

DEONTOLOGICAL GUILT MEDIATES THE EFFECTS OF PERSONALITY ON THE SYMPTOMS OF ROMANTIC RELATIONSHIP OBSESSIVE COMPULSIVE DISORDER (ROCD)

Luigi Tinella, Elisabetta Ricciardi, Teresa Cosentino, Alessandro Oronzo Caffò, Guy Doron, Andrea Bosco, Francesco Mancini

Abstract

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Objective: Relationship obsessive-compulsive disorder (ROCD), a clinical variant of OCD, is associated with personality traits and guilt sensitivity. Previous studies have not investigated whether the guilt associated with ROCD stems from deontological or altruistic morality. The main aim of the present study was to explore the differentiated impact of deontological and altruistic guilt on ROCD symptoms in romantic relationships. The study also aimed to test the mediating role of guilt in the relationships between personality traits and ROCD symptoms.

Method: Through linear regressions and path analysis, we examined the results of an online survey administered to 659 emerging adults, assessing the Big-5 personality traits, ROCD symptoms, and the moral orientation of guilt feelings (deontological/altruistic).

Results: Results revealed the negative influence of agreeableness and emotionality on ROCD symptoms. Moral dirtiness, as a facet of deontological moral orientation, was found to mediate the effects of personality predictors on relationship-centred but not on partner-focused ROCD symptoms, providing support for differential diagnosis.

Conclusions: These findings provide a clearer understanding of the cognitive determinants that sustain ROCD symptoms and offer evidence on associated personality traits. These results may represent a valuable source of knowledge for researchers as well as clinical therapists dealing with ROCD symptoms, couple disorders, and sexual dysfunction.

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1. Introduction

Obsessive-compulsive disorder (OCD) is a debilitating condition characterized by intrusive obsessions and compulsive behaviours aimed at alleviating fears and preoccupations resulting from them (American Psychiatric Association, 2013). The lifetime prevalence is 1.5% for females and 1% for males, peaking between 15 and 25 years old (Fawcett et al., 2020). OCD exhibits various thematic domains including (fear of) contamination, order and symmetry, doubt, superstition, and taboo thoughts (Abramowitz et al., 2008).

More than a decade of research demonstrated evidence on a novel clinical variant of OCD related to close interpersonal relationships (i.e., romantic, parent-child, with mentors, and with God; Doron et al., 2014; Ratzoni et al., 2021). Two different ROCD manifestations may occur: relationship-centered (RC-

ROCD) and partner-focused (PF-ROCD). The former refers to doubts and preoccupations about one's feelings toward one's partner, the partner's feelings, and, more broadly, on the "rightness" of the relational experience (Doron et al., 2012b). The latter (i.e., PF-ROCD) often includes doubts and concerns about the perceived flaws of a partner, such as the partner's physical appearance, sociability, morality, emotional stability, intelligence, competence and trustworthiness (Brandes et al., 2020; Doron et al., 2012a).

Studies on ROCD have mainly focused on symptoms occurring in the context of romantic relationships by highlighting contextual factors (e.g., Littman et al., 2023), cognitive determinants (e.g., Melli et al., 2018), and personality traits associated with the severity of the disorder (e.g., Melli et al., 2024). It has been demonstrated that ROCD is more likely to be associated with depression than OCD (Doron et al., 2016), and that individual differences in personality may influence the

severity of symptoms (Melli et al., 2024; Tinella et al., 2023). Moreover, perfectionism and maladaptive beliefs about romantic relationship were found to play a crucial role in regulating the severity of the disorder (Doron et al., 2016; Melli et al., 2018a). Lastly, relationship length seems to mitigate the severity of the disorder, negatively influencing self-reported symptoms (Kılıç & Altınok, 2021; Szepsenwol et al., 2016; Tinella et al., 2023).

Concerning personality traits, Narcissism and Paranoia were found to positively predict ROCD symptom severity, with differences among subtypes: Paranoia was found to predict RC-ROCD, conversely, Narcissism significantly predicted PF-ROCD (Tinella et al., 2023). This evidence has been partially supported by findings from Melli et al. (2024) which demonstrated that vulnerable Narcissism particularly affects ROCD manifestations, highlighting the importance of considering dispositional variables (i.e., personality traits) in the assessment and treatment of patients with ROCD. Despite this, to the best of our knowledge, no study has sought to investigate the influence of personality on ROCD by considering well-established personality traits models (e.g., Cattels'16 personality factors; Eysenk Personality Inventory; HEXACO; Big-5 model, etc.).

The Big-5 theoretical model of personality, also known as the Five Factors Model (FFM), is a widely accepted and extensively studied framework of personality. It postulates five broad dimensions, each encompassing a wide range of more specific personality characteristics, able to describe the whole individual profile allowing for understanding individual differences in personality (Costa & McCrae, 1992; Goldberg, 1993). The personality traits are often synthesized with the acronym OCEAN including Openness (i.e., reflecting a person's openness, imagination, curiosity, and willingness to try new experiences), Conscientiousness (i.e., the degree to which a person is organized, responsible, reliable, and goal-oriented), Extraversion (i.e., reflecting the extent to which a person is outgoing, sociable, energetic, and assertive), Agreeableness (i.e., the degree to which a person is cooperative, empathetic, trusting, and compassionate towards others), and Neuroticism (i.e., or emotionality, reflecting the tendency to experience negative emotions such as anxiety, depression, irritability, and vulnerability to stress; Costa & McCrae, 1992). A recent study found associations between personality traits and obsessive-compulsive manifestations in a sample of OCD patients (Yadav, 2022). Specifically, Agreeableness was negatively associated with unacceptable intrusive thoughts, while positive relationships emerged between Conscientiousness and harm prevention, injury prevention, and bad luck. In a study by Rector et al. (2005) conducted on a clinical sample, associations were highlighted between lower openness to ideas and greater obsession severity, as well as between lower openness to action and greater compulsive severity. Furthermore, compared with participants with major depression, patients with OCD scored higher in extraversion, conscientiousness, and agreeableness, and lower in neuroticism (Rector et al., 2002). However, regarding Relationship Obsessive-Compulsive Disorder (ROCD), only the effects of pathological personality traits have been explored so far, which do not belong to a theoretical model of personality, thus rendering the existing evidence partial and fragmented.

