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Recurrent Binge Eating (RBE) and Its Characteristics in a Sample of Young Women in Germany

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Objective: To examine the characteristics of recurrent binge eating (RBE) in a non-treatment-seeking sample from the general population. RBE individuals are described in terms of socio-economic status, general psychopathology, and comorbidity rates of mental disorders.
Method: Participants were 1877 German females aged 18–24 years from a population-based epidemiological study.
Results/Discussion: The point prevalence of RBE in our sample was 0.9% ($N = 17$). Compared to healthy women, subjects with RBE suffered more often from comorbid mental disorders and also exhibited more general psychopathology: They were similar to women with other mental disorders and other eating disorders (EDs). RBE seems to be a syndrome of clinical significance itself and might be an important risk factor for the development of further EDs, especially binge eating disorder (BED) and other mental disorders. Copyright © 2007 John Wiley & Sons, Ltd and Eating Disorders Association.

Keywords: recurrent binge eating (RBE); population-based; epidemiology; comorbidity with mental disorders; general psychopathology; eating disorders

INTRODUCTION

There are several epidemiological studies highlighting the prevalence of eating disorders (EDs) (Hoek & van Hoeken, 2003). Cumulative evidence from well-designed surveys indicates a prevalence of 0.2–1% for anorexia nervosa (AN) in young Western women and around 1% for bulimia nervosa (BN) (Clayer et al., 1995; Garfinkel et al., 1995; Walters & Kendler, 1995). The prevalences of sub-clinical forms of AN and BN are somewhat higher, around 0.75–4% and around 0.8–2.7%, respectively, in both general and clinical populations (Bunnell, Shenker, Nussbaum, & Jacobson, 1990; Button & Whitehouse, 1981; Hay, 1998; King, 1989; Mann et al., 1983; Patton, Selzer, Coffey, Carlin, & Wolfe, 1999; Szmukler & Russell, 1983; Wade, Bergin, Tiggemann, Bulik, & Fairburn, 2006; Whitaker et al., 1989). There is evidence that individuals suffering from partial syndrome eating disorders show similar levels of disability, impairment, comorbidity and distress (Dancyger & Garfinkel, 1995; Kruger, McVey, & Kennedy, 1998; Lask, Waugh, & Gordon, 1997; Pinkston et al., 2001).

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The prevalence of binge eating disorder (BED) is less well established and varies from 0.7 (Basdevant et al., 1995) to 4.6% (Spitzer et al., 1993). Studies investigating partial syndromes of BED such as recurrent binge eating (RBE) have found the prevalence to vary from 0.38 to 3.7% in population-based samples and as high as 35% in obese treatment-seeking samples (Basdevant et al., 1995; Britz et al., 2000; Fairburn, Beglin, & Davies, 1992; Fairburn, Hay, & Welch, 1993; Hay, 1998, 2003; Ledoux, Choquet, & Manfredi, 1993; Severi, Verri, & Livieri, 1993; Wade et al., 1999; Westenhoefer, 2001).

Several studies have made a considerable effort to investigate RBE in general and clinical populations, and these are summarized in Table 1. The comparability of the different prevalence rates is limited as there is no consensus with respect to a unique definition of RBE. Although most of the recent studies assessed RBE with an interview, data from earlier studies (e.g. Basdevant et al., 1995; Ledoux, Choquet, & Manfredi, 1993; Marcus, Wing, & Lamparski, 1985; Spitzer et al., 1993; Westenhoefer, 2001) were often based on self-report measures that might lead to an overestimation of prevalence rates (Tanofsky Kraff et al., 2004). Further investigation of the clinical features of RBE in the general population seems to be warranted, as there is evidence that RBE is similar to partial syndrome AN and BN (Cotrufo, Barretta, Monteleone, & Maj, 1998; Hay, 2003; Ledoux, Choquet, & Manfredi, 1993; Striegel-Moore, Wilfley, Pike, Dohm, & Fairburn, 2000a; Striegel-Moore, Wilson, Wilfley, Elder, & Brownell, 1998) in terms of elevated general psychopathology measures. Further, as none of the studies mentioned in Table 1 report on the risk of comorbid disorders in RBE, this question of clinical relevance of RBE remains unanswered.

The aims of the present study were to assess the prevalence of binge eating in a general population sample and to describe this partial syndrome in terms of body mass index (BMI), socio-economic status (SES), measures of psychopathology, and comorbid mental disorders. We assessed RBE according to the Oxford Criteria of Fairburn et al. (1993) in a representative sample of young women. We used structured interviews for DSM-IV (1994) diagnoses, carried out by trained interviewers, and we administered validated questionnaires to describe the RBE population in terms of general psychopathology. To specify the clinical relevance of RBE, we compared RBE subjects with healthy women, with women suffering from mental disorders other than EDs, with obese women, and with women with other EDs (BN or AN).

