



## Research paper

## Metacognitions, rumination, and worry in personality disorder

Marcantonio M. Spada<sup>a,\*</sup>, Ana V. Nikčević<sup>b</sup>, Daniel C. Kolubinski<sup>a</sup>, Alessia Offredi<sup>c</sup>,  
Simona Giuri<sup>c</sup>, Antonella Gemelli<sup>c</sup>, Alessandra Brugnoli<sup>c</sup>, Andrea Ferrari<sup>c</sup>, Gabriele Caselli<sup>a,c,d</sup>

<sup>a</sup> Division of Psychology, School of Applied Sciences, London South Bank University, London, UK

<sup>b</sup> Department of Psychology, School of Law, Social and Behavioural Sciences, Kingston University, London, UK

<sup>c</sup> Studi Cognitivi, Milan, Italy

<sup>d</sup> Sigmund Freud University, Milan, Italy

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## ABSTRACT

Research on metacognitions and repetitive negative thinking in patients with Personality Disorder (PD) is scarce. We aimed to determine if metacognitions and repetitive negative thinking differed between patients with PD and those without PD, and if metacognitions would predict repetitive negative thinking in patients with PD controlling for several variables. A sample of 558 clinical participants were assessed for the presence of a PD diagnosis and completed the following questionnaires: Penn-State Worry Questionnaire, Ruminative Response Scale, Metacognitions Questionnaire 30, Beck Anxiety Inventory and Beck Depression Inventory. Compared to patients without a diagnosis of PD, patients with a PD diagnosis reported higher scores on both rumination and worry (as well as depression and anxiety) and three out of five of the MCQ-30 subscales (positive beliefs about worry, negative beliefs about thoughts concerning uncontrollability and danger, and beliefs about the need to control thoughts). Furthermore, the results of two hierarchical regression analyses in patients with a diagnosis of PD indicated that positive beliefs about worry and negative beliefs about thoughts concerning uncontrollability and danger were independent predictors of worry, and that negative beliefs about thoughts concerning uncontrollability and danger and cognitive self-consciousness were independent predictors of rumination. Metacognitions and repetitive negative thinking may play a role in the severity of psychological distress experienced in PD presentations. The implications of these findings are discussed.

## 1. Introduction

The prevalence estimates of Personality Disorders (PDs) in the general population in the United States and Europe is in the region of 6–13% (Sansone, and Sansone, 2011). There is considerable comorbidity between PDs and a wide range of emotional disorders, particularly for those diagnosed with Borderline Personality Disorder (BPD) and Antisocial Personality Disorders (ASPD) (84.5% and 70.2% respectively met criteria for one or more 12-month Axis I Disorders (Lenzenweger et al., 2007; Goodwin et al., 2005). Importantly, it has been reported that the impairment in functioning resulting from PDs may be largely accounted for by Axis I comorbidity (Lenzenweger et al., 2007).

PDs are known to be difficult to treat and although psychological therapy is the treatment of choice (e.g., Bamelis et al., 2014), drop-out rates are high and can range from 25.6% (Swift, and Greenberg, 2012)

to 40.8% (Gamache et al., 2018). These data highlight the importance of furthering our understanding of therapeutic mechanisms that need addressing in treatment in order to improve engagement and outcomes. One such mechanism that is amenable to therapeutic change and that may account for comorbidity between affective disorders and PDs is repetitive negative thinking.

### 1.1. Repetitive negative thinking (rumination and worry) and its links with PDs

Repetitive negative thinking (RNT) is defined as the “process of thinking attentively, repetitively or frequently about the self and one’s world” (Segerstrom et al., 2003, p.909). This form of maladaptive thinking plays a central role in various models of psychological maladjustment (Watkins (2008). Two types of RNT, worry and rumination,

\* Corresponding author.

E-mail addresses: [spadam@lsbu.ac.uk](mailto:spadam@lsbu.ac.uk) (M.M. Spada), [a.nikcevic@kingston.ac.uk](mailto:a.nikcevic@kingston.ac.uk) (A.V. Nikčević), [kolubid2@lsbu.ac.uk](mailto:kolubid2@lsbu.ac.uk) (D.C. Kolubinski), [a.offredi@studicognitivi.net](mailto:a.offredi@studicognitivi.net) (A. Offredi), [s.giuri@studicognitivi.net](mailto:s.giuri@studicognitivi.net) (S. Giuri), [antonellagemelli1@gmail.com](mailto:antonellagemelli1@gmail.com) (A. Gemelli), [alessandra.brugnoli@gmail.com](mailto:alessandra.brugnoli@gmail.com) (A. Brugnoli), [andrea.ferrari7@gmail.com](mailto:andrea.ferrari7@gmail.com) (A. Ferrari), [g.caselli@milano-sfu.it](mailto:g.caselli@milano-sfu.it) (G. Caselli).

