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Title: Screening for eating disorders in undergraduate women: Norms and validity of the Spanish version of the Eating Disorder Examination Questionnaire (EDE-Q)

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Abstract

The purpose of this investigation was to examine the internal consistency reliability and the convergent validity of the Spanish version of the Eating Disorder Examination Questionnaire (EDE-Q) and to provide EDE-Q norms for Spanish undergraduate women. Seven hundred eight college women, aged 18-30 years, volunteered to complete the EDE-Q, BSQ and EDI-2. Satisfactory internal consistency for the four subscales and the global score of the EDE-Q was obtained (Cronbach's $\alpha \geq .81$). The EDI-2 Drive for Thinness and Body Dissatisfaction subscales and the BSQ global factor score correlated highly and positively with the corresponding EDE-Q subscales ($r \geq .72$). Average scores, standard deviations and percentile ranks for the raw EDE-Q subscales and data on the occurrence of binge eating and compensatory behaviors are presented. Most of these values were lower than those found in other non-European developed countries. Results support the satisfactory internal consistency and convergent validity of the Spanish version of the EDE-Q. Lower scores in EDE-Q subscales suggest the need to study a lower cut-off point for clinical significance in Spanish college women. These data will help clinicians and researchers to interpret the EDE-Q scores of college women in Spain.

Key words: convergent validity; eating disorders; EDE-Q; normative data; reliability.

Screening for eating disorders in undergraduate women: Norms and validity of the Spanish version of the Eating Disorder Examination Questionnaire (EDE-Q)

The Eating Disorder Examination Questionnaire (EDE-Q) is a self-report questionnaire widely used to measure eating-disorder behavior and attitudes. The EDE-Q was derived from the Eating Disorder Examination Interview (EDE) (Fairburn & Cooper, 1993), which is a structured interview with excellent psychometric properties that many researchers consider to be the method of choice for assessing the specific psychopathology of eating disorders (Garner, 1995; Wilson, 1993). Nevertheless, the EDE has several disadvantages. It requires training and can be time-consuming and therefore costly to administer. In addition, it must be administered on an individual basis. Therefore, the EDE-Q emerges as a good alternative.

Studies of the validity of the EDE-Q have demonstrated a high level of agreement between the EDE-Q and the EDE in assessing the core attitudinal features of eating disorder psychopathology in the general population (Fairburn & Beglin, 1994; Mond, Hay, Rodgers, Owen, & Beumont, 2004b), in women substance abusers (Black & Wilson, 1996), in clinical samples of both bulimia nervosa and binge eating disorder patients (Carter, Aime, & Mills, 2001; Grilo, Masheb, & Wilson, 2001; Sysko, Walsh, & Fairburn, 2005; Wilfley, Schwartz, Spurrell, & Fairburn, 1997), in obese women seeking bariatric surgery (Kalarchian, Wilson, Brolin, & Bradley, 2000) and in children and adolescents (Decaluwe & Braet, 2004; Passi, Bryson, & Lock, 2003). The validity of the EDE-Q in assessing eating disorder behaviors is less clear. Although there is some support for a high correlation between both instruments in the assessment of behavioral features of bulimia nervosa (Sysko et al., 2005), some authors have found some significant discrepancies between the interview and the questionnaire in the assessment of binge eating behavior in both the general and clinical population (Black et al.,

1996; Carter et al., 2001; Fairburn & Beglin, 1994; Wilfley et al., 1997). Assessment of the frequency of self-induced vomiting and/or laxative abuse by means of the EDE-Q appears to correspond more closely with the frequency established by means of the interview, though in clinical samples the mean number of episodes reported may be higher when assessed with the EDE (Carter et al., 2001; Fairburn & Beglin, 1994). Acceptable internal consistency and test-retest reliability have also been demonstrated (Luce & Crowther, 1999; Mond, Hay, Rodgers, Owen, & Beumont, 2004a). Above and beyond other existing eating disorder questionnaires, the advantage of the EDE-Q is that it assesses not only eating disorder attitudes, but also specific behaviors -and the frequency of each behavior- related to eating disorders as defined by the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (APA, 1994).