A plethora of studies demonstrated that OCD is associated with inflated responsibility and fear of guilt

(e.g., Mancini & Gangemi, 2015; Mancini & Mancini, 2015). In nonclinical neuro-imaging samples, guilt is correlated with brain activation in regions adjacent to those affected by OCD (Takahashi, Yahata, Koeda, et al., 2004; Shin, Doughert, Orr, et al., 2000). Guilt has been conceptualized as a multidimensional construct and, as such, it results in different phenomena depending on the moral values internalized by the "guilty" (Mancini et al., 2022). Prinz and Nichols (2010) have highlighted that the prototype of guilt in the modern Western cultures is defined by: 1) to have caused harm to others, by action or omission (i.e., altruistic guilt), 2) to have violated a moral norm (i.e., deontological guilt). In altruistic guilt, therefore, there is always a victim, but there might not be any violation of moral rules (Gangemi & Mancini, 2015).

The existence of these distinct types of guilt is supported by evidence from behavioural and neuroimaging studies (F. Mancini et al., 2022). OCD patients are particularly activated by the fear of deontological guilt as they actively tend to avoid them to keep away the feeling of "*Do not play God*" (Sunstein, 2005). For example, facing the trolley dilemma OCD patients show a preference for inaction over action and this is due to their specific sensitivity to deontological guilt (Mancini & Gangemi, 2015). Finally, it has been previously demonstrated that deontological guilt plays a role in the genesis and maintenance of OCD (Basile et al., 2014).

Despite the above, no study has previously focused on the moral orientation of individuals with ROCD. A previous attempt (Tinella et al., 2023) has demonstrated the influence of the fear of guilt on both ROCD manifestations (RC-ROCD and PF-ROCD) in the field of romantic relationships but failed to clarify whether different guilt feelings play a different role in influencing symptoms. A couple of studies have suggested that catastrophic beliefs about being in the wrong relationship or being alone significantly affects ROCD symptoms (Doron et al., 2016; Melli et al., 2018a). Our previous study (Tinella et al., 2023) demonstrated a consistent relationship between fear of guilt and ROCD manifestations: fear of guilt significantly and positively predicted both the ROCD manifestations. Taken together, ROCD symptoms may be related to (a) feelings of guilt toward oneself, because of you are in the "wrong" relationship (i.e., deontological guilt), and (b) feelings of guilt towards the partner, because you may be deceiving them (i.e., altruistic guilt; Tinella et al., 2023). Given the crucial role played by the deontological guilt in the genesis and maintenance of OCD manifestations, it is surprising that evidence involving ROCD symptoms is lacking.

A link between guilt sensitivity and certain personality traits included in the Big-5 model has been highlighted previously. Einstein and Lanning (1998) found that fearful guilt was negatively related to extraversion and positively related to neuroticism while empathetic guilt was positively associated with agreeableness. Moreover, Fayard and colleagues (2012) found positive associations between Conscientiousness and guilt proneness demonstrating that guilt is a crucial factor of Conscientiousness able to account for the relationship between conscientiousness and negative affect.

Taken together, previous findings seem to suggest that guilt is a key component of certain non-pathological personality traits as well as a cognitive determinant of ROCD symptom severity. Despite this, no previous study has explored the relationship between personality traits, guilt (altruistic vs deontological), and ROCD symptoms together.

1.1 The present study

While emerging evidence suggests the influence of pathological personality traits on ROCD symptoms in clinical and non-clinical samples, it remains unclear if non-pathological personality traits may also play a role. Similarly, although fear of guilt appears to be positively correlated with ROCD symptoms, it is unclear which specific type of guilt is associated with ROCD symptoms. Moreover, as suggested in previous studies (Tinella et al., 2023), it is likely that the sensitivity to guilt mediates the relationships between personality traits and ROCD symptoms.

The present study aimed to address these gaps by investigating the mediating role of guilt feelings (i.e., altruistic vs. deontological) in the relationships between the Big-5 personality traits and ROCD symptoms (RC-ROCD and PF-ROCD) within a non-clinical sample. Specifically, the study had two primary objectives. Firstly, it aimed to investigate the effects of socio-demographic variables (i.e., age, sex, education, and relationship length), the Big-5 personality traits (i.e., Extraversion, Agreeableness, Conscientiousness, Emotionality, Openness), and the type of guilt feelings (deontological vs. altruistic), on self-reported ROCD symptoms. Secondly, the study aimed to test the hypothesis that sensitivity to guilt feelings mediates the effects of personality on ROCD symptoms.

We hypothesized that: (a) relationship length would be negatively correlated with symptoms of both ROCD (Tinella et al., 2023); (b) deontological guilt feelings, more than altruistic ones, may be positively associated with ROCD symptom severity (Mancini and Mancini, 2015); (c) the significant effects of personality on ROCD symptoms would be indirectly mediated by the moral orientation of guilt feelings. Specifically, deontological guilt is expected to mediate the relationship between personality and RC-ROCD and altruistic guilt is expected to mediate the effects of personality on PF-ROCD symptoms.

