

# The Body of Cognitive and Metacognitive Variables in Eating Disorders: Need of Control, Negative Beliefs about Worry Uncontrollability and Danger, Perfectionism, Self-esteem and Worry

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## ABSTRACT

**Background:** Many studies have described perfectionism and low self-esteem as traits associated with eating disorders (ED). More recently, research has shown the role played by worry, rumination, control and metacognitive beliefs. This paper investigates the role played by cognitive and metacognitive variables in the psychopathological mechanism of eating disorders, assuming that not only perfectionism and low self-esteem but also metacognitive beliefs and processes can discriminate between controls and EDs.

**Method:** The Structured Clinical Interview for DSM, the Multidimensional Perfectionism Scale, the Rosenberg Self-Esteem Scale, the Anxiety Control Questionnaire, the Penn State Worry and the Metacognition Questionnaire were administered to the samples.

**Results:** Results suggested that metacognitive factors like negative beliefs about worry, uncontrollability and danger, need for control, and worry should be added to the body of cognitive factors underlying ED composed by the classical couple of cognitive factors including perfectionism and low self-esteem.

**Conclusions:** It is possible that an individual with ED assumes that metacognitive processes like worry and rumination are a further proof of his or her lack of value, capacity to control, and self-control. Such appraisals

may reinforce the painful sense of low self-esteem so typical in ED and, in turn, the perfectionistic striving for excellence.

## INTRODUCTION

Cognitive Behavioral Therapy (CBT) protocols for the treatment of bulimia have been proven to obtain excellent results in the reduction of symptoms in a relatively short period of time (1). Despite those findings, drop-outs are common and treatment compliance is particularly difficult to develop (2). For example, Mahon (3), in a review, found that patients' drop-out rate varies from 15% to 65%. When treating patients with bulimia and with eating disorders (ED), clinicians have to face many issues, including non-cooperative behavior, a straight rejection of therapeutic support, therapeutic alliance ruptures, and dysfunctional interpersonal evaluations. Therefore, CBT protocol for the treatment of EDs must cope with motivational aspects of treatment, recovery of physiological weight through proper eating habits, and acquisition of emotional regulation strategies and interpersonal skills, in addition to typical cognitive interventions regarding identification and restructuring of dysfunctional beliefs about weight and body image (4).

Several authors (4-6) have pointed out how patients with ED display high levels of resistance to change, which often result in a lack of commitment to the therapy. Unfortunately, the study of the influence of some clinical variables on the risk of drop-out, focusing on inter- and intra-axial comorbidity, duration and severity of the disease, and so on, has not allowed for identification of specific causal relationships (5, 7). These therapeutic issues force clinicians to engage in a continuing redefinition and negotiation of therapeutic objectives, as well as exploration of new approaches to treatment.

In order to understand how the psychotherapeutic treatment for ED may increase its efficacy it would be interesting to explore the role of possible psychological mechanisms other than those belonging to Fairburn's original CBT model for bulimia (1). Since then, in the CBT literature, fear of fatness, perfectionistic beliefs about eating, shape and weight, and low self-esteem are considered to be the most important non-adaptive cognitive beliefs in ED (1, 4). The aim of this paper is to explore the possible role of mechanisms concerning metacognitive beliefs about control and worry as an added underlying factor of ED.

#### COMMON BELIEFS AND MECHANISMS IN ED

**Perfectionism and Self-esteem in ED.** Many studies have described perfectionism as a personality style associated with ED (8-17) and with behaviors related to ED, such as dieting, weight and shape concern, and Drive for Thinness (18-22).

Perfectionism is generally viewed as a multidimensional conceptualization. Many investigators have utilized either the three-dimensional definition, developed by Hewitt et al. (23), or the six-dimensional definition, developed by Frost et al. (24), and their related questionnaires. In actual fact, the two definitions have much in common, and a comparison of the two related questionnaires revealed considerable overlap (25). Frost et al. (24) individuated six dimensions of perfectionism of high clinical relevance. Among them, concern over mistakes is the distinguishing feature of pathological perfectionism (24, 26). Pathological perfectionists allow little room for making mistakes and perceive even minor ones as likely to lead to future final failure. Thus, pathological perfectionists tends to never feel anything is done completely enough or well enough, and their actions are always accompanied by feelings of self-criticism and a sense of ineffectiveness. In addition, parental criticism is related to perfectionists' tendency to feel parental love as conditional on their capacity to satisfy parents' expectations and critical evaluations (26-29).

