

# Research article

## Ερευνητική εργασία

### The relationship between metacognitive beliefs and symptoms in eating disorders

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The present study aimed to explore the role of dysfunctional metacognitive beliefs in Eating Disorders (EDs) and their potential associations with core and comorbid symptoms. The Metacognition Questionnaire-30 (MCQ-30), the Eating Disorder Examination Questionnaire 6.0 (EDE-Q), the Hospital Anxiety and Depression Scale (HADS) and the Maudsley Obsessive-Compulsive Inventory (MOCI) were used to evaluate 44 Anorexia Nervosa (AN), 50 Bulimia Nervosa (BN) patients and 37 controls. Patients featured more dysfunctional metacognitive beliefs which positively correlated with ED and comorbid symptoms. Both AN and BN patients had higher scores than healthy controls on MCQ-30 total score, Positive Beliefs about Worry, Negative Beliefs about Thoughts Uncontrollability and Danger and Need to Control Thoughts. AN patients also featured higher scores than healthy controls on Cognitive Self-Consciousness. No statistically significant difference was found between the two clinical groups in MCQ-30 total and subscale scores. Among metacognitive beliefs, Negative Beliefs about thoughts Uncontrollability and Danger showed the stronger correlations with core EDs symptoms, (coefficients ranging from 0.24 to 0.40), followed by Need to Control Thoughts (coefficients ranging from 0.22 to 0.38). Dysfunctional metacognitive beliefs were also significantly positively correlated with HADS-Anxiety, HADS-Depression and MOCI Total, in a similar manner. Dysfunctional metacognitive beliefs also predicted 19%, 35%, 20%, and 21% of the variance in Global EDE-Q, HADS-Anxiety, HADS-Depression and MOCI Total scores respectively, in regression analyses. Nevertheless, mediation analysis indicated that the relationship between Negative Beliefs about thoughts Uncontrollability and Danger and core EDs symptomatology as measured by EDE-Q, was not mediated by comorbid anxiety, depression and obsessionality. As a result, dysfunctions in metacognitive beliefs may reflect a common, trans-diagnostic path in AN and BN patients, towards a wide range of symptoms, both core and commorbid.

**Key words:** Anorexia nervosa, bulimia nervosa, cognitive attentional syndrome, metacognition, worry.

## Introduction

Eating disorders (EDs) are debilitating, complex mental disorders characterized by pathological eating behaviours, extreme concerns with body weight and shape, and body image distortions.<sup>1,2</sup> Patients suffer from severe psychosocial and physical consequences, experiencing a highly diminished quality of life.<sup>3,4</sup> The outcome of treatment based on the existing therapeutic models is often poor, especially in anorexia nervosa (AN).<sup>5</sup> As new perspectives in the treatment of EDs are necessary, a better understanding of cognitive processes, rather than solely cognitive content itself, seems promising.<sup>6,7</sup> Such modulating processes fall within the concept of metacognition, failures in which lead to inflexible and maladaptive cognitive patterns.<sup>8</sup>

Metacognition or "cognition about cognition", simplistically as described in the areas of education and developmental psychology, is considered a fundamental component of a well-developed cognitive function and a prerequisite for behavioural change.<sup>9,10</sup> According to Wells, metacognition refers to the structures, content, and processes involved in the monitoring, appraisal, and control of cognition.<sup>11</sup> Dysfunctional metacognitive beliefs refer to assumptions that outline the perceived importance or consequences of specific thoughts.<sup>8</sup> Such beliefs have been found to play an important role across a wide spectrum of disorders. The Self-Regulatory Executive Function (S-REF) model links metacognition to psychopathology as distorted metacognitions (i.e. metacognitive beliefs) lead to a maladaptive cognitive fashion termed Cognitive Attentional Syndrome (CAS) featuring attentional bias, focusing attention on perceived threat and heightened self-focused attention, activation of self-beliefs and self-appraisal, reduced efficiency of cognitive functioning and unhelpful coping strategies.<sup>8,12,13</sup> The S-REF model thus points to a problematic self-processing as major component of the CAS which depletes resources for processing information incompatible with dysfunctional beliefs impeding modification of negative self-beliefs and blocking access to self-knowledge. The CAS has been proven to be strongly positively correlated to psychological inflexibility and metacognitive strategies fundamental to

the CAS, such as rumination and worry, have been conceptualized as specific types of psychological inflexibility.<sup>12</sup>

