**The Placement of Obsessive-Compulsive Symptoms Within a Five-Factor Model of
Maladaptive Personality**

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Abstract

Dimensional models of obsessive-compulsive (OC) symptoms, as seen in obsessive-compulsive disorder (OCD), are instrumental in explaining the heterogeneity observed in this condition and have received considerable empirical support. Normative models of personality partially align with OC symptoms; however, *maladaptive* personality models present a more compelling approach because of their direct relevance to pathological behavior. Prior efforts to map OC symptoms to maladaptive personality space, as operationalized by the DSM-5 Alternative Model of Personality Disorder (AMPD), find these symptoms cross-load under both Negative Affectivity and Psychoticism traits. However, tests of OC symptoms in conjunction with the full AMPD structure, and its 25 lower-level facets, are lacking. We applied joint exploratory factor analysis to an AMPD instrument, the Personality Inventory for DSM-5 (PID-5), and OC symptom data from two separate samples (total $N=1506$) to locate OC symptoms within AMPD space. As expected, OC symptoms cross-loaded on Negative Affectivity, Psychoticism and on the low-end of Disinhibition. OC symptoms more strongly loaded on Psychoticism across samples, suggesting structural relations between OCD and psychotic experiences are stronger than DSM models imply. Facet loadings largely resembled the canonical PID-5 structure. A notable exception was that two Psychoticism facets (Perceptual Dysregulation and Unusual Beliefs/Experiences) more closely tracked OC symptom loadings. We also report exploratory analyses of OC symptom subscales (e.g., obsessing, ordering, checking) with PID-5 variables. Results are discussed in the context of the placement of OC symptoms/OCD in PID-5 space and within the Hierarchical Taxonomy of Psychopathology, an ongoing effort to improve psychopathology classification.

Keywords: obsessive-compulsive disorder, maladaptive personality, joint exploratory factor analyses, dimensional psychopathology, Alternative Model of Personality Disorder for DSM-5.

General Scientific Summary

This study suggests that obsessive-compulsive symptoms can be compellingly described with dimensional personality models of psychopathology. In particular, these symptoms fit well under broader negative affect and psychoticism traits, as well as with lower disinhibition. These findings have implications for how obsessive-compulsive symptoms are conceptualized and assessed.

The Placement of Obsessive-Compulsive Symptoms Within a Five-Factor Model of Maladaptive Personality

Categorical models of obsessive-compulsive disorder (OCD; American Psychiatric Association, 2013), a disorder associated with considerable distress and impairment (Huppert et al., 2009), are limited by substantial heterogeneity of symptom presentation (Abramowitz & Jacoby, 2015; Mataix-Cols et al., 2007; McKay et al., 2004) and inconsistent predictive validity (Olatunji et al., 2018; Stasik et al., 2012). Further, based on the findings that obsessions and compulsions are experienced by a majority of the population and vary greatly in severity and frequency (Rachman & de Silva, 1978; Salkovskis & Harrison, 1984), it is apparent that categorical models of OCD unnecessarily dichotomize these symptoms into pathological and non-pathological manifestations (Abramowitz et al., 2014; Kim et al., 2016).

An alternative is a dimensional approach, in which obsessive-compulsive (OC) symptoms within OCD are conceptualized as a continuum spanning the normative to maladaptive range (García-Soriano et al., 2011; Olatunji et al., 2017). Dimensional models of OCD help to resolve these issues and statistically outperform categorical models (e.g., Kotov et al., 2010; Mataix-Cols et al., 2005; Watson, 2005). Instruments for dimensional assessment of OCD and OC symptoms have also become more common and facilitate innovative investigations into the dimensional structure of the pathology (Abramowitz et al., 2010; Rosario-Campos et al., 2006; Watson et al., 2012; Wootton et al., 2015). Perhaps the most important dimensional finding to date is that instead of representing a unidimensional construct, OCD is comprised of multiple primary symptom dimensions. The majority of studies identified these symptom dimensions as obsessions and checking, symmetry/order, washing/contamination, and hoarding (Mataix-Cols et al., 2005; McKay et al., 2004), although other studies found that hoarding

represents a distinct pathological dimension and was not specific to OCD (e.g., Abramovitch et al., 2021; Wu & Watson, 2005).

Personality Models of OCD and OC Symptoms

One approach to the empirical conceptualization of OCD that has been fruitful involves studying how OCD phenomena can be understood in terms of the five-factor model (FFM) of personality. In a comprehensive meta-analysis, categorical OCD diagnosis was strongly associated with higher neuroticism and with lower extraversion and conscientiousness (Kotov et al., 2010). A similar pattern was found in the relations between OC symptoms and FFM traits, with higher OC symptoms correlated with higher neuroticism (e.g., Furnham et al., 2013; Stanton et al., 2016; Watson, Nus, et al., 2019; Watson & Naragon-Gainey, 2014; Wu & Watson, 2005). Evidence for other trait relations is more mixed. Some studies found strong relations between OC symptoms and low extraversion (Furnham et al., 2013; Watson & Naragon-Gainey, 2014), whereas others did not (Stanton et al., 2016). For conscientiousness, one study found that OC symptoms were *positively* correlated (Furnham et al., 2013), whereas others do not find significant relations (Stanton et al., 2016; Watson & Naragon-Gainey, 2014). Overall, FFM traits clearly have some relation to OCD, but strong conclusions are not tenable.

The FFM is considered a normative personality structure and thus might not be optimized for investigations into OCD. Models of *maladaptive* personality traits show promise for the study of OCD and addressing inconsistent normative personality associations because they focus specifically on the pathological range of personality variation. One such model is the Alternative Model of Personality Disorder from Section III of the DSM-5 (American Psychiatric Association, 2013), which can be operationalized by the Personality Inventory for DSM-5 (PID-5; Krueger et al., 2012). The PID-5 is comprised of 25 trait facets that are constituted into five

higher-order trait domains (Antagonism, Detachment, Disinhibition, Negative Affectivity, and Psychoticism). These traits broadly overlap with the pathological poles of the FFM traits (Gore & Widiger, 2013). Accordingly, the PID-5 is well-suited to study traits when they contain some normative content, but primary empirical interest is in pathological extreme (Suzuki et al., 2015), a description which fits OC symptoms and their relation to OCD.

The PID-5 also contains several facets that conceptually correspond to OCD and OC symptoms. Anxiousness, Perseveration (both commonly load onto the Negative Affectivity trait within the PID-5 structure, with Perseveration also loading on Psychoticism; Watters & Bagby, 2018) and Suspiciousness (commonly cross-loads on Detachment and Negative Affectivity) correspond to symptoms of chronic anxiety, frustration, and negative beliefs common in OCD (e.g., Calkins et al., 2013; Radomsky et al., 2007). The facets that strongly load on the Psychoticism trait – Unusual Beliefs/Experiences, Perceptual Dysregulation, and Eccentricity – all relate to the unusual or bizarre content of some obsessions and compulsions (e.g., Aardema & Wu, 2011; Chmielewski & Watson, 2008). Finally, Rigid Perfectionism (which loads across Psychoticism and Negative Affectivity, as well as on the low end of Disinhibition) also describes a core characteristic of many people with OCD (e.g., Coles et al., 2003).

