**Emotion dysregulation in patients with eating disorders:**

**The role of metacognitions and repetitive negative thinking**

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**Abstract**

**Background:** Using the Self-Regulatory Executive Function model as a basis, this study explored whether, in patients with eating disorders (EDs), metacognitions and repetitive negative thinking are associated with higher levels of emotion dysregulation.

**Methods:** 104 outpatients with eating disorders and 104 controls from the general population were recruited. Emotion dysregulation, metacognitions, rumination, worry, anxiety, and depression were assessed. T-tests, Mann–Whitney tests, correlation and hierarchal regression analyses were run.

**Results:** Patients with EDs, compared to controls, reported significantly higher levels of emotion dysregulation, positive beliefs worry, negative beliefs about thoughts concerning uncontrollability and danger, beliefs about the need to control thoughts, rumination, and worry. Beliefs about the need to control thoughts and worry significantly predicted emotion dysregulation.

**Conclusions:** Among patients with EDs emotion dysregulation appears to be associated with the endorsement of beliefs about the need to control thoughts and worry. Beliefs about the need to control thoughts and worry could be a suitable therapeutic target to reduce emotion dysregulation among patients with EDs.

**Keywords**: Eating disorders; emotion dysregulation; metacognitions; rumination; worry.

**Introduction**

Emotion regulation refers to the processes by which individuals modulate their affective experiences using cognitive, behavioral, interpersonal, and intrapersonal strategies (Gross, 2002; Gross & Thompson, 2007). Emotion dysregulation is a multifaceted construct involving maladaptive ways of responding to one’s emotions, including: (a) lack of emotional awareness, clarity, and acceptance; (b) behavioral dyscontrol in the context of intense emotions; (c) unwillingness to pursue meaningful activities in the context of emotional distress; and (d) inflexible use of adaptive strategies to modulate (vs. eliminate) the intensity and/or duration of emotional experiences (Gratz & Roemer, 2004).

Emotion dysregulation has been conceptualized as a transdiagnostic factor closely related with eating disorder psychopathology (Aldao et al. 2010; Brockmeyer et al., 2014; Buckholdt et al., 2015; Monell et al., 2018; Nowakowski et al., 2013; Trompeter et al., 2021). Greater difficulties in emotion dysregulation have been observed in patients with eating disorders (EDs) when compared with healthy controls (Brockmeyer et al., 2014; Mallorqui-Bague et al., 2018; Monell et al., 2018). Among patients with EDs poor emotional awareness and poor emotional non-acceptance have been found to be associated with more severe cognitive symptoms, difficulties in impulse control, and binge eating (Monell et al., 2018). Similarly, in non-clinical samples, emotion dysregulation has been found to be positively associated with more severe cognitive eating disorder symptoms (Monell et al., 2018). Identifying potential maintenance mechanisms of emotion dysregulation in patients with EDs has been recognized as a priority (Brockmeyer et al., 2014; Gross, 2002; Gross & Thompson, 2007; Monell et al., 2018) since that it may allow clinicians to identify “bottlenecks” to be targeted in clinical interventions to reduce it (Brockmeyer et al., 2014; Gross, 2002; Gross & Thompson, 2007; Monell et al., 2018; Ruggiero et al., 2018). However, a comprehensive understanding of the underlying mechanisms of emotion dysregulation in patients with EDs is still lacking (Monell et al., 2018).

Within the framework of the Self-Regulatory Executive Function (S-REF) model of psychopathology (Wells, 2011; Wells & Matthews, 1994, 1996), it has been proposed that the intensity and persistence of emotion dysregulation could be related to the endorsement of unhelpful metacognitions and the activation of the Cognitive Attentional Syndrome (CAS) (Mansueto et al., 2022; Selby et al., 2008; Selby & Joiner, 2009; Wells, 2011; Wells & Matthews, 1994, 1996). Metacognitions refer to “the information that individuals hold about their own cognition and about coping strategies which impact on it” (Wells & Matthews, 1996) and broadly take five generic forms: positive beliefs about the usefulness of engaging in aspects of repetitive negative thinking, negative beliefs about thoughts concerning uncontrollability and danger, cognitive confidence, beliefs about the need to control thoughts, and cognitive self-consciousness (Wells & Matthews, 1994, 1996). The CAS consists of a style of thinking in the form of repetitive negative thinking (i.e., worry and rumination), threat monitoring, and unhelpful coping behaviors which reduce the capacity for effective self-regulation intensifying and prolonging negative emotions (Capobianco & Nordahl, 2021; Wells, 2011; Wells & Matthews, 1994, 1996).

Literature has shown that a higher endorsement of metacognitions and of specific components of the CAS, i.e., repetitive negative thinking, are more common among patients with EDs than in general population (Palmieri et al., 2021a; Palmieri et al., 2021b; Palmieri et al., 2021c; Palmieri et al., 2022; Smith et al., 2018). It could thus be assumed that emotion dysregulation in those who present with EDs may be a consequence of the tendency to engage in maladaptive forms of mental control i.e., repetitive negative thinking which are activated by metacognitions (Mansueto et al., 2022; Palmieri et al., 2021a; Palmieri et al., 2021c; Palmieri et al., 2022; Selby et al., 2008; Smith et al., 2018). A brief review of the literature underpinning the delineation of the hypothesized associations between metacognitions and emotion dysregulation, as well as between repetitive negative thinking and emotion dysregulation, among those diagnosed with EDs is presented below.

***Emotion Dysregulation within the Framework of the S-REF Model (Wells, 2011; Wells & Matthews, 1994, 1996): the Role of Metacognitions and Repetitive Negative Thinking***