More recently, Shafran, Cooper and Fairburn (30) argued against the multidimensional definition of perfectionism, and proposed a uni-dimensional concept, called clinical perfectionism, defined as "the overdependence of self-evaluation on the determined pursuit of personally demanding, self-imposed, standards in at least one salient domain, despite adverse consequences" (30, p. 778). However, Dunkley et al. (31) pointed out that a large number of studies about perfectionism have concluded that in perfectionism there are at least two dimensions, identified as personal standards (high standards and goals for oneself) and evaluative concerns (critical evaluations of one's own behavior). Given that the Evaluative Concerns dimension corresponds to the above mentioned variable, Concern Over Mistakes, described by Frost et al. in 1990 (24), summing up, it can be stated that the evaluative concerns dimension of perfectionism is the relevant dimension from a clinical viewpoint.

The traditional conceptualization of Self-Esteem is a global, uni-dimensional construct regarding the personal judgment of one's own worth (32). Low self-esteem is considered to be an important factor in developing vulnerability to ED, and recent studies also underline the link between self-esteem, body dissatisfaction, body image, and depression symptoms (33, 34)

ED patients tend to judge themselves in the domains of body shape, weight, and fat (35, 36). Thus, they have characteristic weight-related self-schemata (37). In fact, ED patients appear to be oppressed by a pervasive, generic and vague feeling of not being sufficiently qualified, competent or suited to the demands of life, and they spend a lot of time worrying about these negative feelings. This general self-schema is the second core cognitive characteristic of ED and has been called "long-standing negative self-evaluation" (37). According to Bardone et al. (38), Rosenberg's uni-dimensional concept of self-esteem can be dismantled in a two-dimensional concept comprising self-competence/self-efficacy and self-liking/self-worth. From a theoretical viewpoint, self-efficacy is strictly related to perfectionism. In fact, according to Bandura and Cervone (39) and Bardone-Cone et al. (40), those who distrust their capabilities tend to feel easily discouraged by discrepancies between standards and attainment.

**Control, Worry and Rumination in ED.** Sassaroli and Ruggiero (41) pointed out how individuals with ED are typically engaged in restrictive eating and purging behaviors to strictly control their personal and interpersonal world, thereby trying to make their life more manageable. Individuals with ED perceive control as a general attitude,

involving not only eating, body weight and shape, but also external events and internal feelings. In fact, interoceptive awareness – a construct that includes the acceptance of affective experiences – is significantly associated with dietary restraint in ED (42).

The belief in the need for control comes from the more general concept of psychological control, which is the awareness of a contingent relationship between a response and a consequent outcome (43). In the cognitive literature, the need for control has been linked to anxiety, and has been conceptualized as a perception of lack of control. Such a definition implies that anxiety-disordered subjects judge the world as dangerous and themselves as vulnerable because they consider their level of exerted control on external events or internal reactions as insufficient (44-49). According to Rapee et al. (48), such a conceptualization of control can be strongly related to anxiety.

In the field of ED studies, it is widely known that ED subjects often look for a sense of control obtained by the continuous monitoring of a given parameter, such as bodily perception in panic, intrusive thought in obsessionality, and so on. In the case of ED, such a parameter appears as concerns overeating and body weight and shape (9, 50). As explained by Slade (51), dietary restrictions enhance the subjective sense of being in control. It is absolutely no coincidence that ED have often been defined as a psychopathology of control (9, 52, 53). Many studies considered control as strictly linked to dietary restriction (54-58). Sassaroli, Gallucci and Ruggiero (59) have empirically confirmed that individuals affected by ED consider their level of exerted control on external events or internal reactions as insufficient and use eating and weight monitoring as a tool to obtain a sense of personal control.

Worry is a form of negative perseverative thinking which focuses attention on negative thoughts and maintains psychopathological mechanisms. It is a mental process widely studied as a main feature of anxiety (60). The key feature of worry is the predominance of negative thoughts that entail that those who worry think excessively about possible negative events they are afraid of, to a pathological extent (61, 62). Although worry is generally believed to be strictly linked to anxiety, it has been argued that it is present across diverse disorders (63). Sassaroli et al. (64) have shown the association between Worry and ED. Wadden et al. (65) investigated different kinds of worry in nonclinical adolescents and found that girls showed higher worry levels about weight and food than boys. Kerkhof et al. (66) administered the

Penn State Worry Questionnaire to ED patients and controls and found higher scores in the clinical sample. Scattolon and Nicky (67) found that food consumption in a nonclinical sample of chronic dieters was triggered by social-evaluative/school-related worry. Sassaroli and Ruggiero (68) also found that, in a stress situation, worry is related to the Eating Disorders Inventory's subscales in nonclinical subjects.

The term rumination indicates a variant of worry present in depression and in other mood disorders and has been studied in detail by Nolen-Hoeksema (69). Rumination is related to past negative events, while worry is a preoccupation with future negative events. According to Troop and Treasure (70), the onset of bulimia is associated with rumination in response to life events. Hart and Chiovari (71) have shown that dieters show significant more rumination about eating and food than non-dieters. Nolen-Hoeksema (69) has also shown that rumination predicts future increases in bulimic symptoms, as well as onset of binge eating. The results suggest that rumination may contribute to the etiology of bulimic pathology.

