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## Personality traits as predictors of OCD remission: A longitudinal study

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## ABSTRACT

**Background:** Personality traits may confer vulnerability to psychopathology. However, few studies have examined the association between personality traits and obsessive-compulsive disorder (OCD) course. The present study investigates personality traits, OCD symptom severity, and illness duration as a predictor of OCD remission. **Methods:** 166 treatment-seeking adults with OCD, recruited as part of the Brown Longitudinal Obsessive-Compulsive Study, completed the NEO Five-Factor Inventory 3 (NEO-FFI) and were in episode for OCD at time of NEO-FFI completion. Participants were followed for up to 3 years.

**Results:** Results suggest individuals with OCD had a 21 % likelihood of reaching remission over the course of 3 years. Greater OCD symptom severity and longer illness duration were associated with a decreased likelihood of remission. Among the five factors of personality, only low extraversion was associated with a decreased rate of remission. Neuroticism, openness, agreeableness, and conscientiousness were not associated with remission.

**Limitations:** As this was an observational study, treatment was not controlled precluding examination of treatment on course. Further, data collected on age of onset and symptom severity during follow up were retrospective and therefore are also subject to recall bias.

**Conclusions:** Our findings provide preliminary support that personality traits are potential factors impacting course and symptom presentation. Future research is necessary to determine the mechanisms in which personality traits may influence the presentation and course of OCD.

## 1. Introduction

Obsessive compulsive disorder (OCD) is a debilitating disorder characterized by recurring intrusive thoughts (obsessions) and repetitive behaviors or mental acts to reduce distress (compulsions). Over the past several decades, increasing attention has been placed on the investigation of personality traits in OCD. One of the most frequent hierarchical models used to examine personality traits, the five-factor model (FFM), conceptualizes personality in five broad domains: neuroticism, extraversion, openness, agreeableness, and conscientiousness (Costa and McCrae, 1992). Individuals with OCD have consistently shown to have higher levels of neuroticism and lower levels of extraversion compared to non-patient groups (Samuels et al., 2000; Tackett et al., 2008; Wu et al., 2006). Findings on the presentation of openness, conscientiousness, and agreeableness in OCD have been mixed. Samuels et al. (2000) reported that individuals with a lifetime diagnosis of OCD

scored higher on agreeableness, higher on facets of openness (fantasy and feelings), and lower on facets of conscientiousness (competence and self-discipline) compared to non-patients. Tackett et al. (2008) also indicated individuals with OCD had lower conscientiousness and higher openness relative to a community sample. In contrast, Wu et al. (2006) found that OCD patients had lower levels of openness and no differences in conscientiousness compared to a normative sample. While research has repeatedly implicated high neuroticism and low extraversion in OCD presentation, it remains unclear whether there is a notable profile of openness, agreeableness, and conscientiousness in OCD.

Beyond assessing for an OCD personality profile, previous research has also focused on the relationship between personality traits and OCD symptom severity. Rees et al. (2014) indicated higher neuroticism and lower extraversion were associated with greater OCD symptom severity. Samuels et al. (2020) noted similar findings, while adding openness, agreeableness, and conscientiousness as unrelated. Conversely, Rector

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et al. (2005) found that only openness out of the five domains was associated with OCD severity. However, these findings are limited by a small, cross-sectional sample size (Rector et al., 2005). None of these studies established a relationship between agreeableness or conscientiousness and OCD symptom severity. Overall, the association between personality traits and OCD symptom severity has been equivocal and requires additional investigation.

Although theoretical models suggest personality traits could have an important role as vulnerability factor in psychological disorders (Barlow, 2000; Barlow, 2002), only a few studies have investigated the impact personality traits have on OCD course. Kempe et al. (2007) found higher baseline levels of neuroticism and OCD symptom severity were associated with a lower likelihood of remission over 5 years. However, this study was limited by small sample size and only three points of observation. Similarly, Askland et al. (2015) found neuroticism and OCD symptom severity to be among the most robust predictors of remission in a machine learning study of OCD course. However, this study was limited by the fact that personality domains were not measured prospectively. While the research on OCD course is sparse, a number of research studies have suggested high neuroticism and low extraversion are predictors of worse course for anxiety disorders (Hovenkamp-Hermelink et al., 2021; Schopman et al., 2021; Struijs et al., 2018; Williams et al., 2021) which has a similar presentation of high neuroticism and low extraversion (Kotov et al., 2010). Notably, Spinhoven et al. (2011) indicated the effects of neuroticism and extraversion on anxiety course are largely minimized when symptom severity and symptom duration are taken into consideration. There remains a need for further investigation into how personality traits could be related to OCD symptom severity and illness course given the current dearth of research and mixed findings.

