The Eating Attitudes Test: an index of the symptoms of anorexia nervosa

DAVID M. GARNER[1] AND PAUL E. GARFINKEL

*From the Clarke Institute of Psychiatry, Department of Psychiatry,
University of Toronto, Canada*

SYNOPSIS Data on the development of a 40-item measure of the symptoms in anorexia nervosa are reported. The scale (EAT) is presented in a 6-point, forced choice, self-report format which is easily administered and scored. The EAT was validated using 2 groups of female anorexia nervosa patients ($N = 32$ and 33) and female control subjects ($N = 34$ and 59). Total EAT score was significantly correlated with criterion group membership ($r = 0.87$, $P < 0.001$), suggesting a high level of concurrent validity. There was very little overlap in the frequency distributions of the 2 groups and only 7% of the normal controls scored as high as the lowest anorexic patient. Female obese and male subjects also scored significantly lower on the EAT than anorexics. Recovered anorexic patients scored in the normal range on the test, suggesting that the EAT is sensitive to clinical remission.

INTRODUCTION

There has been recent emphasis on the constellation of psychophysiological signs characteristic of primary anorexia nervosa (Bruch, 1973; Russell, 1970) in contrast to earlier views of its being a non-specific psychological disorder (Bliss & Branch; 1960). Fundamental psychological and behavioural symptoms have been identified (Gull, 1868; Dally, 1969; Crisp, 1970; Bruch, 1973); however, there has been a relative absence of objectivity in their measurement.

Slade (1973) has developed a 22-item scale for assessing anorexic behaviour. This scale measures 3 dimensions of behaviour: (1) 'resistance to eating'; (2) 'methods of disposing of food'; and (3) 'overactivity'. It was designed to be administered by observers who would evaluate patients on a hospital ward. Results were reported for 12 anorexic patients and 12 psychiatric controls; it was found that the 2 groups significantly differed on the rated behaviours.

Although Slade's rating scale appears to have utility in an in-patient setting, it has several limitations. First, the sample on which the scale was validated was very small. Secondly, there

was no indication that the raters were unbiased; they may have had knowledge of the purpose of the study or the diagnosis of the patient. Thirdly, the questions require prolonged observation for a representative judgement to be made in each case. Fourthly, and of greatest significance, the rating scale taps only 3 dimensions of anorexic behaviours. Thus, it does not provide an index of other characteristic behaviours which may be equally representative of the disorder.

Disturbances in body image and interoception have been described (Bruch, 1973; Garner *et al.* 1978) and objectively identified in some patients (Slade & Russell, 1973; Garner *et al.* 1976; Garfinkel *et al.* 1978). Other idiosyncratic attitudes and behaviours surrounding food have been frequently observed (Dally, 1969; Sours, 1969; Theander, 1970; Slade, 1973; Selvini, 1974; Halmi, 1974; Hill, 1976). Finally, various psychobiological symptoms, such as amenorrhea and sleep irregularities, have been commonly reported with anorexia nervosa.

The purpose of this study is to develop and validate a rating scale which may be useful in evaluating a broad range of target behaviours and attitudes found in anorexia nervosa. It is intended to be an instrument that will be economical in terms of administration and scoring time as well as a potentially meaningful assessment or prognostic index.

[1] Address for correspondence: Dr David M. Garner, Clarke Institute of Psychiatry, 250 College Street, Toronto, Ontario M5T 1R8, Canada.

Table 1. *Demographic characteristics of subjects (means)*

Group	N	Age* (s.d.)	Height (cm)* (s.d.)	Present weight (kg)** (s.d.)	Deviation from average weight (%)
Anorexia nervosa (I)	32	22·4 (4·3)	164·0 (6·1)	43·9 (8·9)	− 23·9
Normal controls (I)	34	22·7 (2·5)	161·3 (8·2)	59·8 (6·3)	+ 3·4
Anorexia nervosa (II)	33	22·5 (7·0)	162·0 (6·8)	43·2 (8·3)	− 24·6
Normal controls (II)	59	21·8 (2·8)	158·8 (13·6)	57·7 (4·3)	+ 3·3

* NS.
** $P < 0.001$, t-test between matched groups.

METHOD AND SUBJECTS

Test validation was performed with 2 independent groups of female anorexia nervosa (AN) patients and female normal control (NC) subjects. All AN subjects met the criteria for primary AN according to Feighner *et al.* (1972), but they were relatively heterogeneous in that they were at various stages of weight restoration and long-term treatment. While some of the subjects previously had been hospitalized for AN, others had experienced a relatively recent onset. The mean age of onset of illness for the AN group was 18·4 years.