2. Methods

2.1. Participants

A power analysis was conducted to estimate the required sample size using G*Power 3.1 (Faul et al., 2009). The analysis employed the following parameters: a significance p level of .05, a cautious low effect size set at 0.12, and a power of 0.80. The results indicated that a sample size of 127 participants was adequate to warrant an 80% chance of correctly rejecting the null hypothesis. A total of 736 participants took part in the study by receiving the online link and filling their informed consent. Seventy-seven data records were excluded due to incomplete survey responses across all sections. The final sample consisted of 659 participants (78% f), with a mean age of 32.1 (SD = 12), and a mean of years of schooling equal to 15 (SD = 2.71). Participants were required to meet the following criteria: (a) be engaged in a romantic relationship, (b) not have received a diagnosis of a psychiatric/neurological illness, and (c) be in a healthy state. All participants were from Italy and the 26.8% of them declared to be married. All participants were blind to the study hypothesis and were volunteers. The enrolment and completion of the online survey occurred between February and September 2023. This research complied with the tenets of the Declaration of Helsinki. The study was approved by the ethical committee of the Scuola di Specializzazione in Psicoterapia Cognitiva (SPC), Rome, Italy.

2.2. Materials and Procedure

Participants were recruited through social media, and proxy informants, such as internship students. Each participant was provided with a link to access an online survey hosted on Google Forms®, which encompassed details regarding the study, the consent form, eligibility queries, and sociodemographic information (such as age, gender, and education level). The survey also included questions about the duration of their romantic relationship in months, and further questionnaires (outlined below). Approximately 30 minutes were required for completion of the online survey.

2.2.1. ROCD measures

The Relationship Obsessive-Compulsive Inventory (ROCI; Doron et al., 2012b; Melli et al., 2018b) was employed to assess relationship-centered obsessive-compulsive symptoms. Comprising 14 items, the ROCI assesses three dimensions: a) love for the partner, b) love toward the partner, and c) relationship rightness. Participants were instructed to indicate the extent to which certain thoughts and behaviors characterize their relational experiences (e.g., “I check and recheck whether my relationship feels right”) on a five-point Likert scale, ranging from 0 (“not at all”) to 4 (“very much”). The analysis considered the total score (reliability: $\alpha = 0.830$), with higher scores indicating a greater presence of symptoms.

The Partner Related Obsessive-Compulsive Symptom Inventory (PROCSI; Doron et al., 2012a; Melli et al., 2018b) was employed to assess partner-focused obsessive-compulsive symptoms. Comprising 28 items, the PROCSI assesses obsessive doubts related to various partner characteristics, including morality, social skills, emotional stability, competence, physical appearance, and intelligence. Participants were requested to indicate the extent to which certain thoughts and behaviors characterize their relational experiences (i.e., “I am constantly bothered by doubts about my partner's morality level”) on a five-point Likert scale, ranging from 0 (“not at all”) to 4 (“very much”). The total score (reliability: $\alpha = 0.884$) was considered in the analysis, with higher scores reflecting higher presence of symptoms.

2.2.2. Personality Traits

The Italian version of the 10-item Big-Five Inventory (10-BFI; Guido et al., 2015) was administered to assess personality traits (i.e., Extraversion, Agreeableness, Openness, Conscientiousness, Emotionality). Participants were required to express their agreement with each of the 10 descriptions of their personality (e.g., “I see myself as someone who gets easily agitated”) on a Likert scale ranging from 1 (“not at all”) to 5 (“completely agree”). For each personality trait, two items were used, one of which was a reverse scored item. The instrument showed acceptable to good reliability in each scale (α : Extraversion = 0.955; Agreeableness = 0.601; Openness = 0.603; Conscientiousness: 0.620; Emotionality = 0.682).

2.2.3. Moral orientation of guilt

The Moral Orientation Guilt Scale (MOGS; A. Mancini et al., 2022) was employed to assess the moral orientation of guilt (i.e., deontological or altruistic). The MOGS comprises 17 items and investigates four dimensions, two associated with deontological guilt apprehension, specifically a) Moral Norm Violation

(MNV); b) Moral Dirtiness (MD), and two pertaining to the domain of altruistic guilt apprehension, specifically, c) Empathy, and d) Harm. Participants were instructed to evaluate the extent to which they feel described by the provided statements (e.g., “*When I feel guilty, I feel dirty inside*”) on a five-point scale ranging from 1 (“not at all”) to 5 (“very much”). The instrument showed acceptable to good reliability in each scale (α : MNV = 0.802; MD = 0.639; Empathy = 0.801; Harm = 0.693).

2.3. Statistical Analysis

Descriptive statistics were calculated, and preliminary analyses were performed on all the considered measures. Mean differences t-tests were performed to evaluate differences between gender groups in these measures. To test the hypotheses of the present study we first performed a couple of multiple linear regression models by considering the relationship length, personality traits (i.e., Extraversion, Agreeableness, Openness, Conscientiousness, Emotionality), and each of the factors of moral orientation (MNV; MD; Empathy and Harm) as independent variables and ROCD symptomatology as dependent variables (i.e., RC-ROCD and PF-ROCD), controlling for sociodemographic variables as covariates. Then, a couple of mediation models were tested by considering the significant personality traits identified in the previous analysis as predictors, the significant moral orientation factors identified in the previous analysis as mediators, and the measures of ROCD (i.e., RC-ROCD and PF-ROCD) as dependent variables. Linear regression models were performed prior to path models in order to verify theoretical assumptions of statistical mediation analysis (Baron & Kenny, 1986; Gallucci & Leone, 2012). The determination index R^2 was considered as a marker of model fit. The 95% CI was used to evaluate the significance of overall and separated indirect effects. The value of p was set to 0.05 for the calculation of statistical significance. The effect size of Cohen’s f^2 was estimated for each mediation model (Selya et al., 2012). Statistical analyses were performed with Jamovi software (Version 1.0.7.0; The Jamovi Project, 2019) and by using the software R, lavaan package (Rosseel, 2011).

