**Difficulties in emotion regulation: The role of repetitive negative thinking and metacognitive beliefs**

Word count (all sections included): 8848

Date of 2nd submission: 06/04/2022

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**Highlights**

* Engagement in worry or rumination may be associated with emotion dysregulation
* Dysfunctional metacognitive beliefs may be associated with emotion dysregulation
* Worry could be a therapeutic target to reduce emotion dysregulation
* Rumination could be a therapeutic target to reduce emotion dysregulation
* Metacognitive beliefs could be a therapeutic target to reduce emotion dysregulation

**Abstract**

**Background:** Using the Self-Regulatory Executive Function model as a basis, this study explored whether, in both general population and clinical samples, metacognitive beliefs and repetitive negative thinking (i.e., rumination and worry) are associated with higher levels of emotion dysregulation.

**Methods:** 395 participants from the general population and 388 outpatients seeking psychological treatment were recruited. Emotion dysregulation, metacognitive beliefs, rumination, worry, anxiety, depression, personality disorders were assessed. ANOVA and Welch’s tests, correlation and path analyses were run.

**Results:** Repetitive negative thinking was found to play a mediating role in the relationship between metacognitive beliefs and emotion dysregulation in both general population and clinical samples. Moreover, metacognitive beliefs were found to be directly associated to emotion dysregulation.

**Limitations:** The cross-sectional design.

**Conclusions:** Emotion dysregulation appears to be associated with the tendency to engage in repetitive negative thinking and metacognitive beliefs.Repetitive negative thinking and metacognitive beliefs could be a suitable therapeutic target to reduce difficulties in emotion regulation.

**Keywords:** Emotion dysregulation; metacognitive beliefs; rumination; worry.

**1. Introduction**

Emotion regulation refers to the processes by which individuals modulate their affective experiences using cognitive, behavioral, interpersonal, and intrapersonal strategies (Gross, 2002; Gross and Thompson, 2007). Comprehensive conceptualizations of emotion regulation encompass multiple facets of the self-regulatory process including: (a) emotional awareness; (b) acceptance of emotions; (c) ability to proceed with goal-directed when experiencing negative emotions; and (d) ability to flexibly apply emotion regulation strategies in order to meet individual goals and situational demands (Gratz and Roemer, 2004). The absence of any or all of these abilities would indicate the presence of difficulties in emotion regulation, i.e., emotion dysregulation (Gratz and Roemer, 2004). Emotion dysregulation has been reported to underlie the etiological and maintenance mechanisms in a wide range of psychological disorders including affective disorders, addictive behaviours, eating disorders, trauma related disorders and personality disorders (Aloi et al., 2021; Bayes et al., 2016; Cisler et al., 2010; Dragan, 2015; Fox et al., 2008; Glenn and Klonsky, 2009; Harris et al., 2018; Harrison et al., 2009; Hofmann et al., 2012; Khosravani et al., 2017; Kring and Sloan, 2010; Kring and Wener, 2004; Powers et al., 2015; Salguero et al., 2019; Trompeter et al., 2021).

Emotion dysregulation is often studied in terms of lack of emotion regulation skills (Andove and Morris, 2014; Gratz and Roemer, 2004; Laddis, 2015; Linehan, 1993), however, this does not explain the mechanisms by which emotion dysregulation occurs and persists (Aldao, 2013). As a result, identifying potential maintenance mechanisms of emotion dysregulation has been recognized as a priority (D’Agostino et al., 2017; Gross, 2002; Gross and Thompson, 2007) in order to allow clinicians to identify "bottlenecks" to be targeted in clinical interventions to reduce emotion regulation difficulties (Gross, 2002; Gross and Thompson, 2007; Ruggiero et al., 2018). It has been generally purported that emotion dysregulation may be associated with the use of specific strategies (e.g., avoidance, rumination, worry, emotion suppression) that hinder the process of emotional regulation (D’Agostino et al., 2017; Gross, 1998; Martino et al., 2018; Parkinson and Totterdell, 1999; Selby et al., 2008; Selby and Joiner, 2009; Thompson, 2019). This perspective is consistent with the Self-Regulatory Executive Function (S-REF) model of psychopathology (Wells, 2011; Wells and Matthews, 1994, 1996), according to which the intensity and persistence of negative emotions may be related to the tendency to engage in maladaptive forms of mental control (i.e., repetitive negative thinking, thought suppression, threat monitoring) (Martino et al., 2018; Selby et al., 2008; Selby and Joiner, 2009), which are activated and maintained by metacognitive beliefs (Wells, 2011; Wells and Matthews, 1994, 1996). Metacognitive beliefs are beliefs about the meaning of cognitive-affective experiences and how they should be controlled (e.g., through rumination or worry; Wells and Matthews, 1994, 1996).

Within the S-REF model, emotion dysregulation can be seen as a consequence of the tendency to engage in maladaptive forms of mental control (Dragan, 2015; Mazloom, 2014; Ottonello et al., 2019; Salguero et al., 2019; Wells, 1995; Wells, 2000). Figure 1 presents the model we aimed to test in both general population and clinical samples (i.e., outpatients seeking psychological treatment). In this model, metacognitive beliefs may be related to repetitive negative thinking which in turn may lead to emotion dysregulation. We also postulate that metacognitive beliefs may be directly associated to emotion dysregulation. A brief review of the literature underpinning the delineation of the hypothesized model is presented below.