Although there are clear conceptual overlaps between the PID-5 facets and OCD/OC symptoms, direct empirical evidence is limited. One study by Hong and Tan (2021) related a measure of obsessional intrusive beliefs, but not OC symptoms themselves, to the PID-5 facets. They found significant positive correlations for all of the previously listed OCD-relevant facets, as well as some strong correlations for other facets (e.g., Depressivity and Emotional Lability). These findings might reflect a more general association between negative affect and intrusive thoughts, but it is unclear how specific these constructs are to OC symptoms. Although this study

implies empirical links between OCD/OC symptoms and the PID-5 traits, as of yet, these have not been explicitly tested. Accordingly, it is still unclear how OC symptoms explicitly fit within the PID-5 structure.

OCD and OC Symptoms Within Maladaptive Personality and Psychopathology Structure

The bulk of the work on the symptoms and correlates of OCD have operated from the premise that OCD is best classified as an internalizing disorder, and more specifically, as an anxiety-related disorder (Abramowitz & Jacoby, 2015; McKay, 2018). Similarly, empirical studies of psychopathology structure frequently place OCD under an internalizing spectrum (Cox et al., 2010; Lahey et al., 2008; Slade & Watson, 2006; Watson et al., in press; but see Sellbom et al., 2008). This is perhaps most clearly seen in recent efforts to organize mental disorders within an empirically-derived hierarchical structure, the Hierarchical Taxonomy of Psychopathology (HiTOP; Kotov et al., 2017, Watson et al., in press). HiTOP originally identified OCD under the Internalizing spectrum. However, epidemiological and quantitative psychopathology findings suggest that placement of OCD solely under the internalizing spectrum has inconsistent empirical support and would benefit from additional investigation (for review, see Watson et al., in press). OCD and disorders subsumed under the Thought Disorder spectrum (e.g., schizophrenia spectrum disorders, schizotypal personality disorder) commonly co-occur (Achim et al., 2011; Cederlöf et al., 2015) and have shared polygenic risk (Costas et al., 2016). These results are also reflected in structural studies that find OCD either is entirely subsumed by Thought Disorder (Caspi et al., 2014; Laceulle et al., 2015) or is shared by the Thought Disorder (due to overlap with mania) and Internalizing spectra (e.g., Kotov et al., 2015).

Notably, the cited structural studies extract two- or three-factor solutions that either only model internalizing constructs or are limited to internalizing and externalizing or thought

disorder spectra. The PID-5 yields a five-trait structure that corresponds to the spectra level within the HiTOP framework (Kotov et al., 2017), is highly replicable (Watters & Bagby, 2018), and extends two- and three-factor models while maintaining parsimony (Wright et al., 2012). Thus, the five-factor PID-5 model presents an opportunity to reconcile discordant findings regarding the structural placement of OCD and OC symptoms. It also has the advantage of facilitating comparisons to the FFM of normative personality.

Most pertinent to the current effort are two recent studies of maladaptive personality and the psychopathology structure. Both studies extracted at least a 4-factor model and employed the PID-5 and a continuous OC symptom measure. Faure and Forbes (2021) used a four-factor model defined by Internalizing-Distress, Internalizing-Fear, Externalizing, and Thought Disorder and found that OC symptoms loaded on Thought Disorder exclusively. When analyzing individual OC symptom subscales, the obsessions/checking subscale loaded strongly on Thought Disorder. Other subscales (e.g., washing, symmetry) demonstrated more moderate loadings on Internalizing – Fear. These findings emphasize the cross-loading nature of OC symptoms that contradicts its conceptualization as an anxiety-related disorder and might explain past ambiguous results. However, the canonical PID-5 structure is not tested in this study, as the Externalizing trait splits into two spectra – Disinhibition and Antagonism – when expanding to the five-factor level (Kotov et al., 2017; Wright et al., 2012).

Sellbom and colleagues (2020) modeled all five PID-5 traits as latent predictors and regressed manifest OC symptoms on them. As in Faure and Forbes (2021), OC symptoms cross-loaded on Negative Affectivity and Thought Disorder (Psychoticism in the PID-5 structure). However, in Sellbom et al. (2020), loadings were strongest for Negative Affectivity, rather than Thought Disorder. Importantly, in this study, the PID-5 traits were operationalized with a brief

form that yields adequate trait-level factors but lacks reliable facet scores (Gomez et al., 2020). Accordingly, facet-level analyses were not feasible, and the possibility remains that specific facet- and item-level content included in the full PID-5 (but not brief version could provide a more complex and nuanced picture of OCD's fit within the PID-5 structure. Facet-level indicators that are allowed to cross-load on different factors are also likely better suited to capturing the symptom heterogeneity that is common in OCD.

In summary, the placement of OCD within the full five-factor structure of maladaptive personality, as operationalized with facet-level indicators, remains unclear. Clarification could have important nosological implications, which in turn could contribute to enhanced precision in future work on the etiology and pathophysiology of OCD and OC symptoms.

Current Study

In the current study, we examine the joint structure of the PID-5 and OC symptoms, as operationalized by the Obsessive Compulsive Inventory – Revised (OCI-R, Foa et al., 2002). Our primary goal was to determine where OCD fits within the five-factor structure of maladaptive personality and to examine this association at the facet level. Additionally, to determine the impact of OCD's heterogeneity on its association with personality pathology, we explored the relationship between the PID-5 traits, facets, and OCI-R symptom dimensions. We do this in two separate samples, one comprised of undergraduates and one of general community members (inclusive of both patient and non-patient participants), to test whether the extracted structure is replicable across different populations.

Based on studies of both the clinical phenomenology and personality correlates of OCD, as well as structural analyses of OC symptoms in relation to higher-order psychopathology structure (Faure & Forbes, 2021; Sellbom et al., 2020), we hypothesize that a five-factor solution

will yield factors that are recognizable as the PID-5 trait domains and that OC symptoms will most strongly cross-load on the Negative Affect and Psychoticism PID-5 factors. Further, we hypothesize that the OCI-R total score will negatively load on the Disinhibition factor due to the placement of Rigid Perfectionism on the low end of this factor. In terms of relations between PID-5 variables and OCD symptom dimensions, we broadly predict that PID-5 traits and facets will be most strongly associated with the four OCI-R subscales most characteristic of OCD (Obsessing, Ordering, Checking, Washing; see Abramovitch et al., 2021; Watson & Wu, 2005). However, as we consider these analyses to be primarily exploratory given the limited relevant research on facet-level indicators and OCD, we refrain from proposing specific hypotheses.

Method

Participants

Sample 1 was comprised of 747 undergraduate students (517 women, $M_{\text{age}} = 20.42$, $SD_{\text{age}} = 3.44$) recruited from a large Midwestern university. Recruitment was part of a study of internalizing traits related to laboratory-measured physiological correlates of fear. Only those who could not complete a computerized task (e.g., vision or hearing impaired) were excluded from participation. Participants completed all questionnaires online via Qualtrics. Participants completed questionnaire assessments on their own time before attending laboratory visits (data from laboratory sessions are not relevant to the current endeavor and not reported).

Sample 2 was comprised of two separate subsamples, one of which was collected online (see Watson et al., 2013) and the other which involved in-person testing (see Watson et al., 2015). The online subsample was recruited from the South Bend metropolitan area via online advertisement. Recruitment for the in-person subsample took place in the Michiana area (parts of northern Indiana and southwestern Michigan) from community and mental health clinics. Prior

work has analyzed these subsamples as one combined sample ($N=759^1$, 518 women, $M_{\text{age}} = 40.7$, $SD_{\text{age}} = 14$, 22 participants diagnosed with OCD using DSM-IV-TR criteria in the in-person subsample). We do the same, both to align with prior work and so that Sample 2 has roughly the same sample size and gender distribution as Sample 1.

