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The Validity of the Eating Disorder Examination and its Subscales

ZAFRA COOPER, PETER J. COOPER and CHRISTOPHER G. FAIRBURN

The EDE is a semistructured interview which has been developed as a measure of the specific psychopathology of anorexia nervosa and bulimia nervosa. To establish its discriminant validity it was administered to 100 patients with anorexia nervosa or bulimia nervosa and to 42 controls. The two groups differed significantly on all items. Five subscales were derived on rational grounds and evaluated on the two populations. The α coefficients for each subscale indicated a satisfactory degree of internal consistency. The EDE provides clinicians and research workers with a detailed and comprehensive profile of the psychopathological features of patients with eating disorders.

The psychopathology of anorexia nervosa and bulimia nervosa is complex and varied (Garfinkel & Garner, 1982; Fairburn *et al*, 1986). It has both specific and general components. The specific psychopathology is peculiar to these two disorders and their variants, and includes: disturbed eating habits (extreme dietary restriction, episodes of bulimia, avoidance of eating in public), various methods of weight control (self-induced vomiting, the misuse of purgatives and diuretics, vigorous exercising and extreme dieting), and over-valued ideas about shape and weight. The general psychopathology consists of features found in other psychiatric disorders, for example, a variety of depressive and anxiety symptoms.

Research into the nature and treatment of anorexia nervosa and bulimia nervosa has to take account of this wide range of psychopathology (Wilson, 1987). For a population to be described adequately, standardised measures of both the specific and general psychopathology need to be used. The assessment of the latter does not present a problem since a variety of suitable standardised instruments are available. However, far fewer measures of the specific psychopathology of eating disorders are available and, with two exceptions, these are self-report instruments. They include the Eating Attitudes Test (EAT; Garner & Garfinkel, 1979) and the Eating Disorder Inventory (Garner *et al*, 1983), which are general measures designed to assess a wide range of the behaviour and attitudes of patients with anorexia nervosa and bulimia nervosa.

In addition, there are specific self-report measures which are intended to assess particular aspects of these patients' psychopathology. They include the Binge Eating Scale (Gormally *et al*, 1982), the Bulimia Test (Smith & Thelen, 1984), the Bulimic Investigatory Test (Henderson & Freeman, 1987), the Revised Restraint Scale (Herman & Polivy, 1980), the Three Factor Eating Questionnaire (Stunkard & Messick, 1985), the Dutch Eating Behaviour Questionnaire (van Strien *et al*, 1986) and the Body Shape Questionnaire (Cooper *et al*, 1987).

However, self-report measures are not well suited either for detailed psychopathological studies or for research into the effects of treatment, since many features of these eating disorders are difficult to elicit and define. This is particularly true of the characteristic overvalued ideas concerning shape and weight (Cooper & Fairburn, 1987), which are central to diagnosis (Fairburn & Garner, 1986).

Several of the behavioural features of anorexia nervosa and bulimia nervosa also present difficulties of definition and interpretation. A good example is 'binge eating'. Many of the self-report questionnaires ask about binge eating, yet this term does not have a generally accepted definition. It certainly is not the case that people who report eating in binges necessarily experience episodes of overeating of the type seen among patients with anorexia nervosa or bulimia nervosa. Even among patients who experience florid episodes of uncontrolled overeating, episodes are not identical. Thus, for example, during treatment there is often a change in the nature of these episodes: the amount of food consumed tends to decrease, and there is frequently a less intense sense of loss of control. Despite such changes, patients generally continue to term these episodes as 'binges'. Clearly, self-report questionnaires which simply inquire about the frequency of binge eating will not detect subtle changes of this type.

The difficulties described above could be overcome with the use of a standardised interview (Wilson, 1987). Such an interview would have to be semi-structured so as to provide flexibility without sacrificing reliability, and all key terms would need to be defined. Although such a measure would be less easy to administer and score than a self-report questionnaire, the data obtained would be likely to have greater validity.