The last decade, few studies have examined metacognitive functioning in EDs, most of them focusing on AN, offer corroborative evidence revealing dysfunctional metacognitive beliefs that lead to a perseverative style of thinking and interfere with control of thoughts and emotional regulation. The metacognitions questionnaire 30 (MCQ-30)<sup>14</sup> is often utilized to assess these maladaptive beliefs and tendencies. Three of these studies found higher scores in AN patients than control groups on at least three of the MCQ-30's subscales, with Negative Beliefs about thoughts Uncontrollability and Danger as well as Need to Control Thoughts being among them in all three studies.<sup>15-17</sup> Similar results were yielded by a more recent study in which dysfunctional metacognitions were positively correlated with EDs symptomatology, explaining 51% of the variance in EDs symptoms, with Need to Control Thoughts being the strongest factor.<sup>18</sup> Both typical and atypical AN patients have been shown to feature similar dysfunctional metacognitive profiles, predicting drive for thinness.<sup>19</sup> Similar results were yielded by studies with a qualitative methodology, indicating the presence of dysfunctional metacognitions, thought control strategies like worry and rumination, in a transdiagnostic manner.<sup>20,21</sup>

The present study aimed to examine the profile of dysfunctional metacognitive beliefs in both AN and BN patients. Based on the previous research, our hypothesis was that dysfunctional metacognitions, especially negative beliefs about thoughts uncontrollability and danger as well as need to control thoughts would be present in both AN and BN patients.

Another aim of the study was to examine the potential associations of dysfunctional metacognitive beliefs with clinical characteristics, core EDs clinical symptoms, and comorbid symptoms i.e. depression, anxiety and obsessionality. To the best of our knowledge, there are no such research concerning comorbid symptomatology in EDs, but dysfunctional metacognitive beliefs were found to be associated with EDs symptoms in previous research. As results from previously conducted research<sup>22-25</sup> clearly sup-

port the contribution of dysfunctional metacognitions to depression, anxiety and obsessionality, we hypothesized that dysfunctional metacognitive beliefs will be associated with such comorbid symptoms of EDs patients as well.

Finally, we aimed to further expand previous research examining whether the relationship between dysfunctional metacognitions and EDs symptoms were mediated by comorbid symptoms.

## **Material and method**

### ***Participants and procedures***

Female patients with EDs (n=94) were consecutively recruited following admission to the Eating Disorders Unit of the Eginition University Hospital, prior to consequent outpatient treatment. Patients group consisted of 44 patients with AN (restricting type, AN-R: n=21 and binge-purge type, AN-BP: n=23) and 50 patients with BN. All patients were native Greek speakers, aged 18–45, and were diagnosed with either AN or BN according to DSM-5 criteria by a psychiatrist specializing in EDs. Exclusion criteria for participation in the study were: mental retardation, concurrent comorbidity with substance abuse-related disorders, chronic obsessive-compulsive disorder, body dysmorphic disorder, current major depressive episode and a history of psychosis. A total of 111 patients were invited to participate in the study, but 9 refused participation, while 8 were not eligible for participation due to the exclusion criteria.

The healthy control group consisted of women (n=37) recruited through local advertising among hospital and university personnel, and students of the University of Athens. Exclusion criteria for healthy participants were any history of psychiatric illness, being under psychotropic medications, a Body Mass Index (BMI) <18,5 or >25 and a family history of ED. Initially 46 responded in order to participate, but 9 were dismissed due to exclusion criteria. Basic demographic data were obtained, and participants' weight and height were measured on the day of testing. Prior to enrollment, all participants provided written informed consent. The study was approved by the Eginition University Hospital Ethics Committee.

### ***Measures***

Descriptive self-report data included age, education, duration of disease and lowest adult lifetime BMI as calculated from adult height and lowest adult lifetime weight. BMI was calculated by the height and weight measured at the time of recruitment.

