



Objective and subjective bulimic episodes in the classification of bulimic-type eating disorders: Another nail in the coffin of a problematic distinction

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ABSTRACT

We sought to further explore the validity of the distinction between objective bulimic episodes (OBEs) and subjective bulimic episodes (SBEs) in the study of bulimic-type eating disorders. Drawing on data obtained at the second, interview phase of a large-scale epidemiological study, we identified mutually exclusive subgroups of women with bulimic-type eating disorders who engaged in regular OBEs but not SBEs ($n = 37$) or regular SBEs but not OBEs ($n = 52$). These subgroups were compared on a wide range of outcomes, including socio-demographic characteristics, current levels of eating disorder psychopathology, general psychological distress and impairment in role functioning, current and lifetime impairment in quality of life specifically associated with an eating problem, (self)-recognition of an eating problem, health service utilization and use of psychotropic medication. The only difference between groups was that participants who reported regular OBEs were heavier than those who reported regular SBEs. The findings converge with those of previous research in suggesting that bulimic-type eating disorders characterized by regular SBEs, but not OBEs, do not differ in any clinically meaningful way from those characterized by regular OBEs, but not SBEs. Inclusion of bulimic-type eating disorders characterized by regular SBEs as a provisional category requiring further research in DSM-V appears warranted.

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Ever since the diagnosis of bulimia was introduced in DSM-III (APA, 1980), it has been taken for granted that binge eating entails both the consumption of a large amount of food and a feeling of loss of control over eating. The DSM-III diagnosis of bulimia required that there be: "Recurrent episodes of binge eating (rapid consumption of a large amount of food in a discrete period of time)" and "Awareness that the eating pattern is abnormal and fear of not being able to stop eating voluntarily". In DSM-III-R (APA, 1987), the diagnosis of bulimia nervosa (BN), which replaced that of bulimia, required that there be "Recurrent episodes of binge eating (rapid consumption of a large amount of food in a discrete period of time)" and "A feeling of lack of control over eating behavior during the eating binges". In DSM-IV (APA, 1994), it is explicitly stated that "an episode of binge eating is characterized by both consumption of an objectively large amount of food in a discrete period of time and a sense of lack of control over eating during the episode". Further, this definition was

extended to the new, provisional diagnosis of binge eating disorder (BED), a disorder characterized by recurrent episodes of binge eating in the absence of the regular compensatory (i.e. extreme weight-control) behaviors characteristic of BN (APA, 1994).

In eating disorders research, methods of assessment have been predicated on this assumption. Thus, the Eating Disorder Examination (EDE; Cooper & Fairburn, 1987; Fairburn & Cooper, 1993), widely regarded as the method of choice in assessing eating disorder psychopathology, was specifically designed to distinguish between different types of over eating episodes, in particular, those characterized by a loss of control over eating and consumption of an "objectively large" amount of food (objective bulimic episodes; OBEs) and those in which a loss of control is experienced but the amount of food consumed is not objectively large (subjective bulimic episodes) (SBEs) (Cooper & Fairburn 1987; Fairburn & Cooper, 1993). Only individuals reporting recurrent OBEs are eligible for the diagnosis of BN (or BED) according to the DSM. In other widely used diagnostic measures, such as the Structured Clinical Interview for Psychiatric Disorders (First, Spitzer, Gibbon, & Williams, 1996) and

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the Composite International Diagnostic Interview (Hudson, Hiripi, Pope, & Kessler, 2007), only OBEs are assessed.

It may therefore come as a surprise to readers not familiar with this literature that there is little evidence to support the validity of the DSM definition of binge eating (Latner & Clyne, 2008; Latner, Hildebrandt, Rosewall, Chisholm, & Hayashi, 2007; Mond et al., 2006; Wolfe, Baker, Smith, & Kelly-Weeder, 2009). In fact, findings from several studies, employing a range of different study populations and designs, suggest that the perceived loss of control over eating may be a better indicator of psychiatric disturbance than the amount of food consumed among individuals with bulimic-type eating disorders, namely, BN, BED and variants of these disorders not meeting formal diagnostic criteria (Johnson & Love, 1985; Keel, Mayer, & Harnden-Fischer, 2001; Kerzhnerman & Lowe, 2002; Latner et al., 2007; Latner, Vallance, & Buckett, 2008; Mond et al., 2006; Pratt, Nieg, & Agras, 1998; Rossiter & Agras, 1990). In view of these findings, it has been suggested that reference to the amount of food consumed within the DSM definition of binge eating may need to be reconsidered (cf. Latner et al., 2007, 2008; Latner & Clyne, 2008; Wolfe et al., 2009). An early review of the literature, in the lead up to the publication of DSM-IV, concluded that the DSM definition of binge eating should be retained while further research was undertaken (Wilson, 1992). In view of more recent findings, the issue will almost certainly be revisited in the lead up to the publication of DSM-V (Walsh & Sysko, 2009; Wilfley, Bishop, Wilson, & Agras, 2007; Wolfe et al., 2009).