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have been found to be associated with a range of adverse outcomes such as the intensification and maintenance of negative mood, impaired concentration, memory, and problem-solving, and reduced motivation for instrumental behaviour, amongst others (for a review see [Watkins, 2008](#)). Rumination and worry appear to share the same processes but differ in terms of temporal orientation, with worry characterised by future directed thinking and rumination focused on past directed thinking ([Segerstrom et al., 2000](#)). Although worry is considered to be a primary attribute of Generalised Anxiety Disorder ([Segerstrom et al., 2003](#)), whereas rumination is typical of depression ([Nolen-Hoeksema, 2000](#); [Spasojevic, and Alloy, 2001](#)), the two are considered trans-diagnostic pathological processes that increase vulnerability to multiple anxiety and mood disorders. RNT accounts for comorbidity between anxiety and mood disorders; such comorbidity is associated with higher levels of RNT ([McEvoy et al., 2013](#)). Given the high comorbidity of emotional and PDs, it seems plausible that RNT may also be highly prevalent amongst individuals diagnosed with PDs. However, the extant literature on the topic is limited.

Most of the evidence linking RNT and PDs comes from studies using student populations, cross-sectional designs and focuses on features of BPDs. [Titus and DeShong \(2020\)](#) reported that worry and rumination were positively associated with both BPD features as well as suicide risk in university students. Other researchers ([Peters et al., 2017](#)) have reported that symptoms of BPD are positively associated with various types of dysfunctional rumination i.e., depressive brooding, anger rumination, rumination on interpersonal situations, anxious rumination, and stress-reactive rumination, after controlling for general rumination. [Baer and Sauer \(2011\)](#) found that depressive and anger rumination were strongly associated with the severity of borderline features over and above trait-level sadness, anger, and general negative affect.

BPD is a severe disorder characterised by difficulties with affective disturbance and regulation, interpersonal problems, and maladaptive impulsive behaviours ([APA, 2013](#)). According to the Emotional Cascade Model ([Selby et al., 2009](#); [Selby et al., 2008](#)), rumination plays a central role in driving dysregulated behaviour in individuals with BPD. Typically, rumination will be initiated following an emotionally arousing event (e.g., an interpersonal conflict), in a misguided effort to solve problems, understand the causes and meanings and to reduce distress. However, these efforts will backfire and lead to the intensification of distress which in turn will lead to engagement in impulsive behaviour (self-harm or substance abuse) in order to escape or obtain relief from distress ([Peters et al., 2017](#)). In line with this model Selby and colleagues (2009) have established that a composite rumination variable that includes depressive brooding, anger rumination and catastrophising fully mediated relationship between BPD symptoms and dysregulated behaviour such as self-harm and binge eating.

Apart from the limited literature concerning the role of rumination in BPD, we have not been able to identify any other studies where the role of RNT was examined in the context of other PDs. It is plausible to hypothesise that rumination plays a role in other PDs, such as in antisocial PD or narcissistic PD, as it may exacerbate distress which in turn will lead to antisocial behaviour (in those with antisocial PD) or acts of rejection or harm in those with narcissistic PD. Thus, rumination may mediate the relationship between distress and PD symptoms. This remains to be established empirically.

### 1.2. The metacognitive model of psychopathology

Since the early 1990s metacognition has been introduced as a basis for understanding and treating psychological distress ([Wells, and Matthews, 1994; 1996](#)). In the metacognitive model of psychopathology (the Self-Regulatory Executive Function model; S-REF model), Wells and Matthews argue that psychological distress is maintained by maladaptive coping strategies (e.g., rumination and worry, threat monitoring, avoidance, and thought suppression) that cause negative thoughts and emotions to become perseverative. The activation and persistence of

these maladaptive coping strategies is linked to metacognitions (sometimes termed ‘metacognitive beliefs’).