In the early 1990s Wells and Matthews (1994, 1996) prosed the Self-Regulatory Executive Function (S-REF) model of emotional disorders, according to which the intensity and persistence of psychological disorder may be related with the presence of unhelpful metacognitions and the activation of the CAS (Capobianco & Nordahl, 2021; Wells, 2011; Wells & Matthews, 1994, 1996). On the basis of the S-REF model (Wells & Matthews, 1994, 1996) emotion dysregulation could be considered as clinical outcome maintained by metacognitions (Mansueto et al., 2022; Wells, 2000) and the CAS (Mansueto et al., 2022; Martino et al., 2018; Salguero et al., 2019; Salters-Pedneault et al., 2006). As reported by Wells at the turn of the century (Wells, 2000) given that metacognitions fulfil an executive function with regards to cognitive processing, they may play a contributory role in emotional dysregulation. Research findings appear to support the association between metacognitions and emotion dysregulation in the general population and in clinical samples (i.e., with addictive behaviours, outpatients seeking psychological treatment) (Akbari, 2017; Dragan, 2015; Mansueto et al., 2022; Ottonello et al., 2019; Poormahdy et al., 2022; Salguero et al., 2019). With regards to the relationship between the CAS and emotional dysregulation, it has been shown that some components of the CAS, i.e. repetitive negative thinking in the form of worry (Borkovec et al., 1983) and rumination (Nolen-Hoeksema & Morrow, 1991) are associated with higher levels of emotion dysregulation in the general population and in clinical samples (i.e. subjects with addictive behaviours, in those exposed to traumatic events, outpatients seeking psychological treatment) (Akbari, 2017; Cox et al., 2019; Dragan, 2015; Ehring & Ehlers, 2014; Mansueto et al., 2022; Martino et al., 2018; Mazloom et al., 2016; Jarukasemthawee & Pisitsungkagarn, 2021; Ottonello et al., 2019; Poormahdy et al., 2022; Salguero et al., 2019; Salters-Pedneault et al., 2006). Repetitive negative thinking (i.e., worry, rumination) has also been found to be associated with lower ability to regulate intense and negative emotions (Akbari, 2017; Dragan, 2015; Mansueto et al., 2022; Martino et al., 2018; Salguero et al., 2019; Salters-Pedneault et al., 2006), to proceed with goal-directed behavior when experiencing negative emotions (Salters-Pedneault et al., 2006), to accept one’s own negative emotions (Salters-Pedneault et al., 2006), to stop the engagement in dysfunctional emotion regulation strategies despite its ineffectiveness at emotion generation (Sheppes et al., 2015), as well as, with erroneous analyses of the costs and benefits associated with regulatory emotion strategies (Sheppes et al., 2015). Moreover, a recent study (Mansueto et al., 2022), aimed to build upon this evidence by adopting the S-REF model (Wells, 2011; Wells & Matthews, 1994, 1996) as a theoretical framework for understanding emotion dysregulation, has shown that among the general population and among outpatients seeking psychological treatment some components of the CAS (i.e., worry and rumination), may play a mediating role in the relationship between metacognitions and higher levels of emotion dysregulation.

***Eating Disorder Psychopathology within the Framework of the S-REF Model (Wells, 2011; Wells & Matthews, 1994, 1996): the Role of Metacognitions and Repetitive Negative Thinking***

Metacognitions and repetitive negative thinking have been reported to underlie etiological and maintenance mechanisms for a wide range of EDs (Palmieri et al., 2021a). Literature has shown that both positive and negative metacognitions are significantly higher in individuals with EDs (i.e., Anorexia Nervosa, Bulimia Nervosa, Eating Disorders Not Otherwise Specified), than in healthy controls (Palmieri et al., 2021a), as well as in individuals from the general population with problematic eating attitudes compared to those with normal eating attitudes (Palmieri et al., 2021a). Specific positive and negative metacognitions about binge eating have also been identified in individuals with a diagnosis of Binge Eating Disorder (Palmieri et al., 2021b; Palmieri et al., 2023). Moreover, higher levels of repetitive negative thinking (i.e., worry and rumination) have been observed in patients EDs when compared with general population (Palmieri et al., 2021c; Smith et al., 2018). Among clinical and non-clinical samples, a significant association between higher levels of repetitive negative thinking (i.e., worry and rumination) and more severe eating problems have been observed (Palmieri et al., 2021c; Sassaroli et al., 2005; Smith et al., 2018).

***Aims of the Present Study***

According to the metacognitive tenet (Wells, 2011; Wells & Matthews, 1994, 1996) the current study aimed to extend our understanding of underlying mechanisms in emotion dysregulation in subjects with EDs. On the basis of our knowledge this is the first study exploring the correlations between metacognitions, repetitive negative thinking, and emotion dysregulation in patients with EDs. In the present study we put forward the following hypotheses: (1) patients with EDs will show higher levels of emotion dysregulation than controls without EDs; (2) patients with EDs will show higher levels of metacognitions and repetitive negative thinking (i.e., worry and rumination) than controls without EDs; (3) among patients with EDs metacognitions and repetitive negative thinking (i.e., worry and rumination) will be positively associated with emotion dysregulation. As a corollary, we aimed also to evaluate whether metacognitive factors may be associated with ED symptomatology beyond emotion dysregulation, as well as, whether emotion dysregulation may or may not contribute to ED symptoms when controlling for metacognitive factors (i.e., metacognitions and repetitive negative thinking).

**Method**

***Participants***

104 outpatients with EDs were consecutively recruited at the private clinical centre Studi Cognitivi Cliniche of Milan in Lombardy (Milan, Italy) within one week of admission from February to December 2022, and 104 non-psychiatric controls (i.e., control group) recruited form the general population of Milan (Italy) during the same time were recruited. Given that age and sex can play a role in the presentation and impact of emotion dysregulation, metacognitions, rumination and worry (Johnson & Whisman, 2013; Mansueto et al., 2022; Palmieri et al., 2021b) ED and control groups were matched for sex and age (sex: 104 females and 104 females per sample; age: EDs group mean±SD: 28.79±9.14 years, control group mean±SD: 29.32±8.12 years).

Inclusion criteria for both patients and controls were: (a) 18 years of age or above; (b) able to provide informed consent; and (c) able to complete the assessment protocol. In addition, the EDs group was eligible if meeting the Diagnostic and Statistical Manual of Mental Disorders Five Edition (DSM-5, APA, 2013) criteria for Eating Disorders. Patients with EDs and controls were excluded if they had: (a) current or lifetime neurological or organic diseases which might compromise cognitive functioning; (b) current use of psychotropic medications or engagement in psychotherapy.

***Procedure and Measures***

Ethics approval for the study was obtained from the ethics committee of Sigmund Freud University, Milan, Italy. 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. All participants provided a signed informed consent. Socio-demographic and clinical information was collected via an ad hoc set of questions used previously (Mansueto et al., 2022).

Emotion dysregulation was measured with the Difficulties in Emotion Regulation Scale (DERS; Gratz & 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*”). For the purposes of this study, we considered the DERS total score where a higher score indicates higher levels of emotional dysregulation (Gratz & Roemer, 2004). The DERS has been shown to possess good psychometric properties (Gratz & Roemer, 2004; Sighinolfi et al., 2010).

