to the effects of treatment for OCD. Overall, this interview-only version showed high levels of internal consistency for the scores of the dimensional subscales (Cronbach's $\alpha > .90$) and acceptable levels for the scores of the total severity scale ($\alpha = .70$), both of which were consistent with the original version. Evidence of construct validity was found in the strong positive correlations between global severity as assessed by the DY-BOCS, the gold-standard interview measure of OCD severity (CY-BOCS), and the most widely-used self-report measure of OCD symptom dimensions in youth (OCI-CV). Scores on the DY-BOCS symptom dimensions also correlated in the moderate to strong range with similar dimensions from the OCI-CV. Notably, the correlations were comparable to (or stronger) than those in Garcia-Delgar et al. (2016), where the 88-item self-report screening tool was employed. More modest correlations were observed between total scores on the DY-BOCS and total scores on the measures of anxiety, worry, and depression – but in the expected direction.

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In support of the clinical utility of the DY-BOCS, we found that the global DY-BOCS score correlated with clinician-rated measures of OCD severity (CGI-S) and general functioning (CGAS) at baseline. Importantly, we found that baseline-to-follow-up scores on the DY-BOCS, both global severity and dimensions, were significantly correlated with change scores assessed with the CY-BOCS, OCI-CV, and clinician-rated improvement. The present study is the first to undertake an investigation about the sensitivity of the DY-BOCS to change in OCD symptoms. The results indicate that both the global and dimensional sections of the measure are adequate in this sense. Again, it is important to point out that for 93% of participants in this study, this interview-only version of the DY-BOCS could be administered in a single 60-minute session, about half the time required for the original version. Hence, the present study provides evidence for the feasibility of further studies evaluating the clinical utility of this briefer, interview-only version of the DY-BOCS as a measure of OCD symptom dimensions and treatment outcome in youth with OCD.

It is important to note that the frequency of sexual/religious symptoms assessed with the current version of the DY-BOCS were somewhat lower here than in previous validation studies with youth. In these previous validation studies, participants first completed the 88-item self-report screening tool for the OCD dimensions which then was reviewed by the clinician prior to the DY-BOCS interview. We may have detected a higher rate of sexual/religious symptoms had we not removed the self-report section of the DY-BOCS. Also, clinician-led assessments of youth with OCD are often carried out with parents present and there may be an increased risk of underreporting sexual/religious obsessions as a result. When using the current interview-only

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version, it may be preferable for part of the interview to be carried out with the child alone and/or to compliment the interview with a very brief self-report measure of obsessions with sexual/religious content.

In the present study we also noticed a slightly higher frequency of aggressive symptoms and a lower frequency of miscellaneous symptoms compared to previous validation studies. This may just be normal variation between samples drawn in different countries/contexts. It is also possible that the higher scores in the aggression dimension represent our scoring instructions. Following Pertusa et al. (2012), we took great care not to score symptoms in the miscellaneous dimension that were motivationally related to one of the main symptom dimensions. Obsessions about aggression, harm, and responsibility are the most frequently reported obsessive content in the overall population (Radomsky et al., 2014). Perhaps the more careful classification of miscellaneous symptoms endorsed in this new DY-BOCS version captures this proportionality in an improved way.

Several limitations need to be mentioned. First, the current version of the DY-BOCS is a Swedish translation of the original. While we adhered to recommended translation processes, and the measure possessed similar psychometric properties as the English-language original, no back-translation was carried out. Further evaluations of this interview-only version of the DY-BOCS, in English- and other language-versions, are therefore warranted. Second, we did not directly assess the time (in total minutes) required to administer this interview-only version of the DY-BOCS making direct comparison with administration time for the original more difficult.