3. Results

3.1. Descriptive Statistics and preliminary analyses

Some variables’ distribution significantly deviated from normality (Shapiro–Wilks’s $p < .05$). Anyway, no values of asymmetry and kurtosis exceeded critical thresholds (West et al., 1995). Consequently, all variables were considered in the statistical analyses. The 22% of participant in the sample scored above cutoff score on the ROCI (i.e., >21) while the 34% scored above the cut-off score on the PROCSI (i.e., >21 ; Melli et al., 2018b). The correlation matrix between all the variables as well as descriptive statistics separated for gender groups are shown in **table 1**. The relationship length was significantly and negatively correlated with Harm ($r = -.12$; $p < .01$), and with the ROCI score ($r = -.14$; $p < .001$). Significant correlations emerged between the ROCI score and participants’ age ($r = -.13$; $p < .001$). The relationship length was also positively associated with MNV ($r = .135$; $p < .01$), Empathy ($r = .09$; $p < .05$),

Agreeableness ($r = .11$; $p < .01$), Conscientiousness ($r = .16$; $p < .001$), and Emotionality ($r = .09$; $p < .05$). Moral dirtiness (MD) was associated negatively with Conscientiousness ($r = -.10$; $p < .01$), and Emotionality ($r = -.25$; $p < .001$), while positively with both ROCD measures (i.e., ROCI: $r = .24$; $p < .001$; PROCSI: $r = .23$; $p < .001$). No correlation coefficients among predictors exceeded .7, indicating the absence of multicollinearity. Moreover, indices of common regression diagnostics (variance inflation factor and tolerance) indicated the absence of problems of multicollinearity since no variance inflation factor value exceeding 4.0, as well as no value of tolerance less than 0.2, emerged (Hair et al., 2009). Lastly, differences between gender groups emerged for years of age, $t(657) = -2.42$, $p < .05$, and emotionality, $t(657) = -5.77$, $p < .001$, higher for males, as well as in Empathy, $t(657) = 3.95$, $p < .01$; and Harm, $t(657) = 3.07$, $p < .01$, higher for females. **Table 2** shows the results of independent t-tests.

3.2. Linear regressions

3.2.1. RC-ROCD

The first regression model (**table 3**) was performed by considering the sociodemographic variables (i.e., age, sex, education, relationship length), measures of moral orientation (i.e., MNV, MD, Empathy, Harm), and personality traits (i.e., E, A, O, C, EM) as predictors of RC-ROCD symptoms (i.e., ROCI), which instead was entered in the model as outcome. Overall, the set of predictors explained the 14% of the outcome’s variance. Significant results emerged for the negative effects of relationship length ($\beta = -.01$; $p < .05$), Agreeableness ($\beta = -.65$; $p < .01$), Emotionality ($\beta = -.69$; $p < .001$), and for the positive effect of Moral Dirtiness ($\beta = .80$; $p < .001$). It was observed that the greater the relationship length, and the higher the scores in Agreeableness and Emotionality the less severe the reported symptomatology. Conversely, the higher the reported feelings of moral dirtiness the greater the severity of RC-ROCD symptoms.

3.2.2. PF-ROCD

The second regression model (**table 4**) was performed by considering the same set of predictors of the prior model and the PF-ROCD symptoms (i.e., PROCSI) as outcome. Globally, the set of predictors explained the 15% of the outcome’s variance. Significant results emerged for the negative effects of Agreeableness ($\beta = -2.1$; $p < .001$), and for the positive effect of Education ($\beta = .46$; $p < .05$), and Moral Dirtiness ($\beta = 1.20$; $p < .001$). It was observed that the greater the higher the scores in Agreeableness the less severe the reported symptomatology. Conversely, the higher the years of education and the reported feelings of moral dirtiness the greater the severity of PF-ROCD symptoms.

3.3. Mediation models

Two mediation models (**figure 1a** and **1b**) have been performed by testing the mediation effect of Moral dirtiness on the relationship between significant personality traits and both types of ROCD symptomatology. In both models, the effects of respective significant covariates have been controlled in the analysis.

Table 1. Means, Standard Deviations, and Correlations Between Variables

	Age	Sex	Edu	Time	MNV	MD	EMPHATY	HARM	E	O	A	C	EM	ROCI	Mean	SD
Age	—														32.1	12.0
Sex	0.09 *	—														
Education	-0.07	-0.06	—												15.0	2.71
Time	0.76 ***	0.02	-0.09 *	—											102	128
MNV	0.11 **	-0.06	-0.07	0.14 ***	—										19.5	5.08
MD	-0.07	-0.04	-0.17 ***	-0.02	0.46 ***	—									7.95	2.94
EMPHATY	0.08	-0.15 ***	-0.10 **	0.09 *	0.47 ***	0.48 ***	—								16.1	4.46
HARM	-0.16 ***	-0.12 **	-0.04	-0.12 **	0.43 ***	0.43 ***	0.60 ***	—							12.5	2.40
E	0.01	0.03	0.02	-0.02	-0.03	0.03	-0.15 ***	-0.07	—						6.03	1.84
O	0.00	0.01	0.08 *	0.00	-0.10 *	0.04	0.08 *	0.04	0.01	—					7.02	1.97
A	0.09 *	0.03	0.00	0.11 **	0.06	-0.05	0.09 *	0.11 **	-0.03	0.05	—				6.59	1.72
C	0.21 ***	0.02	0.10 *	0.16 ***	0.22 ***	-0.10 **	-0.07	0.00	0.13 **	-0.07	0.12 **	—			7.23	1.70
EM	0.16 ***	0.22 ***	0.06	0.09 *	-0.12 **	-0.25 ***	-0.16 ***	-0.14 ***	0.14 ***	-0.09 *	0.27 ***	0.17 ***	—		5.16	2.11
ROCI	-0.13 ***	-0.07	0.04	-0.14 ***	0.06	0.24 ***	0.08 *	0.11 **	-0.04	0.00	-0.19 ***	-0.14 ***	-0.25 ***	—	13.6	10.3
PROCSI	-0.01	-0.03	0.04	-0.02	0.09 *	0.23 ***	0.07	0.01	-0.01	0.01	-0.29 ***	-0.09 *	-0.20 ***	0.67 ***	15.8	15.1

Note. MNV = Moral Norm Violation; MD = Moral Dirtiness; A = Agreeableness; E = Extraversion; O = Openness; C = Conscientiousness; EM = Emotional Stability; RC-ROCD = relationship-centered relationship obsessive compulsive disorder; PF-ROCD = partner-focused relationship obsessive-compulsive disorder

