The Portuguese Short Form of the Eating Attitudes Test-40[†]

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To develop a Portuguese short form, the Eating Attitudes Test-40 (EAT-40) was administered to a community sample of 922 female students and to a clinical sample of 63 females suffering from an eating disorder. With the EAT responses of the community sample a factor analysis was performed and items with factor loadings \geq 0.30 were selected. Internal consistency was computed for both the instrument and the factors. To study the discriminant capacity the proportion of symptomatic answers and the mean scores were compared between the clinical (N = 63) and control (N = 63) samples. Three factors were extracted: Drive for Thinness (14 items, $\alpha = .839$), Bulimic Behaviours (8 items, $\alpha = .670$), Social *Pressure to Eat* (3 items, $\alpha = .758$). The short form is composed of 25 items and shows good internal consistency = 0.839. Symptomatic answers for all items (except one) and total mean scores were significantly higher (p < .001) in the clinical sample than in community sample. Copyright © 2007 John Wiley & Sons, Ltd and Eating Disorders Association.

Keywords: eating disorders; EAT-40; Portuguese short form; EAT-25

INTRODUCTION

The Eating Attitudes Test-40 (EAT-40) was originally developed by Garner & Garfinkel (1979) as an objective and valid index of symptoms frequently observed in Anorexia Nervosa (AN). The validity and reliability of the instrument was established by the authors (Garner & Garfinkel, 1979). Nowadays, it is one of the most widely used self-report instruments to assess symptoms of Eating Disorders (EDs) (Garfinkel & Newman, 2001; Mintz & ÓHalloran, 2000; Seiver, 1994) and it has been described as 'the most popular and influential instrument to identify patterns associated with ED' (Raciti & Norcross, 1987). The original EAT consisted of 40 items (Garner & Garfinkel, 1979), but a short version of 26-items was later developed and validated to enable a faster and easier screening of EDs (Garner, Olmsted, Bohr, & Garfinkel, 1982). Based on the factor analysis of the original scale (EAT-40), the authors proposed an abbreviated 26-item version, eliminating 14 items not loading (<0.40) on the three factors obtained. This version correlated highly with the original 40-item scale and maintained adequate validity and reliability parameters.

The EAT has been translated and validated into several languages including Portuguese (EAT-40; Soares, Macedo, Gomes, & Azevedo, 2004). A previous exploratory study using the Portuguese 40-

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[†]Portions of this paper were presented, at the XXXV Annual Congress of the European Association for Behavioural and Cognitive Therapies (Thessaloniki, Greece, 21–24 September 2005).

item version showed high reliability and adequate construct validity. However, this sample only included female university students with ages between 17 and 25 years (N = 596) (Soares et al., 2004).

Several studies based on the assumption that early identification of an ED can lead to earlier treatment of the problem and, therefore, reduce serious physical and psychological complications or even death, have used the EAT-26 as a screening tool (Garfinkel & Newman, 2001). Although the EAT-26 alone does *not* allow a specific diagnosis, it can be an efficient screening instrument as part of a two-stage screening process. Subjects who have high scores on EAT-26 can be later interviewed with a standard diagnostic interview in order to identify a possible ED (Garfinkel & Newman, 2001). However, a Portuguese short version of the EAT-40 has not yet been established.

The aim of this work was to develop and validate for the first time an EAT Portuguese short form based on a large sample of University and Highschool students and to explore some of its psychometric characteristics (reliability and discriminant validity).

METHOD

Data for this study were drawn from an ongoing research on Perfectionism and Obsessive-Compulsive Spectrum Disorders. This research project was reviewed and approved by the Medical Ethics Review Committee of the University Hospital of Coimbra. The main goal of this research was the study of the dimension 'perfectionism' and its relationship with the eating behaviour pathology and with the obsessive and compulsive phenomena in order to empirically validate the concept of obsessive spectrum (Macedo et al., 2002). One of the first steps of the research was the translation of two rating scales, the Perfectionism Multidimensional Scale (PMS) and the Eating Attitude Test (EAT) and their validation for the Portuguese population, according to the usual psychometric methodology.

Subjects

The EAT-40 was administered to a community sample of 922 female high school students and university students (mean age = 18.64 years, SD = 2.20, range: 14-25; mean BMI = 20.87 kg/m²; SD = 2.37) and to a clinical sample composed of 63 females diagnosed with an ED. Most of the patients

had AN-Restricting Type and others Bulimia Nervosa and EDs Not Otherwise Specified (mean age = 19.98 years, SD = 4.70, range: 14–35; BMI = 18.66 kg/m^2 , SD = 3.10).