Metacognitions were measured with the Meta-Cognitions Questionnaire 30 (MCQ-30, Wells & Cartwright-Hatton, 2004), a 30 item self-report measure assessing individual differences in metacognitions, judgments, and monitoring tendencies. The MCQ-30 is characterized by 5 factors measuring: (1) Positive beliefs about worry (MCQ-30 POS) (e. g., “Worry helps me cope”); (2) Negative beliefs about thoughts concerning uncontrollability and danger (MCQ-30 NEG) (e.g., “When I start worrying I cannot stop”); (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 metacognitions. The MCQ-30 has been shown to possess good psychometric properties (Wells & Cartwright-Hatton, 2004).

Rumination was measured with the Ruminative Response Scale (RRS) (Nolen-Hoeksema & Davis, 1999; Nolen-Hoeksema & Morrow, 1991; Palmieri et al., 2007) 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*”), and higher scores indicate higher levels of rumination (Nolen-Hoeksema & Davis, 1999; Nolen-Hoeksema & Morrow, 1991). Two subscales of the RRS were used evaluating brooding rumination and reflection rumination (Nolen-Hoeksema & Davis, 1999; Nolen-Hoeksema & Morrow, 1991). The RRS has been shown to possess good psychometric properties (Nolen-Hoeksema & Davis, 1999; Nolen-Hoeksema & 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) and 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).

General eating pathology was measured with the Eating Disorder Examination Questionnaire (EDE-Q) (Fairburn & Beglin, 2008), a 28-item self-report measure in which participants indicate how many days in the past 28 days they have engaged in eating-disordered behaviour and experienced negative cognitions (e.g., “on how many of the past 28 days have you had a definite fear that you might gain weight?”). The items are rated on a 7-point Likert scale (from 0 = “no days” to 6 = “every day”). The EDE-Q is characterized by 4 factors and a global score. In the present study, only the global score was utilized to assess eating pathology. The EDE-Q has been shown to possess good psychometric properties (Calugi et al., 2017; Fairburn & Beglin, 2008).

Anxiety and depression were measured with the Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983). The HADS consists of 14 items, 7 assessing anxiety and 7 assessing depression. The anxiety factor includes items such as “I get a sort of frightened feeling as if something horrible is about to happen”. The depression factor includes items such as “I feel as if I am slowed down”. Higher scores represent higher levels of anxiety and depression. The HADS has been shown to possess good psychometric properties (Caci et al., 2003; Costantini et al., 1999; Herrmann, 1997; Mykletun et al., 2001; Zigmond & Snaith, 1983).

***Statistical Analyses***

First, descriptive analyses and univariate and multivariate normality tests were calculated. Skewness and kurtosis were assessed and were considered adequate for a linear model of analysis in a range of ±2 (Gravetter & Wallnau, 2016). Second, Chi-square tests were used for the comparisons between the ED group and control groups on gender, marital status, educational levels, and working status. A series of Student t tests (used to compare means of continuous variables normally distributed), and Mann–Whitney tests for independent samples (used to compare rank means of continuous variables non-normally distributed) were run to explore differences between the ED group and control group on age, difficulties in emotions regulations, metacognitions, rumination, worry, anxiety and depressive symptoms. Third, bivariate correlation analyses were run in order to explore the correlations between emotion dysregulation, metacognitions, rumination, worry, anxiety and depressive symptoms among patients with EDs. Fourth, hierarchical linear regression analyses were run to evaluate whether metacognitions and repetitive negative thinking would predict emotion dysregulation among patients with EDs. Four adjustment variables were selected based on the literature, i.e., age, anxiety, depressive symptoms, eating symptoms (Brockmeyer et al., 2014; Hofmann et al., 2012; Mansueto et al., 2022). The ordering of independent variables in the hierarchical linear regression analyses was defined according to the causal structure suggested by the metacognitive model (Wells, 2011; Wells & Matthews, 1994, 1996): age was entered in the first step, metacognitions were entered in the second step, repetitive negative thinking (i.e., rumination and worry) was entered in the third step, affective symptoms (i.e., anxiety and depression) and eating symptoms were entered in the fourth step. Statistical assumptions for using hierarchical linear regression analyses were evaluated (Barbaranelli & D'Olimpio, 2006; Field, 2013; Myers, 1990). The two-sided significance level was set at p ≤ 0.05. Statistical analyses were run using SPSS version 27 of SPSS (IBM SPSS Statistics).

**Results**

Table 1 shows demographic characteristics of the EDs and control groups. When patients with EDs were compared with controls, no statistically significant differences were found for sex and age. Being unmarried or single (*n* = 75, 74.3% vs. *n* = 63, 60.6%, *χ*2(*df*) = 4.36(1), *p* = .04) was significantly more represented among patients with EDs than controls. Patients with EDs, compared with controls, had significantly higher rates of secondary school degrees (*n* = 17, 22.4% vs. *n* = 2, 1.9%, *χ*2(*df*) = 30.05(3), *p* < .001), and high school degree (*n* = 29, 38.2% vs. *n* = 24, 23.1%, *χ*2(*df*) = 30.05(3), *p* < .001). Being unemployed (*n* = 9, 1.9% vs. *n* = 2, .91%, *χ*2(*df*) = 14.19(2), *p* = .003), and being student (*n* = 39, 39.4% vs. *n* = 24, 23.1%, *χ*2(*df*) = 14.19(2), *p* = .003) were significantly more represented among patients with EDs than controls. Among patients, 31 (29.8%) had a diagnosis of Anorexia Nervosa, 32 (30.8%) had a diagnosis of Bulimia Nervosa, 34 (32.7%) had a diagnosis of Binge Eating Disorder, and 7(6.7%) had a diagnosis of an Eating Disorder not otherwise specified.

***Comparisons between Control and EDs Groups and on Emotion Dysregulation, Metacognitions, Repetitive Negative Thinking, and Affective Symptoms***

Table 2 shows the means, standard deviations, ranges, skewness, and kurtosis for all the study variables in both general and clinical groups and the comparisons between control and EDs groups. All variables had skewness and kurtosis in the range of acceptability (skewness ranging from -1.45 to 1.24; kurtosis ranging from -1.01 to 1.97) except rumination-reflection in the control group (kurtosis: 2.77) that was non-normally distributed exceeding the conventional cut off of ±2 (e.g., Mayers, 2013). Patients with EDs endorsed significantly higher levels of emotion dysregulation, positive beliefs about worry, negative beliefs about worry concerning uncontrollability and danger, beliefs about the need to control thoughts, rumination (i.e., brooding and reflection), worry, and more severe eating symptoms, anxiety, and depressive symptoms, than controls (Table 2). When patients with EDs were compared with controls, no statistically significant differences were found for cognitive confidence and cognitive self-consciousness (Table 2).