Interpretation of the extant literature is, however, complicated by the fact that most studies have employed clinical samples of individuals receiving specialist treatment for an eating disorder or for overweight. Because only a small proportion of individuals with disordered eating and/or who are overweight receive specialist treatment (Mond, Hay, Rodgers, & Owen, 2007a), and because this subgroup is likely to be atypical (Fairburn, Welch, Norman, O'Connor, & Doll, 1996), the generalizability of findings from clinical samples is unclear. For example, individuals with bulimic-type eating disorders who receive specialist treatment typically report OBEs and self-induced vomiting or laxative misuse, whereas community cases of these disorders often involve SBEs and non-purging weight-control behaviors, namely, extreme dietary restriction and excessive exercise (Mond et al., 2006; Mond, Rodgers, Hay, Korten, Owen, et al., 2004). An additional problem inherent in the use of clinical samples is that eating disorder patients are more likely than individuals with eating disorders in community samples to report both OBEs and SBEs, making separation of the correlates of the amount of food consumed from those of the experience of loss of control problematic (Kerzhnerman & Lowe, 2002; Pratt et al., 1998). Finally, in clinical samples, differences between bulimic-type disorders characterized by recurrent OBEs and those characterized by recurrent SBEs may be minimized on account of the fact that the occurrence of general psychological distress and impairment in role functioning is strongly predictive of whether specialist treatment is received (Mond et al., 2007a).

Two community-based studies have directly tested the validity of the OBE/SBE distinction as this applies to bulimic-type eating disorders. Keel et al., 2001 compared subgroups of individuals meeting DSM-IV criteria for BN with those meeting criteria for a sub-threshold variant of BN characterized by recurrent SBEs and extreme weight-control behaviors on several measures of eating disorder and comorbid psychopathology. No differences between groups were observed on measures of dietary restraint, disinhibition or hunger, or general psychopathology. However, participants in the OBE subgroup had higher levels of impulsiveness, and a higher frequency of binge/purge episodes, than those in the SBE

subgroup. These results were taken to provide partial validation of the DSM definition of binge eating as this applies to BN. Also of note in this study is that participants in the SBE group were less likely to have received mental health care than those in the OBE subgroup. Hence, the authors noted that there may be a tendency not only to study, but also to treat, what we define.

More recently, Latner et al., 2007 examined the associations between OBE and SBE frequency and various measures of eating disorder and other psychopathology in a community sample of women with BN, BED, variants of these disorders, or no eating disorder. Small to moderate (and statistically significant) correlations were observed between both OBE and SBE frequency and virtually all of the study measures and the magnitude of these correlations did not differ for OBE and SBE frequency. In regression analysis, however, there was some evidence that OBE frequency was a better predictor of psychopathology than SBE frequency, after controlling for age, BMI and the frequency of purging behaviors. The authors concluded that OBE and SBE frequency may be similarly related to psychopathology, that SBEs may be an important target of treatment, and that SBEs should be considered for inclusion in future revisions of classification schemes for eating disorders.

Limitations of the Keel et al. (2001) study were the recruitment of participants from different research settings and the inclusion of participants with only the purging form of BN, whereas the primary limitation of the study by Latner et al., 2007 was the reliance on correlational analysis, as opposed to direct comparison of study subgroups. Limitations common to both studies were the recruitment of participants by targeted advertisement, rather than from a general population sample, a reliance on measures of eating disorder and/or comorbid psychopathology to the exclusion of other important validators of clinical significance, such as impairment in role functioning and health service utilization, and the assessment of participants at only one time point.

With these considerations in mind, the goal of the present study was to further explore the validity of the distinction between objective and subjective bulimic episodes in the study of bulimic eating disorders. Drawing on data obtained at the second, interview phase of a large-scale epidemiological study, we identified mutually exclusive subgroups of women with eating disorders who reported regular OBEs but not SBEs or regular SBEs but not OBEs. These subgroups were then compared on a wide range of outcomes, including socio-demographic characteristics, current levels of eating disorder psychopathology, general psychological distress and impairment in role functioning, current and lifetime impairment in role functioning specifically associated with an eating problem, health service utilization, use of psychotropic medication and (self-) recognition of an eating problem.

Method

Study design and participants

The research was conducted as part of the *Health and Well-Being of Female ACT Residents Study*, a two-phase epidemiological study of disability, health service utilization and “mental health literacy” associated with community cases of the more commonly occurring (BN-type) eating disorders (Mond, Hay, Rodgers, & Owen, 2008; Mond et al., 2007a; Mond et al., 2006). The study was carried out in the Australian Capital Territory (ACT) region of Australia (population 314,000 in 2002), a highly urbanized region that includes the city of Canberra. All aspects of the study design were approved by the ACT Human Research Ethics Committee.

Recruitment of participants has been detailed in a number of previous publications (Mond et al., 2007a, 2008; Mond, Hay, Rodgers, & Owen, 2006a; Mond et al., 2006). In brief, self-report

questionnaires were completed by 5255 female residents of the ACT region aged 18–42 years, which represented a response rate of 57.1% at the first phase of the study (Mond et al., 2006). The questionnaire included measures of eating disorder psychopathology, health-related quality of life, general psychological distress, height and weight and socio-demographic information. Body mass index (BMI) (kg/m^2) was calculated from self-reported height and weight (Mond, Hay, Rodgers, Owen, & Beumont, 2004a). The sample comprised approximately 10% of the total population of women aged 18–42 in the region and was representative of this population on a range of socio-demographic variables (Mond et al., 2006a; Mond, Hay, Rodgers, Owen, & Beumont, 2004b).

The mean (SD) age of participants in the total sample was 30.3 (7.2) years. Their mean (SD) BMI was 24.5 (5.3) kg/m^2 . Reflecting the demographic profile of the ACT region, the vast majority of participants was born in Australia (85.3%), had English as a first language (91.8%), and had completed 12 or more years of formal education (88.2%). Approximately half of participants (47.6%) were employed full-time at the time of the study, 17.5% of participants nominated 'caring for children' as their main activity and 15.6% of participants nominated 'full-time study' as their main activity. More than half of participants were married (40.3%) or living as married (14.4%) and 43.8% had one or more children. More than half of participants (58.7%) had private health insurance at the time of the study.