In Spain the EDE-Q has been widely used in the clinical field. Nevertheless, to our knowledge, to date there is no published study on its validity and reliability among Spanish women attending university. Studying the psychometric properties of the Spanish version of the EDE-Q would meet the American Psychological Association's recommendation to provide empirical evidence of psychometric properties in the particular setting in which the test is to be used (AERA, APA, & NCME, 1999).

Despite its well established psychometric properties in other countries and its clinical utility, norms are needed for interpretation. We found three studies that present normative data for community samples. One of them provided normative data for a British sample of adolescents, aged 12-14 years (Carter et al., 2001), another in an Australian sample, aged 18-42 years (Mond, Hay, Rodgers, & Owen, 2006), and the last one in a group of college women in the United States, aged 18-25 years (Luce, Crowther, & Pole, 2008). As far as we know there is no normative data published for the Spanish population. Considering the fact that eating psychopathology levels may vary across countries (Mond et al., 2006) and, in addition, taking into account the importance of screening eating disorders in college women in whom

this kind of disturbance is very frequent, another pending matter is to provide norms for the specific population upon which the instrument is going to be used (AERA et al., 1999).

The purpose of this study is to evaluate the Spanish version of the EDE-Q in undergraduate women. Thus, the specific objectives are twofold: a) to present data of the internal consistency reliability of the derived subscale scores and to examine the convergent validity with other eating disorder assessing instruments that have already been adapted to the Spanish population; and b) to provide normative EDE-Q data for undergraduate women in Spain and to compare it with previous results from others developed countries.

Method

Participants

Of 827 initial participants, 751 agreed to take part. Participants who refused to participate argued that they did not have time to stay and answer the battery of questionnaires. Data were obtained from 94.3% of these participants, the drop in sample size being due to some of the questionnaires not being fully answered. Therefore, the final sample consisted of 708 undergraduate women enrolled at a large Spanish public university in the Barcelona area. They volunteered to complete an assessment battery and no incentive was given for participation. The women's ages ranged from 18.3 to 30.9 (M = 22.0 years; SD = 2.7 years). Most of the participants were single (92.1%) and Caucasian (94.3%). Their socioeconomic status, which was based on the parents' educational level and occupation according to Hollingshead's index (Hollingshead, 1975), was: 20.5% low, 69.9% medium and 9.6% high. More than half of the participants (62%) studied a career related to health sciences, 35% social sciences, and the remaining 3% engineering.

Measures

Eating Disorder Examination Questionnaire (EDE-Q) (Fairburn & Beglin, 1994): The Spanish adaptation of the EDE-Q-4 (Villarroel, 2008; Villarroel & Raich, 2008) was used. It is a 38-item self-report instrument that assesses attitudes, feelings and behaviors related to eating and body image over the past 28 days. The adaptation process involved the following: (a) contact with the author (C.G. Fairburn, personal communication, June 16, 2006) to obtain the original English version of the EDE-Q; (b) translation of the questionnaire into Spanish by a bilingual psychologist, followed by a blind back-translation into English by a specialized bilingual professional; (c) review of both the Spanish and back-translated English versions for convergences and discrepancies; (d) revision and review by two bilingual psychologists specialized in eating disorders in order to enable the discussion of different perspectives on the concepts and language choices; and (e) a pre-test of the revised measure and a further review by experts to refine the wording.

Subscale scores, relating to dietary restraint, eating, weight and shape concern, are derived from the average of the corresponding 22 items addressing different attitudinal aspects of eating-disorder psychopathology. The response format of these items is a seven-point Likert-type scale (*0: never; 6: everyday*). The global score is the average of the four subscale scores. The frequency of eating disorders (binge eating and compensatory) behaviors is assessed in terms of the average number of weekly episodes occurring during the past four weeks. These items do not contribute to subscale scores. Regular occurrence of these behaviors was defined as at least twice per week, based on DSM-IV-TR criteria (APA, 2000). In addition, in order to compare our results with those of previous studies (Luce et al., 2008; Mond et al., 2006), extreme excessive exercise was calculated as exercising vigorously "as a means of controlling your weight, altering your shape or amount of fat, or burning off calories" at an average of at least five times per week over the past 28 days (item 28), and extreme dietary restraint was calculated as "going without food for a period of eight or more

waking hours in order to influence weight or shape" at an average of at least three times per week over the past 28 days (item 2).