Metacognitions can be broadly separated into positive metacognitions, which are beliefs about the impact of coping strategies on cognition (e.g., “Ruminating will help me make sense of my thoughts”) and negative metacognitions, which are beliefs about the uncontrollability and dangers relating to thinking (e.g., “I cannot control my mind”). Metacognitions and typically assessed using the Metacognitions Questionnaire-30 (MCQ-30; [Wells, and Cartwright-Hatton, 2004](#)). The MCQ-30 assesses the following metacognitions: positive beliefs about worry (reflecting beliefs that RNT is useful); negative beliefs about thoughts concerning uncontrollability and danger (reflecting beliefs that thinking may be uncontrollable and harmful); cognitive confidence (reflecting beliefs in one’s own attention and memory); beliefs about the need to control thoughts (reflecting beliefs about the importance of controlling cognition); and cognitive self-consciousness (reflecting beliefs about the tendency to self-focus attention and monitor thoughts). A very substantial literature base has focused, over the last 20 years, on the role of metacognitions across the spectrum of psychiatric disorders ([Casale, Musicò, and Spada, 2021](#); [Hamonniere, and Varescon, 2018](#); [Palmieri et al., 2021](#); [Spada et al., 2013](#); [Wells, 2013](#)) and, in addition, the structure of the S-REF model has been showcased empirically in anxiety disorders ([Wells, and Carter, 2001](#)), Obsessive Compulsive Disorder ([Myers, and Wells, 2005](#)), Unipolar Depression ([Papageorgiou, and Wells, 2003](#)), and addictive behaviours ([Spada et al., 2015](#); [Caselli et al., 2018](#)). No research, to date, however, has investigated the role of metacognitions in PDs.

### 1.3. Aims of the current study

In the light of current scientific evidence, the first aim of the current study was to determine if metacognitions and RNT differed between patients diagnosed with PD and those without a diagnosis of PD. First, we hypothesised that both metacognitions and RNT would be higher in patients with a diagnosis of PD when compared to patients with emotional disorders but without a diagnosis of PD. Furthermore, we hypothesised that RNT will be positively associated with the severity of PD features, that is the number of PD criteria met. Secondly, we wanted to establish if metacognitions would predict levels of RNT in patients diagnosed with PD controlling for gender, number of PD criteria met, anxiety, and depression. If so, this would indicate the value of targeting both metacognitions and RNT in patients diagnosed with PD.

## 2. Method

### 2.1. Participants

Participants were a consecutive series of 558 patients (270 females; mean age = 37.08 years [SD = 11.40; range 18 to 72 years]) seeking outpatient psychological treatment in two private clinical centres in Modena (Studi Cognitivi and Psicologica). After the clinician administered assessment of PDs (details provided below), 372 (175 females) out of 558 patients, did not meet criteria for PD and 186 (95 females) met criteria for at least one PD (166 patients presenting with one PD diagnosis, 16 presenting with two PD diagnoses, three presenting with three PD diagnoses, and one presenting with four PD diagnoses). A full list of the diagnoses made by type of PD can be found in [Table 1](#). Comorbidities with Axis I disorder are presented in [Table 2](#). Study inclusion criteria were: (1) 18 years of age or above; (2) understanding of spoken and written Italian; (3) informed consent to participate in the study; and (4) completion of the clinician-administered Structured Clinical Interview for DSM-IV Axis II (SCID-II) – from September 2013 to January 2017 - or Structured Clinical Interview for DSM-5 Personality Disorder (SCID-5-PD) – from February 2017 to December 2019.

**Table 1**  
Diagnoses by type of Personality Disorder.

	Number	Percentage
Antisocial	6	3.2
Avoidant	43	22.8
Borderline	50	26.4
Dependent	10	5.3
Histrionic	5	2.7
Narcissistic	10	5.3
Obsessive-Compulsive	34	17.9
Paranoid	26	13.8
Schizoid	2	1.1

**Table 2**  
Comorbidities with Axis I disorder (% on total sample, nr = 558).

	With PD	Without PD	Total
MDD (%)	68 (8.8)	49 (12.2)	117 (21.0)
DYS (%)	8 (1.4)	7 (1.3)	15 (2.7)
PaD (%)	22 (3.9)	29 (5.2)	51 (9.1)
GAD (%)	64 (11.5)	53 (9.5)	117 (21.0)
SAD (%)	20 (3.6)	16 (2.9)	36 (6.5)
SP (%)	5 (0.9)	3 (0.5)	8 (1.4)
HYP (%)	2 (0.4)	4 (0.7)	6 (1.1)
PTSD (%)	6 (1.1)	1 (0.2)	7 (1.3)
OCD (%)	18 (3.2)	24 (4.3)	42 (7.5)

Note: PD = Personality Disorder MDD = Major Depressive Disorder; DYS = Dystimia; PaD = Panic Disorder; GAD = Generalized anxiety disorder; SAD = Social Phobia; SP = Specific Phobia; HYP = Hypochondriasis; PTSD = Post Traumatic Stress Disorder; OCD = Obsessive Compulsive Disorder.