METHOD

Subjects

The data used in this report derive from a large epidemiological study designed to collect information about prevalence, incidence, course and risk factors of mental disorders, especially anxiety and mood disorders of young women in the city of Dresden, Germany. The sample is described in detail by Becker, Margraf, Turke, Soeder, and Neumer (2001) and Hoyer et al. (2002a,b). The results presented in this paper were obtained from the baseline survey, which was conducted between July 1996 and September 1997.

Participants were females aged 18–24 years at the time of sampling. The sample was drawn from the Dresden government registry of residents. A total of 5204 women were located and declared eligible for the study. From this sample 2064 took part in interviews and an additional 998 only filled out questionnaires. This resulted in a response rate of 58.8%. Data from the 1877 participants who both took part in the interviews and filled out the questionnaires are reported. Cases considered for this study thus represent 36.1% of the total possible sample.

The individuals of the different study groups were characterized in terms of BMI, marital status, highest degree earned, and SES. SES was scored as high, middle or low based on answers to a questionnaire especially developed for the study (nonpublished data, available from the author).

According to their occupations, we categorized the young women into a low, medium, or high SES group (Table 2). As we were investigating young females, many of them had not yet finished school. In such instances SES was replaced by the occupational status of the parents.

Procedures and Measures

Diagnostic assessment of mental disorders on Axis-I according to the DSM-IV, (APA, 1994) was done using the Forschungs-DIPS (F-DIPS) (Margraf, Schneider, Soeder, Neumer, & Becker, 1996) by trained interviewers. They were supervised bi-weekly and a supervisor proofread each interview. The F-DIPS is a modified version of the DIPS (Margraf, Schneider, & Ehlers, 1994) and *Anxiety disorders interview schedule for DSM-IV* (ADIS-IV-L) (Brown, DiNardo, & Barlow, 1994), which is widely used for the assessment of mental disorders and shows excellent psychometric properties (Brown, Di Nardo, Lehman, & Campbell, 2001). F-DIPS can be used to diagnose the full spectrum of anxiety

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Table 1. Definitions, assessments, and prevalence rates of recurrent binge eating in the recent literature

Author	Definition	Assessment	Total sample (*N*)	Prevalence rate (%)	Population	Psychopathology
Cotrufo, Gnisci, & Caputo (2005)	1) Partial syndrome BED—DSM-IV criteria (Appendix B) without criteria (ii) or (iv) 2) Subclinical BED—DSM-IV criteria (Appendix B) without criteria (ii) and (iv)	Face-to-face interview, diagnosis according to DSM-IV	$N = 259$ (all female)	0.38 –	Female high school students, Naples, Italy	N/A
Hasler et al. (2004)	At least 4 binges (in a discrete period of time, a larger amount of food than most people would eat) over 1 year with loss of control and subsequent distress	Semi-structured diagnostic interview	$N = 4547$ f: 2,346 m: 2201	8.4	Community-based young adults, Zurich, Switzerland	N/A (only associations between being overweight and psychopathology)
Hay (2003)	RBEg Episode of eating an unusually large amount of food in one go with loss of control at least weekly for 3 months	Face-to-face interview, questions modeled on the EDE	$N = 3010$ f: 1,801; m: 1209	2.6	Community based, Australia	SF-36: quality-of-life scores in mental -and physical health component, most subscales RBEg<no RBE
Crow et al. (2002)	RBEg DSM-IV criteria but frequency, yet at least 1 day per month for 6 months	Face-to-face interview, using the SCID-I	$N = 385$ (all female)	8.6	Women diagnosed with full- or partial syndrome forms of AN, BN, BED, United States	N/A
Westenhoefer (2001)	At least 2 defined binges per week	Self-administered self-report questionnaire	Several different samples	1990 f: 1.5 m: 2.4 1997 f: 4.1–4.6 m: 0.7–1.5	Community based, West Germany	N/A
Striegel-Moore et al. (2000b)	RBEg BE at least twice per week for 3 months	Telephone interview, EDE	$N = 1629$ (black, all female)	4.5	Black and white women, community based, United States	Psychiatric symptoms (GHQ): RBEg > HC

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Table 1. (Continued)

