Chapter #14

EXPLORING BINGE EATING SYMPTOMATOLOGY IN A GENERAL POPULATION SAMPLE

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ABSTRACT

Binge Eating Disorder (BED) is characterised by the consumption of large amounts of food in a relatively short period of time without compensatory behaviour, such as purging or compulsive exercise. Much of what is known about BED comes from studies of overweight or obese treatment seeking individuals, although around one third of those with BED are in the non-obese weight range. This study examined the predictors of BE symptomatology among those in the normal body mass index (BMI) range (n=223; 88.3% female; mean age 28.7 years) and the overweight / obese BMI range (n=179; 85.5% female; mean age 32.9 years). Participants completed an online questionnaire comprising self-report measures of physical and psychological health, demographics and height and weight. Hierarchical regression analysis indicated that the significant predictors of binge eating symptomatology for those in the normal weight range were age, sex, self esteem, shape concerns, and dietary restraint, accounting for about 71% of variance in the severity of BE symptomatology. For those in the overweight or obese BMI range, sex, emotional regulation, and shape concerns were the only significant predictors, accounting for around 68% of variance in the severity of BE symptomatology. The findings have implications for treatment of individuals with BE symptomatology.

Keywords: binge eating, body mass index, self esteem, restraint.

1. INTRODUCTION

Binge Eating Disorder (BED) was first recognized as a formal diagnostic category in the fifth edition of the Diagnostic and Statistical Manual for Mental Disorders (DSM-5; American Psychiatric Association [APA], 2013). The diagnostic criteria for BED do not currently include overvaluation of weight and shape, considered transdiagnostic criteria for eating disorders by many (e.g., Fairburn, 2008). It is a common misconception that all of those with BED are overweight or obese, and the majority of research concerning BED has focused on samples that are overweight or obese, limiting the generalisability of findings to non-obese samples.

There is evidence for the usefulness of both cognitive behaviour therapy and pharmacotherapy interventions to treat BED however not all of those with BED respond to these interventions. Participants in published randomised-controlled treatment trials for BED are overwhelmingly female, with body mass indices (BMI) in the overweight or obese range, and selected for the absence of psychological or physical comorbidities (Brownley et. al., 2016). This is concerning as this does not represent the characteristics of the majority of those with BED, who frequently have comorbid physical and psychological conditions, about one third of whom are in the underweight or normal weight range (Kessler et al., 2013), and where the lifetime prevalence of BED among males is closer to that of females than for other eating disorders (2.0% and 3.5% for males and females

respectively; Hudson, Hiripi, Pope & Kessler, 2007). Understanding the factors that contribute to the etiology and maintenance of BED in broader community samples is important for developing effective treatments for this disabling condition. The current study sought to examine the predictors of BE symptomatology separately among community samples in the normal weight BMI range and in the overweight / obese BMI range.

2. BACKGROUND

Although the fourth edition of the Diagnostic and Statistical Manual for Mental Disorders (DSM-IV; American Psychiatric Association [APA], 1994) included research criteria for BED, the condition was not recognized as an eating disorder until the publication of the fifth edition of the DSM in 2013 (APA, 2013). The current diagnostic criteria for BED require that an individual has recurrent episodes of binge eating (BE), in which they consume an amount of food much larger than most people would eat in the same discrete time period, at least weekly for three months. The BE is associated with a perception of lack of control and distress, and is characterised by at least three of the following: rapid eating; eating until uncomfortably full; eating when not hungry; eating alone; and experiences of self-disgust, depression or guilt following the eating. Importantly, individuals with BED do not engage in the compensatory behaviours that characterise Bulimia Nervosa (BN; APA, 2013). Although transdiagnostic approaches to understanding the etiology, maintenance and treatment of eating disorders posit that overvaluation of shape and weight are transdiagnostic characteristics of all eating disorders (e.g., Fairburn, 2008), they are not included in the DSM-5 diagnostic criteria for BED (APA, 2013). However, accumulating evidence supports the inclusion of these diagnostic criteria for BED (e.g., Yiu, Murray, Arlt, Eneva, & Chen, 2017).