The purpose of this study is to investigate personality traits, OCD symptom severity, and illness duration as predictors of OCD remission. Based on existing research, we hypothesize that high neuroticism and low extraversion will be associated with decreased likelihood of remission. Assessing the impact of personality traits on OCD course may be helpful in identifying high risk populations, modifying treatment approaches, and predicting diagnosis course.

## 2. Methods

### 2.1. Participants

Our subset was a sample of individuals participating in the Brown Longitudinal Obsessive-Compulsive Study (BLOCS) a prospective, longitudinal study of OCD course. The primary outcomes of the study have been published previously (Eisen et al., 2010, 2013; Mancebo et al., 2014). Briefly, inclusion criteria were as follows: 1) primary diagnosis of DSM-IV OCD (defined as the disorder participants considered the biggest problem overall across their lifetime), 2) age 19 or older in the adult sample, and 3) having sought treatment within five years prior to study enrollment. Participants were recruited between July 2001 and February 2006 from multiple psychiatric treatment settings in Rhode Island and Massachusetts including a hospital-based OCD specialty clinic, a private psychiatric hospital inpatient unit, community mental health centers, general outpatient psychiatric practices, and private psychotherapy practices. Participants completed annual interviews for up to 12 years. The Butler Hospital and Brown University Institutional Review Boards approved the study.

The present report is based on 3-year prospective data collected on 166 adults who completed the NEO Five-Factor Inventory 3 (NEO-FFI) and were in-episode for OCD at the time of NEO-FFI completion. The NEO-FFI was first introduced to the BLOCS assessment battery in 2007, 1–6 years after the start of baseline assessments.

### 2.2. Measures

Intake diagnoses, demographic characteristics, clinical history, and psychosocial functioning were established at baseline interviews using the Structured Clinical Interview for DSM-IV Axis I Disorders-Patient Edition (SCID-IV; First et al., 1996). Follow-up interviews were conducted annually. Current (past-week) OCD symptoms and severity was assessed at each annual interview using the Yale-Brown Obsessive-Compulsive Scale (YBOCS), a reliable and valid 10-item rater-administered scale (Goodman et al., 1989a; Goodman et al., 1989b) and the YBOCS Symptom Checklist. Primary obsessions and compulsions were determined by participant report of the symptom which they would most like to get rid of, and by assessor judgment of the symptom causing the most distress and impairment. The NEO Five Factor Inventory (NEO-FFI) (Costa and McCrae, 1992) was used to assess the five domains of personality (neuroticism, extraversion, openness, agreeableness, and conscientiousness) as indicated in the Five Factor Model. Internal consistency reliabilities of each of the 12-item subscales are as follows: neuroticism ( $\alpha = 0.86$ ), extraversion ( $\alpha = 0.81$ ), the openness ( $\alpha = 0.76$ ), agreeableness ( $\alpha = 0.78$ ), and conscientious ( $\alpha = 0.83$ ).

For this study, participants were followed up for 3 years after they completed the NEO-FFI. Follow-up interviews were conducted using the Longitudinal Interval Follow-up Evaluation (LIFE), a semi-structured interview designed to assess the longitudinal course of psychiatric disorders (Keller et al., 1987). The LIFE generates a 6-point psychiatric status rating based on OCD symptom severity, indicating whether the individual meets full criteria for OCD [at moderate (PSR4), severe (PSR5), or extreme (PSR6) levels of distress and impairment], is in partial (PSR3), or is in full remission (PSR2, PSR1). At least partial remission was defined as an OCD PSR  $\leq 3$  for 8 consecutive weeks mirroring the definitions used in prior large-scale longitudinal studies of psychiatric disorders (Ansell et al., 2011; Bruce et al., 2005; Keller et al., 1982). Psychiatric Status Ratings have been used in numerous longitudinal studies and provide a reliable and valid global rating of ongoing disorder severity (Warshaw et al., 1994). Good to excellent interrater and test-retest reliabilities have been established in this sample (Eisen et al., 2010) and in other longitudinal, naturalistic studies with similar assessment protocols (Warshaw et al., 1994). A detail description of rater training including procedures to establish and maintain reliability can be found elsewhere (see Pinto et al., 2006).