## 2.2. Self-report measures

**Worry.** The Penn-State Worry Questionnaire (PSWQ; Meyer et al., 1990) is a widely-used self-report measure of the intensity and uncontrollability of worry. The PSWQ comprises of 16 items which are rated using a 5-point Likert scale (1 = “Not typical at all of me” and 5 = “Very typical of me”). Items include “As soon as I finish one task, I start to worry about everything else I have to do”. Higher scores indicated higher levels of worry. The PSWQ has demonstrated good reliability and validity across clinical and community samples (Brown, Antony, and Barlow, 1992; van Rijsoort, Emmelkamp, and Vervaeke, 1999).

**Rumination.** The Ruminative Response Scale (RRS; Nolen-Hoeksema and Morrow, 1991) is a widely used self-report measure of the tendency to ruminate in response to depressed mood. The RRS comprises of 22 items which are rated using a 4-point Likert scale (1 = “Almost never” and 4 = “Almost always”). Items include: “Think about how alone you feel” and “Think about how angry you are with yourself”. Higher scores indicate higher levels of rumination. The RRS has demonstrated good reliability and validity across clinical and community samples (Treyner, Gonzalez, and Nolen-Hoeksema, 2003).

**Metacognitions.** The Metacognitions Questionnaire 30 (MCQ-30; Wells, and Cartwright-Hatton, 2004) is widely used self-report measure of generic metacognitions in psychopathology. The MCQ-30 comprises of 30 items which are rated using a 4-point Likert scale (1 = “Do not agree” and 4 = “Agree very much”). Five factors are assessed, which include: (a) positive beliefs about worry; (b) negative beliefs about thoughts concerning and uncontrollability and danger; (c) cognitive confidence; (d) beliefs about the need to control thoughts; and (e) cognitive self-consciousness. Higher scores indicate higher levels of dysfunctional generic metacognitions. The MCQ-30 has demonstrated good reliability and validity across clinical and community samples (Spada, Mohiyeddini, and Wells, 2008; Wells, and Cartwright-Hatton, 2004).

**Anxiety.** The Beck Anxiety Inventory (BAI; Beck, and Steer, 1993) is a widely used 21-item self-report measure assessing the main components of anxiety, such as “Numbness or tingling”, “Feeling hot” and

“Dizzy or lightheaded”. Items are rated on a 4-point Likert scale (0 = “Not at all” and 3 = “Severe”). Higher scores indicate higher levels of anxiety.

**Depression.** The Beck Depression Inventory (BDI; Beck et al., 1961) is a widely used 21-item self-report measure assessing symptoms of depression, which are rated on a 4-point Likert scale (e.g. “I do not feel sad” to “I am so sad or unhappy that I can’t stand it”). Higher scores indicate higher levels of depression.

## 2.3. Procedure

Participants were outpatients who voluntarily sought psychological treatment at the Studi Cognitivi and Psicologica Clinics in Modena, Italy, between September 2013 and December 2019. Ethics approval for the study was granted by the Ethics Committee of Studi Cognitivi. After obtaining informed consent, all participants were enrolled in the study, which included providing demographic details, completing self-report measures, and the diagnostic interview SCID-II or SCID-5-PD (the clinical interview changed due to the DSM-5 publication in 2015). Diagnostic interviews were conducted by five trained psychotherapists with the supervision of two senior clinicians who are both psychiatrists. Self-report measures were completed by participants in a small office on the clinical premises. Following this, SCID-II or SCID-5-PD were administered, with a duration between 40 minutes and 2 hours. Inclusion and exclusion criteria were also verified during the interviews.

## 2.4. Data analysis

Group differences were calculated across all self-report measures between those who had qualified for a diagnosis of a PD and those who did not. To conduct a non-parametric MANOVA, a series of independent Mann-Whitney U tests were performed, which included a Bonferroni adjustment to reduce the chance of a type-I error. Correlation analyses using Spearman’s Rho were conducted in order to test the associations between the variables of interest. A hierarchical regression analysis was also conducted with worry and rumination as outcome variables. All analyses were conducted using SPSS (version 25; IBM Corp, 2017).

## 3. Results

### 3.1. Distribution of data and group differences between patients with a diagnosis of PD and patients without a diagnosis of PD

A series of Shapiro-Wilk normality tests indicated that all variables in the study were non-normally distributed at the  $p < .001$  level. A Chi-Square test determined that there were no gender differences between the groups ( $X^2(1) = .298$ , n.s.). However, a Mann-Whitney U Test demonstrated that there was a significant difference in age between the groups (35.7 [11.4] for the group with a diagnosis of PD and 37.9 [11.4] for the group without a diagnosis of PD).