**Metacognitions and ED.** A question which remains unanswered concerns what drives the activation of such thinking in ED. A possibility is that it is activated via metacognitive beliefs. According to Wells (72), rumination and worry are employed by sufferers as fallacious means of coping with problems and threats (driven by positive metacognitive beliefs about their benefits), which then become the object of negative appraisals through negative metacognitive beliefs about these processes, which, in turn, lead to an escalation of negative affect, locking the individual into an escalating cycle of distress. From a metacognitive perspective, it is not a coincidence that ED are often defined as a psychopathology of perceived lack of control (9, 52, 53). A study (59) has shown that the uncontrollability of beliefs concerning not only eating, food and body aspects but also mental states and thoughts may be present in ED. Other studies (73, 74) have found differences in metacognitive beliefs in patients with ED when compared to control groups: higher levels of beliefs about uncontrollability and danger; lower levels of cognitive confidence; higher levels of beliefs about the need for control over thoughts; and higher levels of reported cognitive self-consciousness. In addition, patients with ED were found to be less successful at using thought re-appraisal, and reported using metacognitive strategies to make "themselves feel worse" (74). McDermott and Rushford (75) also found that ED patients had higher scores on metacognitive dysfunction:

higher thought monitoring, thought control and negative beliefs about worrying. Olstad et al. (76) underlined how patients with ED have more dysfunctional metacognitive beliefs than control groups, especially on negative beliefs about uncontrollability and danger, as well as the need to control thoughts.

In turn, the mechanisms of worry depend on meta-cognitive psychopathological mechanisms that focus on knowledge involved in thought processes, appraisal and beliefs of cognition itself (77, 78). In Wells' model (72) beliefs about worry uncontrollability and dangerously enhance the degree of anxiety and worry in affected individuals. In the special case of ED, increased feelings of anxiety may develop increased proneness to trying to control them via eating and weight monitoring, a strategy that maintains ED symptoms. In our opinion, the long tradition of research focusing on anxiety related cognitive mechanisms in ED supports the hypothesis that meta-worry may play a role in the psychopathology of ED. This hypothesis is further supported by the high comorbidity between anxiety disorders and ED (79, 80), as well as the proven influence of worry in ED (64).

**Objectives.** The goal of our study was to investigate the influence of the above-mentioned specific and common beliefs and mechanisms in ED. We assumed that not only perfectionism and low self-esteem but also other cognitive and metacognitive beliefs specific to anxiety (e.g., worry) could discriminate between controls and ED subjects. As a secondary aim, we aimed to observe possible differences – especially with regards to Worry, Controllability and Perfectionism – between subtypes of ED, mainly focusing on anorexia and bulimia nervosa.

## METHODS

### PARTICIPANTS

Participants included 84 Italian individuals affected by an ED and 38 Italian individuals belonging to the control group. Using the Structured Clinical Interview for DSM (SCID), we assessed 48 bulimic and 36 anorexic patients. All of the 84 ED individuals were females. Their mean age was 23.39 years (SD 4.75). The mean age of the onset of their disorders was 18.83 years (SD 2.22). Concerning their highest level of education, 15.6% had a primary school degree, 65.0% high school degree, and 19.4% were university graduates. Concerning their employment in the preceding six months, 99.4% were in full-time or part-time employment.

We recruited a control group of 38 Italians (all female). The mean age of the comparison group was 25.31 years

(SD 5.4). Concerning their highest level of education, 75.9% finished high school and 24.1% were university graduates. An analysis of variance (ANOVA) found no differences in mean age.

### PROCEDURE

We recruited 84 ED subjects out of the population interested in cognitive psychotherapeutic treatment for ED, delivered by the Studi Cognitivi Outpatient Cognitive Psychotherapy Center of Milan and the Outpatient Eating Disorder Unit of the S. Paolo Hospital of Milan. Recruitment was carried out during the initial assessment phase of the treatment. A clinical psychologist and a psychiatrist assessed demographic data and possible past or current psychological and/or psychopharmacological treatments administered the SCID and the battery of self-report questionnaires, and asked people for written permission to use the collected information as data in a study examining their cognitive beliefs. All the participants received detailed information about the procedures and aims of the study and knew that the results of their assessments would be discussed during the initial sessions of the treatment. Those who agreed to participate signed an informed consent form. Parental permission was requested for subjects younger than 18 years old. Criteria for inclusion in the study were: DSM diagnosis based on SCID of one of the above-mentioned disorders; minimum age of 17 years; ability to speak Italian with adequate fluency.

