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Development of a scrupulosity severity scale using the Pennsylvania Inventory of Scrupulosity-Revised

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ABSTRACT

Presently, the only clinically valid assessment of **s**crupulosity, an OCD subtype, is the Pennsylvania Inventory of Scrupulosity-Revised (PIOS-R; (Olatunji, Abramowitz, Williams, Connolly, & Lohr (2007). Journal of Anxiety Disorders, 21(6), 771–787). To date, no study has evaluated the factor structure and diagnostic utility of this measure in a severe psychiatric sample. A clinical sample of 417 residential OCD patients with and without primary scrupulosity was assessed using the PIOS-R. A confirmatory factor analysis revealed that the previously-observed two-factor PIOS-R structure exhibited a good fit with these data. A receiver-operator characteristic (ROC) analysis indicated that the PIOS-R could reliably classify patients with clinically significant scrupulosity among the residential sample, with a score of 24 (out of 60) indicating the threshold of scrupulosity severity for which targeted treatment is warranted. These results indicate that the PIOS-R is a useful and appropriate measure for use in evaluating scrupulosity in patients with severe OCD.

1. Introduction

Scrupulosity is an oft-clinically observed but somewhat understudied obsessive–compulsive disorder (OCD) subtype consisting of religious and/or moral obsessions followed by perfectionistic "atoning" rituals (i.e. prayer, confession, mentally "fixing" thoughts). Although these rituals may be inspired by religious practice traditional to the patient's faith, the manner in which they are completed results in significant functional impairment. Further, the function of such behaviors becomes less about maintaining the patient's faith and connection with their God and instead serves only to reduce an unwanted internal experience, i.e., anxiety or guilt. For example, an individual with scrupulosity might recite a prayer in a repetitive, ritualistic manner whenever a thought or image deemed to be 'unacceptable' enters his mind so as to reduce distress by ostensibly eliminating the likelihood that his thought reflects and underlying intent to sin. Studies evaluating the extent to which scrupulosity is related to various dysfunctional cognitive sets confirm the over-importance of thoughts, moral thought-action-fusion, perfectionism, and overinflated sense of responsibility as prominent in those with scrupulosity (Abramowitz, Deacon, Woods, & Tolin, 2004; Tek & Ulug, 2001).

The literature provides numerous clinical (Abramowitz, Huppert, Cohen, Tolin, & Cahill, 2002; Goodman et al., 1989; Greenberg & Huppert, 2010; Inozu, Karanci, & Clark, 2012; Mancini & Gangemi, 2004; Tek & Ulug, 2001; Zohar, Goldman, Calamary, & Mashiah, 2005) and case studies (Hunter, 2000; Weisner & Riffel, 1961), which speaks to the prevalence of this condition. There is evidence to suggest that the presence of religious obsessions can contribute to "treatment refractory" presentations of OCD (Eğrilmez, Gülseren, Gülseren, & Kültür, 1997; Mahgoub & Abdel-Hafeiz, 1991; Tezcan & Millet, 1997). However, due to its subtle nature, scrupulosity is often overlooked in the presence of the more observable OCD symptoms (e.g. contamination/washing, safety and fear of harm/checking, and not-just-right-experiences/superstitious rituals) and is underappreciated in terms of its clinical impact. The ability to identify scrupulosity severity in OCD patients promises to improve treatment outcome and may contribute to relapse prevention.

To date, the most well-studied and psychometrically sound measure of scrupulosity is the PIOS (Abramowitz et al., 2002; since revised to 15 items; PIOS-R; Olatunji, Abramowitz, Williams, Connolly, & Lohr, 2007). During its initial development, exploratory factor analysis revealed that this measure consists of items that load on one of two factors—dubbed by its developers 'fear of sin' and 'fear of God' (Abramowitz et al., 2002). Evaluation of the psychometric properties using undergraduate samples revealed that the PIOS-R evidenced good convergent and discriminant validity as well as sound internal stability. This indicated that the PIOS is fit for use as

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a research tool, and has since exhibited validity in a cross-cultural and religion analysis (Inozu et al., 2012). Along with assessing scrupulosity by religion (Abramowitz et al., 2004; Fergus & Valentiner, 2012) the PIOS-R has been used to assess the role scrupulosity might play in a variety of other mental health issues such as terror management (Fergus and Valentiner, 2012), over-active conscience, motivation (Cohen, Hall, Koenig, & Meador, 2005), gender and religious affiliation in older adults, devotion (Cosgrove, 2010), mediation of thought-control (Moore & Abramowitz, 2007), and relation between fearfulness, disgust sensitivity and religious obsessions in a non-clinical sample (Olatunji, Tolin, Huppert, & Lohr, 2005).