Additionally, the online questionnaire batteries used in Sample 1 and in one of the Sample 2 subsamples contained “attention check” items (e.g., “I like to walk on the moon”) embedded within longer scales. Sixteen participants (3 from Sample 1, 13 from Sample 2) who responded incorrectly to these item were excluded, and these participants are not reflected in reported sample sizes.

For each sample, all study activities were approved by their respective Institutional Review Boards. All analyzed data from these samples are freely available at <https://osf.io/g62f9/>.

Measures

PID-5

The PID-5 consists of 220 short statements that are rated based on how well the statement describes oneself. Items are rated on a 4-point scale (0 = *Very/Often False* to 3 = *Very /Often True*). The 25 PID-5 facet-level scales are comprised of 4 to 14 items, depending on facet. Facets are calculated by averaging the component items (as such, facet score range is 0-3). See Table 1 for descriptive statistics.

Data collection for both samples allowed for incomplete responses to the PID-5, thus a small number of participants provided responses to most, but not all, PID-5 items. Within

¹ The final $N=759$ for Sample 2 reflects a smaller combined sample than tested in prior work (e.g., Watson et al., 2015); 27 participants were discovered to have participated in both studies comprising Sample 2. See Watson et al., 2019, p. 780, for further information.

Sample 1, single mean imputation was used for missing values (based on the mean of the other items in a given facet). For Sample 2, multiple imputation was used to impute missing items for the PID-5. Across both samples, any participants missing a full PID-5 facet were excluded.

OCI-R

The OCI-R (Foa et al., 2002) is an 18-item self-report measure of OCD-related symptoms. Items are rated on a 5-point scale (0 = *Not at All* to 4 = *Extremely*). Scale content is equally divided among six OCD symptom dimensions (Ordering, Checking, Washing, Hoarding, Neutralizing, Obsessing) and also yields a total score representing overall OC symptom magnitude (range 0-72; scores > 20 indicative of a likely OCD diagnosis; Foa et al., 2002). The OCI-R has been successfully used to assess continuously-measured OCD symptoms in community and outpatient samples (Huppert et al., 2007; Watson, 2009), and compares favorably to standardized interviews for OCD in terms of utility and psychometric strength. In both samples, we included participants only if they responded to every OCI-R item (all sample sizes reflect this exclusion). See Table 1 for descriptive statistics.

Table 1. Descriptive Statistics for OCI-R and PID-5 Facets for Sample 1, Sample 2, and Combined Sample

Scale/Facet	Scale Range	<u>Sample 1</u> (<i>N</i> = 747)		<u>Sample 2</u> (<i>N</i> = 759)		<u>Combined</u> (<i>N</i> = 1506)		<i>d</i> (95%CI)
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
OCI-R Total	0-72	17.71	12.94	12.78	11.57	15.22	12.51	-0.41 (-0.5, -0.29) ^a
Checking	0-12	3.04	2.61	2.12	2.62	2.58	2.66	-0.35 (-0.45, -0.25) ^a
Hoarding	0-12	3.45	2.83	2.82	2.86	3.13	2.86	-0.22 (-0.33, -0.13) ^a
Neutralizing	0-12	2.05	2.61	1.34	2.17	1.69	2.42	-0.30 (-0.4, -0.19) ^a
Obsessing	0-12	3.03	2.8	1.96	2.66	2.49	2.78	-0.39 (-0.5, -0.29) ^a
Ordering	0-12	3.96	3.13	2.98	2.95	3.47	3.08	-0.32 (-0.42, -0.23) ^a
Washing	0-12	2.17	2.61	1.56	2.3	1.86	2.48	-0.25 (-0.35, -0.14) ^a
PID-5 Facets								
Anhedonia	0-3	0.81	0.59	0.67	0.71	0.74	0.66	-0.22 (-0.32, -0.12) ^a
Anxiousness	0-3	1.35	0.75	1.08	0.81	1.21	0.79	-0.35 (-0.46, -0.25) ^a
Attention Seeking	0-3	1.08	0.68	0.81	0.68	0.94	0.69	-0.41 (-0.53, -0.31) ^a
Callousness	0-3	0.36	0.42	0.3	0.44	0.33	0.43	-0.12 (-0.22, -0.02)
Deceitfulness	0-3	0.74	0.58	0.43	0.56	0.58	0.59	-0.53 (-0.65, -0.43) ^a
Depressivity	0-3	0.52	0.56	0.5	0.61	0.51	0.59	-0.02 (-0.12, 0.08)
Distractibility	0-3	1.01	0.66	0.95	0.73	0.98	0.69	-0.07 (-0.18, 0.03)
Eccentricity	0-3	0.83	0.73	0.78	0.75	0.8	0.74	-0.07 (-0.17, 0.03)
Emotional Lability	0-3	1.05	0.73	1.02	0.79	1.04	0.76	-0.04 (-0.15, 0.06)
Grandiosity	0-3	0.62	0.55	0.62	0.55	0.62	0.55	0.00 (-0.1, 0.11)
Hostility	0-3	0.81	0.55	0.89	0.62	0.85	0.59	0.14 (0.03, 0.24)
Impulsivity	0-3	0.79	0.66	0.61	0.7	0.7	0.69	-0.26 (-0.37, -0.16) ^a
Intimacy Avoidance	0-3	0.89	0.46	0.44	0.67	0.66	0.62	-0.78 (-0.9, -0.66) ^a
Irresponsibility	0-3	0.46	0.45	0.35	0.54	0.4	0.5	-0.22 (-0.33, -0.12) ^a
Manipulativeness	0-3	0.93	0.72	0.76	0.68	0.84	0.71	-0.25 (-0.35, -0.15) ^a
Perceptual Dysregulation	0-3	0.53	0.46	0.49	0.52	0.51	0.49	-0.08 (-0.18, 0.02)
Perseveration	0-3	0.86	0.58	0.83	0.61	0.84	0.59	-0.05 (-0.15, 0.06)
Restricted Affectivity	0-3	0.88	0.67	0.82	0.59	0.85	0.63	-0.10 (-0.2, -0.004)
Rigid Perfectionism	0-3	1.04	0.68	0.99	0.68	1.01	0.68	-0.07 (-0.17, 0.03)
Risk-Taking	0-3	1.34	0.52	0.73	0.72	1.03	0.7	-0.98 (-1.09, -0.88) ^a
Separation Insecurity	0-3	0.88	0.67	0.78	0.7	0.83	0.69	-0.14 (-0.24, -0.04)
Submissiveness	0-3	1.31	0.67	1.12	0.73	1.22	0.71	-0.26 (-0.37, -0.16) ^a
Suspiciousness	0-3	0.91	0.54	0.74	0.63	0.82	0.59	-0.29 (-0.4, -0.19) ^a
Unusual Beliefs/Experiences	0-3	0.51	0.51	0.58	0.6	0.55	0.56	0.13 (0.02, 0.23)
Withdrawal	0-3	0.78	0.63	0.92	0.68	0.85	0.66	0.21 (0.11, 0.31) ^b

Note: All values reflect raw (non-normalized) values. Cohen's *d* (and 95% confidence interval) for *t*-tests comparing Samples 1 and 2 are provided in the rightmost column. OCI-R = Obsessive Compulsive Inventory – Revised; PID-5 = Personality Inventory for DSM-5.

^aSample 1 mean > Sample 2 mean at $p < .0001$

^bSample 2 mean > Sample 1 mean at $p < .0001$

Scale Normalization

Prior to correlational and factor analyses, we evaluated all scales skewness within each sample and log-transformed variables with $> .25$ skew. This cutoff resulted in a greater number of transformed variables than in similar prior work (e.g., DeYoung et al., 2016). We observed substantial skew in both samples, but the exact set of skewed variables slightly differed between samples. Thus, we employed this more conservative cutoff to ensure that the samples did not greatly differ in terms of which variables were transformed, while also ensuring that we did not transform variables not requiring transformation.