Thirty-eight female subjects presumably with no ED were recruited – by posting leaflets – out a population of 41 subjects working in a firm in Milan, Italy. Possible ED subjects were excluded using the eating disorders inventory (81) as a screening instrument (82). Furthermore, they were informed that all collected data would have been strictly confidential. All of them agreed to participate and signed an informed consent form. Three subjects were excluded because they reported that they were in therapy for an emotional disorder.

### MEASURES

**The Structured Clinical Interview for DSM-IV (83, 84).** The SCID is a structured interview based on DSM criteria, providing a diagnosis for axis I psychiatric disorders that comprise ED. The Multidimensional Perfectionism Scale (MPS) (24) is a 35-item self-reported questionnaire based on theories about perfectionism. The MPS measures six separate dimensions of perfectionism, including concern over mistakes, personal standards, parental expectations, parental criticism, doubting of actions and organization.

The Rosenberg Self-Esteem Scale (RSES) (32) assesses global self-esteem and sense of self-worthiness. The Anxiety Control Questionnaire (ACQ) (48) assesses perceived control over emotional reaction and external threats. It is a 30-item questionnaire comprising two subscales: Control of Events, consisting of 16 items, and Control of Reactions, consisting of 14 items. The Penn State Worry Questionnaire (PSWQ), developed by Meyer et al. (85), is a 16-item self-reported questionnaire based on Borkovec and his collaborators' theories about worry. Worry is a cognitive activity characterized by a predominance of anxious predictions and fears of possible future negative events (60), and is correlated to the severity of anxiety (62, 86). The Metacognition Questionnaire (MQ) (87) measures several domains of metacognitions using 65 items. The questionnaire generates scores for the following five sub-scales: Positive Beliefs about Worry; Negative Beliefs about Worry; Controllability and Danger; Meta-Cognitive Efficiency and Confidence; General Negative Beliefs; and Cognitive Self-Consciousness.

The protocol of the research project has been approved by the Ethics Committee of Studi Cognitivi Post-Graduate School of Specialization, Milan, conforming to the provisions of the Declaration of Helsinki.

## RESULTS

### PRELIMINARY ANALYSES

Forty-one subjects were selected in order to have a corresponding control group in terms of age and gender distribution. From these, 38 non-ED subjects were selected, and an analysis of variance (ANOVA) found no differences in mean age. The reliability, based on internal consistency, was confirmed with a Cronbach's alpha coefficient greater than .7 for each instrument. Levene's test failed to confirm the assumption, assumed by MANOVA, that each dependent variable had similar variances for all groups. In this study, the homogeneity of variances assumption was met for all the subscales, but not for Doubting of Actions ( $F[2, 119] = .713, p > .05$ ) of MPS, as well as General Negative Beliefs ( $F[2, 119] = 2.277, p > .05$ ) and Cognitive Self-Consciousness ( $F[2, 119] = .030, p > .05$ ) of MQ. In actual fact, failure to meet the assumption of homogeneity of variances is not critical to MANOVA, which is relatively robust. However, we chose the Games-Howell procedure which is recommended when the assumption of homogeneity of variances fails. Regardless, only minor differences emerged when we compared the results of the Games-Howell procedure with the more popular Tukey's HSD test.

### DESCRIPTIVE STATISTICS, MANOVA AND DISCRIMINANT ANALYSIS

Table 1 reports means and standard deviations of each sample. Tables 2-4 report the MANOVA (Games-Howell procedure) among control and ED groups. The scales that discriminated controls from all the ED groups were PWSQ total score, RSES total score, Concern over Mistakes (MPS), Parental Criticism (MPS), Doubting of Actions (MPS), Control of Reactions (ACQ), Positive Beliefs about Worry (MQ), Negative Beliefs about Worry, Controllability and Danger (MQ), General Negative Beliefs (MQ), and Cognitive Self-Consciousness (MQ).

Some of the above-mentioned subscales distinguished those with anorexia from those with bulimia. In fact, anorexics showed higher levels of Doubting of Actions (MPS; Controls – Anorexics:  $P < .001$ ; Controls – Bulimics:  $P < .05$ ; Anorexics – Bulimics:  $P < .01$ ), as well as of Negative Beliefs about Worry, Controllability and Danger (MQ; Controls – Anorexics:  $P < .001$ ; Controls – Bulimics:  $P < .001$ ; Anorexics – Bulimics:  $P < .05$ ) than bulimics. In addition, anorexics had a significantly lower Self-Esteem on the RSES Total Score (Controls – Anorexics:  $p < .001$ ; Controls – Bulimics:  $p < .01$ ; Anorexics – Bulimics:  $p < .001$ ), as well as a significantly lower sense of perceived control on the Control of Reactions scale of ACQ, than Bulimics

Table 1. Means and standard deviations (Controls, AN & BN)