The NC group was largely comprised of University students from the same socioeconomic strata as the AN patients. The NC subjects were within ±10% of average Canadian weight for their age and height (Canadian Average Weights, 1954) and free of past psychiatric illness. Demographic characteristics for the 2 groups, including age, weight, height and deviation from average Canadian weight, are provided in Table 1.

Following validation of the test, males (within ±10% of average weight) and obese females (> 15% over average weight) were also tested and their results compared with the anorexic and normal female groups.

RESULTS

Test construction

From a survey of the clinical literature, 35 preliminary items were developed which reflect a range of reported 'anorexic' behaviours and attitudes. These items were presented in a Likert format where responses were mutually exclusive and exhaustive. Subjects were required to judge whether the item applied 'very often', 'often', 'sometimes', 'rarely' or 'never'. A score of 2 was earned for an extreme response in the 'anorexic' direction and a score of 1 for the adjacent less extreme response. No score was given for 'non-anorexic' answers.

The initial version of the Eating Attitudes Test (EAT) was administered to a criterion group of 32 AN patients and 34 NC subjects. Individual items were considered meaningful if the AN group scored significantly higher compared with the NC group. For 23 items group mean scores differed significantly in the predicted direction ($P < 0.001$, t-test). An overall validity coefficient was obtained by correlating the total EAT score with group membership ($r = 0.72$, $P < 0.001$, biserial correlation). Thus, 23 items from the initial version of the EAT showed a moderate level of concurrent validity in that test scores were good predictors of clinical diagnosis.

The remaining items were eliminated or re-worded and new items were added to the second version of the EAT. In order to maximize group differences, an 'always' alternative was added for each item. This yielded a 6-point, forced choice, Likert scale. In the final version of the test, each extreme response in the 'anorexic' direction was scored as worth 3 points, while the adjacent alternatives were weighted as 2 points and 1 point respectively.

Cross-validation

As essential component of test validity is the determination of the test's predictive ability, using a sample independent from that on which

the items were selected. For this reason, the EAT was administered to an independent sample of AN ($N = 33$) and NC ($N = 59$) subjects.

For the new sample, a validity coefficient was obtained by correlating the total score on the original 23 EAT items and the criterion group membership ($r = 0.85, P < 0.001$). Including all 40 items of the second version of the EAT, and correlating total score with groups, a validity coefficient of 0.87 ($P < 0.001$, biserial correlation) reveals the test to be a good predictor of group membership. The validity of individual items was determined by examining the degree to which item scores were predictive of group membership. Item score was correlated with groups, and for 37 items the biserial correlation was significant at the $P < 0.001$ level of confidence. One item had a lower, but significant, coefficient ($P < 0.01$), while the 2 remaining items were not significant predictors of group membership. The moderate predictive ability of several items was considered acceptable, since it was reasoned that they were clinically relevant to AN. Although some behaviours or attitudes are common to both a normal sample and anorexics, they have special meaning for the AN patients and should be important measures of therapeutic outcome.

The discriminant validity of the EAT, its ability to assess prognosis within AN and results for another population are discussed below. The Appendix contains the items retained for the final version of the EAT, together with a notation of the mean item score differences for the cross-validation sample of AN and NC subjects.