After applying a Bonferroni adjustment, a series of Independent Samples Mann-Whitney U Tests indicated that statistically significant differences did exist between groups for worry ( $U = 47,227.5$ ,  $Z = 7.039$ ,  $p < .01$ ); rumination ( $U = 48,380$ ,  $Z = 7.684$ ,  $p < .01$ ); depression ( $U = 48,754$ ,  $Z = 7.891$ ,  $p < .01$ ); and anxiety ( $U = 42,122.5$ ,  $Z = 4.195$ ,  $p < .01$ ). There were also significant differences for three of the MCQ-30 subscales: positive beliefs about worry ( $U = 40,821.5$ ,  $Z = 3.481$ ,  $p < .01$ ); negative beliefs about thoughts concerning uncontrollability and danger ( $U = 45,234$ ,  $Z = 5.941$ ,  $p < .01$ ); and beliefs about the need to control thoughts ( $U = 44,930$ ,  $Z = 5.774$ ,  $p < .01$ ). Mean differences on two subscales of the MCQ-30, however, were not statistically significant (cognitive confidence and cognitive self-consciousness). See Table 3 for group means.

**Table 3**

Means and standard deviations for patients with a Personality Disorder diagnosis versus those without a Personality Disorder diagnosis.

Patients with a PD diagnosis			Patients without a PD diagnosis			
	Mean	S.D.	n	Mean	S.D.	n
1. Age*	35.66	11.37	182	37.87	11.36	340
2. PSWQ*	60.18	11.15	186	52.29	12.26	372
3. RRS*	57.41	12.51	186	48.53	12.38	372
4. BAI*	19.02	12.66	186	14.36	11.02	372
5. BDI*	19.73	9.79	186	12.92	8.89	372
6. MCQ-30 (POS)*	12.04	4.22	186	10.70	3.83	372
7. MCQ-30 (NEG)*	16.97	3.88	186	14.78	3.87	372
8. MCQ-30 (CC)	12.67	5.39	186	11.45	5.08	372
9. MCQ-30 (NC)*	13.52	3.96	186	11.50	3.81	372
10. MCQ-30 (CSC)	15.87	3.97	186	15.11	3.79	372

n 182 to 372

Note: PD = Personality Disorder; PSWQ = Penn State Worry Questionnaire; RRS = Rumination Responses Scale; BAI = Beck Anxiety Inventory; BDI = Beck Depression Inventory; MCQ-30 (POS) = Metacognitions Questionnaire-30 – Positive Beliefs about Worry; MCQ-30 (NEG) = Metacognitions Questionnaire-30 – Negative Beliefs about Thoughts Concerning Uncontrollability and Danger; MCQ-30 (CC) = Metacognitions Questionnaire-30 – Cognitive Confidence; MCQ-30 (NC) = Metacognitions Questionnaire-30 – Beliefs about the Need to Control Thoughts; MCQ-30 (CSC) = Metacognitions Questionnaire-30 – Cognitive Self-Consciousness; \* $p < .01$ .

### 3.2. Predictors of rumination and worry in patients with a diagnosis of PD

Table 4 shows the means, standard deviations, and correlations between the variables included in this study. All correlations were conducted using Spearman's Rho, with a particular focus on the variables correlating with worry and rumination. Worry and rumination had a moderate correlation with each other ( $r_s = .46, p < .001$ ). Worry was moderately correlated with anxiety ( $r_s = .38, p < .001$ ) and depression ( $r_s = .36, p < .001$ ) and two subscales of the MCQ-30: negative beliefs about thoughts concerning uncontrollability and danger ( $r_s = .49, p < .001$ ) and beliefs about the need to control thoughts ( $r_s = .33, p < .001$ ). There was a weak correlation between worry and gender ( $r_s = .16, p < .05$ ), the number of PD criteria ( $r_s = .19, p < .05$ ) and two MCQ-30 subscales: positive beliefs about worry ( $r_s = .17, p < .05$ ) and cognitive self-consciousness ( $r_s = .19, p < .01$ ).

There were strong correlations between rumination and depression ( $r_s = .69, p < .001$ ) and negative beliefs about thoughts concerning uncontrollability and danger ( $r_s = .51, p < .001$ ). Rumination was moderately correlated with anxiety ( $r_s = .44, p < .001$ ), and beliefs about the need to control thoughts ( $r_s = .44, p < .001$ ). Lastly, there were weak correlations between rumination and cognitive confidence ( $r_s =$

.23,  $p < .001$ ), cognitive self-consciousness ( $r_s = .25, p < .001$ ) and the number of PD criteria ( $r_s = .16, p < .001$ ).