Analytic Plan

Univariate and Correlational Analyses

Prior to conducting the main analyses, we used *t*-tests to compare the two samples on OCI-R total, OCI-R subscale, and PID-5 facet scores. To facilitate interpretation of factor analyses, we also computed correlations amongst OCI-R total score and all PID-5 facets. Given the large number of tests for these analyses, all reported tests were multiple comparisons corrected (Bonferroni-corrected *p*-values).

Primary Analyses

We used exploratory factor analysis (EFA) to examine the joint structure of the PID-5 and OCI-R. All EFAs were conducted in R using the *psych* library (R Core Team, 2018; Revelle, 2017). We conducted EFAs on total OCI-R score and all PID facets for each sample separately.

Because our primary aim is to locate OCI-R variance within the identified PID-5 five-factor structure, we focused analyses on the five-factor PID-5 solution that has been replicated across numerous samples (for meta-analysis, see Watters & Bagby, 2018). However, because of the exploratory nature of our joint analyses, we elected to empirically confirm that a five-factor

solution was replicable and to test solutions with different numbers of factors before performing EFAs and conducting in-depth interpretation. To do this, we calculated two-, three-, four-, and five-factor solutions in each sample and then computed Tucker's Congruence Coefficient (yields a value on -1 to 1 scale, values $\geq .85$ indicative of adequate congruence; Lorenzo-Seva & ten Berge, 2006) to examine the similarity of factors from different samples. We then tested successively more complex solutions (i.e., six-factor solutions and higher) until a solution failed replicate (i.e., at least one extracted factor did not replicate, indicated by Tucker Congruence Coefficient $< .85$). Results of these analyses and theoretical ramifications were then considered before selecting the final number of factors to be extracted.

For all EFAs, we extracted factors using the minimum residual ("minres"; Harman & Jones, 1966) estimation method and used oblimin rotation for all solutions. An oblique rotation was chosen based on an assumption that factors would be correlated due to the inherently interrelated nature of psychopathology and prior work done on the PID-5 (e.g., Krueger et al., 2012; Wright et al., 2012). We also examined inter-factor correlations. In terms of goodness of fit statistics, we provide Bayesian Information Criterion (BIC), root mean square of the residuals (RMSR), root mean square error of approximation (RMSEA), and the Tucker Lewis Index (TLI) for all models. RMSR and RMSEA values of $< .08$ and TLI values $> .9$ of were considered to indicate acceptable model fit (Brown, 2015). We also note that traditional fit statistics can be misleading for psychopathology structures (Forbes et al., 2020; Greene et al., 2019). Accordingly, in addition to fit statistics, models were concurrently evaluated for consistency with theory and prior structural work.

Given our *a priori* focus on OC symptom variance within maladaptive personality structure, we interpret individual scale loadings starting with the OCI-R and its largest

loading(s), then consider other factors in the context of how inclusion of OCI-R variance potentially changes the canonical PID-5 structure. When relevant, we focus interpretation on the *a priori* identified facets with greatest relevance to OCD (Anxiousness, Eccentricity, Perceptual Dysregulation, Perseveration, Rigid Perfectionism, Suspiciousness, Unusual Beliefs/Experiences), particularly if the facet is not found to load on the factor that would be expected based on prior PID-5 research.

Secondary Analysis of OCI-R Subscale Relations to PID-5 Facets

In the current study, we only used the total OCI-R score in the main analyses due to both our primary interest in the OCD symptom dimension as a whole and concerns that entering the six OCI-R subscales would result in a “bloated specific” factor (Oltmanns & Widiger, 2016) that would not be amenable to fruitful interpretation. However, due to prior research identifying differential relations between OCI-R subscales and personality/dimensional psychopathology variables (e.g., Lee & Telch, 2005; Stasik et al., 2012; Watson et al., 2004) and to assist in clarification of total OCI-R results, we conducted exploratory analyses on the relations between the OCI-R subscales and the PID-5 structure in each sample separately and then combined the sample and reran analyses. To provide a measure of the PID-5 trait factors, we re-ran EFAs that only contained the PID-5 facets for each sample and then the combined sample. All parameters were the same as our primary EFAs. Contingent on interpretable factors, we extracted factor scores to use in subsequent analyses.

Initial analyses included bivariate correlations between the OCI-R subscales and the PID-5 trait factor scores and the manifest facet scores. Next, we constructed two sets of regression models predicting each OCI-R subscale. The first set included all PID-5 trait factor scores as predictors; the second set included all PID-5 facet scores as predictors. All predictors

were standardized prior to analyses. Due to concerns about prominent left-skew in OCI-R subscales², we modeled a tobit likelihood function with a left limit of zero (i.e., classical tobit model; Tobin, 1958) in all models to address the left-censored distribution of our data. Tobit model estimation was done using the *VGAM* library (Yee et al., 2010). Tobit regression coefficients reflect the latent distribution of a continuous variable (i.e., if the variable was not skewed or censored) and can be interpreted using the same guidelines as standard multiple linear regression coefficients. In the combined sample analyses, we added a Sample term (dummy-coded) to estimate the influence of sample membership. We conducted likelihood-ratio tests on the combined sample models with and without the Sample term to determine if inclusion of this term resulted in improved model fit. Standard multiple correlation (SMC) was calculated for all models, as well as McFadden's pseudo- R^2 (R_{MF}^2), which provides an R^2 approximation that is appropriate for estimating relative fit between similar models (McFadden, 1974, 1979). As with standard R^2 , larger values indicate a better fitting model. However, R_{MF}^2 will generally be smaller than R^2 from comparable standard linear models (Smith & McKenna, 2013). Variable inflation factor (VIF) was examined for all predictors to ensure multicollinearity did not arise from simultaneously modeling all PID-5 traits or facets in the same model (VIF < 4 considered acceptable).

Results

Univariate Sample Comparisons

² Each OCI-R subscale has a slightly different response distribution, both compared to the other subscales within a sample and between samples. Thus, we elected to not log-transform to address non-normality due to concerns about uneven patterns of normalization that would result in added error in subscale analyses.

Sample 1 participants were significantly younger than Sample 2 participants, $t(1503) = 37.1$, $p < .001$, $d = 1.9$. Gender distribution did not differ between samples, $\chi^2(1, N = 1506) = 0.49$, $p = 0.47$. The samples significantly differed on both OCI-R total and all OCI-R subscales, with Sample 1 having significantly higher means than Sample 2. The samples also differed on some, but not all, PID-5 facets, with Sample 1 participants generally reporting higher levels (the one exception was Withdrawal; here, the Sample 2 participants obtained significantly higher scores). See Table 1 for specific scale differences, all of which differed at $p < .0001$.

Bivariate Correlations

Other than Eccentricity, all *a priori* OC-relevant facets (Anxiousness, Perceptual Dysregulation, Perseveration, Rigid Perfectionism, Suspiciousness, Unusual Beliefs) were correlated with OCI-R at $> .4$ across samples and in the combined sample (see Table 2). Eccentricity was correlated $> .3$ across both samples and in the combined sample. Correlation magnitudes were very strongly related across sample ($r = .93$) and indicated a high degree of cross-sample replicability.