The mean EAT scores for the cross-validation samples of AN and NC subjects are presented in Fig. 1. The final version of the EAT was also administered to groups of male ($N = 49$) and obese ($N = 16$) subjects and their mean scores are shown in Fig. 1. A one-way analysis of variance revealed group differences ($F = 190.04$, $P < 0.001$). As illustrated in Fig. 2, there is some overlap in EAT scores between the AN and NC groups, although only 7% of the NC results fall above the lowest AN score. A strategy which would eliminate false negatives for AN in this sample would involve a minimum cut-off score of 30 on the EAT. This cut-off score would allow
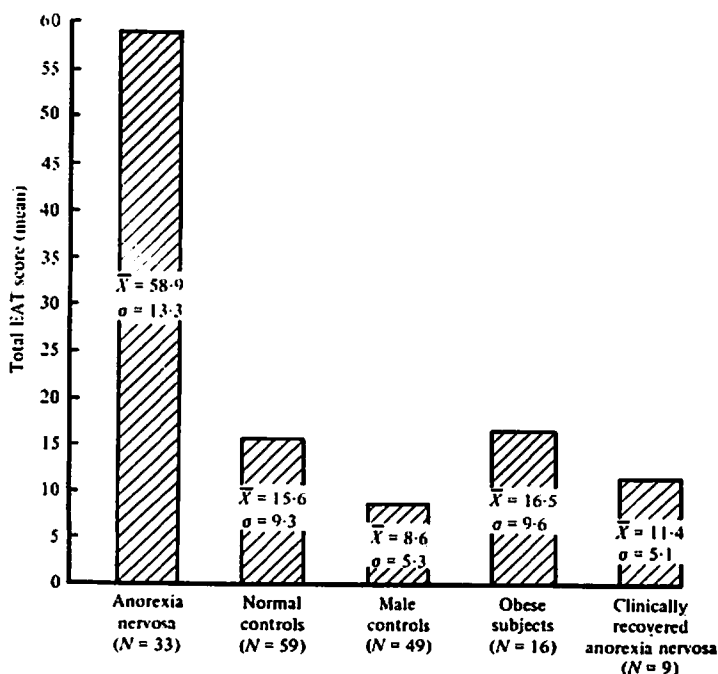

FIG. 1. Mean EAT scores. Mean differences are significant ($P < 0.001$, one-way analysis of variance). Recovered AN group is not included in the analysis.
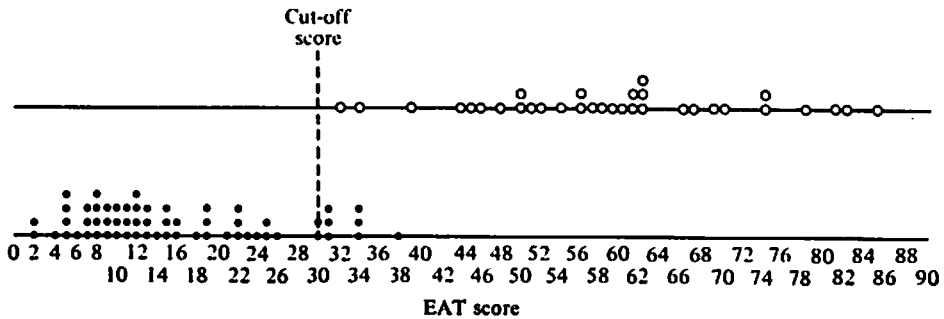
FIG. 2. EAT frequency distribution. O, Anorexia nervosa subjects ($N = 33$, $\bar{X} = 58\cdot9$, $\sigma = 13\cdot3$); ●, normal controls ($N = 59$, $\bar{X} = 15\cdot6$, $\sigma = 9\cdot3$).

a 'false positive' rate, or identification of normal subjects with eating concerns comparable to those in AN, in 13% of the NC group.

A factor analysis of the EAT using the varimax method provided an independent 'check' to verify that items which were intended to measure particular symptom areas correlated more highly with each other than other items clusters. The analysis revealed that items could be grouped together on 7 factors reflecting: (a) food pre-occupation, (b) body image for thinness, (c) vomiting and laxative abuse, (d) dieting, (e) slow eating, (f) clandestine eating, and (g) perceived social pressure to gain weight. Although the sample size in the current study is smaller than optimal for a factor analysis (Nunnally, 1967), the results add tentative support for content validity of several symptom dimensions measured by the EAT. All items which were intended to represent the same symptom area showed positive communal factor loadings.

Reliability

The *alpha* reliability coefficient was computed to obtain a measure of internal consistency and to estimate the influence of other sources of sampling error. For the sample of AN subjects the *alpha* was 0·79, and for the pooled sample of AN and NC subjects the coefficient was 0·94. Considering the relatively small number of items on the EAT, the test demonstrates a high degree of internal reliability.

Relationship between EAT and other measures

In order to demonstrate discriminant validity, the EAT was correlated with several other measures in the NC group. The Restraint Scale (Herman & Polivy, 1975) is an important measure, in that it assesses degree of dieting behaviour. Because of the possible similarity in constructs underlying the EAT and Restraint Scale, scores on the measures were correlated for a sample of 43 NC females. A moderately low Pearson's correlation ($r = 0\cdot28$, $P > 0\cdot05$) was obtained, showing an insignificant relationship between measures.