N.	Controls 38		AN 36		BN 48	
	M	STD	M	STD	M	STD
MPS <sup>1</sup> Concern over Mistakes	21.05	5.17	33.17	9.39	29.50	7.74
MPS <sup>1</sup> Personal Standards	21.34	4.92	22.94	8.75	22.79	5.33
MPS <sup>1</sup> Parental Expectations	13.97	3.76	11.86	6.18	14.56	6.49
MPS <sup>1</sup> Parental Criticism	5.95	1.66	10.19	3.96	10.71	3.41
MPS <sup>1</sup> Doubts over Actions	9.55	3.02	13.72	3.20	11.38	3.26
RSES <sup>2</sup> Rosenberg Self-esteem Scale	29.61	5.32	18.22	5.69	24.50	7.02
ACQ <sup>3</sup> Control over Events	51.58	9.01	35.36	14.00	46.75	13.50
ACQ <sup>3</sup> Control over Reactions	39.42	6.48	17.89	8.58	31.94	12.36
PSWQ <sup>4</sup> Worry	36.24	4.72	63.14	11.37	58.28	10.95
MQ <sup>5</sup> Positive Beliefs about Worry	32.26	6.92	40.56	14.91	38.62	10.44
MQ <sup>5</sup> Negative Beliefs about Worry, Controllability and Danger	25.66	4.20	42.22	8.01	36.46	11.55
MQ <sup>5</sup> Meta-cognitive Efficiency and Confidence	17.02	4.15	21.11	7.59	19.17	5.45
MQ <sup>5</sup> General Negative Beliefs	21.58	5.20	26.08	4.66	25.88	6.42
MQ <sup>5</sup> Cognitive Self-consciousness	16.53	3.14	20.36	3.96	19.65	3.52

Notes: 1) Multidimensional Perfectionism Scale; 2) Rosenberg Self-Esteem Scale; 3) Anxiety Control Questionnaire; 4) Penn State Worry Questionnaire; 5) Metacognition Questionnaire

(Controls – Anorexics:  $P < .001$ ; Controls – Bulimics:  $P < .01$ ; Anorexics – Bulimics:  $P < .001$ ).

In the scales Control of Events (ACQ; Controls – Anorexics:  $P < .001$ ; Anorexics – Bulimics:  $P < .01$ ) and Beliefs about Cognitive Competence (MQ; Controls – Anorexics:  $P < .05$ ), only anorexics had significantly different scores than controls. Personal Standards (MPS;  $F[2, 119] = .734, p > .05$ ), Parental Expectations (MPS;  $F[2, 119] = 2.46, p > .05$ ) and Organization (MPS;  $F[2, 119] = .50, p > .05$ ) presented no differences among controls and all the ED groups.

Multiple Discriminant Analysis (MDA) generated two functions. Function 1 explained 77.8% of variance and Function 2 explained 22.2% of variance. Wilks' Lambda

**Table 2.** MANOVA (Games-Howell procedure) in worry, self-esteem, and need for control

PSWQ Penn Worry State Questionnaire			
N		Subsets	
		1	2
Controls	38	36.24 (4.72)	
AN	36		63.14 (11.37)
BN	48		58.28 (10.95)

$F(2, 119) = 85.09, p < .001$   
 Controls – Anorexics:  $p < .001$ ; Controls – Bulimics:  $p < .001$

RSES Rosenberg Self-Esteem Scale total score				
N		Subsets		
		1	2	3
Controls	38	29.61 (5.32)		
AN	36		18.22 (5.69)	
BN	48			24.50 (7.02)

$F(2, 119) = 31.78, p < .001$   
 Controls – Anorexics:  $p < .001$ ; Controls – BULIMICS:  $p < .01$ ; Anorexics – BULIMICS:  $p < .001$

ACQ Control Of Events			
N		Subsets	
		1	2
Controls	38	51.58 (9.01)	
AN	36		35.36 (14.00)
BN	48	46.75 (13.50)	

$F(2, 119) = 16.58, P < .001$   
 Controls – Anorexics:  $P < .001$ ; Anorexics – Bulimics:  $P < .01$

ACQ Control Of Reactions				
N		Subsets		
		1	2	3
Controls	38	39.42 (6.48)		
AN	36		17.89 (8.58)	
BN	48			31.94 (12.36)

$F(2, 119) = 46.46, P < .001$   
 Controls – Anorexics:  $P < .001$ ; Controls – Bulimics:  $P < .01$ ; Anorexics – Bulimics:  $P < .001$

was significant for both Function 1 (Wilks' Lambda = .148; Chi-square = 211.843;  $df = 34$ ;  $p < .001$ ) and Function 2

**Table 3.** MANOVA (Games-Howell procedure) in Multidimensional Perfectionism Scale

MPS Concern Over Mistakes			
N		Subsets	
		1	2
Controls	38	21.05 (5.17)	
AN	36		33.17 (9.39)
BN	48		29.50 (7.74)