A four-step hierarchical regression analysis was conducted with the worry as the outcome variable (See Table 5). Gender was entered as the predictor variable on the first step. Anxiety and depression were entered on the second step, followed by the number of PD criteria on the third step. Lastly, four subscales of the MCQ-30 were entered on the fourth step. Each of the first two steps resulted in a significant increase in variance, resulting in a model that accounted for 18.6% of the variance of worry scores. When controlling for levels of depression and anxiety, however, gender and the number of PD criteria were not significant predictors of worry ( $B = 2.105, n.s.$ ;  $B = .349, n.s.$ ). The addition of the four MCQ-30 subscales that correlated with worry on the fourth step did produce a significant increase in the level of variance ( $R^2$  change = .167,  $p < .001$ ). However, only positive beliefs about worry and negative beliefs about thoughts concerning uncontrollability and danger were predictors of worry when controlling for the other variables ( $B = .414, p < .05$  [LL = .084, UL = .743];  $B = 1.270, p < .001$  [LL = .803, UL = 1.737]). None of the other variables retained their significance.

A three-step hierarchical regression was conducted with rumination as the outcome variable (See Table 6). Anxiety and depression were entered on the first step, which accounted for 46.8% of the variance of rumination scores. However, only depression scores were significant predictors of rumination ( $B = .793, p < .001$  [LL = .634, UL = .952]). This was followed by the number of PD criteria on the second step, which did not result in a significant change to the variance ( $R^2$  change = .003,  $n.s.$ ). The four MCQ-30 subscales that correlated with rumination were placed on the third step, which did produce a significant increase in the variance explained ( $R^2$  change = .07,  $p < .001$ ). Depression retained its significance as a predictor of rumination ( $B = .698, p < .001$  [LL = .533, UL = .862]), as did both negative beliefs about thoughts concerning uncontrollability and danger, and cognitive self-consciousness ( $B = .712, p < .01$  [LL = .267, UL = 1.158];  $B = .484, p < .01$  [LL = .117, UL = .852]).

## 4. Discussion

To our knowledge, this is the first study to investigate meta-cognitions and RNT in a sample of patients with the PD diagnoses. Results showed that, compared to patients without a diagnosis of PD, participants with a diagnosis of PD reported higher scores on both rumination and worry (as well as depression and anxiety). RNT was also positively associated with the number of PD criteria met by the patients. These results are in line with the findings from previous studies confirming that presenting with features of BPD, and the severity of BPD,

**Table 4**

Correlations for the sample of patients diagnosed with a Personality Disorder.

	1	2	3	4	5	6	7	8	9	10	11	
1.	Gender											
2.	Age	.00										
3.	PSWQ	.16*	-.05									
4.	RSS	.14	-.14	.46**								
5.	BAI	.19*	-.20*	.38**	.44**							
6.	BDI	.19*	-.10	.36**	.69**	.56**						
7.	MCQ-30 (POS)	-.10	-.03	.17*	.10	-.05	.06					
8.	MCQ-30 (NEG)	.12	-.12	.49**	.51**	.51**	.45**	.12				
9.	MCQ-30 (CC)	.10	.15*	.13	.23**	.19*	.26**	.04	.28**			
10.	MCQ-30 (NC)	.00	-.19*	.33**	.44**	.29**	.41	.17*	.62**	.22**		
11.	MCQ-30 (CSC)	.09	-.23**	.19**	.25**	.17*	.11	.12	.31**	.07	.46**	
12.	Number of PD criteria	.05	.15*	.19*	.16*	.14	.17*	-.13	.19*	.22**	.16*	.04

n 182 to 186; \* $p < .05$ ; \*\* $p < .01$ .

Note: PSWQ = Penn State Worry Questionnaire; RRS = Rumination Responses Scale; BAI = Beck Anxiety Inventory; BDI = Beck Depression Inventory; MCQ-30 (POS) = Metacognitions Questionnaire-30 – Positive Beliefs about Worry; MCQ-30 (NEG) = Metacognitions Questionnaire-30 – Negative Beliefs about Thoughts Concerning Uncontrollability and Danger; MCQ-30 (CC) = Metacognitions Questionnaire-30 – Cognitive Confidence; MCQ-30 (NC) = Metacognitions Questionnaire-30 – Beliefs about the Need to Control Thoughts; MCQ-30 (CSC) = Metacognitions Questionnaire-30 – Cognitive Self-Consciousness. Number of PD criteria = total of PD criteria fully satisfied following the structured clinical interview.



**Table 5**

Four-step hierarchical regression analysis with worry (PSWQ) as the outcome variable (patients diagnosed with a Personality Disorder).

