

## Research Article

# Assessing Obsessive-Compulsive Disorder (OCD): A Review of Diagnostic Interviews and Clinician-Rated Instruments

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**Abstract**

Obsessive-compulsive disorder (OCD) affects approximately 2- 2.5% of the adult population and 21%-25% of individuals from the general population subclinically. Assessing OCD is complicated by its own heterogeneity and its diagnostic differentiation from other disorders, as diagnostic comorbidity with other mental disorders is high. Improving assessment and diagnosis of OCD thus remains an important area of focus for research and clinical practice. A crucial component in this is having an overview of OCD measures that complements the review of self-report measures of OCD. This paper provides a critical and comprehensive overview of two diagnostic interviews and five clinician-rated OCD assessment measures commonly used with adults, including a family-report measure and behavioural assessment. The measures are evaluated based on their psychometric properties and practical utility, providing a resource for clinicians and researchers to facilitate their selection of OCD measure to serve their specific clinical or research aims.

**INTRODUCTION**

Obsessive-compulsive disorder (OCD), is a clinically widespread condition, with prevalence rates in the global population ranging from ~1% (current) and 2.0 % to 2.5% [1]. OCD is considered a significant public health concern, because of its prevalence, associated costs, and the difficulty in recognizing the disorder [2,3]. Measuring OCD is complicated by its own heterogeneity and its high diagnostic comorbidity with other mental disorders [4,5]. Improving assessment and diagnosis of OCD therefore remains an important area of focus for research and clinical practice. A critical component of identifying and assessing OCD accurately in any context (e.g., clinical, community, or research) is having an overview of commonly used OCD measures. The advent of DSM-V will encourage this but it maybe some years before new instruments and new versions of instruments are published [6].

There are essentially four ways of measuring OCD: diagnostic interviews, clinician-rated instruments, family-report questionnaires, and self-report questionnaires. This review is of the first two types of instruments, a comprehensive review of the questionnaires being recently published [7]. For a review of OCD instruments appropriate for assessing children and adolescents, see Merlo et al. [8]. Each instrument is designed to facilitate specific assessment goals, such as screening for OCD, diagnosis,

establishing a baseline symptom severity to evaluate treatment progress, and further treatment planning [9].

This paper intends to: 1) provide a overview of diagnostic interviews and clinician-rated measures for OCD that are commonly used with adults; and 2) provide a resource for clinicians and researchers to facilitate their decision on most suitable OCD measure for their specific goals and setting [9,10].

To evaluate psychometric properties of measures, first data on reliability and factor structure will be reported. Reliability refers to the reproducibility or consistency of scores from one assessment to the next; most commonly internal consistency and temporal stability are reported for OCD measures. For validity, researchers prefer to distinguish between content, construct, and criterion-related validity. Construct validity can only be measured indirectly because the significant comparison is to a latent construct instead of an observable one [11,12]. More concretely, criterion-related validity for OCD measures entails the diagnostic accuracy of a cutoff score of a measure, determining the measure's sensitivity (e.g., accurately identifying OCD patients) and specificity (e.g., correctly identifying non-OCD patients). In addition to this predictive aspect, criterion-related validity also contains concurrent validity [12]. Concurrent validity is demonstrated in two ways: 1) through strong

correlations between independent assessment methods of the same diagnostic construct (e.g., convergent validity); and 2) by weak correlations between measures assessing conceptually distinct diagnostic constructs [13]. For OCD measures, this entails that strong correlations with other validated OCD measures is evidence of convergent validity, whereas low correlations with measures of depression, anxiety, worry, and stress is evidence of good divergent validity. For OCD measures this entails that strong correlations (ie  $r > .5$ ), with other validated OCD measures

The measures reviewed will generally be presented from old to new, but where related versions of an assessment tool are still used, these will follow one another (Table 1).

## Diagnostic interviews

These interviews facilitate diagnostic decisions by utilizing specific questions to assess symptoms according to the DSM-IV (APA,2000) criteria. The interviews are divided into sections by disorders. Detailed questions concerning each disorder are administered only if the preliminary criteria are met. Each interview usually takes between 60-120 minutes to complete.

**Anxiety Disorder Interview Schedule for the DSM-IV [14,15].** The ADIS is a semi-structured diagnostic interview

based on the DSM-IV. It was developed to distinguish between anxiety and other disorders that frequently co-occur with anxiety disorders (e.g., mood or substance abuse disorders). The ADIS also includes screening questions for other disorders such as psychotic and eating disorders [16]. Two versions of the ADIS exist: the standard version that assesses current symptoms, and the lifetime version that assesses both current and past symptoms. The interviewer asks questions about personal demographics and specific symptoms for each included disorder. Hereafter, diagnoses are assigned a severity rating, ranging from 0-8, based on the distress and impairment that the patient experiences [9]. However, it does not always give enough good examples to make it reliable.