Body Shape Questionnaire (BSQ) (Cooper, Taylor, Cooper, & Fairburn, 1987): This is a 34-item self report questionnaire assessing dissatisfaction with weight or shape and preoccupation with and distress about body shape. Participants rate items on a scale from 1 (*never*) to 6 (*always*) and higher scores reflect greater dissatisfaction. The BSQ has been found to be a reliable and valid measure of body image as it has been shown to have good test-retest reliability, concurrent validity with other measures of body image (Rosen, Reiter, & Orosan, 1995) and criterion validity for clinical use (Rosen, Jones, Ramirez, & Waxman, 1996). The Spanish version of Raich et al. (1996) was used. A single factor ("global factor") that explains the greatest part of the variance relating to body dissatisfaction is derived from the sum of 17 items (Raich et al., 1996). This adapted version presents good psychometric properties in undergraduate women, with satisfactory indices for test-retest reliability (Raich, Herrera, Rovira, & Torres, 1997), internal consistency reliability (Cronbach's $\alpha = .97$) and convergent validity with the EDI-2 ($r = .78$) (Raich et al., 1996). The internal consistency reliability for the present sample was also high (Cronbach's $\alpha = .97$).

Eating Disorder Inventory 2 (EDI-2) (Garner, 1991). This is a 91-item self-report questionnaire that assesses attitudes, feelings and behaviors that are related to eating disorders. It has been shown to have acceptable internal consistency and good test-retest reliability, as well as good content, concurrent, criterion and construct validity (Garner, 1998). The Spanish version of Corral, González, Pereña & Seisdedos (1998) was used, which presents good psychometric properties (Corral et al., 1998). This instrument has 8 original and main subscales: Drive for Thinness, Bulimia, Body Dissatisfaction, Inefficacy, Perfectionism, Interpersonal Distrust, Interoceptive Awareness and Maturity Fears, and 3 additional subscales: Asceticism, Impulse Regulation and Social Insecurity. These subscales present

high split-half reliability ($\rho \geq .80$) (Corral et al., 1998). In our sample we obtained satisfactory internal consistency indices (Cronbach's α values between .70 and .91).

Procedure

After agreement with teachers, the EDE-Q, BSQ and EDI-2 were voluntarily administered in class, as part of a larger assessment battery, supervised by a research assistant. Confidentiality was assured as well as the possibility of getting feedback through a mnemonic code. Data were collected during spring of 2007 and spring of 2008.

Statistical analysis

Analyses were conducted with the SPSS 15 (SPSS Inc, 2006) and LISREL 8.71 (Jöreskog & Sörbom, 2004). The factor structure of the 22 attitudinal aspects was examined by means of confirmatory factor analysis (CFA). Given that the assumption of multivariate normality was not fulfilled the CFA was based on robust maximum likelihood estimation, applying the Satorra-Bentler (SB) correction (Satorra & Bentler, 1988). Goodness-of-fit was assessed with the common fit indices (McDonald & Ho, 2002). Independent-samples t-tests and Pearson's chi-square tests were used to examine for differences between age groups (18-22 years *vs*. 23-30 years). The internal consistency of the EDE-Q scores was analyzed with Cronbach's α coefficient. Pearson's correlations evaluated convergent and divergent validity between EDE-Q subscale scores and BSQ and EDI-2 scores. To compare our data with results from previous studies, we used one-sample t-tests for quantitative measures and binomial tests for dichotomous variables.

Results

With respect to missing data, only 0.006% of item responses required to score the EDE-Q subscales were missing. Missing item responses were replaced with the mean item score of the corresponding scale.

The original 4-factor structure of EDE-Q described in the method section was tested. The fit indices showed satisfactory values: χ^2_{SB} (202) = 1074.71, RMSEA = .078 (CI 90%: .074 to .083), SRMR = .083, CFI = .953, and TLI = .946. All of the item loadings were statistically significant ($p < .05$) and 21 of the 22 items exceed the .40 value on their factor [1]. Considering these results and, especially, having our aim in this paper in mind, we decided to assume the 4-factor model proposed and theoretically justified by the original authors (Fairburn & Beglin, 1994), which is the same factor structure used by Luce et al. (2008) and Mond et al. (2006).