$F(2, 119) = 25.06, P < .001$   
 Controls – Anorexics:  $P < .001$ ; Controls – Bulimics:  $P < .001$

MPS Personal Standards			
N		Subset	
		1	
Controls	38	21.34 (4.92)	
AN	36		22.94 (8.75)
BN	48		22.79 (5.33)

$F(2, 119) = .734, p > .05$

MPS Parental Expectations			
N		Subsets	
		1	
Controls	38	13.97 (3.76)	
AN	36		11.86 (6.18)
BN	48		14.56 (6.49)

$F(2, 119) = 2.46, p > .05$

MPS Parental Criticism			
N		Subsets	
		1	2
Controls	38	5.95 (1.66)	
AN	36		10.19 (3.96)
BN	48		10.71 (3.26)

$F(2, 119) = 27.08, P < .001$   
 Controls – Anorexics:  $P < .001$ ; Controls – Bulimics:  $P < .001$

MPS Doubting Of Actions				
N		Subsets		
		1	2	3
Controls	38	9.55 (3.02)		
AN	36		13.72 (3.20)	
BN	48			11.38 (3.26)

$F(2, 119) = 3.50, P < .01$   
 Controls – Anorexics:  $P < .001$ ; Controls – Bulimics:  $P < .05$ ; Anorexics – Bulimics:  $P < .01$

MPS Organization			
N		Subsets	
		1	
Controls	38	20.66 (3.87)	
AN	36		20.58 (5.38)
BN	48		21.46 (4.27)

$F(2, 119) = .50, p > .05$

**Table 4.** MANOVA (Games-Howell procedure) in Metacognition Questionnaire

MQ Positive Beliefs About Worry			
N		Subsets	
		1	2
Controls	38	32.26 (6.92)	
AN	36		40.56 (14.91)
BN	48		38.62 (10.44)

F(2, 119) = 5.79, P < .01  
 Controls – Anorexics: P < .05; Controls – Bulimics: P < .01

MQ Negative Beliefs About Worry, Controllability and Danger				
N		Subset		3
		1	2	
Controls	38	25.66 (4.20)		
AN	36		42.22 (8.01)	
BN	48			36.46 (11.55)

F(2, 119) = 34.37, P > .001  
 Controls – Anorexics: P < .001; Controls – Bulimics: P < .001; Anorexics – Bulimics: P < .05

MQ Beliefs About Cognitive Competence			
N		Subsets	
		1	2
Controls	38	17.02 (4.15)	
AN	36		21.11 (7.59)
BN	48	19.17 (5.45)	

F(2, 119) = 4.54, P > .05  
 Controls – Anorexics: P < .05

MQ General Negative Beliefs			
N		Subsets	
		1	2
Controls	38	21.58 (5.20)	
AN	36		26.08 (4.66)
BN	48		25.88 (6.42)

F(2, 119) = 8.12, P < .001  
 Controls – Anorexics: P < .01; Controls – Bulimics: P < .01

MQ Cognitive Self-Consciousness			
N		Subsets	
		1	2
Controls	38	16.53 (3.14)	
AN	36		20.36 (3.96)
BN	48		19.65 (3.52)

F(2, 119) = 12.64, P < .001  
 Controls – Anorexics: P < .001; Controls – Bulimics: P < .05

(Wilks' Lambda = .559; Chi-square = 64.637; df = 16; p < .001). Table 5 reports MDA Functions at group centroids. The result means that Function 1 is useful for individuating cognitive beliefs that can distinguish anorexics from controls, while Function 2 is useful for individuating cognitive beliefs that can distinguish anorexics from bulimics.

Table 6 reports the structure matrix of the MDA.

**Table 5.** MDA functions at group centroids (unstandardized canonical discriminant functions evaluated at group means)

	Functions	
	1	2
AN	1.763	-.977
BN	.515	1.055
Controls	-2.321	-.407

Function 1: Wilks' Lambda = .148; Chi-square = 211.843; df = 34; p < .001.  
 Function 2: Wilks' Lambda = .559; Chi-square = 64.637; df = 16; p < .001.

**Table 6.** Structure Matrix of the Discriminant Function Analysis\*

	Functions	
	1	2
PSWQ Penn Worry State Questionnaire	.712	.188
ACQ Control Of Reactions	-.483	.412
MQ Negative Beliefs About Worry, Controllability, And Danger	.456	-.043
RSES Rosenberg Self-Esteem Scale	-.419	.245
MPS Concern Over Mistakes	.390	.003
MPS Parental Criticism	.371	.308
MPS Doubting About Actions	.297	-.182
ACQ Control of Events	-.280	.278
MQ Cognitive Self-Consciousness	.275	.069
MQ General Negative Beliefs	.214	.113
MQ Positive Beliefs About Worry	.187	.029
MQ Beliefs About Cognitive Competence	.163	-.064
MPS Personal Standards	.065	.028
MPS Parental Expectations	-.064	.195
MPS Organization	.010	.102

\*according to the MDA results reported in Table 5, the variables in Function 1 could be considered as those that distinguish AN from Controls; variables in Function 2 could be considered as those that distinguish AN from BN.