Two semistructured interview measures of the specific psychopathology of anorexia nervosa and bulimia nervosa have recently been developed. The Clinical Eating Disorder Rating Instrument has 35 items, the first 22 of which address the specific psychopathology of anorexia nervosa and bulimia nervosa. The remainder of the instrument is concerned with general psychopathology. Data on its reliability have been reported (Palmer *et al*, 1987), but no information has been published on its validity. The Eating Disorder Examination (EDE) is a more detailed measure. It has been developed and revised over the past five years with the aim of maximising its reliability (Cooper & Fairburn, 1987). The interview focuses exclusively on the current levels of specific psychopathology of these two disorders, particularly the attitudes to shape and weight. It consists of 62 items and takes up to an hour to complete. It is necessary to undergo brief training in order to use the interview but a clinical qualification is not essential.

Method and Results

The EDE was administered to 100 patients with anorexia nervosa or bulimia nervosa (according to DSM-III-R Criteria (American Psychiatric Association, 1987)) and to 42 controls. The 53 patients with bulimia nervosa represent a consecutive series of referrals to out-patient eating disorder clinics in Oxford ($n=20$) and Cambridge ($n=33$). The patients with anorexia nervosa were referrals to an adolescent unit in Oxford ($n=22$), an out-patient eating disorder clinic in Cambridge ($n=7$), and Toronto General Hospital ($n=18$). Assignment to diagnostic groups was made by the clinicians treating these patients. The diagnosis of each patient was checked by ZC before inclusion in the appropriate diagnostic group by confirming the presence of the DSM-III-R criteria from standard clinical information collected without reference to the EDE ratings. The controls were randomly drawn from a general practice register in Cambridge to identify healthy women aged 18–35 years. After consultation with the general practitioner, 50 women were sent a letter asking them to agree to be interviewed; four refused, two could not be traced, and two were found to have a history of an eating disorder. The controls and patients were similar in terms of age (Table I). The control group and the patients with bulimia nervosa were of average weight, and the patients with anorexia nervosa were substantially underweight (Table I). The mean total scores on the EAT of the two patient groups are comparable to those of other published series; the mean EAT score for the controls is somewhat lower than in previous British series (e.g. Cooper & Fairburn, 1983), but this is to be expected given that the group was selected for the absence of a history of eating problems.

Distribution of individual EDE items

The individual EDE items were found to discriminate well between those with eating disorders and controls (Fig. 1).

TABLE I
Age, weight and eating habits of subjects

	Anorexia nervosa (n = 47)		*Bulimia nervosa (n = 53)*		*Controls (n = 42)*	
	Mean	*s.d.*	*Mean*	*s.d.*	*Mean*	*s.d.*
Age: years	20.5	4.9	22.1	4.2	21.3	6.9
% Matched-population weights	73.4	8.0	103.3	12.0	99.9	8.8
Frequency of vomiting: mean no. of episodes per month	18.0	40.8	30.8	35.5	0	–
Frequency of bulimic episodes[1]: mean no. of episodes per month	10.4	23.6	26.5	27.8	0	–
EAT total: mean	53.4	18.6	48.7	14.3	8.8	5.4

1. Bulimic episodes were defined as episodes of uncontrolled excessive overeating.

A series of Mann–Whitney U tests revealed the patients and controls to be different at a high level of significance on all items, the least significant difference being for 'food avoidance' ($z=2.73$, two-tailed $P<0.006$); these differences also emerged when the controls were compared with each of the two patient groups separately.

Derivation of subscales

A preliminary set of five subscales was derived by the rational grouping of items together on the basis of similarity of content (Table II), with the intention of representing the major areas of the psychopathology of anorexia nervosa and bulimia nervosa. The subsequent statistical analyses reported were undertaken to assess their internal consistency and discriminant validity. The subscales were labelled 'restraint', 'bulimia', 'eating concern', 'weight concern', and 'shape concern'. The Cronbach α coefficients for each of the subscales respectively, calculated using the full sample of 142 patients and controls, were 0.75, 0.90, 0.78, 0.67, 0.79, indicating a satisfactory degree of internal consistency for all subscales.

Table II shows that, with two exceptions, the average correlation of the subscale items is greater when items are correlated with their own subscale total than when correlated with the other subscale totals. The exceptions are the items comprising the 'weight concern' subscale which, on average, correlate at a higher level with the 'shape concern' subscale total than with the 'weight concern' subscale total; and the items comprising the 'shape concern' subscale which, on average, correlate at a higher level with the 'weight concern' subscale than with the 'shape concern' subscale.