Table 2. Independent t-tests (Welch's t) between gender groups and descriptive statistics for all the considered variables

	Welch's t	df	Female (N=515)		Male (N=144)	
			Mean	SD	Mean	SD
Age	-2.208	204	31.5	11.5	34.2	13.5
Education	1.491	211	15.1	2.63	14.7	2.96
Time	-0.378	206	101	126	106	137
MNV	1.682	247	19.6	5.17	18.9	4.72
MD	1.105	247	8.01	2.99	7.72	2.74
EMPHATY	4.161	247	16.4	4.49	14.8	4.10
HARM	3.051	227	12.6	2.38	12.0	2.41
E	-0.718	230	6.01	1.85	6.13	1.83
O	-0.387	266	7.00	2.04	7.07	1.72
A	-0.771	245	6.56	1.75	6.68	1.61
C	-0.548	226	7.21	1.70	7.30	1.73
EM	-6.011	243	4.91	2.09	6.03	1.95
ROCI	2.083	263	14.0	10.6	12.1	9.04
PROCSI	1.012	290	16.0	15.9	14.8	12.3

Table 3. Linear regression results: standardized estimates, standard errors, Z scores, F value, p value, and R squared (explained variance) for RC-ROCD (ROCI)

	β	SE	t	p	F	R2
Age	0.04691	0.05012	0.936	0.350	7.897	.139
Sex	-0.72177	0.95894	-0.753	0.452		
Education	0.24881	0.14409	1.727	0.085		
Time	-0.00961	0.00458	-2.100	0.036		
MNV	-0.03596	0.09616	-0.374	0.709		
MD	0.79659	0.16443	4.845	< .001		
EMPHATY	-0.10321	0.11873	-0.869	0.385		
HARM	0.19494	0.21243	0.918	0.359		
E	-0.13140	0.21174	-0.621	0.535		
O	-0.16893	0.19642	-0.860	0.390		
A	-0.65236	0.23357	-2.793	0.005		
C	-0.45348	0.24397	-1.859	0.064		
EM	-0.68532	0.20172	-3.397	< .001		

Table 4. Linear regression results: standardized estimates, standard errors, Z scores, F value, p value, and R squared (explained variance) for PF-ROCD (PROCSI)

	β	SE	t	p	F	R2
Age	0.07078	0.07388	0.9580	0.338	8.645	.150
Sex	-0.24485	141.344	-0.1732	0.863		
Education	0.46351	0.21238	21.824	0.029		
Time	-0.00267	0.00675	-0.3959	0.692		
MNV	0.12292	0.14173	0.8673	0.386		
MD	120.710	0.24236	49.806	< .001		
EMPHATY	-0.00950	0.17500	-0.0543	0.957		
HARM	-0.51398	0.31311	-16.415	0.101		
E	-0.09746	0.31210	-0.3123	0.755		
O	-0.01968	0.28951	-0.0680	0.946		
A	-211.658	0.34428	-61.479	< .001		
C	-0.44518	0.35960	-12.380	0.216		
EM	-0.56479	0.29733	-18.996	0.058		

3.3.1. RC-ROCD

The first mediation model (**figure 2a**) was performed considering Agreeableness and Emotionality as predictors, the moral dirtiness as mediator, and the RC-ROCD symptomatology as outcome. The relationship length was controlled as a covariate in this model. The predictors explained 13% of the variance in ROCI scores. **Table 5** shows significant and non-significant effects on each outcome while **table 6** shows direct, indirect, and total effects of predictors on ROCI for estimated paths. Significant results were found for the direct effects of Agreeableness ($\beta = -.68$; $p < .01$), Emotionality ($\beta = -.73$; $p < .001$), and relationship length ($\beta = -.01$; $p < .01$). Significant results emerged also for the indirect and total effects of moral dirtiness in the relationship between emotionality and ROCI (indirect: $\beta = -.271$; $p < .001$; total: $\beta = -1.00$; $p < .001$). The total effects of the indirect mediated paths of Agreeableness and relationship length were also significant (A: $\beta = -.68$; $p < .01$; relationship length: $\beta = -.001$; $p < .01$), but

not their respective indirect effects through MODI (A: $\beta = .001$; $p = .98$; relationship length: $\beta = .001$; $p = .80$). The model showed adequate fit indices (AIC = 8014,582; BIC = 8054,903) and a medium effect size (Cohen's $f^2 = .15$).

3.3.4. PF-ROCD

The second mediation model (**figure 2b**) was performed considering Agreeableness as predictor, the moral dirtiness as mediator, and the PF-ROCD symptomatology as outcome. The years of education was controlled as a covariate in this model. The predictors explained 14% of the variance in PROCSI scores. **Table 7** shows significant and non-significant effects on each outcome while **table 8** shows direct, indirect, and total effects of predictors on PROCSI for estimated paths. Significant results were found for the direct effects of both Agreeableness ($\beta = -2.42$; $p < .001$) education ($\beta = .44$; $p < .05$). Significant results emerged also for the indirect effects of moral dirtiness

Figure 1. Graphical representations of the two mediation models tested. (a) RC-ROCD. (b) PF-ROCD