1.1. The possible association between repetitive negative thinking and difficulties in emotion regulation

Repetitive negative thinking is a cognitive process characterised by recurrent thoughts and self-focused attention (Segerstrom et al., 2003) that includes worry and rumination as its main constituents (Ehring and Watkins, 2008; Watkins, 2008). Worry is defined as a chain of thoughts and images laden with negative affect and relatively uncontrollable (Borkovec et al., 1983), while rumination is defined as thoughts that repetitively focus attention on negative emotions and symptoms, their causes, meanings, and consequences (Nolen-Hoeksema and Morrow, 1991). Worry is usually focused on problem-solving and is more future-oriented, whereas rumination often consists of themes of loss and typically has a focus on past problems (Olatunji et al., 2013). Although repetitive negative thinking is employed as a strategy for self-regulation and modulating own affective experiences, it may be counterproductive leading to psychological disorder (Kaplan et al., 2018; Mansueto et al., 2021; Palmieri et al., 2021a) and emotion regulation difficulties (Ehring and Ehlers, 2014; Jarukasemthawee and Pisitsungkagarn, 2021; Martino et al., 2018; Salguero et al., 2019; Salters-Pedneault et al., 2006; Yalvac and Gaynor, 2021). The “Extended Process Model of emotion regulation” posits that the emotion regulation system is comprised of a sequence of the following stages: the identification stage (which involves deciding whether to regulate an emotion or not), the selection stage (which determines which strategy are available and appropriate to regulate emotion); the implementation stage (concerned with implementing a particular strategy to regulate emotion); the monitoring stage (which determines if a specific emotion regulation strategy should be stopped, maintained, or adjusted) (Sheppes et al., 2015). Worry and rumination may represent clinical conditions that may hinder the proper implementation and monitoring of emotion regulation strategies (Sheppes et al., 2015). Worry may lead to erroneous analyses of the costs and benefits associated with specific regulatory emotion strategies, hindering the implementation of an adaptive emotion regulation (Sheppes et al., 2015). Rumination may represent an example of failure in ability of stopping a specific emotion regulation strategy, despite the fact that it has operated for a sufficient time without effecting a change in emotion generation (Sheppes et al., 2015). It is plausible that worry and rumination may be maintaining factors of emotional dysregulation (Gaynor and Gordon, 2019; Sheppes et al., 2015). Worry has been found to be positively correlated with emotion dysregulation in general population (Jarukasemthawee and Pisitsungkagarn, 2021; Salguero et al., 2019; Salters-Pedneault et al., 2006). Similarly, a positive association between rumination and emotion dysregulation has been found in general population (Jarukasemthawee and Pisitsungkagarn, 2021; Salguero et al., 2019; Salters-Pedneault et al., 2006; Yalvac and Gaynor, 2021), among road traffic accident survivors (Ehring and Ehlers, 2014) and among patients with diagnosis of borderline personality disorder (Martino et al. 2018). Therefore, it is plausible to assume that an association between repetitive negative thinking and difficulties in emotion regulation may be observed in both general and clinical samples as included in the present study.

* 1. The association between metacognitive beliefs and repetitive negative thinking

Metacognitive beliefs refer to “the information that individuals hold about their own cognition and about coping strategies which impact on it” (Wells and Matthews, 1996). According to the S-REF model (Wells and Matthews, 1994, 1996), metacognitive beliefs activate a combination of maladaptive coping strategies, including repetitive negative thinking, termed the ‘Cognitive Attentional Syndrome’ (CAS; Wells, 2000). Metacognitive beliefs broadly take five different forms: positive metacognitive beliefs about the usefulness of engaging in aspects of the CAS such as repetitive negative thinking (e.g., “Worrying about threats means I can be prepared”; “Rumination can help me to find a solution”); negative metacognitive beliefs about thoughts concerning uncontrollability and danger (e.g., “If I continue to worry I will lose my mind”, “If I continue to ruminate I will lose my mind”); cognitive confidence which refers to beliefs about the effectiveness of one’s cognitive capacities (e.g., ‘‘My memory can mislead me at times’’); beliefs about the need to control thoughts concerning the extent to which a person believes that certain types of thoughts need to be suppressed (e.g., ‘‘I should be in control of my thoughts all of the time”); and cognitive self-consciousness, which refers to beliefs about the tendency to monitor one’s own thoughts and the need to focus attention inwards (e.g., ‘‘I pay close attention to the way my mind works’’) (Wells and Matthews, 1994, 1996).

In both general and clinical populations, metacognitive beliefs have been found to be associated with higher levels of repetitive negative thinking (i.e., worry and rumination) (McEvoy and Mahoney, 2013; Papageorgiou and Wells, 2001; Papageorgiou and Wells, 2009; Sica et al., 2007; Weber and Exner, 2013). Moreover, metacognitive beliefs have been reported to underlie etiological and maintenance mechanisms for a wide range of psychological disorders (Hamonniere and Varescon, 2018; Mansueto et al., 2019; Palmieri et al., 2021b; Spada et al., 2021; Sun et al., 2017). Therefore, it is expected that metacognitive beliefs will be associated with repetitive negative thinking in both general and clinical samples as included in the present study.

1.3. A possible association between metacognitive beliefs and difficulties in emotion regulation

Since metacognitive beliefs fulfill an executive function with regards to cognitive processing, they may play a contributory role in emotional dysregulation (Wells, 2000). Literature has shown that a higher endorsement of metacognitive beliefs is associated with greater difficulties in emotion regulation in the general population (Akbari et al., 2017; Salguero et al., 2019), among problem drinkers and alcohol dependent inpatients (Dragan, 2015; Ottonello et al., 2019), among smokers (Poormahdy et al., 2022) among those reporting an earthquake-related trauma experience (Mazloom et al., 2016) and among adolescents (Laghi et al., 2018). Therefore, it is expected that metacognitive beliefs will be associated with difficulties in emotion regulation in both general and clinical samples as included in the present study.

1.4. Aims of the present studies

The aim of the present studies is to extend our understanding of the underlying mechanisms of emotion dysregulation. Within the S-REF model (Wells, 2011; Wells and Matthews, 1994, 1996), emotion dysregulation can be seen as a consequence of repetitive negative thinking and as reflecting underlying unhelpful metacognitive beliefs (Dragan, 2015; Wells, 2000). However, despite the growing evidence of the role of metacognitive beliefs and related processes, and emotion dysregulation in the context of psychological well-being, as far as we know, these possibilities have been not, hitherto, evaluated. Although the association between positive metacognitive beliefs, negative metacognitive beliefs and emotional dysregulation have been explored (Akbari et al., 2017; Dragan, 2015; Mazloom et al., 2016; Ottonello et al., 2019; Poormahdy et al., 2022; Salguero et al., 2019), the roles of other forms of metacognitive beliefs have received little attention (Laghi et al., 2018). Thus, we propose to test a model where the five metacognitive beliefs facets are associated with repetitive negative thinking (i.e., rumination and worry), which, in turn, is associated with of difficulties in emotion regulation (see Figure 1).

Importantly, we decided to test this model in the general population (Study 1) and in a clinical population (i.e., outpatients seeking psychological treatment). Using two different samples may help to observe the inter-play among the study variables in order to further elucidate the role of metacognitive beliefs and repetitive negative thinking in both clinical and non-clinical conditions. We believed that considering all the variables together may allow for a more comprehensive understanding of how metacognitive beliefs and repetitive negative thinking may exert influence, over and above socio-demographic factors, anxiety, depression and general/clinical population status, on emotion dysregulation. Indeed, in both studies, age, gender, anxiety, and depression are included as control variables (Kaplan et al., 2018; Kring and Sloan, 2010; Sun et al., 2017), whereas the presence of one or more personality disorder is included in Study 2 only (Spada et al., 2021).