Instrument

The EAT-40 is a self-report format questionnaire with 40 items presented in a 6-point forced choice. Severity is measured on a 0–3 scale, where *sometimes*, *rarely* and *never* responses were each scored as 0, and *often*, *very often*, *always* were respectively scored as 1, 2, 3.

The original version was developed using a group of females with AN (N = 66), diagnosed according to Feighner, Robins, Guze, Woodruff, Winokur, and Munoz criteria, and a group of female control subjects (N = 93). All items were good predictors of group membership.

Further validation of the test using a group of obese females (N = 16) and a small group of AN patients who had clinically recovered (N = 9) revealed that both groups scored significantly different from anorexics. Therefore, the authors concluded that the test had good discriminante validity and was sensitive to clinical remission. The degree of internal consistency was also found to be high for AN samples ($\alpha = .79$) and control subjects ($\alpha = .94$) (Garner & Garfinkel, 1979).

The Portuguese version of the EAT-40 was translated by a Portuguese psychiatrist who had large experience on the translation of psychopathology assessment instruments (MH Azevedo). Preliminary qualitative item analysis included the thinking aloud methodology with pilot participants (affected and non-affected girls) and experts panels. Then, it was re-translated by a bilingual translator and a total overlap with the English original version was found. To perform its quantitative analysis the Portuguese version was administered to a sample composed of 596 female university students, aged 17-25 years. The preliminary reliability analysis study showed good internal consistency (Cronbach's $\alpha = .86$) and good temporal stability (Pearson correlation between total scores = .86, p = .000, 1 month interval, N = 293) (Soares et al., 2004).

Procedure

The voluntary nature and general format of the research were explained to the Faculty Professors of Medicine, Dentistry and Humanities of Coimbra University, and all agreed to participate in the study. Then, with their consent, students were given time at the beginning/ending of a class session to fill in the questionnaire. Students were told that participation in the survey was voluntary. Confidentiality was ensured following the guidelines of the Portuguese law for data protection (Law 67/98; 26 October). All students returned the questionnaire. In the present study, only the female sample responses were analysed.

Statistical Analysis

Prior to the factorial analysis, the EAT-40 reliability was assessed using the internal consistency coefficient (Cronbach's α). The factor structure of EAT-40 was studied by the principal components method, with varimax rotation, to obtain the EAT short version (N = 922).

To help establishing the correct number of factors to extract from the factorial analysis, a Cattell's *scree plot*, which is a graphic that helps in deciding how many factors should be extracted based on the magnitude of the eigenvalues, was used. The criterion for factor selection is to retain all factors that eigenvalues in the sharp descent part of the plot before the eigenvalues start to level off (Kline, 1994). According to Kline (1994), this is the best solution to select the correct number of factors.

To select the items for the EAT Portuguese short version a criterion similar to the one used by Garner et al. (1982) was adopted, which consisted of retaining items that showed strong factor loadings from the EAT-40. As other authors have done (Elal, Altug, Slade, & Teckcan, 2000), items with factor loadings \geq 0.30 were chosen.

To study the reliability of this shorter version the internal consistency coefficient Cronbach's α was calculated, which is the most important index of test reliability (Cronbach, 1976; Nunnally, 1978). It is defined as the estimated correlation of the test with any other test of the same length with similar items (i.e. items from the same items universe). Therefore, the coefficient α indicates the expected correlation of a test of *k* items with an alternative form with *k* items (Kline, 2000). A correlation of .8 is considered to be a minimum figure (Kline, 2000) but a correlation of .7 is already acceptable (Loewenthal, 2001; Nunnally, 1978; Pasquali, 2003).

To analyse the ability of a single item to measure the attribute supposed to be assessed by the scale, Pearson correlations coefficients between each item and the total score (excluding the item) were examined. The Cronbach's alphas excluding each item were computed and compared with the coefficient α of the total score. In addition, to investigate the ability of each individual item and the total score power to discriminate between clinical and community samples, a Student's *t*-test for independent samples was used. It was assumed for these statistical analyses that the Lickert measurement scale was interval instead of ordinal. This is a usual procedure in psychological research (Breakwell, Hammond, & Fife-Schaw, 1995).