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Third, by removing the hoarding section of the DY-BOCS interview, it is possible that we might have missed hoarding compulsions that were related to overarching OCD symptom complexes, and, hence, therefore should have been be considered symptoms of OCD (for a discussion of this topic, see Pertusa, Frost, & Mataix-Cols, 2010). It would be useful to evaluate the validity of the original DY-BOCS and the present version in samples of OCD patients who do and do not have hoarding symptoms and patients who have hoarding disorder. Fourth, the present study was carried out as part of an overall research program whose aim was to identify the role played by emotional motivators (e.g., harm avoidance, incompleteness, disgust) in the severity and treatment of OCD and OCD symptom subtypes in treatment-seeking youth. The participants had a heavy assessment burden and we did not administer additional measures for the specific purposes of evaluating the discriminative validity of this version of the DY-BOCS. We did administer measures of anxiety, worry, and depression, and correlations between these measures and the DY-BOCS were generally in the small to moderate range. This might be interpreted as evidence of relatively weak discriminative validity. However, similar sized correlations between measures of OCD, depression, and anxiety have been reported in the literature and it has been argued that these correlations are likely to reflect some combination of shared vulnerabilities, phenotypic overlap, and the high rates of comorbidity among these conditions rather than poor or weak discriminant validity of OCD measures (Goodwin, 2015; Nestadt et al., 2001).

Overall, the present study found that a briefer, interview-only version of the DY-BOCS worked well at both the dimensional and overall severity level as a measure of pre-treatment OCD and as a measure of treatment outcome for OCD in a routine-care, child and adolescent psychiatric service. While this study was carried out with a large clinically-referred sample assessed with

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standardized interviews for OCD, surpassed in size only by the Guler et al. (2016) validation study, and included patients with neurodevelopmental disorders, further validation studies of the version described here are needed. Such studies will need to examine other language versions of the scale, the inter-rater reliability for the DY-BOCS, and with larger samples of youth of different ages where more detailed information is available about their OCD treatment.

**Conflict of Interest Statement**

None of the authors declare any conflicts of interest.

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**Table 1**
Means and standard deviations for the measures of OCD, overall functioning, depression, anxiety, worry, and clinical improvement at baseline and follow-up.

| Variables | Baseline *M* (*SD*) | Baseline Min-Max | Follow-Up *M* (*SD*) | Follow-up Min-Max |
|---|---|---|---|---|
| DY-BOCS Global | 18.74 (3.48) | 10-26 | 12.69 (5.73) | 0-24 |
| Aggressive | 5.45 (4.27) | 0-13 | 3.54 (2.98) | 0-12 |
| Sexual/Religious | 1.20 (2.77) | 0-11 | 0.88 (1.99) | 0-10 |
| Symmetry | 4.55 (4.00) | 0-13 | 3.20 (3.36) | 0-12 |
| Contamination | 4.69 (4.14) | 0-12 | 3.45 (3.30) | 0-10 |
| Miscellaneous | 1.43 (3.09) | 0-12 | 0.96 (2.49) | 0-11 |
| Total Severity | 9.92 (1.81) | 5-13 | 6.64 (2.88) | 0-12 |
| Impairment | 8.82 (1.98) | 3-13 | 6.05 (2.97) | 0-12 |
| CY-BOCS Total | 23.14 (4.34) | 11-33 | 15.89 (6.81) | 0-32 |
| OCI-CV Total | 18.51 (7.10) | 4-35 | 15.53 (7.69) | 2-33 |
| Checking/doubting | 4.78 (2.71) | 0-10 | 3.86 (2.50) | 0-9 |
| Obsessing | 4.49 (2.03) | 0-8 | 3.37 (2.10) | 0-8 |
| Hoarding | 1.67 (1.59) | 0-6 | 1.43 (1.52) | 0-6 |
| Washing | 2.80 (2.19) | 0-6 | 2.27 (2.08) | 0-6 |
| Ordering | 3.07 (2.12) | 0-6 | 2.89 (1.90) | 0-6 |
| Neutralizing | 1.70 (1.57) | 0-6 | 1.36 (1.46) | 0-6 |
| CDI-SV | 5.34 (4.24) | 0-17 | - | - |
| SCARED-R | 30.81 (14.93) | 3-72 | - | - |
| PSWQ-C | 25.96 (9.59) | 4-40 | - | - |
| CGI-S | 4.32 (0.89) | 2-6 | 3.06 (1.33) | 1-6 |
| CGAS | 51.39 (3.14) | 43-58 | - | - |
| CGI-I | - | | 2.70 (1.24) | 1-6 |