'Sensitivity to weight gain' correlated at a relatively low level with its own subscale total ($r=0.26$) and at a high level with the 'restraint' ($r=0.59$) and 'shape concern' ($r=0.61$)

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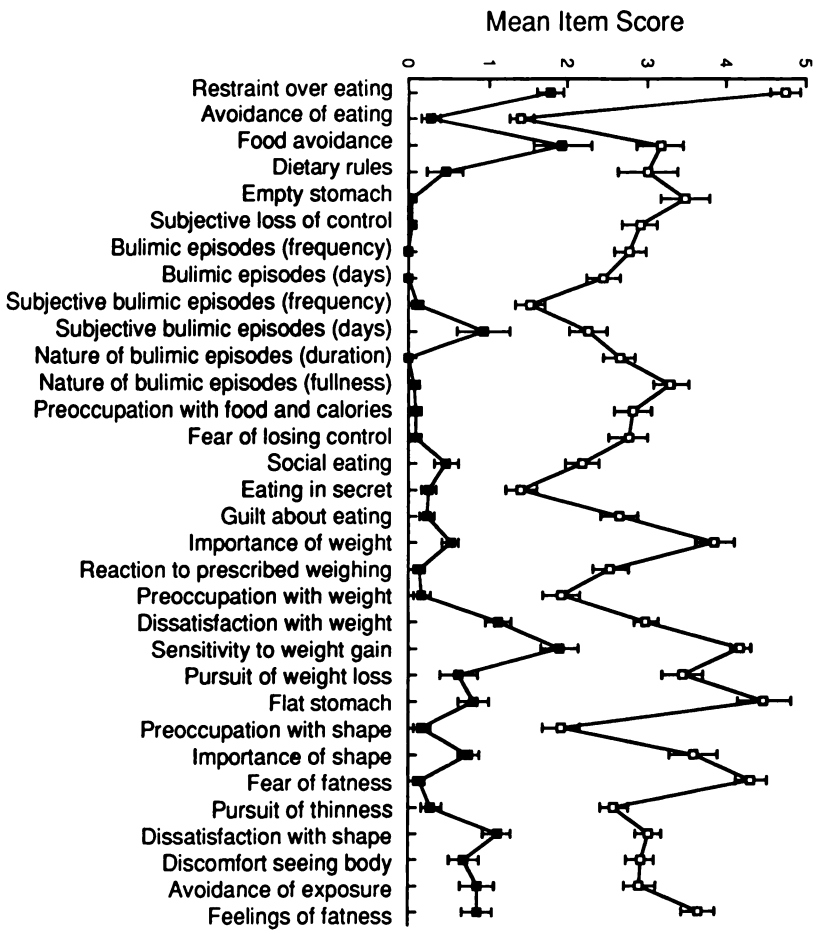

FIG. 1 Mean scores and standard errors for the main EDE items for patients with eating disorders (—□—) and controls (—■—).

subscale totals. This item is, however, an important one from a descriptive point of view and one which clearly differentiates patients from controls (see Fig. 1). It would therefore seem inappropriate to drop it from the instrument altogether, and since the subscales were derived on rational rather than empirical grounds, it would also be inappropriate to move it to another subscale. It therefore seems sensible to retain the item within the full EDE, but drop it from the 'weight concern' subscale. To do so raises the subscale α coefficient to 0.68 and the mean item total correlation to 0.44

'Pursuit of thinness' presents a similar difficulty. This item correlated at a low level with the 'shape concern' subscale total ($r=0.11$), whereas it correlated at a high level with the 'restraint' ($r=0.54$), 'eating concern' ($r=0.40$) and 'weight concern' ($r=0.47$) subscale totals. As can be seen from Fig. 1, it also clearly differentiates patients from controls. Although the concept is of considerable clinical importance (Bruch, 1973; Garfinkel & Garner, 1982), the low correlation it has with the 'shape concern' subscale clearly does not justify retaining it as a subscale item. Again, it seems appropriate to drop this item from the subscale while retaining it within the full EDE as an individual item of interest in itself. Having made this adjustment, the new eight item 'shape concern' subscale has an α coefficient of 0.82 and mean item total correlation of 0.54.