To prevent type I error Bonferroni correction was applied. Alpha level was adjusted for the number of items compared: adjusted $\alpha = (.05/25) = .002$. Chi-square test was used to compare the proportion of symptomatic answers (responses 'always', 'very often', 'often' options were collapsed) in both clinical and community samples.

RESULTS

EAT-40 internal consistency coefficient was $\alpha = .79$.

Factorial Analysis of the EAT-40 and Selection of Items to the Shorter Version

Based on the *scree plot* and on the items meaning, three factors were extracted (as it can be observed in Figure 1 the line starts to level off after the third component).

The factors were:

(i) Factor 1 (14 items; explained variance = 16.354%; α = .839)—*Drive for Thinness*—reflects a concern with being thinner, avoidance of fat foods,

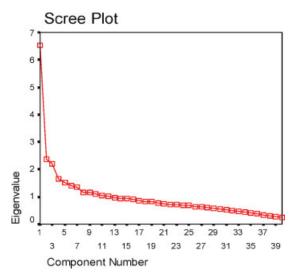


Figure 1. EAT-40 scree plot

| Items* | Factor 1 | Factor 2 | Factor 3 |
|---|----------|----------|----------|
| 4. Am terrified about being overweight | 0.731 | | |
| 25. Preoccupied with having fat on my body | 0.727 | | |
| 15. Preoccupied with a desire to be thinner | 0.723 | | |
| 22. Burning up calories when I exercise | 0.667 | | |
| 36. Feel uncomfortable after eating sweet | 0.586 | | |
| 30. Eat diet foods | 0.543 | | |
| 10. Avoid food with a high carbohydrate content | 0.539 | | |
| 29. Avoid foods with sugar in them | 0.534 | | |
| 37. Engage in dieting behaviour | 0.518 | | |
| 32. Display self-control around food | 0.445 | | |
| 9. Aware of the calorie content of foods that I eat | 0.439 | | |
| 6. Find myself preoccupied with food | 0.435 | | |
| 16. Exercise strenuously to burn off calories | 0.340 | | |
| 31. Feel that food controls my life | 0.329 | | |
| 13. Vomit after I have eaten | | 0.830 | |
| 3. Become anxious prior to eating | | 0.718 | |
| 38. Like my stomach to be empty | | 0.552 | |
| 40. Have the impulse to vomit after meals | | 0.541 | |
| 28. Take laxatives | | 0.516 | |
| 14. Feel extremely guilty after eating | | 0.503 | |
| 34. Give too much time and thought to food | | 0.429 | |
| 7. Eating binges where () I may not be able to stop | | 0.362 | |
| 33. Feel that others pressure me to eat | | | 0.830 |
| 12. Feel that others would prefer if I ate more | | | 0.772 |
| 24. Other people think that I am too thin | | | 0.738 |

* Item numbers correspond to the original version EAT-40.

engagement on extreme physical exercise and a self-control over eating.

- (ii) Factor 2 (8 items; explained variance = 5.902%; α = .670)—Bulimic Behaviours—reflects com- pensatory strategies to avoid weight gain and feelings and thoughts of guilt and discomfort about food.
- (iii) Factor 3 (3 items; explained variance = 5.481%; α = .758)—Social Pressure to Eat—reflects the perceived pressure from others to gain weight.

The 25 items that compose these three factors are listed in Table 1.

Reliability of the Shorter Version

The EAT-25 reliability assessment revealed a high internal consistency of .84 (Cronbach's α). Pearson correlation coefficients between each item and the total score (excluding the item) ranged from .214 (item 25) to .641 (item 14) and 23 of the 25 items (1–12, 14, 16–25) showed moderate to high correlations (>.30). Cronbach's alphas excluding the item, except for item 13, were all smaller than the Cronbach's α coefficient for the total scale (Table 2).

Discriminant Validity of the Shorter Version

Significant differences (p < .001) were found on the proportion of symptomatic answers for all items (except item 15, *Take laxatives*) between the clinical and the community samples. Both the mean score of each item (p < .001) and the EAT-25 total mean score were significantly higher in the clinical sample than in the community sample (M = 4.61, SD = 5.59 vs. M = 31.98, SD = 16.35; *t*(118) = -12.433, p < .001).