### 2.3. Data analysis

Data analysis was performed using R version 4.0.5 (R Core Team, 2014). Descriptive statistics were used to characterize the sample. Pearson correlation coefficients were used to assess the relationship between NEO five factor personality domains, OCD symptom severity, and illness duration. Kaplan-Meier survival analyses was conducted to estimate likelihood of remission of OCD over 3 years. Cox proportional hazards regression was used to assess five factor personality domains, OCD severity, and illness duration as predictors of OCD remission. The significance level was 0.05. Analyses were conducted using the survival package (v2.11–4; Therneau, 2020; Therneau and Grambsch, 2000) in R.

## 3. Results

### 3.1. Sample characteristics

The mean age of our participants was 42.9 years ( $SD = 14.2$ ). The sample was primarily White (95 %) and male (52.4 %). Participants reported a moderate level of OCD symptoms ( $M = 22.1$ ,  $SD = 7.32$ ). The mean age of onset of DSM-IV OCD symptoms was 15.99 ( $SD = 8.28$ ) years and the mean illness duration was 26.99 ( $SD = 13.53$ ) years. Contamination was the most frequently endorsed primary obsession category (23.5 %) and cleaning was the most frequently endorsed

primary contamination (25.3 %). Mean T-score ratings of personality facets were as follows: neuroticism ( $M = 63.40$ ,  $SD = 10.02$ ), extraversion ( $M = 42.48$ ,  $SD = 11.94$ ), openness ( $M = 51.61$ ,  $SD = 11.69$ ), agreeableness ( $M = 49.87$ ,  $SD = 12.40$ ), and conscientiousness ( $M = 42.40$ ,  $SD = 11.84$ ). Compared to a normative population, our sample scored higher on neuroticism and openness and lower on extraversion, agreeableness, and conscientiousness. See [Table 1](#).

### 3.2. Relationship between personality traits and OCD severity

Results from Pearson correlation suggests that higher levels of neuroticism ( $r(164) = 0.37$ ,  $p < 0.001$ ), lower levels of extraversion ( $r(164) = -0.31$ ,  $p < 0.001$ ), and lower levels of conscientiousness ( $r(164) = -0.20$ ,  $p < 0.01$ ) were associated with greater OCD symptom severity. See [Table 2](#).

### 3.3. Rates predictors of remission

The probability of remission from OCD over the course of 3 years was 0.21 (See [Fig. 1](#)). Of the 27 total remissions, 18 (10.8 % of total sample) were partial remissions and 9 (5.4 % of total sample) were full remissions. Because of the low frequency of full remissions in this sample, full or partial remission was used as the clinical outcome for predictor analyses. Lower OCD severity as measured by the YBOCS was associated with a higher rate of remission as was a shorter duration of illness ([Table 3](#)). Among the five factors, only low extraversion was associated with a decreased rate of remission. Neuroticism, openness, agreeableness, and conscientiousness were not associated with remission. See [Table 3](#).

## 4. Discussion

High levels of neuroticism and low levels of extraversion are consistently associated with OCD presentation ([Samuels et al., 2000](#); [Tackett et al., 2008](#); [Wu et al., 2006](#)). However, the relationship between

personality dimensions and clinical features of OCD, such as symptom severity and course of illness, has not been widely investigated. The present study sought to determine whether personality factors are associated with OCD symptom severity and the likelihood of OCD remission. Our findings indicate that higher levels of neuroticism, lower levels of extraversion, and lower levels of conscientiousness were correlated with greater OCD symptom severity. Additionally, lower levels of extraversion, greater OCD symptom severity, and longer illness duration were indicative of a decreased likelihood of remission.