Participants who met the screening criteria for a probable eating disorder, namely, high levels of weight or shape concerns in conjunction with any regular eating disorder behavior (Mond et al., 2004a), were approached to participate in the second phase of the study, involving a face-to-face interview. The interview included diagnostic items of the EDE (14th edition) (Fairburn & Cooper, 2000), along with questions addressing health service utilization, "mental health literacy" and impairment in role functioning specific to eating-disordered behavior (Mond et al., 2007a, 2008). For the present study, the EDE was modified in order to assess both current and lifetime eating disorder behaviors and weight history (Wade, Bergin, Tiggemann, Bulik, & Fairburn, 2006), with the exception that the lifetime assessment of SBEs was deemed too unreliable to be considered (Wade et al., 2006).

Interviews were completed with 324 individuals, which represented a response rate of 76.6% at the second phase. Individuals interviewed were more likely to be married than those not interviewed (38.2% vs. 29.8%; $\chi^2 = 9.58$, $p < 0.05$). There were no other differences between groups. Interviewer training procedures have also been described previously (Mond et al., 2004a).

Participants in the present study were 89 women who met an operational definition of "eating disorder case" according to the interview (EDE) assessment (as described below) and who reported either: (1) regular OBEs but not SBEs (OBEs group; $n = 37$); or (2) regular SBEs but not OBEs (SBEs group; $n = 52$). "Regular" was defined as at least weekly, whereas "not-regular" was defined as less than weekly (Wilfley et al., 2007; Wilson & Sysko, 2009). Hence, participants who reported SBEs at a frequency of less than once per week were not excluded from the OBEs group and participants who reported OBEs at a frequency of less than once per week were not excluded from the SBEs group. However, median SBE frequency was low among participants in the OBEs group and vice versa (see Table 1).

Of the 51 participants in the SBEs group for whom complete (lifetime) data were available, 19 (37.3%) had ever experienced regular OBEs. Of these, 11 (21.6%) had engaged in regular extreme weight-control behaviors concurrent with the occurrence of their OBEs and would therefore have met criteria for BN or sub-threshold BN. The remaining 8 participants (15.7%) had experienced regular OBEs in the absence of regular extreme weight-control behaviors and would therefore have met criteria for BED or sub-threshold BED.

The operational definition of an eating disorder case, which we have used in several previous studies, required the undue influence of weight or shape on self-evaluation in conjunction with any regular eating disorder behavior (Hay, Fairburn, & Doll, 1996; Hay, Marley, & Lemar, 1998; Mond et al., 2007a, 2008; Mond, Hay, Rodgers, & Owen, 2007b). Eating disorder behaviors assessed included, in addition to OBEs and SBEs: self-induced vomiting; misuse of laxatives or diuretics; extreme dietary restriction; and excessive exercise. For self-induced vomiting and misuse of laxatives or diuretics, "regular" was defined as "at least weekly", whereas regular extreme dietary restriction and excessive exercise were recognized if these behaviors occurred, on average, three or more times per week and five or more times per week, respectively (Mond et al., 2006a). The "undue influence of weight or shape on self-evaluation" was defined as a score of 4 or higher, for each of the past three months, on either of the two EDE items that assess this construct (Fairburn & Cooper, 1993).

As is typically the case in general population samples, the sample was comprised primarily of individuals with variants of BN and BED falling into the Eating Disorder Not Otherwise Specified (EDNOS) category (Bijl, Ravelli, & van Zessen, 1998; Hudson et al., 2007; Mond et al., 2007a). There were no participants who currently met DSM-IV criteria for anorexia nervosa (AN).

Table 1

Descriptive statistics for participants reporting regular objective (but not subjective) bulimic episodes (OBEs) and regular subjective (but not objective) bulimic episodes (SBEs).^a

	OBEs ($n = 37$)	SBEs ($n = 52$)	OBEs and SBEs ($n = 13$)		
	Mean (SD)	Mean (SD)	Mean (SD)	t^b	p^b
Age	29.42 (6.38)	28.57 (6.46)	27.18 (7.93)	0.61	0.55
BMI (kg/m^2)	28.99 (7.83)	25.69 (5.21)	31.06 (8.36)	2.25	0.03
	Mdn (IQR)	Mdn (IQR)	Mdn (IQR)	z^b	p^b
OBE frequency (weekly)	2.39 (2.60)	0.31 (0.35)	2.00 (3.58)	-4.80	<0.01
SBE frequency (weekly)	0.54 (0.38)	2.81 (3.02)	2.15 (1.58)	-5.18	<0.01
	%	%	%	χ^2^b	p^b
Obesity (BMI ≥ 30)					
Current	39.4	15.2	54.5	5.94	0.02
Lifetime	51.4	31.4	61.5	3.74	0.15

^a Data for participants reporting both OBEs and SBEs ($n = 13$) are given for descriptive purposes.

^b T, z, χ^2 and p values refer to differences between OBEs and SBEs subgroups.

