

# EATING BEHAVIOUR IN A SAMPLE OF PORTUGUESE HEALTH SCIENCE STUDENTS; RELATIONSHIPS WITH OBESITY, DIETING, AND SELF-ESTEEM

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## Abstract

### Objective:

To assess the relationships between eating behaviour, clinical and psychological dimensions in Portuguese students.

### Method:

Portuguese version of the Dutch Eating Behaviour Questionnaire, Hospital Anxiety and Depression Scale, and self-esteem questionnaires, applied in a sample of 616 students.

### Results:

Test-retest correlation coefficients for restraint, emotional and external eating scores were  $>0.90$  ( $p < 0.001$ ). Women had higher emotional and restraint and lower externally-induced eating scores than men. In both genders, dieters had higher restraint and externally-induced eating scores; overweight/obese subjects had higher and underweight subjects lower restrained scores. In men, restraint was significantly and positively related to anxiety, depression and negative events, and negatively related with self-esteem, self-efficacy, psychological maturity, impulsivity and positive events, whereas in women restraint was significantly and positively related to anxiety, and negatively related with health & quality of life.

### Discussion:

Eating behaviour is largely dependent on gender, overweight/obesity and dieting. The relationships between eating behaviour and other psychological dimensions appear to be gender-specific.

### Key Words:

Eating behaviour, depression, anxiety, young adults, obesity, dieting.

## INTRODUCTION

Several studies have shown that emotional states can affect eating behaviour, either through an increase<sup>1,2</sup> or a decrease<sup>2</sup> of nutritional intake. Obese subjects tend to overeat during emotional stress<sup>2,3</sup>, but reports have been conflicting<sup>4</sup>. Further, in order to devise adequate behavioural changes for the prevention of the development of obesity among the general population, it is of interest to assess the subjects' eating behaviour<sup>5,6,7</sup>. Notwithstanding, little is known regarding the eating behaviour and its determinants in Portugal, a country characterized by an increasing prevalence of obesity and associated health care costs<sup>8</sup>. Further, although an eating behaviour questionnaire has already been applied in Portuguese students<sup>9,10,11</sup>, there is little psychometric information and data on eating behaviour in the Portuguese population.

The Dutch Eating Behaviour Questionnaire (DEBQ) is a widely used questionnaire which provides three robust factors of restraint (attempts to refrain from eating), emotional eating (overeating in response to emotions) and external eating (eating in response to food-related stimuli such as taste, smell, irrespective of hunger and satiety). The DEBQ comprises 33 items, 10 about external eating, 10 about restrained eating and 13 about emotional eating<sup>12,13,14</sup>.

Thus, in this study, a Portuguese version of the DEBQ was validated and applied to a sample of young adult university students from Health Sciences, in order to 1) assess eating behaviour according to gender and overweight/obesity status and 2) establish the correlations between eating behaviour and anxiety/depression and self-esteem.

## MATERIALS AND METHODS

### Population

The survey was conducted between October 1998 and January 1999 in a large private higher education institution near Lisbon after being approved by the Directory of the Institution. All students were considered as eligible and invited to fill a questionnaire on eating behaviour, dieting, anxiety and self-image. Questionnaires were anonymous and no identification of the responder was then possible.

Weight was measured using an electronic scale, with the participants being lightly dressed and without shoes. The scale was calibrated monthly, and weight was rounded to  $\pm 200$  grams. Height was measured with a precision of  $\pm 1$  cm using the MONICA protocol<sup>15</sup>. Overweight/obesity was defined for a body mass index  $\geq 25$  kg.m<sup>-2</sup>, and underweight for a body mass index  $< 19$  kg.m<sup>-2</sup>.

### Dutch Eating Behaviour Questionnaire

A French version of the DEBQ was obtained from Dr. Bernard Herbeth (Centre de Médecine Préventive, Nancy, France) and translated into Portuguese. The questionnaire was then again back translated and minor inconsistencies corrected. The reproducibility of the questionnaire was assessed by applying it twice within a one-week interval to a sample of 53 students of the same Institution. The students who participated in the test/retest procedure were not included in the final analysis.

### Other questionnaires

Anxiety and depression were assessed by the Hospital Anxiety and Depression Scale<sup>16</sup> adapted to the Portuguese population<sup>17</sup>. Self-esteem was assessed by the ICAC (Inventário Clínico de Auto-Conceito – self-esteem clinical inventory) a multidimensional Likert scale with 20 items anchored by strongly agree (rated as 5) and strongly disagree (rated as 1), leading to the assessment of 4 factors: social acceptance, self-efficacy, psychological maturity and impulsivity<sup>18,19</sup>.