Normative Data

Normative data (means and standard deviations) of the community sample are shown in Table 3. The total EAT-40 score can range from 0 to 120 and the total EAT-25 score can range from 0 to 75. With respect to each factor the scores can range as follows: F1, 0–42; F2, 0–24 and F3, 0–9.

DISCUSSION

Based on Garner et al. (EAT-26, 1982) procedure to select items (loading factor score > .30) the

| Items | Total score and item correlation | on α (excluding the item) | |
|---|----------------------------------|----------------------------------|--|
| 1. Become anxious prior to eating | .256* | $.838^{+}$ | |
| 2. Terrified about being overweight | $.618^{\ddagger}$ | .821 [†] | |
| 3. Find myself preoccupied with food | $.418^{\ddagger}$ | .835† | |
| 4. Eating binges | .253* | .837† | |
| 5. Aware of the calorie content of foods | .391 [‡] | .832† | |
| 6. Avoid food with a high carbohydrate content | $.463^{\ddagger}$ | .831 [†] | |
| 7. Feel that others would prefer if I ate more | .232* | .839† | |
| 8. Vomit after I have eaten | .246* | $.839^{\dagger}$ | |
| 9. Feel extremely guilty after eating | $.494^{\ddagger}$ | .831 [†] | |
| 10. Am preoccupied with a desire to be thinner | $.628^{\ddagger}$ | .821 | |
| 11. Exercise strenuously to burn off calories | .275* | .836† | |
| 12. Think about burning up calories when I exercise | .511 [‡] | $.828^{\dagger}$ | |
| 13. Other people think that I am too thin | .064 | .845 | |
| 14. Preoccupied with having fat on my body | $.641^{\ddagger}$ | $.820^{\dagger}$ | |
| 15. Take laxatives | .099 | .839† | |
| 16. Avoid foods with sugar in them | $.484^{\ddagger}$ | .829† | |
| 17. Eat diet foods | $.498^{\ddagger}$ | .831 [†] | |
| 18. Feel that food controls my life | .391 [‡] | .833† | |
| 19. Display self-control around food | .393 [‡] | .833† | |
| 20. Feel that others pressure me to eat | .271* | .836† | |
| 21. Give too much time and thought to food | $.458^{\ddagger}$ | .833† | |
| 22. Feel uncomfortable after eating sweets | .571‡ | $.826^{\dagger}$ | |
| 23. Engage in dieting behaviour | $.458^{\ddagger}$ | .832 [†] | |
| 24. Like my stomach to be empty | $.428^{\ddagger}$ | .836† | |
| 25. Have the impulse to vomit after meals | .214* | $.838^{\dagger}$ | |

Table 2. Correlations between each item and the total score (excluding the item) and Cronbach's α coefficients excluding the item

* *≥*.200.

[†] \leq .839 (Cronbach's α for 25 items).

[‡]≥.300.

Portuguese EAT short-form ended with 25 items instead of 26.

In spite of the differences between the two samples and the fact that Garner et al. (1982) used a smaller sample than the one recommended to perform a factorial analysis (clinical sample of 160 girls with AN), it is interesting to note that 22 items were common to both questionnaires and that factor structures were similar. In both versions, three factors were obtained and their internal consistency was identical. Except for Factor 1 (*Drive for Thiness*), the internal consistency of the other two factors was slightly higher in the present study than in the Garner et al. (1982) study. The internal consistency of Factor 1 was higher than the internal consistency of the total scale in both versions. The total percentage of explained variance was higher in the original Garner's version (40.2%) than in our Portuguese version (27.74%).

Concerning the total number of items a considerable overlapping between the two versions was observed. In fact, 84.6% (22 items) of the EAT-25 corresponded to the original version (Garner et al., 1982) and 65.4% (17 items) loaded in the same factors.