Study measures

Eating disorder psychopathology

The occurrence and frequency of current (i.e. past 3 months) and lifetime eating disorder behaviors was assessed by means of the relevant items of the EDE interview, with the exception of current purging behaviors, which were assessed by relevant items of a self-report version of the EDE, namely, the Eating Disorder Examination Questionnaire (EDE-Q) (Fairburn & Beglin, 1994). This was because women with bulimic-type eating disorders who employ purging behaviors may be more likely to admit to those behaviors when using self-report, rather than (face-to-face) interview assessment (Keel, Crow, Davis, & Mitchell, 2002; Mond, Hay, Rodgers, & Owen, 2007c).

The EDE-Q focuses on the past 28 days. Subscale scores – relating to dietary restraint, eating concerns, weight concerns and shape concerns – and a global score are derived from 22 items addressing attitudinal aspects of eating-disorder psychopathology (Mond et al., 2006a). Self-report assessment of these items has been found to correspond very closely with interview assessment in a range of study populations (cf. Mond et al., 2004a, 2007b). In the present study, the subscale and global scores provided a continuous measure of current eating disorder psychopathology. Scores range from 0 to 6, with higher scores indicating greater symptom frequency or severity (Mond, Hay, Rodgers, & Owen, 2006b).

Impairment in role functioning

Impairment in role functioning was assessed with the Medical Outcomes Study Short-Form (SF-12) (Ware, Kosinski, & Keller, 1996). The SF-12 is a 12-item, self-report, generic measure of health-related quality of life. Items are summarized into two weighted scales (Physical Component Summary scale, PCS; Mental Component Summary scale, MCS), designed to assess impairment in role functioning associated with physical and mental health problems. Each scale is scored to have a mean of 50 and standard deviation of 10 (in the US population), with lower scores indicating higher levels of impairment. A score of 30 or less on the MCS indicates severe impairment in mental health functioning, whereas a score of between 31 and 40 indicates moderate impairment (Sanderson & Andrews, 2002). The SF-12 has good psychometric properties (Ware et al., 1996) and its validity in the Australia population has been demonstrated (Mond, Rodgers, Hay, Owen, et al., 2004; Sanderson & Andrews, 2002).

Impairment in role functioning associated with an eating problem

Questions addressing impairment in role functioning associated with an eating problem were developed by the authors (Mond et al., 2007a). A series of questions assessed the extent to which functioning in each of four domains—main activity, home life, social life and overall quality of life – was currently or had ever been adversely affected by any problem relating to eating attitudes or behaviors. Participants who reported that functioning in at least one of the above-mentioned domains was currently affected “very much” or “extremely” by such a problem were considered to have impairment relating to an eating problem. This measure was found to have good convergent and discriminant validity in our previous research (Mond et al., 2007a). In addition, as part of the mental health literacy component of the interview, participants were asked if they believed that they currently had a problem with their eating (“self-recognition of an eating problem”; Mond et al., 2006b).

General psychological distress

General psychological distress was assessed with the Kessler Psychological Distress Scale (K-10), a 10-item self-report measure

initially designed to screen for anxiety and affective disorders in epidemiological studies (Kessler et al., 2002). In Australia it is also used as an outcome measure among individuals treated within mental health services (Andrews & Slade, 2001). The frequency of each of 10 symptoms is measured on a scale from one to five, such that total scores range from 10 to 50, with lower scores indicating higher symptom levels. The K-10 has been found to have good psychometric properties in research conducted by the authors (Mond, Hay, Rodgers, Owen, & Beumont, 2005; Mond, Rodgers, Hay, Owen, et al., 2004). A score of 30 or less indicates a high probability of clinically significant symptoms of anxiety and/or depression (Andrews & Slade, 2001).

Health service utilization

Questions addressing the use of health services were developed by the authors and were included in the interview assessment (Mond et al., 2007a). Participants were first asked whether they had ever received advice or treatment from a health professional specifically for a problem with eating, such as “eating too much in one go”, “feeling out of control with your eating” or “being preoccupied with what or when you should eat”. Where such treatment was received, additional questions addressed the nature of the treatment received. A series of additional questions followed in which participants were asked whether they had ever received advice or treatment for other emotional problems, such as “being anxious or depressed” or for a problem with weight, such as “wanting to lose weight”. Health professionals were defined as general practitioners, pediatricians, dieticians, social workers, counselors, psychologists and psychiatrists. Current and lifetime use of psychotropic medication was also assessed.

Statistical analysis

T-tests (for continuous variables) or Chi-square tests (for categorical variables) were used to assess differences between participants who reported regular OBEs but not SBEs and those who reported regular SBEs but not OBEs on the various outcome measures. Power analysis, based on actual OBEs and SBEs group sizes, indicated that there was 80% power to detect medium effect sizes for both continuous and dichotomous outcome variables (d and h between 0.5 and 0.6) (Cohen, 1988). With a view to minimizing the likelihood of type-II error, a significance level of 0.05 was employed for all tests and no adjustment was made to alpha levels for multiple comparisons.

Data for ($n = 13$) participants who reported both regular OBEs and regular SBEs are given for descriptive purposes. Where possible, data for a general population sample of women (Mond, Rodgers, Hay, Owen, et al., 2004) and for women with eating disorders receiving specialist treatment (Mond et al., 2005), both recruited from the same region at the same time, are also provided.

Results

As can be seen in Table 1, participants in the OBEs group were heavier than those in the SBEs group. There were no significant differences between groups on any of the socio-demographic variables assessed, nor did any of these comparisons approach significance (all $p > 0.10$).