Author	Definition	Assessment	Total sample (*N*)	Prevalence rate (%)	Population	Psychopathology
			$N = 5741$ (white, all female)	2.6		
Kinzl et al. (1999)	1) BE—subjective loss of control during BE episodes	Telephone interview, eating patterns defined by Spitzer et al. (1991)	$N = 1000$, all female	1) 12.2	Women, community based, Austria	N/A
	2) BE syndrome—in addition to frequent BE, at least 3 of 6 behavioral symptoms (e.g. eating rapidly, eating when not hungry, eating alone)			2) 8.4		
Cotrufo et al. (1998)	1) Partial syndrome BED—DSM-IV criteria (Appendix B) without criteria (ii) or (iv)	Face-to-face interview, diagnosis according to DSM-IV	$N = 919$ all female	1) 0.4	Female adolescent students, southern Italy	Somatic symptoms, anxiety, social dysfunction, depression (GHQ-28): 1) + 2) > HC
	2) Subclinical BED—DSM-IV criteria (Appendix B) without criteria (ii) and (iv)			2) 0.4		
Striegel-Moore et al. (1998)	1) Recurrent episodes of BE at least once but less than twice per week over 6 months	Face-to-face interview, EDE, EAT, EDI	$N = 3287$	1) f: 2.4 m: 1.2	Obese, community based, United States	Low self-esteem: HC<2 = 1<BED Sadness: HC<1<BED Body image disturbance: Difference between current and ideal size + weight dissatisfaction: HC = 2<1 = BED Weight importance: HC = 2<1<BED
	2) Recurrent episodes of overeating at least twice per week over 6 months without loss of control over these eating episodes			2) f: 0.6 m: 1.2		

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Hay (1998)	Episode of eating an unusually large amount of food in one go with loss of control at least weekly for 3 months	Face-to-face interview, questions modeled on the EDE (Fairburn & Cooper, 1993)	$N = 3001$ f: 1,785; m: 1216	3.2	Community based, Australia	N/A
Basdevant et al. (1995)	Association of episodic overeating (in a discrete period of time, a larger amount of food than most people would eat) with loss of control over 6 months	Face-to-face interview, self-report questionnaire (French translation of Spitzer et al., 1993)	1) $N = 447$ all female	1) 2.0	1) Women, community based	N/A
			2) $N = 292$ all female	2) 20.8	2) Normal weight to obese women, seeking help for weight control (private practice), France	
de Zwaan et al. (1994)	1) Overeating without the feeling of loss of control	Face-to-face interview, structured interview (wording suggested in the questionnaire on eating and weight patterns; Spitzer et al., 1992)	$N = 100$	1) 15.0	Overweight to obese women, treatment seeking, Austria	N/A (only difference between full BED and other groups)
	2) Overeating with the sense of loss of control without the frequency and time criteria for a diagnosis of BED (DSM-IV)			2) 20.0		
Ledoux et al. (1993)	RBEg: Eating a large amount of food with the fear of not being able to stop at least twice per month for 12 months	Self-administered self-report questionnaire	$N = 3287$	f: 9.8; m: 7.2	Adolescents, non-treatment seeking, France	Depressiveness: HC<RBEg Body dissatisfaction: HC<RBEg
Severi et al. (1993)	Proposed BED criteria by Wilson & Walsh (1991) for the DSM-IV	Clinical face-to-face interview	$N = 75$ f: 55 m: 20	f: 27.0 m: 18.0	Obese children and adolescents, treatment seeking, Italy	N/A

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Table 1. (Continued)

Author	Definition	Assessment	Total sample (*N*)	Prevalence rate (%)	Population	Psychopathology
Spitzer et al. (1992)	1) Episodic overeating—Episodic overeating for 6 hours a months	Self-administered questionnaire for self-report or telephone interview	a) $N=723$	1) a) 59.5; b) 19.3; c) 86.0	a) 8 samples of weight control programs and former weight control programs	N/A
	2) BE—episodic overeating with feeling of loss of control at least twice a week for 6 months		b) $N=1{,}031$	2) a) 45.9; b) 6.3; c) 83.3	b) 3 community samples	
	3) BE syndrome—in addition to frequent BE during most episodes, at least 3 associated symptoms (eating: more rapidly, until uncomfortably full, when not hungry, unstructured, alone because embarrassed, feeling guilty)		c) $N=230$	3) a) 43.3; b) 4.9; c) 82.4	c) 1 sample from a self-help group (Overeaters Anonymous)	
	4) BE syndrome + distress—in addition to BE syndrome feelings of great distress for 6 months			4) a) 37.9; b) 2.1; c) 78.2	United States	
	5) BED–BE syndrome + distress for 6 months at least twice a week			5) a) 30.1; b) 2.0; c) 71.2		
Bruce and Agras, (1992)	1) BED—DSM-III-R criteria for BN excluding purging behavior	Telephone interview, structured interview according to DSM-III-R criteria for BN excluding purging behavior	$N=455$ all female	1) 1.8	Women, community based, United States (San Francisco Bay Area)	N/A
	2) BE—DSM-III-R criteria for BN excluding purging behavior and frequency criterion			2) 3.8		

