

## Validation of the Body Checking Questionnaire (BCQ) in an Eating Disorders Population

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**Abstract.** The aim of this study was to validate the Body Checking Questionnaire (BCQ) in an eating disorder population, using students in psychology as control. Five hundred and seventy-three females (422 controls and 151 eating disorders patients, mean age  $24.1 \pm 5.9$  years) completed the BCQ and measures of eating disorders psychopathology. Confirmatory factor analysis confirmed that the BCQ measures the global construct of body checking with three correlated subfactors. The BCQ has good test-retest reliability (0.90), and the subfactors had good internal consistency (0.90, 0.92, and 0.84). The BCQ correlates with other body image and eating disorders measures, indicating that the BCQ measure has good concurrent validity. Finally, the BCQ reliably distinguishes eating disorders patients from controls, as well as “dieters” from “non-dieters.” The study provides support for factor structure, validity and reliability of the BCQ on eating disorders population and supports the use of this questionnaire in cross-national studies.

*Keywords:* Body checking, eating disorders, anorexia nervosa, bulimia nervosa, psychological tests.

The over-evaluation of shape and weight is of primary importance in maintaining eating disorders (Dalle Grave, 1998; Fairburn, Cooper, and Shafran, 2003; Meneghelli, Adami, Gandolfo, and Scopinaro, 1995). Most of the clinical features observed in eating disorders patients are derived directly or indirectly from this core psychopathology (Fairburn et al., 2003). Typical behaviour in patients with an over-evaluation of shape and weight is shape and weight checking, or “body checking”. Typical body checking behaviours include checking one’s weight frequently, viewing one’s appearance hypercritically, checking size of specific body parts or pinching fat in order to compare one’s body with others, and to look for reassurance about one’s shape (Rosen, 1997).

Recent cognitive behavioural theories suggest that body checking is of primary importance in maintaining anorexia nervosa (Fairburn et al., 2003) and other eating disorders (Fairburn et al.,

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2003). It has been suggested that body checking, that is, developing a selective attention to some disliked part of the body, increases the preoccupation with shape and weight (Williamson, Muller, Reas and Thaw, 1999). This process is confirmed by some patients who report that their own preoccupation with shape and weight increased after a period of intense body checking (Shafran, Fairburn, Robinson and Lask, 2004). In some patients, the information derived from body checking can be interpreted as a threat to, or a failure of control, which may then stimulate or maintain dietary restriction (Fairburn, Shafran and Cooper, 1999). Finally, it has been reported that some patients decide to check their weight and shape deliberately to induce a state of body dissatisfaction and therefore to increase motivation to maintain dietary restraint (Shafran et al., 2004).

To evaluate body checking behaviours, Reas and colleagues developed a simple instrument called the "Body Checking Questionnaire" (BCQ) (Reas, Whisenhunt, Netemeyer and Williamson, 2002). The BCQ is a self-administered questionnaire made up of 23 items. The person taking the BCQ indicates on a Likert scale from 1 (never) to 5 (very often) how often the particular behaviour described occurs. The total score is the sum of individual item scores and ranges from 23 to 115. Factor analysis showed that BCQ is a single measurement of a level one factor (Body checking) with three strongly correlated sub-factors: 1) Overall Appearance Scale contains 10 items measuring control behaviours linked to general appearance; 2) Specific Body Parts Scale contains 8 items measuring control behaviours of specific body parts; 3) Idiosyncratic Checking Scale contains 5 items linked to unusual control behaviours.

The internal consistency of the tool, measured by means of Cronbach's alpha, is good on all three scales: Overall appearance  $\alpha = 0.88$ ; Specific body parts  $\alpha = 0.92$  and Idiosyncratic checking  $\alpha = 0.83$ . Reproducibility over time for the tool is also significant ( $r = 0.94$ ) and concurrent and discriminating validity are also good (Reas et al., 2002). The BCQ seems to discriminate eating disorders patients from controls, as well as dieters from non-dieters. However, the ability for the BCQ to discriminate eating disorders patients from controls is still preliminary, since the questionnaire was evaluated in only 15 outpatient and day-hospital eating disorders patients.

This study aimed to establish the validation of the BCQ in a large eating disorders population, using students in psychology as controls.