BED is the most common of the eating disorders with lifetime prevalence close to 2% compared to about 1% for BN (Kessler et al., 2013). Although the likelihood of having a BED diagnosis is two to three times higher for females than males, the prevalence of BED among males is much higher than other eating disorders (Kessler et al., 2013). Comorbidity of both psychological and physical conditions with BED is also very high. Based on analysis of a large international data set, Kessler et al. (2013) reported that almost four in five (79%) of those who met research criteria for BED also met criteria for another DSM-IV disorder and those with BED also had an increased risk of physical problems such as musculoskeletal conditions, diabetes, hypertension, ulcers, and chronic headache. Kessler, et al. (2014) reported that the presence of BED was associated with poorer work and family outcomes, and that these effects were eliminated when the presence of comorbid conditions was statistically controlled. Many of the conditions commonly comorbid with BED are associated with high body weight, and it is a common misconception that all of those with BED are overweight or obese (Fairburn, Cooper, Doll, Norman, & O'Connor, 2000).

There is substantial evidence that overvaluation of shape and weight are characteristic of BED (Goldschmidt et al., 2010; Mond, 2013; Wilson, 2011) and theoretical accounts of BE include overvaluation of shape and weight as important explanatory variables (e.g., Polivy & Herman, 1985; Fairburn, 2008). The dietary restraint model proposed that BE is a response to overvalued views concerning the importance of slimness that drives excessive dietary restraint which in turn leads to increased vulnerability to subsequent disinhibition and overeating. Dieting is therefore understood to be a risk factor for the development of BE symptomatology, and higher scores on measures of dietary restraint are associated with onset of BED (Stice, Presnell & Spangler, 2002). However, up to 65% of those with BED

do not have a history of dieting (Dingemans & van Furth, 2012) so that all cases of BED cannot be explained by a dietary restraint model.

It has been proposed that obesity is an inevitable consequence of BED, with differences in weight attributed to the duration of the illness or severity of symptoms (Dingemans, Bruna, & van Furth, 2002; Dakanalis, Riva, Serino, Colmegna & Clerici, 2017). However, Carrard, Van der Linden, and Golay (2012) recruited 74 treatment seeking women with BED from the community and compared those with BMI $\geq$30 (obese group; n=30; 40.5%) to those with BMI <30 (non-obese group; n=44; 59.5%) and found that the groups did not differ in age or severity of symptoms but were significantly different on a measure of dietary restraint, with the non-obese group having a higher mean score than the obese group. Thus, dietary restraint appeared to be more important for those in the non-obese BMI range.

The emotion regulation theory of eating disorders proposes that eating disorders characterized by BE, such as BED, BN and AN (binge-purge subtype), are associated with greater difficulty regulating emotional arousal compared to eating disorders in which BE does not occur, such as AN (restricting subtype; McCurdy, 2010). Svaldi, Griepenstroh, Tuschen-Caffier and Ehring (2012) found that those with AN, BN, and BED had higher levels of emotional intensity, lower levels of acceptance of emotion and emotional awareness, and more dysfunctional emotional regulation strategies compared to a sample without eating disorders. In a study involving obese participants with BED, Gianini, White and Masheb (2013) found a significant relationship between problems with emotional regulation and emotional overeating and general eating pathology after controlling for negative affect. Gianni et al. argued that problems with emotional regulation might contribute to the maintenance of emotional overeating and eating behaviour.

Mason and Lewis (2014) examined the interaction between depressive symptoms, eating styles and BMI in predicting BE symptomatology in a large student sample and found that, although BMI was not correlated with BE symptomatology in the overall sample, the combination of high BMI, depression, and emotional or external eating was associated with greater BE symptomatology. For those with higher BMI and lower maladaptive eating style, depressive symptoms were less predictive in determining BE symptomatology.