Table III shows the mean subscale total scores for the two patient groups and the controls, after the modifications described above were made. It is apparent that the patient samples differ markedly from the controls on all five subscales. Indeed, when the subscale means of the combined patient sample were compared with those of the controls, the smallest Student's t value was greater than 10 (d.f. = 142; $P<0.001$).

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TABLE II
Correlation of individual items[1] with the mean preliminary subscale[2] totals

	Subscales				
	Restraint	*Bulimia*	*Eating concern*	*Weight concern*	*Shape concern*
'Restraint' items					
Restraint over eating	0.58	0.32	0.48	0.60	0.57
Avoidance of eating	0.42	0.05	0.23	0.31	0.28
Food avoidance	0.47	0.26	0.33	0.41	0.44
Dietary rules	0.57	0.20	0.43	0.46	0.46
Empty stomach	0.57	0.35	0.49	0.54	0.54
Mean	0.52	0.12	0.39	0.46	0.46
'Bulimia' items					
Subjective loss of control over eating	0.35	0.79	0.66	0.54	0.58
Bulimic episodes: frequency	0.32	0.86	0.59	0.51	0.50
Bulimic episodes: number of days	0.12	0.77	0.27	0.23	0.24
Subjective bulimic episodes: frequency	0.32	0.52	0.50	0.37	0.41
Subjective bulimic episodes: number of days	0.08	0.55	0.14	0.16	0.17
Nature of bulimic episodes: duration	0.27	0.68	0.53	0.49	0.51
Nature of bulimic episodes: fullness	0.37	0.79	0.56	0.50	0.54
Mean	0.26	0.71	0.46	0.40	0.42
'Eating concern' items					
Preoccupation with food and calories	0.45	0.51	0.55	0.55	0.58
Fear of losing control over eating	0.38	0.50	0.48	0.52	0.62
Social eating	0.49	0.25	0.58	0.51	0.53
Eating in secret	0.25	0.30	0.55	0.34	0.39
Guilt about eating	0.55	0.44	0.67	0.57	0.56
Mean	0.42	0.40	0.56	0.50	0.54
'Weight concern' items					
Importance of weight	0.21	0.06	0.25	0.31	0.36
Reaction to prescribed weighing	0.47	0.35	0.50	0.35	0.55
Preoccupation with weight	0.41	0.35	0.54	0.39	0.67
Dissatisfaction with weight	0.46	0.47	0.46	0.54	0.73
Sensitivity to weight gain	0.59	0.28	0.41	0.26	0.61
Pursuit of weight loss	0.52	0.42	0.55	0.61	0.66
Mean	0.45	0.32	0.45	0.41	0.60
'Shape concern' items					
Flat stomach	0.25	0.16	0.16	0.32	0.40
Preoccupation with shape	0.41	0.35	0.54	0.67	0.60
Importance of shape	0.22	0.21	0.29	0.59	0.50
Fear of fatness	0.56	0.53	0.63	0.71	0.47
Pursuit of thinness	0.54	0.19	0.40	0.47	0.11
Dissatisfaction with shape	0.44	0.43	0.50	0.67	0.54
Discomfort, when seeing body	0.52	0.38	0.53	0.65	0.53
Avoidance of exposure	0.45	0.31	0.44	0.61	0.55
Feelings of fatness	0.54	0.51	0.62	0.72	0.68
Mean	0.44	0.34	0.46	0.60	0.49

1. Corrected item total correlations are given where appropriate.
2. These subscales are the preliminary versions and not the final ones. 'Sensitivity to weight gain' and 'pursuit of thinness' are not included in the final version of the subscales.

TABLE III
Revised EDE subscale totals for patients with bulimia nervosa, patients with anorexia nervosa, and normal controls

	Anorexia nervosa		*Bulimia nervosa*		*Controls*	
	Mean	*s.d.*	*Mean*	*s.d.*	*Mean*	*s.d.*
Restraint	3.17	1.47	3.14	1.22	0.91	0.91
Bulimia	1.58	1.55	3.42	0.79	0.41	0.87
Eating concern	2.17	1.62	2.43	1.30	0.22	0.33
Weight concern	2.40	1.48	3.14	1.44	0.52	0.62
Shape concern	2.85	1.22	3.55	1.35	0.64	0.75