Following Mond et al. (2006) age sample stratification, we divided our sample into two age groups: 18-22 years (517 women; 73%) and 23-30 years (191 women; 27%). However, subscale scores and frequency of behaviors did not differ between the groups (data is available from the authors). Therefore, the pooled sample was used to address the two objectives of the present study.

Internal consistency was satisfactory, taking into account the length of each subscale: Cronbach's α value of .81 for Restraint (five items), .82 for Eating Concern (five items), .92 for Shape Concern (eight items), .83 for Weight Concern (five items) and .95 for Global Score (22 items).

Table 1 presents the coefficient correlations valuing the convergent and divergent validity between EDE-Q and BSQ and EDI-2 scores. The four subscale scores of EDE-Q correlated highly and positively with the EDI-2 Drive for Thinness score (*r* between .72 and .79) and the BSQ global factor score (*r* between .73 and .89). Shape Concern and Weight Concern correlated highly and positively with the EDI-2 Body Dissatisfaction score (*r* = .75

and $r = .72$, respectively). The rest of the correlation between EDE-Q subscale scores and BSQ and EDI-2 measures were lower (Table 1).

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Table 2 shows descriptive data and percentile ranks for the EDE-Q global score and the four subscale scores for the total sample. Independent t-tests comparing EDE-Q scores from the present sample with previous research in community samples yielded significant differences in most of the subscale scores. Comparing our results with those of Mond et al. (2006) in a community sample of 18-22 years (Restraint: $M = 1.29$, $SD = 1.41$; Eating Concern: $M = 0.87$, $SD = 1.13$; Weight Concern: $M = 1.89$, $SD = 1.60$; Shape Concern: $M = 2.29$, $SD = 1.68$; Global Score: $M = 1.59$, $SD = 1.32$), women in the current sample reported significantly lower scores in all subscales (Eating Concern, $t = -5.81$, $p < .001$; Weight Concern, $t = -7.18$, $p < .001$; Shape Concern, $t = -9.64$, $p < .001$; Global score, $t = -6.52$, $p < .001$), except Restraint ($t = -0.10$, $p = .921$). Women in the present sample also reported significantly lower scores than the group of undergraduate women of Luce et al. (2008) in all subscales (Restraint: $M = 1.62$, $SD = 1.54$; Eating Concern: $M = 1.11$, $SD = 1.11$; Weight Concern: $M = 1.97$, $SD = 1.56$; Shape Concern: $M = 2.27$, $SD = 1.54$; Global Score: $M = 1.74$, $SD = 1.30$): Restraint, $t = -6.71$, $p < .001$; Eating Concern, $t = -12.37$, $p < .001$; Weight Concern, $t = -8.68$, $p < .001$; Shape Concern, $t = -9.29$, $p < .001$ and Global score, $t = -9.88$, $p < .001$.

--- INSERT Table 2 ---

Using a cut-off point of four points or more (≥ 4) for clinical significance (Carter et al., 2001), 4.7% of the sample scored in the clinically significant range on Restraint, 2.0% on Eating Concern, 8.2% on Weight Concern, 11.3% on Shape Concern and 4.4% on the Global score. Percentages on Restraint and Shape Concern were significantly lower than those in the study of Luce et al. (2008): 4.7% vs. 7.9% on Restraint ($p = .008$) and 11.3% vs. 14.8% on

Shape Concern (p = .008). Percentages on Weight Concern (8.2%) and Shape Concern (11.3%) were also lower in our sample (p < .005) than those published by Mond et al. (2006) (11.3% and 19.4% respectively).

Table 3 presents the percentages of women who reported any occurrence or regular occurrence of key eating disorder behavioral features and compensatory behaviors. Only 3.2% informed of extreme dietary restraint and 2.8% reported extreme excessive exercise. The mean weekly frequency of each key behavior among those women who had reported any of the respective behaviors was: 2.5 for objective binge episodes (*SD* = 2.7, range 1-24), 2.1 for subjective binge episodes (*SD* = 3.5, range 1-23), 2.9 for vomiting (*SD* = 4.2, range 1-20), 4.9 for laxative misuse (*SD* = 6.4, range 1-30), 4.6 for diuretic misuse (*SD* = 3.6, range 1-20) and 3.0 for excessive exercise sessions (*SD* = 2.2, range 1-23).