Stice and Agras (1998) originally proposed a dual-pathway model whereby problems with dietary restraint and/or negative affect may trigger BE behaviour. Stice et al. (2001) identified sub-types defined by eating patterns and by shape and weight concerns in addition to psychopathology. The authors suggested that the mixed dietary restraint/negative affect sub-type was a more severe variant, with more psychopathology, increased impairment and poorer treatment response compared to the subtype characterised primarily by dietary restraint (Stice et al., 2001). Carrard, Crepin, Ceschi, Golay and Van der Linden (2012) examined a sample of 92 women with threshold and subthreshold BED to determine whether sub-types of BED distinguished by presence of dietary restraint or both dietary restraint and negative affect could be identified. Using cluster analysis these authors reported that about 70% of their sample were dietary restraint only, while the remainder had features of dietary restraint and negative affect and that those with negative affect had more severe symptoms, more frequent BE episodes, higher anxiety, greater impulsivity and were more likely to drop out of treatment. Carrard et al. (2012) argued that understanding the sub-types of BED has important implications for directing effective treatments. However, the majority of Carrard et al.'s (2012) participants were overweight or obese, with only 23% of the sample having a BMI in the normal range. More recently,

Mason and Lewis (2015) reported that the dual pathway model explained BE symptomatology equally well for males and females in a college student sample.

Whilst obesity is not a diagnostic criterion for BED, diagnosis of BED has been found to increase with level of obesity (Didie & Fitzgibbon, 2005; Napolitano & Himes, 2011; Stice, Cameron, Killen, Hayward & Taylor ,, 1999). BE symptomatology often precedes the onset of obesity, which suggests that BE may be a contributing factor for obesity (Dingemans & van Furth, 2012; Stice et al., 1999), and there is a high prevalence of BE among those seeking treatment for obesity (Dingemans et al., 2002; Riener, Schindler, & Ludvik, 2006). Further, many studies of BED have focused on obese samples that are primarily or exclusively female and treatment seeking, limiting the generalisability of findings to the broader population with BE symptomatology, who may be normal weight, non-treatment seeking and male. Thus, the current study sought to examine the predictors of BE symptomatology separately among community samples in the normal weight BMI range and in the overweight / obese BMI range.

3. METHOD

3.1. Design and procedure
The study was approved by the institutional Human Research Ethics Committee and employed a cross-sectional correlational design. Prospective participants followed a link to information about the study and a further link to an online questionnaire presented using Qualtrics software. Participants were informed that consent was indicated by completion and submission of the online questionnaire.

3.2. Participants
Participants were 18 years and over and were recruited from first year undergraduate psychology students (29.5%) and from the general community (70.5%). Those in the student sample received course credit for their participation and those in the community sample were offered an opportunity to enter a draw to win one of three $100 store gift vouchers. Of 840 surveys commenced, 454 were submitted, a completion rate of 54%. Of the 454 completed surveys 27 were excluded due to multiple data entry errors ($n= 9$), age below 18 years ($n=1$), survey completion time less than 10 minutes ($n=12$) or presence of outliers ($n=5$). The final sample ($N=427$; 87.8% female) had a mean age of 30.46 years ($SD=10.16$; range: 18 – 70 years). The majority (79%) had some post-secondary education. Participants were divided into two groups based on BMI: Normal (BMI 18.50 - 24.99; $n=223$), Overweight or Obese (BMI >25.00; $n=179$; Department of Health, 2013).

3.3. Measures
3.3.1. Background questions
Participants completed questions concerning age, sex, education level, diagnosed physical and mental illnesses, psychological treatment history, and self-reported health status.

3.3.2. Binge-Eating scale (BES; Gormally et al., 1982)
The BES is a 16-item measure designed to assess BE severity and was originally developed to measure BE in an obese population. The BES includes questions about behavioural and cognitive aspects of BE, where 14 questions have four alternatives and the remaining questions have three alternatives. Total scores on the BES range from 0 to 46,

with scores below 17 indicating low BE, scores 17 to 27 indicating moderate BE and scores above 27 indicating severe BE (Celio, Whilfley, Crow, Mitchell, & Walsh, 2004). The BES has been reported to have good test-retest reliability (r = .87; Timmerman, 1999). The internal consistency in the current sample was good (Cronbach Alpha =.95).