According to the MDA results reported in Table 5, variables in Function 1 could be considered as those that distinguish anorexics from controls, while variables in Function 2 could be considered as those that distinguish anorexics from bulimics. Thus, the cognitive variables that distinguish anorexics from controls are Worry (loading = .712); Control of Reactions (loading = -.483); Negative Beliefs about Worry, Controllability and Danger (loading = .456); Low Self-Esteem (loading = -.419); and two dimensions of Perfectionism (i.e., Concern over Mistakes [loading = .390] and Parental Criticism [loading = .371]). Given the result that, in Function 1, bulimics are nearer to anorexics than to control, these variables could also be considered as distinguishing features of bulimics. According to Function 2, the cognitive variables that distinguish anorexics from bulimics are Control over Reactions of ACQ (loading = .412) and Parental Criticism of MPS (loading = .308).

## DISCUSSION

With regard to perfectionism, it was confirmed that the personal standards dimension did not discriminate pathological perfectionists from people who simply tend to high competency and success (24, 26). On the other hand, concern over mistakes and parental criticism were confirmed as the distinguishing features of pathological perfectionism. Thus, pathological perfectionists tend never to feel anything is done entirely correctly, and tend to feel parental love as conditional on their capacity to satisfy parents' expectations. Parental criticism can be considered to be the developmental counterpart of concern over mistakes (26-29). Doubting of actions also significantly distinguished ED subjects from controls. It is plausible that the effect depends on its obsessive components.

On the other hand, parental expectations, according to our findings, seem to be the developmental counterpart of personal standards, since it did not distinguish controls from any of the ED groups. The results of the other MPS scales are ambiguous. The organization scale has always been considered the weakest scale by the early studies investigating the validity of MPS (24). Thus, it is not a surprise that, in our sample, Organization attributes higher scores to normal controls.

Concerning self-esteem, our study confirms that this cognitive variable plays a major role in ED people (34-36). Thus, they have characteristic weight-related self-schemata and long-standing negative self-evaluation (37).

This study also underlines the evidence for the role played by the belief in need for control in ED. The fate of the cognitive belief in need for control in the history of studies about ED has been rather odd. Control was a psychological variable frequently present in the papers written by the first great theorists of ED, such as Bruch (9), Crisp (88, 89), Garfinkel and Garner (90), and Selvini-Palazzoli (91). However, this popularity never led to empirical research about the role played by need for control in ED. Perfectionism and low self-esteem surpassed the popularity of the old clinical conceptualization of need for control during the boom in empirical studies about ED in the 1980s. According to Button (52), ED individuals essentially engage in extreme restricted eating and purging behaviors to construct their world from a controlling and narrowed perspective. Issues of relationships, work, play, and even life and death tend to come second place to the bigger issues of weight, size, fat, food and eating. "Although the sufferers may have a job, be engaged in study or bringing up a family, they are generally more preoc-

cupied with trying to fend off the temptation of food" (92, p. 199). The more plausible explanation for such extremes of constriction may be because this constriction makes life more manageable and controllable.

More recently, Eiber, Mirabel-Sarron and Urdapilleta (93) have argued that the maintenance of anorexia nervosa initially shows an extreme need to control eating, which is supported by low self-esteem. This hypothesis is interesting, but considers control as strictly linked to dietary restriction. In our view, the belief of control is a more complex construct, linked not only to eating and the body but to life in general. Such an ample conceptualization can be found in a paper by Surgenor et al. (94), who stressed that psychological Control plays a central role in the etiology and maintenance of anorexia nervosa. They stress that the construct of Control has multiple meanings. In addition, Control can be thought of as a failure in self-regulatory abilities to manage negative emotions. In fact, research has suggested that the failure to exert efficacious cognitive and emotional Control is a fundamental factor contributing to disorders such as anorexia and bulimia nervosa. Many studies have shown that anorexic subjects have maladaptive attention strategies when they are confronted with weight and body related stimulations (95, 96). The hypothesis about the role played by the belief of control in ED could be interpreted as an application to ED of the role played by such a belief in anxiety disorders. In fact, according to many important authors (44, 45, 48, 97), anxiety is concerned with one's control over threat. In fact, the future-directed thinking present in anxiety mainly addresses the assessment of the probability and size of the threat, as well as one's own ability to cope with it. Feeling in control over the threat means not only being able to predict the threat, but also being able to respond to the feared threat in a way that reduces or eliminates it. In ED, the need for control tends to be narrowed to the themes of fat, body shape and eating (59, 64).