To sum up, in both studies, we hypothesised that: (1) metacognitive beliefs would be positively associated with repetitive negative thinking (i.e., rumination and worry); (2) repetitive negative thinking (i.e., rumination and worry) would be positively associated with emotion dysregulation; (3) metacognitive beliefs would be positively associated with emotion dysregulation both directly and indirectly via repetitive negative thinking (i.e., rumination and/or worry).

Figure 1: Proposed theoretical model.



Note: In the clinical sample (Study 2), the presence of one or more personality disorder was added as an additional control variable.

**Study 1: Exploring the relationship between emotion dysregulation, repetitive negative thinking, and metacognitive beliefs in general population**

**2. Method**

2.1 Participants

A convenience sample of participants was recruited from the general population between August and October 2021. Participants were eligible for inclusion in the study if they were: (a) 18 years of age or above; (b) able to provide informed consent; and (c) able to complete the online questionnaire in Italian.Eligibility criteria were minimal to attract a sample that represented a broad range of individuals.

2.2 Procedure and measures

Participants were recruited via email and social media. Those who agreed to participate provided a digital informed consent of privacy protection disclaimer and completed an online questionnaire. Ethics approval for the study was obtained from the Sigmund Freud University (protocol N°: KC5LGWFJB4KFVE88876).All procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

Socio-demographic characteristics were collected via a set of interview-based screening questions already used in the past (Mansueto et al., 2016; Martino et al., 2018; Palmieri et al., 2018).

Difficulties in emotion regulation were measured with the Difficulties in Emotion Regulation Scale (DERS; Gratz and Roemer, 2004), a 36‐item self-report measure assessing the ability to regulate intense and negative emotions. The items are rated on a 5-point Likert scale (from 1 = “*almost never*” to 5 = “*almost always*”). Higher scores indicate greater difficulty in emotion regulation (Gratz and Roemer, 2004). For the purposes of this study, we considered the DERS total score. The DERS has been shown to possess good internal consistency (Gratz and Roemer, 2004; Sighinolfi et al., 2010).

Metacognitive beliefs were measured with the Meta-Cognitions Questionnaire 30 (MCQ-30, Wells and Cartwright-Hatton, 2004), a 30 item self-report measure assessing individual differences in metacognitive beliefs, judgments, and monitoring tendencies. The MCQ-30 consists of 5 replicable sub-scales measuring the following dimensions of metacognition: (1) Positive metacognitive beliefs (MCQ-30 POS) (e.g., “Worry / rumination helps me cope”); (2) Negative metacognitive beliefs (MCQ-30 NEG) about thoughts concerning uncontrollability and danger (e.g. ‘‘When I start worrying I cannot stop’’; “If I continue to ruminate I will lose my mind”); (3) Cognitive confidence (MCQ-30 CC) (e.g. ‘‘My memory can mislead me at times’’); (4) Beliefs about the need to control thoughts (MCQ-30 NC) (e.g. ‘‘Not being able to control my thoughts is a sign of weakness’’); and (5) Cognitive self-consciousness (MCQ-30 CSC) (e.g. ‘‘I pay close attention to the way my mind works’’). The items are rated on a 4-point Likert scale (from 1 = “*I do not agree”* to 4 = “*I totally agree*”). Higher scores indicate higher levels of maladaptive metacognitive beliefs. The MCQ-30 has been showed good psychometric properties (Wells and Cartwright-Hatton 2004).

Rumination was measured with the Ruminative Response Scale (RRS) (Nolen-Hoeksema and Davis, 1999; Nolen-Hoeksema and Morrow, 1991), a 22 item self-report measure assessing the propensity to ruminate in response to depression. The items are rated on a 4-point Likert scale (from 1 = “*almost never*” to 4 = “*almost always*”). Higher scores indicate higher levels of rumination (Nolen-Hoeksema and Davis, 1999; Nolen-Hoeksema and Morrow, 1991). The RRS has been shown to possess good internal consistency (Nolen-Hoeksema and Davis, 1999; Nolen-Hoeksema and Morrow, 1991).

Worry was measured with the Penn State Worry Questionnaire (PSWQ) (Meyer et al., 1990), a 16-item self-report measure based on what has been theorized about worry by Borkovec (1994). The items are rated on a 5-point Likert scale (from 1 = *“not at all typical of me”* to 5 = *“*very typical of me) (Meyer et al., 1990). Higher scores indicate higher levels of worry (Meyer et al., 1990). The PSWQ has been shown to possess good psychometric properties (Meyer et al., 1990; Morani et al., 1999).

Anxiety and depression were measured by the subscale of the Symptom Checklist-90-R (SCL-90-R; Derogatis, 1977, 1994; Prunas et al., 2012). Higher scores indicate higher levels of anxiety and depression (Derogatis 1977, 1994; Prunas et al., 2012). The SCL-90-R has been shown to possess good internal consistency (Derogatis 1977, 1994; Prunas et al., 2012).

2.3 Statistical analyses

First, descriptive analyses and univariate and multivariate normality tests were calculated. Second, correlation analyses were conducted on the general population sample in order to test the associations among the study variables. Third, the pattern of relationships specified by our hypothesised model (Figure 1) was tested through path analyses, using the Lavaan package (Rosseel, 2012) of the software R (R Development Core Team, 2020). Specifically, a single observed score for each variable and the maximum likelihood methods (Satorra and Bentler, 1994) were used. The bootstrap approach (1000 bootstrap samples) was used to test for mediation. In the hypothesised model, the five metacognitive beliefs were the independent variables; worry and rumination were the mediators; and difficulties in emotion regulation was the dependent variable (Figure 1). Age, gender, anxiety, and depression were included as covariates of the dependent variable.

The full model was first tested. Then, path coefficients not significant at the 5% level were subsequently removed step-by-step in order to select the most plausible model. To evaluate the goodness of fit of the model, the explained variance of each endogenous variable (R2) and the total coefficient of determination (TCD; Bollen, 1989; Jӧreskog and Sӧrbom, 1996) were considered. Briefly, the TCD is a reliable fit index of models run as path analysis (that is SEM for observed variables) and it represents the joined effect of all predictor variables on all dependent variables, so that higher TCD scores indicate more variance explained.