The QCA (Questionário de Cognições Antecipatórias – Anticipatory Cognitions Questionnaire) was devised by<sup>20</sup> and adapted to the Portuguese population<sup>21</sup>. It is a self-questionnaire, in which each item is presented under the following form: a) a simple situation is proposed to the patient, requiring his or her anticipation; b) a cognitive reply is proposed. The situations are drawn from three areas of everyday life, enabling the assessment of three dimensions: health & quality of life (QCA1); affective, family & social life (QCA2); and work & various occupations (QCA3). Two other dimensions can be derived, based on non-depressive (positive) or depressive (negative) events.

### Statistical analysis

Statistical analysis was conducted with SAS V.8 statistical software (SAS Institute, Cary, NC, U.S.A.). Reproducibility of the DEBQ was assessed by Spearman non parametric correlation and the Kappa statistic. Principal component analysis was also applied to determine the main dimensions of the questionnaire. Results were expressed as mean  $\pm$  standard deviation or as number of subjects and (percentage). Bivariate comparisons were performed by Student's t-test (for normal distributed data), non-parametric tests (for DEBQ, HADS, ICAC and QCA scores) and chi-square (for qualitative data). Correlations were computed using Spearman's rank test. Statistical significance was assessed for  $p < 0.05$ .

## RESULTS

### Validation of the Dutch Eating Behaviour Questionnaire

In the test-retest procedure, 32 out of the 33 DEBQ items, the Spearman correlation coefficient between the first and the second evaluations varied between 0.362 and 0.933 (all  $p < 0.01$ ) and the Kappa statistic between 0.208 and 0.924 (all  $p < 0.05$ ). Only one item scored a borderline, nonsignificant kappa (0.180,  $p < 0.08$ ), and all correlations were statistically significant. Finally, the test-retest correlation coefficients for restraint, emotional eating and external eating scores were 0.900, 0.890 and 0.877, respectively ( $p < 0.001$ ). Principal component analysis showed that three factors explained 54% and 56% of all variance in the first and second evaluations, respectively, and that there was a good agreement between the variables with the higher coordinates for a given factor and the variables used to compute the restraint, external and

emotional eating (not shown). Those findings were further confirmed by the analysis of data from the final survey, which showed that three factors explained 50% of total variance, and that the variables displaying the higher coordinates within each factor were, with one exception, those initially used for computing the different scores.

### Subjects' characteristics

Overall, 616 students (435 women, 181 men) were assessed. Their characteristics are summarized in table 1. Women were less frequently overweight or obese and more frequently underweight, reported more frequently being on a diet, had higher emotional and restrained eating scores and lower externally induced eating scores than men; women also presented more frequently with anxiety, and with lower QCA scores for positive events, family & social (QCA1), and work & occupations (QCA3) than men. Conversely, no differences were found for the prevalence of depression, ICAC questionnaire scores, QCA negative events or health & quality of life (QCA1) (table 1).

**Table 1 - Clinical characteristics of the participants. Results are expressed as mean  $\pm$  standard deviation or as number of subjects and (percentage). BMI, body mass index; DEBQ, Dutch Eating Behaviour Questionnaire; HADS, Hospital Anxiety and Depression Scale; ICAC, Inventário Clínico de Auto-Conceito (self-esteem clinical inventory); QCA, Questionário de Cognitiones Antecipatórias, (anticipatory cognition questionnaire). Statistical analysis by Student's t-test, Wilcoxon test (for scores) and chi-square. NS, not significant; \*,  $p < 0.05$ ; \*\*,  $p < 0.01$ ; \*\*\*,  $p < 0.001$ .**