3.3.3. Eating disorders examination questionnaire (EDE-Q) (Fairburn & Beglin, 1994)

The EDE-Q comprises 28 questions about eating disorder symptomatology associated with binge eating, dietary restraint, compensatory behaviours, and shape and weight concerns along with questions concerning height, weight, and menstruation. The EDE-Q provides four subscale scores (Dietary Restraint, Eating Concerns, Weight Concerns, and Shape Concerns) and a Global score which is the average of the four sub-scales. The sub-scale questions are rated on likert scales that range from 0 to 6, where scores on each scale reflect averages across items and therefore also range from 0 to 6, and where higher scores indicate more severe symptomatology. The EDE-Q subscales have adequate internal consistency, with Cronbach Alpha coefficients for the subscales ranging from .57 to .77, with Cronbach Alpha for the EDE-Q Global scale of .79 (Mond, Hay, Rodgers, Owen, & Beumont, 2004). The EDE-Q has demonstrated validity in the assessment of BE in community samples (Mond et al., 2004). In the current sample, the reliability of the instrument was lower than in previous work with Cronbach Alphas of .67 for the EDE-Q Global scale and .65, .69, .71 and .56 for the EDE-Q Restraint, EDE-Q Eating Concerns, EDE-Q Shape Concerns and EDE-Q Weight Concerns subscales respectively.

3.3.4. Depression, anxiety & stress scale-21 (DASS-21) (Lovibond & Lovibond, 1995)

The DASS-21 is a 21-item questionnaire that measures symptoms of depression, anxiety and stress over the past seven days. The scale is comprised of three 7-item sub-scales (Depression, Anxiety and Stress) and all items are measured using a 4-point Likert scale that ranges from 0 to 3. Scores are summed to contribute to three subscales of seven items each, and scores on each sub-scale are doubled so that they range from 0 to 42 for comparison with norms from the original 42 item DASS. The Depression and Anxiety scales have been found to measure features that are unique to depression and anxiety, whilst the Stress scale measures features of both (Antony, Bieling, Cox, Enns, & Swinson, 1998). As such, only the DASS-21 Depression and DASS-21 Anxiety subscales were used for our analyses. The DASS-21 has high internal consistency with Cronbach Alphas for the Depression and Anxiety subscales of .94 and .87 respectively (Antony et al., 1998) and in the current sample internal consistency was high (.94 for the Depression subscale; .89 for the Anxiety subscale).

3.3.5. Satisfaction with life scale (SWLS) (Diener, Emmons, Larsen, & Griffin, 1985)

The SWLS is a 5-item measure of subjective well-being measured on a 7-point Likert scale so that total scores range from 5 to 35 with higher scores suggesting greater satisfaction with life. The SWLS has been found to have high internal consistency and test-retest reliability and scores correlate moderately to highly on other measures of subjective well-being (Diener et al., 1985). In the current sample, Cronbach Alpha was .93.

3.3.6. Rosenberg self esteem scale (RSES) (Rosenberg, 1965)

The RSES is a 10-item measure of self-esteem with scores ranging from 0 to 30 and higher scores reflecting greater self-esteem. Test-retest reliability is high, with correlations of .85 and .88 (Rosenberg, 1965). In the current sample, Cronbach Alpha was .94.

3.3.7. Difficulties in emotion regulation scale (DERS) (Gratz & Roemer, 2004)

The DERS is a 36-item measure that provides a total score and scores for subscales of non-acceptance of emotional responses, difficulties engaging in goal directed behaviour, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity. The total score range is 36 to 180 with higher scores suggesting problems with emotional regulation. Gratz and Roemer (2004) reported intraclass correlation coefficients for test-retest reliability of .88 for the total DERS and in the current sample, Cronbach Alpha was .88 for the total DERS.

3.3.8. Body mass index (BMI)

BMI was calculated based on self-reported height in centimetres and weight in kilograms using the formula $BMI = kg/m2$. The BMI is a reliable index of adiposity (Stice et al., 1999).