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	3) EDNOS—meeting some, but not all, criteria for BED or BE			3) 6.6		
Marcus et al. (1985)	1) Serious problem with BE with BES score > 27 2) Moderate problem with BES score > 17	Self-report questionnaire BES	$N = 432$	1) 46.0 2) 36.0	Treatment-seeking women, Pittsburgh, United States	N/A

Notes: ED: Eating disorder; BED: binge eating disorder; BE: binge eating; BN: bulimia nervosa; AN: anorexia nervosa; EDNOS: eating disorder not otherwise specified; RBEg: recurrent binge eating group in specific study; f: female, m: male; =: no significant difference, </>: significant difference; HC: healthy controls; N/A: not applicable.
Assessment Instruments: EDE: Eating Disorder Examination (Fairburn & Cooper, 1993); EAT: Eating Attitude Test (Garner, Olmsted, Bohr, & Garfinkel, 1982); EDI: Eating Disorder Inventory (Garner, Olmsted, & Polivy, 1983); M-CIDI: Munich Composite International Diagnostic Interview (Wittchen et al., 1995); BES: Binge Eating Scale (Gormally, Black, Daston, & Rardin, 1982); EDE-Q: Eating Disorder Examination-Questionnaire (Fairburn & Beglin, 1994); GHQ: General Health Questionnaire (Goldberg, 1978); GHQ-28: General Health Questionnaire (Goldberg & Williams, 1988); SF-36: Quality of Life (Ware, Kosinski, & Keller, 1994); SCID-I: Structured Clinical interview for DSM-IV Axis I disorders (First, Spitzer, Gibbon, & Williams, 1995).

disorders, affective disorders, mixed anxiety-depression, hypochondriasis, somatization disorder, conversion disorder and pain disorder, substance abuse and dependence, bulimia, anorexia nervosa, and some childhood disorders (separation anxiety, attention-deficit and disruptive behaviour disorders, elimination disorders).

Test–retest reliabilities of the F-DIPS for classes of mental disorders (e.g. anxiety disorders, eating disorders) were between 0.64 and 0.89 for Cohen's kappa and between 0.65 and 0.94 for Yule's Y coefficient. For eating disorders kappa was 0.89 and Yule's Y coefficient was 0.94 (Schneider & Margraf, in press).

The diagnostic criteria for RBE were developed according to the Oxford Criteria of Fairburn et al. (1993) or respectively the DSM-IV, (APA, 1994) and included eating an unusually large amount of food and feeling loss of control at least twice weekly over a period of 3 months. Thus RBE was defined using the same categorical questions designed to diagnose BN, which asked about subjective, uncontrollable eating attacks, the duration and frequency of episodes, and compensatory behaviour (see Appendix A for the specific questions used). Subjects who in the last 3 months experienced eating attacks twice a week with a subjective loss of control that extended over a discrete period of time, for example 2 hours, and who did not engage in compensatory behaviour were categorized as suffering from RBE. The DSM-IV criteria, however, are not comparable to those of the Eating Disorder Examination, EDE (Fairburn & Cooper, 1993), which is more detailed and comprehensive in assessing disordered eating behaviour.

Women with RBE according to the F-DIPS (Margraf, Schneider, Soeder, Neumer, & Becker, 1996) were compared to women with other mental disorders (excluding EDs), women suffering from AN or BN, a group of healthy women, and a group of obese women without mental disorders. All members of the RBE group had normal weight and none of the obese women reported RBE, so there was no overlap between these study groups. Women were included in the obese group when their self-reported height and weight resulted in a BMI of 30 kg/m^2 or more. All 1877 women could be unambiguously assigned to one of the study groups. All study groups were described by demographic characteristics, comorbidity with specific mental disorders, and questionnaires of general psychopathology.

Psychopathological symptoms were assessed through two self-report questionnaires: the Beck Anxiety Inventory, BAI (Beck, Epstein, Brown, &

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Table 2. Socioeconomic status (SES)

SES	Activity/Job
High	Employee with management function, senior official, freelance graduate work
Middle	Foreman/forewoman, master craftsman/craftswoman, employee with skilled or highly qualified job, low- or middle-ranking official, self-employed in trade and industry or farming
Low	Unemployed, housewife/houseman, pensioner, job-creation measure, retraining, honorary position, worker, employee with low job skills, trainee, working member of family

Steer, 1988); German version by Margraf and Ehlers, (in press) and the Beck Depression Inventory, BDI (Beck, Steer, & Garbin, 1988a), German version by Hautzinger Bailer, Worall, & Keller (1995), and through the Symptom-Check-List, 90 Revised (SCL-90R) (Derogatis, 1977). The questionnaires possess good psychometric properties such as internal consistency, reliability, and convergent validity (Beck, Epstein, Brown, & Steer, 1988; Beck et al., 1988a; Essau, Groen, Conradt, Turbanisch, & Petermann, 2001; Franke, 1992, 1995; Franke & Staecker, 1995; Kammer, 1983; Lukesch, 1974; Margraf & Ehlers, in press). Most of them are used in studies of obesity and binge eating (de Zwaan et al., 1994). Data were analysed using SPSS 12.0.1 (SPSS, Inc., Chicago, IL, USA).