**3. Results**

3.1. Descriptive statistics

A total of 395 participants (62.5% females, mean age was = 36.4 years [SD = 13.9; range 18 to 71 years] were enrolled. Regarding education, about half of the sample had a high-school diploma (49.1%), 39.7% had a higher education level (Bachelor's, Master's degree or PhD), and the remaining 11.1% had a middle-school diploma. About 61% of the sample was employed and 29% comprised university students, whereas the remaining were unemployed or retired. The majority of the sample (59.3%) was married, co-habiting or in a stable partnership, while the remaining was single (35.4%) or divorced (5.3%).

Table 1 shows the means, standard deviations, ranges, skewness, kurtosis for all the study variables. Skewness and kurtosis values suggested that some measurements were non-normally distributed, slightly exceeding the conventional cut off of ±3 (e.g., Mayers, 2013). Moreover, the endogenous variables included in the path analysis (i.e. worry, rumination, and difficulties in emotion regulation) did not follow a multivariate normal distribution (Mardia’s skewness and Mardia’s kurtosis both showed *p* < .001), thus further sustaining the use of the bootstrap method in the subsequent path analyses.

3.2 Correlation analyses

Correlations (Table 2) revealed that all the variables of interest were positively associated with DERS, with the strongest association observed between DERS and RRS, *r* (393) = .69, *p* < .001. The five metacognitive beliefs were positively associated with PSWQ and RRS, with the exception of the non-significant association between MCQ30-CC and PSWQ, *r* (393) = .10, *p* = .051. Results also showed a medium-to-large association between PSWQ and RRS, *r* (393) = .49, *p* < .001. Relatively smaller and negative associations were observed between age and all other variables (with the exception of MCQ30-CC, *r* (393) = .01, *p* = .883).

3.3. Path analysis

A first full version of the model was tested including all the variables of interest. The first version of the model revealed that several path coefficients were not significant at the *p* <.05 level (i.e., the paths between MCQ30-NC, MCQ30-CSC and PSWQ; the paths between MCQ30-POS, MCQ30-NC and RRS; the paths between PSWQ, MCQ30-POS, MCQ30-CC, SCL-90-ANX, gender, age and DERS). Thus, these non-significant paths were removed step by step and the final model including all the significant paths is shown in Figure 2. In this model, MCQ30-POS and MCQ30-NEG were positively associated with PSWQ. MCQ30-CC was negatively, though weakly, associated to PSWQ and positively to RRS. MCQ30-NEG and MCQ30-CSC were also positively associated with RRS. MCQ30-NC was directly and positively associated with DERS, as well as MCQ30-NEG, whereas MCQ30-CSC was negatively associated with DERS. In turn, only one mediator (i.e., RRS) was positively associated with DERS. Regarding the control variables, SCL-90-DEP was associated to the outcome variable.

Along with the direct paths, three indirect relationships were found significant (that is their 95% confidence intervals did not include zero): the mediating role of RRS between three metacognitive beliefs and DERS: MCQ30-NEG (*β* = .152, *b* = .787 [.478-1.136], z = 4.762), MCQ30-CC (*β* = .060, *b* = .253 [.048-.457], z = 2.492), and MCQ30-CSC (*β* = .096, *b* = .523 [.253-.780], z = 3.840). Moreover, the total effect of MCQ30-NEG on DERS was *β* = .335, *b* = 1.736 [1.210-2.306], z = 5.989, and the total effect of MCQ30-CSC on DERS was *β* = -.120, *b* = -.656 [-1.244- -.075], z = -2.238.

Regarding the model fit, the model accounted for 57% of the variance of DERS, 23% for RRS, and 40% for PSWQ. Finally, the total amount variance explained by the model (TCD = .66) indicated a very good fit to the observed data. In terms of effect size, TCD = .72 corresponds to a correlation of *r* = .81 (which is large effect size according to the Cohen’s [Cohen, 1988]traditional criteria).

**Study 2: Exploring the relationship between emotion dysregulation, repetitive negative thinking and metacognitive beliefs in clinical sample**

**4. Method**

4.1 Participants

Participants were outpatients seeking psychological treatment at the private clinical centre Studi Cognitivi (Italy) from September 2013 to December 2019. Study inclusion criteria were: (a) 18 years of age or above; (b) able to provide informed consent; and (c) able to complete the assessment protocol of Studi Cognitivi. Eligibility criteria were minimal to attract a sample that represented a broad range of individuals. A total of 388 patients (50% females; mean age = 36.1 years [SD = 11.7; range 18 to 72 years]) were eligible. The procedure was described in detail elsewhere (Spada et al., 2021).

4.2 Procedure and measures

The assessment protocol of Studi Cognitivi includes a wide range of instruments but just a subsample of patients usually complete all questionnaires, for feasibility reasons. Therefore, for the purpose of the current study, a subsample of patients, who completed all measures assessing the constructs of interest in the present study, was selected (N= 189). After obtaining informed consent, participants provided demographic details and completed the clinical administered diagnostic interview (Structured Clinical Interview for DSM-IV Axis I disorders, SCID-II, First et al., 1994; Mini International Neuropsychiatric Interview, M.I.N.I, Sheehan et al., 1998; SCID-5 Personality Disorders, SCID-5-PD, First et al., 2015a; SCID-5 Clinical Version, SCID-5 CV, First et al., 2015b). They then completed the batch of self-report measures.

Difficulties in emotion regulation, metacognitive beliefs, worry, and rumination were measured with the same measures described for the Study 1 in the general population sample (i.e., DERS (Gratz and Roemer, 2004), MCQ-30 (Wells and Cartwright-Hatton, 2004), RRS (Nolen-Hoeksema and Davis, 1999; Nolen-Hoeksema and Morrow, 1991), and PSWQ (Meyer et al., 1990).

Anxiety was measured using the Beck Anxiety Inventory (BAI; Beck and Steer, 1993), a 21-item self-scale 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 (from 1 = *“Not at all”* to 4 = *“Severe”*). Higher scores indicate higher levels of anxiety. The BAI has been shown to possess good psychometric properties (Beck and Steer, 1993).