Consistent with findings from prior OCD studies ([Rees et al., 2014](#); [Samuels et al., 2020](#)), we found that higher levels of neuroticism and lower levels of extraversion were associated with greater OCD symptom severity. Interestingly, lower levels of conscientiousness were also related to greater OCD symptom severity. These traits may confer a vulnerability to psychopathology. Compared to individuals low in neuroticism, individuals high in neuroticism are more likely to experience negative life events ([Magnus et al., 1993](#)), be sensitive to fear ([Servaes et al., 2013](#)), and react strongly to threat appraisals ([Schneider, 2004](#)). Previous research has suggested conscientiousness and extraversion could be protective factors against stress as higher levels on these traits predicted greater use of problem-focused and support seeking coping strategies ([Bartley and Roesch, 2011](#); [Connor-Smith and Flachsbart, 2007](#)). When looking at the presentation of personality traits together in relation to psychopathology, [Naragon-Gainey and Simms \(2017\)](#) found that having both high extraversion and high conscientiousness were protective against the negative effects of high neuroticism. This suggests that those with high neuroticism in combination with low extraversion and low conscientiousness may be more likely to experience more severe psychopathology. The combination of poor coping skills, interpreting ordinary situations as threatening, and greater experience of negative emotions may translate into greater distress and psychopathology.

Results from survival analyses suggest individuals with OCD had a 21 % likelihood of reaching remission over the course of 3 years, which is lower than the probability we have found in earlier investigations of this cohort ([Eisen et al., 2010, 2013](#)). The requirement that participants be in-episode for OCD at the time of NEO administration 1–6 years into the study, resulted in a more chronically ill sample less prone to remission. Prospective follow-up studies of OCD have found the rate of at least partial remission ranges from 20 % to 70 % ([Catapano et al., 2006](#); [Eisen et al., 2013](#); [Steketee et al., 1999](#)). Long duration of illness, greater OCD severity, and earlier age of OCD onset are among the factors that have been associated with lower likelihood of remission ([Dell'Osso et al., 2010](#); [Eisen et al., 2013](#)). Our results here add to the robust literature associating greater symptom severity and longer illness duration with protracted course which underscores the need for early intervention and treatment in OCD.

When examining OCD course, we found that lower levels of extraversion, greater symptom severity, and longer duration of illness were related to lower likelihood of achieving remission. This is in line with extant research on anxiety disorders that suggests low extraversion is predictive of greater chronicity ([Hovenkamp-Hermelink et al., 2021](#); [Struijs et al., 2018](#)). High extraversion is associated with experiencing more positive life events ([Magnus et al., 1993](#)), good response to medication and therapy ([Samuels et al., 2020](#)), and greater resilience to stressful experiences ([Campbell-Sills et al., 2006](#)) – factors that could aid in achieving remission. The relationship between greater symptom severity and duration of illness, respectively, and remission was established in previous research ([Eisen et al., 2013](#)). Unexpectedly, there was no association between neuroticism and remission. One explanation is that heightened levels of neuroticism may be an artifact of OCD symptom severity but does not uniquely impact course of the disorder.

There are several limitations to this study. The majority of our participants were non-Hispanic White/Caucasian and all were treatment seeking, limiting the generalizability of the results to racially and ethnically diverse populations and non-treatment seeking populations.

**Table 1**

Baseline scores.

	Overall <sup>a</sup> (n = 166)
Neuroticism (T-score)	63.40 (10.02)
Extraversion (T-score)	42.48 (11.94)
Openness (T-score)	51.61 (11.69)
Agreeableness (T-score)	49.87 (12.40)
Conscientiousness (T-score)	42.40 (11.84)
YBOCS total score (OCD severity), y	22.13 (7.32)
Duration of OCD, y	26.99 (13.53)
Age of OCD onset, y	15.99 (8.28)
<b>Primary obsession category, n (%)</b>	
Contamination	39 (23.5 %)
Overresponsibility for harm	31 (18.7 %)
Symmetry/exactness	21 (12.7 %)
Hoarding	18 (10.8 %)
Aggressive	13 (7.8 %)
Sexual	11 (6.6 %)
Somatic	10 (6.0 %)
Sexual	11 (6.6 %)
Religious	9 (5.4 %)
Miscellaneous	8 (4.8 %)
Missing	6 (3.6 %)
<b>Primary compulsion category, n (%)</b>	
Cleaning/washing	42 (25.3 %)
Miscellaneous	33 (19.9 %)
Checking	30 (18.1 %)
Repeating rituals	21 (12.7 %)
Hoarding/collecting	18 (10.8 %)
Ordering/arranging	9 (5.4 %)
Counting	6 (3.6 %)
Missing	7 (4.2 %)