## Methods

### *Participants*

The number of participants was 573, all females, 422 recruited from psychology classes at the University of Padua, and 151 eating disorders patients recruited from two eating disorders inpatient hospitals in Italy. Subjects with eating disorders were grouped according to diagnosis: anorexia nervosa (76 patients), bulimia nervosa (27) and eating disorder not otherwise specified (EDNOS) (48). Diagnosis was established using the diagnostic questions of the Eating Disorder Examination (EDE 12.0D) interview (Fairburn and Cooper, 1993).

Control participants were divided into 'dieters' and 'non-dieters'. We classified dieters as the participants who gave a positive answer to the question "Are you actually following a restricted calorie diet to lose weight?", and non-dieters were the participants who gave a negative answer. Consent forms explaining the purpose and procedures of the study were read and signed by all participants.

The average age of the participants was 24.1 ( $SD = 5.9$ ) years, and the majority indicated they were single ( $N = 510$ ; 89.2 %). Average Body Mass Index (BMI:  $\text{kg}/\text{m}^2$ ) for the control group was 20.4 ( $SD = 2.2$ ), and for the clinical group 16.8 ( $SD = 3.1$ ) ( $F[1, 535] = 197.8$ ,  $p < .001$ ).

### Procedure

The BCQ was administered as part of a battery of tests, described below. Before undergoing the tests, each subject completed a form reporting personal information regarding age, years of education, marital status, weight and height. The control group was also asked if they were trying to lose weight.

### Questionnaires

*Body Checking Questionnaire* (BCQ) (Reas et al., 2002). The questionnaire was translated independently into Italian by three psychologists and was back-translated by a native English speaker with experience in the treatment of eating disorders. The three translations were compared in order to obtain a single version. A comparison between the original English language version and the back-translation made it possible to eliminate inconsistencies or significant differences in meaning. The style of the test was adjusted to make the list of questions easier to read, and the questionnaire was tested on small groups of people drawn from the general population to check ease of comprehension and readability. Adjustments were made and final touches added.

*Body Image Avoidance Questionnaire* (BIAQ) (Rosen, Srebnik, Saltzberg and Wendt, 1991). The tool measures avoidance behaviours of situations that may trigger an increase in concern for one's body image. The BIAQ consists of 19 items scored on a Likert 6-point scale of from 0 (never) to 5 (always) to indicate frequency of behaviour. Factor analysis reveals a four-factor structure: Clothing – included 9 items concerning choice of clothing behaviours; Social activities – consisted of 4 items measuring social behaviours; Eating restraint – made up of 3 items regarding control over eating; and Grooming and weighing – covered 3 items concerning behaviours regarding weight control and body care. This tool was determined to have good internal consistency (Cronbach's  $\alpha = 0.89$ ), test-retest reliability ( $r = 0.87$ ), and concurrent and discriminating validity in the original version. The Italian version of BIAQ also showed good psychometric proprieties: 4 scales apparent, Cronbach's alpha greater than 0.75, good test-retest reliability at 3 weeks ( $r > 0.90$ ) (Riva and Molinari, 1998).

*Body Uneasiness Test* (BUT) (Cuzzolaro, Vetrone, Marano and Battacchi, 1999). The Body Uneasiness Test (BUT) is a self-administered, quick questionnaire developed in Italy specifically to evaluate concern for physical appearance, body image awareness (34 items, Part I), and body parts that most strongly contribute to body dissatisfaction (37 items, Part II). Only the first part of the BUT tool was used in this study. Part I scores, ranging from 0 (never) to 5 (always) are combined in a Global Severity Index and in 5 sub-scales as a result of factor analysis (Weight phobia, Body image concerns, Avoidance, Compulsive self-monitoring, Depersonalization). The five sub-scales distinguish subjects with eating disorders from non-clinical controls (Wilk's Lambda = 0.62,  $p = .0001$ ) (12). BUT reliability is good (Cronbach's  $\alpha$ : Weight phobia = 0.85; Body image concern = 0.92; Avoidance = 0.75; Compulsive self-monitoring = 0.81; Depersonalization = 0.77).

*Eating Attitude Test–40* (EAT-40) (Garner and Garfinkel, 1979). This test is commonly used to evaluate the symptoms and concerns that are characteristic of eating disorders. It is made up of 40 items scored on a 6-point scale; each reply scores from 0 to 3 and the sum of all the items produces the total score that can range from 0 to 120. EAT-40 cut-off point used was 30. The Italian version of the EAT-40 test is able to discriminate between control and clinical subjects (Cuzzolaro and Petrilli, 1988).