		Coefficients <sup>a</sup>								
		R <sup>2</sup>	Change in R <sup>2</sup>	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model				B	Std. Error	β	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	.032	.032*	58.143	1.153		50.433	.000	55.868	60.417
	Gender			3.994	1.613	.180	2.476	.014	.811	7.177
2	(Constant)	.186	.154**	49.840	1.780		27.995	.000	46.328	53.353
	Gender			2.106	1.522	.095	1.384	.168	-.897	5.108
	BAI			.156	.069	.177	2.255	.025	.019	.292
	BDI			.319	.090	.281	3.567	.000	.143	.496
3	(Constant)	.200	.013	46.520	2.605		17.859	.000	41.381	51.660
	Gender			2.105	1.513	.095	1.391	.166	-.881	5.091
	BAI			.154	.069	.175	2.244	.026	.019	.290
	BDI			.288	.091	.253	3.166	.002	.108	.467
	Number of PD Criteria			.349	.201	.119	1.738	.084	-.047	.745
4	(Constant)	.366	.167**	26.028	4.158		6.260	.000	17.822	34.233
	Gender			2.244	1.400	.101	1.603	.111	-.518	5.007
	BAI			.040	.066	.046	.607	.544	-.090	.171
	BDI			.159	.088	.139	1.797	.074	-.016	.333
	Number of PD Criteria			.313	.184	.107	1.702	.090	-.050	.677
	MCQ-30 (POS)			.414	.167	.157	2.480	.014	.084	.743
	MCQ-30 (NEG)			1.270	.237	.442	5.362	.000	.803	1.737
	MCQ-30 (NC)			-.219	.245	-.078	-.893	.373	-.702	.265
	MCQ-30 (CSC)			.124	.196	.044	.630	.529	-.263	.511

Note: PSWQ = Penn State Worry Questionnaire; BAI = Beck Anxiety Inventory; BDI = Beck Depression Inventory; MCQ-30 (POS) = Metacognitions Questionnaire-30 – Positive Beliefs about Worry; MCQ-30 (NEG) = Metacognitions Questionnaire-30 – Negative Beliefs about Thoughts Concerning Uncontrollability and Danger; MCQ-30 (NC) = Metacognitions Questionnaire-30 – Beliefs about the Need to Control Thoughts; MCQ-30 (CSC) = Metacognitions Questionnaire-30 – Cognitive Self-Consciousness;  $n = 186$ .

\*  $p < .05$ .

\*\*  $p < .001$ .

are associated with higher scores on rumination and worry (e.g., Baer, and Sauer, 2011; Peters et al., 2017; Titus, and DeShong, 2020). However, previous studies have predominantly utilised university student samples and focused exclusively on BPD features. The novelty of our findings thus lies in showcasing the differences in levels of RNT in patients with a diagnosis of PD, taken as a whole, relative to patients with other emotional disorders and without a diagnosis of PD.

Our findings also highlight the importance of metacognitions in differentiating patients with a diagnosis of PD from those without a diagnosis of PD. We found that patients with a diagnosis of PD reported

higher scores on three out of five of the MCQ-30 subscales (positive beliefs about worry, negative beliefs about thoughts concerning uncontrollability and danger, and beliefs about the need to control thoughts). Furthermore, the results of two hierarchical regression analyses in the patients with a diagnosis of PD indicated that controlling for gender, number of PD criteria, anxiety, and depression: (1) positive beliefs about worry and negative beliefs about thoughts concerning uncontrollability and danger were independent predictors of worry; and (2) negative beliefs about thoughts concerning uncontrollability and danger and cognitive self-consciousness were independent predictors of

**Table 6**

Three-step hierarchical regression analysis with rumination (RSS) as the outcome variable (patients diagnosed with a Personality Disorder).

		Coefficients <sup>a</sup>								
Model	R <sup>2</sup>	Change in R <sup>2</sup>	Unstandardized Coefficients	Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B			
							B	Std. Error	$\beta$	
1	(Constant)	.468	.468**	39.699	1.559		25.471			
	BAI			.109	.062	.110	1.751	.082		
	BDI			.793	.080	.621	9.854	.000		
2	(Constant)	.472	.003	37.839	2.333		16.217			
	BAI			.108	.062	.109	1.738	.084		
	BDI			.775	.082	.607	9.440	.000		
	Number of PD Criteria			.195	.183	.059	1.071	.286		
3	(Constant)	.524	.070**	22.152	3.762		5.888			
	BAI			.012	.062	.012	.188	.851		
	BDI			.698	.083	.546	8.365	.000		
	Number of PD Criteria			.090	.175	.027	.511	.610		
	MCQ-30 (NEG)			.712	.226	.221	3.157	.002		
	MCQ-30 (CC)			.073	.129	.032	.568	.570		
	MCQ-30 (NC)			-.034	.230	-.011	-.148	.883		
	MCQ-30 (CSC)			.484	.186	.154	2.599	.010		

Note: RRS = Rumination Responses Scale; BAI = Beck Anxiety Inventory; BDI = Beck Depression Inventory; MCQ-30 (NEG) = Metacognitions Questionnaire-30 – Negative Beliefs about Thoughts Concerning Uncontrollability and Danger; MCQ-30 (CC) = Metacognitions Questionnaire-30 – Cognitive Confidence; MCQ-30 (NC) = Metacognitions Questionnaire-30 – Beliefs about the Need to Control Thoughts; MCQ-30 (CSC) = Metacognitions Questionnaire-30 – Cognitive Self-Consciousness;  $n = 186$ ; \* $p < .05$ ; \*\* $p < .001$ .

rumination.