The Metacognition Questionnaire-30, MCQ-30, assesses individual differences in monitoring tendencies and metacognitive beliefs. It consists of five subscales assessed by 30-items in total, rated on a 4-point Likert scale, where higher scores indicate greater dysfunctional metacognitive activity.<sup>14</sup> MCQ-30 subscales are: (1) Positive Beliefs about Worry (extent to which a person believes that worrying is useful), (2) Negative Beliefs about thoughts Uncontrollability and Danger (extent to which a person thinks that worrying is uncontrollable and dangerous), (3) Lack of Cognitive Confidence (lack of confidence in attention and memory), (4) Need to Control Thoughts, and (5) Cognitive Self-Consciousness (tendency to monitor one's own thoughts and focus attention inwards). The Greek version of the MCQ-30 has been proven to be a comprehensible, psychometrically adequate, reliable tool for assessing worry-related metacognitions in the Greek population.<sup>26</sup>

The Eating Disorder Examination Questionnaire 6.0, EDE-Q 6.0, measures the severity of EDs symptomatology.<sup>27</sup> The EDE-Q consists of four subscales, with 28 items in total, which assess Restraint of food intake, Concern about Eating, Concern about Shape and Concern about Weight. Items are scored in a range from 0 to 6, where higher scores imply higher severity of eating disorder symptoms. Each subscale's score is presented as a mean score, and Global EDE-Q score is calculated as the mean score of all the four subscales. The Greek version of EDE-Q 6.0 is a reliable tool with good psychometric properties.<sup>28</sup>

The Hospital Anxiety and Depression Scale, HADS, is a self-report scale consisting of two seven-item subscales that measure current Anxiety and Depression.<sup>29</sup> The Greek version of HADS has been shown with good psychometric properties.<sup>30</sup> The Maudsley Obsessive–Compulsive Inventory, MOCI,

was used to measure obsessionality.<sup>31</sup> It is a self-report 30-item instrument, including four subscales: Checking, Cleaning, Doubting and Slowness. The scale has been adjusted and validated in Greek by research groups at the University of Athens.<sup>32</sup>

### **Statistical analysis**

All data were preliminary assessed for normality. Since the great majority of the examined variables did not follow a normal distribution (as indicated by the Kolmogorov–Smirnov test, kurtosis values and relevant plots) non-parametric tests were used for all variables, for reasons of uniformity. A series of Kruskal–Wallis H non-parametric tests were conducted in order to evaluate differences among the different sample groups (AN, BN and HC) in age, BMI, years of education, EDE-Q, HADS, MOCI and MCQ-30 total and subscale scores. Post-hoc Mann-Whitney U tests were performed for pairwise comparisons. Bonferroni correction for multiple comparisons was performed as appropriate. The relationship between metacognition and EDs symptoms as well as depression, anxiety and obsessionality was examined by calculating Spearman's rho correlation coefficient. Multiple linear regressions were performed to explore the effects of metacognitive factors in predicting EDs symptoms, anxiety, depression and obsessionality. The SPSS PROCESS macro version 3.333 for multiple mediation analyses using bootstrapping was used to examine whether the relationship between metacognitive beliefs and Global EDE-Q was mediated by HADS-Anxiety, HADS-Depression and MOCI Total. Unstandardized indirect effects were computed for each of 5,000 bootstrapped samples, and the 95% confidence interval was computed by determining the indirect effects at the 2.5th and 97.5th percentiles. For all statistical analyses, IBM SPSS Statistics Version 25.0 for Windows was used.

## **Results**

### **Difference between groups in demographic and clinical variables**

No statistically significant difference was found between the three groups with respect to age and years of education. Additionally, no statistically significant difference was found between AN and BN

patients in disease duration. As expected, there was a statistically significant difference in BMI between the two clinical groups (AN and BN). The current and the lowest lifetime BMI was significantly lower in AN than BN patients ( $U=377.50$ ,  $p<0.001$  and  $U=38.50$ ,  $p<0.001$  respectively). There were statistically significant differences between the three groups in HADS-Anxiety, HADS-Depression and MOCI Total as well as in Global EDE-Q and its subscales as shown in table 1.