To determine whether the EAT simply reflects difficulties in controlling weight, the EAT was correlated with adult weight fluctuations for NC subjects ($N = 58$, $r = +0\cdot17$, $P > 0\cdot1$). The EAT scores also showed insignificant correlations with extraversion ($N = 26$, $r = 0\cdot30$, $P > 0\cdot1$) and neuroticism ($N = 26$, $r = 0\cdot10$, $P > 0\cdot1$) on the Eysenck Personality Inventory in NCs. Thus, from these data, the EAT appears to measure specific symptoms that are found much more often in an anorexic population than in others. Moreover, the scores on this test are not merely related to measures of dieting, weight fluctuations, extraversion or neuroticism.

Relationship between EAT score and prognosis

The EAT was administered to a small number of AN patients who had clinically recovered. These subjects showed scores in the normal range ($N = 9$, $\bar{X} = 11\cdot4$, S.D. $= 5\cdot1$), suggesting that the EAT is sensitive to clinical remission. Six of these patients had been administered the EAT while symptomatic for AN and at that time showed EAT scores that were comparable to the clinical AN group.

DISCUSSION

These data suggest that the EAT is an objective and valid index of symptoms frequently observed

in anorexia nervosa. Cross-validation procedures revealed the scale's predictive validity to be consistent across 2 independent samples of patients and controls. EAT scores for a small group of clinically recovered AN patients were in the normal range, suggesting it is also sensitive to prognosis. Scores on this test were not significantly related to measures of dieting, weight fluctuation or neuroticism. Obese females and normal weight males scored significantly different from anorexics. The EAT therefore seems to measure behaviour and attitudes which meaningfully relate to an anorexic population. However, it is noteworthy that some individuals from the non-anorexic groups scored as 'symptomatic' on particular items. Moreover, a significant percentage (7%) of the non-anorexic subjects scored in the range overlapping with the lowest anorexic subjects. This raises the important question about the meaning of these responses. Bruch (1973) has reported upon a sub-group of chronic dieters called 'thin-fat' people whose psychological orientation is not clearly distinguishable from that of patients with anorexia nervosa except that they do not manifest the classical weight loss. The 7% of the NC subjects whose EAT scores were in the AN range (> 30) may reflect this group with serious eating concerns as described by Bruch. Clinical interviews with NC subjects who scored over 30 on the EAT revealed that they did, in fact, experience significant concerns about their weight.

Although there are obvious advantages to the 'self-report' format of the EAT, there are also potential limitations. Self-report inventories rely on the assumption that subjects will accurately describe their symptoms. This may be of particular concern for patients with anorexia nervosa since they often display significant denial surrounding their disorder (Slade & Russell, 1973; Kalucy *et al.* 1977; Goldberg *et al.* 1977). It is difficult to determine the biasing effects of denial on the questionnaire responses, since it is impossible to establish objectively the magnitude of the phenomenology tapped by many of the items. All of the anorexia nervosa subjects in the current study were either in treatment or had agreed to a consultation. Thus, they had shown some acceptance of their condition. However, results from another study have revealed the EAT to be useful in detecting cases of primary anorexia nervosa that have not been previously diagnosed (Garner & Garfinkel, 1978). The EAT was administered to 112 professional dance students and those who scored greater than 30 on the test were interviewed clinically. Six cases (5%) were found to have primary anorexia nervosa according to the criteria of Feighner *et al.* (1972). Thus, denial may exert an effect upon the test score, but it does not appear to prohibit the identification of patients with anorexia nervosa.

Future research with the EAT will examine the possible associations between the symptom areas and clinical features, prognosis, course of treatment as well as previously observed perceptual–conceptual disturbances. The EAT may also be useful as a screening instrument for identifying actual or incipient cases of anorexia nervosa in populations which are at high risk for developing the disorder. This could be valuable since prognosis has been related to short duration of illness (Theander, 1970; Morgan & Russell, 1975). Further exploration and development of EAT subscales, as well as the generation of additional predictive items, are also being pursued.

Psychological or behavioural symptoms of anorexia nervosa have been identified but have not been consistently employed in assessing diagnosis or treatment outcome. Results from the EAT suggest that it is a valid objective and economical instrument for evaluating the symptomatology in anorexia nervosa.

APPENDIX Eating Attitudes Test

Please place an (X) under the column which applies best to each of the numbered statements. All of the results will be *strictly* confidential. Most of the questions directly relate to food or eating, although other types of questions have been included. Please answer each question carefully. Thank you.