Brown et al. [15], reported that interrater reliability of the ADIS was moderate to good ( $\kappa = 0.56-0.81$ ) for most disorders, including OCD ( $\kappa = 0.75$ ). Specifically, for OCD, the interrater reliability ranged from 0.43 (resistance to obsessive impulses) to 0.84 (clinical severity rating). There is limited data on the validity of the ADIS, as studies commonly examine symptoms rather than diagnostic categories. Yet, Brown, Chorpita, and Barlow [17], verified convergent and discriminant validity of the ADIS based on its factor structure, by demonstrating that the symptoms loaded significantly on the expected latent factor without cross-

**Table 1:** Summary Review.

Measure	Format	Number of items	Description	Evaluation: Strengths and Weaknesses
ADIS (Brown et al., 1994; 2001)	Diagnostic interview	NA	Includes detailed symptom queries for each disorder. Each disorder is rated on severity (0-8 scale).	Excellent reliability. Enhanced diagnostic utility through detailed descriptions of disorders. However, time intensive and trained rater required
SCID-I (First & Gibbon, 2004)	Diagnostic interview	NA	Contains questions about past and present symptoms for DSM-IV diagnoses.	Assesses broad range of comorbid disorders. Good diagnostic utility with simple design. Disadvantages are: poor reliability of OCD diagnoses, time intensity, and requirement of trained rater.
Y-BOCS (Goodman et al., 1989)	Clinician administered	54	Contains a symptom checklist and separate obsession and compulsion severity ratings (0-4 scale).	Measures both symptom frequency and severity. Excellent reliability, good content and construct validity. Moderate convergent and divergent validity, questionable criterion-related validity. Disadvantages are disagreement over factor structure and requirement of trained rater.
Y-BOCS-II (Goodman et al., 2006)	Clinician administered	67	Contains a symptom checklist and separate obsession and compulsion severity ratings (0-5 scale).	Modifications overcome limitations of the Y-BOCS. Excellent reliability. Good construct and convergent validity, but still limited discriminative power and also requirement of trained rater.
DY-BOCS (Rosario-Campos et al., 2006)	Clinician-administered	88	Contains a symptom checklist and separate severity ratings (0-5 scale). Also assesses global symptom severity (0-10 scale) and impairment (0-15 scale).	Modifications overcome limitations of the Y-BOCS. Excellent reliability, though temporal stability unknown. Good construct and adequate concurrent validity. Too much overlap between global severity and impairment scale; miscellaneous symptoms also need revision. Psychometrics need to be tested in nonclinical samples. Time intensive and trained rater required.
BATs (Steketee, Chambless, Tran, & Worden, 1996)	Clinician administered	3 or 4	Patient performs single or multiple tasks related to feared stimuli or compulsions. Distress, completed steps, avoidance and rituals are rated.	In vivo measure of fear and avoidance could be useful as part of a multimethod assessment. However, overt compulsions are not observable. Adequate to poor reliability and validity. Good treatment sensitivity but difficult to standardize and implement.
FAS (Calvocoressi et al., 1999)	Clinician administered or self-report	13	Designed to be administered to family members. Includes 2 parts: a detailed symptom list and 13 questions about accommodation (0-4 scale).	Only externally validated measure that assesses family accommodation, which has been shown to deteriorate patients' symptoms further. Good to adequate reliability, though test-retest reliability unknown. Good convergent and discriminant validity. Sensitivity to treatment unknown.

loading on the latent factors of other disorders. In conclusion, the main advantages of the ADIS are its detailed descriptions per disorder and adequate reliability of the OCD category. However, the raters need to have a high level of expertise and the time and to administer the ADIS is burdensome, especially when the lifetime version is used [9].

**Structured Clinical Interview for DSM-IV Axis I Disorders [18].** The SCID-I is also a semi-structured interview that can be used to establish a diagnosis for Axis I disorders according to DSM-IV criteria, though it can also be used in research. Interviewers ask questions with respect to different diagnostic criteria (past and present), demographic, and other historical information such as treatment history. To be more efficient, the measure includes 'leave out' instructions, enabling clinicians to skip over questions about a particular diagnosis if it is clear that the diagnostic criteria are not met. A shortened clinical version of the SCID-I exists, which assesses disorders commonly seen in clinical practice. However, this version excludes a number of disorders such as eating disorders, social phobia, and some specifiers such as 'with poor insight' for OCD [18].

Test-retest reliability of the SCID-I ranges from  $\kappa = 0.35$  to 1.0, depending on diagnostic category, time between testing, interviewer training, and study population. For OCD, test-retest reliability ranges from poor to moderate ( $\kappa = 0.42-0.60$ ). The authors postulate that it is difficult to evaluate the validity of the SCID, as there is no 'gold standard' for psychiatric diagnosis with which to compare the SCID [18]. Yet, First and Gibbon (2004) do cite a number of studies that used the 'Longitudinal evaluation by Experts using All Data available' (LEAD) standard and found that the SCID demonstrates good validity for establishing psychiatric diagnoses at intake, relative to a standard clinical interview [19,20]. The LEAD standard uses data collected over time from expert diagnosticians and all the available data from the patient (e.g., information from collaterals, behavioral observations, and medical records) and compares diagnoses obtained on the basis of one method to those obtained using the combined information [9].