Table 2. Correlations Between OCI-R Total and PID-5 Facets for Samples 1, 2, and Combined Sample

Facet	Sample 1	Sample 2	Combined
Anhedonia	0.31	0.37	0.35
Anxiousness	0.45	0.51	0.50
Attention Seeking	0.17	0.18	0.21
Callousness	0.24	0.30	0.28
Deceitfulness	0.26	0.27	0.30
Depressivity	0.35	0.45	0.40
Distractibility	0.30	0.46	0.38
Eccentricity	0.31	0.49	0.40
Emotional Lability	0.37	0.49	0.43
Grandiosity	0.26	0.26	0.26
Hostility	0.35	0.46	0.38
Impulsivity	0.22	0.35	0.31
Intimacy Avoidance	0.24	0.32	0.33
Irresponsibility	0.27	0.34	0.32
Manipulativeness	0.20	0.21	0.22
Perceptual Dysregulation	0.45	0.59	0.52
Perseveration	0.52	0.63	0.57
Restricted Affectivity	0.13	0.26	0.19
Rigid Perfectionism	0.50	0.61	0.55
Risk-Taking	-0.03	0.05	0.10
Separation Insecurity	0.27	0.38	0.34
Submissiveness	0.17	0.20	0.21
Suspiciousness	0.43	0.41	0.44
Unusual Beliefs/Experiences	0.41	0.53	0.45
Withdrawal	0.31	0.44	0.34

Note: correlations $\geq .3$ are bolded, $\geq .4$ are also italicized. OCI-R = Obsessive Compulsive Inventory - Revised; PID-5 = Personality Inventory for DSM-5.

Factor Extraction and Structure Replication

Tucker's Congruence coefficients indicated that the hypothesized five-factor solution successfully replicated across samples. All five coefficients for the five-factor models indicated that the extracted factors were adequately similar across samples (all coefficients $\geq .86$, see Table 3). In terms of solutions with less than five extracted factors, the two- and three-factor solution showed adequate congruence across samples, but the four-factor solution did not (one factor yielded a coefficient $< .85$). In terms of solutions with greater than five factors, the six-factor

model did not replicate across samples (three of six factors had coefficients $< .85$); thus, we did not extract any additional factors³. After these analyses, we elected to retain five-factors for the EFAs that serve as our primary analyses, as five-factors was the most complex solution that replicated, the most interpretable, and the most aligned with prior work on the PID-5. Factor loadings and correlations for models that were not used in further analyses can be found in the Supplemental Materials (Tables S1-S4).

Table 3. Tucker Congruence Coefficients for Two, Three, Four, Five, and Six Factor Solutions

Solution	F1	F2	F3	F4	F5	F6
2-Factor	0.99	0.96				
3-Factor	0.99	0.87	0.99			
4-Factor	0.93	0.92	0.97	0.45		
5-Factor	0.94	0.96	0.93	0.93	0.86	
6-Factor	0.97	0.91	0.92	0.78	0.79	0.69

Note: each column corresponds to an extracted factor. Bolded coefficients $\geq .85$ are indicative of acceptable congruence. Each value represents congruence between the factor extracted separately in Sample 1 and 2 that shares the most variance.

Sample 1 EFA

A five-factor solution was an adequate fit for the data on some, but not all, fit statistics (BIC = -96.89, RMSR = 0.03, TLI = 0.852, RMSEA = 0.083, 90% CI [0.079, 0.087]). We largely replicated the PID-5 structure in this analysis, as factors recognizable as Antagonism, Detachment, Disinhibition, Psychoticism, and Negative Affectivity emerged (see Table 4). OCI-R loaded most strongly on Psychoticism (.41), followed by Negative Affectivity (.31). The next

³ Each sample had a different set of variables that were significantly skewed, and thus met criteria to be log-transformed. To ensure any inhomogeneity between samples was not due to normalization differences, we re-ran all EFAs using untransformed variables and re-calculated Tucker's Congruence Coefficient. The same congruence pattern emerged but are not reported here because they were virtually identical to the originally computed coefficients.

largest loading was a negative loading on Disinhibition (-.24). In terms of specific facets, Perseveration's largest loading (.51) was on Psychoticism, instead of Negative Affectivity (.38); the opposite pattern of cross-loading is more commonly observed (e.g., Watters & Bagby, 2018). Also notable is that Suspiciousness weakly cross-loaded (.22 – .28) across all factors except for Disinhibition. In other samples, the Suspiciousness facet does not show this pattern of loadings and instead strongly loads on Detachment, with a cross-loading on Negative Affectivity. Finally, the strongest loading for Rigid Perfectionism was a negative loading on Detachment (-.51), with the remaining, modest loadings (.27 – .30) for this facet spread across Antagonism, Negative Affectivity, and Psychoticism.

The pattern of factor correlations (see Table 4) appeared largely consistent with prior work, with one exception. The correlation between Psychoticism and Disinhibition ($r = .15$) was attenuated compared to the moderately strong correlation seen in other work (r s .37 – .47; e.g., Krueger et al., 2012, Wright et al., 2012).

Table 4. Five-Factor Oblique Loadings and Factor Correlations for Sample 1

Scale/Facet	Psychoticism	Negative Affectivity	Disinhibition	Antagonism	Detachment	Residual
OCI-R Total	0.41	0.31	-0.24	0.08	0.02	0.58
Unusual Beliefs/Exp.	0.8	-0.07	-0.09	0.07	-0.05	0.38
Perceptual Dysregulation	0.79	0.11	0.1	-0.04	0.07	0.24
Eccentricity	0.65	-0.04	0.18	0.04	0.15	0.39
Perseveration	0.51	0.38	-0.01	0.06	0.14	0.31
Distractibility	0.38	0.3	0.37	-0.03	0.11	0.44
Anxiousness	0.16	0.71	-0.13	-0.06	0.16	0.31
Emotional Lability	0.2	0.66	0.04	0.04	-0.03	0.42
Separation Insecurity	-0.11	0.64	0.07	0.25	-0.1	0.57
Depressivity	0.13	0.49	0.21	-0.03	0.48	0.26
Submissiveness	-0.01	0.36	-0.06	0.08	0.04	0.85
Impulsivity	0.3	0.11	0.53	0.23	-0.13	0.41
Rigid Perfectionism	0.3	0.3	-0.51	0.27	-0.01	0.43
Irresponsibility	0.31	0.09	0.41	0.17	0.18	0.46
Risk-Taking	0.25	-0.24	0.41	0.26	-0.28	0.56
Manipulativeness	-0.02	-0.02	-0.01	0.84	-0.08	0.33
Deceitfulness	-0.02	0.05	0.11	0.78	0.16	0.3
Grandiosity	0.18	-0.07	-0.19	0.68	-0.07	0.41
Attention Seeking	0.11	0.14	0.07	0.65	-0.41	0.39
Callousness	0.03	-0.14	0.09	0.65	0.36	0.34
Hostility	-0.02	0.32	-0.03	0.56	0.25	0.43
Withdrawal	0.2	-0.02	-0.15	0.08	0.75	0.24
Anhedonia	0.02	0.31	0.12	-0.02	0.71	0.27
Restricted Affectivity	0.18	-0.42	-0.03	0.31	0.51	0.43
Intimacy Avoidance	0.32	-0.15	-0.09	0.12	0.4	0.61
Suspiciousness	0.22	0.25	-0.05	0.25	0.28	0.54
Factor Correlations						
Negative Affectivity	0.37					
Disinhibition	0.15	0.07				
Antagonism	0.1	0.52	0.11			
Detachment	0.38	0.21	0.02	0.15		