Depression was measured using the Beck Depression Inventory (BDI; Beck et al., 1961), a 21-item self-report scale assessing symptoms of depression. The items are rated on a on a 4-point Likert scale (from 1 = “*I do not feel sad*” to 4 = “*I am so sad or unhappy that I can’t stand it*”). Higher scores indicate higher levels of depression (Beck et al., 1961). The BDI has been shown to possess good psychometric properties (Beck et al., 1961).

Ethics approval for the study was obtained from the ethics committee of Studi Cognitivi. All procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

4.3. Statistical analyses

The two samples i.e., general population (see Study 1, section 2.2) and clinical sample (Study 2) were compared with respect to scores obtained on all study measures (except for anxiety and depression that were assessed with different measures) with a series of ANOVA and Welch’s tests.

Then, the statistical procedure followed that described for Study 1 in the general sample (see Study 1, paragraph 2.3). Correlation analyses were conducted in order to test the associations among the study variables. Then, the pattern of relationships specified by our hypothesised model (Figure 1) was tested through path analyses using the same procedure (see Study 1, paragraph 2.3). In the hypothesised model, the five metacognitive beliefs were the independent variables; worry and rumination were the mediators; and difficulties in emotion regulation was the dependent variable (Figure 1). Age, gender, anxiety, depression, and the presence of one or more personality disorder were included as covariates of the dependent variable.

**5. Results**

5.1. Descriptive statistics and ANOVA and Welch’s tests

A total of 189 patients (38% females; mean age = 36.6 years [SD = 10.9; range 18 to 72 years]; 68.8% in a stable partnership) took part in the study. About one third of the sample (32.3%) had at least one personality disorder. More than half of the participants (62%) had an anxiety disorder (i.e., generalized anxiety disorder, panic attacks, hypochondria, phobias) and less than half of the participants (41%) had an affective disorder (i.e., depression, dysthymia). Other disorders were less frequently diagnosed: 14 participants had obsessive-compulsive disorder; 11 participants had alcohol/substance misuse; 8 had an eating disorder; 3 were at high-risk for suicidal ideation; 4 had post-traumatic stress disorder; two had grief disorder; and one had a sleep disorder (See Table S1).

Skewness and kurtosis values of the study variables suggested that overall were normally distributed (Table 1). However, the endogenous variables included in the path analysis (i.e. worry, rumination, and difficulties in emotion regulation) did not follow a multivariate normal distribution (Mardia’s skewness and Mardia’s kurtosis both showed *p* < .001), thus further sustaining the use of the bootstrap method in the subsequent path analyses. Results from the ANOVA and Welch’s tests indicated differences in all constructs with outpatients (Sample 2) showing higher scores than the general population (Sample 1, see Study 1) (Table 1). No differences emerged with regards to MCQ30-POS, MCQ30-CC, and MCQ30 CSC.

5.2 Correlation analyses

Correlations (Table 3) revealed that, with the exception of MCQ30-CSC (*r* (187) = .12, *p* = .092), all the variables of interest were positively associated with DERS. The strongest association was observed between DERS and RRS, *r* (187) = .71, *p* < .001 (Table 3). The five metacognitive beliefs were positively associated with PSWQ and RRS. Results also showed a medium-to-large association between PSWQ and RRS, *r* (187) = .54, *p* < .001. Concerning age, the associations were small and the presence of at least one personality disorder was not associated with none of the variables of interest.

5.3. Path analyses

A first full version of the model was tested including all the variables of interest. The first version of the model revealed that several path coefficients were not significant at the *p* <.05 level (i.e., the paths between MCQ30-CC, MCQ30-NC, MCQ30-CSC and PSWQ; the paths between MCQ30-POS, MCQ30-CC, MCQ30-CSC and RRS; the paths between MCQ30-POS, MCQ30-NEG, MCQ30-CC, BAI, BDI, gender, age, presence of at least one personality disorder and DERS). Thus, these non-significant paths were removed step by step and the final model including all the significant paths is shown in Figure 3. In this model, MCQ30-POS and MCQ30-NEG were positively associated with PSWQ. MCQ30-NEG and MCQ30-NC were also positively associated with RRS. MCQ30-NC was directly and positively associated with DERS, whereas MCQ30-CSC was negatively associated with the outcome variable. In turn, both the mediators (i.e., PSWQ and RRS) were positively associated with DERS.

Along with the direct paths, four indirect relationships were found significant (that is their 95% confidence intervals did not include zero): the mediating role of PSWQ between two metacognitive beliefs and DERS: MCQ30-POS (*β* = .028, *b* = .168 [.028-.375], z = 1.857), and MCQ30-NEG (*β* = .095, *b* = .579 [.202-.953], z = 2.927). Moreover, results indicated the mediating role of RRS between two metacognitive beliefs and DERS: MCQ30-NC (*β* = .215, *b* = 1.305 [.782-1.893], z = 4.599), and MCQ30-NEG (*β* = .131, *b* = .789 [.310-1.267], z = 3.194). The total effect of MCQ30-NC on DERS was *β* = .479, *b* = 2.891 [2.036-3.751], z = 6.835.

Regarding the model fit, the model accounted for 61% of the variance of DERS, 39% for RRS, and 38% for PSWQ. Finally, the total amount variance explained by the model (TCD = .64) indicated a very good fit to the observed data. In terms of effect size, TCD = .76 corresponds to a correlation of *r* = .80 (which is large effect size according to the Cohen’s (Cohen, 1988)traditional criteria).

**6. Discussion**

The aim of the current study was to extend our understanding of underlying mechanisms in emotion dysregulation according to the metacognitive psychopathology tenet.Within the perspective of the S-REF model of psychopathology (Wells, 2011; Wells and Matthews, 1994, 1996), we tested a model where we hypothesised that metacognitive beliefs would be associated with repetitive negative thinking (i.e., rumination and/or worry), which in turn would be associated with emotion dysregulation (see Figure 1). The path analyses of our hypothesised model and the amount of variance explained revealed that it fits the data well in both general and clinical samples, suggesting that the proposed model may be of value.

Among participants from the general population (see Figure 2), we observed that rumination may play a mediating role in the relationship between negative metacognitive beliefs about thoughts concerning uncontrollability and danger (e.g. “when I start ruminating I cannot stop’’; “If I continue to ruminate I will lose my mind”), cognitive confidence (e.g. ‘my memory can mislead me at times’’), cognitive self-consciousness (e.g. ‘‘I pay close attention to the way my mind works’’) and emotion regulation difficulties. Moreover, we observed that negative metacognitive beliefs about thoughts concerning uncontrollability and danger and beliefs about the need to control thoughts (e.g., ‘‘not being able to control my thoughts is a sign of weakness’’) appear to be directly associated to emotion dysregulation.