In sum, the main advantage of the SCID-I is the structured method of information gathering to diagnose OCD according to criteria in the DSM-IV. It also examines comorbid diagnoses, which could influence treatment and prognosis. Disadvantages of the SCID involve the level of expertise needed for administration, how time-costly the measure is, and the relative low reliability of specific OCD diagnoses. Furthermore, Taylor, Thordarson, and Sochting [21], observed that the SCID does not generate as much clinically useful information related to OCD in comparison to other measures [15]. Overall, the SCID could be preferred to the ADIS but would need to be used in combination with the Yale-Brown Obsessive-Compulsive Scale [22].

It should be pointed out that there are indeed other instruments which included structured interview measures of OCD: the Composite International Diagnostic Interview (CIDI) (WHO, 1990) and the Mini-International Neuropsychiatric Interview (MINI) [23]. These measures have been reviewed by Zohar [24].

## Clinician-rated measures

The use of a clinician-rated inventory allows trained individuals to make informed ratings of OCD related impairment and distress. Scores for all items are determined by the clinician on the basis of the person's report, parent(s)/spouse's report and behavioral observations. Some measures use the symptom checklist as a self-report inventory, in combination with the semi-structured interview with a trained clinician. Advantages of clinician-rated measures include the ability to gain more detailed information about specific symptoms and OCD triggers of the patient. Shaffer, Fisher, and Lucas [25], also suggest that there is the opportunity to clarify items for respondents, so that responses are in concert with item content. Disadvantages of clinician-rated measures are the administration time, level of training required, potential rater bias when responses are coded, and the susceptibility to demand characteristic [9]. Finally, psychometric properties may be more variable than self-administered measures, due to variability in interviewer experience, thoroughness, and attitude [25]. This section will present the following measures: the three most widely used clinician-rated measures, an observational assessment, and a family report measure. They were chosen as they appeared to be the most widely used and researched in the literature.

**Yale-Brown Obsessive Compulsive Scale [26,27]:** The Y-BOCS is administered in two parts: first, clinicians utilize a symptom checklist to establish the types of obsessions and/or compulsions experienced by the patient. Hereafter, severity of these obsessions and compulsions are rated on a five-point scale with higher scores indicating greater severity. Baer [28], developed a self-report version of the Y-BOCS symptom checklist [22]. The scale and symptom checklist can be used separately (and the latter in self-report form), but are designed to be used together.

For the symptom checklist, the participant first ticks (or leaves open) every symptom personally experienced, either 'current' or 'past', followed by circling the three main obsessions and three main compulsions. Subsequently, the severity of these main symptoms are rated on the severity scale. There are separate subtotals for severity of obsessions (sum of items 1 through 5) and compulsions (sum of items 6 through 10). Symptoms are assessed with respect to how much they occupy the patient's time, interfere with normal functioning, cause subjective distress, are actively resisted by the patient, and can actually be controlled by the patient [26]. The scale for the 10 items on the severity scale (Y-BOCS SS) are 0 (none) to 4 (extreme). Hence, the total Y-BOCS severity score ranges from 0 to 40.

Goodman et al. [26], reported interrater reliability to be excellent, for total Y-BOCS scores this was  $r = 0.98$ , for obsessions and compulsion subtotals  $r = 0.95$  and  $0.98$ , and for items  $r = 0.80 - 0.95$ . Internal consistency for all four raters was also high, demonstrating homogeneity of the Y-BOCS, Cronbach's alphas were between 0.88 and 0.91, and the mean of all raters was 0.89. Steketee et al. [29], reported Cronbach's alpha for the total score of the self-report version, for a nonclinical sample ( $n = 70$ ) to be 0.90-0.91 and for the clinical sample ( $n = 36$ ) to be 0.55-0.78. For the interview version Cronbach's alpha ranged between 0.78 and 0.88 for the nonclinical sample and between 0.56-0.74 for

the clinical sample. Later studies have generally reported high internal consistency rates for the Y-BOCS, with Cronbach's alphas between 0.80 and 0.87 in clinical samples [30,31]. However, slightly lower internal consistency figures were obtained by Anholt et al. (2009) in their OCD sample. The total Y-BOCS-SC was found to have a Cronbach's alpha of 0.72, whereas the symptom subscales ranged between 0.47-0.70. For the severity scale this was higher: the Cronbach's alpha of the total score was 0.80, and for the obsessions and compulsions subscales 0.68 and 0.70, respectively. Furthermore, Steketee et al. [29], reported excellent test-retest reliability ( $r = 0.81-0.97$  over a two week interval). These authors also reported parallel forms reliability, between the self-report version and the interview, to be adequate ( $r$ s of 0.65-0.75 for nonclinical and 0.73-0.79 for clinical individuals).