4. RESULTS

The data were analysed using the Statistical Package for Social Sciences (SPSS) Version 2. The characteristics of the sample are summarised in Table 1. There was a significant difference between the groups based on BMI in age, where those in the normal BMI range were significantly younger than those in the overweight or obese range. In terms of eating disorder symptomatology, those in the overweight or obese range had significantly higher scores than those in the normal range on EDE-Q shape concerns and EDE-Q weight concerns but significantly lower scores on. EDE-Q eating concerns Overall, there were no differences between the groups on the EDE-Q global score. There was a significant association between BMI group and self-assessed health, where fewer people in the overweight and obese group rated their health as very good or excellent (33.5%) compared to the normal BMI group (46.2%) and more rated their health as fair or poor (36.3%) compared to the normal BMI group (22.9%; see Table 1). There were no other significant differences between the groups based on BMI category.

Table 1.
Characteristics of the Sample (N = 427).

	Normal BMI range (*n* = 223)	Overweight or Obese BMI range (n = 179)	Total (*N*=427)
Mean age in years (SD)	28.7 (9.7)	32.9 (10.6)**	30.6 (10.3)
No. female (%)	197 (88.3)	153 (85.5)	350 (87.1)
No. Physical diagnoses (%)	94 (42.2)	79 (44.1)	173 (43.0)
No. Psych. diagnoses (%)	126 (56.5)	110 (61.5)	236 (58.7)
No. self-assessed health (%)			
Excellent	29 (13.0)	14 (7.8)*	43 (10.7)
Very Good	74 (33.2)	46 (25.7)	120 (29.9)
Good	69 30.9)	54 (30.2)	123 (30.6)
Fair	35 (15.7)	50 (27.9)	85 (21.1)
Poor	16 (7.2)	15 (8.4)	31 (7.7)
BES Total	17.8 (12.9)	20.8 (12.3)*	19.1 (12.7)
EDE-Q Total	5.9 (.86)	6.0 (.72)	6.0 (.80)
EDE-Q Restraint	6.0 (1.5)	5.9 (1.3)	5.9 (1.4)
EDE-Q Eating Concerns	5.9 (1.5)	5.6 (1.5)*	5.7 (1.5)
EDE-Q Shape Concerns	6.1 (1.4)	6.5 (1.3)*	6.3 (1.3)
EDE-Q Weight Concerns	5.7 (1.7)	6.2 (1.4)**	5.9 (1.6)
DASS-21 Depression subscale	13.8 (6.3)	13.4 (5.7)	13.6 (6.0)
DASS-21 Anxiety subscale	12.2 (4.9)	11.7 (4.8)	12.0 (4.9)
SWLS	21 (8.1)	20.1 (8.1)	20.6 (8.1)
RSES	16.7 (7.6)	16.9 (6.7)	16.8 (7.2)
DERS	101.3 (20.9)	97.7 (18.8)	99.7 (20.1)

Note. BMI: Body Mass Index; No. Physical diagnoses: at least one of coronary heart disease, cancer, asthma, bronchitis, osteoporosis, diabetes, irritable bowel syndrome reported; No. Psychological diagnoses: at least one of depression, anxiety, schizophrenia, bipolar disorder reported. BESTotal: Binge Eating Scale Total score; EDE-Q: Eating Disorder Examination-Questionnaire; DASS-21: 21 item Depression, Anxiety and Stress Scale; SWLS: Satisfaction with Life Scale; RSES: Rosenberg Self-Esteem Scale; DERS: Difficulties in Emotional Regulation Scale. * p<.05; **p<.004

Hierarchical regression was used to examine predictors of BES Total in the two samples based on BMI. Data screening was conducted for all variables and univariate outliers were identified by calculating z-scores. Multivariate outliers were assessed by calculating the Mahalanhobis distance with p < .001 and outliers were removed. The data were analysed using parametric tests robust to violations of the assumptions of skewness and kurtosis at sample sizes above $N > 50 + 8m$, where m is the number of predictor variables (Tabachnick & Fidell, 2013). Variables included in the hierarchical regression analysis had multicollinearity < .70, and all variables included in the analyses correlated significantly with BES Total. Only EDE-Q Shape Concerns, rather than both EDE-Q Shape Concerns and EDE-Q Weight Concerns, was included in the analyses because EDE-Q Shape Concerns and EDE-Q Weight Concerns were highly correlated (r=.88, p<.001) and because the internal consistency of EDE-Q Shape Concerns was higher (Cronbach Alpha = .71).