Lifetime prevalence at baseline denotes the rate of the disorder and covers the respondents' lifetime period prior to baseline assessment. Baseline prevalence refers to percentage of persons having the disorder within the respondents' 7-day period prior to assessment.

Prevalences were always tested by separately comparing RBE patients with the other study groups. Associations with comorbid disorders are described using odds ratios (OR) including 95% confidence intervals (CI). Corresponding significance tests were performed using Fisher's exact test, as cell sizes for estimated frequencies were often small (i.e. less than five). It should be mentioned that this test gives rather conservative confidence levels. No corrections for multiple testing were made. Psychopathology scores obtained from questionnaires were also tested by separately comparing RBE patients with the other study groups.

RESULTS

Prevalences of RBE, AN or BN, Obesity and Other Mental Disorders

According to the F-DIPS, point prevalence rates were 0.9% ($N = 17$) for RBE, 0.4% ($N = 8$) for AN, 0.5% ($N = 9$) for BN, 1.5% ($N = 28$) for obesity, and 18.8% ($N = 352$) for all other mental disorders. RBE subjects were significantly heavier than women with other mental disorders and anorectic women, and significantly lighter than obese women (Table 3). Also the women with RBE were less likely to be involved in a relationship than healthy women or women with mental disorders other than EDs.

The SES categories were similarly distributed across the study groups: Most women were categorized into the middle SES category (Table 3). On average one third of the individuals were classified as having low SES and about 8% as high.

Comparisons between RBE and the Other Study Groups Regarding Comorbid Disorders

Table 4 shows odds ratios and results of Fisher's exact tests for the comparison between RBE and each of the other study groups. Comparing comorbid disorders between RBE and the healthy sample is only possible for lifetime prevalence and not for point prevalence, as the healthy group was defined as having no point prevalence of any comorbid disorder at the time of assessment. Compared to the healthy sample, having an RBE was associated with higher lifetime prevalences of comorbid disorder (OR = 8.21, CI = 3.07–21.96), anxiety disorder (OR = 5.43, CI = 2.04–14.46), affective disorder (OR = 5.59, CI = 2.03–15.37), and EDs (OR = 11.54, CI = 3.60–37.03).

Subjects with RBE did not differ from women with mental disorders other than EDs with respect to comorbid disorders and affective disorders. Relative to this sample, RBE was associated with a lower point and lifetime prevalence of anxiety disorder (OR = 0.07, CI = 0.02–0.19 for point prevalence; OR = 0.07, CI = 0.03–0.20 for lifetime prevalence) and an elevated lifetime prevalence of EDs (OR = 8.02, CI = 2.30–28.01).

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Table 3. Sample characteristics

Diagnosis	Total sample *N*/%	Age[a] (*SD*)	BMI[b] (*SD*)	In relationship[c]	SES[d]
RBE	17/0.9	20.8 (1.8)	22.5 (3.0)	35.3	35.3/58.8/5.9 ns
Healthy	1,463/77.9	21.4 (1.9) ns	21.0 (2.5) ns	66.2**	30.2/61.5/8.3 ns
MDs without EDs	352/18.8	21.2 (1.9) ns	20.9 (2.5)*	68.8**	32.6/58.0/9.4 ns
Ob	28/1.5	21.9 (1.6) ns	33.7 (3.3)***	53.6 ns	57.1/42.9/0.0 ns
BN	9/0.5	21.3 (1.3) ns	21.9 (2.6) ns	33.3 ns	33.3/55.6/11.1 ns
AN	8/0.4	20.9 (1.1) ns	17.6 (1.2)***	75.0 ns	31.2/60.4/0.0 ns
Total	1,877/100	21.3 (1.9)	21.2 (2.9)	66.1	31.2/60.4/8.3

Notes: RBE: recurrent binge eating; MDs: mental disorders; EDs: eating disorders; Ob: obesity; BN: bulimia nervosa; AN: anorexia nervosa; *SD*: standard deviation; significances are based on separate *t* tests between RBE patients and the corresponding other study group.
[a] Mean in years, significance levels based on *t* tests assuming non-equal group variances.
[b] Body mass index kg/m^2, significance levels based on *t* tests assuming non-equal group variances.
[c] in percent, significance levels based on Fisher's exact test.
[d] SES: socioeconomic status in percent, high/middle/low; significance levels based on chi-square tests; ns: $p > 0.05$.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

The comparison of the RBE sample with obese women revealed the following results: RBE and obese subjects only differed regarding lifetime prevalence of EDs. Whereas 24% of all RBE subjects suffered from EDs in their lifetime, none did so in the obese group.