***Correlation Analyses in the EDs Group***

Table 3 shows correlation analyses among patients with EDs. Correlations analyses revealed that emotion dysregulation was significant positively associated with, negative beliefs about thoughts concerning uncontrollability and danger, beliefs about the need to control thoughts, rumination (i.e., brooding and reflection), worry, eating symptoms, anxiety, and depression (*r* ranging from .54 to .61). Results also suggested positive significant correlations between metacognitions and repetitive negative thinking (i.e., rumination and worry) (*r* ranging from .26 to .58) expect between cognitive confidence and rumination (*r* ranging from = .10 to .02) and between cognitive confidence and worry (*r* = .09, *p* = .355). Significant positive correlations were also found between positive beliefs about worry, negative beliefs about thoughts concerning uncontrollability and danger, cognitive confidence, beliefs about the need to control thoughts and eating psychopathology (*r* ranging from .20 to .37), while no significant correlation was found between cognitive self-consciousness and eating symptoms. Significant positive correlations were also found between negative beliefs about thoughts concerning uncontrollability and danger, beliefs about the need to control thoughts, and affective symptoms (i.e., anxiety and depression) (*r* ranging from .43 to .67). No significant correlations were found between positive beliefs about worry, cognitive confidence, cognitive self-consciousness, and affective symptoms (i.e., anxiety and depression) (*r* ranging from -.06 to .18). Finally, with regards to repetitive negative thinking, positive and significant correlations were found between worry and rumination (i.e., brooding and reflection) (*r* ranging from .21 to .58), as well as between worry, rumination (i.e., brooding and reflection) and eating psychopathology, anxiety and depression (*r* ranging from .24 to .66).

***Hierarchical Linear Regression Model: Metacognitions, Repetitive Negative Thinking and Emotion Dysregulation in Patients with EDs***

Table 4 shows the hierarchical linear regression examining the role of metacognitions and repetitive negative thinking in the prediction of emotion dysregulation, adjusted for age, affective symptoms, and eating symptoms, in patients with EDs. Before analysing data, assumptions were tested. Multicollinearity statistics were within acceptable ranges (Tolerance Index ranged from 0.32 to 1; Variance Inflation Factor [VIF] ranged from 1 to 3.13 (Barbaranelli & D'Olimpio, 2006; Bowerman & O'Connell, 1990; Field, 2013; Hair et al., 1998). The Durbin–Watson test (2.09) showed that there were no significant correlations between standardized residuals and independent variables (Barbaranelli & D’Olimpio, 2006; Field, 2013). The criterion variable (i.e., dependent variable) in the hierarchical regression model was emotion dysregulation (i.e., DERS total score). The entry order of predictor variables (i.e., independent variables) was the following. Age was entered in the first step, and it was found that it did not significantly increase the predictive ability of the model.

Subsequently both negative beliefs about thoughts concerning uncontrollability and danger and beliefs about need to control thoughts were added in the second step and were found to significantly predict emotion dysregulation; negative beliefs about thoughts concerning uncontrollability and danger and beliefs about need to control thoughts contributed an additional 39% variance to that explained by age. Subsequently rumination (i.e., brooding and reflection) and worry were added in the third step; only worry was found to significantly predict emotion dysregulation beyond age, negative beliefs about thoughts concerning uncontrollability and danger, and beliefs about the need to control thoughts; worry contributed an additional 10% variance to that explained by all other variables. Affective symptoms and eating symptoms were added in the fourth step; only eating symptoms were found to significantly predict emotion dysregulation, contributing an additional 8% variance to that explained by all other variables. A closer inspection of the final equation indicates that beliefs about the need to control thoughts, worry, and eating symptoms, were significant predictors of emotion dysregulation accounting for a total of 61% of the variation in this variable (F=16.48, df=9, p<.001).

***Hierarchical Linear Regression Model: Metacognitions, Repetitive Negative Thinking, Emotion Dysregulation, and Eating Disorder Symptoms in Patients with EDs***

Table 5 shows the hierarchical linear regression examining the role of metacognitions, repetitive negative thinking, emotion dysregulation, adjusted for age, in the prediction of eating symptoms severity, in patients with EDs. Before analysing data, assumptions were tested. Multicollinearity statistics were within acceptable ranges (Tolerance Index ranged from 0.41 to 1; Variance Inflation Factor [VIF] ranged from 1 to 2.42 (Barbaranelli & D'Olimpio, 2006; Bowerman & O'Connell, 1990; Field, 2013; Hair et al., 1998). The Durbin–Watson test (1.91) showed that there were no significant correlations between standardized residuals and independent variables (Barbaranelli & D’Olimpio, 2006; Field, 2013). The criterion variable (i.e., dependent variable) in the hierarchical regression model was the eating symptoms (i.e., EDE-Q total score). The entry order of predictor variables (i.e., independent variables) was the following. Age was entered in the first step, and it was found to significantly predict eating symptoms explaining 4% of the variance. Metacognitions (i.e., positive beliefs about worry, negative beliefs about worry concerning uncontrollability and danger, cognitive confidence, beliefs about the need to control thoughts), rumination (i.e., brooding and reflection), and worry were entered in the second step. Cognitive confidence, rumination-brooding, and worry were found to significantly predict eating symptoms; cognitive confidence, rumination-brooding, and worry contributed to an additional 38% variance to that explained by age.

Subsequently emotion dysregulation was entered in the third step. Emotion dysregulation was found to significantly predict eating symptoms beyond age, cognitive confidence, rumination-brooding, and worry. Emotion dysregulation contributed to an additional 7% variance to that explained by all other variables. A closer inspection of the final equation indicates that cognitive confidence, rumination-brooding, and emotion dysregulation were significant predictors of eating symptoms accounting for a total of 49% of the variation in this variable (F=10.08, df=9, p<.001).