Tables 2 and 3 present the results of hierarchical regression analyses predicting BES Total from age and sex (Step 1), SWLS and RSES (Step 2), DERS and DASS-21 Depression (Step 3), and EDE-Q Restraint and EDE-Q Shape Concerns (Step 4) separately for those in the normal BMI range (Table 2) and those in the overweight and obese BMI range (Table 3). It is apparent that the eight variables account for a similar proportion of the variability in each sample (70.7% for those in the normal BMI range and 67.5% for those in the overweight and obese BMI range). It is also apparent that the significant predictors are somewhat different for the two samples. For those in the normal BMI range, at Step 4 the significant predictors of BES Total were age, sex, RSES, EDE-Q Restraint and EDE-Q Shape Concerns (see Table 2). For those in the overweight and obese BMI range, at Step 4 the significant predictors of BES Total were sex, DERS and EDE-Q Shape Concerns (see Table 3).

Table 2.
Hierarchical Regression Model predicting BES Total – Normal BMI range (N=223).

Predictors	R	Adjusted R^2	R^2 Change	B	SE	β	t
Step 1	0.48	0.22	0.23**				
Age				-.52	.08	-.39	-6.56**
Sex				9.98	2.39	.25	4.17**
Step 2	0.78	0.61	0.38**				
Age				-.18	.06	-.14	-3.00*
Sex				6.04	1.74	.15	3.46*
SWLS				-.17	.10	-.11	-1.74
RSES				-1.01	.11	-.59	-8.95**
Step 3	0.79	0.71	0.01*				
Age				-.14	.06	-.11	-2.23*
Sex				6.08	1.73	.15	3.53*
SWLS				-.03	.12	-.02	-.27
RSES				-.84	.13	-.49	-6.49**
DERS				.04	.04	.06	1.03
DASS-21 Depression				.37	.18	.18	1.99*
Step 4	0.85	0.72	0.10**				
Age				-.13	.06	-.10	-2.30*
Sex				4.21	1.53	.11	2.75*
SWLS				.04	.10	.02	.39
RSES				-.55	.12	-.32	-4.69**
DERS				.05	.03	.08	1.45
DASS-21 Depression				.19	.16	.10	1.15
EDE-Q Restraint				-.74	.34	-.08	-2.16*
EDE-Q Shape Concerns				3.79	.45	.40	8.39**

* $p<0.05$; ** $p<0.001$; BES Total: Binge Eating Scale Total; EDE-Q: Eating Disorder Examination-Questionnaire; DASS-21: DASS-21: 21 item Depression, Anxiety and Stress Scale;; SWLS: Satisfaction with Life Scale; RSES: Rosenberg Self-Esteem Scale; DERS: Difficulties in Emotional Regulation Scale

Table 3.
Hierarchical Regression Model predicting BES Total – Overweight or Obese BMI range (N=179).

Predictors	R	Adjusted R^2	R^2 Change	B	SE	β	t
Step 1	0.43	0.19	0.19**				
Age				-.30	.08	-.26	-3.79**
Sex				12.77	2.38	.37	5.38**
Step 2	0.74	0.54	0.36**				
Age				-.10	.06	-.09	-1.61
Sex				7.90	1.84	.23	4.29**
SWLS				-.22	.11	-.14	-2.01*
RSES				-.98	.14	-.53	-7.21**
Step 3	0.77	0.58	0.05**				
Age				-.07	.06	-.06	-1.23
Sex				7.38	1.76	.21	4.19**
SWLS				-.15	.10	-.10	-1.42
RSES				-.61	.16	-.33	-3.84**
DERS				.13	.05	.19	2.76*
DASS-21 Depression				.35	.19	.16	1.86
Step 4	0.83	0.68	0.10**				
Age				-.10	.05	-.09	-1.91
Sex				4.48	1.60	.13	2.81*
SWLS				-.13	.09	-.09	-1.45
RSES				-.20	.15	-.11	-1.33
DERS				.10	.04	.15	2.52*
DASS-21 Depression				.26	.16	.12	1.58
EDE-Q Restraint				.11	.40	.01	0.27
EDE-Q Shape Concerns				4.25	.58	.44	7.33**