Table 2 shows the comparison between OBEs and SBEs groups on measures of eating disorder psychopathology (EDE-Q subscales and global score), impairment in role functioning (SF-12 PCS, MCS), general psychological distress (K-10), days “out-of-role”, impairment in role functioning associated with an eating problem and (self-) recognition of an eating problem. It can be seen that there

Table 2

Comparison between subgroups on measures of eating disorder psychopathology, impairment in role functioning, general psychological distress, days “out-of-role”, impairment in role functioning associated with an eating problem and (self-) recognition of an eating problem.^a

	General population sample (<i>n</i> = 495)	OBEs (<i>n</i> = 37)	SBEs (<i>n</i> = 52)	OBEs and SBEs (<i>n</i> = 13)	Eating disorder patients (<i>n</i> = 118)		
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	<i>t</i> ^b	<i>p</i> ^b
Eating Disorder Examination Questionnaire subscales							
Restraint	1.22 (1.42)	3.27 (1.48)	3.28 (1.39)	3.45 (1.94)	3.78 (1.69)	−0.03	0.97
Eating concern	0.64 (0.99)	3.24 (1.10)	3.11 (1.12)	3.92 (1.42)	3.67 (1.54)	0.55	0.58
Weight concern	1.65 (1.42)	4.25 (0.84)	4.31 (0.92)	3.97 (0.74)	4.27 (1.49)	−0.29	0.77
Shape concern	2.10 (1.58)	4.87 (0.82)	4.88 (0.81)	4.99 (0.73)	4.65 (1.35)	−0.07	0.94
Global score	1.40 (1.20)	3.91 (0.78)	3.90 (0.75)	4.08 (0.82)	4.07 (1.35)	0.08	0.94
SF-12 Physical Component Summary Scale (PCS)	50.73 (8.76)	46.50 (10.21)	48.84 (10.82)	45.77 (11.64)	46.70 (10.64)	−1.00	0.32
SF-12 Mental Component Summary Scale (MCS)	47.40 (10.30)	36.34 (11.98)	36.28 (12.23)	36.58 (10.86)	30.74 (10.40)	0.02	0.98
Kessler Psychological Distress Scale (K-10)	43.24 (6.45)	35.88 (8.73)	36.31 (7.12)	34.27 (9.30)	30.49 (7.61)	−0.24	0.81
	%	%	%	%	%	χ^2 ^b	<i>p</i> ^b
Severe impairment in mental health (MCS ≤ 30)	9.6	29.4	31.4	38.5	49.2	0.04	0.848
Probable anxiety or affective disorder (K-10 ≤ 30)	5.6	14.7	20.0	45.5	53.0	0.37	0.542
Impairment associated with an eating problem:							
Current	—	45.9	32.7	53.8	—	1.61	0.21
Lifetime	—	56.8	55.8	76.9	—	0.01	0.93
(Self-) Recognition of an eating problem	—	51.4	46.2	75.0	—	0.23	0.63

^a Data for participants reporting both OBEs and SBEs (*n* = 13) (present study), for a general population sample of women (*n* = 495) (Mond, Rodgers, Hay, Owen, et al., 2004) and for women with eating disorders receiving specialist treatment (*n* = 118) (Mond et al., 2005) are given for descriptive purposes.

^b *T*, χ^2 and *p* values refer to differences between OBEs and SBEs subgroups.

were no significant differences between groups on any of these measures, nor did any of the differences between groups approach statistical significance (all *p* > 0.20).

There were also no differences between groups with respect to the current or past use of extreme weight-control behaviors (all *p* > 0.05) (Table 3). However, there was a trend for participants in the SBEs group to be more likely to have ever engaged in excessive exercise than participants in the OBEs group (65.4% vs 45.9%, $\chi^2 = 3.34$, *p* = 0.07). Finally, there were also no differences between groups with respect to the use of health services or psychotropic medication, nor did any of the differences between groups approach statistical significance (all *p* > 0.40) (Table 4).

In view of the difference between groups with respect to body weight, the analysis was repeated using analysis of covariance (ANCOVA) (for continuous outcome variables) or logistic regression (for dichotomous outcome variables) with BMI entered as a covariate. The findings were unchanged (details are available from the first author upon request).

Discussion

Summary of main findings

In a community sample of women with bulimic-type eating disorders, we identified subgroups of participants who reported regular OBEs but not SBEs and regular SBEs but not OBEs. These groups were compared on a wide range of outcomes, including socio-demographic characteristics, current levels of eating disorder psychopathology, general psychological distress and impairment in role functioning, current and lifetime occurrence of extreme weight-control behaviors, current and lifetime occurrence of impairment in role functioning specifically associated with an eating problem, health service utilization, use of psychotropic medication and (self-)recognition of an eating problem.

There were no differences between groups on any of these outcomes. As would be expected, given that subgroups were differentiated on the basis of the amount of food consumed during loss of control episodes, participants who reported recurrent OBEs were heavier than those who reported recurrent SBEs. A tendency for participants in the SBEs group to report higher lifetime rates of excessive exercise may also have contributed to between-group differences in body weight.