### *Statistical analysis*

Some internal differences in the sample and discriminant validity were studied using one-way ANOVA. Internal validity was evaluated using Cronbach's alpha. Pearson's  $r$  coefficient was used to check test-retest reliability and concurrent validity. Confirmatory factor analysis was carried out to check that the factor structure of the Italian version of the BCQ corresponded to the original version.

Analysis was carried out using SPSS software version 10.0 for Windows and the statistics pack LISREL 8.

## **Results**

### *Group difference on the BCQ and discriminant validity*

Total BCQ score was compared between eating disorder patients and control subjects. Subjects with eating disorder obtained significantly higher scores on the BCQ ( $M = 62.6$ ,  $SD = 24.1$ ) than the students ( $M = 44.2$ ,  $SD = 14.7$ ;  $F[1, 568] = 119.9$ ,  $p < .001$ ). ANOVA with the clinical sample grouped according to diagnosis indicate that patients with bulimia nervosa obtained significantly higher scores on the BCQ ( $M = 71.8$ ,  $SD = 23.9$ ) than patients with anorexia nervosa ( $M = 58.3$ ,  $SD = 23.9$ ,  $F[2, 146] = 3.4$ ,  $p < .05$ , post-hoc Bonferroni). No significant differences emerged between patients with bulimia nervosa and EDNOS ( $M = 64.4$ ,  $SD 23.3$ , ns) and between patients with anorexia nervosa and EDNOS.

As another test of validity, the dieters of the control group were compared with non-dieters. Dieters ( $N = 56$ ) scored significantly higher on the BCQ ( $M = 54.6$ ,  $SD = 18.7$ ) than non-dieters ( $N = 363$ ,  $M = 42.6$ ,  $SD = 13.4$ ;  $F[1, 417] = 34.9$ ,  $p < .001$ ). Three subjects in the control group failed to answer the question about diet.

A negative correlation was found between age and total BCQ score both in eating disorder patients ( $r = -0.17$ ,  $p < .05$ ) and in control subjects ( $r = -0.29$ ,  $p < .001$ ) and a positive correlation between BMI and total BCQ score both in clinical sample ( $r = 0.27$ ,  $p = .003$ ) and in the control sample ( $r = 0.12$ ,  $p = .013$ ).

### *Concurrent validity*

The BCQ total score was correlated with the BUT, the BIAQ and the EAT-40 scores to evaluate concurrent validity. Results indicate good concurrent validity of the BCQ: a strong, positive correlation was found between the BCQ and the BUT ( $r = 0.80$ ,  $p < .01$ ) and between the BCQ and the BIAQ ( $r = 0.71$ ,  $p < .01$ ). The results indicate that body checking behaviours are associated with body image concerns and body avoidance behaviours. Less strong but nonetheless significant is the correlation between the total scores on the BCQ

**Table 1** Pearson's correlation between BCQ total score and Eating Attitude Test – 40, Body Uneasiness Test, Body Image Avoidance Questionnaire

	BCQ total score <i>r</i>
Eating Attitude Test – 40	
Dieting	0.50
Oral control	0.20
Bulimia and food preoccupation	0.32
Total score	0.39
Body Uneasiness Test	
Weight phobia	0.81
Body image concerns	0.73
Compulsive self-monitoring	0.64
Depersonalization	0.66
Global severity index	0.80
Body Image Avoidance Questionnaire	
Body clothing	0.50
Social activities	0.66
Eating restraint	0.59
Grooming and weighing	0.36
Total score	0.71

All the correlations are significant at the .01 level.

and the EAT-40 ( $r = 0.39, p < .01$ ). These results indicate an association between body checking and symptoms of eating disorders. Table 1 shows correlations between the subscales of the measures administered and the BCQ. The highest correlations were with BUT subscales Weight phobia and Body image concerns.

#### *Internal consistency*

Internal consistency measured using Cronbach's alpha proved to be good in the three BCQ scales: Overall appearance ( $\alpha = 0.90$ ), Specific body parts ( $\alpha = 0.92$ ), Idiosyncratic checking ( $\alpha = 0.84$ ).