### **Difference between groups in metacognitive variables**

Pairwise comparisons showed that both AN and BN patients had higher scores than HC on MCQ-30 total score, Positive Beliefs about Worry, Negative Beliefs about Thoughts Uncontrollability and Danger and Need to Control Thoughts. AN patients also featured higher scores than HC on Cognitive Self-Consciousness. No statistically significant difference was found between the two clinical groups in MCQ-30 total and subscale scores (table 2).

### **Associations between metacognitive and clinical variables**

Since there was no statistically significant difference between AN and BN patients in MCQ-30 and their subscales, these two groups were collapsed into one EDs group onwards in the correlation and mediation analyses.

In the unified clinical sample, no statistically significant correlations were found between metacognitive beliefs (MCQ-30 subscales and total score) and BMI, lowest lifetime BMI, and duration of disease. Among the MCQ-30 subscales, Negative Beliefs about thoughts Uncontrollability and Danger showed the stronger correlations with Global EDE-Q and its subscales (coefficients ranging from 0.24 to 0.40), followed by Need to Control Thoughts (coefficients ranging from 0.22 to 0.38). Dysfunctional metacognitive beliefs were also significantly positively correlated with HADS-Anxiety, HADS-Depression and MOCI Total. Negative Beliefs about thoughts Uncontrollability and Danger showed the strongest correlations, similarly to what was found in the correlations with EDs core symptoms (table 3).

**Table 1.** Demographic and clinical characteristics of Anorexia Nervosa (AN), Bulimia Nervosa (BN) and Healthy Controls (HC).

	AN (n=44)	BN (n=50)	HC (n=37)	H	p
	Median (IQR)				
Age (years)	26.00 (10.75)	24.00 (6.00)	25.00 (7.00)		ns
Education (years)	16.00 (3.00)	16.00 (2.00)	16.00 (3.00)		ns
BMI (kg/m <sup>2</sup> )	16.58 (2.37)	21.77 (4.45)	20.94 (2.50)	84.04	<0.001
Lowest lifetime BMI (kg/m <sup>2</sup> )	15.49 (2.22)	18.66 (3.50)	–	38,50*	<0.001
Duration of disease (years)	5.00 (8.00)	6.00 (9.00)	–	–	ns
HADS-Anxiety	13.00 (5.00)	10.50 (7.00)	3.00 (2.00)	68.16	<0.001
HADS-Depression	9.00 (5.00)	9.00 (5.00)	2.00 (2.00)	62.33	<0.001
MOCI Total	13.50 (7.75)	12.00 (8.00)	5.00 (4.50)	61.25	<0.001
EDE-Q Restraint	4.80 (1.20)	4.00 (1.85)	0.60 (0.80)	73.53	<0.001
EDE-Q Eating Concern	3.50 (1.90)	4.00 (1.45)	0.20 (0.60)	78.62	<0.001
EDE-Q Shape Concern	4.50 (2.06)	4.94 (1.75)	0.75 (1.25)	70.10	<0.001
EDE-Q Weight Concern	3.60 (2.00)	4.60 (1.65)	0.40 (1.10)	74.64	<0.001
Global EDE-Q	4.15 (1.34)	4.45 (1.08)	0.47 (0.99)	77.71	<0.001

IQR: Inter-quartile range, HADS: Hospital Anxiety and Depression Scale, MOCI: Maudsley Obsessive Compulsive Inventory, ns: Non statistically significant, p-values are estimated from Kruskal-Wallis H non-parametric tests

\* Mann-Whitney U between AN and BN groups

Linear regression analyses were performed in which Global EDE-Q, HADS-Anxiety, HADS-Depression and MOCI Total scores were successively used as dependent variables. BMI and Duration of disease were examined as possible predictors in Model 1 and the five MCQ-30 factors were entered as predictors in Model 2 (table 4). Collinearity and residual statistics were within the acceptable range in all models. BMI, Lowest adult lifetime BMI, Duration of disease, Age and Years of Education were not significant predictors in any of the analyses. Metacognitive factors explained 19% of the variance in the Global EDE-Q, 35% of the variance in HADS-Anxiety, 20% of the variance in HADS-Depression and 21% of the variance in MOCI Total. Negative Beliefs about thoughts Uncontrollability and Danger was the predominant and common factor in all but HADS-Depression analyses where Lack of Cognitive Confidence was a significant predictor. In the analysis predicting MOCI Total variance, apart from Negative Beliefs about thoughts Uncontrollability and Danger, Cognitive Self-Consciousness was also a significant predictor.