The factor structure of the Y-BOCS severity scale (e.g., obsessions and compulsions being the two sub factors), has not consistently been replicated in the literature. Though some research has supported the original two-factor structure [32-34], many report different factor structures. For example, Deacon and Abramowitz [35], found a two-factor solution comprised of symptom severity (e.g., time, distress, and interference from obsessions and compulsions) as distinct from resistance and control of obsessions and compulsions. The severity subscale showed good psychometric properties and construct validity, as opposed to the resistance/control subscale (these items comprise 40% of the Y-BOCS items without meaningfully contributing to the measurement of OCD symptom severity; Deacon & Abramowitz, Amir, Foa, and Coles [36], found a disturbance factor and a symptom severity factor, instead of the obsessions and compulsions factors. Moritz et al. [37], even reported three factors: severity of obsessions, severity of compulsions, and resistance to symptoms. More recently, Anholt et al. [38], replicated the same three-factor structure in a large sample of OCD patients.

As for convergent validity, Mataix-Cols et al. [39], found small to moderate correlations between corresponding Y-BOCS symptom subscales and the corresponding Maudsley Obsessional Compulsive Inventory [40], and Padua Inventory (PI) [41], subscales in an OCD sample. The only exceptions were the washing/contamination subscales of the Y-BOCS-SC and those of the MOCI and PI, showing  $r$ s of 0.59 and 0.60, respectively. Yet, these results are limited as the MOCI does not assess a broad spectrum of OCD symptoms [42], and the PI does not include any items to assess hoarding symptoms. Moreover, the PI has been shown to fail to discriminate between general worries and obsessions [43]. In a psychometric comparative study of the Y-BOCS-SC and the Obsessive Compulsive Inventory-Revised (OCI-R [44]. Sulkowski et al. [31], found a moderately strong relationship between the two measures ( $r = 0.63$ ). In addition, strong correlations were observed between corresponding subscales: the contamination/washing subscales ( $r = 0.80$ ), the hoarding subscales ( $r = 0.65$ ), the symmetry/ordering subscales ( $r = 0.62$ ). Further moderate relations were observed between the Y-BOCS-SC sexual/religious scale and the OCI-R obsessing scale ( $r = 0.47$ ), and the Y-BOCS-SC aggressive/checking scale and the OCI-R checking scale ( $r = 0.42$ ).

Equivocal findings for discriminant validity have generally been reported for the Y-BOCS. For example, Taylor [45], found high correlations of the Y-BOCS with the Hamilton Depression Scale (HAM-D; [46], and the Hamilton Anxiety Scale (HAM-A; [47]:  $r$ s of 0.53-0.91 and 0.47-0.85, respectively. Storch et al. [34], also reported moderate correlations with the Beck Depression Inventory (BDI [48]. Conversely, Mataix-Cols et al [39], reported few significant correlations between the Y-BOCS SC dimensions and psychological state measures. Sulkowski et al. [31], also found the divergent validity of the Y-BOCS-SC and severity scale to be good. In their study, the Y-BOCS-SC showed a correlation of  $r = 0.29$  with the State-Trait Anxiety Inventory-Trait (STAI-T [49], and the Y-BOCS-SS showed a correlation of  $r = 0.36$  with the Beck Depression Inventory Second Edition [50]. Subscales also correlated weakly or moderately with divergent constructs (e.g., the Y-BOCS-SC sexual/religious and aggressive/checking scales showed respective  $r$ s of 0.30 and 0.27 with the STAI-T [31].

As for criterion-related validity of both the self-report and interview version of the Y-BOCS, the cut-off score of 16 showed very good sensitivity but relatively poor specificity [29]. This means that true positives were accurately identified but true negatives to a lesser extent. Wu et al.'s [30], between-groups data suggests that OCD and non-OCD patients differed significantly only on symmetry/ordering symptoms. Hence, the self-report Y-BOCS SC may be inappropriate for distinguishing OCD from non-OCD patients, as it leads to over-identification of OCD patients. It is important to note however, that the Y-BOCS was not developed to serve as a diagnostic instrument [26].

In conclusion, the Y-BOCS and its symptom checklist are commonly considered the gold standard for assessing OCD symptom severity [9]. Apart from the measure's unstable factor structure, psychometric properties and treatment sensitivity appear to be good. A separate severity scale is in concert with symptom severity independent of the number of different types of symptoms endorsed [33]. There is also psychometric support for a strong convergence between the original, clinician-administered Y-BOCS and its self-report counterpart [29]. Nonetheless, the Y-BOCS was not developed to serve as a diagnostic instrument. Its ability to distinguish OCD from non-OCD groups is not very good, which is important as cut-off scores on the Y-BOCS (i.e., 16) are normally used as inclusion/exclusion criteria for participation in clinical research. Therefore, the self-report Y-BOCS has limitations when used more broadly such as in: a) the assessment of OCD-like symptoms reported by non-OCD patients and non-patients, and b) differentiation between OCD and non-OCD patients [30].