#### *Test-retest reliability*

To evaluate the test-retest reliability of the BCQ questionnaire, the test was re-administered to 69 subjects randomly selected from the sample  $N = 422$  control group after 2 weeks. Test-retest reliability of the total BCQ score was  $r = 0.90$  ( $p < .01$ ). The three scales also proved reliable: Overall appearance ( $r = 0.89, p < .01$ ), Specific body parts ( $r = 0.83, p < .01$ ), Idiosyncratic checking ( $r = 0.86, p < .01$ ).

#### *Confirmatory factor analysis*

BCQ items were initially evaluated for univariate normality using the Kolmogorov-Smirnov test. The difference between observed and normal distribution proved significant for all the

**Table 2** Goodness adaptation indices for the Body Checking Questionnaire

	Italian version <i>N</i> = 556	Original version <i>N</i> = 165
Chi square ( <i>df</i> )	625.05 (227)	/
<i>p</i> -value	≈ 0.00000	/
$\chi^2/df$	2.75	/
RMSEA	0.056	0.074
SRMR	0.045	/
NNFI	0.97	/
CFI	0.97	0.90
IFI	0.97	0.90

RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean square Residuals; NNFI = Non-normed Fit Index; CFI = Comparative Fit Index; IFI = Incremental Fit Index.

variables ( $p < .001$ ). This makes it possible to use the maximum likelihood method for factor analysis (Jöreskog and Sörbom, 1996).

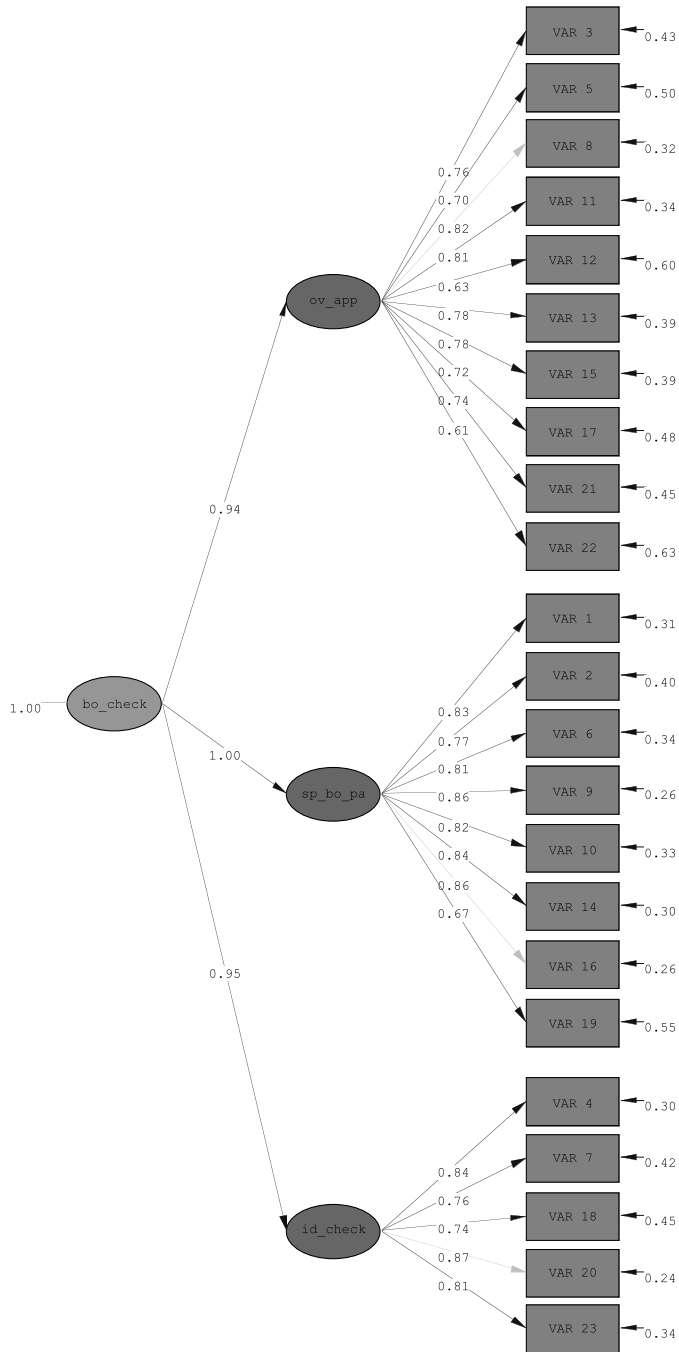
Confirmatory factor analysis indicates the model is valid with Body checking as a level two factor made up of three level one factors (Overall appearance, Specific body parts, Idiosyncratic checking) (Figure 1).