Always	Very often	Often	Sometimes	Rarely	Never		
( )	( )	( )	( )	( )	(X)†	1.	Like eating with other people.
(X)	( )	( )	( )	( )	( )	2.	Prepare foods for others but do not eat what I cook.
(X)	( )	( )	( )	( )	( )	3.	Become anxious prior to eating.
(X)	( )	( )	( )	( )	( )	4.	Am terrified about being overweight.
(X)	( )	( )	( )	( )	( )	5.	Avoid eating when I am hungry.
(X)	( )	( )	( )	( )	( )	6.	Find myself preoccupied with food.
(X)	( )	( )	( )	( )	( )	7.	Have gone on eating binges where I feel that I may not be able to stop.
(X)	( )	( )	( )	( )	( )	8.	Cut my food into small pieces.
(X)	( )	( )	( )	( )	( )	9.	Aware of the calorie content of foods that I eat.
(X)	( )	( )	( )	( )	( )	10.	Particularly avoid foods with a high carbohydrate content (e.g. bread, potatoes, rice, etc.).
(X)	( )	( )	( )	( )	( )	11.	Feel bloated after meals.
(X)	( )	( )	( )	( )	( )	12.	Feel that others would prefer if I ate more.
(X)	( )	( )	( )	( )	( )	13.	**Vomit after I have eaten.
(X)	( )	( )	( )	( )	( )	14.	Feel extremely guilty after eating.
(X)	( )	( )	( )	( )	( )	15.	**Am preoccupied with a desire to be thinner.
(X)	( )	( )	( )	( )	( )	16.	Exercise strenuously to burn off calories.
(X)	( )	( )	( )	( )	( )	17.	**Weigh myself several times a day.
( )	( )	( )	( )	( )	(X)	18.	‡Like my clothes to fit tightly.
( )	( )	( )	( )	( )	(X)	19.	Enjoy eating meat.

Always	Very often	Often	Sometimes	Rarely	Never		
(X)	( )	( )	( )	( )	( )	20.	Wake up early in the morning.
(X)	( )	( )	( )	( )	( )	21.	Eat the same foods day after day.
(X)	( )	( )	( )	( )	( )	22.	Think about burning up calories when I exercise.
( )	(.)	( )	( )	( )	(X)	23.	Have regular menstrual periods.
(X)	( )	( )	( )	( )	( )	24.	Other people think that I am too thin.
(X)	( )	( )	( )	( )	( )	25.	Am preoccupied with the thought of having fat on my body.
(X)	( )	( )	( )	( )	( )	26.	Take longer than others to eat my meals.
( )	( )	( )	( )	( )	(x)	27.	Enjoy eating at restaurants.
(X)	( )	( )	( )	( )	( )	28.	**Take laxatives.
(X)	( )	( )	( )	( )	( )	29.	Avoid foods with sugar in them.
(X)	( )	( )	( )	( )	( )	30.	Eat diet foods.
(X)	( )	( )	( )	( )	( )	31.	Feel that food controls my life.
(X)	( )	( )	( )	( )	( )	32.	Display self control around food.
(X)	( )	( )	( )	( )	( )	33.	Feel that others pressure me to eat.
(X)	( )	( )	( )	( )	( )	34.	Give too much time and thought to food.
(X)	( )	( )	( )	( )	( )	35.	*Suffer from constipation.
(X)	( )	( )	( )	( )	( )	36.	Feel uncomfortable after eating sweets.
(X)	( )	( )	( )	( )	( )	37.	Engage in dieting behaviour.
(X)	( )	( )	( )	( )	( )	38.	Like my stomach to be empty.
( )	( )	( )	( )	( )	(X)	39.	Enjoy trying new rich foods.
(X)	( )	( )	( )	( )	( )	40.	Have the impulse to vomit after meals.

† The 'X' represents the most 'symptomatic' response and would receive a score of 3 points.
* $P < 0.05$, *t*-test.   ** $P < 0.01$, *t*-test.   ‡ $P > 0.05$, *t*-test.
For all remaining items, group means differed at the $P < 0.001$ level of confidence with a *t*-test.

Note. The analysis reported in the body of the paper is a point biserial correlation coefficient where item score was correlated with group membership to establish the validity of individual items as predictors. The *t*-test results reported above simply demonstrate the magnitude of the differences between mean item scores for the AN and NC cross-validation sample.

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