**Yale-Brown Obsessive Compulsive Scale Second Edition [22]:** The Y-BOCS was recently revised to address aforementioned shortcomings, by making the following changes [22]. 1) within the severity scale (SS), the 'Resistance against Obsessions' item was replaced with an item assessing 'Obsession-Free Interval'; 2) the Likert-type response scale was expanded from a 5-point to 6-point scale, making the upper limit on the total Y-BOCS II (sum of items 1-10) 50 instead of 40; 3) avoidance behaviors were given added emphasis in measuring symptom severity through revised instructions and anchor point definitions; and 4) modifications were made to the symptom checklist (SC) content and format.



Storch et al. [51,52], measured internal consistency using the KR-20 formula, resulting in a coefficients ranging from 0.63 (avoidance items) to 0.91 (Y-BOCS-II SS total score). Interrater reliability was also high (with intra-class coefficients, ICCs, ranging from 0.83 to 0.97) and support for test-retest reliability was reported (ICCs ranged from 0.75-0.90). Storch et al. [52], found two factors to underlie the severity scale: obsessions and compulsions, accounting for 56.8% of the variance in the Y-BOCS-II. A promax rotation of the items on the symptom checklist resulted in a four-factor solution accounting for 60.78% of the variance. These four factors were largely consistent with the 4-factor structure generally found for the Y-BOCS (symmetry/ordering, contamination/washing, hoarding, and sexual/religious/aggression dimensions; Bloch et al. [53]. Though checking items did not load on a separate dimension, this can be explained by checking rituals serving multiple functions.

For convergent validity, Storch et al. [51], reported that the Y-BOCS-II symptom checklist total score correlated moderately with the Y-BOCS-II severity scale ( $r = 0.39$ ) and with the OCI-R total score ( $r = 0.69$ ). Corresponding dimensions of the Y-BOCS II SC and the OCI-R correlated more strongly than noncorresponding or more general dimensions. The relationship between the Y-BOCS II severity scale score and the OCI-R was also significant, although less robust. Storch et al. [52], furthermore reported strong correlations between the Y-BOCS II SS and the National Institute of Mental Health Global Obsessive-Compulsive Scale (NIMH GOCS [54]. The Y-BOCS-II and Y-BOCS were strongly correlated ( $r = 0.97$ ) and similarly related to the converging and divergent constructs.

Storch et al. [51,52], reported good discriminant validity through weak to moderate correlations between the Y-BOCS-II symptom checklist and the Penn State Worry Questionnaire (PSWQ) [55], with the highest  $r$ s being between 0.27-0.30 for hoarding and the taboo thoughts dimensions. The Inventory of Depressive Symptomatology—Self Report (IDS-SR) [56], similarly correlated with the Y-BOCS-II-symptom and severity total scores ( $r$ s for contamination/washing scales and taboo thoughts dimensions: 0.29-0.38). Though there is considerable overlap between the Y-BOCS-II SC total score, several symptom dimensions, and measures of general worry and depression, these correlations are lower than other OCD measures have generally reported. Moreover, the obsession and compulsion severity subscales showed very weak or nonsignificant correlations with general worry or depressive symptoms, indicating good divergent validity [52].

In sum, the original Y-BOCS-SC self-report did not rate ritualistic avoidance explicitly and it also misconceived that not all OC symptoms are driven by fear or anxiety (but can be motivated by 'just-right' feelings or disgust). The Y-BOCS II aimed at resolving these shortcomings and eliminating 'resistance to obsessions' items, as these are not a manifestation of psychological health. Replacing these items by 'obsession-free interval' items allowed for improved assessment of the time burden imposed by obsessions [57]. By extending the upper ends of the severity scale items (from a 5-point range to a 6-point range), more accurate symptom assessment is enabled at the highest levels of symptom severity and subclinical presentations. The Y-BOCS-

II-SC appears to be a robust measure of OCD, and discriminant validity seems to have improved over its predecessor. However, more psychometric studies (and ROC analyses) are needed to assess its discriminant power further, whether the Y-BOCS II will accurately distinguish between OCD and non-OCD patients.

One recent factor-analytic study provides "considerable converging evidence for a five-factor structural model" and supportive evidence of "this multidimensional model in OCD genetic linkage studies" [58].