Mediation analysis indicated that the relationship between Negative Beliefs about thoughts Uncontrollability and Danger and Global EDE-Q was not mediated by HADS-Anxiety, HADS-Depression and MOCI Total. The direct effect of Negative Beliefs about thoughts Uncontrollability and Danger on Global EDE-Q was 0.07 ( $p=0.012$ ). Neither the total indirect effect through the three mediators (HADS-Anxiety, HADS-Depression and MOCI Total), nor each of them separately was statistically significant, as determined by the bias corrected and accelerated confidence intervals (95% BCaCI). (Total Indirect effect 95% BCaCI: -0.004-0.067, indirect effect 95% BCaCI: for HADS-Anxiety -0.039-0.035, for HADS-Depression -0.011-0.038, for MOCI Total -0.002-0.047).

## Discussion

This study is the first to investigate the role of dysfunctional metacognitive beliefs in relation to a variety of symptoms in AN and BN patients, extending the so far existing research. The results of the present study are consistent with the S-REF

**Table 2.** Metacognitive beliefs in Anorexia Nervosa (AN), Bulimia Nervosa (BN) and Healthy Controls (HC)

	AN (n=44)	BN (n=50)	HC (n=37)	H	p	U	p	
	Median (IQR)							
MCQ-30	79.00 (22.00)	77.00 (19.50)	54.00 (20.00)	45.06	<0.001	AN-HC BN-HC AN-BN	159.50 270.00 966.00	<0.001 <0.001 ns
Lack of Cognitive Confidence	12.00 (9.00)	11.00 (8.00)	9.00 (5.00)	7.02	0.030	AN-HC BN-HC AN-BN	531.00 696.00 985.00	ns ns ns
Positive Beliefs about Worry	14.00 (6.00)	11.00 (6.00)	8.00 (6.00)	17.83	<0.001	AN-HC BN-HC AN-BN	375.50 570.50 898.00	<0.001 0.036 ns
Negative Beliefs about Thoughts Uncontrollability and Danger	18.00 (7.00)	18.00 (6.50)	10.00 (7.00)	46.41	<0.001	AN-HC BN-HC AN-BN	160.50 243.00 1,065.50	<0.001 <0.001 ns
Need to Control Thoughts	15.00 (7.00)	16.00 (4.50)	9.00 (5.00)	41.68	<0.001	AN-HC BN-HC AN-BN	184.50 288.00 1,016.00	<0.001 <0.001 ns
Cognitive Self-Consciousness	18.00 (3.00)	16.00 (5.50)	15.00 (4.00)	9.71	0.008	AN-HC BN-HC AN-BN	485.00 669.00 936.00	0.041 ns ns

IQR: Inter-quartile range, ns: Non statistically significant

Note: p in Mann-Whitney U tests was corrected for multiple comparisons using the Bonferroni approach.

**Table 3.** Spearman's Correlation Coefficients (rho) of metacognitive beliefs with EDs core and comorbid symptoms (n=94).

	MCQ-30 Total score	Need to control thoughts	Negative beliefs about thoughts uncontrollability and danger	Positive beliefs about worry	Cognitive self-consciousness	Lack of cognitive confidence
Global EDE-Q	0.24*	0.35**	0.32*	0.07	-0.03	0.13
Restraint	0.04	0.17	0.06	0.04	0.06	-0.02
Eating Concern	0.26*	0.27*	0.38**	0.05	-0.15	0.31*
Weight Concern	0.14	0.22*	0.24*	-0.02	-0.15	0.06
Shape Concern	0.34**	0.38**	0.40**	0.09	0.08	0.17
HADS-Anxiety	0.49**	0.31*	0.57**	0.18	0.14	0.35**
HADS-Depression	0.35**	0.27*	0.36**	0.00	0.08	0.36**
MOCI Total	0.33**	0.31*	0.44**	0.16	-0.10	0.24*