**Discussion**

The aim of the current study was to extend our understanding of underlying mechanisms in emotion dysregulation in patients with EDs according to the metacognitive psychopathology tenet (Wells, 2011; Wells & Matthews, 1994, 1996).We evaluated whether those presenting with EDs, compared to controls drawn from the general population, reported higher levels of emotion dysregulation, metacognitions, and repetitive negative thinking. We also examined whether among patients EDs emotion dysregulation would be positively correlated with the endorsement of metacognitions and repetitive negative thinking. In addition, we examined whether metacognitive factors and emotion dysregulation may contribute to ED symptoms.

Consistent with what has been observed in previous studies our findings showed that patients with EDs, compared to controls, had higher levels of emotion dysregulation (Brockmeyer et al., 2014; Mallorqui-Bague et al., 2018; Monell et al., 2018), higher levels of positive beliefs about worry, negative beliefs about thoughts concerning uncontrollability and danger, beliefs about the need to control thoughts (Palmieri et al., 2021a; Palmieri et al., 2021b), rumination, and worry (Palmieri et al., 2021c; Smith et al., 2018). An unexpected result of this study is that patients with EDs and controls did not differ on cognitive confidence and cognitive self-consciousness. Whether these metacognitions are closely related with EDs is not clear yet (Palmieri et al., 2021a). Indeed, while some studies reported lower levels of cognitive confidence and higher levels of cognitive self-consciousness in patients with EDs compared to general population, by contrast, others reported opposite findings (Palmieri et al., 2021a).

Correlation analyses revealed that among patients with EDs, emotion dysregulation was positively correlated with metacognitions (i.e., positive beliefs about worry, negative beliefs about thoughts concerning uncontrollability and danger, beliefs about the need to control thoughts) and repetitive negative thinking (i.e., rumination and worry). These findings are consistent with those observed in previous studies which were run in different settings, that is in the general population (Akbari, 2017; Mansueto et al., 2022; Salguero et al., 2019), outpatients seeking psychological treatment (Mansueto et al., 2022), and in those presenting with addictive behaviours (Dragan, 2015; Ottonello et al., 2019; Poormahdy et al., 2022). No studies have assessed the correlation between metacognitions and emotion dysregulation in patients with EDs, yet. Moreover, correlations analyses revealed that among patients with EDs higher endorsement of metacognitions (i.e., positive beliefs about worry, negative beliefs about thoughts concerning uncontrollability and danger, cognitive confidence, and beliefs about the need to control thoughts) was associated with higher levels of repetitive negative thinking (i.e., worry and rumination). These findings are comparable with those of previous studies, which were run in different settings, that is in the general population, in outpatients seeking psychological treatment (Mansueto et al., 2022; Sica et al., 2007), in patients with anxiety disorder (McEvoy & Mahoney, 2013), in patients with depression (Cano-López et al., 2022; Papageorgiou & Wells, 2001, 2003, 2009), and in university students (Weber & Exner, 2013). No studies have assessed the correlation between metacognitions and repetitive negative thinking in patients with EDs, yet.

Hierarchal regression models showed that metacognitions and repetitive negative thinking make a unique contribution to emotion dysregulation in EDs patients. More specifically, hierarchal regression models suggested that beyond age, eating general psychopathology, anxiety, and depression, beliefs about the need to control thoughts (i.e., the extent to which a person believes that certain types of thoughts need to be suppressed) were significant predictors of emotion dysregulation. Similar findings have been observed in the general population and among outpatients seeking psychological treatment (Laghi et al., 2018; Mansueto et al., 2022). Beliefs about the need to control thoughts may be associated with a decreased ability to shift between mental sets (Kraft et al., 2017) leading to a cognitive ‘gridlock’ and excessive self-focussed attention (Spada et al., 2008). This could explain why patients with EDs who endorse high levels of beliefs about the need to control thoughts may experience difficulties to switching to more adaptive emotion regulation strategies (than rumination and worry). Among patients with EDs, beliefs about the need to control thoughts may explain the subjective perception of the state of emotional dysregulation in terms of low agency and low executive control. Moreover, beliefs about need to control thoughts (e.g., “Not being able to control my thoughts is a sign of weakness”) may lead patients with EDs to engage in dysfunctional eating behaviours (e.g. binge eating or dieting) as coping strategies to control their thoughts and emotional distress (Palmieri et al., 2021a; Palmieri et al., 2021b). However, further studies are needed to evaluate in greater depth this issue.

A partially unexpected result of this study is that beyond age, eating symptoms, anxiety, and depression, negative beliefs about thoughts concerning uncontrollability and danger appear not predict emotion dysregulation in patients in EDs. A possible explanation for this result may lie with previous evidence (Mansueto et al., 2022) suggesting that negative beliefs about thoughts concerning uncontrollability and danger may lead to emotion dysregulation only when repetitive negative thinking is activated. It may be assumed, therefore, that among patients with EDs negative beliefs about thoughts concerning uncontrollability and danger could increase the severity of eating psychopathology (Palmieri et al., 2021a) and affective symptoms or make them perseverative (Wells, 2005; 2010) without generating the increase in emotion dysregulation unless repetitive negative thinking is activated (Mansueto et al., 2022). However, the lack of studies exploring this contention prevents us from drawing firm conclusions about the association between negative beliefs about thoughts concerning uncontrollability and danger and emotion dysregulation in patients with EDs.

Moreover, hierarchal regression models suggested that beyond age, eating general psychopathology, anxiety, depression, and metacognitions, higher levels of emotion dysregulation in patients with EDs could be predicted by worry but not rumination. The positive association between worry and emotion dysregulation has been observed among outpatients seeking psychological treatment (Mansueto et al., 2022). It has been argued that compared to rumination, worry appears to be a more influential cognitive vulnerability factor in predicting the escalation of psychological symptoms over time (Hong, 2007; Hoyer et al., 2009). This could explain why among patients with EDs worry and rumination seem to have differential effects on the severity of emotion dysregulation, although further studies are needed to evaluate in depth this issue. Although the association between worry and emotion dysregulation observed in the present study may suggest that the activation of the CAS may play a role in the maintenance of emotion dysregulation (Wells, 2011; Wells & Matthews, 1994, 1996) in EDs patients, whether emotion dysregulation and CAS are two different constructs or whether these two constructs overlap with each other is still unclear. Further studies are required to explore in depth the relationship between other components of the CAS (Wells, 2011; Wells & Matthews, 1994, 1996) and emotion dysregulation in ED patients, as it is beyond the scope of the present study.