With regards to the clinical sample investigated (see Figure 3), we observed that worry may play a mediating role in the association between positive metacognitive beliefs about the usefulness of worry (e.g. ‘‘worry helps me cope’’), negative metacognitive beliefs about thoughts concerning uncontrollability and danger (e.g. “If I continue to worry I will lose my mind”) and emotion regulation difficulties. Moreover, we found that rumination may play a mediating role in the relationship between negative metacognitive beliefs about thoughts concerning uncontrollability and danger, beliefs about the need to control thoughts and emotion regulation difficulties. In addition, our findings suggested that beliefs about the need to control thoughts could be directly associated to emotion dysregulation.

Taken together these findings are consistent with the S-REF model (Wells, 2011; Wells and Matthews, 1994, 1996) suggesting that in general population and among outpatients seeking psychological treatment the persistence of emotion regulation difficulties may be explained by the tendency to engage in repetitive negative thinking (i.e., worry or rumination) and related metacognitive beliefs.

The positive association between metacognitive beliefs and repetitive negative thinking is well established (McEvoy and Mahoney, 2013; Papageorgiou and Wells, 2001, 2009; Sica et al., 2007; Weber and Exner, 2013; Wells and Matthews, 1994, 1996). With regards to the association between metacognitive beliefs and emotional dysregulation, our findings extend previous literature, which was mostly focused on positive and negative metacognitive beliefs (Akbari et al., 2017; Dragan, 2015; Mazloom et al., 2016; Ottonello et al., 2019; Poormahdy et al., 2022; Salguero et al., 2019), underlying also the role of beliefs about the need to control thoughts (e.g. “I should be in control of my thoughts all of the time”) as potential maintenance mechanisms of emotion dysregulation. Similar findings were reported only in a previous study in adolescent sample (Laghi et al., 2018). Previous studies suggested that beliefs about the need to control thoughts may be associated with a decreased ability to shift between mental sets (Kraft et al., 2017) as well as with a cognitive gridlock that in turn may produces even more repetitive negative thinking (Spada et al., 2008). This could clarify why individuals with high levels of beliefs about the need to control may experience difficulties to switching to more adaptive emotion regulation strategies, even tough further studies are needed to evaluate in depth this issue.

In addition, our findings confirm previous studies’ findings reporting an association between repetitive negative thinking and emotion dysregulation (Ehring and Ehlers, 2014; Jarukasemthawee and Pisitsungkagarn, 2021; Martino et al., 2018; Salguero et al., 2019; Salters-Pedneault et al., 2006; Yalvac and Gaynor, 2021). However, a partially unexpected result of this study is the negative association observed in the general population and in the clinical sample between cognitive self-consciousness (i.e., the tendency to monitor one’s own thoughts and focuses attention inwards, e.g. ‘‘I pay close attention to the way my mind works’’) and emotion dysregulation, suggesting that cognitive self-consciousness may be associated with greater ease in emotion regulation. Similar finding were observed among adolescents (Laghi et al., 2018). Moreover, a possible explanation for this result may lie with literature suggesting that, compared with other metacognitive beliefs, cognitive self-consciousness tends to be negatively associated with some problematic tendencies as inhibitory behaviour tendency or lower impulsivity (Efrati et al., 2021).

Lastly, although different subtype of metacognitive beliefs, repetitive negative thinking, affective symptoms and difficulties in emotion regulation were found to be significantly correlated, when multivariate analyses were run some path coefficients become non significant. Indeed, it is likely that within multivariate analyses some association may become not significant because multiple effects are taken into account simultaneously (Field, 2018). From a clinical point of view it may assume that some metacognitions may be more critical than other in enchaining poor clinical outcomes (Sun et al., 2017) such as repetitive negative thinking and emotion dysregulation. Indeed, across general population and clinical samples, we observed that: positive and negative metacognitions seems more critical in enhancing repetitive negative thinking, than other metacognitive beliefs; beliefs about the need to control thoughts are more likely to be independently associated with difficulties in emotion regulation, than other metacognitions.

Yet, another unexpected result of this study was that worry appears to play a mediating role in the association between metacognitive beliefs and emotion dysregulation only in the clinical sample but not in the general population, differently from rumination that seems to play a mediating role in both samples. It may be assumed that worry may lead to emotion dysregulation only when the meta-worry (or type-2 worry) is activated (Wells, 2005; 2010). Meta-worry may cause an escalation of emotion dysregulation and an increase in the perception of its uncontrollability, as observed in generalized anxiety disorder (Wells, 2005; 2010; 2011). It may be argued that without meta-worry, worry could increase anxiety states or make them perseverative without generating the increase in emotion dysregulation (Wells, 2005; 2010). However, further studies are needed to evaluate in depth the role of different metacognitions, repetitive negative thinking and emotion dysregulation.

 6.1 Clinical implications

These preliminary findings bring us to consider their potential clinical implications. Firstly, in terms of assessment, information about repetitive negative thinking and related metacognitive beliefs may be gathered during the anamnesis process of emotion regulation difficulties in both the general population and among outpatients seeking psychological treatment. Secondly, the S-REF model (Wells, 2011; Wells and Matthews, 1994, 1996) may be used to define an idiosyncratic case conceptualization of emotion dysregulation, as well as, to socialize individuals to the idea that repetitive negative thinking and metacognitive beliefs may contribute to the persistence of emotion regulation difficulties. Thirdly, in terms of interventions, reducing the propensity to engage in repetitive negative thinking and modifying related metacognitive beliefs (Wells, 2011; Wells and Matthews, 1994, 1996) could be considered as a potential therapeutic target for treatment aimed to reduce emotion regulation difficulties in outpatients seeking psychological treatment. Moreover, interventions aimed to reduce rumination and modified related metacognitive beliefs (Wells, 2011; Wells and Matthews, 1994, 1996) could be also considered to improve emotion regulation abilities in the general population.