Table 2 gives the adaptation indices of the model shown in Figure 1 and the reference values of the, original BCQ version. As expected with high sample numbers, the ratio between chi square and degrees of freedom is less than 3 and therefore acceptable. Other fit indices are at optimal levels and RMSEA, CFI and IFI are greater than in the original BCQ model. Furthermore, saturation of the 23 items in the three factors, i.e. the structural coefficients, is all high and significant (Table 3), as are the structural coefficients that link the three first level factors to the second level factor ( $r = 0.94, 1.00, 0.95$ , respectively).

## Conclusions

Results of this study indicate that the BCQ is a valid and reliable questionnaire for the measurement of body checking behaviours in subjects with eating disorders. Our data indicate that the BCQ discriminates eating disorders patients from controls as well dieters from non-dieters. These results confirm a previous preliminary observation (Reas et al., 2002) in a larger group of eating disorders patients. The results of this study support the clinical observation that patients with eating disorders frequently check their body in order to obtain information on their shape and weight (Shafran et al., 2004). Our study adds some novel observations to the area of body checking behaviours: 1) bulimia nervosa patients obtain higher scores on the BCQ than anorexia nervosa patients; 2) EDNOS patients obtain similar scores on the BCQ than anorexia nervosa and bulimia nervosa patients; 3) the BCQ scores are negatively correlated with age and positively correlated with BMI.

Although additional research is needed to evaluate whether body checking contributes to the maintenance of eating disorders, clinical observations indicate that body checking behaviours increase the patient's preoccupation with shape and weight (Shafran et al., 2004) and occasionally her/his motivation to maintain dietary restraint (Fairburn et al., 1999).



Chi-Square = 625.05, df = 227, P-value = 0.00000, RMSEA = 0.056

Figure 1 Confirmatory factor analysis of BCQ: standardized solution

**Table 3** Estimates and standardized solution in the Italian version and factor loadings in the original version of 23 items BCQ

Item	Loading		
	Italian version		Original version Factor loading
	Estimates	Standardized solution	
Factor 1 – Overall appearance			
Q 3	0.92	0.76	0.69
Q 5	0.86	0.70	0.62
Q 8	1.00	0.82	0.76
Q 11	0.99	0.81	0.63
Q 12	0.77	0.63	0.64
Q 13	0.95	0.78	0.67
Q 15	0.95	0.78	0.58
Q 17	0.87	0.72	0.69
Q 21	0.90	0.74	0.69
Q 22	0.74	0.61	0.63
Factor 2 – Specific body parts			
Q 1	0.97	0.83	0.79
Q 2	0.90	0.77	0.69
Q 6	0.95	0.81	0.70
Q 9	1.00	0.86	0.83
Q 10	0.96	0.82	0.75
Q 14	0.97	0.84	0.85
Q 16	1.00	0.86	0.77
Q 19	0.78	0.67	0.73
Factor 3 – Idiosyncratic checking			
Q 4	0.96	0.84	0.85
Q 7	0.87	0.76	0.61
Q 18	0.85	0.74	0.70
Q 20	1.00	0.87	0.80
Q 23	0.93	0.81	0.68

Factor analysis confirms a structure with a general factor of a higher level, body checking, and three level one factors: overall appearance, specific body parts, and idiosyncratic checking.

Internal consistency proved very high on all the BCQ scales as did test-retest reliability over a period of 15 days. However, a limitation of the study is that the BCQ was readministered to control participants but not to patients. The analysis of the correlations revealed good concurrent validity of the tool.

The more serious the body checking behaviour, the greater the body dissatisfaction and the tendency to adopt body avoidance behaviours. The relationship between body checking and body avoidance behaviours confirms what other authors have observed, that many patients alternate repeated body checking with active avoidance behaviours without the presence of one being an indication of the absence of the other (Shafran et al., 2004). The correlation between the BCQ, EAT-40 and the subscales Weight phobia and Body image concerns of BUT



suggests an association between body checking and the symptoms and concerns characteristic of eating disorders.