Study strengths, limitations and other methodological considerations

Although findings from several previous studies have similarly suggested that the distinction between objective and subjective bulimic episodes may be of questionable value, several features of

Table 3

Percent (%) frequency of regular current and lifetime extreme weight-control behaviors by study subgroup.^a

	OBEs (<i>n</i> = 37)	SBEs (<i>n</i> = 52)	OBEs and SBEs (<i>n</i> = 13)		
	%	%	%	χ^2 ^b	<i>p</i> ^b
Purging behaviors					
Self-induced vomiting ^c					
Current	10.8	11.5	23.1	0.01	0.92
Lifetime	18.9	28.8	23.1	1.15	0.29
Laxative misuse ^c					
Current	10.8	5.8	7.7	0.76	0.38
Lifetime	24.3	13.5	16.7	1.73	0.19
Vomiting or laxative misuse					
Current	18.9	17.3	23.1	0.04	0.85
Lifetime	37.8	44.2	25.0	0.36	0.55
Non-purging behaviors					
Extreme dietary restriction ^d					
Current	8.1	9.6	0.0	0.06	0.81
Lifetime	45.9	46.2	46.2	0.00	0.99
Excessive exercise ^e					
Current	16.2	11.5	15.4	0.41	0.52
Lifetime	45.9	65.4	23.1	3.34	0.07
Restriction or exercise					
Current	21.6	21.2	15.4	0.00	0.96
Lifetime	70.3	78.8	61.5	0.85	0.36
Any regular behavior					
Current	35.1	30.8	38.5	0.19	0.67
Lifetime	78.4	84.6	69.2	0.57	0.45

^a Data for participants reporting both OBEs and SBEs (*n* = 13) are given for descriptive purposes.

^b χ^2 and *p* values refer to differences between OBEs and SBEs subgroups.

^c For self-induced vomiting and laxative misuse, “regular” was defined as at least weekly.

^d Regular extreme dietary restriction was defined as going without food for periods of 8 or more waking hours in order to influence weight or shape on average at least 3 times per week.

^e Regular excessive exercise was defined as compulsive or obligatory exercise for weight or shape reasons on average at least 5 times per week.

Table 4Use of health services and psychotropic medication by study subgroup.^a

	OBEs (n = 37)	SBEs (n = 52)	OBEs and SBEs (n = 13)	χ^2 ^b	p ^b
	%	%	%		
Lifetime:					
Treatment for an eating problem	37.8	30.8	53.8	0.48	0.49
Treatment for a weight problem	78.4	70.6	92.3	0.67	0.41
Treatment for a general mental health problem	78.4	78.8	53.8	0.00	0.96
Treatment from a mental health professional	35.1	30.8	38.5	0.19	0.67
Use of anti-depressant medication	41.7	32.7	33.3	0.74	0.39
Use of anxiolytic medication	13.9	19.2	0.0	0.43	0.51
Use of either anti-depressant or anxiolytic medication	44.4	40.4	33.3	0.14	0.70

^a Data for participants reporting both OBEs and SBEs (n = 13) are given for descriptive purposes.^b χ^2 and p values refer to differences between OBEs and SBEs subgroups.

the present study permit greater confidence in the findings. First, participants were recruited from a general population sample, thereby eliminating the problems of sampling bias associated with the use of treatment-seeking samples and community-based samples recruited by means of targeted advertisements. Second, sample size at the first phase of the study was sufficiently large to permit identification of mutually exclusive subgroups of individuals reporting OBEs but not SBEs and those reporting SBEs but not OBEs at the second, interview-assessment phase of the study. Third, eating disorder behaviors were assessed by trained interviewers. Finally, we were able to compare the respective subgroups on a broader range of outcomes relevant to the determination of clinical significance than has previously been possible.

Limitations of the present study should also be acknowledged. First, it is generally agreed that failure to reject the null hypothesis indicates only that there is no evidence to support the alternative hypothesis (Nickerson, 2000). Interpretation of null findings is problematic when the statistical power to detect meaningful differences is limited by small subgroup sample sizes. In the present study, power calculations based on actual sample sizes suggested that there was 80% power to detect medium effect sizes for both continuous and categorical outcome measures (d , $h \approx 0.55$). Hence, the presence of such effects, which are of an order of being clinically significant, cannot be excluded entirely on the basis of the present findings. However, they are unlikely. Of course, real differences between OBE and SBE groups may be smaller than this. In practice, recruitment of a very large first phase sample and/or conduct of a very large number of interviews at the second phase would be the only way to have confidence in detecting smaller effect sizes while employing a general population sample.

Second, inclusion of participants who reported (any) SBEs in the OBEs group and of participants who reported (any) OBEs in the SBEs group subgroups may have had the effect of creating more homogeneous groups and, in turn, reduced the likelihood of detecting differences between groups. Although it would have been possible to achieve a more complete separation between the study subgroups, namely, by excluding individuals who reported *any* SBEs from the OBEs group and individuals who reported *any* OBEs from the SBEs group, this approach was rejected because it would have come at the cost of reduced subgroup sample sizes and also because the occurrence of SBEs was uncommon in the OBEs subgroup and vice versa (Table 1). In addition, identifying subgroups of participants who reported OBEs in the (complete) absence of SBEs and SBEs in the absence of OBEs would have detracted from the ecological validity of the study in that subgroups of women meeting these more stringent criteria appear to be uncommon in the general population.

A third limitation was that the response rate at the first phase of the study (57.1%) was fair only. Although a detailed analysis of data from a pilot study did not suggest any form of non-response bias,

differences between respondents and non-respondents at the first phase of the present study cannot be excluded (Mond et al., 2004b). Further, the ACT is an urbanized, affluent region and the generalizability of the findings to other, more diverse populations is unclear (Mond, Hay, Rodgers, & Owen, 2006c).