Finally, hierarchal regression models suggested that cognitive confidence, brooding, and emotion dysregulation were independently significant predictors of eating symptoms. These findings are consistent with previous studies underlying the potential role of metacognitions, repetitive negative thinking, and emotion dysregulation as possible maintenance factors of eating

pathology (Aldao et al. 2010; Monell et al., 2018; Palmieri et al., 2021a; Palmieri et al., 2021b).

Taken together these findings are consistent with the S-REF model (Wells, 2011; Wells & Matthews, 1994, 1996), suggesting that among patients with EDs: (1) Beliefs about the need to control thoughts (e.g., ‘‘I should be in control of my thoughts all of the time”, ‘‘not being able to control my thoughts is a sign of weakness’’) and worry (e.g. “worrying about eating and weight gain, as well as, worry about factors not strictly connected to core features of EDs”) may act as potential maintenance mechanisms of emotion dysregulation; (2) Cognitive confidence (e.g., “My memory can mislead me at times”), brooding (e.g. ““What am I doing to deserve this?; Why do I always react this way”), and emotion dysregulation may act as potential maintenance mechanisms of eating pathology.

***Clinical Implications***

These preliminary findings bring us to consider their potential clinical implications. Firstly, in terms of assessment, profiling beliefs the need to control thoughts and worry may be of use during the anamnesis process of emotion dysregulation in patients with EDs. Secondly, the S-REF model (Wells, 2011; Wells & Matthews, 1994, 1996) may be used to define an idiosyncratic case conceptualization of emotion dysregulation and to socialize patients with EDs to the idea that need to control thoughts and worry may contribute to the persistence of emotion dysregulation. Thirdly, in terms of interventions, Metacognitive Therapy techniques, such as the restructuring beliefs about need to control thoughts, thorough metacognitive focused Socratic questioning as well as behavioural experiments (Papageorgiou, 2015; Wells, 2011; Wells & Matthews, 1994, 1996), and the interruption of worry through a combination of postponement, detached mindfulness and attention training, may help reduce emotion dysregulation in patients with EDs. Moreover, it may be possible to assume that Metacognitive Therapy techniques (Papageorgiou, 2015; Wells, 2011; Wells & Matthews, 1994, 1996) focused on restructuring cognitive confidence, on reducing levels of brooding and emotion dyregulation may contribute to reducing eating pathology severity (Robertson & Strodl, 2020).

***Limitations***

Results of this study must be considered with regards to its limitations: (a) a cross-sectional design was adopted, and this precludes the drawing of conclusions as to whether or not metacognitions and repetitive negative thinking play a causal role in predicting emotion dysregulation, as well as, whether metacognitive factors and emotion dysregulation play a causal role in predicting eating symptoms, in patients with EDs; (b) social desirability, self-report biases, context effects, and poor recall may have contributed to errors in self-report measurements; (c) the sample was collected from clinics in the same city and in the same country, which may limit the generalisation of findings; (d) controls were not screened for the presence of an undiagnosed eating disorder; (e) the relationship between negative beliefs and emotion dysregulation among ED patients is still unclear since we found that negative metacognitions are not a unique predictor of emotion dysregulation; probably this result is related to the domains link to affective and eating symptoms and with worry (Mansueto et al., 2022; Palmieri et al., 2021a; Wells, 2000); (f) although the CAS in the S-REF model is understood as a state factor and more proximal cause of distress (Wells, 2011; Wells & Matthews, 1994, 1996), in the present study one of components of the CAS, i.e. worry, was measured using a trait-worry measure i.e., the PSWQ (Meyer et al., 1990); and (g) the sample size was adequate to run the analyses (Austin & Steyerberg, 2015; De Winter, 2013), although it might seem small to drawn firm conclusion of the association between metacognitive factors, emotion dsyregulation, and eating symptoms. These limitations suggest some directions for future research. Further studies in patients with EDs ensuring a more diverse sample of participants, including a state measure of worry (e.g., the Cognitive-Attentional Syndrome Questionnaire-1; (Kowalski & Dragan, 2019) and longitudinal designs (testing the association between metacognitions, repetitive negative thinking, emotion dysregulation, and eating symptoms), are warranted.

**Conclusions**

In alignment with the S-REF model (Wells, 2011; Wells & Matthews, 1994, 1996) our findings show that in patients with EDs: (a) emotion dysregulation may be associated with the presence of beliefs about the need to controls thoughts as well as the engagement in worry; (b) eating pathology may be associated with lack of cognitive confidence, brooding, and emotion dysregulation. If these findings were to be replicated: (a) beliefs about the need to controls thoughts and worry could be considered as potential therapeutic targets in clinical interventions aimed at reducing emotion dysregulation in patients with EDs; (b) cognitive confidence, brooding, and emotion dysregulation could be considered as potential therapeutic targets in clinical interventions aimed at reducing the severity of eating symptoms in patients with EDs.

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**Table 1.** Socio-demographic variables.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Controls  (n=104) | Patients with EDs (n=104) | χ2(df) /t(df) | *p* |
| **Gender** |  |  |  |  |  |
| Female | n (%) | 104(100) | 104(100) | 44(206) | *.66* |
| Age (years) | mean ± SD | 29.32(8.12) | 28.79(9.14) |
| **Marital status** |  |  |  |  |  |
| Unmarried/single | n (%) | 63(60.6) | 75(74.3) | 4.36(1) | *.04* |
| Married/cohabitant | n (%) | 41(39.4) | 26(25.7) |  |  |
| **Education** |  |  |  |  |  |
| Secondary school | n (%) | 2(1.9) | 17(22.4) | 30.05(3) | *<.001* |
| High school | n (%) | 24(23.1) | 29(38.2) |  |  |
| Undergraduate degree | n (%) | 27(26) | 21(27.6) |  |  |
| Postgraduate degree | n (%) | 52(49) | 9(11.8) |  |  |
| **Working status** |  |  |  |  |  |
| Unemployed | n (%) | 2(1.9) | 9(9.1) | 14.19(2) | *.003* |
| Student | n (%) | 24(23.1) | 39(39.4) |  |  |
| Employed | n (%) | 77(74) | 51(51.5) |  |  |