	Men (n=181)	Women (n=435)	Test
Age (years)	20.7 $\pm$ 3.3	21.0 $\pm$ 3.5	1.19 <sup>NS</sup>
BMI (kg.m <sup>2</sup> )	23.7 $\pm$ 3.2	21.6 $\pm$ 3.0	7.33 <sup>***</sup>
Underweight (%)	8 (4.4)	70 (16.1)	
Obese/overweight (%)	46 (25.4)	54 (12.4)	27.1 <sup>***</sup>
Dieters (%)	14 (7.7)	61 (14.0)	4.73 <sup>*</sup>
DEBQ			
Restraint	1.87 $\pm$ 0.71	2.32 $\pm$ 0.77	6.43 <sup>***</sup>
Emotional	1.82 $\pm$ 0.70	2.24 $\pm$ 0.68	6.44 <sup>***</sup>
External	2.67 $\pm$ 0.51	2.59 $\pm$ 0.45	2.16 <sup>*</sup>
HADS			
Anxiety	50 (27.6)	160 (36.8)	4.77 <sup>*</sup>
Depression	16 (8.8)	33 (7.6)	0.27 <sup>NS</sup>
ICAC scores			
Total	77.4 $\pm$ 9.0	76.5 $\pm$ 7.7	1.54 <sup>NS</sup>
Social acceptance	18.5 $\pm$ 3.5	18.3 $\pm$ 3.0	1.25 <sup>NS</sup>
Self-efficiency	22.7 $\pm$ 3.3	22.3 $\pm$ 3.3	1.64 <sup>NS</sup>
Psychological maturity	15.6 $\pm$ 2.2	15.4 $\pm$ 2.1	0.72 <sup>NS</sup>
Impulsivity	12.4 $\pm$ 1.9	12.2 $\pm$ 1.7	1.14 <sup>NS</sup>
QCA scores			
Negative events	2.81 $\pm$ 2.27	2.48 $\pm$ 1.86	1.18 <sup>NS</sup>
Positive events	3.17 $\pm$ 1.54	2.86 $\pm$ 1.53	2.32 <sup>*</sup>
Health & quality of life (QCA1)	1.07 $\pm$ 1.10	1.12 $\pm$ 1.12	0.48 <sup>NS</sup>
Affective, family & social (QCA2)	1.48 $\pm$ 1.42	1.14 $\pm$ 1.24	2.77 <sup>**</sup>
Work & occupations (QCA3)	3.41 $\pm$ 1.42	3.07 $\pm$ 1.32	2.75 <sup>**</sup>

### Relationships between eating behaviour and clinical markers

In both genders, subjects who reported being on diet had higher restrained and externally-induced eating scores; in women, dieters also had lower emotional eating scores (table 2). Among dieters only, women had higher emotional eating scores than men ( $2.50 \pm 0.61$  vs.  $1.87 \pm 0.76$ ,  $p < 0.01$ ). Overweight/obese subjects had higher and underweight subjects had lower restrained scores than normal weight subjects in both genders. In men, overweight/obese subjects had lower and underweight subjects had higher externally-induced eating scores than normal weight subjects. In women overweight/obese subjects had higher and underweight subjects had lower emotional eating scores than normal weight subjects (table 2).

**Table 2 - Restraint, emotional and externally induced eating behaviour scores between dieters and non-dieters and between overweight/obese, underweight and normal weight subjects, by gender. Results are expressed as mean  $\pm$  standard deviation. Statistical analysis by Kruskal-Wallis test. NS, not significant; \*,  $p < 0.05$ ; \*\*,  $p < 0.01$ ; \*\*\*,  $p < 0.001$ .**

	Men			Women			Test	Test
	Dieters (n=14)	Non-dieters (n=167)	Test	Dieters (n=61)	Non-dieters (n=372)	Test		
Restraint	$2.95 \pm 0.59$	$1.79 \pm 0.64$	5.00 ***	$3.17 \pm 0.57$	$2.18 \pm 0.70$	8.98 ***		
Emotional	$1.87 \pm 0.76$	$1.82 \pm 0.70$	0.09 NS	$2.50 \pm 0.61$	$2.19 \pm 0.67$	3.27 **		
External	$2.34 \pm 0.46$	$2.70 \pm 0.50$	2.49 *	$2.48 \pm 0.44$	$2.60 \pm 0.45$	2.10 *		

  

	Men				Women			
	Underweight (n=8)	Normal (n=127)	Overw/obese (n=46)	Test	Underweight (n=70)	Normal (n=311)	Overw/obese (n=54)	Test
Restraint	$1.36 \pm 0.45$	$1.79 \pm 0.64$	$2.22 \pm 0.80$	15.50 ***	$1.66 \pm 0.72$	$2.39 \pm 0.73$	$2.73 \pm 0.56$	71.30 ***
Emotional	$1.88 \pm 0.65$	$1.80 \pm 0.67$	$1.89 \pm 0.80$	0.50 NS	$2.06 \pm 0.60$	$2.23 \pm 0.67$	$2.50 \pm 0.73$	12.43 **
External	$2.95 \pm 0.33$	$2.71 \pm 0.48$	$2.50 \pm 0.57$	10.44 **	$2.65 \pm 0.48$	$2.58 \pm 0.44$	$2.55 \pm 0.49$	2.62 NS

An inverse relationship was found between restriction and externally-induced eating in men ( $r = -0.20$ ,  $p < 0.001$ ) but not in women ( $r = -0.06$ ,  $p = 0.22$ ); conversely, women had a stronger relationship between restraint and emotional eating than men ( $r = 0.31$ ,  $p < 0.001$  and  $r = 0.16$ ,  $p < 0.04$ , respectively). Finally, the relationship between emotional and externally-induced eating was comparable between genders ( $r = 0.40$  and  $r = 0.39$  in men and women, respectively, both  $p < 0.001$ ).