6.2 Limitations

Results of this study must be considered with regards to its limitations. Firstly, a cross-sectional design was adopted, and this precludes drawing of conclusions as to whether or not metacognitive beliefs and repetitive negative thinking play a causal role in predicting emotion dysregulation. Secondly, social desirability, self-report biases, context effects, and poor recall may have contributed to errors in self-report measurements. Thirdly, regarding the general population sample, the participants in this study may not have been representative of the general population as they were all based in Italy. Fourthly, the clinical sample data was collected from clinics in the same city, which may limit generalisation. Fifthly, the different assessment conditions for the two samples hampered the possibility to explicitly test possible differences in the path model across general and clinical populations. Lastly, a further limitation of the present study is that different measures of anxiety and depression were used for general and clinical samples, limiting partially the generalizability of our results. These limitations suggest some directions for future research. For example, an ideal demonstration of any causal contribution of metacognitive beliefs, repetitive negative thinking to emotion dysregulation could involve an experimental or clinical manipulation of both metacognitive beliefs and repetitive negative thinking, as well as the employment of a longitudinal study designs. Further studies ensuring a more diverse sample of participants are warranted. Finally, since the current study evaluated generic metacognitive beliefs, additional studies investigating specific metacognitive beliefs about emotional regulation functioning (e.g., “When I feel bad, I feel ashamed of myself for feeling that way,” or “I can’t control my emotions”; Salguero et al. 2019) are warranted.

**7. Conclusion**

Consistently to the S-REF model (Wells, 2011; Wells and Matthews, 1994, 1996) our findings show that emotion dysregulation is associated to the tendency to engage in repetitive negative thinking, which, in turn, is related to metacognitive beliefs.If these findings were to be replicated, it could open-up new prospects in the psychotherapeutic treatment of emotion regulation difficulties. Repetitive negative thinking and metacognitive beliefs could be the potential therapeutic target in clinical interventions reducing emotion regulation difficulties.

**Author statement**

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**Funding:** This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Declaration of interest:** none

**Acknowledgments:** the authors like to thank all participants in this study.

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Figure 2: Results of the path analysis (Sample 1: general population).



Notes: \* *p* < .05, \*\* *p* < .01, \*\*\* *p* < .001; N = 395; Coefficients are Beta (standardized estimates); 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; PSWQ = Penn State Worry Questionnaire; RRS = Rumination Response Scale; DERS = Difficulties in Emotion Regulation Strategies; SCL-90-DEP = Symptoms Check List-90 – Depression.

Figure 3: Results of the path analysis (Sample 2: clinical population).



Notes: \* *p* < .05, \*\* *p* < .01, \*\*\* *p* < .001; N = 189; Coefficients are Beta (standardized estimates); 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; PSWQ = Penn State Worry Questionnaire; RRS = Rumination Response Scale; DERS = Difficulties in Emotion Regulation Strategies.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Sample 1 |  |  |  | Sample 2 |  |  |  |  |  |  |  |
|  | M(SD) | Range | Skewness (SE) | Kurtosis (SE) | M(SD) | Range | Skewness (SE) | Kurtosis (SE) | *F*(1) | *p* | *Welch test*(df) | *p* |
| 1. DERS
 | 73.01(18.03) | 36-132 | .828(.123) | .531(.245) | 94.01(23.96) | 50-160 | .337(.177) | -.485(.352) | 139.08 | <.001 | 114.27(293.36) | <.001 |
| 1. PSWQ
 | 50.21(11.33) | 26-80 | .426(.123) | -.288(.245) | 55.23(12.69) | 21-80 | -.206(.177) | -.317(.352) | 23.24 | <.001 | 21.46(335.49) | <.001 |
| 1. RRS
 | 43.80(11.31) | 22-81 | .545(.123) | .612(.245) | 52.27(13.79) | 25-85 | .181(.177) | -.543(.352) | 61.90 | <.001 | 53.90(313.03) | <.001 |
| 1. MCQ-POS
 | 11.05(3.64) | 6-24 | .922(.123) | 1.088(.245) | 10.94(3.96) | 6-24 | .745(.177) | .304(.352) | .11 | .739 | .11(344.35) | .746 |
| 1. MCQ-NEG
 | 13.73(3.30) | 6-24 | .376(.123) | .102(.245) | 15.53(3.86) | 6-24 | .081(.177) | -.581(.352) | 33.82 | <.001 | 30.27(323.19) | <.001 |
| 1. MCQ-CC
 | 11.10(4.07) | 6-24 | .856(.123) | .371(.245) | 11.56(5.31) | 6-24 | .929(.177) | -.242(.352) | 1.30 | .254 | 1.09(297.43) | .298 |
| 1. MCQ-NC
 | 11.05(3.09) | 6-24 | .826(.123) | .835(.245) | 11.98(3.90) | 6-24 | .411(.177) | -.334(.352) | 9.65 | .002 | 8.21(304.82) | .004 |
| 1. MCQ-CSC
 | 15.71(3.13) | 6-24 | .153(.123) | .028(.245) | 15.10(3.89) | 6-24 | .058(.177) | -.297(.352) | 4.11 | .043 | 3.53(308.67) | .061 |
| 1. Anxiety°
 | 1.74(.56) | 1-4.40 | 1.608(.123) | 3.45(.245) | 15.53(11.31) | 0-47 | .762(.177) | -.476(.352) | - | - | - | - |
| 1. Depression§
 | 1.87(.64) | 1-4.54 | 1.482(.123) | 3.016(.245) | 16.53(10.55) | 0-47 | .634(.177) | -.274(.352) | - | - | - | - |
| 1. Age
 | 36.42(13.90) | 18-71 | .497(.123) | -1.129(.245) | 37.56(10.91) | 18-72 | .774(.177) | .326(.352) | .974 | .324 | 1.15(460.86) | .284 |

 Table 1: Means, standard deviations, ranges, ANOVA and Welch’s tests of study variables in Sample 1 (general population) and Sample 2 (clinical population).

Notes: DERS = Difficulties in Emotion Regulation Strategies; PSWQ = Penn State Worry Questionnaire; RRS = Rumination Response Scale; 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; °= Anxiety is assessed with the Symptoms Check List-90 – Anxiety in Sample 1 and with the BAI (Beck Anxiety Inventory) in Sample 2; §= Depression is assessed with the Symptoms Check List-90 – Depression in Sample 1 and with the BDI (Beck Depression Inventory) in Sample 2.

Table 2: Inter-correlations of study variables in Sample 1 (general population).