Note. EDs: eating disorders

**Table 2.** Means, standard deviations, range, skewness and kurtosis of study variables and comparison between control group and Eating Disorders group.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Controls (n=104) | | | |  | Patients with EDs (n=104) | | | |  |  |  |
|  | M(SD) | Range | Skewness | Kurtosis |  | M(SD) | Range | Skewness | Kurtosis | F | t(gdl) / U Mann-Whitney | *p* |
| DERS | 76(22.45) | 45-140 | 1.04 | .77 |  | 113(31.02) | 44-172 | -.12 | -1.01 | 23.04 | -9.89(206) | <.001 |
| MCQ-30-P | 11.16(3.95) | 6-21 | .73 | .24 |  | 12.32(4.23) | 6-24 | .39 | -.46 | .52 | -2-03(206) | .043 |
| MCQ-30-N | 13.78(3.51) | 6-24 | .36 | .02 |  | 16.57(3.66) | 8-24 | .13 | -.39 | .042 | -5.61(206) | <.001 |
| MCQ-30-CC | 11.05(4.56) | 6-24 | .77 | -.32 |  | 11.94(5.43) | 0-24 | .68 | -.49 | 2.15 | -1.28(206) | .201 |
| MCQ-30-NC | 10.37(3.28) | 5-24 | 1.02 | 1.91 |  | 13.76(4.21) | 6-24 | .09 | -.74 | 8.75 | -6.49(206) | <.001 |
| MCQ-30-CSC | 15.41(3.61) | 6-24 | .12 | .03 |  | 15.46(3.87) | 6-23 | -.05 | -.39 | 1.00 | -.08(206) | .935 |
| RRS-B | 10.14(2.99) | 5-17 | .34 | -.33 |  | 14.02(3.54) | 5-20 | -.38 | .02 | .59 | -8.53(206) | <.001 |
| RRS-R | 8.20(2.60) | 5-20 | 1.24 | 2.77 |  | 12.11(3.15) | 5-20 | -.35 | .15 | - | 8977.50 | <.001 |
| PSWQ | 51.42(12.48) | 23-79 | -.04 | -.26 |  | 60.21(13.05) | 24-80 | -.62 | -.33 | .46 | -4.96(206) | <.001 |
| EDE-Q | 1.24(.98) | 0-5.14 | 1.23 | 1.97 |  | 4.19(1.23) | .36-5.75 | -1.45 | .89 | 6.33 | -19.13 | <.001 |
| HADS-A | 8.10(2.61) | 4-15 | .40 | -.20 |  | 10.51(5.14) | 1-21 | .07 | -.91 | 52.15 | -4.28(206) | <.001 |
| HADS-D | 3.93(3.06) | 0-15 | .00 | 1.32 |  | 9.32(4.57) | 0-20 | .01 | -.80 | 23.12 | -9.99(206) | <.001 |

Note: EDs: Eating Disorders; DERS = Difficulties in Emotion Regulation Scale; MCQ-30-P = Positive beliefs about worry; MCQ-30-N = Negative beliefs about thoughts concerning uncontrollability and danger; MCQ-30-CC = Cognitive confidence; MCQ-30-NC = Beliefs about the need to control thoughts; MCQ-30-CSC = Cognitive self-consciousness; HADS-A = Hospital Anxiety and Depression Scale - Anxiety; HADS-D = Hospital Anxiety and Depression Scale – Depression; PSWQ = Penn State Worry Questionnaire; RRS-B = Ruminative Response Scale Brooding; RRS-R = Ruminative Response Scale Reflection.

**Table 3.** Inter-correlations of variables among patients with Eating Disorders (n=104).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | DERS | 1 | .03 | .57\*\*\* | .05 | .61\*\*\* | .01 | .48\*\*\* | .31\*\* | .66\*\*\* | .53\*\*\* | .66\*\*\* | .58\*\*\* |
| 2 | MCQ-P |  | 1 | .10 | .20\* | .22\* | .24\* | .22\* | .28\*\* | .29\*\* | .20\* | .13 | .02 |
| 3 | MCQ-N |  |  | 1 | .11 | .69\*\*\* | .26\*\* | .42\*\*\* | .27\*\* | .61\*\*\* | .32\*\*\* | .67\*\*\* | .51\*\*\* |
| 4 | MCQ-CC |  |  |  | 1 | .15 | .02 | .10 | .02 | .09 | .34\*\*\* | -.02 | .11 |
| 5 | MCQ-NC |  |  |  |  | 1 | .25\* | .48\*\*\* | .32\*\*\* | .58\*\*\* | .37\*\*\* | .58\*\*\* | .43\*\*\* |
| 6 | MCQ-CSC |  |  |  |  |  | 1 | .21\* | .42\*\*\* | .21\* | .04 | .18 | -.06 |
| 7 | RRS-B |  |  |  |  |  |  | 1 | .63\*\*\* | .52\*\*\* | .52\*\*\* | .54\*\*\* | .38\*\*\* |
| 8 | RRS-R |  |  |  |  |  |  |  | 1 | .37\*\*\* | .29\*\* | .41\*\*\* | .24\* |
| 9 | PSWQ |  |  |  |  |  |  |  |  | 1 | .46\*\*\* | .66\*\*\* | .48\*\*\* |
| 10 | EDE-Q |  |  |  |  |  |  |  |  |  | 1 | .43\*\*\* | .48\*\*\* |
| 11 | HADS-A |  |  |  |  |  |  |  |  |  |  | 1 | .66\*\*\* |
| 12 | HADS-D |  |  |  |  |  |  |  |  |  |  |  | 1 |

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

Note: EDE-Q = Eating Disorder Examination Questionnaire; DERS = Difficulties in Emotion Regulation Scale; MCQ-30-P = Positive beliefs about worry; MCQ-30-N = Negative beliefs about thoughts concerning uncontrollability and danger; MCQ-30-CC = Cognitive confidence; MCQ-30-NC = Beliefs about the need to control thoughts; MCQ-30-CSC = Cognitive self-consciousness; HADS-A = Hospital Anxiety and Depression Scale - Anxiety; HADS-D = Hospital Anxiety and Depression Scale – Depression; PSWQ = Penn State Worry Questionnaire; RRS-B = Ruminative Response Scale Brooding; RRS-R = Ruminative Response Scale Reflection.