Note: Values refer to EDs group correlations, ns: Non statistically significant, \*p<0.05, \*\*p<0.001

**Table 4.** Multiple regression analyses predicting *Global EDE-Q, HADS-Anxiety, HADS-Depression, MOCI Total* (n=94).

	<i>Global EDE-Q</i>			<i>HADS-Anxiety</i>			<i>HADS-Depression</i>			<i>MOCI Total</i>		
	$\beta$	SE	$R^2$ change	$\beta$	SE	$R^2$ change	$\beta$	SE	$R^2$ change	$\beta$	SE	$R^2$ change
<b>Model 1</b>			0.09			0.08			0.08			0.15
BMI	0.07	0.04		-0.21	0.16		0.01	0.13		-0.35	0.18	
Lowest lifetime BMI	-0.02	0.04		0.47	0.18		-0.16	0.15		0.11	0.20	
Duration of disease	-0.02	0.03		0.14	0.13		0.06	0.11		0.21	0.15	
Age	-0.14	0.07		-0.04	0.14		0.04	0.12		-0.13	0.16	
Education				-0.62	0.32		-0.58	0.28		-0.86	0.36	
<b>Model 2</b>			0.19*			0.35*			0.20*			0.21*
NBUD	0.06*	0.03		0.53*	0.12		0.13	0.12		0.45*	0.15	
NCT	0.06	0.04		-0.10	0.13		0.19	0.13		0.15	0.17	
CSC	0.00	0.03		0.04	0.13		0.04	0.12		-0.37*	0.16	
PBW	-0.02	0.03		0.07	0.10		-0.14	0.09		0.03	0.12	
LCC	0.00	0.02		0.22	0.08		0.21*	0.08		0.09	0.10	

\* $p < 0.05$ , SE: standard error, NBUD: *Negative Beliefs about thoughts Uncontrollability and Danger*, NCT: *Need to Control Thoughts*, CSC: *Cognitive Self-Consciousness*, PBW: *Positive Beliefs about Worry*, LCC: *Lack of Cognitive Confidence*

model linking metacognition to psychopathology. They also confirm the results of previous research studies regarding the presence of dysfunctional metacognitions in AN and BN, and well replicates previous findings that Negative Beliefs about thoughts Uncontrollability and Danger, Need to Control Thoughts, Positive Beliefs about Worry and Cognitive Self-Consciousness are higher in AN than controls.<sup>15-19</sup> It also suggests that the same findings also apply in BN patients, with the exception of Cognitive Self-Consciousness. Previous findings, suggested that participants with AN were more likely to endorse positive beliefs about worry and were more likely to state that they could not trust their cognitive abilities than BN patients.<sup>21</sup> Results from our study indicate that with the exception of Cognitive Self-Consciousness the degree of the dysfunction was found to be almost equal in AN and BN, a finding that is consistent with the present transdiagnostic conceptualization of EDs. This

is probably more accurate than previous findings since the present study used larger sample and stricter statistical methodology. Overall, our findings support the transdiagnostic role of dysfunctional metacognitions in AN and BN.

As found in previous research, several dysfunctional metacognitive beliefs correlated with EDs symptomatology in the clinical sample, in our study specifically the following: Negative Beliefs about thoughts Uncontrollability and Danger, Need to Control Thoughts and Lack of Cognitive Confidence. Among those, Negative Beliefs about thoughts Uncontrollability and Danger and Need to Control Thoughts showed the strongest correlations with EDs symptoms. These findings are in line with a meta-analysis of 45 studies that showed elevated dysfunctional metacognitions across patients, with large and robust effects for beliefs concerning the uncontrollability and danger of worry and for beliefs about the need to control thoughts.<sup>33</sup> The EDs

symptoms which significantly correlated with dysfunctional metacognitions in our study were: Eating Concern, Weight Concern, and Shape Concern, which –among symptoms represented by EDE-Q subscales– are those most closely related to the construct of worry, as they are of psychological nature, whereas Restriction reflects a behaviour. These findings are in line with previous research.<sup>18</sup> According to Wells metacognitive beliefs trigger a counterproductive cognitive style where threat-focused attention and ineffective coping strategies such as rumination and worry strain-limited cognitive resources, leading to maladaptive means of coping with problems and threats.<sup>8</sup> Worry and rumination have been found to be significant predictors of EDs symptomatology in previous studies, over and above the effects of anxiety and depression.<sup>35,36</sup>