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 1. DERS
 | - |  |  |  |  |  |  |  |  |  |  |
| 1. PSWQ
 | .41\*\*\* | - |  |  |  |  |  |  |  |  |  |
| 1. RRS
 | .69\*\*\* | .49\*\*\* | - |  |  |  |  |  |  |  |  |
| 1. MCQ-POS
 | .20\*\*\* | .41\*\*\* | .27\*\*\* | - |  |  |  |  |  |  |  |
| 1. MCQ-NEG
 | .50\*\*\* | .58\*\*\* | .43\*\*\* | .31\*\*\* | - |  |  |  |  |  |  |
| 1. MCQ-CC
 | .35\*\*\* | .10 | .25\*\*\* | .16\*\* | .34\*\*\* | - |  |  |  |  |  |
| 1. MCQ-NC
 | .44\*\*\* | .38\*\*\* | .38\*\*\* | .41\*\*\* | .57\*\*\* | .31\*\*\* | - |  |  |  |  |
| 1. MCQ-CSC
 | .16\*\* | .34\*\*\* | .33\*\*\* | .39\*\*\* | .40\*\*\* | .09 | .50\*\*\* | - |  |  |  |
| 1. SCL-90-ANX
 | .57\*\*\* | .52\*\*\* | .59\*\*\* | .27\*\*\* | .49\*\*\* | .17\*\* | .40\*\*\* | .28\*\*\* | - |  |  |
| 1. SCL-90-DEP
 | .65\*\*\* | .52\*\*\* | .66\*\*\* | .29\*\*\* | .45\*\*\* | .28\*\*\* | .39\*\*\* | .22\*\*\* | .78\*\*\* | - |  |
| 1. Age
 | -.22\*\*\* | -.18\*\*\* | -.29\*\*\* | -.20\*\* | -.19\*\*\* | .01 | -.18\*\*\* | -.23\*\*\* | -.21\*\*\* | -.16\*\* | - |
| 1. Gender
 | .13\* | .28\*\*\* | .15\*\* | -.11\* | .20\*\*\* | .01 | -.03 | .02 | .13\* | .20\*\*\* | .14\*\* |

Notes: N = 395; Degrees of freedom = 393; \**p* < .05; \*\**p* < .01; \*\*\**p* < .001. DERS = Difficulties in Emotion Regulation Strategies; PSWQ = Penn State Worry Questionnaire; RRS = Rumination Response Scale; 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 Question-naire-30 - Beliefs about the Need to Control Thoughts; MCQ-30 - CSC = Metacognitions Questionnaire-30 - Cognitive Self-Consciousness; SCL-90-ANX = Symptoms Check List-90 – Anxiety; SCL-90-DEP = Symptoms Check List-90 – Depression; Gender = 1:M, 2:F.

Table 3: Inter-correlations of study variables in Sample 2 (clinical population).

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 1. DERS
 | - |  |  |  |  |  |  |  |  |  |  |
| 1. PSWQ
 | .55\*\*\* | - |  |  |  |  |  |  |  |  |  |
| 1. RRS
 | .71\*\*\* | .54\*\*\* | - |  |  |  |  |  |  |  |  |
| 1. MCQ-POS
 | .15\* | .27\*\*\* | .15\* | - |  |  |  |  |  |  |  |
| 1. MCQ-NEG
 | .60\*\*\* | .59\*\*\* | .59\*\*\* | .19\*\*\* | - |  |  |  |  |  |  |
| 1. MCQ-CC
 | .31\*\*\* | .20\*\* | .22\*\* | .13 | .33\*\*\* | - |  |  |  |  |  |
| 1. MCQ-NC
 | .59\*\*\* | .48\*\*\* | .53\*\*\* | .31\*\*\* | .62\*\*\* | .34\*\*\* | - |  |  |  |  |
| 1. MCQ-CSC
 | .12 | .24\*\*\* | .24\*\*\* | .27\*\*\* | .31\*\*\* | .08 | .46\*\*\* | - |  |  |  |
| 1. BAI
 | .50\*\*\* | .45\*\*\* | .48\*\*\* | .14 | .45\*\*\* | .25\*\* | .36\*\*\* | .09 | - |  |  |
| 1. BDI
 | .57\*\*\* | .46\*\*\* | .65\*\*\* | .09 | .46\*\*\* | .30\*\*\* | .46\*\*\* | .12 | .57\*\*\* | - |  |
| 1. Age
 | -.15\* | -.14 | -.19\* | -.12 | -.09 | .06 | -.19\*\* | -.14 | -.18\* | -.04 | - |
| 1. Gender
 | -.12 | -.19\*\* | -.23\*\* | .01 | -.18\* | .01 | -.02 | -.16\* | -.17\* | -.17\* | -.01 |
| 1. PD (absent vs. present)
 | .06 | .06 | .02 | .001 | -.001 | .04 | .09 | .14 | .04 | -.06 | -.18\* |

Notes: N = 189; Degrees of freedom = 187; \**p* < .05; \*\**p* < .01; \*\*\**p* < .001. DERS = Difficulties in Emotion Regulation Strategies; PSWQ = Penn State Worry Questionnaire; RRS = Rumination Response Scale; 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; BAI = Beck Anxiety Inventory; BDI = Beck Depression Inventory; Gender = 1:M, 2:F; PD = Personality Disorder (0: absence, 1: presence).

Table S1: Frequencies of mental disorders in the clinical sample (n=189).

|  |  |
| --- | --- |
|  |  |
| **Personality disorder**  |  |
| Avoidant Personality Disorder | 17 |
| Obsessive Compulsive Personality Disorder | 16 |
| Passive Aggressive Personality Disorder | 3 |
| Dependent Personality Disorder | 2 |
| Depressive Personality Disorder | 3 |
| Paranoid Personality Disorder | 7 |
| Histrionic Personality Disorder | 1 |
| Borderline Personality Disorder | 21 |
| **Anxiety disorders**  |  |
| Generalized Anxiety Disorder | 67 |
| Panic attacks | 21 |
| Agoraphobia | 7 |
| Hypochondria | 4 |
| Phobias | 5 |
| Social phobia | 13 |
| **Affective disorders**  |  |
| Depression | 64 |
| Dysthymia | 7 |
| Melancholia | 6 |
| **Obsessive-compulsive Disorder** | 14 |
| **Addictive behaviours** |  |
| Alcohol dependence and abuse | 13 |
| Substance use | 4 |
| **Eating disorders** |  |
| Bulimia | 4 |
| Binge Eating | 4 |
| **High-risk for suicidal ideation** | 3  |
| **Post-traumatic Stress Disorder** | 4  |
| **Grief Disorder** | 2 |
| **Sleep Disorder** | 1 |