**Table 4.** Hierarchical regression model: metacognitions, repetitive negative thinking, and emotion dysregulation in patients with Eating Disorders.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Predictor | B | Std. Error | β | t | 95% Confidence interval for B | | R | R2 | Adjusted R2 | ΔR2 |
| Lower Bound | Upper Bound |
| Model |  |  |  |  |  |  |  |  |  |  |
| Step 1 |  |  |  |  |  |  | .17 | .03 | .02 | .03 |
| Age | -.59 | .33 | -.17 | -1.78 | -1.24 | . 07 |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Step 2 |  |  |  |  |  |  | .65 | .42 | .40 | .39\*\*\* |
| Age | -.21 | .26 | -.06 | -.82 | -.74 | .31 |  |  |  |  |
| MCQ-N | 2.49 | .89 | .29 | 2.81\* | .73 | 4.25 |  |  |  |  |
| MCQ-NC | 2.90 | .78 | .39 | 3.71\*\* | 1.35 | 4.45 |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Step 3 |  |  |  |  |  |  | .72 | .52 | .49 | .10\*\*\* |
| Age | -.06 | .25 | -.02 | -.23 | -.55 | .43 |  |  |  |  |
| MCQ-N | 1.06 | .87 | .12 | 1.21 | -.67 | 2.79 |  |  |  |  |
| MCQ-NC | 1.83 | .76 | .25 | 2.41\* | .32 | 3.33 |  |  |  |  |
| RRS-B | 1.06 | .89 | .12 | 1.19 | -.71 | 2.82 |  |  |  |  |
| RRS-R | -.22 | .89 | -.02 | -.25 | -1.99 | 1.55 |  |  |  |  |
| PSWQ | .90 | .23 | .38 | 3.92\*\*\* | .45 | 1.36 |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Step 4 |  |  |  |  |  |  | .78 | .61 | .57 | .08\*\*\* |
| Age | .02 | .23 | .01 | .08 | -.45 | .48 |  |  |  |  |
| MCQ-N | .06 | .87 | .01 | .06 | -1.67 | 1.78 |  |  |  |  |
| MCQ-NC | 1.61 | .70 | .22 | 2.31\* | .23 | 2.99 |  |  |  |  |
| RR-B | -.09 | .87 | -.01 | -.10 | -1.83 | 1.65 |  |  |  |  |
| RRS-R | -.20 | .83 | -.02 | -.24 | -1.85 | 1.44 |  |  |  |  |
| PSWQ | .58 | .23 | .24 | 2.58\* | .13 | 1.03 |  |  |  |  |
| HADS-A | 1.25 | 1.69 | .21 | 1.82 | -.11 | 2.61 |  |  |  |  |
| HADS-D | 1.01 | .63 | .15 | 1.61 | -.24 | 2.27 |  |  |  |  |
| EDE-Q | 4.80 | 2.07 | .19 | 2.32\* | .70 | 8.91 |  |  |  |  |

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

Note: EDE-Q = Eating Disorder Examination Questionnaire; HADS-A = Hospital Anxiety and Depression Scale - Anxiety; HADS-D = Hospital Anxiety and Depression Scale – Depression; MCQ-N = Negative beliefs about thoughts concerning uncontrollability and danger; MCQ-NC = Beliefs about the need to control thoughts; PSWQ = Penn State Worry Questionnaire; RRS-B = Ruminative Response Scale Brooding, RRS-R = Ruminative Response Scale Reflection.

**Table 5.** Hierarchical regression model: metacognitions, repetitive negative thinking, emotion dysregulation and eating symptoms severity in patients with Eating Disorders.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Predictor | B | Std. Error | β | t | 95% Confidence interval for B | | R | R2 | Adjusted R2 | ΔR2 |
| Lower Bound | Upper Bound |
| Model |  |  |  |  |  |  |  |  |  |  |
| Step 1 |  |  |  |  |  |  | .21 | .04 | .03 | .04\* |
| Age | -.03 | .01 | -.21 | -2.18\* | -.05 | -.003 |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Step 2 |  |  |  |  |  |  | .65 | .42 | .37 | .38\*\*\* |
| Age | -.02 | .01 | -.14 | -1.71 | -.04 | .003 |  |  |  |  |
| MCQ-P | -.01 | .02 | -.02 | -2.21 | -.06 | .04 |  |  |  |  |
| MCQ-N | -.01 | .04 | -.04 | -.32 | -.09 | .07 |  |  |  |  |
| MCQ-CC | .07 | .02 | .31 | 3.71\*\*\* | .03 | .11 |  |  |  |  |
| MCQ-NC | .01 | .03 | .02 | .86 | -.06 | .07 |  |  |  |  |
| RRS-B | .13 | .04 | .37 | 3.25\*\* | .05 | .21 |  |  |  |  |
| RRS-R | -.02 | .04 | -.06 | -.56 | -.10 | .06 |  |  |  |  |
| PSWQ | .02 | .01 | .25 | 2.29\* | .003 | .05 |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Step 3 |  |  |  |  |  |  | .70 | 49 | .44 | .07\*\*\* |
| Age | -.02 | .01 | -.13 | -1.67 | -.04 | .003 |  |  |  |  |
| MCQ-P | .02 | .03 | .06 | .74 | -.03 | .07 |  |  |  |  |
| MCQ-N | -.02 | .04 | -.07 | -.64 | -.09 | .05 |  |  |  |  |
| MCQ-CC | .07 | .02 | .31 | 3.95\*\*\* | .04 | .11 |  |  |  |  |
| MCQ-NC | -.03 | .03 | -.09 | -.83 | -.09 | .04 |  |  |  |  |
| RRS-B | .11 | .04 | .33 | 3.03\*\* | .04 | .19 |  |  |  |  |
| RRS-R | -.03 | .04 | -.07 | -.71 | -.10 | .05 |  |  |  |  |
| PSWQ | .01 | .01 | .08 | .69 | -.01 | .03 |  |  |  |  |
| DERS | .02 | .004 | .40 | 3.65\*\*\* | .01 | .03 |  |  |  |  |

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

Note: DERS: Difficulties in Emotion Regulation Scale; HADS-A = Hospital Anxiety and Depression Scale - Anxiety; HADS-D = Hospital Anxiety and Depression Scale – Depression; MCQ-30-P = Positive beliefs about worry; MCQ-N = Negative beliefs about thoughts concerning uncontrollability and danger; MCQ-30-CC = Cognitive confidence; MCQ-NC = Beliefs about the need to control thoughts; PSWQ = Penn State Worry Questionnaire; RRS-B = Ruminative Response Scale Brooding, RRS-R = Ruminative Response Scale Reflection.