Note: bolded numbers indicate the largest loading in each row. Factors are ordered by absolute value of OCI-R loading; facet loadings are ordered by absolute magnitude within a factor. OCI-R = Obsessive Compulsive Inventory - Revised; PID-5 = Personality Inventory for DSM-5

Sample 2 EFA

A five-factor solution was again an adequate fit according to some, but not all, fit indices (BIC = -28.07, RMSR = 0.03, TLI = 0.864, RMSEA = 0.085, 90% CI [0.081, 0.090]). The PID-5 structure was again replicated, with the PID-5 factors clearly recognizable (see Table 5). As in Sample 1, the strongest OCI-R loading (.49) was found on Psychoticism, with cross-loadings on Negative Affectivity (.27) and Disinhibition (-.31); however, compared with Sample 1, OCI-R loaded more strongly on Psychoticism and (negatively) on Disinhibition, and less strongly on Negative Affectivity, in Sample 2. Perseveration again strongly loaded on Psychoticism (.33), however, it cross-loaded more strongly on Negative Affectivity (.47). Relatedly, the Negative Affectivity factor appears to be marked by more facets than are seen in Sample 1 or prior work – Anhedonia (.53), Distractibility (.48) and Depressivity (.59) are all more commonly seen as most strongly loading on other PID-5 factors (e.g., Watters & Bagby, 2018), yet most strongly loaded on Negative Affectivity in this analysis. Rigid Perfectionism again most strongly loaded on Disinhibition (-.48). In contrast to Sample 1, Suspiciousness equally cross-loaded (.28) on both Negative Affectivity and Psychoticism.

Factor correlations from this EFA (see Table 5) yielded a somewhat similar pattern to Sample 1 and prior PID-5 analyses. However, as in Sample 1, the correlation between Psychoticism and Disinhibition was small ($r = .09$). Further, correlations between Negative Affectivity and the other factors, except Disinhibition, were moderately larger than those seen in prior work (r s = .25 – .57, e.g., Krueger et al., 2012, Wright et al., 2012).

Table 5. Five-Factor Oblique Loadings and Factor Correlations for Sample 2

Scale/Facet	Psychoticism	Negative Affectivity	Disinhibition	Antagonism	Detachment	Residual
OCI-R Total	0.49	0.27	-0.31	0	0.1	0.42
Perceptual Dysregulation	0.83	0.1	0.03	-0.04	0.05	0.2
Unusual Beliefs/Exp.	0.83	-0.03	-0.03	0	-0.03	0.36
Eccentricity	0.67	0.02	0.09	0.13	0.12	0.3
Suspiciousness	0.27	0.27	0.18	0.15	0.16	0.52
Rigid Perfectionism	0.22	0.27	-0.48	0.19	0.18	0.47
Irresponsibility	0.25	0.25	0.44	0.26	0.1	0.3
Risk-Taking	0.18	-0.09	0.44	0.41	-0.11	0.53
Impulsivity	0.32	0.24	0.35	0.27	-0.05	0.38
Anxiousness	0.09	0.75	0.01	0.04	0.06	0.29
Emotional Lability	0.27	0.69	-0.03	0.06	-0.16	0.31
Separation Insecurity	0.08	0.61	-0.06	0.13	-0.08	0.55
Depressivity	0.17	0.59	0.03	-0.11	0.29	0.3
Submissiveness	-0.3	0.54	-0.08	0.19	0.08	0.75
Anhedonia	-0.05	0.53	0.27	-0.09	0.48	0.25
Distractibility	0.26	0.48	0.17	0.02	0.12	0.41
Perseveration	0.33	0.47	-0.15	0.17	0.15	0.26
Withdrawal	0.11	0.19	-0.1	-0.07	0.71	0.28
Restricted Affectivity	0.12	-0.21	-0.07	0.23	0.67	0.45
Intimacy Avoidance	0.07	0.12	0.1	0.03	0.49	0.62
Manipulativeness	-0.04	0	0.03	0.82	0.05	0.33
Attention Seeking	0.05	0.13	-0.04	0.72	-0.28	0.42
Deceitfulness	-0.03	0.15	0.23	0.7	0.12	0.26
Grandiosity	0.08	-0.09	-0.28	0.69	0.09	0.45
Callousness	0.23	-0.13	0.2	0.5	0.34	0.32
Hostility	0.24	0.3	0.06	0.32	0.19	0.38
Factor Correlations						
Negative Affectivity	0.57					
Disinhibition	0.09	0.11				
Antagonism	0.49	0.25	0.18			
Detachment	0.42	0.38	0.1	0.22		

Notes: bolded numbers indicate the largest loading in each row. Factors are ordered by absolute value of OCI-R loading; facet loadings are ordered by absolute magnitude within a factor. OCI-R = Obsessive Compulsive Inventory - Revised; PID-5 = Personality Inventory for DSM-5

OCI-R Subscale and PID-5 Trait and Facet Analyses

All EFAs with only PID-5 facets entered yielded the expected 5-factor solutions, thus factor scores were extracted and used in the following analyses. Loadings and factor intercorrelations for all PID-5 solutions used in this step of analyses can be found in the Supplemental Material (Tables S5-S7). In the following sections, we focus our report on OCI-R subscale results; however, statistics for models involving the OCI-R total score are included in the associated tables. Given the exploratory nature of these analyses, we focus in-text report on results that replicated across sample and thus are likely to be the most robust findings. VIF was satisfactory for all regressions reported below.

Trait-Level Analyses

Bivariate Correlations for Samples 1 and 2. Correlations for both samples can be found in Table 6. The pattern of bivariate correlations between the OCI-R subscales and the PID-5 trait scores revealed that, in both samples, Obsessing had the largest number of moderately-to-strongly associated traits ($r \geq .3$) for Negative Affectivity, Psychoticism, and Detachment). Checking, Hoarding, and Ordering all had two such associated traits ($r \geq .3$) in both samples. Psychoticism and Negative Affectivity were the two PID-5 traits most consistently correlated with OCI-R subscales in both samples.

Table 6. Associations (Zero-Order Correlations and Standardized Tobit Regression Coefficients) Between OCI-R Subscales and PID-5 Factor Scores for each sample

Sample 1														
	Checking		Hoarding		Neutralizing		Obsessing		Ordering		Washing		Total	
	<i>r</i>	β	<i>r</i>	β	<i>r</i>	β	<i>r</i>	β	<i>r</i>	β	<i>r</i>	β	<i>r</i>	β
Antagonism	0.22	0.19	0.24	0.19	0.23	0.41	0.16	-0.14	0.26	0.66	0.19	0.36	0.28	1.13
Detachment	0.20	-0.06	0.24	0.15	0.16	-0.14	0.32	0.29	0.17	-0.13	0.14	-0.10	0.26	0.14
Disinhibition	0.00	-0.63	0.14	-0.09	0.09	-0.32	0.21	0.02	-0.11	-1.19	0.02	-0.55	0.07	-2.13
Neg. Affect	0.37	0.88	0.31	0.56	0.26	0.55	0.54	1.35	0.36	1.13	0.22	0.57	0.44	4.18
Psychoticism	0.41	1.03	0.42	1.03	0.37	1.29	0.48	1.04	0.35	0.99	0.30	1.12	0.50	5.04
Tobit Model	SMC	R^2_{MF}	R^2_{MF}	R^2_{MF}	SMC	R^2_{MF}	SMC	R^2_{MF}	SMC	R^2_{MF}	SMC	R^2_{MF}	SMC	R^2_{MF}
Statistics	0.255	0.064	0.204	0.047	0.160	0.042	0.380	0.105	0.281	0.068	0.120	0.035	0.344	0.054