RBE subjects suffered less from any comorbid lifetime disorder than BN patients (OR = 0.09, CI = 0.01–0.87) and also suffered less from an ED during their lifetime compared to patients with either AN or BN. Further, none of the RBE subjects suffered from a current or lifetime substance abuse disorder.

General Psychopathology

As shown in Table 5, RBE individuals did not differ from women with mental disorders other than EDs, from obese women, or from women with AN or BN with respect to most measures of general psychopathology. The only exception concerns the significantly higher number of psychopathological symptoms of women with RBE compared to obese women as reflected in the Positive Symptom Total (PST) Score of the SCL-90 (Derogatis, 1977; Franke, 1995), $t(35.62) = 2.23$, $p < 0.05$). Compared to healthy women, psychopathological symptoms were all higher in RBE subjects. On the SCL-90R, women with RBE showed significantly more intense symptoms (Global Severity Index (GSI), $t(16.21) = 2.58$, $p < 0.05$, more frequent positive symptoms, PST: $t(16.26) = 3.05$, $p < 0.05$, and more distress, Distress Index, PSDI: $t(16.46) = 2.37$, $p < 0.05$, due to these symptoms than the healthy control group. This pattern of elevated psychopathology compared to healthy subjects also manifested itself in elevated anxiety, BAI: $t(16.37) = 2.36$, $p < 0.05$ (Beck, Epstein, Brown, & Steer, 1988; J. Margraf & Ehlers, in press), and depressive scores, BDI: $t(16.24) = 2.08$; $p < 0.05$ (Beck et al., 1988a; Hautzinger, Bailer, Worall, & Keller, 1995).

DISCUSSION

This study found that RBE affects a considerable number of young women in the general population (point prevalence: 0.9%). In comparison to studies that used comparable methods in non-clinical populations, our estimates of the RBE prevalence are lower than those reported by Hay (1998, 2003) in community-based populations in Australia (3.2% and 1.8%, respectively), but higher than those reported by Cotrufo, Gnisci, and Cabuto (2005) in Italy, which might be due to their small sample size but corroborate data gathered by Cotrufo et al. (1998). This result seems to underline the possible pattern of lower prevalence rates of BED-like symptoms in Europe. Given the various definitions of partial syndromes, however, it would be premature to draw ultimate conclusions about the prevalence of RBE.

Our analyses provide further information about the clinical features and the clinical impact of RBE. In our study, all RBE individuals were of normal weight. This result challenges findings of other studies, in which RBE is accompanied by obesity

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Table 4. Comorbidity Rates of RBE Compared with Different Study Groups

Disorder	RBE ($N=17$)		Healthy ($N=1{,}463$)		RBE vs. healthy			MD without ED ($N=352$)		RBE vs. MD without ED			Ob ($N=28$)		RBE vs. Ob			AN ($N=8$)		RBE vs. AN			BN ($N=9$)		RBE vs. BN		
	n	%	*n*	%	OR	(95% CI)	*p*	*n*	%	OR	(95% CI)	*p*	*n*	%	OR	(95% CI)	*p*	*n*	%	OR	(95% CI)	*p*	*n*	%	OR	(95% CI)	*p*
ComD																											
PP	6	35.3	0	0	[d]			81	23	1.83[b]	(0.66–5.09)	ns	5	17.9	2.51[b]	(0.63–10.08)	ns	4	50.0	0.55[b]	(0.01–3.00)	ns	6	66.7	0.27[b]	(0.05–1.50)	ns
LP	7	41.2	115	7.9	8.21	3.07–21.96	***	206	58.5	0.5	(0.19–1.33)	ns	8	28.6	1.75	(0.49–6.21)	ns	5	62.5	0.42[b]	(0.08–2.36)	ns	8	88.9	0.09[b]	(0.01–0.87)	*
AnxD																											
PP	6	35.3	0	0	[d]			314	89.2	0.07[b]	(0.02–0.19)	***	6	21.4	2.00[b]	(0.52–7.66)	ns	3	37.5	0.91[b]	(0.16–5.20)	ns	5	55.6	0.44[b]	(0.08–2.27)	ns
LP	7	41.2	167	11.4	5.43	2.04–14.46	**	320	90.9	0.07[b]	(0.03–0.20)	***	15	53.6	0.61	(0.18–2.05)	ns	3	37.5	1.17[b]	(0.21–6.56)	ns	5	55.6	0.56[b]	(0.11–2.86)	ns
AffD																											
PP	2	11.8	0	0	[d]			26	7.4	1.67[b]	(0.36–7.71)	ns	0	0	[a]		ns	1	12.5	0.93[b]	(0.07–12.11)	ns	2	22.2	0.47[b]	(0.05–4.03)	ns
LP	6	35.3	130	8.9	5.59	2.03–15.37	**	102	29	1.34[b]	(0.48–3.71)	ns	6	21.4	2.00[b]	(0.52–7.66)	ns	4	50.0	0.55[b]	(0.01–3.00)	ns	3	33.3	1.01[b]	(0.20–6.01)	ns
SubD																											
PP	0	0	0	0	[d]			14	4	[a]		ns	0	0	[c]			0	0	[c]			1	11.1	[a]		ns
LP	0	0	9	0.6	[a]		ns	21	6	[a]		ns	1	3.6	[a]		ns	1	12.5	[a]		ns	1	11.1	[a]		ns
ED																											
LP	4	23.5	38	2.6	11.54	3.60–37.03	**	13	3.7	8.02[b]	(2.30–28.01)	**	0	0	[a]		*	8	100.0	[a]		***	9	100	[a]		***