A similar pattern of correlations was also found between dysfunctional metacognitive beliefs and comorbid anxiety, depression and obsessionality. Thus, these correlation results indicate that dysfunctional metacognitions might reflect a common path towards a wide range of symptoms, such as EDs core symptoms, anxiety, depression and obsessionality in EDs patients. This was further supported by the linear regression analyses, in which metacognitive beliefs predicted 19%, 35%, 20%, and 21% of the variance in the Global EDE-Q, HADS-Anxiety, HADS-Depression, and MOCI Total scores, respectively. In a previous study,<sup>18</sup> dysfunctional metacognitions, especially Need to Control Thoughts, was found to explain 51% of variance of the Global EDE-Q score, a finding that should be attributed to the fact that regression analysis was conducted in the total sample, including the control groups.

Dysfunctional metacognitive beliefs are well demonstrated to be associated with depression, anxiety and obsessionality.<sup>22,25</sup> In order to examine the probable role of comorbidity symptoms in the path from dysfunctional metacognitions to eating, weight and shape symptoms in EDs we conducted mediation analyses. The mediation results suggest that anxiety, depression and obsessionality symptoms do not mediate this relationship. These results provide further support to the notion that the CAS and especially metacognitive dysfunctions are di-

rectly implicated in the psychopathology of eating disorders, contributing directly to the development and maintenance of eating disorder symptoms.

The findings of this study must be interpreted in the context of several limitations. Our data are based on self-report instruments, even though the questionnaires used in this study are considered valid and reliable. Patients group consisted of individuals that were probably acknowledging their condition and might have been less reluctant to seek treatment, as they were recruited through the initial assessment of an Eating Disorders Unit. The representativeness of the control group can be questioned as it was a non-random sample. Last but not least, the cross-sectional design of the study is a limitation by itself.

Dysfunctional metacognitions seem to be present in EDs in a trans-diagnostic pattern, being associated both with core EDs psychopathology as well as concurrent symptoms such as anxiety, depression and obsessionality. This seems to be related to the severity of symptomatology, but additional research is required. Taken together, our findings provide further support that targeting such beliefs could prove to be an effective strategy to reduce core and comorbid symptoms in EDs. As ED patients present with such maladaptive coping strategies, our findings suggest that future research could include further exploration of the CAS in EDs. As the S-REF model emphasizes on common processes in psychological disorders, predicting universal, or transdiagnostic abnormalities in attention (e.g. threat monitoring), metacognition and perseveration, several dysfunctions in patients with EDs, namely body image distortions,<sup>37</sup> alexithymia<sup>38</sup> and self-knowledge deficits in general,<sup>39</sup> mentalizing deficits,<sup>40</sup> and impaired awareness of illness and symptoms<sup>41</sup> might prove to be associated with maladaptive self-reflectivity processes and self-centered worries relevant to CAS.

In addition, longitudinal studies need to address the temporal relationship of metacognitive functioning with EDs pathology. This would provide evidence as to whether the current therapeutic models are able to assess and eventually alter dysfunctions in metacognitions, or interventions directly targeting these processes need to be integrated.