Given the increasingly evident prevalence of scrupulosity, it is important to further evaluate the extent that the putative construct validity of the most commonly used tool to evaluate it holds in OCD populations. To our knowledge, no study has evaluated the PIOS-R in a clinical population. Further, no study has evaluated the extent that this measure may be helpful in identifying patients with OCD whose scrupulosity merits clinical attention. The current study sought to address this gap in the literature by using the PIOS-R to assess a sample of patients with severe, treatment-refractory OCD currently in a residential treatment facility. Our goal was to evaluate the factor structure of the PIOS-R, then determine the diagnostic utility of the measure by evaluating whether it can accurately identify patients with 'clinically significant' levels of scrupulosity, as determined by attending clinicians.

2. Method

2.1. Participants

The clinical sample comprised 417 patients from the Obsessive–Compulsive Disorder Institute (OCDI) at McLean Hospital in Belmont, MA, with treatment-resistant OCD requiring partial or residential-hospital level of care. Patients in this sample received their OCD and scrupulosity diagnoses via extensive structured interview, behavioral assessments by their treatment team consisting of a psychiatrist, behavioral therapist, and social worker. Such diagnoses were typically convergent with diagnoses made by the patients' outpatient providers prior to admission to the Institute. Because this study sought to evaluate the factor structure and diagnostic utility of the PIOS-R in a naturalistic sample, no patients were excluded on the basis of Axis I or Axis II comorbidity.

The OCDI offers treatment groups that are tailored towards addressing specific symptom clusters for subsets of the census that are suffering with those particular symptoms. The 'scrupulosity group' (run by author LS) is an example of such a group. This group focuses on numerous topics, including identifying the differences between healthy faith and life-interfering scrupulous symptoms, and discussing the rationale for and methods to approach implementing exposures. For the purposes of this study, our clinical sample was separated into 'scrupulous' ($N=95$) versus 'non-scrupulous' ($N=322$) OCD on the basis of assignment to the scrupulosity group by their behavior therapist. Behavioral therapists made a determination to assign a patient to the scrupulosity group based on a semi-structured clinical interview performed at intake. Several factors played a role in making the decision to assign to the scrupulosity group, most notably: when patients' obsessions and/or rituals carried religious themes, e.g., fears of eternal damnation, praying rituals; when it was apparent that guilt, or avoidance thereof, was a significant factor in motivating OCD behavior; or when patients' approaches to religious activity was perfectionistic in nature and resulted in significant functional impairment. Additionally, because author LS served as the group leader, we were in a position to confirm whether the group assignment determined by the behavior therapist was appropriate by way of repeated assessments with the PIOS-R in-group. Table 1 describes the characteristics of each sample.

2.2. Measures

PIOS-R. The PIOS-R is a 15 item self-report questionnaire designed to assess the degree of scrupulosity-related symptomatolgy in the respondent with one subscale measuring "fear of sin" and another measuring "fear of God" on a 5-point scale ranging from 0 (never) to 4 (constantly). Subjects indicate their (non)religious affiliation as well as the strength of religious belief on a scale from 1 (not at all devoted) to 5 (very strongly devoted). There have been numerous previous studies that reflect the generally excellent psychometric properties of this measure (Abramowitz et al., 2002; Nelson, Abramowitz, Whiteside, & Deacon, 2006; Olatunji et al., 2007). Exploratory factor analyses of this measure using primarily undergraduate samples have yielded a two-pronged factor structure: 'fear of sin (10 items),' and 'fear of God (5 items).'

Table 1
Participant characteristics.