These findings are consistent with the S-REF model psychopathology (Wells, and Matthews, 1994; 1996) which postulates that metacognitions are associated with the activation and maintenance of maladaptive coping strategies (e.g., rumination and worry) that bring to an escalation of psychological distress. We know from the extant literature that holding positive beliefs about the benefits of worry is linked to the activation of RNT and that the combination of negative beliefs about thoughts concerning uncontrollability and danger and beliefs about the need to control thoughts leads to cycles of greater accessibility of threat concepts in processing and an escalation of negative affect across psychological disorders (e.g., Wells, 2000; Spada et al., 2015). For example, several researchers investigating the link between rumination, metacognitions, and depression (Papageorgiou, and Wells, 2003; Faissner et al., 2018) have described the importance of both these metacognitions in the pathogenesis of unipolar depression, highlighting its connection to the activation and maintenance of rumination. Since depressive symptoms are a part of the clinical picture in PD (APA, 2013), rumination, negative beliefs about thoughts concerning uncontrollability and danger and beliefs about the need to control thoughts could emerge as a clinical expression of negative affect in this condition.

Taken together, our findings show, for the first time, that patients with a diagnosis of PD report higher levels of metacognitions and RNT compared to patients with emotional disorders but without a diagnosis of PD. If this finding were to be replicated, it could open-up new prospects in the psychotherapeutic treatment of patients with a diagnosis of PD through targeting metacognitions and RNT. This could be achieved by through Metacognitive Therapy (MCT; Wells, 2009). MCT has already been developed and applied to, with significant success, the treatment of a wide range of psychological disorders (see Wells, 2013 and Normann, and Morina, 2018 for a review). MCT techniques, such as the restructuring of metacognitions, the postponement of RNT, attention training and detached mindfulness may be of benefit when targeting the rumination-depression and worry-anxiety axes in PD.

Results of this study must be considered with regards to its limitations. Firstly, a cross-sectional design was adopted, and this precludes the drawing of conclusions as to whether or not metacognitions play a causal role in predicting RNT in PD. Secondly, social desirability, self-report biases, context effects, and poor recall may have contributed to errors in self-report measurements. Thirdly, though results showed that, compared to patients without a diagnosis of PD, participants with a diagnosis of PD reported higher scores on both rumination and worry (as well as depression and anxiety) it is possible that this difference may be due to the comorbidity of PD with anxiety disorders and depression, which has not been considered in this study. Fourthly, our findings were limited to data collected from two clinics in the same city, which may limit generalisation. These limitations also suggest some directions for future research. For example, an ideal demonstration of any causal contribution of metacognitions to RNT in PD could involve an experimental or clinical manipulation of metacognitions, rumination and worry, or the employment of a longitudinal research design.

## 5. Conclusions

Our findings show, for the first time, that patients with a diagnosis of PD report higher levels of both metacognitions and RNT compared to patients with emotional disorders but without a diagnosis of PD, and that metacognitions predict both rumination and worry in patients with a diagnosis of PD beyond negative affect and PD criteria. If this finding were to be replicated, it could open-up new prospects in the psychotherapeutic treatment of PD patients including the potential use of MCT.

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## CRedit authorship contribution statement

**Marcantonio M. Spada:** Conceptualization, Data curation, Writing - original draft, Writing - review & editing. **Ana V. Nikčević:** Conceptualization, Data curation, Writing - original draft, Writing - review & editing. **Daniel C. Kolubinski:** Conceptualization, Data curation, Formal analysis, Writing - original draft, Writing - review & editing. **Alessia Offredi:** Writing - review & editing. **Simona Giuri:** Writing - review & editing. **Antonella Gemelli:** Writing - review & editing. **Alessandra Brugnani:** Writing - review & editing. **Andrea Ferrari:** Writing - review & editing. **Gabriele Caselli:** Conceptualization, Data curation, Writing - original draft.

## Declaration of Competing Interest

The authors declare no conflict of interest. Ethical standards: This study did not involve human and/or animal experimentation.

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