Multivariate regression analysis on the determinants of restraint, emotional and externally induced eating behaviour scores showed that gender was significantly related to all eating behaviour scores, whereas overweight/obesity and dieting were only related to restraint scores (not shown).

### Relationships between eating behaviour and psychological markers

In men, restraint was significantly and positively related to anxiety, depression and negative events (QCA), and negatively related with self-esteem, self-efficiency, psychological maturity, impulsivity and positive events (QCA). Emotional eating was also significantly and positively related with anxiety, depression, negative events, health & quality of life (QCA1) and family & social scores (QCA2), whereas externally-driven eating was significantly and positively related to negative events and family & social (QCA2) scores only (table 3).

Table 3 - Correlates of restraint, emotional and externally induced eating behaviour scores with anxiety, depression and self-esteem, according to gender. HADS, Hospital Anxiety and Depression Scale; ICAC, Inventário Clínico de Auto-Conceito (Self-esteem Clinical Inventory); QCA, Questionário de Cognações Antecipatórias (Anticipatory Cognition Questionnaire). Results are expressed as Spearman rank correlation coefficient: NS, not significant; \*.  $P < 0.05$ ; \*\*,  $p < 0.01$ ; \*\*\*,  $p < 0.001$ .

	Men			Women		
	Restraint	Emotional	External	Restraint	Emotional	External
HADS						
Anxiety	0.28 ***	0.27 ***	0.09 NS	0.12 *	0.19 ***	0.03 NS
Depression	0.15 *	0.26 ***	0.08 NS	0.04 NS	0.14 **	0.08 NS
ICAC						
Total (self-esteem)	-0.19 *	-0.05 NS	0.07 NS	-0.01 NS	-0.16 ***	-0.06 NS
Social acceptance	-0.13 NS	-0.04 NS	0.12 NS	0.03 NS	-0.05	0.01 NS
Self-efficiency	-0.15 *	-0.12 NS	0.01 NS	-0.05 NS	-0.18 ***	-0.13 **
Psychological maturity	-0.23 **	-0.09 NS	-0.05 NS	-0.03 NS	-0.09	-0.06 NS
Impulsivity	-0.15 *	-0.02 NS	0.14 NS	0.02 NS	-0.05	0.06 NS
QCA						
Negative events	0.19 **	0.27 ***	0.16 *	0.02 NS	0.12 *	0.10 *
Positive events	-0.22 **	0.06 NS	-0.02 NS	-0.14 **	-0.05 NS	-0.01 NS
Health & quality of life (QCA1)	0.08 NS	0.23 **	0.10 NS	-0.15 **	-0.09 NS	0.02 NS
Affective, family & social (QCA2)	0.17 *	0.20 **	0.15 *	0.03 NS	0.05 NS	0.04 NS
Work & occupations (QCA3)	-0.06 NS	0.11 NS	-0.07 NS	-0.06 NS	0.12 *	0.07 NS

Women revealed a different pattern, in which restraint was significantly and positively related to anxiety only, and negatively related with health & quality of life (QCA1). Emotional eating was significantly and positively related to anxiety, depression, negative events and work & occupations (QCA3) and negatively to self-esteem and self-efficiency. Finally, externally-induced eating was significantly and positively associated with negative events and negatively associated with self-efficiency (table 3).

## DISCUSSION

To our knowledge, this is one of the very few studies that assessed eating behaviour among young adults in Portugal<sup>10</sup>. Our data indicate that the test-retest reliability of the DEBQ is very high in this age group, comparable to that found in the literature<sup>22</sup>, thus providing a useful tool for the assessment of eating behaviour.