The Italian eating disorder sample obtained a lower mean score ( $M = 62.6$ ,  $SD = 24.1$ ) than the American eating disorder sample ( $M = 82.1$ ,  $SD = 18$ ) (Reas et al., 2002). The difference might be explained by the older age of the Italian eating disorder sample (the total BCQ correlate negatively with age), different admixture of eating disorder subtype in the two samples, spurious findings of the small American eating disorder sample and, perhaps, cultural differences between Italian and American patients. Future cross-cultural researches should be able to clarify these preliminary findings.

In conclusion, this study provides evidence of factor structure, validity and reliability of the BCQ in an eating disorders population. The potential important role of body checking in the maintenance of an eating disorder indicates that the BCQ may be a useful clinical tool in the assessment and treatment of eating disorders patients. Finally, the validation of the Italian version of the BCQ supports using the questionnaire in cross-national studies of body image in clinical and non clinical subjects.

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### References

- Cuzzolaro, M. and Petrilli, A.** (1988). Validazione della Versione Italiana dell'EAT-40. *Psichiatria dell'infanzia e dell'adolescenza*, 55, 209–217.
- Cuzzolaro, M., Vetrone, G., Marano, G. and Battacchi, M. W.** (1999). BUT: una nuova scala per la valutazione del disagio relativo all'immagine del corpo. *Psichiatria dell'infanzia e dell'adolescenza*, 66, 417–428.
- Dalle Grave, R.** (1998). Il trattamento multidisciplinare dell'anoressia nervosa: aspetti teorici e pratici. *Psicoterapia Cognitiva e Comportamentale*, 5, 31–44.
- Fairburn, C. G. and Cooper, Z.** (1993). The eating disorders examination (12th ed). In C. Fairburn and G. Wilson (Eds.), *Binge Eating: nature, assessment, and treatment* (pp. 317–331). New York: The Guilford Press.
- Fairburn, C. G., Cooper, Z. and Shafran, R.** (2003). Cognitive behaviour therapy for eating disorders: a “transdiagnostic” theory and treatment. *Behaviour Research and Therapy*, 41, 509–528.
- Fairburn, C. G., Shafran, R. and Cooper, Z.** (1999). A cognitive behavioural theory of anorexia nervosa. *Behaviour Research and Therapy*, 37, 1–13.
- Garner, D. M. and Garfinkel, P. E.** (1979). The Eating Attitudes Test: an index of the symptoms of anorexia nervosa. *Psychological Medicine*, 9, 273–279.
- Jöreskog, K. G. and Sörbom, D.** (1996). *LISREL 8 User's Reference Guide*. Chicago: Scientific Software International.
- Meneghelli, A., Adami, G. F., Gandolfo, P. and Scopinaro, N.** (1995). “Body Image” e peso corporeo nel paziente con obesità grave. *Psicoterapia Cognitiva e Comportamentale*, 1, 5–14.
- Reas, D. L., Whisenhunt, B. L., Netemeyer, R. and Williamson, D. A.** (2002). Development of the body checking questionnaire: a self-report measure of body checking behaviors. *International Journal of Eating Disorders*, 31, 324–333.

- Riva, G. and Molinari, E.** (1998). Replicated factor analysis of the Italian Version of the Body Image Avoidance Questionnaire. *Perceptual Motor Skills*, *86*, 1071–1074.
- Rosen, J.** (1997). Cognitive-behavioural image therapy. In D. Garner and P. Garfinkel (Eds.), *Handbook of Treatment for Eating Disorders* (pp. 188–201). New York: The Guilford Press.
- Rosen, J., Srebnik, D., Saltzberg, E. and Wendt, S.** (1991). Development of a body image avoidance questionnaire. *Psychological Assessment*, *3*, 32–37.
- Shafran, R., Fairburn, C. G., Robinson, P. and Lask, B.** (2004). Body checking and its avoidance in eating disorders. *International Journal of Eating Disorders*, *35*, 93–101.
- Williamson, D. A., Muller, S. L., Reas, D. L. and Thaw, J. M.** (1999). Cognitive bias in eating disorders: implications for theory and treatment. *Behavior Modification*, *23*, 556–577.