Finally, the revised subscale totals were intercorrelated for each of the three samples. Since, in psychopathological terms, the three samples do not stand in a simple linear relationship to one another, one would expect, as an index of discriminant validity, different patterns of correlations to emerge. It is apparent from Table IV that the pattern of correlations was indeed different across samples. For example, for the patients with anorexia nervosa, 'eating concern' was highly correlated with 'bulimia', 'weight concern' and 'shape concern', whereas for the patients with bulimia nervosa it was moderately highly correlated with all the subscales, and for the normal controls it was weakly

TABLE IV
Intercorrelations of revised subscales for the three samples

	Anorexia nervosa					*Bulimia nervosa*					*Controls*				
	R	*EC*	*B*	*WC*	*SC*	*R*	*EC*	*B*	*WC*	*SC*	*R*	*EC*	*B*	*WC*	*SC*
R	-	0.28	0.19	0.49	0.45	-	0.30	0.20	0.32	0.26	-	0.53	0.16	0.43	0.37
EC		-	0.56	0.56	0.52		-	0.36	0.35	0.36		-	0.06	0.23	0.37
B			-	0.24	0.12			-	0.00	0.10			-	0.05	0.22
WC				-	0.55				-	0.86				-	0.54
SC					-					-					-

R, restraint; EC, eating concern; B, bulimia; WC, weight concern; SC, shape concern.

associated with 'weight concern' and moderately highly correlated with 'shape concern'. Similarly, although 'weight concern' and 'shape concern' were highly correlated for all three samples, they were particularly highly associated in the case of the patients with bulimia nervosa.

Discussion

The individual items of the EDE discriminate well between patients with eating disorders and normal controls; indeed, the means and standard errors of all these individual items do not overlap for the two groups. Despite the impressive distributions shown in Fig. 1, it is important to note that the control group was specifically selected for the absence of a history of eating problems and they therefore represent a group particularly unconcerned about body shape and weight. For this reason it is important that a comparison be made between the EDE scores of patients with eating disorders and individuals concerned about eating, shape, and weight but who do not have an eating disorder. Wilson & Smith (1989) have made such a comparison and found that, unlike the self-report Eating Disorder Inventory, the EDE discriminated well between the groups.

The five subscales grouped items together in a systematic fashion to represent the major areas of psychopathology. The α coefficients of each of these subscales indicated a satisfactory degree of internal consistency in all cases, thus providing empirical justification for the rational procedure. Since both 'sensitivity to weight gain' and 'pursuit of thinness' appear to be of clinical importance it was decided to retain them within the full EDE but, in accordance with the empirical evidence, to remove them from their respective subscales. This modification to the subscales slightly raised their α coefficients. Although items were originally assigned to subscales on rational rather than empirical grounds, it seemed appropriate to use empirical findings to delete items from subscales. While the empirical findings could have been used to re-assign items to different subscales, this was not considered appropriate because it would have undermined the original purpose of grouping items together in terms of the extent to which they were conceptually related. This procedure is justified by the fact that it was necessary to drop only two items, and by the high α coefficients of all five subscales. It is clear from Table III that the amended subscales differentiate clearly between patients and controls.

The puzzling anomaly over the 'weight concern' and 'shape concern' subscales indicates that for the group of patients and controls studied, weight concerns and shape concerns are very closely associated with each other. This may reflect the fact that the most objective and accessible way of assessing body shape for individuals is by means of body weight; and that concerns about weight are, at least in part, a secondary consequence of concerns about shape. Whether this close association holds for all groups remains to be seen. For this reason, it seems premature to assume that the two subscales can be combined.

Conclusion

The EDE overcomes many of the limitations of the self-report measures of the psychopathology of eating disorders by providing unambiguous definitions of all key items and by addressing in detail the complex concerns about shape and weight. It gives a detailed and comprehensive profile of the psychopathological features characteristic of patients with eating disorders. Thus, it makes it possible to describe particular patient populations in detail; to make precise comparisons between different patient groups, such as those with anorexia nervosa and those with bulimia nervosa; to compare patient populations with groups with no eating disorders but with high levels of concern about shape or weight; and, of particular importance, to assess the effects of specific treatments on the psychopathology of anorexia nervosa and bulimia nervosa.

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