Variable	Scrupulous sample				Non-scrupulous sample			
	N	%	PIOS-RM	SD	*n*	%	PIOS-RM	SD
Sample size	95	22.8			322	77.2		
Gender (male)	61	64.2			161	50		
Race (white)	84	88.4			299	92.9		
Religious affiliation								
Catholic	38	40	37.54	17.6	116	36	17.5	13.25
Jewish	6	6.3	25.20	22.29	55	17.1	14.60	11.31
Protestant	14	14.7	36.75	14.7	39	12.1	16.7	14.8
All other religions	37	39			112	34.8		
Age (years)			34.1	13.2			35.1	14.8
Y-BOCS total score			25.9	6.5			25.5	6.8
PIOS-R total score			34.4	16.6			17.1	14.2

In their analysis of the PIOS-R using an unselected college student population, Olatunji and colleagues found that the measure exhibited excellent internal consistency ($\alpha=0.943$, inter-item correlations 0.27–0.78). Further, a confirmatory factor analysis revealed that the two-factor solution exhibited a good fit to their data (RMSEA = 0.06, CFI = 0.97, SRMR = 0.05; Olatunji et al., 2007). Finally, this study showed that the PIOS-R was highly correlated with OC symptoms, state anxiety, trait anxiety, negative affect, disgust sensitivity, and specific fears. Results from their analysis also revealed that the relationship between OCD and scrupulosity, as measured by the PIOS-R, is not merely epiphenomena of trait anxiety or negative affect (Olatunji et al., 2007). This study found that the total score and the two factors were moderately to strongly associated with theoretically relevant constructs (e.g., anxiety symptoms, negative affect) and weakly related to constructs that may be considered theoretically distinct from scrupulosity (e.g., positive affect; Olatunji et al., 2007).

Yale-Brown Obsessive Compulsive Scale (Y-BOCS, (Goodman et al., 1989). The Y-BOCS is a ten item measure that assesses the severity of OCD symptoms by evaluating time spent managing, distress and functional impairment caused by, and unsuccessful efforts to eliminate obsessions and compulsions. The Y-BOCS is the most commonly used measure for the assessment of OCD symptoms (e.g., Storch et al., 2010 and many others).

2.3. Procedure

Patients were administered the PIOS-R upon admission to the Institute as part of a standard self-report assessment battery. Although the current study evaluates only PIOS-R scores at admission, the PIOS-R was also administered to all patients monthly, and at discharge.

2.4. Data analysis strategy

The current study has two primary objectives: to determine the extent that the factor structure of the PIOS-R holds in a naturalistic sample and to evaluate the extent that the PIOS-R can identify individuals struggling with clinically significant levels of scrupulosity.

We used LISREL (version 8.80 student) to perform a confirmatory factor analysis on the full clinical sample, the scrupulous patients, and the non-scrupulous patients using maximum likelihood estimates. The two factor model was estimated by loading the ten fear of sin items and five fear of God items a priori. When evaluating the full sample and the non-scrupulous patients, we evaluated goodness of fit of the two-factor structure using the standardized root mean square residual (SRMR), root-mean-square error of approximation (RMSEA), and the comparative fit index (CFI), in accordance with recommendations by Hu and Bentler (1999). Good model fit was defined by the following criteria: RMSEA $<=.06$; SRMR $<=.08$; and CFI $>=.95$ (Hu & Bentler, 1999). The use of multiple indices provides a conservative and reliable evaluation of model fit relative to the use of a single-fit index. When evaluating the scrupulous patients, we used only the SRMR and CFI, given that the RMSEA tends to reject the model too often yet the SRMR and CFI are understood to perform well when the sample size is small ($N<250$; Hu & Bentler, 1999; Tabachnick & Fidell, 2007; Hooper, Coughlan, & Mullen, 2008). In order to evaluate the diagnostic utility of the PIOS-R, we utilized a receiver-operator characteristic (ROC) analysis. ROC analysis uses the association between sensitivity (1—false negative rate) and specificity (1—false positive rate) to estimate the area under the curve (AUC) to indicate how well scores on a measure distinguish between positive (in this case, a 'diagnosis' of clinically significant scrupulosity) and negative (no significant scrupulosity) cases based on the diagnosis by expert clinicians. A value of 1.0 indicates perfect