Notes: ComD: comorbid disorders; AnxD: anxiety disorders; AffD: affective disorders; SubD: substance disorders; ED: eating disorders; RBE: recurrent binge eating; PP: point prevalence; LP: lifetime prevalence; *p*: *p* values are based on Fisher's exact test, ns: $p > 0.10$.
OR: odds ratios; CI: 95% confidence interval.
[*] $p < 0.05$.
[**] $p < 0.01$.
[***] $p < 0.001$.
[a] Odds ratio not calculable as at least one cell frequency is zero.
[b] At least 1 cell has expected count less than 5.
[c] No subjects with SubD in either group and hence neither odds ratio nor *p* value calculable.
[d] No analysis performed as the healthy sample by definition has no point prevalence of other mental disorders.

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Table 5. Planned comparisons between RBE and other study groups

	RBE			Healthy				MD without ED				Ob				BN				AN			
	N	*M*	*SD*	*N*	*M*	*SD*	*p*	*N*	*M*	*SD*	*p*	*N*	*M*	*SD*	*p*	*N*	*M*	*SD*	*p*	*N*	*M*	*SD*	*p*
SCL GSI	17	0.53	0.36	1456	0.29	0.27	*	352	0.54	0.45	ns	28	0.34	0.36	ns	8	0.69	0.43	ns	8	0.48	0.28	ns
SCL PST	17	31.35	16.26	1463	19.29	13.62	**	352	29.59	17.33	ns	28	19.93	17.32	*	9	33.33	14.92	ns	8	31.38	15.04	ns
SCL PSDI	17	1.42	0.29	1458	1.25	0.33	*	352	1.47	0.41	ns	28	1.39	0.42	ns	8	1.59	0.50	ns	8	1.30	0.23	ns
BDI	17	7.24	5.80	1455	4.63	4.67	*	350	8.19	6.50	ns	28	6.86	6.18	ns	9	12.89	8.04	ns	8	11.25	7.17	ns
BAI	17	6.53	4.32	1459	4.04	4.32	*	351	7.55	7.44	ns	28	5.46	7.75	ns	9	9.22	9.32	ns	8	6.25	4.43	ns

Notes. SLC: Symptom Checklist, German version (Franke, 1995); GSI: Global Severity; PST = positive symptom total; PSDI: Distress Index; BDI: Beck Depression Inventory, German version (Hautzinger, Bailer, Worall, & Keller, 1995), BAI: Beck Anxiety Inventory, German version (Margraf & Ehlers, in press); RBE: recurrent binge eating; MD: mental disorder; ED: eating disorder; Ob: obesity; BN: bulimia nervosa; AN: anorexia nervosa; *M*: mean; *SD*: standard deviation; *p*: significance level for comparison between RBE and the corresponding sample based on a *t* test; ns: $p > 0.10$. * $p < 0.10$. No attempts were made to adjust for multiple comparisons.
* $p < 0.05$.
** $p < 0.01$.

(Engström & Norring, 2001; Johnson, Roberson-Nay, Rohan, & Torgrud, 2003; Striegel-Moore et al., 2000; Wilfley et al., 2000; Yanovski, Nelson, Dubbert, & Spitzer, 1993). We assessed RBE in young women, which means that they might have been assessed at the beginning of the development of disordered eating behaviour, and weight gain might not yet have been that excessive. To find out whether these women are on the verge of developing obesity as suggested by Fairburn (1999), longitudinal studies are required.

Our findings show that, similar to partial syndromes of AN and BN (Dancyger & Garfinkel, 1995; Kruger, McVey, & Kennedy, 1998; Lask, Waugh, & Gordon, 1997; Pinkston et al., 2001), partial syndromes of BED can also affect individuals profoundly.