*Note*. DY-BOCS=Dimensional Yale-Brown Obsessive Compulsive Scale, CY-BOCS=Children's Yale-Brown Obsessive Compulsive Scale, OCI-CV=Obsessive Compulsive Inventory-Child Version, CDI-SV=Children's Depression Inventory-Short Version, SCARED-R= Screen for Child Anxiety Related Emotional Disorders, PSWQ-C=Penn State Worry Questionnaire for Children, CGI-S=The Clinical Global Impressions Scale, CGAS=The Children's Global Assessment Scale. CGI-I= The Clinical Global Impressions Scale-Improvement. *N*=119, except for the self-report scales where *N*=98 at baseline and *N*=69 at follow-up.

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**Table 2**
Correlations between scores on the DY-BOCS and the measures of OCD, anxiety, worry, depression, and clinician-rated severity and global functioning assessed at baseline.

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1. DY-BOCS Global | | | | | | | |
| 2. CY-BOCS | .72** | | | | | | |
| 3. OCI-CV Total | .33** | .23* | | | | | |
| 4. CGI-S | .78** | .71** | .26* | | | | |
| 5. CGAS | -.64** | -.57** | -.23* | -.65** | | | |
| 6. SCARED-R | .24* | .10 | .61** | .11 | -.07 | | |
| 7. PSWQ-C | .23* | .11 | .71** | .15 | .05 | .70** | |
| 8. CDI-SV | .17 | .13 | .46** | .15 | -.05 | .71** | .49** |

*Note.* DY-BOCS=Dimensional Yale-Brown Obsessive Compulsive Scale, CY-BOCS=Children's Yale-Brown Obsessive Compulsive Scale, OCI-CV=Obsessive Compulsive Inventory-Child Version, CGI-S= The Clinical Global Impressions Scale, CGAS= The Children's Global Assessment Scale, SCARED-R=Screen for Child Anxiety Related Emotional Disorders, PSWQ-C=Penn State Worry Questionnaire for Children, CDI-SV=Children's Depression Inventory-Short Version. * indicates $p < .05$. ** indicates $p < .01$.

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**Table 3**
Correlations between the symptom dimensions of DY-BOCS and the symptom dimensions of the self-reported OCI-CV.

| Symptom dimensions | OCI-CV Checking/ Doubting | OCI-CV Obsessing | OCI-CV Hoarding | OCI-CV Washing | OCI-CV Ordering | OCI-CV Neutral-izing |
|---|---|---|---|---|---|---|
| DY-BOCS Aggressive | .33** | .36** | .14 | -.06 | .03 | .15 |
| DY-BOCS Sexual/Rel. | .13 | .32** | -.06 | .12 | -.18 | -.06 |
| DY-BOCS Symmetry | .10 | -.07 | .30** | -.23* | .46** | .30** |
| DY-BOCS Cont. | .11 | -.00 | -.20 | .72** | .01 | -.13 |
| DY-BOCS Misc. | -.00 | .08 | .09 | .15 | -.13 | -.08 |

*Note*. DY-BOCS=Dimensional Yale-Brown Obsessive Compulsive Scale, OCI-CV=Obsessive Compulsive Inventory-Child Version. $N$=98. * indicates $p < .05$. ** indicates $p < .01$.