* $p<0.05$; ** $p<0.001$; BES Total: Binge Eating Scale Total; EDE-Q: Eating Disorder Examination-Questionnaire; DASS-21: DASS-21: 21 item Depression, Anxiety and Stress Scale;; SWLS: Satisfaction with Life Scale; RSES: Rosenberg Self-Esteem Scale; DERS: Difficulties in Emotional Regulation Scale

5. DISCUSSION

This study sought to examine predictors of BE symptomatology in a general population sample divided into groups based on BMI. There were significant differences between the groups in age and several measures of eating symptomatology, with the overweight and obese group significantly older, with higher BES Total, EDE-Q Shape Concerns and EDE-Q Weight Concerns, although significantly lower EDE-Q Eating Concerns. There was also a significant association between BMI group and self-assessed health, where the normal BMI range group were more likely to report that their health was very good or excellent and less likely to report that it was fair or poor. This is consistent with extensive literature indicating that BMI in the overweight and obese range is associated with poorer health (e.g., Kessler et al., 2014).

The regression analyses showed that predictors of BE symptomatology varied with BMI, where younger age, female sex, lower self esteem, dietary restraint and shape concerns were significant predictors of higher BES score for those in the normal BMI range, while for those in the overweight and obese BMI range female sex, DERS score, and shape concerns were the only significant predictors. Importantly, low self esteem, considered a transdiagnostic indicator of eating disorder symptomatology (e.g., Le Marne & Harris, 2016), was a significant predictor of BE symptomatology only for those in the normal BMI group. Emotional regulation was independently associated with BE symptomatology only for those in the overweight and obese BMI range and symptoms of depression were not associated with BE symptoms in either group, which is inconsistent with Mason and Lewis' (2014) findings that for those with higher BMI, depressive symptoms were important predictors of BE symptomatology. However, Mason and Lewis (2014) did not measure emotional regulation, which was positively correlated with depression in the present sample (r=.69, p<.001), and when the present analysis was repeated excluding the DERS depression emerged as a significant independent predictor of BES Total. It is suggested that, consistent with emotional regulation theory, BE symptomatology is associated with difficulty regulating emotional arousal after controlling for negative affect, particularly for those in the overweight and Obese BMI range.

The findings provide support for the dual-pathway model. For those in the normal BMI range, bingeing was predicted by restraint, however, for those in the overweight/obese range difficulties with emotional regulation, but not restraint, predicted BE, which is somewhat consistent with the findings of earlier work (Dingemans & van Furth, 2012). Whilst not a key diagnostic marker for BED in terms of DSM-5 criteria, overvaluation of shape was a significant predictor of BE symptom severity in both BMI samples, and this is consistent with the transdiagnostic model of eating disorders (Fairburn, 2008; Goldschmidt et al., 2010; Mond, 2013; Wilson, 2011).

Limitations of the current study must be recognised. Whilst this study gathered information from a large community sample all data was self-report and there was no objective assessment of BMI. However, as the survey was anonymous, the motivation to misrepresent sensitive information in socially desirable ways may be expected to be low. However, replication incorporating objective and externally validated measures is warranted.

7. CONCLUSION

BED has been recognised since the publication of DSM-5 in 2013 as a distinct eating disorder and is associated with significant distress and disability. Developing effective treatments for BED requires that the expression of the condition is well understood. While much previous research on BED has focused on samples in the overweight or obese BMI range the present findings suggest that the predictors of BE are different for those in the normal BMI range. The findings are consistent with earlier work indicating that dietary restraint, shape and weight concerns, and emotional dysregulation are all strongly associated with BE, although the DSM-5 diagnostic criteria for BED do not recognise overvaluation of weight and shape as important contributors to BED. The findings of the present study imply that psychological interventions for BED should focus on dietary restraint for those in the normal BMI range and on improving emotional regulation for those in the overweight / obese BMI range.

6. FUTURE RESEARCH DIRECTIONS

Future research examining the predictors of BED symptomatology in clinical samples stratified by BMI will be important for validating these findings. Research examining the effectiveness of interventions targeted at the factors maintaining BE in those in the normal BMI range and those in the overweight and obese range is also warranted.

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