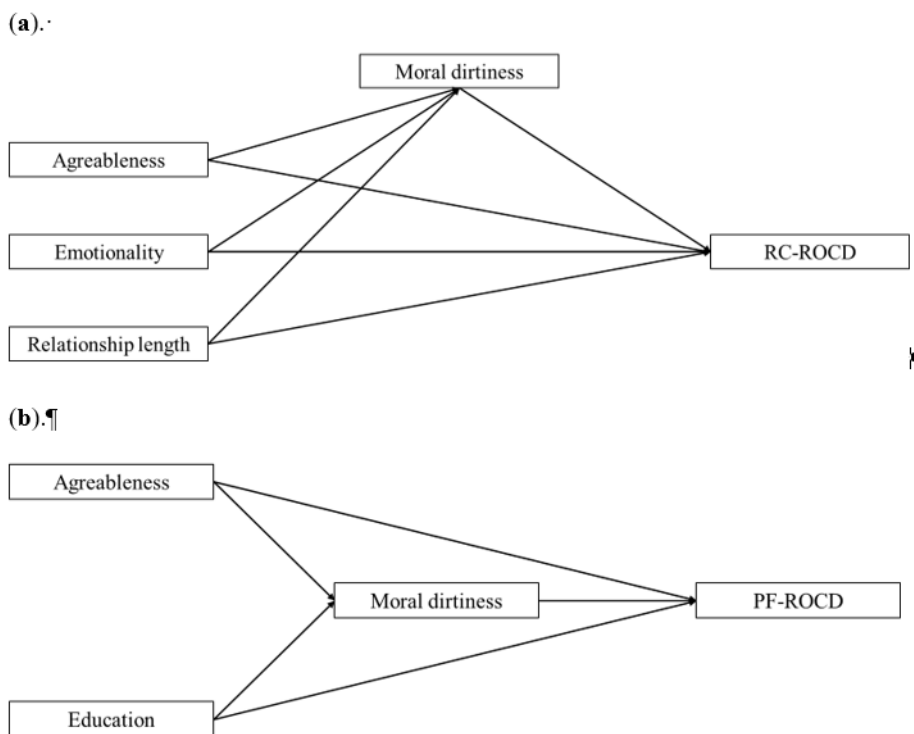


Figure 2. Graphical representations of the two mediation models tested. (a) RC-ROCD. (b) PF-ROCD. Coefficients are reported for each regression path. * indicates $p < 0.05$. ** indicates $p < 0.01$. *** indicates $p < 0.001$. Significant paths ($p < 0.05$) are bolded

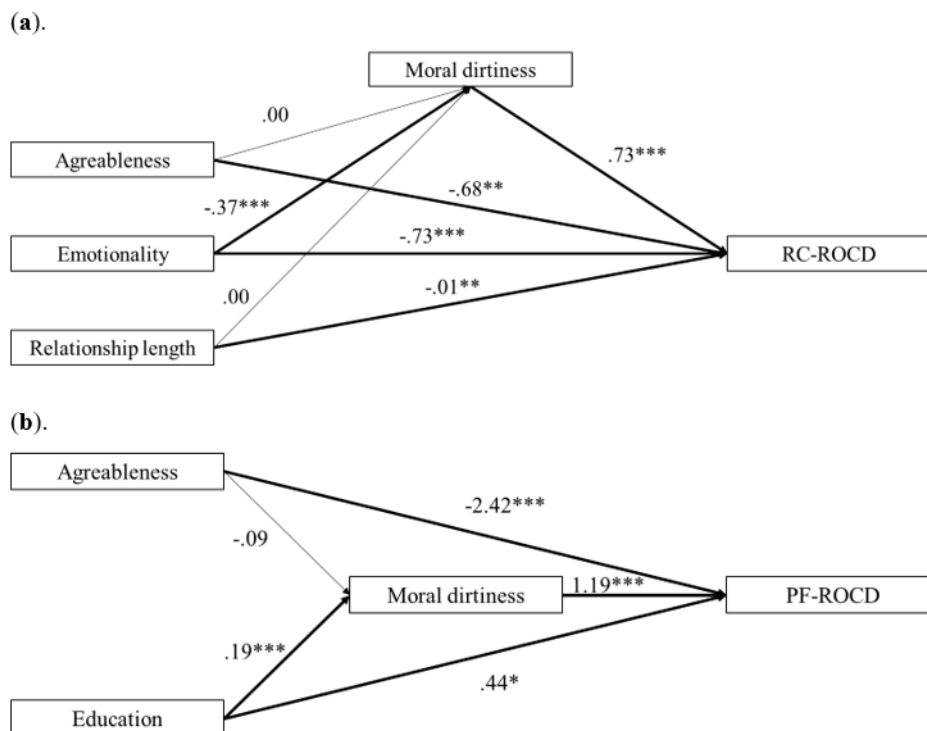


Table 5. Path analysis results: standardized estimates, standard errors, Z scores, p value, and R squared (explained variance) for the outcome (ROCI) and the mediation variable (MODI). 95% Confidence Intervals (C.I.) are also reported

Effect	β	SE	95% C.I.		t	p	R2
			Lower	Upper			
<i>On MODI</i>							
Time	.00	.001	-0.00149	0.00191	.244	.807	.071
A	.001	.067	-0.12998	0.13288	.022	.983	
EM	-.371	.054	-0.47775	-0.26483	-6.836	<.001	
<i>On ROCI</i>							
Time	-.009	.003	-0.01437	-0.00285	-2.930	<.01	.126
A	-.679	.227	-112.345	-0.23371	-2.990	<.01	
EM	-.727	.190	-109.996	-0.35388	-3.819	<.001	
MODI	.730	.133	0.47046	0.99010	5.509	<.001	

Table 6. Direct, indirect, and total effects of Agreeableness, Emotional Stability, and relationship length on RC-ROCD (ROCI). 95% Confidence Intervals (C.I.) are also reported. * indicates $p < 0.05$. ** indicates $p < 0.01$

Effect	Direct Effect	95% C.I.		Indirect effect MODI	95% C.I.		Total effect MODI	95% C.I.	
		Lower	Upper		Lower	Upper		Lower	Upper
A	-.68**	-112.345	-0.23371	0.001	-0.09492	0.09704	-.68**	-113.298	-0.22206
EM	-.73***	-0.35388	-0.15022	-.271***	-0.39504	-0.14725	-1.00***	-136.699	-0.62914
Time	-.01*	-0.00285	-0.10814	0.00	-0.00109	0.00140	-.001**	-0.01435	-0.00256