**Dimensional Yale-Brown Obsessive-Compulsive Scale (DY-BOCS) [59]:** Despite the potential utility of using dimensional ratings and the availability of psychometrically sound self-report measures, there are almost no severity scales designed for expert-ratings available that adequately assess the dimension-specific OC symptom severity. This led Rosario-Campos et al. [59], to revise the Y-BOCS and develop the DY-BOCS. The measure, like the Y-BOCS and Y-BOCS II can be used as an expert-rated measure, a self-report, or a combination of the two. The DY-BOCS symptom checklist is composed of 88 items, designed to provide a detailed description of obsessions and compulsions that are divided into six different OC symptom dimensions [60], aggression/ harm, sexuality/morality/religion, symmetry/ordering/ just-right, contamination/cleaning, hoarding, and miscellaneous (e.g., somatic concerns and superstitions).

For the severity ratings, three ordinal scales with six anchor points are used: symptom frequency (0-5), amount of distress (0-5), and the degree to which symptoms interfered with functioning during the previous week (0-5). Besides the symptom checklist, the DY-BOCS self-report also asks the patient to assess the overall symptom severity in each of the dimensions for the previous week on a 0-10 scale. The academic expert raters rate global OC symptom severity with the same ordinal scale, and finally assess an individual's overall current level of impairment due to OCD on a 0-15 scale. The total global score is obtained by combining the sum of global severity scores in frequency, distress, interference, and the impairment score (0-15), yielding a maximum total global severity score of 30.

Rosario-Campos et al. [59], reported excellent internal consistency across the severity domains of the six dimensions (Cronbach's alphas ranged between 0.94-0.95) and found interrater reliability between the expert raters on the DY-BOCS to be excellent, with ICCs of at least 0.98 for each component score. Parallel forms reliability was also very good in the original validation study, as the self-report and clinician measures of severity correlated between 0.75-0.87. Pertusa et al. [60,61] and Harsányi et al. [62], replicated excellent internal consistency in an English external validation, Spanish adaptation, and Hungarian adaptation of the DY-BOCS respectively (Cronbach's alphas were 0.89 for the global severity scale and between 0.97-0.99 for the subscales). Pertusa et al. [60], furthermore found the interrater reliability between the expert raters on the DY-BOCS to be very strong (ICCs ranged from 0.81-0.95), and parallel forms reliability of the self-report and clinician version to be good, except of the symmetry and miscellaneous subscales. Given that the level of agreement between self-report and expert ratings may vary for these scales, caution should be taken to use the DY-BOCS as a reliable substitute for their clinician-administered counterpart.

Rosario-Campos et al. [59,62], and Pertusa et al. [60,61], found correlations between each of the DY-BOCS dimensions and the total DY-BOCS and global severity scores to be generally low to moderate, indicating that the dimensions are largely independent and explain unique variance. However, all studies report the global severity and impairment scales to be highly correlated ( $r = 0.89$ ), suggesting that one could be eliminated without losing valuable information. As for convergent validity, Rosario-Campos et al. [59,62], and Pertusa et al. [61], reported high correlations between the DY-BOCS total global score, impairment rating, and the Y-BOCS total score and obsessions and compulsions subscale scores (all  $r$ s ranged between 0.62 and 0.85). In particular, Pertusa et al. [60,61], reported the global severity and impairment scales of the DY-BOCS to both correlate most strongly with the OCI-R total score ( $r = 0.45$ ). Between these two measures, the largest correlations appeared between the corresponding symptom subscales; correlations between non-corresponding subscales were smaller or nonsignificant. The DY-BOCS hoarding subscale was furthermore most strongly correlated with all the subscales of the Saving Inventory-Revised (SI-R) [63]. These results were moreover confirmed through multiple regression analyses [60,61].

The divergent validity of the DY-BOCS shows marginal improvement over the divergent validity of the Y-BOCS. In particular, the symmetry and miscellaneous dimensions were strongly related to the Work and Social Adjustment Scale (WSAS) [64], with  $r$ s of 0.57 and 0.58, respectively [59]. The global severity and impairment scales of the DY-BOCS were also strongly associated with the WSAS ( $r$ s of 0.67 and 0.70, respectively) and BDI ( $r$ s of 0.57 and 0.51, respectively; Rosario-Campos et al [59]. Conversely, adequate divergent validity was reported by Pertusa et al. [61], as the correlations between the subscales of the DY-BOCS and measures of depression (HAM-D) and anxiety (HAM-A) ranged from nonsignificant to moderate. Harsányi et al. [62], also reported adequate discriminant validity in their Hungarian validation of the DY-BOCS. They used the HAM-D to compare OCD dimensions with the most frequent comorbid disorder, depression. Only for the aggressive dimension a significant correlation with depression was found.