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**Table 4**
Correlations between the change in DY-BOCS global score from baseline to follow-up and other measures of symptom and disorder severity change from baseline to follow-up.

| Variable | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1. DY-BOCS Global (change score) | | | | |
| 2. CGI-I | -.84** | | | |
| 3. CY-BOCS Total (change score) | .91** | -.89** | | |
| 4. CGI-S (change score) | .85** | -.81** | .84** | |
| 5. OCI-CV Total (change score) | .46** | -.53** | .48** | .45** |

*Note*. DY-BOCS=Dimensional Yale-Brown Obsessive Compulsive Scale, CGI-I=The Clinical Global Impressions Scale-Improvement, CY-BOCS=Children's Yale-Brown Obsessive Compulsive Scale, CGI-S=The Clinical Global Impressions Scale, OCI-CV=Obsessive Compulsive Inventory-Child Version. $N$=69 for the OCI-CV correlations, $N$=100 for all other correlations. * indicates $p < .05$. ** indicates $p < .01$.

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**Table 5**
Correlations between change score of the DY-BOCS dimensions and change scores of the self-reported OCI-CV dimensions.

| Symptom dimensions (change scores) | OCI-CV Checking/ Doubting | OCI-CV Obsessing | OCI-CV Hoarding | OCI-CV Washing | OCI-CV Ordering | OCI-CV Neutral-izing |
|---|---|---|---|---|---|---|
| DY-BOCS Aggressive | .30* | .15 | .02 | .08 | .16 | .16 |
| DY-BOCS Sexual/Rel. | -.04 | .25* | .08 | .10 | -.01 | -.06 |
| DY-BOCS Symmetry | .27* | .20 | .13 | .21 | .30* | .32** |
| DY-BOCS Cont. | .18 | .08 | .02 | .43** | .17 | .04 |
| DY-BOCS Misc. | .32** | .22 | .15 | .24 | .16 | -.09 |

*Note*. DY-BOCS=Dimensional Yale-Brown Obsessive Compulsive Scale, OCI-CV=Obsessive Compulsive Inventory-Child Version. $N$=69. * indicates $p < .05$. ** indicates $p < .01$.

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**Table 6**

Means and standard deviations of the DY-BOCS symptom dimensions in the present and previously published validation studies with youth samples. Effect sizes for the differences between the present and previous studies are presented as Cohen's *d*.

| | Present study (*N* = 119) *M* (*SD*) Cohen's *d* | Rosario-Campos et al. (2006; *N* = 59) *M* (*SD*) Cohen's *d* | Guler et al. (2016; *N* = 143) *M* (*SD*) Cohen's *d* | Garcia Delgar et al. (2016; *N* = 97) *M* (*SD*) Cohen's *d* |
|---|---|---|---|---|
| DY-BOCS Aggressive | 5.5 (4.8) | 4.2 (4.3) | 4.2 (4.5) | 4.3 (4.7) |
| | - | **0.29** | **0.28*** | **0.25** |
| DY-BOCS Sexual/Rel. | 1.2 (2.8) | 2.3 (3.6) | 4.7 (4.6) | 2.2 (3.6) |
| | - | **0.34*** | **0.92***** | **0.31** |
| DY-BOCS Symmetry | 4.6 (4.0) | 6.7 (3.9) | 5.7 (3.8) | 4.9 (4.0) |
| | - | **0.53**** | **0.28*** | **0.08** |
| DY-BOCS Contamination | 4.7 (4.1) | 5.5 (5.0) | 5.6 (4.5) | 4.1 (4.3) |
| | - | **0.17** | **0.21** | **0.14** |
| DY-BOCS Miscellaneous | 1.4 (3.1) | 6.2 (3.8) | 2.6 (3.7) | 5.4 (4.1) |
| | - | **1.38***** | **0.35**** | **1.10***** |

*Note.* DY-BOCS=Dimensional Yale-Brown Obsessive Compulsive Scale. * indicates $p < .05$. ** indicates $p < .01$ *** indicates $p < .001$.

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