Table 7. Path analysis results: standardized estimates, standard errors, Z scores, p value, and R squared (explained variance) for the outcome (PROCSI) and the mediation variable (MODI). 95% Confidence Intervals (C.I.) are also reported

Effect	β	SE	95% C.I.		t	p	R2
			Lower	Upper			
<i>On MODI</i>							
Education	-.187	.042	-0.2688	-0.1059	-4.508	<.001	.032
A	-.09	.066	-0.2144	0.0424	-1.312	.189	
<i>On PROCSI</i>							
Education	.44*	.205	0.0359	0.8414	2.135	.033	.136
A	-2.42	.319	-30.503	-17.982	-7.590	<.001	
MODI	1.196	.190	0.8244	15.679	6.306	<.001	

Table 8. Direct, indirect, and total effects of Agreeableness, and education on PF-ROCD (PROCSI). 95% Confidence Intervals (C.I.) are also reported. * indicates $p < 0.05$. ** indicates $p < 0.01$

Effect	Direct Effect	95% C.I.		Indirect effect MODI	95% C.I.		Total effect MODI	95% C.I.	
		Lower	Upper		Lower	Upper		Lower	Upper
A	-2.42***	-30.503	-17.982	-.103	-0.2597	0.0540	-2.53***	-31.714	-18.828
Education	.44*	-0.1943	0.6233	-.224***	-0.3439	-0.1043	.215	-0.1943	0.6233

in the relationship between education and PROCSI ($\beta = -.224$; $p < .001$) but not for the total effect ($\beta = .215$; $p = .30$). Conversely, significant results emerged for the total effects of the indirect path between Agreeableness and PROCSI ($\beta = -2.53$; $p < .001$) but not for the indirect effect ($\beta = -.103$; $p = .19$). The model showed adequate fit indices (AIC = 8637,866; BIC = 8669,301) and a medium effect size (Cohen's $f^2 = .16$).

4. Discussion

The present study aimed to investigate the relationships between sociodemographic variables, the Big-5 personality traits, ROCD symptoms (both RC-ROCD and PF-ROCD), and the specific type of moral orientation of guilt feelings (i.e., altruistic vs. deontological), in a non-clinical sample of participants.

The study also aimed to test the mediation role of guilt feeling in the relationship between personality traits and the ROCD symptoms' severity.

Preliminary results showed that, out of the total sample, the 26.8% of participants were married, the 22% and 34% scored higher the cut-off on ROCI and PROCSI, respectively. The last evidence suggests a consistent presence of romantic ROCD symptoms among non-clinical populations already found in previous study (Melli et al., 2018; Gorelik et al., 2023). Moreover, differences emerged between gender groups in terms of emotional stability, higher in males, as well as in empathy and harm which were higher in females. These differences confirm previous findings indicating that females appear more emotionally expressive and emotionally instable than males (Rodríguez-Ramos et al., 2021), which instead seem to spend less effort in cognitive regulation due to a greater use of automatic emotion regulation (McRae et al., 2008) or emotional suppression (Tinella et al., 2021). Moreover, these results are in line with those of other studies showing that females tend to score higher than males in empathy measures (Schutte et al., 1998; Fischer et al., 2018). Gender differences in empathy have been previously explained with reference to motivation than to ability (Klein & Hodges, 2001). It has been argued that females may be more intrinsically motivated to be empathic and, for this reason, they show higher scores in test and questionnaires than males.

Significant links emerged between the set of predictors entered in the two regression models and measures of both ROCD manifestations. These effects were associated to relatively small coefficients of determination likely influenced by the *regression dilution* (Smith & Phillips, 1996) due to differences in reliability between independent variables. This also indicate that different non-explored factors characterize ROCD, suggesting that further research are needed to explore determinants affecting symptoms.

The linear regression model performed on RC-ROCD symptoms showed significant results for the negative associations with relationship length, Agreeableness, and Emotionality, and positive links with moral dirtiness' feelings. Although marginal, the negative effect of relationship length seems to suggest that longer relationship duration are associated with somewhat less severe RC-ROCD symptoms. These results are consistent with our previous findings (Tinella et al., 2023) as well as findings from other studies (Kılıç & Altınok, 2021; Szepsenwol et al., 2016) suggesting that shared dyadic experiences may produce desirable effects through the reduction of ROCD symptoms.

The negative effects of Agreeableness and Emotionality represents a novelty. To the best of our knowledge, this is the first study examining the effects of normal personality traits on ROCD symptoms. These results highlight that both agreeable and emotional stable individuals may be less exposed to experience relationship-centred doubts and preoccupations. More agreeable individuals tend to be pleasant and friendly with other; they also tend to be compassionate and cooperative rather than suspicious and antagonistic (Costa & McCrae, 1992). Individuals with emotional stability, on the other hand, tend to be calm, composed, and stress resistant; they can remain stable during stressful periods and tend to not experience many negative feelings (Costa & McCrae, 1992). Given this, it is likely that more agreeable and more emotional stable individuals are less exposed to experience doubts on their feelings towards the partner, on the partner's feelings, and on the relationship's rightness. Overall,

results indicate that these two personality traits might play as protective factors against the genesis of RC-ROCD. Further research is needed to clarify this point.