# Η σχέση μεταξύ μεταγνωσιακών πεποιθήσεων και συμπτωμάτων στις διαταραχές πρόσληψης τροφής

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Η παρούσα μελέτη αποσκοπούσε στη διερεύνηση του ρόλου των δυσλειτουργικών μεταγνωσιακών πεποιθήσεων στις Διαταραχές Πρόσληψης Τροφής (ΔΠΤ) και στις πιθανές συσχετίσεις τους τόσο με ειδικά όσο και συνοδά συμπτώματα των ασθενών αυτών. Το Ερωτηματολόγιο για τις Μεταγνωσίες (Metacognitive Questionnaire-30, MCQ-30), το Ερωτηματολόγιο για την Εξέταση των Διατροφικών Διαταραχών (Eating Disorder Examination Questionnaire, EDE-Q), η Νοσοκομειακή Κλίμακας Άγχους και Κατάθλιψης (Hospital Anxiety and Depression Scale, HADS) και η Κλίμακα Ιδεοψυχαναγκαστικών Συμπτωμάτων (Maudsley Obsessive-Compulsive Inventory - MOCI) χρησιμοποιήθηκαν για την αξιολόγηση 44 ασθενών με Ψυχογενή Ανορεξία (ΨΑ), 50 ασθενών με Ψυχογενή Βουλιμία (ΨΒ) και 37 υγιών μαρτύρων. Οι ασθενείς με ΨΑ και ΨΒ παρουσίασαν υψηλότερες βαθμολογίες δυσλειτουργικών μεταγνωσιακών πεποιθήσεων, οι οποίες συσχετιζόνταν θετικά τόσο με τα ειδικά συμπτώματα των διατροφικών διαταραχών όσο και τα συνοδά συμπτώματα άγχους, κατάθλιψης και ψυχαναγκαστικότητας. Τόσο οι ασθενείς με ΨΑ όσο και εκείνοι με ΨΒ παρουσίασαν υψηλότερες βαθμολογίες από τους υγιείς μάρτυρες στη συνολική βαθμολογία της κλίμακας MCQ-30, και στις υποκλίμακες «θετικές πεποιθήσεις σχετικές με την ανησυχία», «αρνητικές πεποιθήσεις σχετικά με την απώλεια ελέγχου και τον κίνδυνο που η ανησυχία συνεπάγεται» και «ανάγκη για έλεγχο της σκέψης». Οι ασθενείς με ΨΑ επιπλέον εμφάνισαν υψηλότερη βαθμολογία από τους υγιείς μάρτυρες στη βαθμολογία της υποκλίμακας «νοητική αυτοσυνείδηση». Δεν παρατηρήθηκαν στατιστικά σημαντικές διαφορές μεταξύ των δύο ομάδων ασθενών στη συνολική βαθμολογία της κλίμακας MCQ-30 και τις υποκλίμακές της. Η υποκλίμακα «αρνητικές πεποιθήσεις σχετικά με την απώλεια ελέγχου και τον κίνδυνο που η ανησυχία συνεπάγεται» εμφάνισε τις ισχυρότερες θετικές συσχετίσεις με τα ειδικά συμπτώματα των διατροφικών διαταραχών (συντελεστές που κυμαίνονταν από 0,24 έως 0,40), ακολουθούμενη από την «ανάγκη για έλεγχο της σκέψης» (συντελεστές που κυμαίνονταν από 0,22 έως 0,38). Αντίστοιχα, οι δυσλειτουργικές μεταγνωσιακές πεποιθήσεις εμφάνισαν στατιστικά σημαντικές θετικές συσχετίσεις και με τη συνοδό συμπτωματολογία άγχους, κατάθλιψης και ψυχαναγκαστικότητας, με παρόμοιο τρόπο. Σε αναλύσεις παλινδρόμησης οι δυσλειτουργικές μεταγνωσιακές πεποιθήσεις προέβλεπαν το 19%, 35%, 20% και 21% της διακύμανσης στις συνολικές βαθμολογίες των EDE-Q, HADS-Anxiety, HADS-Depression και MOCI, αντίστοιχα. Οι αναλύσεις διαμεσολάβησης ανέδειξαν πως η συνοδός συμπτωματολογία δεν διαμεσολαβεί τη σχέση μεταξύ δυσλειτουργικών μεταγνωσιακών πεποιθήσεων και ειδικών συμπτωμάτων των ΔΠΤ. Κατά συνέπεια, οι δυσλειτουργίες στις μεταγνωσιακές πεποιθήσεις μπορεί να αντικατοπτρίζουν ένα κοινό, δια-διαγνωστικό μονοπάτι στην ΨΑ και ΨΒ προς ένα ευρύ φάσμα συμπτωμάτων σε ασθενείς με ΔΠΤ.

**Λέξεις ευρετηρίου:** Ψυχογενής ανορεξία, ψυχογενής βουλιμία, σύνδρομο γνωσιακής προσοχής, μεταγνωσία, ανησυχία.

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