The Portuguese Factor 1 has nine items in common with the original factor (76.9%), which are those related to diet behaviours and worries

Table 3. Total and factorial mean scores in community sample

| | TAA-40 | TAA-25 | F1 | F2 | F3 |
|--------------------------------------|--|---|---|---|--|
| M/M _d SD Min Max | $\begin{array}{c} M = 11.53 / M_{\rm d} = 9 \\ 8.092 \\ 0 \\ 64 \end{array}$ | $\begin{array}{c} M = 5.33 / M_{\rm d} = 3 \\ 6.444 \\ 0 \\ 44 \end{array}$ | $ M = 4.37/M_d = 3 5.446 0 30 $ | $\begin{array}{c} M = 0.41/M_{\rm d} = 0 \\ 1.235 \\ 0 \\ 16 \end{array}$ | $\begin{array}{c} M {=} 0.57/M_{\rm d} {=} 0 \\ 1.390 \\ 0 \\ 9 \end{array}$ |

M, mean; *M*_d, median; SD, standard deviation; Min, minimum; Max, maximum.

about food (exception is item 6 Avoid food with a high carbohydrate content, which belongs to Factor 2 in the original factor). Two items related to drive for thinness (item 31 Feel that food controls my life and item 32 Display self-control around food) that load on Factor 1 in our Portuguese version load, respectively, in Factor 2 and Factor 3 in the original Garner's version.

With respect to Factor 2-Bulimic Behavioursthe comparison between the original and the Portuguese version reveals more differences. The four common items (66%) are those related to binge episodes and vomit (item 7 Eating binges and not be able to stop, item 13 Vomit after I have eaten and item 34 Give too much time and thought to food and item 40 Have the impulse to vomit after meals). However, the Portuguese Factor 2 also includes items related to laxatives use (item 28 Take laxatives) and anxiety prior to eating (item 3 Become anxious prior to eating), which are not included in the Garner's original short version. Items 14 (Feel extremely guilty after eating) and 38 (Like my stomach to be empty) that had maximum loadings in Factor 1 in the original version, loaded in Factor 2 in the Portuguese version. In contrast, items 6 (Find myself preoccupied with food) and 31 (Feel that food controls my life) that in the original version load on Factor 2, in this Portuguese version have their maximum loadings in Factor 1.

Considering the Portuguese Factor 3, less items load in this factor (three items) than in the original factor (seven items). The common items are all related to social pressure to eat. With the exception of item 32 (*Display self-control around food*), that have its load on our Factor 1, the remaining three items did not load on any of the three factors found in our structure.

From the 14 items that were not selected to EAT-26 and from the 15 items that were not included in our Portuguese version, 78.57% (11 items) overlap (1, 2, 11, 17, 8, 20, 21, 23, 27 and 35).

The reliability results highlighted the homogeneity of the Portuguese EAT-25 items and the ability of each item to assess adequately the concept measured by it (Kline, 2000).

The EAT-25 total score and its items showed good capacity to discriminate between community and clinical cases. The only exception was item 15-Take *laxatives*. This item, although presenting a considerable loading on Factor 2 (*Bulimic behaviours*, loading = 0.516), showed a poor correlation with the total score (excluding the item) (r = .099). This could be due to the fact that the great majority of our girls were suffering from AN-*Restricting Type*.

It is remarkable that the great similarity between our factorial structure and the ones obtained by others, particularly the versions from western cultures (Wells, Coope, Gabb, & Pears, 1985; Garner et al., 1982) although sample characteristics and the criterion chosen to define the association of the item to the factor were different.

Unlike others who have merely used the 26 items of the original short version (Garner et al., 1982) and then studied its psychometric characteristics for their population (Bighetti, 2003; Dotti & Lazzari, 1998; Koslowsky et al., 1992; Mukay, Crago, & Shisslak, 1994; Mumford, Whitehouse, & Platts, 1991; Nasser, 1994; Rutt & Colemann, 2001), we independently established the factors which were most appropriate for our Portuguese sample. We feel that our procedure represent a more valid cultural measurement.

In summary, the EAT-25 is a brief, short selfadministered and promising instrument to assess ED, with high reliability and good discriminant capacity between clinical and non-clinical populations.

ACKNOWLEDGEMENTS

This paper was partially supported by a grant of the Fundação para a Ciência e Tecnologia, Portugal (POCTI/ 37569/PSI/2001). Special thanks are due to the Professors and Students of the Faculties for their co-operation. Thanks are extended to Dr Carlos Paz Ferreira (Director, Department of Psychiatry, Hospital of Ponta Delgada, Azores), for providing data for the secondary students sample and Professor Michele Pato (Veterans Administration, Syracuse, NY and Center for Psychiatric and Molecular Genetics, SUNY/Upstate Medical University, Syracuse, NY) for her comments and suggestions on an earlier draft of this paper. Work supported by the grant POCTI/PSI/37569/2001 from the Fundação para a Ciência e Tecnologia.

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