Women presented higher restraint and emotional eating scores; those findings are in agreement with most of the studies published<sup>10, 23, 24, 25, 26</sup>. A possible explanation relies on a stronger social and media pressure for a slim body image among women<sup>27, 28, 29, 30, 31</sup>, thus increasing the likelihood of body dissatisfaction and eating disorders in this group<sup>31, 32, 33</sup>, although this hypothesis has been challenged<sup>34</sup>. Conversely, men had higher externally-induced eating scores than women; those findings might be related to a lower restriction score in men, making them more prone to eating in response to external, food-related stimuli, as suggested previously<sup>3, 35, 36</sup>.

In both genders, overweight/obese subjects had higher restraint scores; in men, overweight/obese subjects also had lower externally-induced eating scores and in women, overweight/obese subjects also had higher emotional eating scores. Those findings are consistent with those found in other studies conducted in adolescents<sup>37</sup> and obese children<sup>14</sup>, which showed higher scores for emotional, external and restrained eating behaviour, although in our study only the restrained eating behaviour (and the emotional eating in women) were significantly higher among obese subjects, a finding also reported in another study<sup>38</sup>. Our data is also consistent with another study conducted in Lebanon, which found that overweight/obese students scored higher on anxiety and guilt than normal or underweight students<sup>23</sup>. Still, our data do not replicate the results

of another study<sup>39</sup>, which found no differences in DEBQ scores between obese and normal adults. Possible differences might be due to the small sample size or to the older age of the subjects studied.

Underweight subjects had lower restraint scores than normal subjects in both genders; those findings might indicate that the subjects are aware of their status and thus need to increase their weight. Indeed, underweight men had higher externally-driven eating scores, thus confirming the trend for a higher a nutritional intake. Conversely, underweight women also presented with lower emotional eating scores, a finding already reported previously<sup>2</sup>. Thus, it is possible that undereating by underweight women when experiencing negative emotions may contribute to their low body weight, irrespective of a lower eating restraint.

In agreement with the literature, overweight/obese women had higher restrained and emotional eating scores than women with normal weight<sup>40</sup>. Contrary to other studies<sup>41</sup> anxiety, depression and self-esteem scores were not significantly different in overweight/obese and normal weight women (not shown), a finding already reported among high school students<sup>42</sup>. Thus, the differences in restrained and emotional eating do not seem to be mediated by other psychological characteristics and might be mainly related to dieting, since the prevalence of dieters was significantly higher among overweight/obese women. Indeed, no relationships were found between eating restraint and self-esteem in a sample of noneating-disordered women<sup>43</sup>. Further, higher emotional eating scores in the overweight/obese group may lead to higher food intake<sup>35</sup>, thus maintaining excess weight, which in turn might trigger a dieting behaviour and ensuing higher restraint scores.

In both genders, emotional eating was correlated with anxiety; those findings are in agreement with other studies<sup>26, 44</sup>. Conversely, and contrary to other studies<sup>1, 26</sup>, no relationship was found between depression and restraint, a finding already reported among African-American women<sup>1</sup>. A possible explanation might be the relatively low prevalence of depression in this sample, or a true lack of relationship between depression and food restraint.

Unlike van Strien's study<sup>35</sup>, we did not find any relationship between emotional eating and social acceptance. Although obese adolescents tend to have lower social expectations<sup>45</sup>, it is possible that our findings may be related to the sample characteristics, e.g. higher socio-economical level along with a relatively low prevalence of obesity and thus a higher social acceptance.

Emotional eating was negatively related with self-efficiency and positively with negative events in both genders, although the relationship with self-efficiency reached statistical significance in women only. Those findings are in agreement with other studies<sup>26</sup>, a finding indicating that emotional eating is associated with negative emotions<sup>26, 40</sup>. Still, emotional eating was also positively related with health & quality of life and affective, family & social life in men, thus indicating that this relationship might be more complex than previously thought; thus, it is possible than men (but not women) tend to associate food intake with some social or health benefits. Nonetheless, further studies are needed to better assess the gender differences regarding eating behaviours.

Several comments should be made in this study: a) it was applied in a private university of Health Sciences, where the socio-economical level might not be representative of the Portuguese student population; b) the DEBQ used was not the original (Dutch) one, but a French translation, which might have led to slight differences in wording; still, the reproducibility of the Portuguese version was very good and the translation/re-translation procedure was conducted by trained clinical psychologists, thus reducing the risk of such a bias.

In summary, our data indicate that eating behaviour is largely dependent on gender, weight status, dieting and anxiety, whereas depression appears to exert little effect. Women are more prone to eat due to emotional stress, whereas men are more sensitive to external factors. The relationships between eating behaviour and other psychological dimensions appear to be gender-specific.

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