Concerning the metacognitive field, this paper suggests a central role for worry in the psychopathology of ED. In fact, it is noticeable that a central symptom of anorexia, the fear of fatness in DSM-IV, has much in common with worry. Like worry, fear of fatness is a prevision about possible future negative events. Plausibly, ED subjects think a lot about weight, fat and body shape because they foresee a long chain of negative consequences linked to them. These negative consequences may regard interpersonal problems, sense of self-efficacy, or fear of being blamed or disparaged by parents, peers, etc. The relationship between worry and ED is confirmed not only by studies that directly investigated this variable (64-68), but also by other researchers. Godley et al.



(98) have actually shown that patients with either anorexia or bulimia nervosa had significantly more negative future-oriented cognitions than controls. The negative theme most commonly mentioned by anorexics and bulimics was that of their own health, followed by the social/interpersonal domain. It is not necessary to stress that negative future-oriented cognition is a concept very similar to worry.

With regard to negative beliefs concerning worry, uncontrollability and danger, as well as the other related metacognitive variables, 4 out of the 5 scales of the MQ showed significantly higher scores in ED than in controls. This result supports the hypothesis that, in ED, the worry about fat, weight and eating, in turn, becomes the object of negative metacognitive beliefs and appraisals. When worrying is appraised as dangerous, the degree of preoccupation with food, weight and fat increases, and it is difficult for the ED individual to obtain an internal state signaling that it is safe to stop worrying. From a clinical perspective, we can assume that this metacognitive model of ED could be compatible with Wells' metacognitive model of anxiety (72).

There are other researchers who have hypothesized the psychopathological role of metacognition in ED. According to Ardovini (99) and Woolrich, Cooper and Turner (74), metacognitive functions that protect the individual from psychopathological suffering are frequently absent in ED people. According to Tchanturia et al. (100), individuals with anorexia performed in a worse manner than healthy control subjects on metacognitive tasks in a laboratory experiment.

Basically, the results provided by the structure matrix of the MDA confirm those suggested by the MANOVA results. According to the MDA, the cognitive variables that mainly distinguish anorexics and (less rigorously) bulimics from controls are Control of Reactions, Low Self-Esteem, Negative Beliefs about Worry, Controllability and Danger, two dimensions of Perfectionism (i.e., Concern Over Mistakes and Parental Criticism) and Worry.

In addition, according to MDA, the cognitive variables that distinguish anorexics from bulimics are Control of Reactions of ACQ and Parental Criticism of MPS. Of course, such results need confirmation. However, in some sense, the Control of Reactions finding is in agreement with previous studies that individuated impulsivity as a feature able to distinguish bulimics from anorexics (95, 101)

In conclusion, the study suggests that the body of cognitive factors underlying ED is composed by a greater number of variables than the classical couple including perfectionism and low self-esteem. Negative beliefs about worry, uncontrollability and danger, need for control and worry should

be added to the list. Erroneous metacognitive beliefs and negative appraisals concerning worry about food, fat and weight may be a sort of engine driving specific disorder maintenance loops. It is possible that the individual with ED assumes that a pervasive worry is a further proof of his or her lack of value, capacity to control and self-control. Such appraisals may reinforce the painful sense of low self-esteem so typical in ED and, in turn, the perfectionistic striving for excellence. These findings may lead to a cognitive therapeutic model including a specific intervention for each given belief: control, metacognitive negative beliefs about worry, uncontrollability and danger and worry.

The present study has certain limitations that need to be taken into account when considering the study and its contributions. First, we cannot consider the body of explored cognitive beliefs as exhaustive. For example, Fairburn, Cooper and Shafran (35) do not only consider perfectionism and low self-esteem as maintaining processes of ED, but also mood intolerance and interpersonal difficulties. Another limitation could be the absence of other psychological assessment tools (especially a measure of general psychological illness) for both the samples.

These outcomes suggest that further steps forward in the cognitive understanding and treatment of ED may not only lie in increasing the level of complexity of the standard CBT model but also in exploring new directions. A possible alternate path for increasing the clinical understanding of ED and enhancing the therapeutic efficacy of treatment may involve exploring the possible role of metacognitive processes. Future research on how to assess the impact of metacognitive beliefs on eating disordered behaviors among clinical samples could be useful in order to determine and understand whether metacognition plays a role in the psychopathology of ED, and even if it is possible to propose and empirically explore a metacognitive model able to explain the emergence and maintenance of EDs' psychopathology.

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Walter Sapuppo and Giovanni Maria Ruggiero: conception, design, data analysis and interpretation; Gabriele Caselli: critical revision; Sandra Sassaroli: conception and final approval.

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