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Discussion

Over recent years, many clinicians have used the EDE-Q in Spain. Nevertheless, to our knowledge, this is the first study reporting data on the internal consistency and the convergent validity of the Spanish version of the EDE-Q and also presenting normative EDE-Q data for undergraduate women in Spain.

The high and significant correlations between the EDE-Q and the EDI-2 pertinent subscales and the BSQ global factor provide evidence of convergent validity. We also obtained satisfactory internal consistency indices for the EDE-Q Global score and subscales.

Compared with Luce et al. (2008), Spanish college women obtained significantly lower scores in all subscales. Women in the present study also reported significantly lower scores than the Australian age-matched sample of Mond et al. (2006) in all subscales, except Restraint. Consequently, considering a cut-off point of four points or more for clinical

significance (Carter et al., 2001), percentages on Restraint and Shape Concern were significantly lower than those available in the study of Luce et al. (2008) and percentages on Weight Concern and Shape Concern were also significantly lower in our sample than those published by Mond et al. (2006). Given these results, we can observe that our Spanish sample presents lower percentages of eating disorder symptoms, when compared to the Australian (Mond et al., 2006) and North-American samples (Luce et al., 2008). Regarding the sample from the study by Mond et al. (2006), the lower percentages obtained in our sample can be explained by differences in the participants' education level. However, the sample analyzed by Luce et al. (2008) was comprised of university students like ours. Our lower scores could be explained by cross-cultural differences between the Spanish and the other non-European developed country samples. Therefore, the cut-off point for clinical significance in samples of Spanish undergraduate women should be lowered and studied in future research.

In addition, these differences do not seem to be a function of specific characteristics of our sample. In fact, the BSQ mean score obtained in our sample is quite similar to the value obtained in another sample of Spanish undergraduate women (Warren et al., 2008). Moreover, comparisons between scores for EDI-2 and BSQ obtained in our sample and in Australian and USA samples support the idea of cross-cultural differences. The BSQ mean score in our Spanish sample is lower than values obtained in other samples consisting of undergraduate women in USA (Rosen et al., 1996; Sloan, 2002; Warren et al., 2008) and in Australia (Glauert, Rhodes, Fink & Grammer, in press; Smith & Rieger, in press). In relation to EDI-2, most of the mean scale scores in our sample are also slightly lower than values obtained for undergraduate women in USA (Garner, 1998; Petersons, Rojhani, Steinhaus & Larkin, 2000) and in Australia (Jennings, Forbes, McDermott, Hulse & Juniper, 2006), especially for the scales related to eating disturbances such as Drive for Thinness, Bulimia and Body Dissatisfaction (Garner, 1998). However, the comparison between our data and those of

previous research on EDE-Q (Luce et al., 2008; Mond et al., 2006) should be considered with caution, due to the fact that no measurement invariance analyses have been conducted across cultures with EDE-Q.

Although to a lesser extent than in other samples, our findings support that there is a substantial proportion of college women in Spain who are concerned about their appearance. From a behavioral point of view, our study suggests that one out of every five women reported that they had regularly exercised hard to control their shape or weight (at least twice per week). Of purging behaviors, diuretic misuse was the most common method. Furthermore, one out of every five women indicated having had at least two objective binge eating episodes per week. However, this outcome should be interpreted with caution, given the evidence that the EDE-Q may overestimate binge eating compared to the original EDE interview (Black et al., 1996; Fairburn & Beglin, 1994).

Our results, and those of Mond et al. (2006) and Luce et al. (2008), highlight the importance of the matter and the need for further study and for norms to be established which enable prevention and intervention among young adult populations. The norms that we present in this study will help to interpret EDE-Q scores among Spanish undergraduate women, and therefore can be used as a contribution in diagnosing, preventing and intervening in eating problems.

One limitation of this study is that we used a non-random sample. However, the characteristics of our sample, which we can consider a large sample, included students from different courses. One of the strengths of this study is that data were available on 85.6% of the initial sample. Nonetheless, we should consider the possibility that our figure may underestimate the true prevalence and severity of eating disorder features among undergraduate women in light of evidence that disorder eating is disproportionately common among those who reject participation in surveys on eating disorders (Beglin & Fairburn,

1992). Another strength is that the response rate was very high, in terms of a negligible number of missing responses among the participants who completed the questionnaire (0.006%). Future research should study EDE-Q norms in a random Spanish sample that also includes male undergraduates. Further investigation should also evaluate the validity of the Spanish version of the EDE-Q and the EDE interview.