In conclusion, by dividing OC symptoms according to dimensions, the DY-BOCS is capable of inquiring about symptoms that are inherently ambiguous (e.g., checking, mental rituals, repetition, and avoidance behaviors) and that may be present in more than one symptom domain. Especially, the DY-BOCS allows for assessment of 'hybrid symptom combinations'. A hybrid symptom combination is a compulsion that is usually conceptualized as belonging to a certain dimension, yet might be triggered by an obsession that pertains to a different dimensions. As opposed to the Y-BOCS and the DY-BOCS focuses on the obsessions motivating the rituals, instead of the observable behaviors themselves. Further advantages of the DY-BOCS are its clarity by offering examples, making it more similar to the clinician-administered version when used as a self-report, and the aforementioned significant improvements over the Y-BOCS. Nonetheless, the psychometric properties of the DY-BOCS in nonclinical populations remain to be studied, as it is still unclear whether the DY-BOCS is suitable to assess subclinical OCD presentations. Additional work is also needed to sort through the

miscellaneous symptoms. Pertusa et al.'s [59], study suggests that some of the symptoms currently included in the miscellaneous dimension are likely to become part of the already existing subscales. Finally, usage of the DY-YBOCS has the disadvantage of its time burden, as patient need approximately 40 minutes to complete the self-report checklist, and the expert rater needs 49 minutes to administer the clinician version [59].

**Behavioral Avoidance Tests (BATs) [45,65]:** BATs are observational measures that examine avoidance behavior and accompanied levels of distress. Although the tests have traditionally been used to measure fear and avoidance in individuals with phobias, they have also started to be incorporated in OCD research [9]. BATs can involve one single or multiple tasks. For the single form, the patient is presented with a feared stimulus and asked to give a rating of their level of distress, e.g., the subjective unit of disturbance ('SUD'). In the multiple tasks form the patient performs and rates a variety of tasks from 0 (*none*) to 100 (*extreme*), which normally lead to compulsive behavior [45]. Rituals and avoidance for each task is assessed on a scale from 0 (*no avoidance*) to 2 (*complete avoidance*). A composite BAT score can be calculated by summing the percentage of steps, SUDs, avoidance, and rituals. BATs are commonly administered by a clinician before and after treatment to examine the severity of fear and avoidance, in addition to treatment effects [65]. Although there is mixed support for validity of the measure, it is generally considered to have good treatment sensitivity. Steketee et al. [65], researched a sample of 50 OCD patients with varying symptoms using the multiple task BAT. Internal consistency of the composite BAT was adequate at pre-test (Cronbach's  $\alpha = 0.64$ ), but lower at post-test (Cronbach's  $\alpha = 0.49$ ). Interrater reliability was adequate ( $r = 0.71$ ). Good convergent validity of the BAT and its subscales was demonstrated through significant correlations with the Y-BOCS total score ( $r = -0.33-0.49$ ). Unlike the individual BAT variables, the composite BAT score showed reasonably good convergent validity with the Maudsley Obsessional Compulsive Inventory (MOCI) [40], correlations were between  $-0.20-0.46$ . Negative correlations reflect the association between the percentage of assigned steps completed with the Y-BOCS and MOCI total scores, with higher percentages of steps being completed linking to lower scores on the Y-BOCS and MOCI. Divergent validity was generally good, with low correlations observed among the BAT scores and the revised version of the Symptom Checklist's (SCL-90-R) [66], depression subscale ( $r = 0.01-0.36$ ) and SCID criteria for Obsessive Compulsive Personality Disorder (OCPD is often confused with the Axis II diagnosis;  $r = -0.10-0.04$ ).

Advantages of the BAT are that it can offer in vivo measures of fear and avoidance related to obsessions and compulsions [29,65], and that it can be tailored to specific symptoms of the patients [67]. Further, Steketee et al [65], propose that BATs can be an important addition to other interview or self-report measures, and hence, be part of a multimethod approach to assess OCD symptoms and severity. On the other hand, Taylor [45], suggests that BATs may not be helpful with some compulsions, such as checking, ordering, or mental rituals, since these are situation-specific or unlikely to be observable. Finally, designing multi-task/multi-method BATs can be complicated, and there are no standardized procedures or guidelines for administration.

**Family Accommodation Scale (FAS) [68]:** The FAS is a clinician-administered measure designed to assess “the nature and frequency of accommodating behaviors of family members toward a family member with OCD” [69]. Accommodation of OCD symptom refers to actions taken by family members that facilitate rituals (e.g., provide objects needed for the rituals), acquiesce the patient’s demands (e.g., following a certain routine to minimize anxiety), and reassure the patient (e.g., answer questions repeatedly). Although such actions are generally well-intentioned, they often result in greater impairment and symptom severity [70]. Several studies have found significant positive correlations between family accommodation and Y-BOCS scores of the OCD patients [69,71,72]. Recently, Merlo et al. [8], found that 88% of parents of OCD children reported to engage in at least mild accommodation of their child’s symptoms. The FAS is divided into three parts: 1) a detailed symptom list, which is designed for the family member to identify symptoms of which he/she is aware; 2) nine items that assess the degree to which family members have accommodated the patient’s OCD symptoms during the previous months (family accommodation index; FAI); and 3) four items that evaluate the level of distress or impairment that the relatives and the patient experience as a result of this accommodation, or the absence of this accommodation (family distress index; FDI). The items in the second and third part are answered on a scale from 0 (*none*) to 4 (*extreme*).