Sample 2														
	Checking		Hoarding		Neutralizing		Obsessing		Ordering		Washing		Total	
	<i>r</i>	β	<i>r</i>	β	<i>r</i>	β	<i>r</i>	β	<i>r</i>	β	<i>r</i>	β	<i>r</i>	β
Antagonism	0.14	0.00	0.17	0.13	0.22	0.28	0.27	-0.02	0.22	0.71	0.16	0.06	0.26	0.45
Detachment	0.28	0.15	0.23	0.13	0.23	0.02	0.39	0.20	0.32	0.59	0.22	0.46	0.39	1.05
Disinhibition	-0.04	-0.96	0.11	-0.21	0.03	-0.74	0.26	0.00	-0.09	-1.32	0.10	-1.24	0.04	-3.08
Neg. Affect	0.42	0.93	0.39	0.99	0.33	0.40	0.61	1.40	0.35	0.74	0.16	0.34	0.54	3.41
Psychoticism	0.49	1.49	0.36	0.68	0.49	1.81	0.66	1.68	0.40	0.86	0.15	1.64	0.63	5.98
Tobit Model	SMC	R^2_{MF}	SMC	R^2_{MF}	SMC	R^2_{MF}	SMC	R^2_{MF}	SMC	R^2_{MF}	SMC	R^2_{MF}	SMC	R^2_{MF}
Statistics	0.320	0.090	0.179	0.043	0.267	0.087	0.498	0.172	0.284	0.071	0.283	0.083	0.491	0.091

Note: coefficients $\geq |.3|$ are bolded, $\geq |.4|$ are also italicized. Zero-order correlations calculated from raw (i.e., non-transformed) variables. McFadden's Pseudo- R^2 (R^2_{MF}) is analogous to R^2 for standard linear models. OCI-R = Obsessive Compulsive Inventory - Revised; PID-5 = Personality Inventory for DSM-5; SMC = squared multiple correlation.

Regressions for Samples 1 and 2. Tobit regressions clarified the bivariate associations between the traits and the individual OCI-R subscales (see Table 6). In both samples, PID-5 traits accounted for more variance in Obsessing (Sample 1: $R_{MF}^2 = 0.105$; Sample 2: $R_{MF}^2 = 0.172$) than other OCI-R subscales. Models predicting Checking also yielded some of the largest R_{MF}^2 values, relative to other models from the same sample (Sample 1: $R_{MF}^2 = 0.064$; Sample 2: $R_{MF}^2 = 0.090$). Models predicting Hoarding (Sample 1: $R_{MF}^2 = 0.047$; Sample 2: $R_{MF}^2 = 0.043$) and Washing (Sample 1: $R_{MF}^2 = 0.035$; Sample 2: $R_{MF}^2 = 0.083$) yielded among the smallest R_{MF}^2 values, again relative to other models from the same sample.

Psychoticism and Negative Affectivity were the traits that most strongly predicted the subscales (all $\beta s \geq .34$). Disinhibition was also consistently negatively or non-predictive across subscales in both samples. Also notable was that Antagonism strongly predicted Ordering in both samples (Sample 1 $\beta = .66$; Sample 2 $\beta = .71$).

Combined Sample Correlations and Regressions. Bivariate correlations within the combined sample are provided in the Supplementary Materials (Table S8). Given that they are calculated on the averaged values of Sample 1 and Sample 2 data, and thus the coefficients themselves are averages of the coefficients from each sample, we focus instead on the tobit regressions. All LRTs were significant for $df = 2$ ($ps < .001$), and therefore we only report results from models including the Sample term (see Table S8 for coefficients and model statistics).

The general pattern observed in each sample separately was also observed for the combined sample. The Obsessing model again yielded the highest R_{MF}^2 (0.147) and Checking also yielded a large value relative to the other R_{MF}^2 values ($R_{MF}^2 = 0.082$). Washing ($R_{MF}^2 = 0.072$) and Hoarding ($R_{MF}^2 = 0.003$) were again among the smallest R_{MF}^2 values, Psychoticism and

Negative Affectivity were again the most predictive traits ($\beta s \geq .52$). Notably, Psychoticism and Negative Affectivity both strongly predicted Obsessing at a magnitude greater than those seen in any other model ($\beta s \geq .1$). Disinhibition was again a negative predictive of all subscales.

Antagonism again strongly predicted Ordering as well, but to a lesser extent than in the separate samples ($\beta = 0.84$).

Facet-Level Analyses

Full results from the OCI-R subscales regressed onto the 25 PID-5 facets for each sample separately and for the combined sample can be found in the Supplemental Material (Tables S9-S11). Here, we briefly describe the most salient facet results that were fully replicated. Only combined sample coefficients are reported here in the interest of parsimony. Most notably, and largely consistent with the equivalent trait models, the Obsessing and Ordering models yielded the highest R_{MF}^2 (0.152 for both models in the combined sample), followed by Checking ($R_{MF}^2 = 0.107$). On the facet level, Obsessing was most strongly predicted by Perceptual Dysregulation ($\beta = 1.35$), followed by Perseveration ($\beta = .61$). For Ordering, Rigid Perfectionism was the strongest and primary predictor ($\beta = 2.26$). For Checking, both Rigid Perfectionism ($\beta = 1.33$) and Perseveration ($\beta = 1.18$) were strong positive predictors, followed by Anxiousness ($\beta = .77$), Perceptual Dysregulation ($\beta = .77$), Unusual Beliefs/Experiences ($\beta = .63$) and, in the negative direction, Depressivity ($\beta = -.72$). The other subscales showed relatively increased inter-sample variability and thus the pattern of coefficients was less replicable. However, the strongest predictor of each subscale was consistent across samples: Rigid Perfectionism strongly predicted both Neutralizing ($\beta = .89$) and Washing ($\beta = .86$), whereas Perseveration was the strongest predictor of Hoarding ($\beta = .75$).

Discussion

Our findings clarify the placement of OCD within the five-factor structure of maladaptive personality. The PID-5 structure was replicated and successfully accommodated OC symptoms, operationalized by OCI-R score. As predicted, OC symptoms cross-loaded on Negative Affectivity and Psychoticism in a five-factor model, with the magnitude of the Psychoticism loading stronger than the Negative Affectivity loading in both samples. These results are strongly consistent with recent studies of the PID-5 structure and OC symptoms (Faure & Forbes, 2021; Sellbom et al., 2020) and structural studies of OCD more broadly (Kotov et al., 2017). OC symptoms also moderately loaded on the low end of Disinhibition, although loading strength differed between samples. In terms of factor intercorrelations when incorporating OC symptoms into the structure, it is notable that the correlation between Psychoticism and Disinhibition is attenuated when compared with the associations between these traits without OC symptoms variance introduced (see Watters & Bagby, 2018). This is possibly explained by OC symptoms' presence on Psychoticism, as the OCI-R was only weakly correlated with the Disinhibition trait (due to relatively weaker associations with all the constituent facets other than Rigid Perfectionism). Overall, trait-domain results suggest that OCD resides largely under Psychoticism and Negative Affectivity, and moderately under Disinhibition. Results replicated across samples and provide evidence for the reliability and generalizability of reported results.