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Footnotes

[1] The exception was item 11 (preoccupation with weight and shape), which showed standardized factor loadings above 1. The goodness-of-fit indices of the respecified model when removing item 11 did not improve with respect to those of the initial model: χ^2_{SB} (183) = 1290.95, RMSEA = .093 (CI 90%: .088 to .097), SRMR = .075, CFI = .939, and TLI = .929 (data of the complete results is available from the authors).

Table 1: Pearson's correlations (and confidence interval 95%) between EDE-Q subscale scores and EDI-2 main subscale and BSQ global factor scores

	Restraint	Eating Concern	Weight Concern	Shape Concern
BSQ-global factor score	**.73 (.69; .76)****	**.74 (.71; .78)****	**.84 (.81; .86)****	**.89 (.87; .90)****
EDI-DT drive for thinness	**.72 (.67; .76)****	**.74 (.70; .78)****	**.76 (.72; .80)****	**.79 (.75; .82)****
EDI-B bulimia	.34 (.26; .42)**	.56 (.50; .62)**	.45(.38; .52)**	.45 (.37; .51)**
EDI-BD body dissatisfaction	.57 (.51; .63)**	.64 (.59; .69)**	**.72 (.67; .76)****	**.75 (.71; .79)****
EDI-I inefficacy	.29 (.21; .37)**	.38 (.30; .45)**	.34 (.26; .42)**	.35 (.27; .42)**
EDI-P perfectionism	.19 (.11; .28)**	.27 (.19; .35)**	.25 (.17; .33)**	.28 (.20; .36)**
EDI-ID interpersonal distrust	.18 (.09; .26)**	.25 (.17; .33)**	.21 (.12; .29)**	.24 (.15; .32)**
EDI-IA interoceptive awareness	.38 (.31; .46)**	.52 (.45; .58)**	.45 (.38; .52)**	.45 (.38; .52)**
EDI-MF maturity fears	.15 (.07; .24)**	.15 (.07; .24)**	.13 (04; .22)*	.13 (.05; .22)*

*p<0.01; **p<0.001

Table 2: EDE-Q descriptive data and percentile ranks for raw EDE-Q Global and subscale scores for Spanish undergraduate women ($N = 708$)

		Restraint	Eating Concern	Weight Concern	Shape Concern	Global score
Mean (*SD*)		1.29 (1.33)	0.66 (0.97)	1.51 (1.41)	1.75 (1.50)	1.30 (1.19)
Percentile rank	5	---	---	---	---	0.06
	10	---	---	---	0.13	0.15
	15	---	---	0.20	0.38	0.25
	20	---	---	0.20	0.38	0.33
	25	0.20	---	0.40	0.50	0.39
	30	0.40	0.20	0.40	0.75	0.47
	35	0.40	0.20	0.60	0.75	0.56
	40	0.60	0.20	0.80	1.00	0.65
	45	0.60	0.20	0.80	1.13	0.78
	50	0.80	0.20	1.00	1.38	0.92
	55	1.00	0.40	1.20	1.50	1.08
	60	1.20	0.40	1.40	1.63	1.23
	65	1.40	0.40	1.80	1.88	1.44
	70	1.80	0.60	2.00	2.25	1.62
	75	2.00	0.80	2.40	2.63	1.88
	80	2.40	1.00	2.64	3.00	2.20
	85	2.80	1.20	3.20	3.50	2.59
	90	3.40	1.82	3.60	4.13	3.07
	95	3.80	3.11	4.51	4.88	3.88
	99	5.18	4.58	5.60	5.75	4.92

Table 3: Frequency of any or regular occurrence of key eating and compensatory behaviors for Spanish undergraduate women ($N = 708$)

Key behaviour	Any (%) ≥1/week	Regular (%) ≥2/week
Dietary restraint	14.7	6.2
Objective binge episodes	36.0	20.1
Subjective binge episodes	23.0	6.1
Self-induced vomiting	2.8	1.7
Laxative misuse	3.8	2.4
Diuretic misuse	7.5	6.4
Excessive exercise	23.7	20.2