Several studies have reported internal consistency to be variable but generally acceptable, with Cronbach’s alphas ranging between 0.67 and 0.90 [68,70,73,74]. Interrater reliability for the FAS was found to be good, with intraclass coefficients (ICCs) of 0.75-0.95 [68]. Most recently, Albert et al. [74], conducted exploratory factor analysis in an adult sample and found evidence for three distinct subscales of the FAS (i.e., Modification, Distress and Consequences, and Participation). Interestingly, type of onset was related to the FAS 13-item total score: family members of patients with an abrupt onset showed greater accommodation scores than those subjects with an insidious onset; means of FAS total score were 25.37 (*SD* 10.13) and 21.76 (*SD* 9.12), respectively. Calvocoressi et al. [68], reported good convergent validity through significant correlations with the Y-BOCS ( $r = 0.49$ ), patient Global Assessment of Functioning scores [75],  $r = -0.45$ ), poor global family functioning on the Family Assessment Device (FAD) [76];  $r = 0.50$ ), the Patient Rejection Scale (e.g., measure of relatives’ rejecting attitudes towards the patients; Kreisman, Simmens, & Joy [77];  $r = 0.67$ ), and Questionnaire on Resources and Stress (QRS) subscales measuring dependency and management [78];  $r = 0.73$ ). Support for divergent validity was furthermore found through low construct overlap between the FAS and the other FAD and QRS subscales. Correlations with financial stress (Holroyd, 1987 [78];  $r = 0.05$ ), stress associated with caring for a terminally ill family member ( $r = 0.001$ ), a cognitively impaired family member ( $r = -0.05$ ), and physically impaired family member ( $r = 0.18$ ) were reported to be weak [68]. Geffken et al [73], compared the FAS with the subscales of the COPE Inventory (e.g., a 52-item questionnaire of coping responses with a range of distinct scales; Carver, Scheier, & Weintraub [79], and reported weak correlations. Secondly, they compared the FAS with the BDI-II, resulting in a correlation of  $r = 0.23$ ; and with the Hunter Opinions and Personal Expectations Scale ( $r = -0.21$ ; Nunn et al. [80]). In sum, the FAS demonstrates

good internal consistency, interrater reliability, and evidence of construct validity, whilst test-retest data and data on sensitivity to treatment effects are still lacking. Nonetheless, the FAS is a valuable tool as it is currently the only measures that examines accommodation behavior in family members of OCD patients.

## CONCLUSION

In this paper diagnostic interviews and clinician-rated OCD measures have been reviewed (see table 1 for an overview), which assess the presence and severity of obsessions and compulsions in nonclinical and clinical individuals. This paper focused on diagnostic interviews and clinician-rated measures, to complement the review of self-report measures by Overduin and Furnham [7,81-85]. Diagnostic interviews are useful for differential diagnosis as they assess comorbid symptoms whilst distinguishing different psychiatric disorders; yet, they are very time-consuming and expensive. Clinician-rated measures on the other hand, have the benefit of collecting data through both the patient and the clinician, whilst having the disadvantages of requiring extensive training and being subject to interviewer bias. Specifically, behavioral assessments can provide in vivo measures of fear and avoidance related to OCD symptoms that contribute unique information to the clinical picture, but they are difficult to standardize and implement. Recent revisions of the previous ‘gold standard’ of OCD measures, the Y-BOCS, namely the Y-BOCS II and the DY-BOCS, show most promise in both their clinician-rated and self-report checklist form.

In general, measures should assess OCD obsessions and rituals as connected phenomena, in addition to OCD severity in a multidimensional fashion. Literature consistently shows that OCD severity consists of parameters such as distress, functional interference, duration of the obsessions or compulsions, and especially avoidance behavior aimed at reducing obsessional anxiety [35]. Hybrid symptom combinations also need to be accounted for; measures must avoid solely ‘emphasising the overt form of obsessions and rituals while overlooking the function of these symptoms’

At times the experience of clinicians and the “demands” of psychometricians are at odds in the sense that the former may strongly favour an instruments which the latter maintain either has shortcomings or little evidence of validity. This tension is inevitable in applied clinical research.

The advent of DSM V will have an effect on the above instruments. The new manual has made some changes with regard to the diagnosis of OCD such as the extent to which people have insight into their own beliefs and behaviours as well an extended interest in “Tic Specifiers”. The chapter on OCD considers two other related disorders (Body Dysmorphic; Trichotillomania) but includes two new disorders: Hoarding Disorder and Excoriation Disorder. These developments will, over time, no doubt influence the modification of current and development of new measures which will require reviews such as this updated every few years.

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