OCD in the Context of Facet

Overall, OC symptoms variance was introduced into the PID-5 structure with only a moderate shift in facet-level loadings. Both samples yielded facet-level loadings largely consistent with a meta-analysis of 14 independent sets of PID-5 loadings (Watters & Bagby, 2018). Some facets loading more strongly on different traits than those suggested by meta-analytic results. However, we did not observe any facets completely failing to load on an

expected factor. Shifts in facet loadings (based on divergence from the meta-analysis by Watters & Bagby, 2018) appear to occur primarily in relation to Psychoticism and Negative Affectivity. The PID-5 structure in the current samples, without OCI-R variables included, demonstrated the expected facet loading pattern. Therefore, the shift in loadings within the joint EFAs is due to the inclusion of OC symptoms in EFAs and not indicative of idiosyncrasies in our samples.

Facet shifts were somewhat inconsistent across samples. In Sample 1, Perseveration most strongly loaded on Psychoticism and moderately loaded on Negative Affectivity; the reverse is commonly reported. Distractibility showed near-identical loadings on both Psychoticism and Disinhibition, whereas unambiguously stronger loadings on Disinhibition and more moderate Psychoticism loadings are commonly reported. In Sample 2, Anhedonia and Depressivity most strongly load on Negative Affectivity despite both more commonly loading most strongly on Detachment. We contend that this is further evidence for the introduction of OC symptom variance causing shifts in facet loadings, as all the noted facets are associated with OC symptoms to some degree in the broader literature (Masellis et al., 2003; Schatz & Rostain, 2006).

Regarding the inconsistency in facet shifts between samples, one possible explanation is found in the age difference between samples. For example, Van den Broeck and colleagues (2013) found that Perseveration and Distractibility were significantly higher in a younger cohort compared with an older cohort, which might account for a shifting of these facet loadings in the younger Sample 1 compared with Sample 2. Another possibility is that overall symptom severity differentially affected each structure. Sample 2 included participants from mental health centers, and thus the shift in Anhedonia and Depressivity loadings might be due to the overall increases in nondifferentiated distress that would be more common in a treatment setting and are thought to track with overall severity (Caspi et al., 2014; Markon, 2010).

In terms of facet-level findings that were stable across samples, one notable result was that Perceptual Dysregulation and Unusual Beliefs/Experiences loaded more strongly on the Psychoticism than did Eccentricity. Given the presence of OC symptoms on Psychoticism in our analyses, this result likely reflects a weaker relation between OC symptoms and Eccentricity than the other Psychoticism facets (as also seen in reported bivariate correlations). The content of the Eccentricity items reflects the respondent's report on how others view their behavior (e.g., others finding their ideas unusual). Thus, it is plausible that relations between Eccentricity and OC symptoms are attenuated due to poor insight into the interpersonal ramifications of their symptoms (consistent with identified characteristics of poor insight in some with OCD; Matsunaga et al., 2002). Another notable result was that Rigid Perfectionism remained primarily under Disinhibition, instead of joining OC symptoms on another factor. Relatedly, the average factor inter-correlation between Disinhibition and the other traits was low in both samples (r_s 0.02 – 0.18), but were in the expected range in EFAs that only included the PID-5 facets (see Tables S5-S7). This suggests that the Disinhibition facets were generally less related to the other traits once OC symptoms was introduced into the structure.

OCD Symptom Dimensions and Maladaptive Personality Structure

Our exploratory subscale analyses also yielded intriguing results. At the trait level, Obsessions, Checking, Ordering, and to a lesser extent Washing, were the OCI-R subscales that showed the most consistent directional relations to the most conceptually and empirically relevant PID-5 traits (higher Psychoticism and Negative Affectivity, lower Disinhibition). The primacy of these four subscales in their relation to broader psychopathology is consistent with our broad prediction based on the prior literature (Stasik et al., 2012) and is generally consistent with findings that OCD is predominantly comprised of these four symptom dimensions (Mataix-

Cols et al., 2005; McKay et al., 2004). A weaker and inconsistent pattern of prediction in relation to the other subscales (Hoarding and Neutralizing) further corroborates evidence that these symptom dimensions, particularly Hoarding, are distinct from core OC symptoms dimensions and introduce problematic heterogeneity into OCD measurement (Abramovitch et al., 2021; Stasik et al., 2012; Wu & Watson, 2005). At the facet level, we found that Rigid Perfectionism, Perseveration, and Perceptual Dysregulation were most overall predictive of the OCI-R subscales (see Tables S9-S11 in Supplementary Material). Interestingly, each of these facets represents one of the three traits affiliated with OCD (Disinhibition, Negative Affectivity, and Psychoticism, respectively) and further underscores the placement of OCD in the PID-5 structure is contingent on specific symptom dimensions that are strongly linked to core dimensions of the pathology.

Limitations

Our results are promising, but several limitations are evident. First, we used a single brief scale to measure OC symptoms. Although the OCI-R has excellent psychometric properties, future studies might incorporate measures that assess a broader range of OCD-related content (e.g., Rosario-Campos et al., 2006). However, including more OC symptom relevant scales potentially complicates analyses, most notably regarding bloated specific factors. Future studies could address this issue through the inclusion of scales that contain both OC symptoms and non-OC symptoms subscales (e.g., Watson et al., 2012), as method-specific variance would likely be constant across these scales and potentially attenuate the bloated specific issue. Finally, another limitation is that with the current data we cannot determine the degree to which our psychoticism variables are reflecting true psychotic content (e.g., psychotic delusions, see Widiger & Crego, 2019). Thus, it remains unclear how our results relate to first-rank psychotic symptoms and more severe psychosis. Future studies can address this limitation by measuring a broader range of

psychotic content and testing samples with a greater proportion of psychotic illness present (e.g., psychiatric inpatients).

Also notable is that both samples were not recruited to explicitly obtain a robust distribution of severe OC symptoms. Future work could recruit such a sample, as well as ensure that a broad and diverse range of OC content is present. Finally, given the cross-cultural variations seen in OCD and OC symptoms that have substantial implications for the content of —and coping styles in regard to — symptoms (Nicolini et al., 2017; Yang et al., 2018), future work could highly benefit from increasing cultural diversity in their research samples and incorporating relevant cultural dimensions into analyses.

Nosological Implications and Conclusion

Primary nosological implications of this work echo those from a growing body of quantitative and theoretical literature: OCD is well represented by a multidimensional model but is poorly defined as a strictly anxiety or internalizing disorder. The shift from DSM-IV-TR to DSM-5 resulted in OCD separated from the anxiety disorders and placed into its own section (viz., obsessive-compulsive and related disorders), which indeed represents progress. However, based on the current and past results, it is clear that OCD overlaps considerably with psychoticism and that nosological systems could be improved by incorporating this increasing body of evidence into future developments. For example, consideration should be given as to how OCD might fit into the current Schizophrenia Spectrum and Other Psychotic Disorders section of the DSM-5. This is not to say that OCD is analogous to a psychotic disorder, but overlap is present on multiple dimensions. Further research that links the core OC symptoms dimensions with specific symptoms of psychosis might be particularly fruitful for clarifying the overlap between the two pathologies.

Outside of the DSM paradigm, the current findings are immediately relevant for the HiTOP model and provide additional support for OCD's status as a constituent of both the Internalizing and Thought Disorder spectra (similar to the bipolar disorders and mania dimensions, which also demonstrate links to OCD; e.g., Amerio et al., 2014; Watson et al., 2012; Watson, Stanton, et al., 2019). Unique to the current study is the finding that OC symptoms also fit within the PID-5 structure on the low end of Disinhibition. Although this finding requires further replication, it is reasonable to now consider if this relation is justified within the HiTOP model. Outside of nosological implications, these findings suggest that future etiological and mechanistic work on OCD and OC symptoms might benefit from the integration of psychological and neural processes not usually associated with internalizing (including those more typically associated with psychosis) into their investigative framework.

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