In our study a broad range of psychopathological symptoms and anxiety and depression ratings indicated elevated distress in RBE individuals compared to healthy women. RBE individuals were more comparable to women with mental disorders other than EDs, obese women, and women with AN or BN with respect to most general psychopathology measures. These results underline past findings about general psychological distress from clinical samples in our non-treatment-seeking population of women with RBE (Fichter, Quadflieg, & Brandl, 1993; Masheb & Grilo, 2000; Wilfley et al., 2000).

Women with RBE were more affected by comorbidity with mental disorders than healthy women and were comparable to women with mental disorders other than EDs. Specifically, RBE subjects were burdened with a higher probability of suffering from any lifetime comorbid mental disorder, in particular anxiety disorders and affective disorders, compared to healthy control groups. Note that this cannot be due to obesity, as all of the subjects in the RBE group were of normal weight.

Our results further corroborate data about comorbid mental disorders in full-blown BED in clinical and non-clinical populations obtained by Telch and Stice (1998) and Wilfley, Pike, Dohm, Striegel-Moore, and Fairburn (2001). But in contrast to Telch and Stice (1998), we found in our RBE subjects an elevated probability of suffering specifically from anxiety and affective disorders compared to healthy women. Compared to the data of Wilfley et al. (2001), we report lower point and lifetime prevalence of affective disorders, but higher rates of anxiety disorders overall. This could be due to the mean age of 30 years in the Wilfley et al. sample, which corresponds to an age at which elevated rates

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of affective disorders are more common in general. The elevated estimates of anxiety disorders in our RBE subjects seem to be an inherent characteristic of our specific population of young adults (see also Becker et al., 2001).

RBE subjects were further characterized by a higher lifetime prevalence of EDs than any other study group except the women with AN or BN. Hence the question arises whether RBE is a relict of a former ED as suggested by Wade, Bergin, Tiggemann, Bulik, and Fairburn (2006), a stable disordered eating behavior, or a precursor of subsequent BED as hypothesized by, for example Crow, Agras, Halmi, Mitchell, and Kraemer (2002) and Stice, Agras, and Hammer (1999). So far, there has been only one general population survey that reveals information about the long-term course of RBE, pointing to a possible chronicity from adolescence to middle adulthood (Hay, 2003). Thus, it seems too early to draw conclusions about the long-term course of RBE.

Several caveats should be borne in mind when interpreting our findings. It is possible that the prevalences presented here might underestimate the true population figures because of the problem of non-participation of those at risk for mental disorders (Beglin & Fairburn, 1992; Hoek & van Hoeken, 2003). A further limitation is that data about specific ED behavior was limited because the Dresden study was not specifically designed to investigate EDs and hence concerns about shape and weight and full-syndrome BED were not assessed. Further the sample sizes of the women with AN, BN, obesity and RBE were quite small. To strengthen the validity of the present findings, future studies in the community should consider larger sample sizes and should also include men, as the sex ratio of RBE in a community is thought to be equal (Hay, 2003).

A final caution relates to the special situation of young women who were interviewed shortly after the unification of East and West Germany. The response rate (36.1%) was quite low, and the reason is probably rooted in the context of the study, which was conducted in Dresden (former East Germany). Because of economic and other problems stemming from the transformation of the political system following the demise of communism, many were unwilling to participate in psychiatric studies (see also Maercker & Herrle, 2003). Specific reasons for non-participation included the scarcity of telephones at the time of the assessment (mid 1990s), high levels of economic migration to other parts of Germany, and a general reluctance to allow personal data to be reported. This may limit the validity of our results.

Bearing in mind the aforementioned limitations, our data show that young women with RBE from the general population show psychological distress in terms of general psychopathology symptoms and comorbid mental disorders. This association has already been established in patients with partial AN or BN. Future research should focus on the longitudinal course of RBE as a syndrome of clinical relevance. Given the promising treatments for BED, steps can be taken to reduce barriers to identifying and treating women with RBE (see e.g. Wonderlich, de Zwaan, Mitchell, Peterson, & Crow, 2003). And because in Europe eligibility for treatment covered by health insurance often depends on diagnostic status, a re-evaluation of the severity criterion of BED is warranted.

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APPENDIX

F-DIPS (Margraf, Schneider, Soeder, Neumer, & Becker, 1996) research questions from the section on bulimia nervosa used to assess recurrent binge eating (RBE)

1. Have you had in the last 7 days binges or episodes of ravenousness, during which you ate a large amount of food within a short period? Please describe exactly what and how much you eat during a typical binge. How long does it take on average?
2. During these binges do you have the feeling that you cannot control what and how much you are eating?
3. Have you had these binges at least twice a week for 3 months?

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