Considering the regression model performed on PF-ROCD, significant negative associations were found with Agreeableness. Positive associations were found with both education and moral dirtiness. As in the previous case, the higher the score obtained in Agreeableness, the less severe the reported PF-ROCD symptomatology. Conversely, the higher the level of education, the more severe the reported PF-ROCD symptomatology. Agreeableness seems to play a protective role also in the genesis of doubts and preoccupations focused on the partner's perceived flaws (PF-ROCD). It is likely that more agreeable individuals tend to experience less preoccupations on the partner's flaws due to their tendency to be more cooperative and friendly, even approaching the relationship's partner. It is also likely that they might be more able to share preoccupations with the partner when occurring promoting more functional patterns of communications (Tinella et al., 2023). Considering the positive effects of education, the result suggests that the higher the level of education the more severe the reported symptomatology. The result might seem counterintuitive at a first glance since education have been shown positively associated with mental health (Pérez-Vigil et al., 2018; Belo et al., 2020). Despite this, such a relationship seems to be anything but obvious when considering the population of individuals with obsessive-compulsive symptoms. It has been found that OCD is associated with pervasive educational outcomes underachievement (Pérez-Vigil et al., 2018). Other influences of education may seem ambiguous (Dahmann & Schnitzlein, 2019) and include negative effects on mental health (Damaske et al., 2016). Higher education allows the access to prestigious occupations where work pace and work-related stress may be harmful (Eibich, 2015). Otherwise, high education together with contextual factors (such job scarcity) may result in generating psychological diseases (Bracke et al., 2013). Emerging adulthood is characterized by pervasive modifications in identity and relationships (Germani et al., 2020), which impacts on subjective well-being. These changes characterize different life domains like residence, love, and work (Luyckx et al., 2014). Given that the sample of the present study was mainly composed by young and young adults' participants, most of them undergraduate university students, it is likely that contextual factors associated with their education level (i.e., uncertainty on academic achievements, fear for exams, etc.) contributed to positively affect PF-ROCD symptoms.

The positive relationship with moral dirtiness were found in both ROCD manifestations. This is the first study examining the role of moral orientation of guilt feelings in affecting ROCD. We found that the higher the feelings of moral dirtiness, the more severe the reported ROCD symptomatology. First, this finding supports the evidence that deontological guilt plays a crucial role in the genesis and the maintenance of obsessive-compulsive and related disorders (Basile et al., 2014; Mancini & Gangemi, 2015). Furthermore, this result is in line with findings from a previous study which highlighted the role of fear of guilt as a cognitive determinant of both ROCD manifestations (Tinella et al., 2023). It has been argued that ROCD patients may experience fear to be potentially guilty of (a) being in the wrong relationship (i.e., RC-ROCD), and (b) deceiving the relationship's partner (PF-ROCD).

The results presented here describe more specifically

the channels by which the fear of guilt exerts an influence on ROCD. Deontological moral inclinations seem to promote a sense of moral dirtiness when experience doubts and worries centred on the romantic relationship itself or focused on the relationship's partners. It is likely that this deontological moral orientation leads ROCD patients to feel under a Damocles's sword: on one hand, they would be guilty towards themselves by staying in a relationship where they are doubtful about the rightness of the relationship or about the qualities of the partner; on the other hand, they would be guilty to their partners by leaving them and causing them to suffer. Both these channels prelude the violation of deontological moral norms related to not promoting one's own or others' suffering (Mancini, 2016).

This study also aimed to test the hypothesis that guilt feelings mediate the effects of personality on ROCD. Considering the model performed on RC-ROCD measure, results showed that moral dirtiness, as a facet of deontological moral inclination, significantly mediated the effects of emotional stability on symptoms' severity. These results showed that emotional stability negatively influenced moral dirtiness which in turn showed a positive effect on the severity of RC-ROCD symptoms. Given the significant and negative association between emotional stability and RC-ROCD emerged in the model, this result suggests that moral dirtiness may act by dampening the desirable effects of emotional stability on symptomatology. In other words, moral dirtiness would regulate the relationship between the personality trait and the symptoms by modifying it and thus determining the symptoms exacerbation.

Considering the mediation model performed on PF-ROCD symptoms, no significant mediation effect emerged. Despite the indirect effect of education through moral dirtiness on the outcome, the total effect showed to be non-significant. Overall, mediation models showed that feelings of moral dirtiness can explain the occurrence of RC-ROCD symptoms in non-clinical individuals by intervening to modify the influence of personality and contributing to regulate their severity. These findings may represent a source for defining therapeutic intervention strategies for ROCD, which could benefit from the treatment of goals and beliefs connected to the fear of guilt (Tinella et al., 2023) as well as that of mental representations on the consequences of deontological norm violation (Johnson-Laird et al., 2006; Basile et al. 2014; Mancini, 2016).

5. Conclusion

The present study sheds light on the role of personality traits and mental state (i.e., fear of guilt) in the development of ROCD. Overall, the main results confirm the significant contribution of specific personality traits, (i.e., Agreeableness and Emotionality), to the manifestation of ROCD symptoms. Additionally, the findings underscore the role of moral dirtiness in ROCD, implying that the moral orientation associated with the fear of guilt predominates in the context of ROCD.

This study is not without limitations, and methodological improvements needed to be address in further studies. Firstly, the participant sample recruited for this investigation is a non-clinical convenience sample. Future studies may explore Relationship Obsessive-Compulsive Disorder (R-OCD) by involving clinical samples and comparing different groups, such as participants diagnosed with R-OCD and

OCD, as well as control groups. Secondly, self-report instruments were employed in this study. This could potentially limit the generalizability of the obtained results, especially considering the acceptable values of internal consistency. Subsequent research could further investigate ROCD symptoms using additional clinical tools, such as expert physician diagnoses. Lastly, the cross-sectional study design employed in this study could be enhanced through additional research. For instance, future studies may adopt a longitudinal design to explore both the development of ROCD and its maintenance factors over time.

Despite this, the present study contributes to the knowledge on the ROCD, providing evidence on the differential effect of personality traits and on the role of moral orientation of guilt feelings. Future studies may focus on diverse non-pathological personality traits by studying together mediating roles of different facets of guilt. This evidence may have practical implications for the understanding, identification, and treatment of ROCD (Petrocchi et al., 2021). Specifically, the assessment of personality traits, along with the examination of beliefs related to the fear of guilt (Cosentino et al., 2012), could be crucial aspects of therapeutic intervention for ROCD. Finally, based on these results, digital interventions previously shown effective for ROCD (e.g., "OCD.app"; Giraldo O'Meara & Doron, 2020; Roncero et al., 2019; Cerea et al., 2021) maybe improved by taking into account users' personality profiles of the users involved, as well as focusing on dimensions of guilt and responsibility.

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