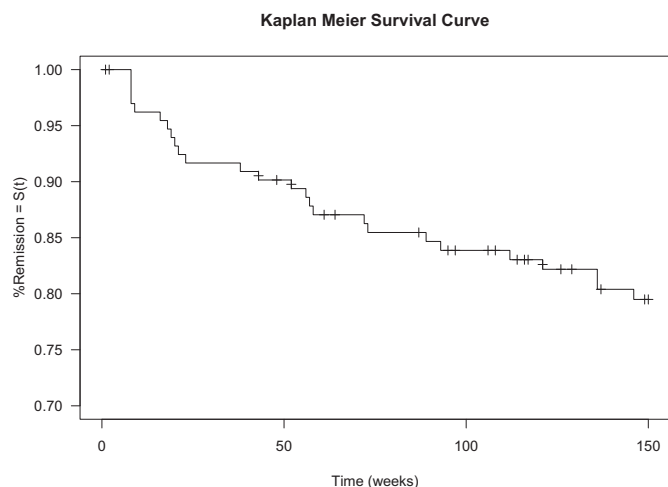
Note: YBOCS = Yale Brown Obsessive Compulsive Scale.

<sup>a</sup> Values shown as mean (SD) unless otherwise noted.

**Table 2**  
Correlation Matrix Between Personality Domains and OCD Symptom Severity.

	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness	OCD Severity
Neuroticism						
Extraversion	-0.52****					
Openness	0.02	0.11				
Agreeableness	-0.24**	0.32****	-0.01			
Conscientiousness	-0.35****	0.37****	-0.20*	0.02		
OCD Severity	0.37****	-0.31****	-0.02	-0.11	-0.20**	
Duration of OCD	0.02	-0.12	-0.09	0.11	0.02	0.10

\*\*\*\*p < .0001; \*\*\*p < .001, \*\*p < .01, \*p < .05



**Fig. 1.** Rate of OCD remission.

**Table 3**  
Cox proportional hazard model testing five factor model, OCD severity, and age of onset as predictors of remission<sup>a</sup>.

	B (SE)	X <sup>2</sup>	p	HR	95 % CI
Neuroticism	0.01 (0.03)	0.03	0.86	1.01	0.94–1.07
Extraversion	0.09 (0.04)	4.26	<0.05	1.09	1.00–1.18
Openness	-0.06 (0.04)	2.97	0.09	0.93	0.88–1.01
Agreeableness	0.08 (0.04)	3.35	0.07	1.08	0.99–1.18
Conscientiousness	-0.06 (0.03)	3.03	0.08	0.94	0.88–1.01
OCD severity	-0.14 (0.03)	23.80	<0.0001	0.87	0.82–0.92
Duration of OCD	-0.05 (0.01)	6.56	<0.05	0.95	0.92–0.99

Note: HR = hazard ratio; CI = confidence interval.

<sup>a</sup> Predictors entered simultaneously (df = 7, Wald X<sup>2</sup> = 41.13. p < 0.0001).

As this was an observational study, treatment was not controlled precluding examination of treatment on course. Further, data collected on age of onset and symptom severity during follow up were retrospective and therefore are also subject to recall bias. This study also only examined a limited number of predictors. While the purpose of this study was to investigate five factor personality traits as predictors of OCD remission, additional predictors with relevance to personality traits and OCD should be examined in future work (e.g., depression, obsessive compulsive personality disorder). Nonetheless, this is one of the only investigations of the five-factor model in a well characterized sample of OCD and, to our knowledge, the only large prospective investigation to examine five-factor traits as predictors of OCD remission.

In summary, the findings of this study provide preliminary support that personality domains may have implications on OCD course and symptom presentation. Neuroticism, extraversion, and conscientious are related to OCD symptom severity. Extraversion may be unique personality factor impacting OCD course. Future prospective, longitudinal studies are necessary to elucidate the mechanisms in which personality traits might influence the presentation, impairment, and course of OCD.

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**Data statement**

The data that support the findings of this study are available on request from the corresponding author.

**Conflict of Interest**

None.

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None.

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