Fourth, this was a study of young adult women. We studied this population precisely because it is the demographic in which the prevalence of bulimic-type eating disorders is highest. However, it is becoming apparent that bulimic behaviors are not as uncommon among men as previously believed (Hay, Mond, Darby, & Buttner, 2008; Striegel-Moore et al., 2009) and that the validity of the distinction between OBEs and SBEs may be no less problematic for children and adolescents than for adults (Goldschmidt et al., 2008; Goossens, Soenens, & Braet, 2009; Hilbert & Czaja, 2009). Hence, inclusion of both males and females and both pediatric and adult populations in future research would be welcome.

It should also be noted that the present findings apply only to the validity of the OBE-SBE distinction as this applies to individuals with eating disorders of normal- or above-average body weight. Since individuals with AN or variants of AN not meeting formal diagnostic criteria often report OBEs and/or SBEs, similar issues may arise in relation to individuals with eating disorders of low body weight (cf. Wolfe et al., 2009). However, evidence bearing on the validity of the OBE-SBE distinction among individuals with AN and variants of AN is far more limited and the low population prevalence of these disorders is such that the issue could only be addressed in treatment-seeking samples.

Finally, as in the studies of Keel and colleagues (Keel et al., 2001) and Latner and colleagues (Latner et al., 2007), this was a cross-sectional study and it is generally agreed that clinical course is a central component of diagnostic validity (Kendall & Jablensky, 2003). Although the modified diagnostic interview employed in the present study permitted the assessment of lifetime eating disorder behaviors, findings in this regard need to be interpreted with caution because the reliability of this assessment is unclear (Mond, Peterson, & Hay, in press; Wade et al., 2006). Prospective community-based studies remain the best means by which to elucidate the natural history of psychiatric disorders (Fairburn, Cooper, Doll, Norman, & O'Connor, 2000; Rathner, 1992). However, prospective studies of outcome in clinical samples are needed to inform treatment response for individuals with different clinical profiles. As it is, little is known about whether and to what extent treatments with demonstrated effectiveness for individuals who meet criteria for BN and BED can be applied to individuals with variants of these disorders involving recurrent SBEs (Latner et al., 2007, 2008; Wolfe et al., 2009).

It should also be emphasized that the present study was not – and was not intended to be – a test of the validity of the DSM-IV diagnoses of either BN or BED. Rather, we identified subgroups of participants who reported regular OBEs but not SBEs and regular

SBEs but not OBEs, irrespective of the occurrence of extreme weight-control behaviors. It could be argued that the failure to specifically address the validity of BN or BED, as defined in DSM-IV, limits the impact of the findings. On the other hand, it is widely agreed that DSM-IV criteria for both BN and BED are over-restrictive and that this limits their usefulness when rigidly applied in experimental research (Mond & Hay, 2010; Mond et al., *in press*; Wilfley et al., 2007). In addition, if it was the case that the sorts of disorders identified were uncommon in the general population or trivial in terms of their impact on psycho-social functioning, then the findings would be of little consequence. But that is not the case. Evidence from both community and primary care studies suggests that sub-threshold variants of both BN and BED are common among women in the community and associated with high levels of distress and disability (Hay et al., 1996, 1998; Mond et al., 2007a; Mond, Rodgers, Hay, Owen, et al., 2004). The present findings add to this evidence.

In recent years, attention has focused on a third possible category of bulimic-type eating disorder, characterized by the use of extreme weight-control behaviors in the absence of binge eating (Keel, Haedt, & Edler, 2005). Evidence is accumulating to suggest that disorders of this kind are associated with distress and disability comparable to that of BN (Keel, 2007; Wade, 2007). Further, individuals who report extreme weight-control behaviors in the absence of binge eating also tend to report SBEs and it may be the combination of SBEs and extreme weight-control behaviors – rather than extreme weight-control behaviors per se – that indicates clinical significance (Mond & Hay, 2010). Of interest in this regard is that a substantial minority of participants (37.3%) in the SBE subgroup reported that they had at some time experienced recurrent OBEs and close to one third had previously met criteria for BN or sub-threshold BN. Hence, it is possible that considerable overlap exists between disorders characterized by recurrent OBEs and those characterized by recurrent SBEs when a longitudinal perspective is taken (Mond et al., *in press*). Considerable overlap might also exist between bulimic-type disorders that involve the use of extreme weight-control behaviors and those that do not. In the present study, the vast majority of participants in both groups reported the lifetime occurrence of one or more extreme weight-control behaviors, whereas only one third had one or more current behaviors.

Study implications

If it is accepted that the distinction between OBEs and SBEs in eating disorders research is problematic, the question arises as to how this problem might be addressed in future revisions of the DSM. Clearly one possibility would be to remove reference to the consumption of an objectively large amount of food in the current definition of binge eating, so that binge eating – or, perhaps, “loss of control” – episodes entail only a loss of control over eating. Alternatively, BN and BED might be sub-typed according to the type of bulimic episode – objective or subjective – that is typically experienced. A third, related, option would be to replace the current DSM classification with a scheme in which broad categories for eating disorders – rather than specific diagnoses – are recognized. In this scheme, BN and BED, as currently defined, would become prototypes of broader categories of BN- or BED-type disorders, alongside variants of BN and BED involving SBEs rather than OBEs (Walsh & Sysko, 2009).

However, any change to classification schemes in which eating disorders characterized by SBEs, but not OBEs, are given formal recognition raises vexed questions. For one thing, the notion that consumption of an objectively large amount of food is the defining feature of binge eating is so ingrained in the literature that any departure from this would be difficult to accept by many authorities

(Beumont, 2002). Second, the assessment of SBEs is highly unreliable (Grilo, Masheb, Lozano-Blanco, & Barry, 2004; Mond et al., 2004a; Rizvi, Peterson, Crow, & Agras, 2000). This is in contrast to the assessment of OBEs and likely reflects the fact that the determination of loss of control is particularly difficult when the amount of food consumed is not very large. To our knowledge, no attempt has been made to address this problem, for example, by considering alternative methods of assessment. Third, whereas there is good evidence that the occurrence of OBEs is associated with distress and functional impairment irrespective of the occurrence of extreme weight-control behaviors, little is known about bulimic-type eating disorders characterized by recurrent SBEs and available evidence suggests that these disorders are clinically significant only when extreme weight-control behaviors are present (Hay et al., 1996; Mond et al., 2006). Hence, at present, a definition of binge eating solely in terms of the loss of control over eating might be considered in relation to the diagnosis of BN, but not BED.

A less controversial alternative, one that avoids or at least defers consideration of these difficulties, would be to include bulimic-type eating disorders characterized by recurrent SBEs, but not OBEs, as a provisional category requiring further research in DSM-V, as was done with BED in DSM-IV. This option makes sense, given that disorders characterized by “the use of inappropriate compensatory behaviors by an individual of normal body weight after eating small amounts of food” are already included in the DSM as one of six exemplars of EDNOS and given that there is already considerable evidence supporting the clinical significance of these disorders (Keel, 2007; Mond et al., 2006; Mond et al., *in press*). A change of this kind would give researchers time to explore alternative operational definitions of loss of control episodes, while also elucidating the clinical significance and treatment response of disorders characterized by extreme weight-control behaviors and neither OBEs nor SBEs and those characterized by SBEs but not extreme weight-control behaviors (Mond et al., 2006; Mond et al., *in press*). As has been noted, there is no assessment of SBEs in at least two measures that have been widely used in epidemiological studies. As a consequence, estimates of the health burden of eating-disordered behavior derived from research employing these measures almost certainly underestimate the true extent of the problem (Mond, Rodgers, Hay, Owen, et al., 2004; Mond, Hay, Rodgers, & Owen, 2009).

Inclusion of bulimic-type eating disorders characterized by recurrent SBEs, but not OBEs, as a provisional category requiring further research would also provide an incentive for the basic epidemiological research needed to elucidate the distribution of OBEs and SBEs subgroups in the population of individuals with bulimic eating disorders (Wolfe et al., 2009). For example, the relative frequency of disorders characterized by OBEs but not SBEs and SBEs but not OBEs is unclear. Further, virtually nothing is known about the prevalence and correlates of disorders characterized by both OBEs and SBEs. Although the number of participants who reported both OBEs and SBEs in the present study was too small to permit any conclusions in this regard, our findings do suggest that this subgroup is sufficiently common at the population level to warrant further investigation.

A particularly problematic issue, one that cuts across any proposed changes, is that of the priority given to epidemiological, as opposed to clinical, data in revising classification schemes for psychiatric disorders. On the one hand, the primary objective of the DSM is to inform the care of individuals presenting to treatment. Hence, “clinical utility” needs to be given a high priority in revising classification schemes (First et al., 2004). On the other hand, the influence of the DSM extends far beyond its role in informing clinical practice (Rounsaville et al., 2002). Classification schemes for psychiatric disorders that describe only the sorts of cases observed in specialist treatment facilities may be conducive to low or

inappropriate treatment-seeking among individuals with clinically significant symptoms that do not accord with accepted criteria (Fairburn & Beglin, 1990; Hay et al., 1998; Mond, Rodgers, Hay, Owen, et al., 2004; Mond et al., 2006b). They may also constrain research practice (Walsh & Kahn, 1997; Keel et al., 2001). As has been noted, the characteristics of individuals with eating disorders who receive specialist treatment are different from those in unselected samples. This is one of the reasons that little is known about bulimic-type eating disorders characterized by SBEs but not OBEs and by non-purging but not purging weight-control behaviors.

Our view is that both epidemiological and clinical data need to be considered when revising classification schemes for eating disorders and that it would be helpful for some clarification to this effect to be included in the explanatory text. Although calls have periodically been made for the development of classification schemes that better reflect the spectrum of disturbance as this occurs in the community (Fairburn & Beglin, 1990; Hay et al., 1998), to date the balance appears to be tipped in favour of clinical utility and, in turn, a reliance on data from treatment-seeking samples (Fairburn & Bohn, 2005; Walsh, 2007). In this regard, it is important to note that giving greater weight to epidemiological data in revising classification schemes for eating disorders and improving clinical utility may be complementary, particularly given the impetus to adopt a more dimensional approach to the classification of mental disorders in DSM-V (Regier, Narrow, Kuhl, & Kupfer, 2009). It is hoped that a more dimensional approach to the classification of eating-disordered behavior in DSM-V will lay the foundation for improved clinical and scientific utility, while also reminding both researchers and clinicians of the need to view diagnostic criteria as “scientific hypotheses, rather than inerrant Biblical scripture” (Regier et al., 2009; p.649).

In sum, the present findings converge with those of previous research in suggesting that bulimic-type eating disorders characterized by SBEs, but not OBEs, do not differ in any clinically meaningful way from those characterized by OBEs but not SBEs. Inclusion of bulimic-type eating disorders characterized by recurrent SBEs as a provisional category requiring further research in DSM-V appears warranted.

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